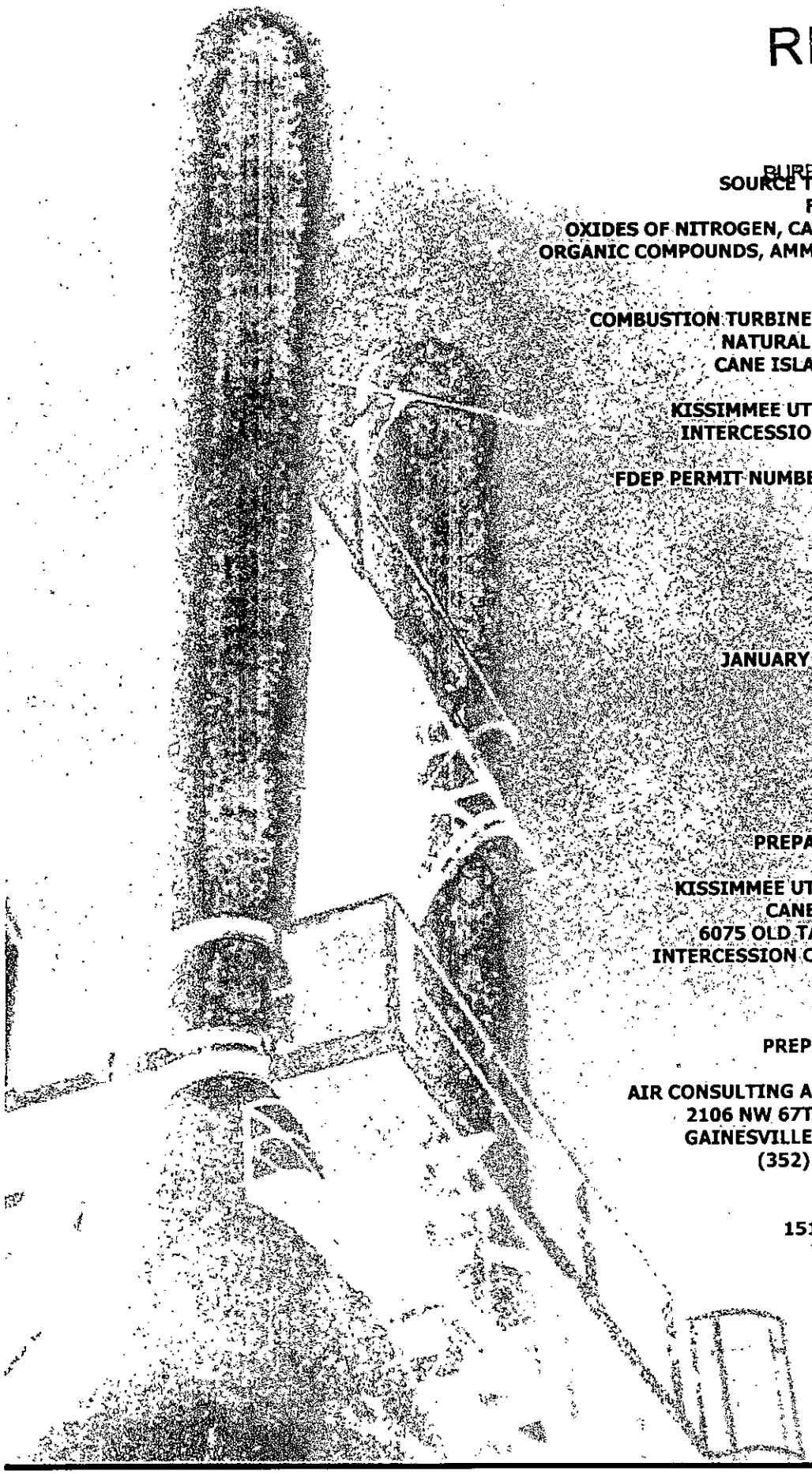


RECEIVED

APR 28 2003

BUREAU OF AIR REGULATION

SOURCE TEST REPORT
FOR
OXIDES OF NITROGEN, CARBON MONOXIDE, VOLATILE ORGANIC COMPOUNDS, AMMONIA AND VISIBLE EMISSIONS

COMBUSTION TURBINE CT-3 WITH DUCT BURNER
NATURAL GAS FIRING
CANE ISLAND FACILITY

KISSIMMEE UTILITY AUTHORITY
INTERCESSION CITY, FLORIDA

FDEP PERMIT NUMBER 0970043-PSD-FL-254

JANUARY 9 & 10, 2002

PREPARED FOR:

KISSIMMEE UTILITY AUTHORITY
CANE ISLAND
6075 OLD TAMPA HIGHWAY
INTERCESSION CITY, FLORIDA 33848

PREPARED BY:

AIR CONSULTING AND ENGINEERING, INC.
2106 NW 67TH PLACE, SUITE 4
GAINESVILLE, FLORIDA 32653
(352) 335-1889

151-02-01

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACE
AIR CONSULTING
& ENGINEERING, INC.

2106 N.W. 67th Place • Suite 4 • Gainesville, Florida • 32653
(352) 335-1889 FAX (352) 335-1891

REPORT CERTIFICATION

To the best of my knowledge, all applicable field and analytical procedures comply with the Florida Department of Environmental Protection requirements and all test data and plant operating data are true and correct.

Dagmar Fick

Dagmar Fick, Mechanical Engineer

2/19/2002

Date

1.0 INTRODUCTION

On January 9 and 10, 2002, Air Consulting and Engineering, Inc. (ACE) performed compliance testing for Oxides of Nitrogen (NO_x)/Oxygen (O_2), Carbon Monoxide (CO), Volatile Organic Compounds (VOC), Ammonia (NH_3) and Visible Emissions (VE) on the Combustion Turbine CT-3 with duct burner at the Cane Island Facility of the Kissimmee Utility Authority (KUA) in Intercession City, Florida.

The purpose of the testing was to demonstrate annual compliance while firing natural gas as specified in the Florida Department of Environmental Protection (FDEP) Operating Permit Number 0970043-PSD-FL-254 (see Appendix A).

Combustion Turbine CT-3 with duct burner was tested using United States Environmental Protection Agency (EPA) Method 20/7E and 3A for NO_x and O_2, EPA Method 10 for CO, EPA Method 25A for VOC, modified EPA Method 26 for Ammonia collection and EPA Method 9 for VE. The fuel analysis was used to calculate SO_2 emissions in pounds per hour.

Mr. Larry Mattern of KUA coordinated testing and provided production data.

Mr. Garry Kuberski of the Florida Department of Environmental Protection (FDEP) witnessed a portion of the test.
Ms Lee Ann Pell and Ms Cindy Mulkey of the FDEP Tallahassee also observed a portion of the test.

2.0 SUMMARY AND DISCUSSION OF RESULTS

CT-3 with duct burner test results were found to be within the allowable standards of the current permit. Table 1 summarizes the emission results.

Oxides of Nitrogen emissions averaged 4.02 ppmvd and 20.13 lbs/hr, which is within the allowable standard of 9.4 ppm_{vd}. Actual CO emissions at 0.58 ppm_{vd} and 1.76 lbs/hr compare well to the permitted value of 20 ppm_{vd}. VOC emissions averaged 0.17 ppm_{vd} as propane, the permitted standard is 4.0 ppm_{vd}. SO_2 emissions calculated by fuel analysis averaged 0.69 lbs/hr. The fuel analysis of the natural gas stream showed 0.15 grains of Sulfur per 100 cubic feet of gas, which is also within the permitted Sulfur content of 20 grains per 100 cubic foot. SO_2 emission calculations are presented in Appendix G along with the fuel analysis and the production data.

Ammonia emissions averaged 0.503 ppm_{vd}, which is within the permitted value of 5 ppm_{vd} (SCR)(see Appendix D for Ammonia data.

Visible emissions, observed concurrently with Run 3, averaged 0.0 percent opacity for the highest six-minute period of each run (see Appendix E for VE data). Permitted opacity is 10%.

During the test, the heat input rate of the turbine and duct burner based on the lower heating value (LHV) averaged 1527.4 million BTU per hour (MMBTUH) (see Appendix G for calculations).

Complete emission summaries, and data logger records with strip chart copies are presented in Appendix B and C.

Table 1. Emission Summary
Unit 3 Combustion Turbine - Gas Fired
Kissimmee Electric Authority
Intercession City, Florida
January 9-10, 2002

Run Number	Time	Oxygen	NOx Emissions				CO Emissions			C3H8 Emissions			SO2 Emissions	
		%	ppm	ppm 15% O2	lbs/hr	lbs/MMBTU	ppm	lbs/hr	lbs/MMBTU	ppm	lbs/hr	lbs/MMBTU	gr/100cf	lbs/hr
Full Load CT at 171 MW with Duct Burner														
1	1428-1535	13.68	4.44	3.63	22.15	0.013	0.54	1.63	0.001	0.15	0.74	4.50E-04	0.15	0.68
2	1628-1734 1/10/02	13.67	3.58	2.92	17.84	0.011	0.43	1.31	0.001	0.09	0.44	2.60E-04	0.15	0.68
3	0837-0943	13.40	4.05	3.19	20.41	0.012	0.76	2.34	0.001	0.28	1.35	7.80E-04	0.15	0.71
Average	---	13.58	4.02	3.25	20.13	0.012	0.58	1.76	0.001	0.17	0.84	4.97E-04	0.15	0.69

Run Number	Time	Total Gas Flow CT & DB Kscfh	Total Heat Input MMBTUH HHV	MMBTUH LHV	Ammonia Emissions ppm	lbs/hr
1	1428-1535	1586.7	1658.1	1502.6	1.031	2.290
2	1628-1734 1/10/02	1588.2	1659.6	1504.0	0.267	0.589
3	0837-0943	1663.8	1738.7	1575.6	0.211	0.469
Average	---	1612.9	1685.5	1527.4	0.503	1.116

Natural Gas Fd-Factor = 8710 MMBTU/dscf
lbs/hr = ppm(2.595 x 10^E-9)MW (20.9/20.9-%O2)(Fd)(Heat Input HHV)
Heat Input HHV = (gas flow)(1045 dry Btu/cf)(60 min/hr)/10E6
MW CO = 28 lbs/lb-mole ***MW NOx = 46 lbs/lb-mole***

Allowable Emissions
NOx = 9.4 ppmvd (DLN), 4.5 ppmvd (SCR)
CO = 20 ppmvd **NH3 = 5 ppmvd (SCR)**
VOC = 4.0 ppmvd
SO2 = 20 grains/100std. Cuft

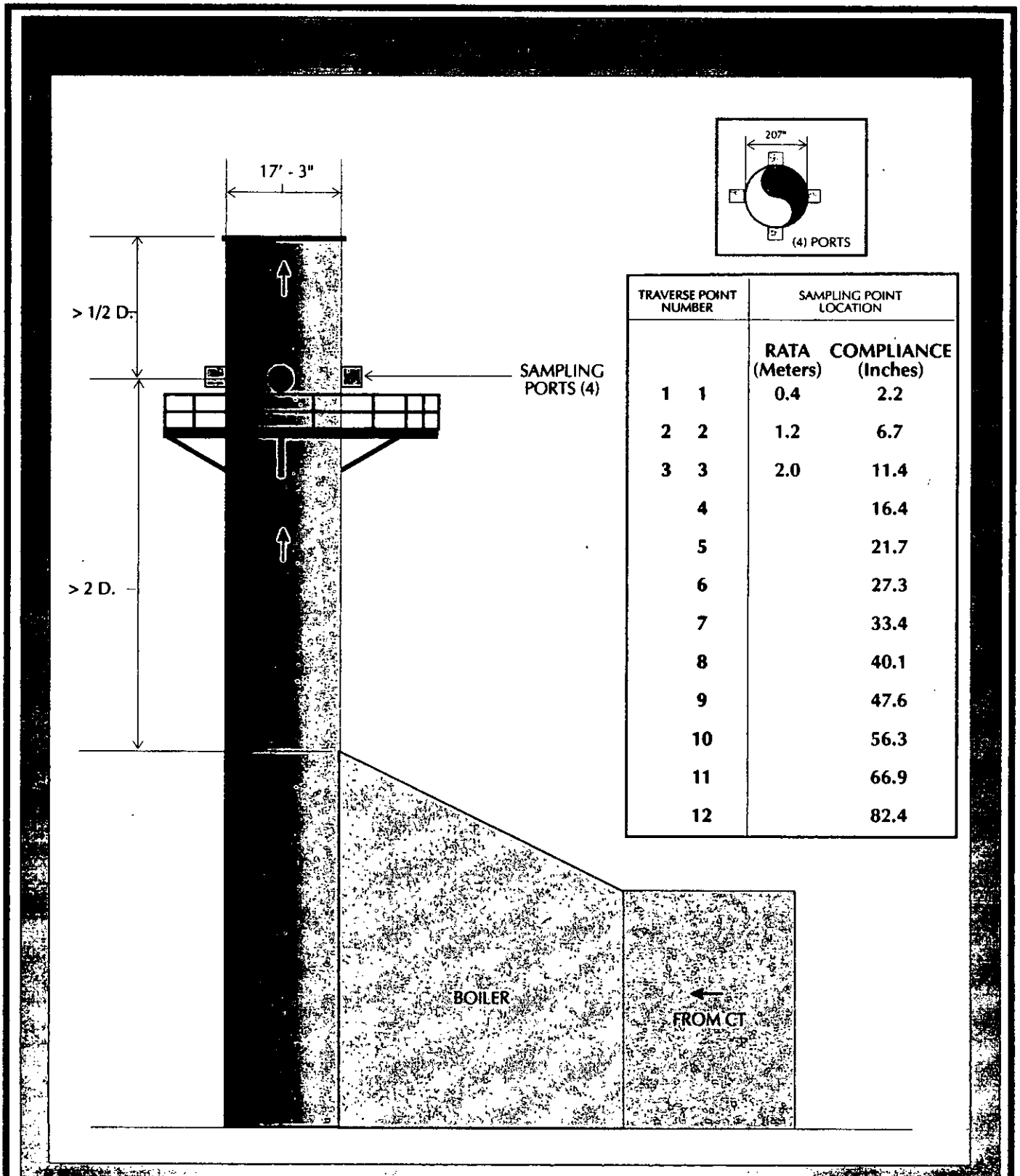
3.0 PROCESS DESCRIPTION AND OPERATION

Kissimmee Utility Authority's Cane Island Plant operates a 250 MW combined cycle combustion turbine CT-3 with heat recovery boiler. The heat recovery steam generator is equipped with duct burners. During the compliance test CT-3 achieved 171 MW at full load. The duct burners were also in operation.

Plant operating data and fuel analysis are provided in Appendix G.

4.0 SAMPLING POINT LOCATION

The sampling point locations and outlet duct schematics are given in Figure 1. Each run consisted of sampling 16 different sample points, a total of 48 points. No O_2 stratification was detected.



TRAVERSE POINT NUMBER		SAMPLING POINT LOCATION	
		RATA (Meters)	COMPLIANCE (Inches)
1	1	0.4	2.2
2	2	1.2	6.7
3	3	2.0	11.4
	4		16.4
	5		21.7
	6		27.3
	7		33.4
	8		40.1
	9		47.6
	10		56.3
	11		66.9
	12		82.4

NOTE: NOT TO SCALE

SOURCE: AIR CONSULTING & ENGINEERING, INC. (KUAC13) 1/31/02

ACE AIR CONSULTING & ENGINEERING, INC.

FIGURE 1.
SAMPLING POINT LOCATION
COMBUSTION TURBINE 3 COMBINED CYCLE EXHAUST (3B)
KISSIMMEE UTILITITY COMMISSION
CANE ISLAND POWER PLANT

5.0 FIELD AND ANALYTICAL PROCEDURES

5.1 Determination of Nitrogen Oxides Emissions From Stationary Gas Turbines--EPA Method 20

The sampling system is shown in Figure 2. A sample was drawn from the stack at a rate of approximately 5 SCFH. A heated stainless steel probe and filter assembly was followed by a three-way stainless steel motorized valve. Immediately following the valve was an ice cooled knockout bottle which allowed condensation and removal of stack gas moisture without the opportunity for potential reaction (NO_x absorption) with the stack gases. The sample was pumped through a non-heated 3/8" O.D. TEFLON sampling line approximately 100' long to instrumentation near the bottom of the stack. Calibration gases were introduced at the sampling interface (the three-way valve) through another 3/8" O.D. 100' TEFLON line that was not heated. The calibration gas cylinders were also housed near the bottom of the stack.

Gases are induced through a sample pump with TEFLON diaphragm to a sample manifold. One stream was directed to a Thermo Electron Model 10S Chemiluminescent Analyzer, converted to nitric oxide, reacted with ozone, and a chemiluminescent response measured by a photomultiplier. A second stream was directed through a Teledyne Model 320P digital oxygen analyzer. A third stream was dumped to the ambient air. All instrument responses were recorded on strip chart recorders.

All calibration gases were certified NBS traceable. Quality assurance procedures and results provided in the Appendices.

An overview of the EPA Method 20 NO_x sampling procedure as adapted for Subpart GG gas turbine requirements can be easily presented. Three test runs are performed.

Each of the three test runs are conducted by withdrawing a sample stack gas from each of eight sampling locations across a stack cross-section. Each test point is analyzed for a minimum of one minute plus demonstrated instrument response time. To normalize NO_x emission to a referenced standard, it is necessary to measure the oxygen content of the gases in addition to NO_x; therefore, two analyzers are required for testing. ACE utilized a Thermo Electron Model 10S Chemiluminescent NO_x analyzer and a Teledyne Model 320P O_2 analyzer for this purpose. As gas turbine NO_x emissions consist of mostly NO, some NO_2 can be expected to be present (5-20% by volume). The 10 AR is, therefore, equipped with a NO_2/NO converter for reduction of any NO_2 back to NO before

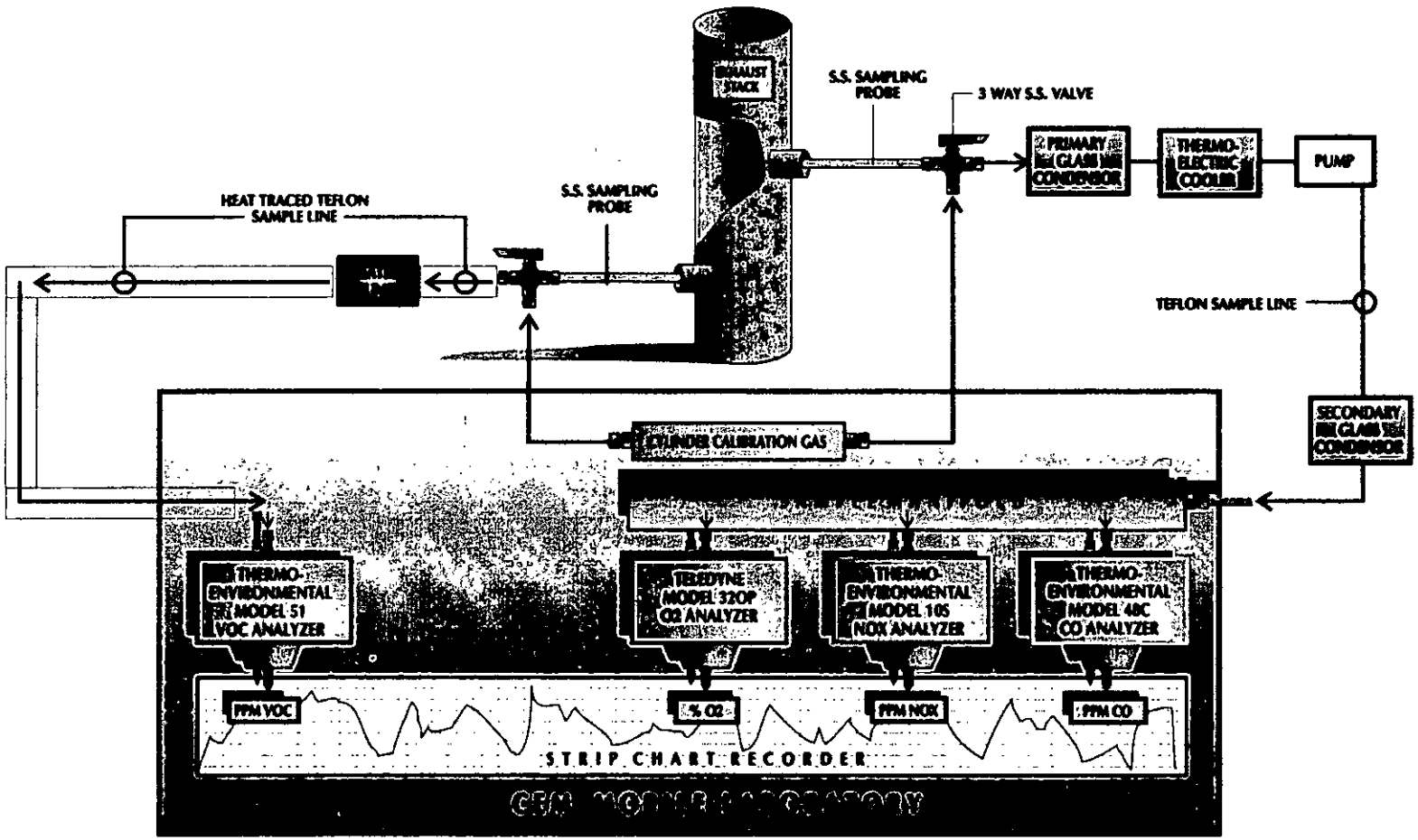


FIGURE 2.
EPA METHODS 3A, 7E, 10, & 25A CEM SAMPLING SCHEMATIC
(DETERMINATION OF OXYGEN CONCENTRATIONS
CARBON MONOXIDE, NITROGEN OXIDE,
& GASEOUS ORGANIC COMPOUNDS)

analysis. This is effected by heating the gas stream to 650°C in the presence of stainless steel. Method 20 quality assurance measures calls for demonstration of converter efficiency by filling a TEDLAR bag with a 50% NO/N_2 gas and ambient air and immediately performing analysis on the 10S. If the converter is working properly, analyzer response will not change more than ±2% over a 30-minute period, although NO_2 is being formed in the TEDLAR bag.

To further ensure accuracy of the monitoring instruments, it is necessary to demonstrate linear response using National Bureau of Standards (NBS) traceable NO/N_2 and O_2/N_2 calibration gases. Three NO/N_2 and a zero NO calibration gas are required for the NO_x analyzer; and two O_2 calibration gases and an O_2 zero are required for the oxygen analyzer. The analyzer(s) must demonstrate linearity with these gases within 2% of span which is 300 ppm for the NO_x analyzer and 25% for the oxygen analyzer.

The eight points that are required to be tested for each of the three test runs necessary to constitute an emission evaluation are selected after evaluating the sampling location for potential stratification. As strip chart records for O_2 and NO_x indicate, no stratification is present. The only differences in concentrations of either parameter are a result of instrument drift and/or minor load fluctuations and are not test point dependent.

The results of accuracy and response time testing are included in the Q/A section of the appendices.

5.2 Determination of Carbon Monoxide Emissions from Stationary Source --EPA Method 10

The sampling system is shown in Figure 2. A sample was drawn from the stack at a rate of approximately 2 SCFH. A stainless steel probe assembly was followed by a three-way stainless steel valve. The sample was pumped through an ice-cooled condensate trap followed by a 3/8" O.D. TEFLON sampling line. Calibration gases were introduced at the sampling interface (the three-way valve) through another 3/8" O.D. TEFLON line. The sample pump delivered gases to a manifold system where one flow is divided between a Teledyne 320P O_2 analyzer and a Thermo Electron Model 48 CO analyzer (NDIR with gas filter correlation). Excess flow is dumped to ambient. All instrument responses were recorded on strip chart recorders. The sampling system yields O_2, and CO, concentrations on a dry gas basis.

Calibration gases consisted of CO and O_2 standards in nitrogen. All calibration gases were certified NBS traceable, Protocol 1.

5.3 Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer --EPA Method 25A

A Flame Ionization Analyzer (FIA) is used to monitor Volatile Organic Compounds (VOC) concentrations based on propane calibrations. Results are reported as ppm carbon. A Ratfisch Model RS55 or Thermo Electron Model 51 analyzers with heated components were used for the testing.

A schematic of the sample system is provided in Figure 2. Sample gases are continuously removed through a probe and heat traced TEFLON sample line maintained at approximately 250°F. They pass through a non-reactive diaphragm sample pump and are then directed to the analyzer and analyzer bypass through a second heat traced line. Propane calibration gases are injected through a three-way valve at the probe exit so that they "see" the same sample system as source gases. Three calibration gases plus a zero air gas are utilized for the sample range of interest (0-100 ppm, 0-1000 ppm, and 0-10000 ppm).

Before testing a calibration error test is conducted after adjustment of zero and span gas values by injecting the remaining two gases into the sample system. These gases must demonstrate a linearity of within 5% of the
calibration gas values.

After each test run (or hourly), a propane and zero gas are injected to demonstrate the drift rate. Both gases should demonstrate a drift of ≤3% of range.

Since all source gases are sampled on a wet basis, final concentrations must be divided by the source dry gas fraction to correct values to a dry gas basis. Total mass emissions as carbon are then determined by multiplying these concentrations by the source standard hourly flow rate.

5.4 Visible Emissions Testing--EPA Method 9

The visible emission tests were performed in accordance with EPA Method 9. The observers maintain semi-annual FDEP certification for the performance of visible emission tests and attend the classroom lecture as required.

All procedures listed in Method 9 were followed including observer's position relative to the sun, distance from the stack, and line of sight. These items are noted on the visible emission data sheet. Observations

were made at 15-second intervals and recorded to the nearest five percent. The final opacity was determined by calculating the average of the highest consecutive 24 readings of the observation period.

5.5 Determination of Ammonia Emissions from Stationary Sources --EPA Method 26

An integrated sample is extracted from the source and passed through a pre-purged heated probe and filter into dilute sulfuric acid and dilute sodium hydroxide solutions which collect the gaseous hydrogen halides and halogens, respectively. The halide ions in the separate solutions are measured by ion chromatography (IC).

A schematic of the sampling train is provided in Figure 3.

PREPARATION OF EQUIPMENT

1. Filters - A Teflon-glass filter in a mat configuration was installed behind the probe to remove particulate matter from the gas stream. When the stack gas temperature exceeds 410° F and the Cl^- concentration is greater than 20 ppm, a quartz fiber filter was utilized.
2. Sampling Probe - Borosilicate glass approximately 3/8 inch I.D. with a heating system to prevent moisture condensation.
3. Three-way Stopcock - A borosilicate glass three-way stopcock with a heating system to prevent moisture condensation. The heated stopcock was connected to the outlet of the heated filter and the inlet of the first impinger.
4. Impingers - Four 30 ml midget impingers with leak-free glass connectors. For sampling at high moisture sources or when sampling times greater than 1 hour occurred, a midget impinger with a short-end stem was used in front of the first impinger. The drying tube impinger, of Mae West design, was filled with 6 to 16-mesh indicating type silica gel to dry the gas sample and to protect the dry gas meter and pump.

TEST PROCEDURE

Immediately before sampling, the purge line was connected to the stopcock and turned to permit the purge pump to purge at a rate of 2 liters per minute (lpm) for at least 5 minutes. The stopcock was then turned and a vacuum of 1 inch Hg was pulled by the sampling pump. The sampling rate was then adjusted to 2 lpm and maintained within 10 percent during the entire sampling run. Readings of the dry gas meter volume and temperature, rate meter, and vacuum gauge were taken at least once every 5 minutes during the run. Three one-hour test runs were conducted.

The gases sampled passed through the following components: a heated glass probe; a glass fiber or quartz fiber filter; an empty (optional) knockout midget impinger; two midget impingers each with 15ml acidic absorbing solution (0.1N H_2SO_4); two midget impingers each with 15 ml alkaline absorbing solution (0.1N NaOH); one midget impinger with silica gel (indicating type 6-16 mesh); an air tight pump; a dry test meter; and a calibrated orifice. Sample recovery was accomplished by the following procedures:

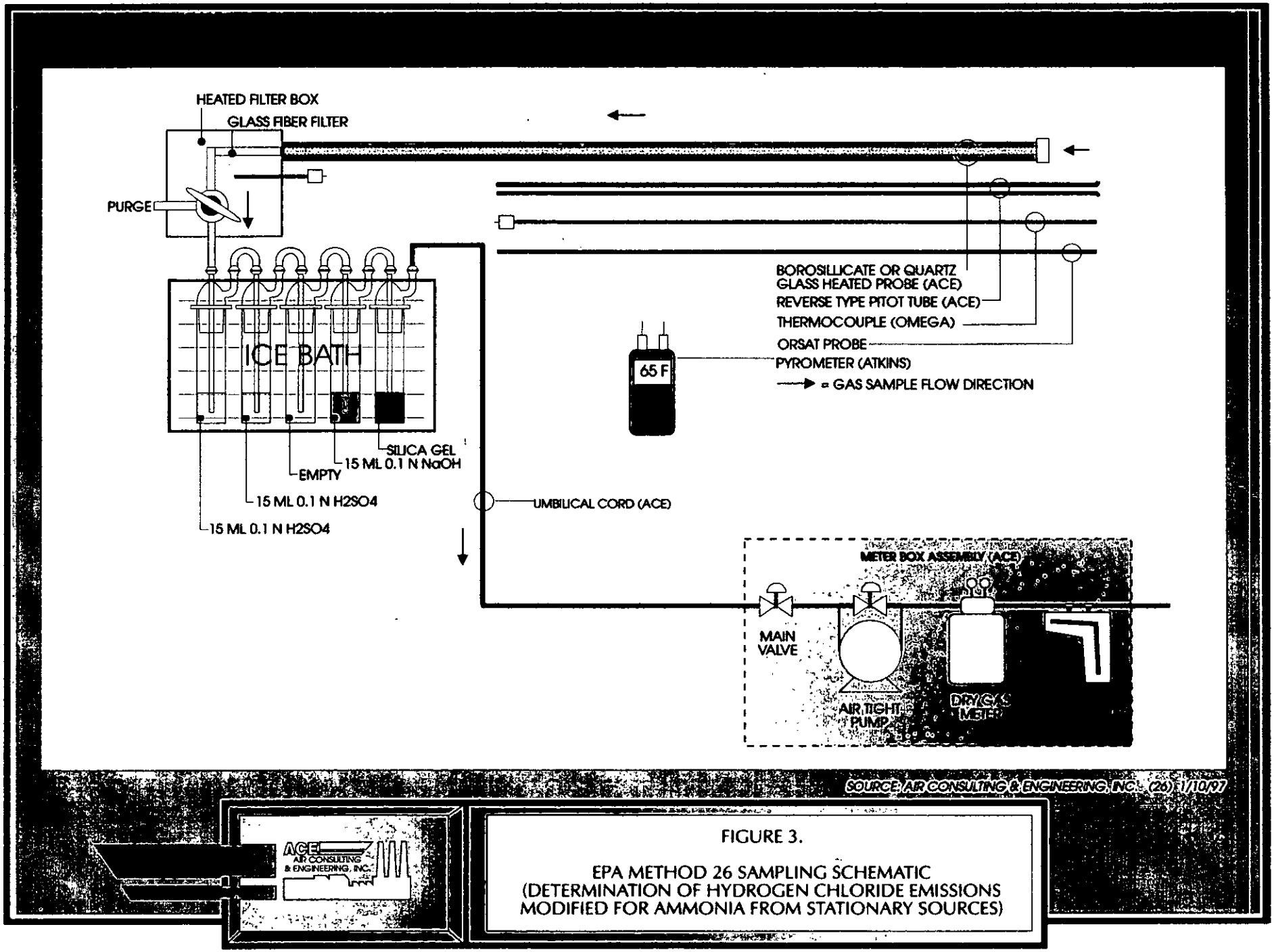


FIGURE 3.

EPA METHOD 26 SAMPLING SCHEMATIC
(DETERMINATION OF HYDROGEN CHLORIDE EMISSIONS
MODIFIED FOR AMMONIA FROM STATIONARY SOURCES)

1. The contents of the acid impingers and the (optional) knockout impinger were transferred to a leak-free storage bottle. The water rinses of each of these impingers and connecting glassware was added to the storage bottle.

2. Blanks were made of the 0.1N H_2SO_4 solution equivalent to the amount used in the sampling train and diluted to the approximate volume of the corresponding samples using rinse water directly from the wash bottle being used. A portion of the rinse water was placed in a separate storage bottle.

LABORATORY ANALYSES

Prior to shipment, all sample containers were rechecked to ensure that the caps were well secured. The lids of all containers were sealed around the circumference with Teflon tape with the liquid level noted to determine any leakage during shipment.

APPENDIX A

FDEP PERMIT NUMBER 0970043-PSD-FL-254

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

PERMITTEE:

Kissimmee Utility Authority (KUA)
1701 West Carroll Street
Kissimmee, Florida 34741-6804

File No.	PSD-FL-254 (PA98-38)
FID No.	0970043
SIC No.	4911
Expires:	December 31, 2002

Authorized Representative:

A.K. Sharma, Director of Power Supply

PROJECT AND LOCATION:

Permit pursuant to the requirements for the Prevention of Significant Deterioration of Air Quality (PSD Permit) for the construction of: a nominal 167 megawatt (MW) gas-fired, stationary combustion turbine-electrical generator; a supplementally-fired heat recovery steam generator (HRSG); a nominal 80-90 MW steam electrical generator; a 1.0 million gallon storage tank for back-up distillate fuel oil; a selective catalytic reduction unit and ancillary equipment; ammonia storage; a 130-foot stack; and a 100-foot bypass stack for simple cycle operation. The unit will achieve approximately 250 megawatt in combined cycle operation at referenced conditions. The unit is designated as Unit 3 and will be located at the Cane Island Power Park, 6075 Old Tampa Highway, near Intercession City, Osceola County. UTM coordinates are: Zone 17; 447.72 km E; 3127.68 km N.

STATEMENT OF BASIS:

This PSD permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.) and 40CFR52.21. The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

The attached Appendix is made a part of this permit:

Appendix GC Construction Permit General Conditions

Howard L. Rhodes, Director
Division of Air Resources
Management

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254

SECTION I - FACILITY INFORMATION

FACILITY DESCRIPTION

The existing Kissimmee Utility Authority (KUA) Cane Island Power Park consists of a nominal 40 MW simple cycle combustion turbine designated as Unit 1 and a nominal 120 MW combined cycle combustion turbine-electrical generator with a heat recovery steam generator (HRSG) and a steam electrical generator designated as Unit 2.

The proposed KUA Cane Island Power Park Unit 3 is a nominal 250 MW combined cycle plant. It will include: a nominal 167 MW stationary gas combustion turbine-electrical generator burning natural gas with fuel oil as backup; a supplementally gas-fired heat recovery steam generator to raise sufficient steam to achieve 250 MW in combined cycle operation; an 80-90 MW steam electric generator, a 44 mmBtu/hr heat input duct burner; a selective catalytic reduction unit and ancillary equipment; ammonia storage; a 130-foot stack; and a 100-foot bypass stack for simple cycle operation. New major support facilities for Unit 3 include a cooling tower, water and wastewater facilities, water storage tanks, storm water detention pond, 230 KV transmission line, and a 1.0 million gallon storage tank for back-up distillate fuel oil.

Emissions from Cane Island Power Park Unit 3 will be controlled by Dry Low NO_x (DLN) combustors or wet injection under simple cycle operation. Emissions will be controlled by DLN or wet injection and selective catalytic reduction (SCR) when operating in combined cycle mode. Inherently clean fuels and good combustion practices will be employed to control all pollutants.

EMISSION UNITS

This permit addresses the following emission units:

EMISSION UNIT	SYSTEM	EMISSION UNIT DESCRIPTION
003	Power Generation	One nominal 167 Megawatt Gas Combustion Turbine-Electrical Generator
004	Fuel Storage	1.0 Million Gallon Fuel Oil Storage Tank
005	Steam Generation	One 44 mmBtu/hr Duct Burner in a Supplementally Fired Heat Recovery Steam Generator (and 80-90 MW Steam Electrical Turbine)
006	Water Cooling	Cooling Tower

REGULATORY CLASSIFICATION

The facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), or volatile organic compounds (VOC) exceeds 100 tons per year (TPY).

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254

SECTION I - FACILITY INFORMATION

This facility is within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because emissions are greater than 100 TPY for at least one criteria pollutant, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD). Pursuant to Table 62-212.400-2, this facility modification results in emissions increases greater than 40 TPY of NO_x, 25/15 TPY of PM/PM_{10}, 100 TPY of CO and 40 TPY of VOCs. These pollutants require review per the PSD rules and a determination for Best Available Control Technology (BACT) per Rule 62-212.400, F.A.C.

This Project is subject to the applicable requirements of Chapter 403. Part II, F.S., Electric Power Plant and Transmission Line Siting because the steam electric generating capacity of this facility is greater than 75 MW. [Chapter 403.503 (12), F.S., Definitions]

This facility is also subject to certain Acid Rain provisions of Title IV of the Clean Air Act.

PERMIT SCHEDULE

- 11/23/99 PSD Permit Issued
- 11/22/99 Site Certification Issued
- 01/09/99 Notice of Intent to Issue PSD Permit published in The Orlando Sentinel
- 01/07/99 Distributed Intent to Issue Permit
- 08/05/98 Received PSD Application

RELEVANT DOCUMENTS:

The documents listed below are the basis of the permit. They are specifically related to this permitting action, but are not incorporated into this permit. These documents are on file with the Department.

- Application received on August 5, 1998
- Department/BAR letters to KUA dated August 17, and September 23, 1998
- Comments from the Fish and Wildlife Service dated September 11, 1998
- KUA letters (through Black & Veatch) dated November 6 and November 30, 1998 and January 6, February 3, February 12, March 10, and March 24, 1999.
- Department's Intent to Issue and Public Notice Package dated January 8, 1999.
- Department's revised Draft Permit and BACT determination dated March 25, 1999.
- Letters from EPA Region IV dated February 2, February 10, and November 8, 1999.
- Black & Veatch and GE Presentations to Department and EPA Region IV on March 4, 1999.
- Site Certification for the KUA Cane Island Facility approved November 22, 1999.
- Department's Final Determination and Best Available Control Technology Determination issued concurrently with this Final Permit.

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254
SECTION II - ADMINISTRATIVE REQUIREMENTS

GENERAL AND ADMINISTRATIVE REQUIREMENTS

1. Regulating Agencies: All documents related to applications for permits to construct, operate or modify an emissions unit should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (FDEP), at 2600 Blairstone Road, Tallahassee, Florida 32399-2400 and phone number (850)488-0114. All documents related to reports, tests, and notifications should be submitted to the DEP Central District Office, 3319 Maguire Boulevard, Suite 232, Orlando, Florida 32803-3767 and phone number 407/894-7555.

2. General Conditions: The owner and operator is subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in Appendix GC of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. [Rule 62-4.160, F.A.C.]

3. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.

4. Forms and Application Procedures: The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. [Rule 62-210.900, F.A.C.]

5. Modifications: The permittee shall give written notification to the Department when there is any modification to this facility. This notice shall be submitted sufficiently in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and the anticipated completion date of the change. [Chapters 62-210 and 62-212, F.A.C.]

6. Expiration: Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, or if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. The Department may extend the 18-month period upon a satisfactory showing that an extension is justified. [40 CFR 52.21(r)(2)]

7. BACT Determination: In conjunction with extension of the 18 month periods to commence or continue construction, or extension of the December 31, 2002 permit expiration date, the permittee may be required to demonstrate the adequacy of any previous determination of best available control technology for the source. [40 CFR 52.21(j)(4)]

8. Permit Extension: The permittee, for good cause, may request that this PSD permit be extended. Such a request shall be submitted to the Bureau of Air Regulation prior to 60 days before the expiration of the permit (Rule 62-4.080, F.A.C.).

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254

SECTION II - ADMINISTRATIVE REQUIREMENTS

9. Application for Title IV Permit: An application for a Title IV Acid Rain Permit, must be submitted to the U.S. Environmental Protection Agency Region IV office in Atlanta, Georgia and a copy to the DEP's Bureau of Air Regulation in Tallahassee 24 months before the date on which the new unit begins serving an electrical generator (greater than 25 MW). [40 CFR 72]

10. Application for Title V Permit: An application for a Title V operating permit, pursuant to Chapter 62-213, F.A.C., must be submitted to the DEP's Bureau of Air Regulation, and a copy to the Department's Central District Office. [Chapter 62-213, F.A.C.]

11. New or Additional Conditions: Pursuant to Rule 62-4.080, F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]

12. Annual Reports: Pursuant to Rule 62-210.370(2), F.A.C., Annual Operation Reports, the permittee is required to submit annual reports on the actual operating rates and emissions from this facility. Annual operating reports shall be sent to the DEP's Central District Office by March 1st of each year.

13. Stack Testing Facilities: Stack sampling facilities shall be installed in accordance with Rule 62-297.310(6), F.A.C.

14. Quarterly Reports: Quarterly excess emission reports, in accordance with 40 CFR 60.7 (a)(7) (c) (1998 version), shall be submitted to the DEP's Central District Office.

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254
SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

APPLICABLE STANDARDS AND REGULATIONS:

1. Unless otherwise indicated in this permit, the construction and operation of the subject emission unit(s) shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S. and Florida Administrative Code Chapters 62-4, 62-17, 62-204, 62-210, 62-212, 62-213, 62-214, 62-296, and 62-297; and the applicable requirements of the Code of Federal Regulations Section 40, Parts 52, 60, 72, 73, and 75.

2. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements or regulations. [Rule 62-210.300, F.A.C.]

3. These emission units shall comply with all applicable requirements of 40CFR60, Subpart A, General Provisions including:

   - 40CFR60.7, Notification and Recordkeeping
   - 40CFR60.8, Performance Tests
   - 40CFR60.11, Compliance with Standards and Maintenance Requirements
   - 40CFR60.12, Circumvention
   - 40CFR60.13, Monitoring Requirements
   - 40CFR60.19, General Notification and Reporting requirements

4. ARMS Emissions Unit 003. Direct Power Generation, consisting of a nominal 167 megawatt combustion turbine-electrical generator, shall comply with all applicable provisions of 40CFR60, Subpart GG, Standards of Performance for Stationary Gas Turbines, adopted by reference in Rule 62-204.800(7)(b), F.A.C. The Subpart GG requirement to correct test data to ISO conditions applies. However, such correction is not used for compliance determinations with the BACT standard(s).

5. ARMS Emission Unit 004. Fuel Storage, consisting of a 1.0 million gallon distillate fuel oil storage tank shall comply with all applicable provisions of 40CFR60, Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels, adopted by reference in Rule 62-204.800, F.A.C.

6. ARMS Emission Unit 005. Steam Power Generation, consisting of a supplementally-fired heat recovery steam generator equipped with a natural gas fired 44 mmBTU/hr duct burner (HHV) and 80-90 MW steam electrical generator shall comply with all applicable provisions of 40CFR60, Subpart Dc, Standards of Performance for Small Industrial Commercial-Institutional Steam Generating Units Which Construction is Commenced After September June 9, 1989, adopted by reference in Rule 62-204.800(7), F.A.C.

7. ARMS Emission Unit 006. Cooling Tower, is an unregulated emission unit. The Cooling Tower is not subject to a NESHAP because Chromium-based chemical treatment is not used.

8. All notifications and reports required by the above specific conditions shall be submitted to the DEP's Central District Office.

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254

SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

GENERAL OPERATION REQUIREMENTS

9. Fuels: Only pipeline natural gas or maximum 0.05 percent sulfur fuel oil No. 2 or superior grade of distillate fuel oil shall be fired in this unit. [Applicant Request, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]

10. Combustion Turbine Capacity: The maximum heat input rates, based on the lower heating value (LHV) of each fuel to this Unit at ambient conditions of 19°F temperature, 55% relative humidity, 100% load, and 14.7 psi pressure shall not exceed 1,696 million Btu per hour (mmBtu/hr) when firing natural gas, nor 1,910 mmBtu/hr when firing No. 2 or superior grade of distillate fuel oil. These maximum heat input rates will vary depending upon ambient conditions and the combustion turbine characteristics. Manufacturer's curves corrected for site conditions or equations for correction to other ambient conditions shall be provided to the Department of Environmental Protection (DEP) within 45 days of completing the initial compliance testing. [Design, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]

11. Heat Recovery Steam Generator equipped with Duct Burner. The maximum heat input rate of the natural gas fired duct burner shall not exceed 44 mmBtu/hour (HHV). [Applicant Request, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]

12. Unconfined Particulate Emissions: During the construction period, unconfined particulate matter emissions shall be minimized by dust suppressing techniques such as covering and/or application of water or chemicals to the affected areas, as necessary.

13. Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the owner or operator shall notify the DEP Central District office as soon as possible, but at least within (1) working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; the steps being taken to correct the problem and prevent future recurrence; and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with the conditions of this permit and the regulations. [Rule 62-4.130, F.A.C.]

14. Operating Procedures: Operating procedures shall include good operating practices and proper training of all operators and supervisors. The good operating practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment. [Rule 62-4.070(3), F.A.C.]

15. Circumvention: The owner or operator shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. [Rules 62-210.650, F.A.C.]

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254
SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

16. Maximum allowable hours of operation for the 250 MW Combined Cycle Plant are 8760 hours per year while firing natural gas. Fuel oil firing of the combustion turbine is permitted for a maximum of 720 hours per year. [Applicant Request, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]

17. Simple Cycle Operation The plant may be operated in simple cycle mode. Different limits apply depending upon whether simple cycle operation is of an intermittent nature, such as: caused by maintenance of equipment following the combustion turbine; temporary electrical demand fluctuations; a decision to not install the heat recovery steam generator; or long term electrical demand situations.

CONTROL TECHNOLOGY

18. Dry Low NO_x (DLN) combustors shall be installed on the stationary combustion turbine to comply with the simple cycle NO_x emissions limits listed in Specific Condition 24. [Design, Rules 62-4.070 and 62-212.400, F.A.C.]

19. A water injection system shall be installed for use when firing No. 2 or superior grade distillate fuel oil for control of NO_x emissions. [Design, Rules 62-4.070 and 62-212.400, F.A.C.]

20. The permittee shall install selective catalytic reduction system to comply with the combined cycle NO_x limit listed in Specific Condition 24.

21. The permittee shall design these units to accommodate adequate testing and sampling locations for compliance with the applicable emission limits (per each unit) listed in Specific Conditions No. 24 through 28. [Rule 62-4.070 , Rule 62-204.800, F.A.C., and 40 CFR60.40a(b)]

22. The permittee shall provide manufacturer's emissions performance versus load diagrams for the DLN and wet injection systems prior to their installation. DLN systems shall each be tuned upon initial operation to optimize emissions reductions and shall be maintained to minimize simple cycle NO_x emissions and CO emissions. [Rule 62-4.070, and 62-210.650 F.A.C.]

23. Drift eliminators shall be installed on the cooling tower to reduce PM/PM_{10} emissions.

EMISSION LIMITS AND STANDARDS

24. Nitrogen Oxides (NO_x) Emissions:

A. Combined Cycle Operation

- The concentration of NO_x in the stack exhaust gas, with the combustion turbine operating on gas (fuel oil) and the duct burner on or off, shall not exceed 3.5 (15) ppmvd @15% O_2 on a 3-hr block average. Compliance shall be determined by the continuous emission monitor (CEMS). Emissions of NO_x calculated as NO_2 in the stack exhaust gas (at ISO conditions) with the combustion turbine operating shall not exceed 26 (108) pounds per hour (lb/hr) with the duct burner on or off to be demonstrated by initial stack test. [Applicant Request on November 9, 1999]

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254

SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

- The concentration of ammonia in the exhaust gas from each combustion turbine shall not exceed 5 ppmvd @15% O_2. The compliance procedures are described in Specific Condition 52. [Rules 62-212.400 and 62-4.070, F.A.C.]
- When NO_x monitoring data is not available, substitution for missing data shall be handled as required by Title IV (40 CFR 75) to calculate any specified average time.

B. Intermittent Simple Cycle Operation

- The concentration of NO_x in the stack exhaust gas, with the combustion turbine operating on gas (fuel oil) shall not exceed 12 (42) ppmvd at 15% O_2 (24-hr block average). Emissions of NO_x in the stack exhaust gas (at ISO conditions) with the combustion turbine operating shall not exceed 86 (310) pounds per hour (lb/hr). [Rules 62-212.400, F.A.C.]
- Notwithstanding the applicable NO_x limit during simple cycle operation, reasonable measures shall be implemented to maintain the concentration of NO_x in the exhaust gas at 9 ppmvd at 15% O_2 or lower. Any tuning of the combustors for Dry Low NO_x operation while firing gas shall result in initial subsequent NO_x concentrations of 9 ppmvd @15% O_2 or lower. [Rules 62-212.400 and 62-4.070, F.A.C.]
- When NO_x monitoring data is not available, substitution for missing data shall be handled as required by Title IV (40 CFR 75) to calculate any specified average time.

C. Continuous Simple Cycle Operation

- The concentration of NO_x in the stack exhaust gas, with the combustion turbine operating on gas (fuel oil) shall not exceed 9 (42) ppmvd at 15% O_2 (24-hr block average). Emissions of NO_x in the stack exhaust gas (at ISO conditions) with the combustion turbine operating shall not exceed 65 (310) pounds per hour (lb/hr). [Rules 62-212.400, F.A.C.]
- Notwithstanding the applicable NO_x limit during simple cycle operation, reasonable measures shall be implemented to maintain the concentration of NO_x in the exhaust gas at 9 ppmvd at 15% O_2 or lower. Any tuning of the combustors for Dry Low NO_x operation while firing gas shall result in initial subsequent NO_x concentrations of 9 ppmvd @15% O_2 or lower. [Rules 62-212.400 and 62-4.070, F.A.C.]
- When NO_x monitoring data is not available, substitution for missing data shall be handled as required by Title IV (40 CFR 75) to calculate any specified average time.

25. Carbon Monoxide (CO) Emissions: Emissions of CO in the stack exhaust gas (at ISO conditions) with the combustion turbine operating on gas (fuel oil) shall exceed neither 12 (20) ppm nor 43 (71) lb/hr with the duct burner off and neither 20 (30) ppm nor 71 (108) lb/hr with the duct burner on to be demonstrated by stack test using EPA Method 10. [Rule 62-212.400, F.A.C.]

26. Volatile Organic Compounds (VOC) Emissions: Emissions of VOC in the stack exhaust gas (at ISO conditions) with the combustion turbine operating on gas (fuel oil) shall exceed neither 1.4 (10) ppm nor 3 (21.4) lb/hr with the duct burner off and neither 4 (10) ppm nor 8.5 (21.4)

lb/hr with the duct burner on to be demonstrated by initial stack test using EPA Method 18, 25 or 25A. [Rule 62-212.400, F.A.C.]

27. Sulfur Dioxide (SO_2) emissions: SO_2 emissions shall be limited by firing pipeline natural gas (sulfur content less than 20 grains per 100 standard cubic foot) or by firing No. 2 or superior grade distillate fuel oil with a maximum 0.05 percent sulfur for 720 hours per year. Compliance with this requirement in conjunction with implementation of the Custom Fuel Monitoring Schedule in Specific Conditions 48 and 49 will demonstrate compliance with the applicable NSPS SO_2 emissions limitations from the duct burner or the combustion turbine. Emissions of SO_2 shall not exceed 38.1 tons per year. [40CFR60 Subpart GG and Rules 62-4.070, 62-212.400, and 62-204.800(7), F.A.C. to avoid PSD Review]

28. Visible emissions (VE): VE emissions shall serve as a surrogate for PM/PM_{10} emissions from the combustion turbine operating with or without the duct burner and shall not exceed 10 percent opacity from the stack in use. [Rules 62-4.070, 62-212.400, and 62-204.800(7), F.A.C.]

EXCESS EMISSIONS

29. Excess emissions resulting from startup, shutdown, or malfunction shall be permitted provided that best operational practices are adhered to and the duration of excess emissions shall be minimized. Excess emissions occurrences shall in no case exceed two hours in any 24-hour period except during both "cold start-up" to or shutdowns from combined cycle plant operation. During start-up to simple cycle operation, up to one hour of excess emissions are allowed. During cold start-up to combined cycle operation, up to four hours of excess emissions are allowed. During shutdowns from combined cycle operation, up to three hours of excess emissions are allowed. Cold start-up is defined as a startup to combined cycle operation following a complete shutdown lasting at least 48 hours. [Applicant Request, G.E. Combined Cycle Startup Curves Data and Rule 62-210.700, F.A.C.].

30. Excess emissions entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during startup, shutdown or malfunction, shall be prohibited pursuant to Rule 62-210.700, F.A.C. These emissions shall be included in the 24-hr average for NO_x.

31. Excess Emissions Report: If excess emissions occur for more than two hours due to malfunction, the owner or operator shall notify DEP's Central District office within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Pursuant to the New Source Performance Standards, all excess emissions shall also be reported in accordance with 40 CFR 60.7, Subpart A. Following this format, 40 CFR 60.7, periods of startup, shutdown, malfunction, shall be monitored, recorded, and reported as excess emissions when emission levels exceed the permitted standards listed in Specific Condition No. 24. [Rules 62-4.130, 62-204.800, 62-210.700(6), F.A.C., and 40 CFR 60.7 (1998 version)].

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254
SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

COMPLIANCE DETERMINATION

32. Compliance with the allowable emission limiting standards shall be determined within 60 days after achieving the maximum production rate, but not later than 180 days of initial operation of the unit, and annually thereafter as indicated in this permit, by using the following reference methods as described in 40 CFR 60, Appendix A (1998 version), and adopted by reference in Chapter 62-204.800, F.A.C.

33. Initial (I) performance tests (for both fuels) shall be performed by the deadlines in Specific Condition 32. Initial tests shall also be conducted after any substantial modifications (and shake down period not to exceed 100 days after re-starting the CT) of air pollution control equipment such as installation of SCR or change of combustors. Annual (A) compliance tests shall be performed during every federal fiscal year (October 1 - September 30) pursuant to Rule 62-297.310(7), F.A.C., on these units as indicated. The following reference methods shall be used. No other test methods may be used for compliance testing unless prior DEP approval is received in writing.

- EPA Reference Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources" (I, A).
- EPA Reference Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources" (I, A).
- EPA Reference Method 20, "Determination of Oxides of Nitrogen Oxide, Sulfur Dioxide and Diluent Emissions from Stationary Gas Turbines." Test must be conducted with the duct burner on and with the duct burner off.
- EPA Reference Method 18, 25 and/or 25A, "Determination of Volatile Organic Concentrations." Initial test only.
- EPA Method 26A (modified) for ammonia sample collection
- EPA Draft Method 206 for ion chromatographic analysis for ammonia.

34. Continuous compliance with the NO_x emission limits: Continuous compliance with the NO_x emission limits shall be demonstrated with the CEM system on a 3-hr average basis. Based on CEMS data, a separate compliance determination is conducted at the end of each 3-hr period and a new average emission rate is calculated from the arithmetic average of all valid hourly emission rates from the previous 3-hr period. Valid hourly emission rates shall not include periods of start up, shutdown, or malfunction unless prohibited by 62-210.700 F.A.C. A valid hourly emission rate shall be calculated for each hour in which at least two NO_x concentrations are obtained at least 15 minutes apart. These excess emissions periods shall be reported as required in Condition 31. [Rules 62-4.070 F.A.C., 62-210.700, F.A.C., 40 CFR 75 and BACT]

35. Compliance with the SO_2 and PM/PM_{10} emission limits: Not withstanding the requirements of Rule 62-297.340, F.A.C., the use of pipeline natural gas, is the method for determining compliance for SO_2 and PM_{10}. For the purposes of demonstrating compliance with the 40 CFR 60.333 SO_2 standard, ASTM methods D4084-82 or D3246-81 (or equivalent) for sulfur

content of gaseous fuel shall be utilized in accordance with the EPA-approved custom fuel monitoring schedule or natural gas supplier data may be submitted or the natural gas sulfur content referenced in 40 CFR 75 Appendix D may be utilized. However, the applicant is responsible for ensuring that the procedures in 40 CFR60.335 or 40 CFR75 are used when determination of fuel sulfur content is made. Analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency pursuant to 40 CFR 60.335(e) (1998 version).

36. Compliance with CO emission limit: An initial test for CO, shall be conducted concurrently with the initial NO_x test, as required. The initial NO_x and CO test results shall be the average of three valid one-hour runs. Annual compliance testing for CO may be conducted at less than capacity when compliance testing is conducted concurrent with the annual RATA testing for the NO_x CEMS required pursuant to 40 CFR 75. Alternatively to annual testing in a given year, periodic tuning data may be provided to demonstrate compliance in the year the tuning is conducted.

37. Compliance with the VOC emission limit: An initial test is required to demonstrate compliance with the VOC emission limit. Thereafter, the CO emission limit and periodic tuning data will be employed as surrogate and no annual testing is required.

38. Testing procedures: Testing of emissions shall be conducted with the combustion turbine operating at permitted capacity. Permitted capacity is defined as 90-100 percent of the maximum heat input rate allowed by the permit, corrected for the average ambient air temperature during the test (with 100 percent represented by a curve depicting heat input vs. ambient temperature). If it is impracticable to test at permitted capacity, the source may be tested at less than permitted capacity. In this case, subsequent operation is limited by adjusting the entire heat input vs. ambient temperature curve downward by an increment equal to the difference between the maximum permitted heat input (corrected for ambient temperature) and 105 percent of the value reached during the test until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the permitted capacity. Procedures for these tests shall meet all applicable requirements (i.e., testing time frequency, minimum compliance duration, etc.) of Chapters 62-204 and 62-297, F.A.C.

39. Test Notification: The DEP's Central District office shall be notified, in writing, at least 30 days prior to the initial performance tests and at least 15 days before annual compliance test(s).

40. Special Compliance Tests: The DEP may request a special compliance test pursuant to Rule 62-297.310(7), F.A.C., when, after investigation (such as complaints, increased visible emissions, or questionable maintenance of control equipment), there is reason to believe that any applicable emission standard is being violated.

41. Test Results: Compliance test results shall be submitted to the DEP's Central District office no later than 45 days after completion of the last test run. [Rule 62-297.310(8), F.A.C.].

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254

SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

NOTIFICATION, REPORTING, AND RECORDKEEPING

42. Records: All measurements, records, and other data required to be maintained by KUA shall be recorded in a permanent form and retained for at least five (5) years following the date on which such measurements, records, or data are recorded. These records shall be made available to DEP representatives upon request.

43. Compliance Test Reports: The test report shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in Rule 62-297.310(8), F.A.C.

MONITORING REQUIREMENTS

44. Continuous Monitoring System: The permittee shall install, calibrate, maintain, and operate a continuous emission monitor in the stack to measure and record the nitrogen from these units. Periods when NO_x emissions (ppmvd @ 15% oxygen) are above the permitted limits, listed in Specific Condition No. 24, shall be reported to the DEP Central District Office within one working day (verbally) followed up by a written explanation not later than three (3) working days (alternatively by facsimile within one working day). [Rules 62-204.800, 62-210.700, 62-4.130, 62-4.160(8), F.A.C and 40 CFR 60.7 (1998 version)].

45. CEMS for reporting excess emissions: The NO_x CEMS shall be used in lieu of the requirement for reporting excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG (1998 version). Upon request from DEP, the CEMS emission rates for NO_x on the CT shall be corrected to ISO conditions to demonstrate compliance with the NO_x standard established in 40 CFR 60.332. [EPA Approval dated February10, 1999]

46. CEMS in lieu of Water to Fuel Ratio: The NO_x CEMS shall be used in lieu of the water/fuel monitoring system for reporting excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG (1998 version). Subject to EPA approval, the calibration of the water/fuel monitoring device required in 40 CFR 60.335 (c)(2) (1998 version) will be replaced by the 40 CFR 75 certification tests of the NO_x CEMS. Upon request from DEP, the CEMS emission rates for NO_x on this Unit shall be corrected to ISO conditions to demonstrate compliance with the NO_x standard established in 40 CFR 60.332. [EPA Approval dated February10, 1999]

47. Continuous Monitoring System Reports: The monitoring devices shall comply with the certification and quality assurance, and any other applicable requirements of Rule 62-297.520, F.A.C., 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7(a)(5) or 40 CFR Part 75. Quality assurance procedures must conform to all applicable sections of 40 CFR 60, Appendix F or 40CFR75. The monitoring plan, consisting of data on CEM equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location shall be provided to the DEP Emissions Monitoring Section Administrator and EPA for review no later than 45 days prior to the first scheduled certification test pursuant to 40 CFR 75.62.

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254
SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

48. Natural Gas Monitoring Schedule: A custom fuel monitoring schedule pursuant to 40 CFR 75 Appendix D for natural gas may be used in lieu of the daily sampling requirements of 40 CFR 60.334 (b)(2) provided the following requirements are met:

    - The permittee shall apply for an Acid Rain permit within the deadlines specified in 40 CFR 72.30.
    - The permittee shall submit a monitoring plan, certified by signature of the Designated Representative, that commits to using a primary fuel of pipeline supplied natural gas (sulfur content less than 20 gr/100 scf pursuant to 40 CFR 75.11(d)(2)).
    - Each unit shall be monitored for SO_2 emissions using methods consistent with the requirements of 40 CFR 75 and certified by the USEPA.

    This custom fuel monitoring schedule will only be valid when pipeline natural gas is used as a primary fuel. If the primary fuel for these units is changed to a higher sulfur fuel, SO_2 emissions must be accounted for as required pursuant to 40 CFR 75.11(d).

49. Fuel Oil Monitoring Schedule: The following monitoring schedule for No. 2 or superior grade fuel oil shall be followed: For all bulk shipments of No. 2 fuel oil received at this facility an analysis which reports the sulfur content and nitrogen content of the fuel shall be provided by the fuel vendor. The analysis shall also specify the methods by which the analyses were conducted and shall comply with the requirements of 40 CFR 60.335(d).

50. Determination of Process Variables:

    - The permittee shall operate and maintain equipment and/or instruments necessary to determine process variables, such as process weight input or heat input, when such data is needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.
    - Equipment and/or instruments used to directly or indirectly determine such process variables, including devices such as belt scales, weigh hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value [Rule 62-297.310(5), F.A.C]

51. Subpart Dc Monitoring and Recordkeeping Requirements: The permittee shall comply with all applicable requirements of this Subpart [40CFR60, Subpart Dc].

52. Selective Catalytic Reduction System (SCR) Compliance Procedures:

    - An initial stack emission test for nitrogen oxides and ammonia from the CGT/HRGS pair shall be conducted: 1) for natural gas firing and 2) for distillate fuel oil firing. The ammonia injection rate necessary to comply with the NO_x standard shall be established during the initial performance tests.

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-254
SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

- The SCR shall operate at all times that the turbine is operating, except during turbine start-up and shutdown periods. During turbine start-up, permittee shall begin use of SCR (i.e., commence ammonia injection) within two (2) hours of the initial turbine firing or when the temperature of the catalyst bed reaches a suitable predetermined temperature level, whichever occurs first. During turbine shutdown, permittee shall discontinue use of the SCR (i.e., discontinue ammonia injection) when the catalyst bed temperature drops below the predetermined temperature levels, but no more than one hour prior to the time at which the fuel feed to the turbine is discontinued. Suitable temperature for activation and deactivation of the SCR shall be established during performance testing. The permittee shall, whenever possible, operate the facility in a manner so as to optimize the effectiveness of the SCR unit while minimizing ammonia slip to below the emission limit.
- The permittee shall install and operate an ammonia flow meter to measured and record the ammonia injection rate to the SCR system of the CGT/HRSG set. It shall be maintained and calibrated according to the manufacture's specifications. During the stack test, the permittee at each load condition shall determine the minimum ammonia flow rate required to meet the emissions limitations. During NO_x CEM downtimes or malfunctions, the permittee shall operate at greater or equal to 100% of the ammonia injection rate determined during the stack test.

APPENDIX GC
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

a) Have access to and copy and records that must be kept under the conditions of the permit;
b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

a) A description of and cause of non-compliance; and
b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

APPENDIX GC
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extend it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

G.10 The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.

G.13 This permit also constitutes:

a) Determination of Best Available Control Technology (X)
b) Determination of Prevention of Significant Deterioration (X); and
c) Compliance with New Source Performance Standards (X).

G.14 The permittee shall comply with the following:

a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

c) Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The person responsible for performing the sampling or measurements;
3. The dates analyses were performed;
4. The person responsible for performing the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyses.

G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Cane Island Power Park Unit 3
Kissimmee Utility Authority
PSD-FL-254 and PA98-38
Intercession City, Osceola County, Florida

BACKGROUND

The applicant, Kissimmee Utility Authority (KUA), proposes to install a nominal 250 megawatt (MW) (net) combined cycle combustion turbine at the existing Cane Island Power Park, located at 6075 Old Tampa Highway, near Intercession City, Osceola County. The proposed project will result in "significant increases" with respect to Table 62-212.400-2, Florida Administrative Code (F.A.C.) of emissions of particulate matter (PM and PM_{10}), carbon monoxide (CO), volatile organic compounds (VOC), and nitrogen oxides (NO_X). The project is therefore subject to review for the Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rules 62-212.400, F.A.C.

The primary unit to be installed is a nominal 167 MW, General Electric PG7241FA (7FA) combustion turbine-electrical generator, fired primarily with pipeline natural gas. The project includes an 80-90 MW heat recovery steam generator (HRSG) with a steam turbine-electrical generator. Duct burners will be installed in the HRSG for supplemental firing to compensate for reduced combustion turbine capacity at high ambient temperature. The project also includes a new 1 million gallon storage tank for backup No. 2 fuel oil, cooling tower, 130 foot stack for combined cycle operation, and a 100 foot bypass stack for simple cycle operation. Descriptions of the process, project, air quality effects, and rule applicability are given in the Technical Evaluation and Preliminary Determination dated January 8, 1999, accompanying the Department's Intent to Issue.

BACT APPLICATION:

The application was received on August 5, 1998 and included a proposed BACT proposal prepared by the applicant's consultant, Black & Veatch. A revision which reduced the proposed emission limits was received on November 6 through a Response to Statement of Sufficiency. A draft BACT was issued by the Department on January 7, 1999. It was revised on March 25 as a result of comments received by the Department. The revised version was introduced by KUA into the record of the Administrative Hearing held on June 1 pursuant to the Site Certification requirements of the Florida Power Plant Siting Acton. The draft BACT included therein constitutes KUA's most recent BACT proposal. The proposal is summarized in the table below.

POLLUTANT	CONTROL TECHNOLOGY	BACT PROPOSAL
PM/PM_{10}, VE	Pipeline Natural Gas Good Combustion	10 Percent Opacity 5 ppmvd Ammonia Slip if SCR is used
VOC	As Above	1.4 ppm (Gas, CT on, DB off) 4 ppm (Gas, CT and DB on)) 10 ppm for F.O.
CO	As Above	12 ppmvd (Gas, CT on, DB off) 20 ppmvd (Gas, CT and DB on) 30 ppmvd for F.O.
NO_X (CT on, DB off)	DLN, or DLN & SCR for gas WI or SCR for fuel oil 720 Hours on fuel oil with DB On or Off	9 ppmvd (DLN) or 4.5 ppmvd (SCR) for gas 42 ppmvd (WI) or 15 ppmvd (SCR) for fuel oil 12/42 ppmvd (gas/oil) Intermittent Simple Cycle
NO_X (CT and DB on)	DLN & Low NO_X, or DLN & SCR for gas WI & Low NO_X, or SCR for fuel oil Duct burner only fires natural gas	9.4 ppmvd (DLN) or 4.5 ppmvd (SCR) for gas 42 ppmvd (WI) or 15 ppmvd (SCR) for fuel oil DB limited to 0.4 lb/MW-hr

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

BACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES:

The minimum basis for a BACT determination is 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines (NSPS). Subpart GG was adopted by the Department by reference in Rule 62-204.800, F.A.C. The key emission limits required by Subpart GG are 75 ppmvd NO_x @ 15% O_2. (assuming 25 percent efficiency) and 150 ppmvd SO_2 @ 15% O_2 (or <0.8% sulfur in fuel). The BACT proposed by the KUA is consistent with the NSPS which allows NO_x emissions in the range of 110 ppmvd for the high efficiency unit to be purchased by the Kissimmee Utility Authority. No National Emission Standard for Hazardous Air Pollutants exists for stationary gas turbines.

The duct burner required for supplementary gas-firing of the HRSG at high ambient temperatures is subject to 40 CFR 60, Subpart Dc, Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978. There are no NSPS-based emission limits for these small units when firing natural gas.

DETERMINATIONS BY EPA AND STATES:

The following table is a sample of information on some recent BACT determinations by States in the South for combined cycle stationary gas turbine projects. These are projects incorporating large prime movers capable of producing more than 150 MW excluding the steam cycle. Such units are typically categorized as F or G Class Frame units. The greatest activity in combined cycle installations appears to be in Texas, Florida, and Alabama. The KUA draft BACT is included for reference.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

TABLE 1

RECENT BACT LIMITS FOR NITROGEN OXIDES FOR LARGE STATIONARY GAS TURBINE COMBINED CYCLE PROJECTS

Project Location	Power Output Megawatts	NO_x Limit ppmvd @ 15% O_2 and Fuel	Technology	Comments
Mobile Energy, AL	~250	~3.5 - NG (CT&DB) ~11 – FO (CT&DB)	DLN & SCR	178 MW GE 7FA CT 1/99 585 mmBtu Duct Burner
Alabama Power Barry	800	4.8* - NG Permit Limit is 0.018 lb/mmBtu	DLN & SCR	3x170 MW GE 7FA CTs 11/98 Cannot meet 9 ppmvd w/o SCR Large DB and Pwr Augmentation
Alabama Power Theo	210	4.8* – NG Proposed Limit is 0.018 lb/mmBtu	DLN & SCR	4x170 MW GE 7FA CTs 11/98 Cannot meet 9 ppmvd w/o SCR Large DB and Pwr Augmentation
KUA Cane Island 3	250	9/4.5 - NG (CT) 9.4/4.5 - (CT&DB) 42/15 - FO	DLN/SCR DLN/SCR WI/SCR	170 MW GE 7FA. 11/99 Increase allowed for DB. If SCR, ammonia slip = 5 ppmvd
Lake Worth LLC, FL	250	9/3.5 - NG (CT) 9.4/3.5 - (CT&DB) 42 - FO	DLN/SCR DLN/SCR WI	170 MW GE 7FA. 11/99 Increase allowed for DB. Project repowers one+ units
Lakeland, FL	350	9/7.5 – NG 42/15 – FO	DLN/SCR WI/SCR	250 MW WH 501G 7/98 Initially 250 MW simple cycle and 25 ppmvd NO_x limit on gas
Santa Rosa, FL	241	9 - NG (CT) 9.8/6 (CT&DB)	DLN DLN/SCR	170 MW GE 7FA CT. 12/98 6 ppmvd if SCR or SNCR
Tallahassee, FL	260	12 - NG 42 - No. 2 FO	DLN	160 MW GE 7FA CT. 7/98 DLN guarantee is 9 ppmvd
LSP Batesville, MI	~800	9 - NG 42 - No. 2 FO	DLN & SCR WI	3x185 MW WH 501F CTs 11/97 Revised 7/98. Large DB Cannot meet 9 ppmvd w/o SCR
Miss Power Daniel	1000	4.8* – NG Permit Limit is 0.018 lb/mmBtu	DLN & SCR	4x170 MW GE 7FA CTs 11/98 Cannot meet 9 ppmvd w/o SCR Large DB and Pwr Augmentation
Panda Guadalupe TX	1000	9 - NG	DLN	4x170 MW GE 7FA CTs 2/99
Hays San Marco, TX	1080	5 - NG	SCR	4x175 ABB GT24 CTs. 6/99 Cannot meet 9 ppmvd w/o SCR
Duke Hidalgo, TX	520	12 - NG	DLN	2x170 MW GE 7FA CTs 12/98
Tenaska Rusk, TX	888	9 - NG	DLN	3x164 MW GE 7FA CT. 5/99
Sabine River, TX	440	6 - NG	DLN & SCR	2 x170 MW GE 7FA CTs 6/99
GTP/Calpine, TX	500	5 – NG	SCR	2x183 MW WH501F CTs 9/99 Cannot meet 9 ppmvd w/o SCR

DB = Duct Burner
NG = Natural Gas
FO = Fuel Oil
DLN = Dry Low NO_x Combustion
SCR = Selective Catalytic Reduction
WI = Water or Steam Injection
GE = General Electric
WH = Westinghouse
ABB = Asea Brown Bovari

* Reportedly revised in mid-1999 to 0.013 lb/mmBtu which equals 3.5 ppmvd

There are more than 20 applications pending for similar projects in Texas with similar BACT proposals as indicated above. There are numerous applications for similar projects throughout the Southeast including Florida, all of which include BACT proposals within the range of the determinations given above.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

TABLE 2

RECENT BACT LIMITS FOR CARBON MONOXIDE, VOLATILE ORGANIC COMPOUNDS, PARTICULATE MATTER, AND VISIBILITY FOR LARGE STATIONARY GAS TURBINE COMBINED CYCLE PROJECTS

Project Location	CO - ppmvd (or lb/mmBtu)	VOC - ppm (or lb/mmBtu)	PM - lb/mmBtu (or gr/dscf or lb/hr)	Technology and Comments
Mobile Energy, AL	~18 – NG (CT&DB) ~26 – FO (CT&DB)	~5 – NG ~6 - FO	10% Opacity	Clean Fuels Good Combustion
Alabama Power Barry	~15 – NG(CT) ~25 – NG(DB & CT)	~8 - NG(CT) ~12 – NG(CT & DB)	0.010 lb/mmBtu – (CT) 0.011 lb/mmBtu -(CT/DB) 10% Opacity	Clean Fuels Good Combustion
Alabama Power Theo	~36 – CT & DB	~12.5 CT & DB		Clean Fuels Good Combustion
KUA Cane Island	10 - NG (CT) 20 - NG (CT&DB) 30 - FO	1.4 - NG (CT) 4 - NG (CT&DB) 10 - FO	10% Opacity	Clean Fuels Good Combustion
Lake Worth LLC, FL	9 - NG (CT) 15 – NG (CT & DB) 20 - F.O. (3-hr)	1.4 - NG (CT) 1.8 - NG (CT & DB) 3.5 – F.O.	10% Opacity	Clean Fuels Good Combustion
Lakeland	25 – NG or 10 by Ox Cat 75 – FO	4 – NG 10 – FO	10%	Clean Fuels Good Combustion
Santa Rosa, FL	9 - NG (CT) 24 - NG (CT&DB)	1.4 - NG (CT) 8 - NG (CT&DB)	10% Opacity	Clean Fuels Good Combustion
Tallahassee, FL	25 – NG 90 – FO			Clean Fuels Good Combustion
LSP Batesville, MI	30 at > 75% load - NG 36 at > 75% load - FO	9 at > 75% load – NG 15 at > 75% load - FO	40% Opacity	Clean Fuels Good Combustion
Miss Power Daniel	~15 - NG(CT) ~25 – NG(DB & CT	~8 - NG(CT) ~12 – NG(CT & DB)	0.010 lb/mmBtu – (CT) 0.011 lb/mmBtu -(CT/DB) 10% Opacity	Clean Fuels Good Combustion
Panda Guadalupe TX	15 - NG			Clean Fuels Good Combustion
Hays San Marco, TX	9 - NG			Clean Fuels Good Combustion
Duke Hidalgo, TX	20 - NG			Clean Fuels Good Combustion
Tenaska Rusk, TX	25 - NG			Clean Fuels Good Combustion
Sabine River, TX	15 - NG			Clean Fuels Good Combustion
GTP/Calpine, TX	10 or 25			Clean Fuels Good Combustion

The following table is derived from the information given above for projects incorporating duct burners within supplementally-fired heat recovery steam generators. There are a number of projects from the lists above for which the Department did not obtain the details regarding the duct burners. The main focus was on NO_x emissions.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

TABLE 3

RECENT BACT LIMITS FOR NITROGEN OXIDES FROM LARGE STATIONARY GAS TURBINE COMBINED CYCLE PROJECTS WITH DUCT BURNERS

Project Location	Duct Burner Rated Heat Input (mmBtu/hr)	NO_x Limit (lb/mmBtu or ppmvd)	Technology	Comments
Mobile Power, FL	585	3.5	SCR	Combined CT & DB
Alabama Power Barry	159	4.8	SCR	Combined CT & DB Possibly revised to 3.5
Alabama Power Theo		4.8	SCR	Combined CT & DB Possibly revised to 3.5
KUA Cane Is, FL	44	9.4/4.5 - (CT&DB) 42/15 - FO	DLN or DLN & SCR DLN or DLN & SCR WI or WI & SCR	Gas-fired Duct Burner Low NO_x Burners on DB Max 0.4 lb/MW-hr on DB
Santa Rosa, FL	585	9.8/6 (CT&DB)	DLN or DLN & SCR	Gas-fired Duct Burner Low NO_x Burners on DB Max 0.4 lb/MW-hr on DB
Miss Power Daniel	159	4.8	SCR	Combined CT & DB Possibly revised to 3.5
Saranac Energy, NY	553	0.08 lb/mmBtu	SCR	2 GE 7EA CTs with DBs Permit issued 1992
Bermuda HEL, VA	197	9	Steam Injection, SCR	1175 mmBtu/hr CT (1992)
Bear Island Paper, VA	129	9	SCR	474 mmBtu/hr CT (1992)
Pilgrim Energy, NY	214	4.5 (CT) 0.012 lb/mmBtu (DB)	Steam Injection, SCR Low NO_x Burner, SCR	2 WH 501D5 CTs 2 Duct Burners
Selkirk Cogen, NY	206	9 (CT) 0.018 lb/mmBtu (DB)	Low NO_x Burner, SCR	1173 mmBtu/hr CT
Grays Ferry, PA	366	9 (CT) 0.09 lb/mmBtu (DB)	DLN Low NO_x Burner	WH 501D5A CT with DB DLN Failed, SCR Required

OTHER INFORMATION AVAILABLE TO THE DEPARTMENT:

Besides the initial information submitted by the applicant, the summary above, and the references at the end of this document, key information reviewed by the Department includes:

- Comments from the National Park Service dated, September 11 1998
- Master Overview for Alabama Power Plant Barry Project received in 1998
- Master Overview for Mississippi Power Plant Daniel Project received in 1998
- Letters from EPA Region IV dated February 2, and November 8, 1999 regarding KUA Cane Island Unit 3
- Presentations by Black & Veatch and General Electric at EPA Region IV on March 4, 1999
- Letter from Black & Veatch to EPA Region IV dated March 10, 1999
- Letter from Black & Veatch to the Department and EPA Region IV dated March 24, 1999
- Texas Natural Resource Conservation Commission Draft Tier I BACT for August, 1999

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

- Texas Natural Resource Conservation Commission Website – www.tnrcc.state.tx.us
- DOE website information on Advanced Turbine Systems Project
- Alternative Control Techniques Document - NO_X Emissions from Stationary Gas Turbines
- General Electric 39th Turbine State-of-the-Art Technology Seminar Proceedings
- GE Guarantee for Jacksonville Electric Authority Kennedy Plant Project
- GE Power Generation - Speedtronic™ Mark V Gas Turbine Control System
- GE Combined Cycle Startup Curves
- Coen website information and brochure on Duct Burners

REVIEW OF NITROGEN OXIDES CONTROL TECHNOLOGIES:

Some of the discussion in this section is based on a 1993 EPA document on Alternative Control Techniques for NO_X Emissions from Stationary Gas Turbines. Project-specific information is included where applicable.

Nitrogen Oxides Formation

Nitrogen oxides form in the gas turbine combustion process as a result of the dissociation of molecular nitrogen and oxygen to their atomic forms and subsequent recombination into seven different oxides of nitrogen. Thermal NO_X forms in the high temperature area of the gas turbine combustor. Thermal NO_X increases exponentially with increases in flame temperature and linearly with increases in residence time. Flame temperature is dependent upon the ratio of fuel burned in a flame to the amount of fuel that consumes all of the available oxygen.

By maintaining a low fuel ratio (lean combustion), the flame temperature will be lower, thus reducing the potential for NO_X formation. Prompt NO_X is formed in the proximity of the flame front as intermediate combustion products. The contribution of Prompt to overall NO_X is relatively small in near-stoichiometric combustors and increases for leaner fuel mixtures. This provides a practical limit for NO_X control by lean combustion.

Fuel NO_X is formed when fuels containing bound nitrogen are burned. This phenomenon is not important when combusting natural gas. Although low sulfur fuel oil has more fuel-bound nitrogen than natural gas its use is limited to 720 hours per year.

Uncontrolled emissions range from about 100 to over 600 parts per million by volume, dry, corrected to 15 percent oxygen (ppmvd @15% O_2). The Department estimates uncontrolled emissions at approximately 200 ppmvd @15% O_2 for the proposed KUA turbine. The proposed NO_X controls will reduce these emissions significantly.

NO_X Control Techniques

Wet Injection

Injection of either water or steam directly into the combustor lowers the flame temperature and thereby reduces thermal NO_X formation. Typical emissions achieved by wet injection are in the range of 15–25 ppmvd when firing gas and 42 ppmvd when firing fuel oil in large combustion turbines. These values often form the basis, particularly in combined cycle turbines, for further reduction to BACT limits by other techniques. Carbon monoxide (CO) and hydrocarbon (HC) emissions are relatively low for most gas

turbines. However steam and (more so) water injection may increase emissions of both of these pollutants.

Combustion Controls

The excess air in lean combustion cools the flame and reduces the rate of thermal NO_x formation. Lean premixing of fuel and air prior to combustion can further reduce NO_x emissions. This is accomplished by minimizing localized fuel-rich pockets (and high temperatures) that can occur when trying to achieve lean mixing within the combustion zones.

The above principle is depicted in Figure 1 for a General Electric DLN-1 can-annular combustor operating on gas. For ignition, warm-up, and acceleration to approximately 20 percent load, the first stage serves as the complete combustor. Flame is present only in the first stage, which is operated as lean stable combustion will permit. With increasing load, fuel is introduced into the secondary stage, and combustion takes place in both stages. When the load reaches approximately 40 percent, fuel is cut off to the first stage and the flame in this stage is extinguished. The venturi ensures the flame in the second stage cannot propagate upstream to the first stage. When the fuel in the first-stage flame is extinguished (as verified by internal flame detectors), fuel is again introduced into the first stage, which becomes a premixing zone to deliver a lean, unburned, uniform mixture to the second stage. The second stage acts as the complete combustor in this configuration.

To further reduce NO_x emissions, GE developed the DLN-2.0 (cross section shown in Figure 1) wherein air usage (other than for premixing) was minimized. The venturi and the centerbody assembly were eliminated and each combustor has a single burning zone. So-called "quaternary fuel" is introduced through pegs located on the circumference of the outward combustion casing.

GE has made further improvements in the DLN design. The most recent version is the DLN-2.6 (proposed for the KUA project). The combustor is similar to the DLN-2 with the addition of a sixth (center) fuel nozzle. The emission characteristics of the DLN-2.6 combustor while firing natural gas are given in Figure 2 for a unit tuned to meet a 15 ppmvd NO_x limit (by volume, dry corrected to at 15 percent oxygen) at JEA's Kennedy Station.

NO_x concentrations are higher in the exhaust at lower loads because the combustor does not operate in the lean pre-mix mode. Therefore such a combustor emits NO_x at concentrations of 15 ppmvd at loads between 50 and 100 percent of capacity, but concentrations as high as 100 ppmvd at less than 50 percent of capacity. Note that VOC comprises a very small amount of the "unburned hydrocarbons" which in turn is mostly non-VOC methane.

The combustor can be tuned differently to achieve emissions as low as 9 ppmvd of NO_x and 9 ppmvd of CO. Emissions characteristics by wet injection NO_x control while firing oil are expected to be similar for the DLN-2.6 as they are for those of the DLN-2.0 shown in Figure 3. Simplified cross sectional views of the totally premixed (while firing natural gas) DLN-2.6 combustor to be installed at the KUA project are shown in Figure 4.

In all but the most recent gas turbine combustor designs, the high temperature combustion gases are cooled to an acceptable temperature with dilution air prior to entering the turbine (expansion) section. The sooner this cooling occurs, the lower the thermal NO_x formation. Cooling is also required to protect the first stage nozzle. When this is accomplished by air cooling, the air is injected into the component and is ejected into the combustion gas stream, causing a further drop in combustion gas temperature. This, in turn, lowers achievable thermal efficiency for the unit.

Larger units, such as the Westinghouse 501 G or the planned General Electric 7H, use steam in a closed loop system to provide much of the cooling. The fluid is circulated through the internal portion of the

nozzle component or around the transition piece between the combustor and the nozzle and does not enter the exhaust stream. Instead it is normally sent back to a steam generator. The difference between flame temperature and firing temperature into the first stage is minimized and higher efficiency is attained.

Another important result of steam cooling is that a higher firing temperature can be attained with no increase in flame temperature. Flame temperatures and NO_x emissions can therefore be maintained at comparatively low levels even at high firing temperatures. At the same time, thermal efficiency should be greater when employing steam cooling. A similar analysis applies to steam cooling around the transition piece between the combustor and first stage nozzle.

The relationship between flame temperature, firing temperature, unit efficiency, and NO_x formation can be appreciated from Figure 5 which is from a General Electric discussion on these principles. In addition to employing pre-mixing and steam cooling, further reductions are accomplished through design optimization of the burners, testing, further evaluation, etc.

At the present time, emissions achieved by combustion controls are as low as 9 ppmvd from large gas turbines, such as the GE 7FA line. Specialized dual fuel DLN burners were installed in a project in Israel[1], but their performance on fuel oil is not known to the Department.

Figure 6 is an example of an in-line duct burner arrangement and an individual burner. Since duct burners operate at lower temperature and pressure than the combustion turbine, the potential for emissions is generally lower. Furthermore the duct burner size is only 44 mmBtu/hr compared with the turbine that can accommodate a heat input greater than 1600 mmBtu/hr (LHV). The duct burner will be of a Low NO_x design and will be used to compensate for loss of capacity at high ambient temperatures.

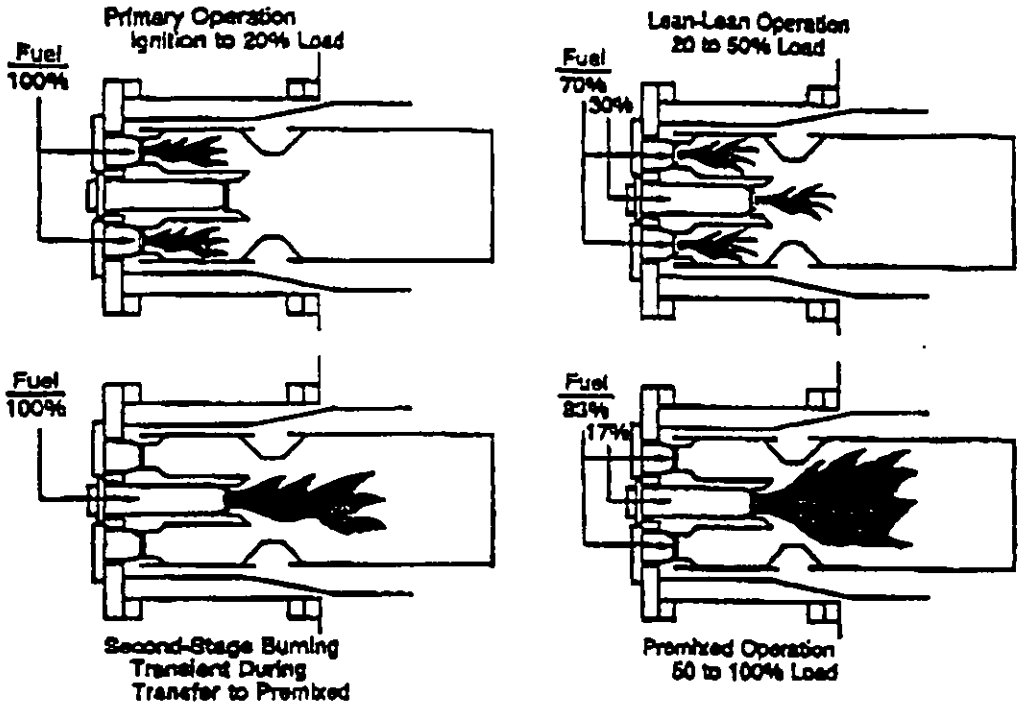
Selective Catalytic Combustion

Selective catalytic reduction (SCR) is an add-on NO_x control technology that is employed in the exhaust stream following the gas turbine. SCR reduces NO_x emissions by injecting ammonia into the flue gas in the presence of a catalyst. Ammonia reacts with NO_x in the presence of a catalyst and excess oxygen yielding molecular nitrogen and water. The catalysts used in combined cycle, low temperature applications (conventional SCR), are usually vanadium or titanium oxide and account for almost all installations. For high temperature applications (Hot SCR up to 1100 °F), such as simple cycle turbines, zeolite catalysts are available but used in few applications to-date. SCR units are typically used in combination with wet injection or DLN combustion controls.

In the past, sulfur was found to poison the catalyst material. Sulfur-resistant catalyst materials are now becoming more available. Catalyst formulation improvements have proven effective in resisting sulfur-induced performance degradation with fuel oil in Europe and Japan, where conventional SCR catalyst life in excess of 4 to 6 years has been achieved, while 8 to 10 years catalyst life has been reported with natural gas.

As of early 1992, over 100 gas turbine installations already used SCR in the United States. Only one combustion turbine project in Florida (FPC Hines Power Block 1) employs SCR. The equipment was installed on a temporary basis because Westinghouse had not yet demonstrated emissions as low as 12 ppmvd by DLN technology at the time the units were to start up in 1998. Seminole Electric will install SCR on a previously permitted 501F unit at the Hardee Unit 3 project. The reasons are similar to those for the FPC Hines Power Block 1.

Figure 7 below is a diagram of a HRSG including an SCR reactor with honeycomb catalyst and the ammonia injection grid. The SCR system lies between low and high pressure steam systems where the temperature requirements for conventional SCR can be met. Figure 8 is a photograph of FPC Hines Energy Complex.



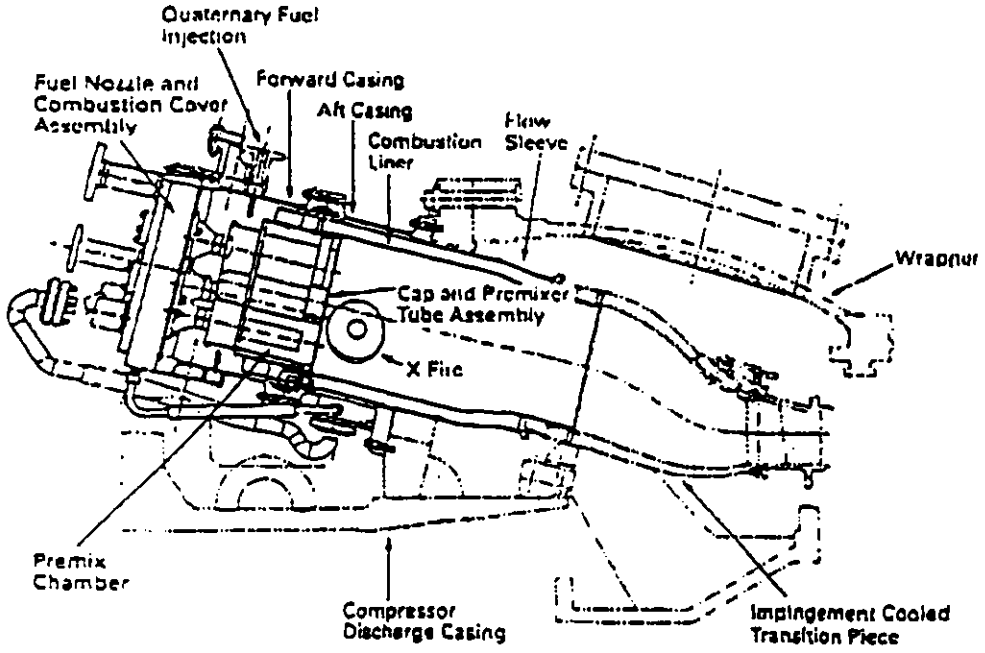


Figure 1 – Dry Low NO_X Operating Modes – DLN-1
Cross Section of GE DLN-2

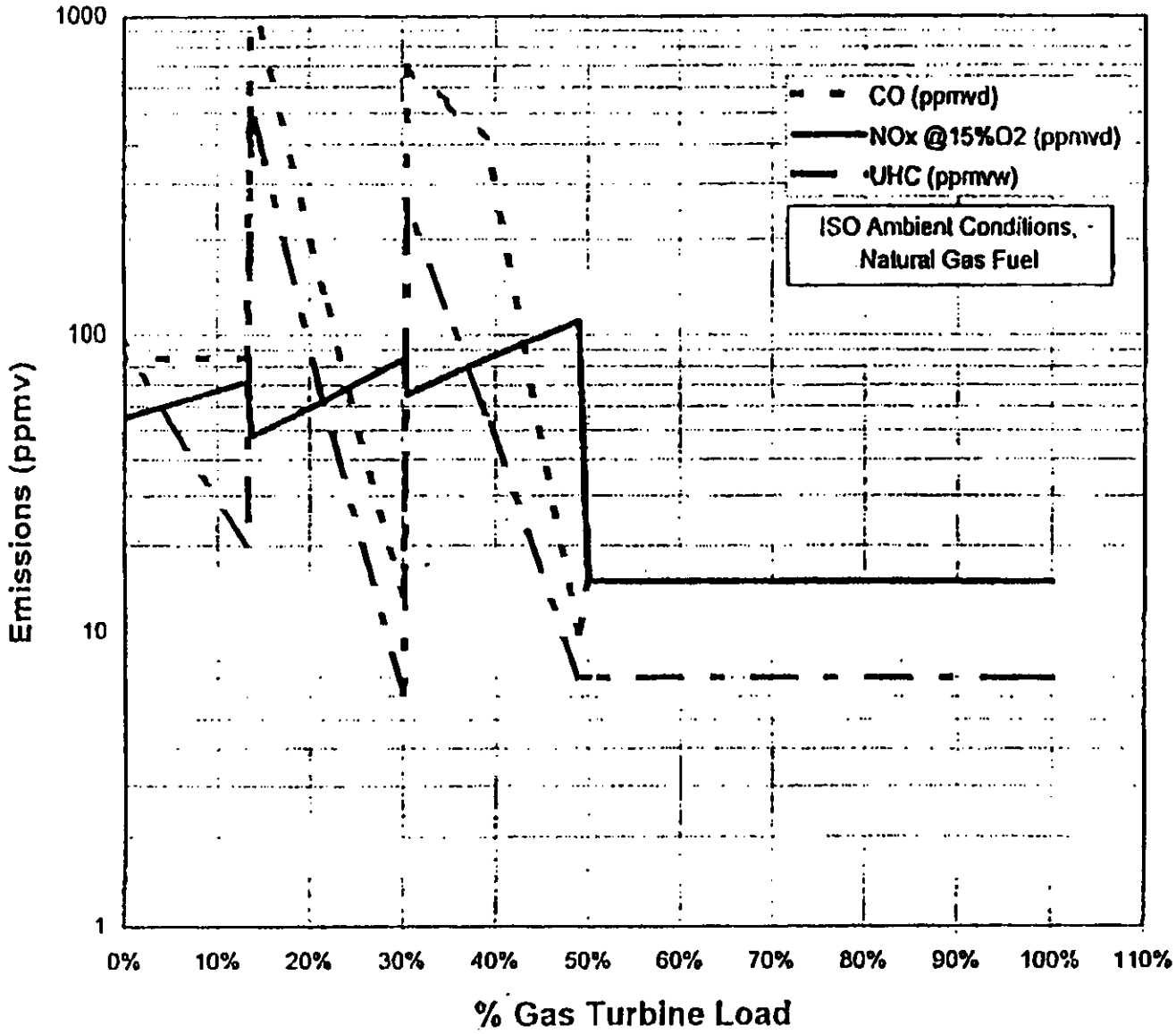


Figure 2 – Emissions Performance Curves for GE DLN-2.6 Combustor Firing Natural Gas in a Dual Fuel GE 7FA Combustion Turbine

(Simple Cycle Intermittent Duty – If Tuned to 15 ppmvd NO_x)

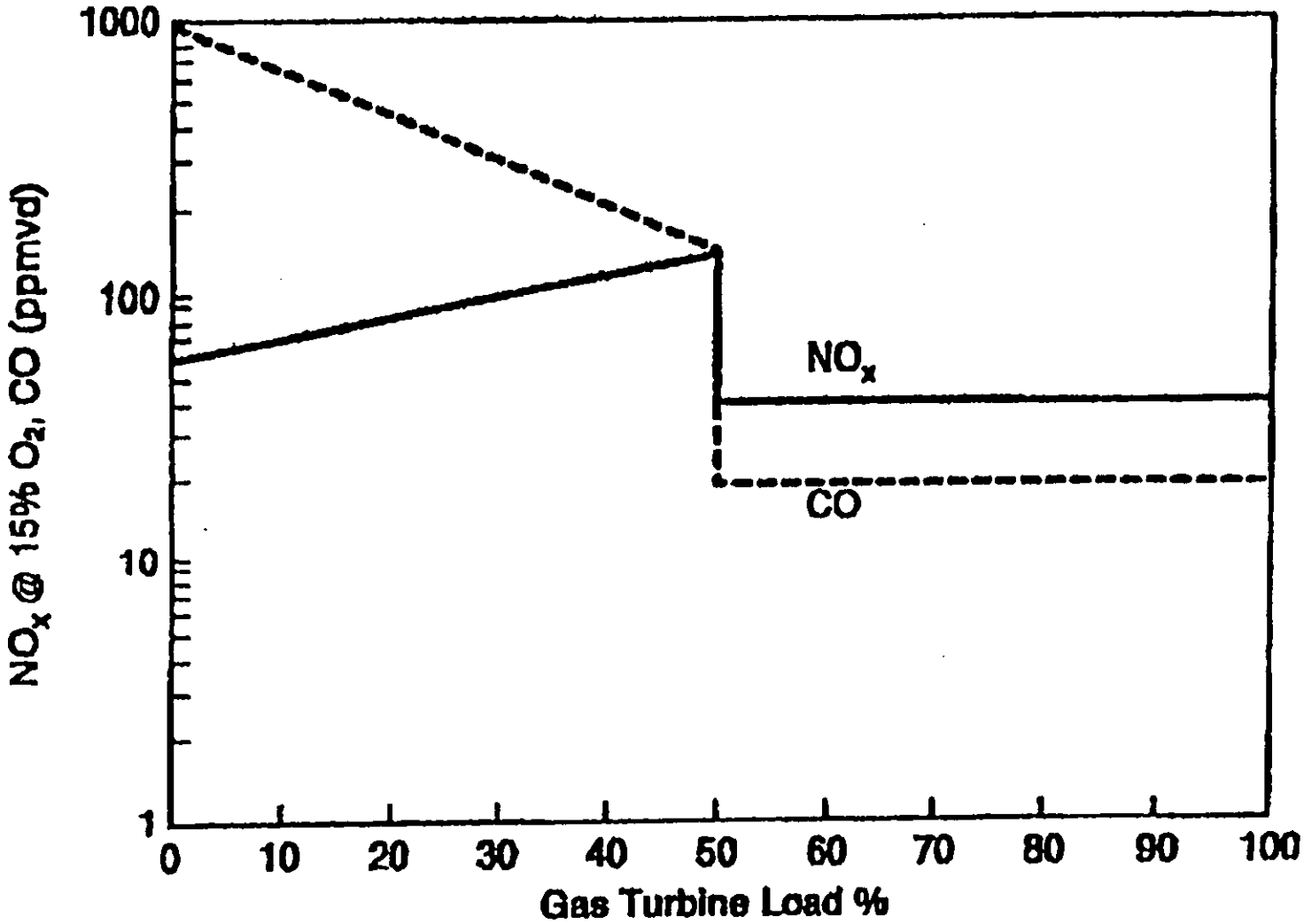
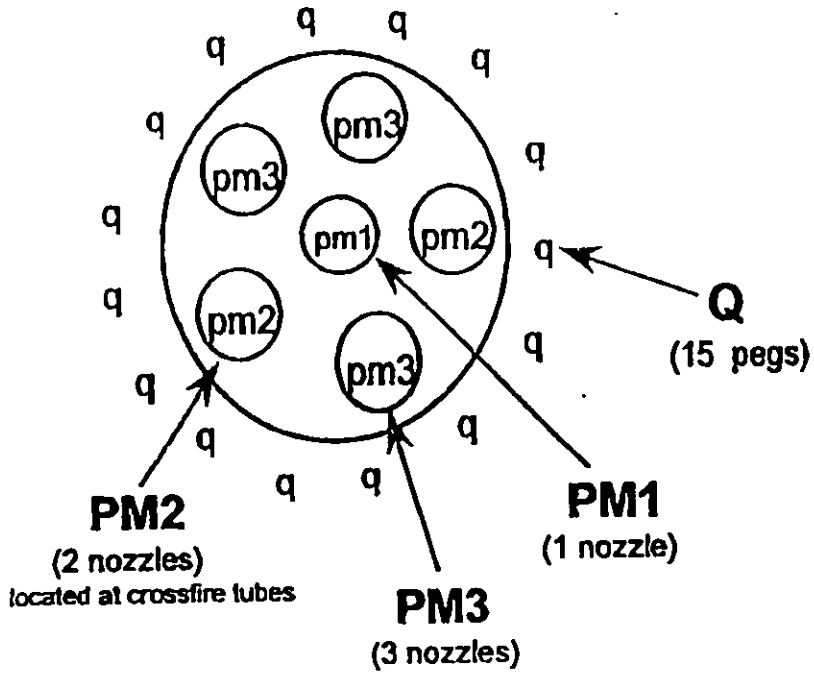
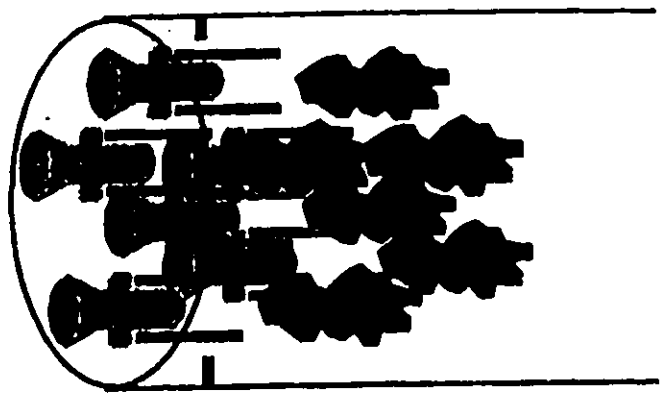
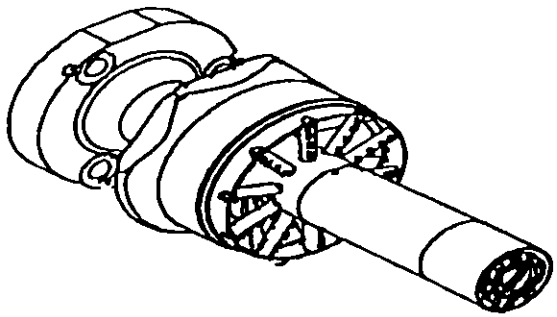


Figure 3 – Emissions Performance for DLN-2 Combustors
Firing Fuel Oil in Dual Fuel GE 7FA Turbine







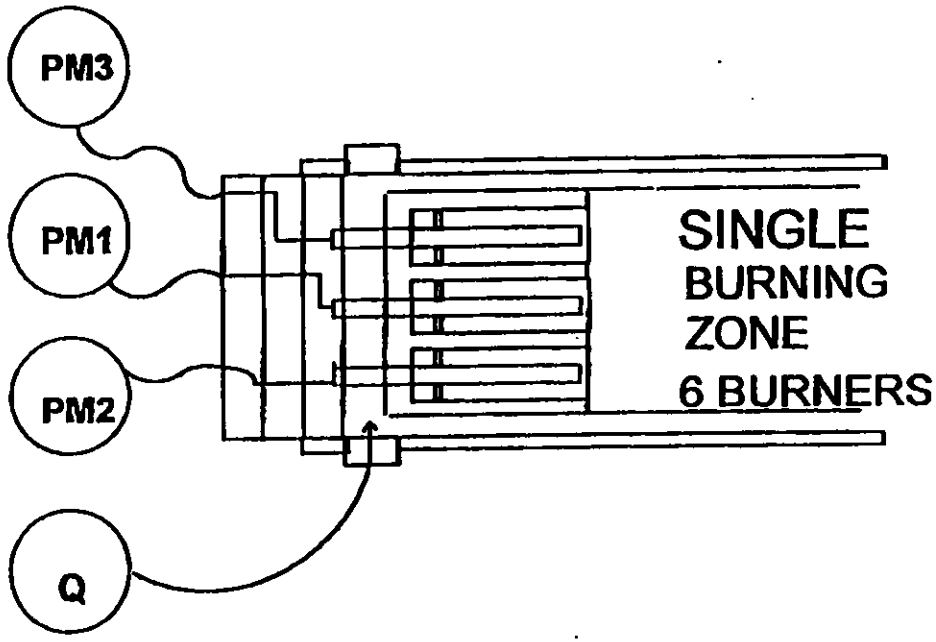


Figure 4 - DLN2.6 Fuel Nozzle Arrangement

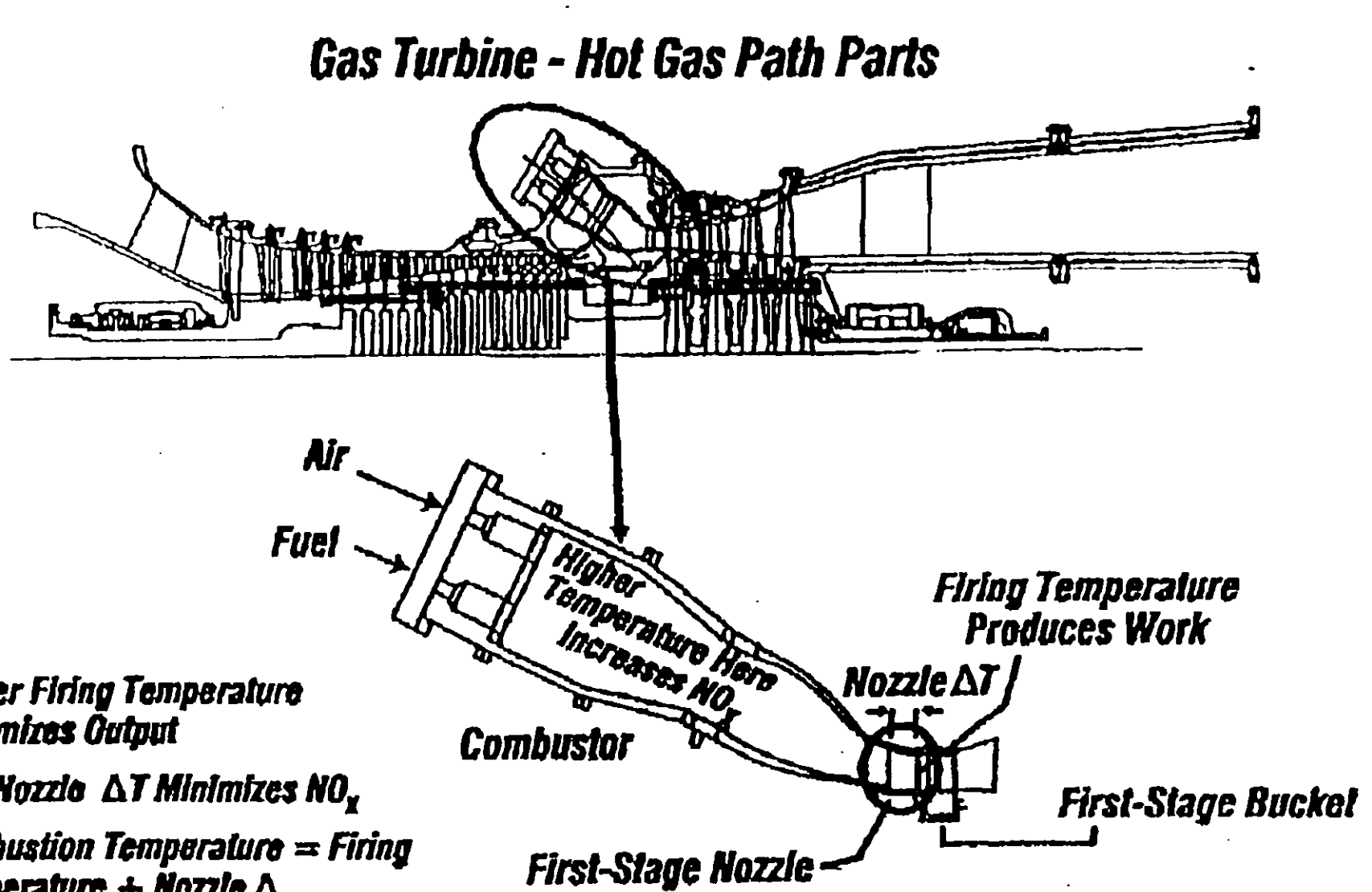
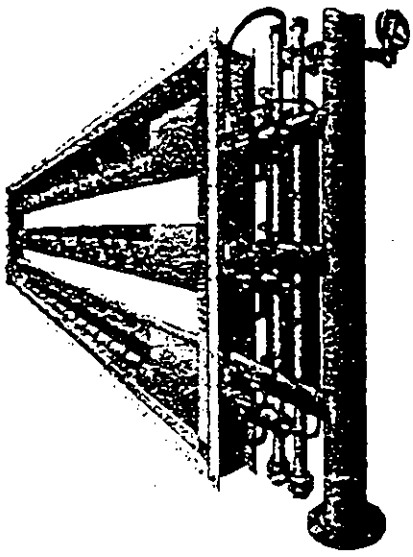
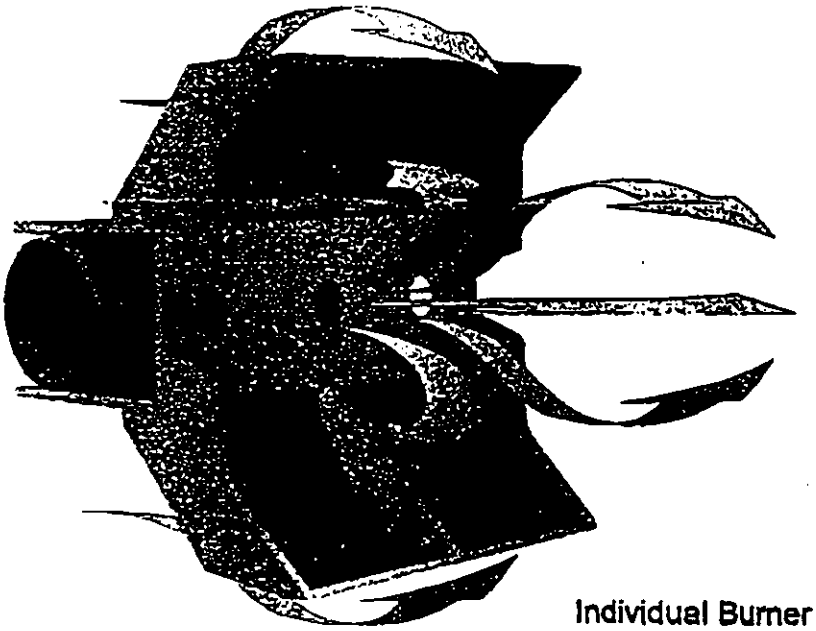


Figure 5 – Relation Between Flame Temperature and Firing Temperature

Burner Arrangment





Individual Burner

Figure 6 - Coen In-line Duct Burner and Arrangement

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

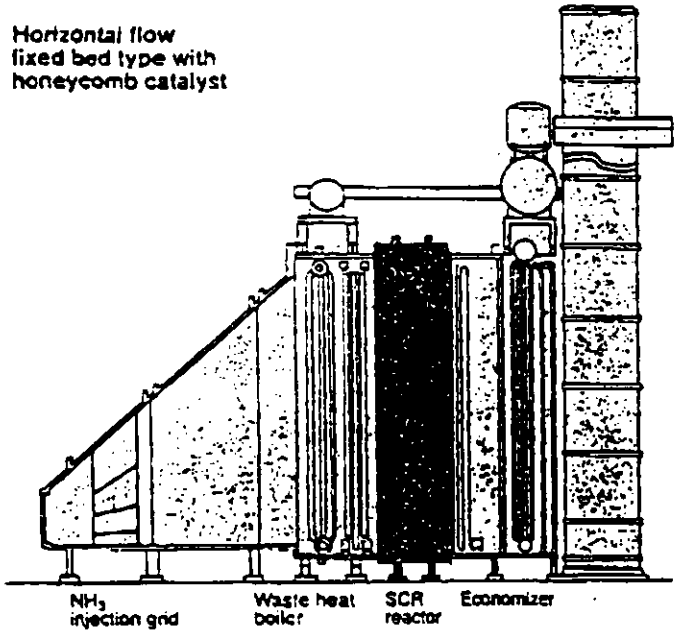


Figure 7 – SCR System within HRSG

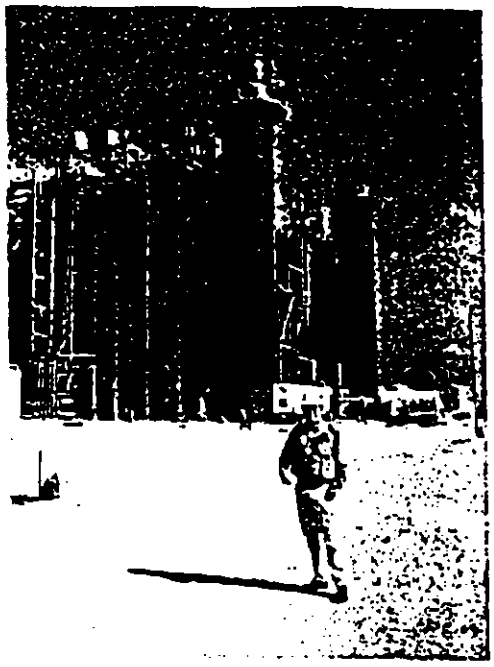


Figure 8 – FPC Hines Power Block I

The external lines to the ammonia injection grid are easily visible in Figure 8. The magnitude of the installation can be appreciated from the relative size compared with nearby individuals and vehicles.

Excessive ammonia use tends to increase emissions of CO, ammonia (slip), and particulate matter (when sulfur bearing fuels are used). Permit limits as low as 2 to 3.5 ppmvd NO_X have been specified using SCR on combined cycle F Class projects throughout the country. Permit BACT limits as low as 3.5 ppmvd NO_X have been specified using SCR for at least one F Class project (with large in-line duct burners) in the Southeast.

In a project such as KUA Cane Island, the DLN system will reduce potential emissions from about 200 ppmvd to 9 ppmvd while firing gas. Such a DLN system is a sophisticated combustion system that optimizes efficiency and emissions. An SCR system at KUA would further reduce emissions to about 4.5 ppmvd at a substantial cost and obviously with add-on control equipment that does nothing to enhance efficiency. It increases PM formation and substitutes another pollutant (ammonia) while bringing NO_X emissions to levels equal to the uncertainty in the measurement method.

Selective Non-Catalytic Combustion

Selective non-catalytic reduction (SNCR) reduction works on the same principle as SCR. The differences are that it is applicable to hotter streams than conventional or hot SCR, no catalyst is required, and urea can be used as a source of ammonia. No applications have been identified wherein SNCR was applied to a gas turbine because the exhaust temperature of 1100 °F is too low to support the NO_X removal mechanism.

The acceptable temperature for the removal reactions is between 1400 and 2000 °F. A supplementally-fired HRSG is defined as a HRSG fired to an average temperature not exceeding about 1800 °F. The 44 mmBtu/hr duct burner described by KUA will not achieve these temperatures close to this value. Although it is one of the approved options for the Santa Rosa Energy Center, which incorporates a 585 mmBtu/hr duct burner, SNCR does not appear to be feasible for KUA's project.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Emerging Technologies: SCONOX™ and XONON™

$SCONO_x$™ is a catalytic technology that achieves NO_x control by oxidizing and then absorbing the pollutant onto a honeycomb structure coated with potassium carbonate. The pollutant is then released as harmless molecular nitrogen during a regeneration cycle that requires dilute hydrogen gas. The technology has been demonstrated on small units in California and has been purchased for a small source in Massachusetts.[2] California regulators and industry sources have stated that the first 250 MW block to install SCONOx ™ will be at PG&E's La Paloma Plant near Bakersfield.[3] The overall project includes several more 250 MW blocks with SCR for control.[4] USEPA has identified an "achieved in practice" BACT value of 2.0 ppmvd over a three-hour rolling average based upon the recent performance of a Vernon, California natural gas-fired 32 MW combined cycle turbine (without duct burners) equipped with the patented SCONOx™ system

SCONOx™ technology (at 2.0 ppmvd) is considered to represent LAER in non-attainment areas where cost is not a factor in setting an emission limit. It competes with less-expensive SCR in those areas, but has the advantages that it does not cause ammonia emissions in exchange for NO_x reduction. Advantages of the SCONOx ™ process include in addition to the reduction of NO_x, the elimination of ammonia and the control of VOC and CO emissions. $SCONO_x$™ has not been applied on any major sources in ozone attainment areas.

In a letter dated March 23, 1998 to Goal Line Environmental Technologies, the SCONOx™ process was deemed as technically feasible for maintaining NO_x emissions at 2 ppmvd on a combined cycle unit. ABB Environmental was announced on September 10, 1998 as the exclusive licensee for SCONOx™ for United States turbine applications larger than 100 MW. ABB Power Generation has stated that scale up and engineering work will be required before SCONOx™ can be offered with commercial guarantees for large turbines (based upon letter from Kreminski/Broemmelsiek of ABB Power Generation to the Massachusetts Department of Environmental Protection dated November 4, 1998).

XONON™, which works by partially burning fuel in a low temperature pre-combustor and completing the combustion in a catalytic combustor. The overall result is low temperature partial combustion (and thus lower NO_x combustion) followed by flameless catalytic combustion to further attenuate NO_x formation. The technology has been demonstrated on combustors on the same order of size as $SCONO_x$™ has. XONON™ avoids the emissions of ammonia and the need to generate hydrogen. It is also extremely attractive from a mechanical point of view.

Catalytica Combustion Systems, Inc. develops, manufactures and markets the XONON™ Combustion System. In a press release on October 8, 1998 Catalytica announced the first installation of a gas turbine equipped with the XONON™ Combustion System in a municipally owned utility for the production of electricity. The turbine was started up on that day at the Gianera Generating Station of Silicon Valley Power, a municipally owned utility serving the City of Santa Clara, Calif. The XONON™ Combustion System, deployed for the first time in a commercial setting, is designed to enable turbines to produce environmentally sound power without the need for expensive cleanup solutions. Previously, this XONON™ system had successfully completed over 1,200 hours of extensive full-scale tests which documented its ability to limit emissions of nitrogen oxides, a primary air pollutant, to less than 3 parts per million.

In a definitive agreement signed on November 19, 1998, GE Power Systems and Catalytica agreed to cooperate in the design, application, and commercialization of XONON™ systems for both new and installed GE E and F-class turbines used in power generation and mechanical drive applications. This appears to be an up-and-coming technology, the development of which will be watched closely by the Department for future applications. It is not yet available for fuel oil and cycling operation.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

REVIEW OF PARTICULATE MATTER (PM/PM_{10}) CONTROL TECHNOLOGIES:

Particulate matter is generated by various physical and chemical processes during combustion and will be affected by the design and operation of the NO_x controls. The particulate matter emitted from this unit will mainly be less than 10 microns in diameter (PM_{10}).

Natural gas and 0.05 percent sulfur No. 2 (or superior grade) distillate fuel oil will be the only fuels fired and are efficiently combusted in gas turbines. Such fuels are necessary to avoid damaging turbine blades and other components already exposed to very high temperature and pressure. Natural gas is an inherently clean fuel and contains no ash. The fuel oil to be combusted contains a minimal amount of ash and will be used for approximately 720 hours per year making any conceivable add-on control technique for PM/PM_{10} either unnecessary or impractical.

A technology review indicated that the top control option for PM/PM_{10} is a combination of good combustion practices, fuel quality, and filtration of inlet air.

REVIEW OF CARBON MONOXIDE(CO) CONTROL TECHNOLOGIES

CO is emitted from combustion turbines due to incomplete fuel combustion. Combustion design and catalytic oxidation are the control alternatives that are viable for the project. The most stringent control technology for CO emissions is the use of an oxidation catalyst.

Among the most recently permitted projects with oxidation catalyst requirements are the 500 MW Wyandotte Energy project in Michigan, the El Dorado project in Nevada, Ironwood in Pennsylvania, Millenium in Massachusetts, and Sutter Calpine in California. The permitted CO values of these units are between 3 and 5 ppmvd. Catalytic oxidation was recently installed at a cogeneration plant at Reedy Creek (Walt Disney World), Florida to avoid PSD review which would have been required due to increased operation at low load. Seminole Electric will install oxidation catalyst to meet the permitted CO limit at its planned 244 MW Westinghouse 501FD combined cycle unit in Hardee County, Florida.[5]

Most combustion turbines incorporate good combustion to minimize emissions of CO. These installations typically achieve emissions between 10 and 30 ppmvd at full load, even as they achieve relatively low NO_x emissions by SCR or dry low NO_x means. KUA proposes to meet a limit of 10 ppmvd while firing natural gas with the small duct burner off. The higher values of 20 and 30 while firing gas or fuel oil with the duct burner operating are still within the range. The present proposal is a big improvement compared to the original proposal of 25 ppmvd when firing gas and 90 ppmvd when firing oil.

According to recent test data reviewed by the Department, actual CO emissions from large F Class frame units are less than 5 ppmvd, even when firing fuel oil. The Department has not reviewed an extensive body of actual data, but has reasonable assurance that the GE PG7241FA unit selected by KUA will achieve values well below those proposed without requiring installation of an oxidation catalyst.

REVIEW OF VOLATILE ORGANIC COMPOUND (VOC) CONTROL TECHNOLOGIES

Volatile organic compound (VOC) emissions, like CO emissions, are formed due to incomplete combustion of fuel. The high flame temperature is very efficient at destroying VOC. The applicant has proposed good combustion practices to control VOC. The limits proposed by KUA for this project are 1.4 ppm for gas with the duct burner off or 4 ppm with the duct burner on. The limit proposed by KUA is 10 ppm for oil firing whether the duct burner is on or off. According to GE, VOC emissions less than 1.4 ppm were achieved during recent tests of the DLN-2.6 technology when firing natural gas.[6]

Based on the chosen equipment, the Department believes VOC emissions will actually be well within the values proposed by KUA.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

BACKGROUND ON SELECTED GAS TURBINE

KUA plans to the purchase a 167 MW (nominal) General Electric 7FA combined cycle gas turbine with a supplementary-fired heat recovery steam generator (HRSG) equipped with a small duct burner and a steam turbine-electrical generator to produce an additional 80-90 of electrical power. The 44 mmBtu/hr duct burner will incorporate a low NO_x design.

The first commercial GE 7F (or 7FA) unit was installed in a combined cycle project at the Virginia Power Chesterfield Station in 1990.[7] The initial units had a firing temperature of 2300 °F and a combined cycle efficiency exceeding 50 percent. By the mid-90s, the line was improved by higher combustor pressure, a firing temperature of 2400 °F, and a combined cycle efficiency of approximately 56 percent based on a 167 MW combustion turbine.

The first GE 7F/FA project in Florida was at the FPL Martin Plant in 1993 and entered commercial service in 1994.[8] The units were equipped with DLN-2 combustors with a permitted NO_x limit of 25 ppmvd. These actually achieved emissions of 13-25 ppmvd of NO_x, 0-3 ppmvd of CO, and 0-0.17 ppmvd of VOC.[9] The City of Tallahassee received a permit in 1998 to install a GE PG7231FA combustion turbine at its Purdom Plant.[10] Although permitted emissions are 12 ppmvd of NO_x, the City obtained a performance guarantee from GE of 9 ppmvd.[11]

FPL also obtained a guarantee and permit limit of 9 ppmvd NO_x for fourteen GE 7241FA turbines to be installed at the Fort Myers and Sanford Repowering Projects.[12, 13] The Santa Rosa Energy Center and the Lake Worth LLC Project in Florida received permits with a 9 ppmvd NO_x BACT limit for GE 7241FA turbines with DLN-2.6 burners.[14] Further examples are given in Table 1 above.

General Electric has primarily relied on further advancement and refinement of DLN technology to provide sufficient NO_x control for their combustion turbines in Florida. When required by BACT determinations of most states, General Electric incorporates SCR in combined cycle projects.[15] In its recent permits, Florida has included separate and lower limits in the event that GE's DLN technology does not achieve 9 ppmvd or the applicant selects a manufacturer that does not provide combustors capable of meeting 9 ppmvd.

GE's approach of progressively refining such technology is a proven one, even on some relatively large units. Recently GE Frame 7FA units met performance guarantees of 9 ppmvd with "DLN-2.6" burners at Fort St. Vrain, Colorado and Clark County, Washington.[16] Although the permitted limit is 15 ppmvd, GE has already achieved emission levels of approximately 6-7 ppmvd on gas at a dual-fuel 7EA (120 MW combined cycle) KUA Cane Island Unit 2.[17] Unit 2 is equipped with DLN-1 combustors. According to GE, similar performance is expected soon on the 7FA line such as the one that will be installed for the KUA Project. Performance guarantees less than 9 ppmvd can be expected for DLN-2.6 combustors on units delivered in a couple of years.[18]

The 9 ppmvd NO_x limit on natural gas during baseload requested by KUA is typical compared with recent BACT determinations for F Class units, such as those previously listed. The 4.5 ppmvd value for the SCR option is in-line with the recent projects listed in Table 1 that incorporate the SCR option. Although at least one of those projects has a limit of 3.5 ppmvd, it is noted that none of the projects on the list has an ammonia slip limit. The KUA ammonia limit of 5 ppmvd is lower than the typical slip guarantee value.

The GE Speedtronic™ Mark V Gas Control System will be used. This control system is designed to fulfill all gas turbine control requirements. These include control of liquid, gas, or both fuels in accordance with the requirements of the speed, load control under part-load conditions, temperature control under maximum capability conditions, or during start-up conditions. The Mark V also monitors the DLN process and controls fuel staging and combustion modes to maintain the programmed NO_x values.[19]

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

DEPARTMENT BACT DETERMINATION

Following are the BACT limits determined for the KUA project assuming full load. Values for NO_x are corrected to 15% O_2. The emission limits or their equivalents in terms of pounds per hour and NSPS units, as well as the applicable averaging times, are given in the permit Specific Conditions No. 24 through 29.

POLLUTANT	CONTROL TECHNOLOGY	BACT DETERMINATION
PM/PM_{10}, VE	Pipeline Natural Gas Good Combustion	10 Percent Opacity 5 ppmvd Ammonia Slip if SCR is used
VOC	As Above	1.4 ppm (Gas, CT on, DB off) 4 ppm (Gas, CT and DB on)) 10 ppm for F.O.
CO	As Above	12 ppmvd (Gas, CT on, DB off) 20 ppmvd (Gas, CT and DB on) 30 ppmvd for F.O.
NO_x (CT on, DB off)	DLN, or DLN & SCR for gas WI or SCR for fuel oil 720 Hours on fuel oil with DB On or Off	9 ppmvd (DLN) or 4.5 ppmvd (SCR) for gas 42 ppmvd (WI) or 15 ppmvd (SCR) for fuel oil 12/42 ppmvd (gas/oil) Intermittent Simple Cycle
NO_x (CT and DB on)	DLN & Low NO_x, or DLN & SCR for gas WI & Low NO_x, or SCR for fuel oil Duct burner only fires natural gas	9.4 ppmvd (DLN) or 4.5 ppmvd (SCR) for gas 42 ppmvd (WI) or 15 ppmvd (SCR) for fuel oil DB limited to 0.4 lb/MW-hr

RATIONALE FOR DEPARTMENT'S DETERMINATION

- The Lowest Achievable Emission Rate (LAER) for NO_x is approximately 2 ppmvd. It has been achieved at a small combustion turbine installation using $SCONO_x$. There are permitted projects for large turbines requiring $SCONO_x$ or SCR.
- The "Top" technology in a top/down analysis will achieve 2 ppmvd.
- The Department has reviewed CEMS data from Fort St. Vrain, CO indicating that a similar unit with DLN-2.6 combustors consistently achieved less than 9 ppmvd NO_x in 1997 (obviously with no ammonia slip).[20]
- DLN is a pollution prevention technology. It controls NO_x by not allowing it to form and does not result in emissions of another pollutant (ammonia). The procedures given in the Top/Down methodology allow for cost-effectiveness of further control to be calculated using the pollution prevention technology as the baseline value.
- Starting with a baseline of 9 ppmvd, KUA estimated the cost of SCR to reduce emissions from 9 to 3.5 ppmvd at $5452 per ton assuming 10 ppmvd ammonia slip. KUA estimated cost-effectiveness at $16,056 per ton when the collateral emissions of PM, CO, and ammonia are deducted from the reductions in NO_x emissions. EPA and the Department do not recognize the latter method, although the point is appreciated.
- General Electric estimates that for units designed for fuel oil as stand-by fuel, the costs are much higher than estimated by KUA. They believe that any amount of fuel oil firing will significantly increase costs because heat recovery steam generator maintenance costs will increase. This is due to fouling by sticky ammonium sulfate and bisulfate residue.[21]
- According to estimates by other consultants, the cost of reducing slip from 10 (the basis of KUA's estimate) to 5 or 2 ppmvd would add $600 to 2900 per ton of NO_x removed[22, 23]
- At $6,000 to 8,300 per ton (after adjusting the KUA estimate for slip control), the Department does not believe it is cost-effective to reduce emissions to 3.5 ppmvd with a slip of 2-5 ppmvd

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

- SCR causes environmental and energy impacts including increased particulate emissions, undesirable (though unregulated) ammonia emissions, and energy penalties. At equal emission rates, DLN technology is a better control strategy than SCR. At higher emission rates, DLN can still be justified as BACT given the cost-effectiveness estimates above together with the negative effects of SCR described above.
- EPA Region IV advised the concerns above are valid. However EPA stated that the Department (in its first draft BACT) did not present "any unusual site-specific conditions associated with the KUA project to indicate that the use of SCR to achieve 3.5 ppmvd would create greater problems than experienced elsewhere at other similar facilities."[24]
- Region IV advised that (notwithstanding cost-effectiveness calculations) it considers SCR cost-effective on the basis that it has been required in many parts of the country without making projects economically unfeasible.[25] EPA advised that it intends to appeal the KUA Permit if the Department does not require a NO_X emissions rate of 3.5 ppmvd when firing natural gas.[26] EPA does not require or propose an ammonia slip limit.
- The Department notes that the EPA Region IV criterion for the BACT limit is most similar to the criterion applied in non-attainment areas where Lowest Achievable Emissions Rate (LAER) is applicable. According to mid-1998 correspondence from EPA Region IX to Goal Line, "any future combustion turbine co-generation project that is subject to the LAER requirement for NO_X must either achieve compliance with a 3.5 ppmv NO_X emission limit, or demonstrate that unique circumstances at the specific facility make compliance with a 3.5 ppmv NO_X emission limit technically infeasible."[27]
- Uncertainties (and statistical variances) in NO_X emissions related to instrumentation, methodology, calibration and sampling errors, exhaust flow, ammonia slip bias, corrections to 15% O_2 and ambient conditions, etc., are approximately equal to "ultra low NO_X" limits (2.5-3.5 ppmvd).[28]
- The Department believes BACT for natural gas firing is 9 ppmvd by DLN or 4.5 ppmvd by SCR (with ammonia slip of 5 ppmvd). The values for the SCR option take into consideration the uncertainties mentioned above and minimize the negative effects of ammonia emissions.
- The recently-drafted Tier I BACT for all large combined cycle turbines prepared by Texas is 9 ppmvd by DLN or 5 ppmvd by SCR (with ammonia slip of 7 ppmvd). The proposal is based on the input from states, applicants, catalyst vendors, turbine manufacturers, etc.
- KUA elected to install SCR technology and meet a 3.5 ppmvd NO_X limit while firing natural gas as required by EPA.[29] The reason is that an appeal would delay issuance of the final permit by roughly one year. KUA has contractual commitments that cannot be met since construction cannot commence until the permit is issued.[30]
- The required NO_X reduction by SCR while firing gas is therefore from 9 to 3.5 ppmvd instead of from 9 to 4.5 ppmvd. More catalyst is normally required to meet the additional 22% reduction to meet EPA's requirement.
- The baseline NO_X limit for fuel oil firing is 42 ppmvd by wet injection. The Department estimates that more catalyst is required to meet the 15 ppmvd NO_X SCR-based limit while firing fuel oil than was required to meet 4.5 ppmvd while firing gas. A unit sized to reduce NO_X from 9 to 4.5 ppmvd while firing gas will only reduce NO_X from 42 to about 27 ppmvd while firing fuel oil. The extra catalyst already required to effect the "additional" 56% reduction to 15 ppmvd while firing fuel oil should be capable of accommodating a revised 3.5 ppmvd gas-based limit while maintaining the specified ammonia slip of 5 ppmvd.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

- During intermittent simple cycle operation, the Department will permit NO_x emissions of 12 ppmvd. Prolonged operation of the unit in simple cycle mode will require that it meet the same 9 ppmvd limit by DLN through re-tuning.
- VOC emissions of 1.4 ppm from the combustion turbine by Good Combustion proposed by the Department are at the lower end of values determined as BACT. However even lower values have already been achieved by the previous generation DLN 2 combustors on the GE's 7FA units after tuning. Similar VOC performance is expected with the DLN-2.6 combustors while firing natural gas. The limit of 4 ppm with the duct burner in operation is also low. The 10 ppm limit while firing fuel oil is readily achievable whether the duct burner is on or off.
- The CO concentrations of 12 ppmvd are low with the duct burner off. With the duct burner on, they will be less than 20 ppmvd which is within the range of recent Department BACT determinations for combustion turbines alone. The CO limit, during the limited hours of fuel oil firing, will be set at 30 ppmvd whether or not the duct burner is in operation.
- For reference, CO limits for the Lakeland and Tallahassee projects are 25 ppmvd on gas while the limit for the FPL Fort Myers project is 12 ppmvd. Limits for the Santa Rosa Energy Center are 9 ppmvd with the duct burner off and 24 ppmvd with the large duct burner on. The CO impact on ambient air quality is lower compared to other pollutants because the allowable concentrations of CO are much greater than for NO_x, SO_2, VOC (ozone) or PM_{10}.
- BACT for PM_{10} was determined to be good combustion practices consisting of: inlet air filtering; use of pipeline natural gas; and operation of the unit in accordance with the manufacturer-provided manuals.
- PM_{10} emissions will be very low and difficult to measure. Additionally, the higher emission mode will involve fuel oil firing which will occur substantially less than the permitted 720 hours per year. It is not practical to require running the turbine on oil, simply to conduct tests. Therefore, the Department will set a Visible Emission standard of 10 percent opacity as BACT for both natural gas and fuel oil firing, consistent with the definition of BACT.

COMPLIANCE PROCEDURES

POLLUTANT	COMPLIANCE PROCEDURE
Visible Emissions	Method 9
Volatile Organic Compounds	Method 18, 25, or 25A (initial tests only)
Carbon Monoxide	Annual Method 10 (can use RATA if at capacity)
NO_x (3 and 24-hr averages)	NO_x CEMS, O_2 or CO_2 diluent monitor, and flow device as needed
NO_x (performance)	Annual Method 20 (can use RATA if at capacity)

BACT EXCESS EMISSIONS APPROVAL

Pursuant to the Rule 62-210.700 F.A.C., the Department through this BACT determination will allow excess emissions as follows: Valid hourly emission rates shall not included periods of startup, shutdown, or malfunction as defined in Rule 62-210.200 F.A.C., where emissions exceed the applicable NO_x standard. These excess emissions periods shall be reported as required in Specific Condition 32 of the Permit . A valid hourly emission rate shall be calculated for each hour in which at least two NO_x concentrations are obtained at least 15 minutes apart [Rules 62-4.070 F.A.C., 62-210.700 F.A.C. and applicant request].

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Excess emissions may occur under the following startup scenarios:

Hot Start: One hour in simple cycle or following a shutdown less than or equal to 8 hours.
Warm Start: Two hours following a shutdown between 8 and 48 hours.
Cold Start: Four hours following a shutdown greater than or equal to 48 hours.

The *starts* are defined by the amount of time the HRSG has been shutdown, following the normal (hot) shutdown procedure described by General Electric, prior to the startup.[31]

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

A. A. Linero, P.E. Administrator, New Source Review Section 11/22
Teresa Heron, Review Engineer, New Source Review Section
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended By:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

Date: 11/23/99

Approved By:

Howard L. Rhodes, Director
Division of Air Resources Management

Date: 11/23/99

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

REFERENCES

1 Telecom. Linero, A.A., FDEP and Chalfin, J., GE. NO_x control technology for fuel oil.

2 News Release. Goaline Environmental. Genetics Institute Buys SCONOx Clean Air System. August 20, 1999.

3 "Control Maker Strives to Sway Utility Skeptics." Air Daily. Volume 5, No. 199. October 14, 1998.

4 Telecom. Linero, A.A., FDEP, and Beckham, D., U.S. Generating. Circa November 1998.

5 Letter. Opalinski, M.P., SECI to Linero, A.A., FDEP. Turbines and Related Equipment at Hardee Unit 3. December 9, 1998.

6 Telecon. Vandervort, C., GE, and Linero, A.A., DEP. "VOC Emissions from FA Gas Turbines with DLN-2.6 Combustors."

7 Brochure. General Electric. "GE Gas Turbines - MS7001FA." Circa 1993.

8 Davis, L.B., GE. "Dry Low NO_x Combustion Systems for GE Heavy Duty Gas Turbines." 1994.

9 Report. Florida Power & Light. "Final Dry Low NO_x Verification Testing at Martin Combine Cycle Plant." August 7, 1995.

10 Permit. Florida DEP. City of Tallahassee Purdom Unit 8. File PSD-FL-239. May, 1998.

11 Application. City of Tallahassee. PSD/Site Certification Application. April, 1997.

12 Permit. Florida DEP. FPL Fort Myers Repowering Project. File 0710002-004-AC. November, 1998.

13 Permit. Florida DEP. FPL Sanford Repowering Project. File 1270009-004-AC. September, 1998.

14 Permit. Florida DEP. Santa Rosa Energy Center. File 1130168-001-AC. December, 1998.

15 Permit. State of Alabama. Alabama Power Plant Barry. 1998.

16 Telecon. Schorr, M., GE, and Costello, M., Florida DEP. March 31, 1998. Status of DLN-2.6 Program

17 Monthly Report. Florida DEP Bureau of Air Regulation. June, 1998.

18 Telecon. Schorr, M., GE, and Linero, A.A., Florida DEP. August, 1998. Cost effectiveness of DLN versus SCR.

19 Rowen, W.I. "General Electric Speedtronic™ Mark V Gas Turbine Control System. 1994."

20 CEMS Data. NO_x Emissions From GE Gas Turbine at Fort St. Vrain. 1997 and 1998.

21 Presentations. KUA (by B&V) and GE to EPA Region IV. Cane Island Unit 3. Atlanta, March 4, 1999

22 Application. Golder Associates. Lake Worth LLC Combined Cycle Project. March, 1999.

23 Letter. Davis, T., ECT to Linero, A.A., FDEP, Duke New Smyrna Project. Responses to EPA Comments. March 25, 1999.

24 Letter. Neeley, R. Douglas, EPA Region IV, to Fancy, C.H., FDEP. Draft PSD Permit – KUA Project. February 2, 1999.

25 Meeting. EPA Region IV and FDEP. Discussion of Combustion Turbine Projects and Control Technology in Florida. November 5, 1999.

26 Letter. Smith, Winston, EPA Region IV, to Rhodes, H.L., FDEP. Proposed KUA Permit. November 8, 1999.

27 Letter. Haber, M., EPA Region IX, to Danziger, R., Goal Line. $SCONO_x$™ at Federal Cogen. July 2, 1998.

28 Zachary, J, Joshi, S., and Kagolanu, R., Siemens. "Challenges Facing the Measurement and Monitoring of Very Low Emissions in Large Scale Gas Turbine Projects." Power-Gen Conference. Orlando, Florida. December 9-11, 1998.

29 Telecon. Buford, T., Esq., YVVA, P.A., and Goorland, Scott, FDEP. November 10, 1999.

30 Meeting. KUA and FDEP. Discussion of KUA's Alternatives. November 9, 1999.

31 General Electric. Combined Cycle Startup Curves. June 19, 1998.

APPENDIX B

GASEOUS EMISSION SUMMARY

NOx EMISSION SUMMARY
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9/02 1/10/02
GAS FIRING

RUN NUMBER:	1-GAS	2-GAS	3-GAS	AVERAGES
START TIME:	14:28	16:28	8:37	
END TIME:	15:35	17:34	9:43	
DATA LOGGER NOx PPM:	4.29	3.44	4.05	
DATA LOGGER O2%:	13.47	13.56	13.53	
DATA LOGGER CO PPM:	0.66	0.56	0.74	
DATA LOGGER CO2%:	NA	NA	4.58	
DATA LOGGER C3H8 PPM:	0.17	0.1	0	
NOx INITIAL BIAS:	5.14	5.06	9.64	
NOx FINAL BIAS:	5.06	5.08	9.44	
NOx AVERAGE BIAS:	5.1	5.07	9.54	
O2 INITIAL BIAS:	13.78	13.76	14.23	
O2 FINAL BIAS:	13.76	14	13.8	
O2 AVERAGE BIAS:	13.77	13.88	14.015	
CO INITIAL BIAS:	3.3	3.39	3.33	
CO FINAL BIAS:	3.39	3.31	3.41	
CO AVERAGE BIAS:	3.345	3.35	3.37	
CO2 INITIAL BIAS:	NA	NA	3.88	
CO2 FINAL BIAS:	NA	NA	3.88	
CO2 AVERAGE BIAS:	NA	NA	3.88	
C3H8 INITIAL BIAS:	3.14	3.07	2.71	
C3H8 FINAL BIAS:	3.07	3.07	2.75	
C3H8 AVERAGE BIAS:	3.105	3.07	2.73	
NOx INITIAL ZERO:	-0.04	0.01	-0.05	
NOx FINAL ZERO:	0.01	-0.02	0	
NOx AVERAGE ZERO:	-0.015	-0.005	-0.025	
O2 INITIAL ZERO:	0.13	0.06	0.19	
O2 FINAL ZERO:	0.06	0.07	0.09	
O2 AVERAGE ZERO:	0.095	0.065	0.14	
CO INITIAL ZERO:	0.03	0.21	-0.01	
CO FINAL ZERO:	0.21	0.04	-0.16	
CO AVERAGE ZERO:	0.12	0.125	-0.085	
CO2 INITIAL ZERO:	NA	NA	0.02	
CO2 FINAL ZERO:	NA	NA	0.02	
CO2 AVERAGE ZERO:	NA	NA	0.02	
C3H8 INITIAL ZERO:	0	0	0	
C3H8 FINAL ZERO:	0	0	-0.6	
C3H8 AVERAGE ZERO:	0	0	-0.3	
NOx CAL GAS VALUE:	5.27	5.27	9.5	
O2 CAL GAS VALUE:	13.99	13.99	13.89	
CO CAL GAS VALUE:	3.2	3.2	3.2	
CO2 CAL GAS VALUE:	NA	NA	3.5	
C3H8 CAL GAS VALUE:	2.83	2.83	2.83	
NOx CORRECTED AVERAGE:	4.44	3.58	4.05	4.02
O2 CORRECTED AVERAGE:	13.68	13.67	13.40	13.58
CO CORRECTED AVERAGE:	0.54	0.43	0.76	0.58
CO2 CORRECTED AVERAGE:	NA	NA	4.13	4.13
C3H8 CORRECTED AVERAGE:	0.15	0.09	0.28	0.18
Fo:			1.81	
FUEL FACTOR:	8710	8710	8710	8710.00
CO LB/MMBTU:	**0.0010**	**0.0008**	**0.0013**	**0.0010**
NOx LB/MMBTU:	**0.013**	**0.011**	**0.012**	**0.012**
NOx PPM @ 15%:	**3.63**	**2.92**	**3.19**	**3.24318**
C3H8 LB/MMBTU:	**0.00045**	**0.00026**	**0.00078**	**0.00050**
CT FUEL FLOW(#/SEC):	19.6	19.6	20.5	19.90
FUEL SPECIFIC GRAVITY(CF/LB):	22.08	22.08	22.08	22.08
CT FUEL FLOW(KSCFH):	1558.0	1558.0	1629.5	1581.81
DB FUEL FLOW(KSCFH):	28.7	30.2	34.3	31.07
TOTAL FUEL FLOW(KSCFH):	1586.7	1588.2	1663.8	1612.88
HHV(BTU/SCF):	1045	1045	1045	1045.00
LHV(BTU/SCF):	947	947	947	947.00
CT MMBTUH(HHV):	1628.1	1628.1	1702.8	1652.99
CT MMBTUH(LHV):	1475.4	1475.4	1543.1	1497.98
DB MMBTUH(HHV):	30.0	31.6	35.8	32.46
DB MMBTUH(LHV):	27.2	28.6	32.5	29.42
TOTAL MMBTUH(HHV):	1658.1	1659.6	1738.7	1685.46
TOTAL MMBTUH(LHV):	**1502.6**	**1504.0**	**1575.6**	**1527.40**
SULFUR GRAINS/HCF:	0.15	0.15	0.15	0.150
SO2 LB/HR:	**0.68**	**0.68**	**0.71**	0.69
NOx LB/HR:	**22.15**	**17.84**	**20.41**	20.13
CO LB/HR:	**1.63**	**1.31**	**2.34**	1.76
C3H8 LB/HR:	**0.74**	**0.44**	**1.35**	**0.84**

APPENDIX C

DATA LOGGER COPIES
AND
STRIP CHART COPIES

EMISSION SUMMARY
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9/02
GAS FIRING

DATA LOGGER SUMMARIES
RUN 1 GAS

PORT 1 POINTS 1-12 @ 4 MINUTES PER POINT
PLUS PORT 2 POINTS 1-4 @ 4 MINUTES PER POINT

Date	Time	Channel 5-STACK O2%	Channel 6-48C CO	Channel 1-10s NOx	Channel 8-51 C3H8
		%	PPM	PPM	PPMw
		Average	Average	Average	Average
1/9/02	14:28:24	13.47	0.67	4.22	0.22
1/9/02	14:28:39	13.46	0.69	4.27	0.22
1/9/02	14:28:54	13.46	0.63	4.23	0.22
1/9/02	14:29:09	13.47	0.61	4.27	0.22
1/9/02	14:29:24	13.47	0.67	4.23	0.22
1/9/02	14:29:39	13.47	0.69	4.13	0.18
1/9/02	14:29:54	13.47	0.75	4.06	0.18
1/9/02	14:30:09	13.47	0.61	4.09	0.17
1/9/02	14:30:24	13.47	0.55	4.08	0.18
1/9/02	14:30:39	13.47	0.53	4.08	0.17
1/9/02	14:30:54	13.47	0.71	4.07	0.17
1/9/02	14:31:09	13.48	0.60	4.09	0.17
1/9/02	14:31:24	13.47	0.55	4.18	0.18
1/9/02	14:31:39	13.47	0.63	4.23	0.17
1/9/02	14:31:54	13.47	0.72	4.25	0.17
1/9/02	14:32:09	13.47	0.67	4.25	0.18
1/9/02	14:32:24	13.47	0.6	4.28	0.17
1/9/02	14:32:39	13.47	0.67	4.22	0.16
1/9/02	14:32:54	13.47	0.63	4.24	0.17
1/9/02	14:33:09	13.47	0.68	4.3	0.17
1/9/02	14:33:24	13.47	0.61	4.3	0.14
1/9/02	14:33:39	13.47	0.73	4.29	0.14
1/9/02	14:33:54	13.46	0.82	4.26	0.16
1/9/02	14:34:09	13.46	0.84	4.3	0.17
1/9/02	14:34:24	13.46	0.76	4.28	0.16
1/9/02	14:34:39	13.46	0.8	4.21	0.16
1/9/02	14:34:54	13.46	0.75	4.2	0.15
1/9/02	14:35:09	13.46	0.77	4.24	0.14
1/9/02	14:35:24	13.46	0.89	4.23	0.15
1/9/02	14:35:39	13.46	0.96	4.19	0.11
1/9/02	14:35:54	13.46	0.93	4.18	0.1
1/9/02	14:36:09	13.46	0.89	4.27	0.13
1/9/02	14:36:24	13.46	0.85	4.28	0.14
1/9/02	14:36:39	13.46	0.85	4.23	0.14
1/9/02	14:36:54	13.46	0.77	4.20	0.14
1/9/02	14:37:09	13.46	0.81	4.22	0.14
1/9/02	14:37:24	13.46	0.85	4.22	0.14
1/9/02	14:37:39	13.46	0.9	4.2	0.14
1/9/02	14:37:54	13.46	0.93	4.2	0.15
1/9/02	14:38:09	13.46	0.94	4.2	0.15
1/9/02	14:38:24	13.46	0.9	4.24	0.14
1/9/02	14:38:39	13.46	0.94	4.23	0.14
1/9/02	14:38:54	13.47	0.88	4.29	0.14
1/9/02	14:39:09	13.47	0.75	4.25	0.14
1/9/02	14:39:24	13.47	0.81	4.27	0.14
1/9/02	14:39:39	13.46	0.75	4.26	0.14
1/9/02	14:39:54	13.46	0.62	4.25	0.14
1/9/02	14:40:09	13.46	0.61	4.22	0.14
1/9/02	14:40:24	13.46	0.59	4.22	0.14
1/9/02	14:40:39	13.47	0.61	4.27	0.14
1/9/02	14:40:54	13.47	0.54	4.26	0.14
1/9/02	14:41:09	13.46	0.57	4.23	0.13
1/9/02	14:41:24	13.46	0.69	4.27	0.14
1/9/02	14:41:39	13.46	0.65	4.27	0.1

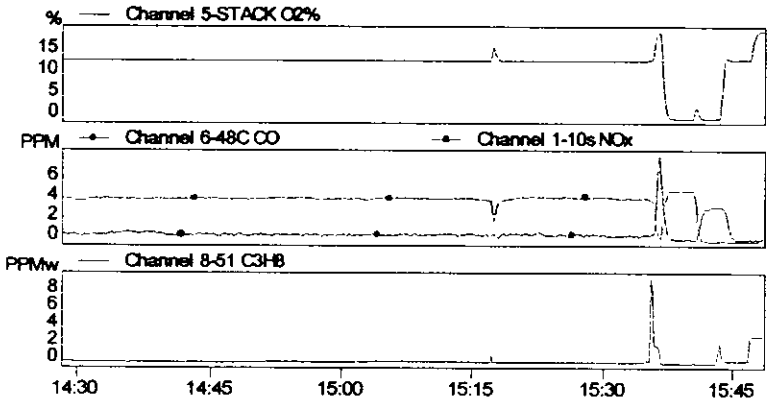
1/9/02	14:41:54	13.46	0.69	4.28	0.13
1/9/02	14:42:09	13.46	0.57	4.26	0.11
1/9/02	14:42:24	13.45	0.57	4.27	0.13
1/9/02	14:42:39	13.45	0.68	4.24	0.14
1/9/02	14:42:54	13.45	0.64	4.27	0.11
1/9/02	14:43:09	13.46	0.54	4.29	0.14
1/9/02	14:43:24	13.46	0.67	4.3	0.14
1/9/02	14:43:39	13.46	0.75	4.29	0.11
1/9/02	14:43:54	13.45	0.78	4.33	0.1
1/9/02	14:44:09	13.45	0.65	4.33	0.11
1/9/02	14:44:24	13.45	0.71	4.28	0.13
1/9/02	14:44:39	13.45	0.66	4.27	0.13
1/9/02	14:44:54	13.45	0.64	4.31	0.11
1/9/02	14:45:09	13.46	0.7	4.3	0.11
1/9/02	14:45:24	13.45	0.68	4.31	0.1
1/9/02	14:45:39	13.45	0.56	4.3	0.11
1/9/02	14:45:54	13.45	0.52	4.26	0.12
1/9/02	14:46:09	13.45	0.56	4.24	0.1
1/9/02	14:46:24	13.45	0.72	4.27	0.09
1/9/02	14:46:39	13.45	0.71	4.26	0.13
1/9/02	14:46:54	13.45	0.64	4.26	0.11
1/9/02	14:47:09	13.45	0.62	4.22	0.14
1/9/02	14:47:24	13.45	0.69	4.22	0.11
1/9/02	14:47:39	13.45	0.54	4.23	0.1
1/9/02	14:47:54	13.45	0.57	4.27	0.13
1/9/02	14:48:09	13.45	0.75	4.23	0.14
1/9/02	14:48:24	13.45	0.75	4.26	0.14
1/9/02	14:48:39	13.44	0.63	4.28	0.14
1/9/02	14:48:54	13.44	0.62	4.24	0.15
1/9/02	14:49:09	13.45	0.61	4.24	0.14
1/9/02	14:49:24	13.45	0.57	4.18	0.14
1/9/02	14:49:39	13.44	0.63	4.25	0.14
1/9/02	14:49:54	13.44	0.65	4.23	0.14
1/9/02	14:50:09	13.44	0.71	4.23	0.14
1/9/02	14:50:24	13.44	0.6	4.27	0.11
1/9/02	14:50:39	13.45	0.76	4.28	0.12
1/9/02	14:50:54	13.44	0.68	4.26	0.16
1/9/02	14:51:09	13.44	0.67	4.28	0.17
1/9/02	14:51:24	13.45	0.63	4.29	0.2
1/9/02	14:51:39	13.45	0.62	4.31	0.22
1/9/02	14:51:54	13.44	0.55	4.31	0.22
1/9/02	14:52:09	13.44	0.53	4.29	0.22
1/9/02	14:52:24	13.44	0.63	4.3	0.22
1/9/02	14:52:39	13.44	0.72	4.33	0.22
1/9/02	14:52:54	13.44	0.67	4.33	0.22
1/9/02	14:53:09	13.44	0.63	4.33	0.2
1/9/02	14:53:24	13.44	0.68	4.36	0.19
1/9/02	14:53:39	13.44	0.65	4.32	0.18
1/9/02	14:53:54	13.44	0.65	4.29	0.21
1/9/02	14:54:09	13.44	0.6	4.32	0.17
1/9/02	14:54:24	13.44	0.63	4.32	0.22
1/9/02	14:54:39	13.44	0.69	4.33	0.2
1/9/02	14:54:54	13.44	0.67	4.37	0.21
1/9/02	14:55:09	13.44	0.66	4.35	0.21
1/9/02	14:55:24	13.44	0.54	4.37	0.18
1/9/02	14:55:39	13.44	0.57	4.34	0.17
1/9/02	14:55:54	13.44	0.66	4.3	0.17
1/9/02	14:56:09	13.44	0.7	4.32	0.17
1/9/02	14:56:24	13.44	0.66	4.33	0.17
1/9/02	14:56:39	13.44	0.58	4.31	0.18
1/9/02	14:56:54	13.45	0.67	4.26	0.18
1/9/02	14:57:09	13.45	0.71	4.22	0.18
1/9/02	14:57:24	13.44	0.63	4.17	0.18
1/9/02	14:57:39	13.45	0.52	4.17	0.18

1/9/02	14:57:54	13.45	0.51	4.2	0.17
1/9/02	14:58:09	13.45	0.66	4.18	0.17
1/9/02	14:58:24	13.45	0.61	4.18	0.17
1/9/02	14:58:39	13.45	0.65	4.22	0.18
1/9/02	14:58:54	13.45	0.67	4.17	0.18
1/9/02	14:59:09	13.45	0.63	4.2	0.17
1/9/02	14:59:24	13.44	0.57	4.26	0.17
1/9/02	14:59:39	13.44	0.68	4.28	0.15
1/9/02	14:59:54	13.44	0.65	4.24	0.17
1/9/02	15:00:09	13.44	0.69	4.26	0.17
1/9/02	15:00:24	13.44	0.63	4.28	0.17
1/9/02	15:00:39	13.44	0.57	4.24	0.17
1/9/02	15:00:54	13.44	0.71	4.23	0.17
1/9/02	15:01:09	13.44	0.61	4.24	0.17
1/9/02	15:01:24	13.44	0.59	4.27	0.17
1/9/02	15:01:39	13.44	0.64	4.32	0.18
1/9/02	15:01:54	13.43	0.67	4.33	0.21
1/9/02	15:02:09	13.43	0.61	4.31	0.2
1/9/02	15:02:24	13.44	0.63	4.23	0.17
1/9/02	15:02:39	13.45	0.69	4.14	0.17
1/9/02	15:02:54	13.45	0.68	4.13	0.18
1/9/02	15:03:09	13.45	0.66	4.18	0.21
1/9/02	15:03:24	13.44	0.73	4.22	0.22
1/9/02	15:03:39	13.44	0.70	4.27	0.22
1/9/02	15:03:54	13.44	0.66	4.3	0.22
1/9/02	15:04:09	13.44	0.64	4.32	0.22
1/9/02	15:04:24	13.44	0.65	4.32	0.22
1/9/02	15:04:39	13.44	0.6	4.33	0.22
1/9/02	15:04:54	13.43	0.61	4.31	0.22
1/9/02	15:05:09	13.43	0.58	4.28	0.22
1/9/02	15:05:24	13.43	0.63	4.25	0.22
1/9/02	15:05:39	13.43	0.61	4.27	0.22
1/9/02	15:05:54	13.44	0.58	4.35	0.22
1/9/02	15:06:09	13.44	0.6	4.35	0.22
1/9/02	15:06:24	13.44	0.61	4.35	0.22
1/9/02	15:06:39	13.44	0.65	4.34	0.25
1/9/02	15:06:54	13.44	0.66	4.32	0.26
1/9/02	15:07:09	13.44	0.64	4.34	0.29
1/9/02	15:07:24	13.44	0.71	4.36	0.27
1/9/02	15:07:39	13.44	0.68	4.33	0.27
1/9/02	15:07:54	13.44	0.63	4.33	0.27
1/9/02	15:08:09	13.45	0.63	4.32	0.27
1/9/02	15:08:24	13.45	0.77	4.29	0.27
1/9/02	15:08:39	13.45	0.67	4.31	0.27
1/9/02	15:08:54	13.45	0.61	4.29	0.27
1/9/02	15:09:09	13.45	0.61	4.29	0.27
1/9/02	15:09:24	13.45	0.59	4.32	0.25
1/9/02	15:09:39	13.45	0.65	4.32	0.22
1/9/02	15:09:54	13.45	0.68	4.32	0.22
1/9/02	15:10:09	13.45	0.64	4.3	0.23
1/9/02	15:10:24	13.45	0.64	4.28	0.22
1/9/02	15:10:39	13.45	0.66	4.25	0.22
1/9/02	15:10:54	13.46	0.6	4.23	0.22
1/9/02	15:11:09	13.46	0.68	4.23	0.22
1/9/02	15:11:24	13.46	0.74	4.24	0.22
1/9/02	15:11:39	13.46	0.64	4.23	0.22
1/9/02	15:11:54	13.46	0.72	4.24	0.21
1/9/02	15:12:09	13.46	0.67	4.24	0.19
1/9/02	15:12:24	13.46	0.71	4.25	0.22
1/9/02	15:12:39	13.46	0.71	4.26	0.22
1/9/02	15:12:54	13.45	0.68	4.3	0.22
1/9/02	15:13:09	13.45	0.71	4.31	0.22
1/9/02	15:13:24	13.45	0.59	4.29	0.19
1/9/02	15:13:39	13.46	0.61	4.28	0.17

1/9/02	15:13:54	13.46		0.68	4.32	0.20
1/9/02	15:14:09	13.46		0.68	4.3	0.18
1/9/02	15:14:24	13.46		0.7	4.29	0.17
1/9/02	15:14:39	13.46		0.76	4.32	0.19
1/9/02	15:14:54	13.46		0.75	4.3	0.2
1/9/02	15:15:09	13.47		0.73	4.3	0.18
1/9/02	15:15:24	13.46		0.67	4.28	0.17
1/9/02	15:15:39	13.46		0.6	4.31	0.18
1/9/02	15:15:54	13.47		0.63	4.26	0.18
1/9/02	15:16:09	13.48		0.59	4.18	0.18
1/9/02	15:16:24	13.47		0.56	4.19	0.18
1/9/02	**15:16:39**	**13.48**		**0.69**	**4.16**	**0.17**
1/9/02	**15:16:54**	**13.48**		**0.7**	**4.13**	**0.18**
1/9/02	**15:17:09**	**13.49**		**0.48**	**4.08**	**0.39**
1/9/02	**15:17:24**	**14.93**		**0.58**	**3.53**	**0.59**
1/9/02	**15:17:39**	**16.52**	**PORT**	**0.67**	**2.11**	**0.17**
1/9/02	**15:17:54**	**14.76**	**CHANGE**	**0.45**	**3.14**	**0.16**
1/9/02	**15:18:09**	**13.8**		**0.45**	**3.9**	**0.16**
1/9/02	**15:18:24**	**13.57**		**0.62**	**4.04**	**0.15**
1/9/02	**15:18:39**	**13.52**		**0.74**	**4.08**	**0.16**
1/9/02	**15:18:54**	**13.52**		**0.67**	**4.14**	**0.15**
1/9/02	15:19:09	13.51		0.59	4.18	0.14
1/9/02	15:19:24	13.51		0.76	4.23	0.14
1/9/02	15:19:39	13.51		0.76	4.28	0.14
1/9/02	15:19:54	13.51		0.76	4.33	0.14
1/9/02	15:20:09	13.50		0.75	4.38	0.14
1/9/02	15:20:24	13.51		0.72	4.39	0.14
1/9/02	15:20:39	13.51		0.67	4.43	0.14
1/9/02	15:20:54	13.51		0.66	4.42	0.14
1/9/02	15:21:09	13.5		0.75	4.38	0.14
1/9/02	15:21:24	13.5		0.79	4.39	0.15
1/9/02	15:21:39	13.51		0.69	4.44	0.17
1/9/02	15:21:54	13.51		0.62	4.46	0.18
1/9/02	15:22:09	13.51		0.73	4.47	0.17
1/9/02	15:22:24	13.5		0.8	4.46	0.18
1/9/02	15:22:39	13.51		0.93	4.44	0.18
1/9/02	15:22:54	13.51		0.84	4.41	0.17
1/9/02	15:23:09	13.51		0.74	4.44	0.14
1/9/02	15:23:24	13.51		0.64	4.42	0.14
1/9/02	15:23:39	13.52		0.57	4.41	0.15
1/9/02	15:23:54	13.52		0.6	4.4	0.14
1/9/02	15:24:09	13.52		0.6	4.39	0.14
1/9/02	15:24:24	13.53		0.56	4.41	0.14
1/9/02	15:24:39	13.53		0.53	4.42	0.14
1/9/02	15:24:54	13.52		0.66	4.39	0.14
1/9/02	15:25:09	13.52		0.76	4.41	0.14
1/9/02	15:25:24	13.52		0.71	4.44	0.14
1/9/02	15:25:39	13.53		0.63	4.48	0.14
1/9/02	15:25:54	13.53		0.59	4.46	0.14
1/9/02	15:26:09	13.53		0.54	4.38	0.14
1/9/02	15:26:24	13.53		0.56	4.35	0.14
1/9/02	15:26:39	13.52		0.64	4.39	0.14
1/9/02	15:26:54	13.52		0.72	4.38	0.14
1/9/02	15:27:09	13.52		0.74	4.35	0.14
1/9/02	15:27:24	13.52		0.72	4.36	0.14
1/9/02	15:27:39	13.52		0.56	4.36	0.14
1/9/02	15:27:54	13.52		0.6	4.41	0.14
1/9/02	15:28:09	13.52		0.7	4.4	0.14
1/9/02	15:28:24	13.52		0.64	4.38	0.14
1/9/02	15:28:39	13.52		0.64	4.37	0.14
1/9/02	15:28:54	13.52		0.72	4.38	0.14
1/9/02	15:29:09	13.52		0.67	4.42	0.12
1/9/02	15:29:24	13.52		0.65	4.44	0.13
1/9/02	15:29:39	13.52		0.6	4.41	0.14

1/9/02	15:29:54	13.52		0.64		4.42		0.14	
1/9/02	15:30:09	13.51		0.68		4.42		0.14	
1/9/02	15:30:24	13.51		0.61		4.41		0.14	
1/9/02	15:30:39	13.52		0.52		4.4		0.14	
1/9/02	15:30:54	13.52		0.59		4.37		0.14	
1/9/02	15:31:09	13.52		0.51		4.35		0.14	
1/9/02	15:31:24	13.52		0.5		4.3		0.14	
1/9/02	15:31:39	13.52		0.54		4.29		0.11	
1/9/02	15:31:54	13.52		0.54		4.27		0.09	
1/9/02	15:32:09	13.52		0.52		4.23		0.13	
1/9/02	15:32:24	13.52		0.53		4.24		0.09	
1/9/02	15:32:39	13.51		0.59		4.27		0.12	
1/9/02	15:32:54	13.52		0.61		4.30		0.14	
1/9/02	15:33:09	13.51		0.67		4.30		0.09	
1/9/02	15:33:24	13.51		0.57		4.29		0.12	
1/9/02	15:33:39	13.51		0.55		4.23		0.13	
1/9/02	15:33:54	13.51		0.64		4.24		0.1	
1/9/02	15:34:09	13.51		0.51		4.3		0.13	
1/9/02	15:34:24	13.51		0.52		4.26		0.12	
1/9/02	15:34:39	13.51		0.61		4.25		0.14	
1/9/02	15:34:54	13.51		0.66		4.28		0.19	
1/9/02	15:35:09	13.54		0.67		4.3		0.31	
AVERAGES:		13.47		0.66		4.29		0.17	
1/9/02	15:35:24	13.61		0.61		4.2		0.22	
1/9/02	15:35:39	13.64		0.64		4.13		5.63	
1/9/02	15:35:54	14.94		0.86		3.58		4.76	
1/9/02	15:36:09	17.77		3.01		2.04		2.09	
1/9/02	15:36:24	19.56		7.31		0.84		1.97	
1/9/02	15:36:39	20.16		7.88		0.36		0.9	
1/9/02	15:36:54	17.13		5.2		0.85		0.05	
1/9/02	15:37:09	7.98		2.71		3.08		0.04	
1/9/02	15:37:24	2.56		1.4		4.41		0.04	
1/9/02	15:37:39	0.8		0.72		4.83		0.04	
1/9/02	15:37:54	0.29		0.41		5	**5.27 NOx**	0.04	
1/9/02	15:38:09	0.15		0.28		5.02		0.04	
1/9/02	15:38:24	0.11		0.25		5.03		0.04	
1/9/02	15:38:39	0.09		0.22		5.03		0.01	
1/9/02	15:38:54	0.09		0.24		5.01		0.01	
1/9/02	15:39:09	0.08	**ZERO O2**	0.22		**5.06**		0	
1/9/02	15:39:24	0.08		0.18		**5.05**		0	
1/9/02	15:39:39	0.07		0.22		**5.07**	**5.06**	0	
1/9/02	15:39:54	0.07		0.24		5.04		0	
1/9/02	15:40:09	0.07		0.3		5.05		0	
1/9/02	15:40:24	0.07		0.19		5.04		0.01	
1/9/02	15:40:39	0.52		0.18		5.02		0.13	
1/9/02	15:40:54	2.47		0.26		3.74		0	
1/9/02	15:41:09	1.67		0.77		1.44		0	
1/9/02	15:41:24	0.62		1.74	**3.2 CO**	0.52		0	**ZERO C3H8**
1/9/02	15:41:39	0.22		2.77		0.2		0	
1/9/02	15:41:54	0.1		3.21		0.1		**0**	
1/9/02	15:42:09	0.07		3.24		0.07		**0**	
1/9/02	15:42:24	**0.06**		**3.24**		0.06		**0**	
1/9/02	15:42:39	**0.06**		**3.48**		0.05		**0**	
1/9/02	15:42:54	**0.06**	**0.06**	**3.45**	**3.39**	0.05		**0**	
1/9/02	15:43:09	0.1		3.41		0.04		**0**	**0**
1/9/02	15:43:24	0.13		3.4		0.04		0.87	
1/9/02	15:43:39	0.21		3.39		0.05		2.08	
1/9/02	15:43:54	4.41		3.4		0.09		1.4	
1/9/02	15:44:09	12.07		3.31		0.16		0.38	
1/9/02	15:44:24	14.05		2.94		0.11		0.32	
1/9/02	15:44:39	13.91		1.98		0.06		0.32	

1/9/02	15:44:54	13.75		0.88		0.04		0.32	
1/9/02	15:45:09	13.71		0.4		0.02		0.32	
1/9/02	15:45:24	13.7		0.22		0.02		0.32	
1/9/02	15:45:39	13.72	**13.99 O2**	0.22		0.02		0.29	
1/9/02	15:45:54	13.73		0.2		0.02		0.3	
1/9/02	15:46:09	13.74		0.16		0.01		0.32	
1/9/02	15:46:24	**13.75**		0.16		0.01		0.32	
1/9/02	15:46:39	**13.75**		0.17		0.01		0.32	
1/9/02	15:46:54	**13.77**	**13.76**	0.2		0.01		0.32	
1/9/02	15:47:09	13.9		0.26		0		2.58	**2.83 C3H8**
1/9/02	15:47:24	15.96		0.11	**ZERO CO**	0.01	**ZERO NOx**	3.09	
1/9/02	15:47:39	18.61		0.23		0.01		3.09	
1/9/02	15:47:54	19.79		**0.24**		**0.01**		3.1	
1/9/02	15:48:09	20.2		**0.18**		**0.01**		**3.07**	
1/9/02	15:48:24	20.32		**0.21**	**0.21**	**0**		**3.07**	
1/9/02	15:48:39	20.34		0.29		**0.01**	**0.01**	**3.07**	**3.07**



EMISSION SUMMARY
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9/02
GAS FIRING

DATA LOGGER SUMMARIES
RUN 2 GAS

PORT 2 POINTS 5-12 @ 4 MINUTES PER POINT

PLUS PORT 3 POINTS 1-8 @ 4 MINUTES PER POINT

Date	Time	Channel 5-STACK O2%	Channel 6-48C CO	Channel 1-10s NOx	Channel 8-51 C3H8
		%	PPM	PPM	PPMw
		Average	Average	Average	Average
1/9/02	16:27:58	13.54	0.58	3.69	0.09
1/9/02	16:28:13	13.54	0.59	3.66	0.09
1/9/02	16:28:28	13.54	0.47	3.65	0.09
1/9/02	16:28:43	13.54	0.45	3.65	0.09
1/9/02	16:28:58	13.54	0.54	3.63	0.09
1/9/02	16:29:13	13.54	0.48	3.63	0.1
1/9/02	16:29:28	13.54	0.47	3.63	0.09
1/9/02	16:29:43	13.54	0.62	3.59	0.09
1/9/02	16:29:58	13.54	0.52	3.62	0.09
1/9/02	16:30:13	13.54	0.49	3.59	0.09
1/9/02	16:30:28	13.54	0.59	3.58	0.09
1/9/02	16:30:43	13.54	0.55	3.57	0.09
1/9/02	16:30:58	13.54	0.47	3.56	0.09
1/9/02	16:31:13	13.54	0.58	3.53	0.09
1/9/02	16:31:28	13.53	0.67	3.56	0.07
1/9/02	16:31:43	13.53	0.57	3.58	0.09
1/9/02	16:31:58	13.53	0.62	3.57	0.09
1/9/02	16:32:13	13.54	0.64	3.57	0.09
1/9/02	16:32:28	13.53	0.6	3.54	0.09
1/9/02	16:32:43	13.53	0.48	3.54	0.09
1/9/02	16:32:58	13.53	0.24	3.59	0.09
1/9/02	16:33:13	13.53	0.43	3.53	0.09
1/9/02	16:33:28	13.53	0.58	3.46	0.09
1/9/02	16:33:43	13.53	0.5	3.49	0.09
1/9/02	16:33:58	13.53	0.47	3.49	0.09
1/9/02	16:34:13	13.53	0.56	3.48	0.09
1/9/02	16:34:28	13.53	0.53	3.52	0.09
1/9/02	16:34:43	13.53	0.49	3.52	0.05
1/9/02	16:34:58	13.53	0.64	3.49	0.08
1/9/02	16:35:13	13.53	0.64	3.51	0.09
1/9/02	16:35:28	13.53	0.66	3.5	0.09
1/9/02	16:35:43	13.53	0.58	3.51	0.09
1/9/02	16:35:58	13.53	0.5	3.54	0.07
1/9/02	16:36:13	13.53	0.55	3.52	0.06
1/9/02	16:36:28	13.53	0.51	3.49	0.07
1/9/02	16:36:43	13.53	0.53	3.5	0.09
1/9/02	16:36:58	13.53	0.59	3.51	0.09
1/9/02	16:37:13	13.53	0.56	3.51	0.09
1/9/02	16:37:28	13.52	0.54	3.5	0.09
1/9/02	16:37:43	13.53	0.59	3.48	0.09
1/9/02	16:37:58	13.53	0.62	3.48	0.09
1/9/02	16:38:13	13.53	0.51	3.46	0.09
1/9/02	16:38:28	13.53	0.51	3.53	0.09
1/9/02	16:38:43	13.53	0.48	3.51	0.09
1/9/02	16:38:58	13.53	0.58	3.48	0.09
1/9/02	16:39:13	13.53	0.66	3.48	0.09
1/9/02	16:39:28	13.53	0.59	3.52	0.09
1/9/02	16:39:43	13.53	0.56	3.53	0.09
1/9/02	16:39:58	13.53	0.71	3.49	0.09
1/9/02	16:40:13	13.53	0.69	3.47	0.09
1/9/02	16:40:28	13.53	0.63	3.49	0.09
1/9/02	16:40:43	13.53	0.62	3.46	0.09
1/9/02	16:40:58	13.53	0.58	3.49	0.09
1/9/02	16:41:13	13.53	0.54	3.48	0.09
1/9/02	16:41:28	13.53	0.64	3.48	0.09
01/09/02	16:41:43	13.53	0.57	3.54	0.09
1/9/02	16:41:58	13.53	0.68	3.53	0.09
1/9/02	16:42:13	13.53	0.56	3.52	0.09
1/9/02	16:42:28	13.56	0.5	3.5	0.09

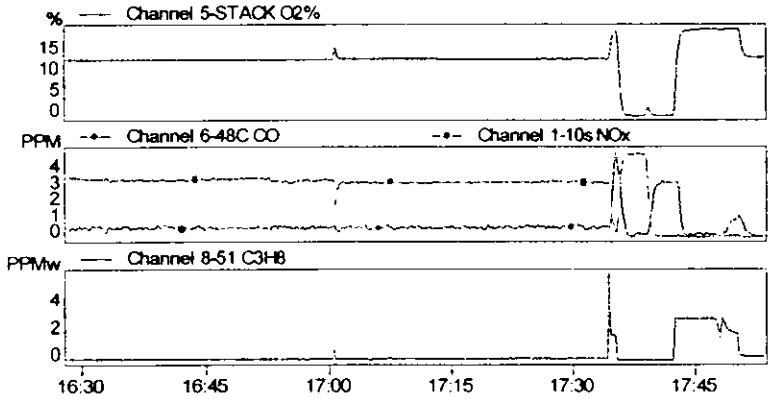
1/9/02	16:42:43	13.54	0.55	3.46		0.09
1/9/02	16:42:58	13.53	0.52	3.5		0.09
1/9/02	16:43:13	13.53	0.46	3.5		0.09
1/9/02	16:43:28	13.53	0.54	3.52		0.09
1/9/02	16:43:43	13.53	0.56	3.53		0.09
1/9/02	16:43:58	13.53	0.62	3.51		0.09
1/9/02	16:44:13	13.53	0.66	3.52		0.09
1/9/02	16:44:28	13.53	0.56	3.55		0.09
1/9/02	16:44:43	13.53	0.53	3.56		0.09
1/9/02	16:44:58	13.53	0.41	3.53		0.09
1/9/02	16:45:13	13.53	0.5	3.53		0.09
1/9/02	16:45:28	13.53	0.58	3.53		0.09
1/9/02	16:45:43	13.53	0.58	3.6		0.09
1/9/02	16:45:58	13.53	0.5	3.59		0.09
1/9/02	16:46:13	13.53	0.51	3.56		0.09
1/9/02	16:46:28	13.53	0.46	3.54		0.05
1/9/02	16:46:43	13.53	0.46	3.56		0.09
1/9/02	16:46:58	13.54	0.52	3.59		0.09
1/9/02	16:47:13	13.54	0.53	3.59		0.09
1/9/02	16:47:28	13.54	0.5	3.59		0.09
1/9/02	16:47:43	13.54	0.56	3.58		0.09
1/9/02	16:47:58	13.54	0.6	3.56		0.09
1/9/02	16:48:13	13.54	0.58	3.56		0.09
1/9/02	16:48:28	13.55	0.57	3.63		0.09
1/9/02	16:48:43	13.54	0.51	3.58		0.09
1/9/02	16:48:58	13.54	0.56	3.55		0.09
1/9/02	16:49:13	13.55	0.58	3.59		0.09
1/9/02	16:49:28	13.55	0.55	3.6		0.09
1/9/02	16:49:43	13.54	0.52	3.59		0.09
1/9/02	16:49:58	13.54	0.51	3.64		0.09
1/9/02	16:50:13	13.55	0.53	3.64		0.06
1/9/02	16:50:28	13.55	0.5	3.58		0.05
1/9/02	16:50:43	13.55	0.54	3.61		0.09
1/9/02	16:50:58	13.55	0.53	3.61		0.09
1/9/02	16:51:13	13.56	0.62	3.62		0.09
1/9/02	16:51:28	13.56	0.61	3.63		0.09
1/9/02	16:51:43	13.56	0.47	3.6		0.1
1/9/02	16:51:58	13.56	0.53	3.62		0.09
1/9/02	16:52:13	13.56	0.53	3.57		0.09
1/9/02	16:52:28	13.56	0.57	3.58		0.09
1/9/02	16:52:43	13.56	0.46	3.61		0.09
1/9/02	16:52:58	13.57	0.48	3.5		0.09
1/9/02	16:53:13	13.57	0.6	3.46		0.09
1/9/02	16:53:28	13.57	0.66	3.41		0.09
1/9/02	16:53:43	13.57	0.54	3.45		0.09
1/9/02	16:53:58	13.57	0.62	3.5		0.09
1/9/02	16:54:13	13.57	0.65	3.47		0.09
1/9/02	16:54:28	13.57	0.6	3.4		0.09
1/9/02	16:54:43	13.57	0.61	3.43		0.09
1/9/02	16:54:58	13.57	0.58	3.38		0.09
1/9/02	16:55:13	13.57	0.58	3.32		0.09
01/09/02	16:55:28	13.57	0.57	3.33		0.09
1/9/02	16:55:43	13.57	0.49	3.36		0.09
1/9/02	16:55:58	13.57	0.51	3.4		0.09
1/9/02	16:56:13	13.57	0.59	3.42		0.09
1/9/02	16:56:28	13.57	0.48	3.48		0.06
1/9/02	16:56:43	13.56	0.55	3.49		0.09
1/9/02	16:56:58	13.57	0.55	3.46		0.09
1/9/02	16:57:13	13.57	0.48	3.49		0.05
1/9/02	16:57:28	13.57	0.54	3.52		0.04
1/9/02	16:57:43	13.57	0.51	3.44		0.07
1/9/02	16:57:58	13.57	0.64	3.4		0.09
1/9/02	16:58:13	13.57	0.6	3.45		0.09
1/9/02	16:58:28	13.57	0.52	3.43	1-20	0.09

1/9/02	16:58:43	13.57	0.61	3.47	0.09
1/9/02	16:58:58	13.57	0.62	3.49	0.07
1/9/02	16:59:13	13.57	0.6	3.51	0.08
1/9/02	16:59:28	13.57	0.54	3.54	0.09
1/9/02	16:59:43	13.57	0.58	3.53	0.09
1/9/02	16:59:58	13.57	0.53	3.51	0.09
1/9/02	17:00:13	13.57	0.54	3.5	0.09
01/09/02	**17:00:28**	**13.59**	**0.59**	**3.51**	**0.4**
1/9/02	**17:00:43**	**15.21**	**0.64**	**2.88**	**0.39**
1/9/02	**17:00:58**	**15.7**	**0.46**	**2.22**	**0.1**
1/9/02	**17:01:13**	**14.15**	**0.33**	**3.02**	**0.09**
1/9/02	**17:01:28**	**13.7**	**0.42**	**3.3**	**0.09**
1/9/02	**17:01:43**	**13.61**	**0.52**	**3.35**	**0.09**
1/9/02	**17:01:58**	**13.59**	**0.52**	**3.34**	**0.09**
1/9/02	**17:02:13**	**13.59**	**0.57**	**3.31**	**0.09**
1/9/02	17:02:28	13.59	0.64	3.29	0.09
1/9/02	17:02:43	13.59	0.6	3.34	0.09
1/9/02	17:02:58	13.59	0.54	3.35	0.09
1/9/02	17:03:13	13.59	0.55	3.35	0.09
1/9/02	17:03:28	13.59	0.54	3.37	0.09
1/9/02	17:03:43	13.59	0.62	3.32	0.09
1/9/02	17:03:58	13.59	0.52	3.34	0.09
1/9/02	17:04:13	13.59	0.56	3.37	0.09
1/9/02	17:04:28	13.59	0.67	3.37	0.07
1/9/02	17:04:43	13.59	0.54	3.36	0.07
1/9/02	17:04:58	13.59	0.42	3.32	0.03
1/9/02	17:05:13	13.59	0.43	3.25	0.05
1/9/02	17:05:28	13.59	0.5	3.34	0.08
1/9/02	17:05:43	13.59	0.64	3.32	0.09
1/9/02	17:05:58	13.59	0.52	3.33	0.09
1/9/02	17:06:13	13.59	0.53	3.32	0.05
1/9/02	17:06:28	13.59	0.56	3.3	0.09
1/9/02	17:06:43	13.59	0.52	3.32	0.09
1/9/02	17:06:58	13.59	0.64	3.31	0.1
1/9/02	17:07:13	13.59	0.71	3.31	0.12
1/9/02	17:07:28	13.59	0.62	3.36	0.14
1/9/02	17:07:43	13.58	0.56	3.35	0.12
1/9/02	17:07:58	13.59	0.47	3.3	0.09
1/9/02	17:08:13	13.59	0.48	3.32	0.09
1/9/02	17:08:28	13.59	0.53	3.33	0.1
1/9/02	17:08:43	13.59	0.53	3.3	0.09
1/9/02	17:08:58	13.59	0.57	3.3	0.1
1/9/02	17:09:13	13.59	0.56	3.32	0.09
1/9/02	17:09:28	13.59	0.53	3.31	0.12
1/9/02	17:09:43	13.59	0.51	3.31	0.13
1/9/02	17:09:58	13.59	0.59	3.33	0.11
1/9/02	17:10:13	13.59	0.66	3.33	0.09
1/9/02	17:10:28	13.59	0.6	3.33	0.11
1/9/02	17:10:43	13.59	0.58	3.31	0.09
1/9/02	17:10:58	13.59	0.68	3.31	0.09
1/9/02	17:11:13	13.59	0.62	3.26	0.09
1/9/02	17:11:28	13.58	0.54	3.27	0.09
1/9/02	17:11:43	13.58	0.48	3.31	0.09
1/9/02	17:11:58	13.58	0.53	3.32	0.09
1/9/02	17:12:13	13.58	0.52	3.3	0.09
1/9/02	17:12:28	13.58	0.58	3.32	0.09
1/9/02	17:12:43	13.58	0.51	3.33	0.09
1/9/02	17:12:58	13.58	0.47	3.34	0.09
1/9/02	17:13:13	13.58	0.5	3.36	0.09
1/9/02	17:13:28	13.58	0.49	3.36	0.1
1/9/02	17:13:43	13.58	0.5	3.35	0.09
1/9/02	17:13:58	13.57	0.5	3.33	0.09
1/9/02	17:14:13	13.57	0.55	3.35	0.09
1/9/02	17:14:28	13.57	0.59	3.35	0.09

1/9/02	17:14:43	13.57	0.54	3.37	0.09
1/9/02	17:14:58	13.57	0.49	3.35	0.09
1/9/02	17:15:13	13.58	0.61	3.32	0.09
1/9/02	17:15:28	13.57	0.53	3.33	0.09
1/9/02	17:15:43	13.57	0.49	3.34	0.09
1/9/02	17:15:58	13.57	0.53	3.36	0.09
1/9/02	17:16:13	13.57	0.51	3.34	0.09
1/9/02	17:16:28	13.57	0.57	3.31	0.12
1/9/02	17:16:43	13.57	0.65	3.35	0.06
1/9/02	17:16:58	13.57	0.58	3.32	0.08
1/9/02	17:17:13	13.57	0.55	3.35	0.11
1/9/02	17:17:28	13.57	0.53	3.35	0.09
1/9/02	17:17:43	13.57	0.6	3.31	0.09
1/9/02	17:17:58	13.57	0.56	3.33	0.09
1/9/02	17:18:13	13.57	0.5	3.35	0.09
1/9/02	17:18:28	13.57	0.47	3.34	0.09
1/9/02	17:18:43	13.57	0.58	3.36	0.09
1/9/02	17:18:58	13.57	0.46	3.38	0.12
1/9/02	17:19:13	13.57	0.43	3.41	0.1
1/9/02	17:19:28	13.57	0.61	3.39	0.11
1/9/02	17:19:43	13.57	0.64	3.33	0.13
1/9/02	17:19:58	13.57	0.53	3.36	0.11
1/9/02	17:20:13	13.57	0.53	3.4	0.09
1/9/02	17:20:28	13.57	0.49	3.37	0.12
1/9/02	17:20:43	13.57	0.53	3.38	0.09
1/9/02	17:20:58	13.57	0.57	3.38	0.09
1/9/02	17:21:13	13.57	0.54	3.37	0.13
1/9/02	17:21:28	13.57	0.46	3.39	0.1
1/9/02	17:21:43	13.57	0.59	3.37	0.09
1/9/02	17:21:58	13.57	0.65	3.37	0.09
1/9/02	17:22:13	13.57	0.62	3.34	0.11
1/9/02	17:22:28	13.57	0.58	3.36	0.13
1/9/02	17:22:43	13.57	0.5	3.38	0.09
1/9/02	17:22:58	13.57	0.46	3.38	0.11
1/9/02	17:23:13	13.57	0.51	3.35	0.14
1/9/02	17:23:28	13.57	0.62	3.33	0.14
1/9/02	17:23:43	13.57	0.56	3.32	0.14
1/9/02	17:23:58	13.57	0.56	3.4	0.14
1/9/02	17:24:13	13.57	0.64	3.37	0.14
1/9/02	17:24:28	13.57	0.7	3.32	0.14
1/9/02	17:24:43	13.57	0.65	3.33	0.14
1/9/02	17:24:58	13.57	0.61	3.31	0.07
1/9/02	17:25:13	13.57	0.6	3.33	0.14
1/9/02	17:25:28	13.57	0.57	3.33	0.14
1/9/02	17:25:43	13.58	0.68	3.33	0.13
1/9/02	17:25:58	13.57	0.65	3.35	0.13
1/9/02	17:26:13	13.57	0.67	3.35	0.12
1/9/02	17:26:28	13.58	0.63	3.4	0.1
1/9/02	17:26:43	13.58	0.56	3.37	0.13
1/9/02	17:26:58	13.58	0.5	3.37	0.1
1/9/02	17:27:13	13.57	0.61	3.4	0.14
1/9/02	17:27:28	13.57	0.53	3.43	0.1
1/9/02	17:27:43	13.57	0.56	3.42	0.09
1/9/02	17:27:58	13.58	0.57	3.41	0.13
1/9/02	17:28:13	13.58	0.54	3.41	0.11
1/9/02	17:28:28	13.58	0.50	3.40	0.11
1/9/02	17:28:43	13.58	0.51	3.42	0.09
1/9/02	17:28:58	13.57	0.64	3.45	0.09
1/9/02	17:29:13	13.57	0.63	3.42	0.09
1/9/02	17:29:28	13.58	0.65	3.38	0.12
1/9/02	17:29:43	13.58	0.51	3.38	0.14
1/9/02	17:29:58	13.58	0.53	3.36	0.14
1/9/02	17:30:13	13.58	0.63	3.42	0.14
1/9/02	17:30:28	13.58	0.74	3.43	0.12

1/9/02	17:30:43	13.58		0.72		3.4	0.09	
1/9/02	17:30:58	13.58		0.67		3.38	0.14	
1/9/02	17:31:13	13.58		0.68		3.37	0.14	
1/9/02	17:31:28	13.58		0.6		3.32	0.14	
1/9/02	17:31:43	13.58		0.47		3.32	0.14	
1/9/02	17:31:58	13.58		0.44		3.32	0.11	
1/9/02	17:32:13	13.58		0.48		3.35	0.11	
1/9/02	17:32:28	13.58		0.49		3.34	0.14	
1/9/02	17:32:43	13.58		0.59		3.29	0.12	
1/9/02	17:32:58	13.58		0.6		3.37	0.13	
1/9/02	17:33:13	13.58		0.49		3.36	0.13	
1/9/02	17:33:28	13.58		0.51		3.37	0.14	
1/9/02	17:33:43	13.58		0.56		3.37	0.12	
1/9/02	17:33:58	13.58		0.61		3.33	0.13	
01/09/02	17:34:13	13.58		0.57		3.31	0.14	
1/9/02	17:34:28	13.57		0.6		3.31	0.56	
AVERAGES:		13.56		0.56		3.44	0.10	
1/9/02	17:34:43	13.87		0.56		3.29	5	
1/9/02	17:34:58	16.44		0.96		2.28	1.95	
1/9/02	17:35:13	18.95		3.16		0.97	1.87	
1/9/02	17:35:28	20.07		4.98		0.39	1.63	
1/9/02	17:35:43	19.7		4.57		0.32	0.06	**ZERO C3H8**
1/9/02	17:35:58	12.11		3.68		2.09	0	
1/9/02	17:36:13	4.31		2.29		4.04	0	
1/9/02	17:36:28	1.38		1.35		4.7	**5.27 NOx** 0	
1/9/02	17:36:43	0.46		0.56		4.98	**0**	
1/9/02	17:36:58	0.19		0.18		5.03	**0**	
1/9/02	17:37:13	0.13		0.1		5.05	**0**	
1/9/02	17:37:28	0.11		0.06		5.05	**0**	
1/9/02	17:37:43	0.1		0.03		5.05	**0**	
1/9/02	17:37:58	0.09		0.1		**5.08**	**0**	
1/9/02	17:38:13	0.09		0.2		**5.09**	**0**	**0**
1/9/02	17:38:28	0.08		0.19		**5.07**	**5.08** 0	
1/9/02	17:38:43	0.08		0.15		5.06	0	
1/9/02	17:38:58	0.08		0.15		5.07	0.02	
1/9/02	17:39:13	0.54		0.13		4.97	0.04	
1/9/02	17:39:28	1.91		0.25		3.38	0	
1/9/02	17:39:43	1.23		0.71		1.34	0	
1/9/02	17:39:58	0.45		1.7		0.41	0	
1/9/02	17:40:13	0.18		2.68		0.15	0	
1/9/02	17:40:28	0.1		3.06	**3.2 CO**	0.07	0	
1/9/02	17:40:43	0.08	**ZERO O2**	3.19		0.04	0	
1/9/02	17:40:58	0.07		3.27		0.03	0	
1/9/02	17:41:13	**0.07**		3.4		0.02	0	
1/9/02	17:41:28	**0.07**		**3.34**		0.01	0	
1/9/02	17:41:43	**0.07**		**3.32**		0.01	0	
1/9/02	17:41:58	**0.07**		**3.32**		0	0	
1/9/02	17:42:13	**0.07**	**0.07**	**3.26**	**3.31**	0	0	**2.83 C3H8**
1/9/02	17:42:28	0.07		3.32		0	0.13	
1/9/02	17:42:43	1.19		3.43		0	2.74	
1/9/02	17:42:58	9.13		3.38		0.03	3.08	
1/9/02	17:43:13	16.02		2.78		0.05	**3.07**	
1/9/02	17:43:28	19.03		1.71		0.03	**3.07**	
1/9/02	17:43:43	20		0.71		0.01	**3.07**	
1/9/02	17:43:58	20.27		0.2		0	**3.07**	
1/9/02	17:44:13	20.37		0.07		-0.01	**3.07**	**3.07**
1/9/02	17:44:28	20.41		0.12		-0.01	3.04	
1/9/02	17:44:43	20.47		0.13		-0.02	3.03	
1/9/02	17:44:58	20.54		0.1		-0.02	3.03	
1/9/02	17:45:13	20.57		0.11		-0.01	3.03	
1/9/02	17:45:28	20.59		0.21		-0.02	3.03	

1/9/02	17:45:43	20.6		0.18		-0.02		3.05
1/9/02	17:45:58	20.61		0.19		-0.02		3.06
1/9/02	17:46:13	20.62		0.11		-0.02		3.07
1/9/02	17:46:28	20.64		0.2		-0.02		3.07
1/9/02	17:46:43	20.65		0.2		-0.02		3.07
1/9/02	17:46:58	20.65		0.12		-0.03		3.04
1/9/02	17:47:13	20.65		0.13		-0.02		3.07
1/9/02	17:47:28	20.64		0.13		-0.03		3.04
1/9/02	17:47:43	20.62		0.14		-0.01		2.96
1/9/02	17:47:58	20.58		0.06		0.03		2.05
1/9/02	17:48:13	20.55		0.11		-0.02		1.64
1/9/02	17:48:28	20.55		0.2		-0.01		3
1/9/02	17:48:43	20.57		0.22		0.01		2.79
1/9/02	17:48:58	20.62		0.26		0.03		2.45
1/9/02	17:49:13	20.65		0.48		0.05		2.28
1/9/02	17:49:28	20.68		0.8		0.06		2.16
1/9/02	17:49:43	20.7		0.97		0.07		2.06
1/9/02	17:49:58	20.71		1.04		0.07		2.01
1/9/02	17:50:13	20.76		1.08		0.06		1.98
1/9/02	17:50:28	20.79		1.24		0.05		0.9
1/9/02	17:50:43	19.34		1.17		0.03		0.36
1/9/02	17:50:58	16.32		0.95		0		0.35
1/9/02	17:51:13	14.69		0.54		-0.02		0.32
1/9/02	17:51:28	14.22		0.34		-0.02		0.32
1/9/02	17:51:43	14.07		0.21		-0.02		0.32
1/9/02	17:51:58	14.03		0.14		-0.02		0.32
1/9/02	17:52:13	14.01	**13.99 O2**	0.07	**ZERO CO**	-0.02	**ZERO NOx**	0.32
1/9/02	17:52:28	14.01		0.08		-0.02		0.32
1/9/02	17:52:43	**14**		**0.02**		**-0.02**		0.32
1/9/02	17:52:58	**14**		**0.12**		**-0.02**		0.32
1/9/02	17:53:13	**14**		**0.02**		**-0.03**		0.32
1/9/02	17:53:28	**14**	**14.00**	**0**	**0.04**	**-0.02**	**-0.02**	0.31



EMISSION SUMMARY
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9/02
GAS FIRING

DATA LOGGER SUMMARIES
RUN 3 GAS

PORT 3 POINTS 9-12 @ 4 MINUTES PER POINT
PLUS PORT 4 POINTS 1-12 @ 4 MINUTES PER POINT

Date	Time	annel 5-STACK O2%	Channel 6-48C CO	Channel 1-10s NOx	Channel 8-51 C3H8
		%	PPM	PPM	PPMw
		Average	Average	Average	Average
1/10/02	8:36:57	13.62	0.67	3.85	0
1/10/02	8:37:12	13.61	0.73	3.78	0

1/10/02	8:37:27	13.61	0.67	3.77	0
1/10/02	8:37:42	13.61	0.72	3.72	0
1/10/02	8:37:57	13.61	0.61	3.71	0
1/10/02	8:38:12	13.61	0.59	3.7	0
1/10/02	8:38:27	13.61	0.69	3.68	0
1/10/02	8:38:42	13.62	0.77	3.68	0
1/10/02	8:38:57	13.62	0.78	3.68	0
1/10/02	8:39:12	13.61	0.82	3.71	0
1/10/02	8:39:27	13.61	0.69	3.69	0
1/10/02	8:39:42	13.61	0.79	3.69	0
1/10/02	8:39:57	13.61	0.67	3.66	0
1/10/02	8:40:12	13.61	0.67	3.67	0
1/10/02	8:40:27	13.61	0.75	3.68	0
1/10/02	8:40:42	13.61	0.81	3.73	0
1/10/02	8:40:57	13.6	0.74	3.78	0
1/10/02	8:41:12	13.61	0.64	3.72	0
1/10/02	8:41:27	13.6	0.66	3.74	0
1/10/02	8:41:42	13.6	0.59	3.73	0
1/10/02	8:41:57	13.61	0.71	3.7	0
1/10/02	8:42:12	13.6	0.7	3.71	0
1/10/02	8:42:27	13.6	0.75	3.71	0
1/10/02	8:42:42	13.61	0.66	3.71	0
1/10/02	8:42:57	13.6	0.68	3.72	0
1/10/02	8:43:12	13.6	0.67	3.75	0
1/10/02	8:43:27	13.6	0.7	3.7	0
1/10/02	8:43:42	13.6	0.78	3.7	0
1/10/02	8:43:57	13.6	0.73	3.69	0
1/10/02	8:44:12	13.6	0.79	3.74	0
1/10/02	8:44:27	13.6	0.79	3.75	0
1/10/02	8:44:42	13.6	0.81	3.79	0
1/10/02	8:44:57	13.6	0.74	3.76	0
1/10/02	8:45:12	13.6	0.66	3.78	0
1/10/02	8:45:27	13.6	0.88	3.77	0
1/10/02	8:45:42	13.6	0.98	3.76	0
1/10/02	8:45:57	13.6	0.99	3.72	0
1/10/02	8:46:12	13.6	1.11	3.75	0
1/10/02	8:46:27	13.6	1.09	3.73	0
1/10/02	8:46:42	13.6	1.13	3.79	0
1/10/02	8:46:57	13.6	1.05	3.78	0
1/10/02	8:47:12	13.6	1.03	3.77	0
1/10/02	8:47:27	13.6	0.97	3.78	0
1/10/02	8:47:42	13.6	0.94	3.87	0
1/10/02	8:47:57	13.59	0.8	3.9	0
1/10/02	8:48:12	13.59	0.75	3.89	0
1/10/02	8:48:27	13.59	0.85	3.93	0
1/10/02	8:48:42	13.59	0.72	3.93	0
1/10/02	8:48:57	13.59	0.72	3.94	0
1/10/02	8:49:12	13.59	0.71	3.92	0
1/10/02	8:49:27	13.59	0.67	3.86	0
1/10/02	8:49:42	13.59	0.77	3.88	0
1/10/02	8:49:57	13.59	0.87	3.92	0
1/10/02	8:50:12	13.59	0.79	3.94	0
1/10/02	8:50:27	13.59	0.73	3.97	0
1/10/02	8:50:42	13.59	0.74	4.03	0
1/10/02	8:50:57	13.59	0.73	3.95	0
1/10/02	8:51:12	13.58	0.67	4	0
1/10/02	8:51:27	13.58	0.69	4.03	0
1/10/02	8:51:42	13.58	0.71	4.01	0
1/10/02	8:51:57	13.57	0.68	4.02	0
1/10/02	8:52:12	13.57	0.75	4.05	0
1/10/02	8:52:27	13.57	0.75	4.06	0
1/10/02	8:52:42	13.57	0.65	4.06	0
1/10/02	8:52:57	13.57	0.74	4.07	0
1/10/02	8:53:12	13.56	0.86	4.05	0

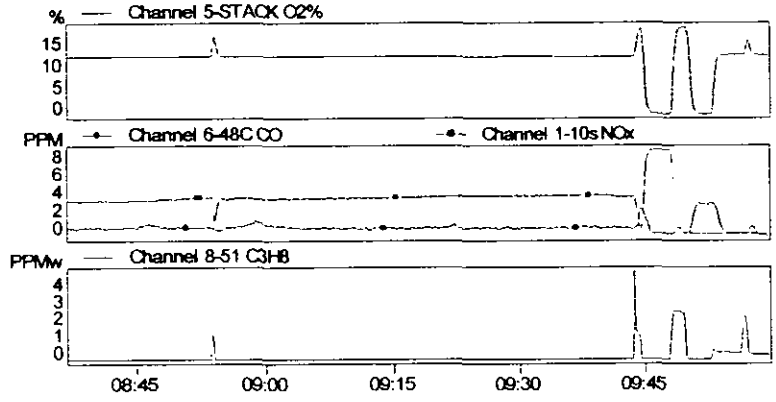
1/10/02	8:53:27	13.55	0.78	4.09	0
1/10/02	**8:53:42**	**13.69**	**0.66**	**4.13**	**0.8**
1/10/02	**8:53:57**	**16.48**	**0.65**	**2.74**	**0.75**
1/10/02	**8:54:12**	**17.76**	**0.56**	**1.53**	**0**
1/10/02	**8:54:27**	**15.08**	**0.44**	**3.07**	**0**
1/10/02	**8:54:42**	**13.86**	**0.45**	**3.83**	**0**
1/10/02	**8:54:57**	**13.61**	**0.56**	**4.01**	**0**
1/10/02	**8:55:12**	**13.55**	**0.69**	**3.95**	**0.00**
1/10/02	**8:55:27**	**13.54**	**0.77**	**3.88**	**0**
1/10/02	8:55:42	13.53	0.75	3.9	0
1/10/02	8:55:57	13.53	0.77	3.96	0
1/10/02	8:56:12	13.52	0.86	3.97	0
1/10/02	8:56:27	13.52	0.68	4.01	0
1/10/02	8:56:42	13.52	0.82	4.03	0
1/10/02	8:56:57	13.52	0.89	4.06	0
1/10/02	8:57:12	13.52	0.86	4.07	0
1/10/02	8:57:27	13.52	0.94	4.04	0
1/10/02	8:57:42	13.52	0.96	4.03	0
1/10/02	8:57:57	13.52	1.04	4.01	0
1/10/02	8:58:12	13.52	1.14	4	0
1/10/02	8:58:27	13.51	1.21	4.04	0
1/10/02	8:58:42	13.52	1.33	3.99	0
1/10/02	8:58:57	13.52	1.56	3.95	0
1/10/02	8:59:12	13.52	1.39	3.92	0
1/10/02	8:59:27	13.52	1.31	3.95	0
1/10/02	8:59:42	13.52	1.24	3.95	0
1/10/02	8:59:57	13.52	1.11	3.94	0
1/10/02	9:00:12	13.52	1	3.96	0
1/10/02	9:00:27	13.52	0.98	3.95	0
1/10/02	9:00:42	13.52	1.04	3.91	0
1/10/02	9:00:57	13.52	0.92	3.93	0
1/10/02	9:01:12	13.52	0.82	3.94	0
1/10/02	9:01:27	13.51	0.96	3.94	0
1/10/02	9:01:42	13.51	0.86	3.97	0
1/10/02	9:01:57	13.51	0.92	4.01	0
1/10/02	9:02:12	13.52	0.88	3.97	0
1/10/02	9:02:27	13.52	0.84	4	0
1/10/02	9:02:42	13.52	0.73	3.96	0
1/10/02	9:02:57	13.52	0.83	3.94	0
1/10/02	9:03:12	13.52	0.78	3.96	0
1/10/02	9:03:27	13.52	0.73	3.95	0
1/10/02	9:03:42	13.52	0.74	3.97	0
1/10/02	9:03:57	13.52	0.75	3.95	0
1/10/02	9:04:12	13.52	0.59	3.93	0
1/10/02	9:04:27	13.52	0.64	3.95	0
1/10/02	9:04:42	13.52	0.62	3.97	0
1/10/02	9:04:57	13.52	0.64	4	0
1/10/02	9:05:12	13.52	0.68	4.01	0.00
1/10/02	9:05:27	13.52	0.65	3.98	0
1/10/02	9:05:42	13.52	0.7	3.98	0
1/10/02	9:05:57	13.52	0.71	3.95	0
1/10/02	9:06:12	13.52	0.68	4.01	0
01/10/02	9:06:27	13.52	0.6	3.98	0
1/10/02	9:06:42	13.52	0.75	3.95	0
1/10/02	9:06:57	13.52	0.72	4.01	0
1/10/02	9:07:12	13.52	0.74	4.01	0
1/10/02	9:07:27	13.52	0.65	4.01	0
1/10/02	9:07:42	13.52	0.63	4.03	0
1/10/02	9:07:57	13.52	0.77	4.02	0
1/10/02	9:08:12	13.52	0.71	3.99	0
1/10/02	9:08:27	13.53	0.68	3.98	0
1/10/02	9:08:42	13.52	0.7	4.02	0
1/10/02	9:08:57	13.52	0.54	4.08	0
1/10/02	9:09:12	13.53	0.61	4.07	0

1/10/02	9:09:27	13.53	0.59	4.02	0
1/10/02	9:09:42	13.53	0.64	3.97	0
1/10/02	9:09:57	13.53	0.65	4.04	0
1/10/02	9:10:12	13.53	0.74	4.04	0
1/10/02	9:10:27	13.53	0.77	4.03	0
1/10/02	9:10:42	13.53	0.66	4.1	0
1/10/02	9:10:57	13.53	0.53	4.08	0
1/10/02	9:11:12	13.53	0.59	4.05	0
1/10/02	9:11:27	13.53	0.55	3.99	0
1/10/02	9:11:42	13.53	0.64	4	0.00
1/10/02	9:11:57	13.53	0.7	4.04	0
1/10/02	9:12:12	13.53	0.5	4.1	0
1/10/02	9:12:27	13.53	0.53	4.03	0
1/10/02	9:12:42	13.53	0.64	4.05	0
1/10/02	9:12:57	13.53	0.74	4.04	0
1/10/02	9:13:12	13.53	0.78	4.06	0
1/10/02	9:13:27	13.53	0.63	4.08	0
1/10/02	9:13:42	13.53	0.68	4.07	0
1/10/02	9:13:57	13.53	0.63	4.06	0
1/10/02	9:14:12	13.53	0.6	4.05	0
1/10/02	9:14:27	13.53	0.74	4.09	0
1/10/02	9:14:42	13.52	0.75	4.09	0
1/10/02	9:14:57	13.52	0.62	4.06	0
1/10/02	9:15:12	13.52	0.64	4.08	0
1/10/02	9:15:27	13.52	0.59	4.1	0
1/10/02	9:15:42	13.52	0.69	4.09	0
1/10/02	9:15:57	13.52	0.67	4.09	0
1/10/02	9:16:12	13.52	0.65	4.1	0
1/10/02	9:16:27	13.51	0.53	4.09	0
1/10/02	9:16:42	13.51	0.63	4.09	0
1/10/02	9:16:57	13.51	0.57	4.13	0
1/10/02	9:17:12	13.51	0.73	4.12	0
1/10/02	9:17:27	13.51	0.69	4.1	0
1/10/02	9:17:42	13.5	0.64	4.08	0
1/10/02	9:17:57	13.5	0.69	4.11	0
1/10/02	9:18:12	13.5	0.67	4.15	0
1/10/02	9:18:27	13.5	0.63	4.12	0
1/10/02	9:18:42	13.5	0.75	4.13	0
1/10/02	9:18:57	13.50	0.79	4.11	0
1/10/02	9:19:12	13.5	0.75	4.1	0
1/10/02	9:19:27	13.5	0.73	4.09	0
1/10/02	9:19:42	13.5	0.7	4.15	0
1/10/02	9:19:57	13.5	0.74	4.14	0
1/10/02	9:20:12	13.49	0.73	4.13	0
1/10/02	9:20:27	13.5	0.63	4.14	0
1/10/02	9:20:42	13.5	0.7	4.13	0
1/10/02	9:20:57	13.5	0.68	4.15	0
1/10/02	9:21:12	13.49	0.76	4.16	0
1/10/02	9:21:27	13.49	0.76	4.18	0
1/10/02	9:21:42	13.49	0.79	4.17	0
1/10/02	9:21:57	13.49	0.93	4.18	0
1/10/02	9:22:12	13.49	0.92	4.19	0
1/10/02	9:22:27	13.49	1.02	4.18	0
1/10/02	9:22:42	13.49	0.8	4.21	0
1/10/02	9:22:57	13.48	0.72	4.19	0
1/10/02	9:23:12	13.48	0.67	4.19	0
1/10/02	9:23:27	13.48	0.57	4.22	0
1/10/02	9:23:42	13.48	0.59	4.28	0
1/10/02	9:23:57	13.48	0.62	4.28	0
1/10/02	9:24:12	13.49	0.64	4.27	0
1/10/02	9:24:27	13.48	0.67	4.24	0
1/10/02	9:24:42	13.48	0.7	4.21	0
1/10/02	9:24:57	13.48	0.74	4.23	0
1/10/02	9:25:12	13.48	0.72	4.22	0

1/10/02	9:25:27	13.48	0.63	4.24	0
1/10/02	9:25:42	13.49	0.7	4.22	0
1/10/02	9:25:57	13.49	0.71	4.25	0
1/10/02	9:26:12	13.49	0.74	4.22	0
1/10/02	9:26:27	13.49	0.78	4.2	0
1/10/02	9:26:42	13.49	0.68	4.23	0
1/10/02	9:26:57	13.49	0.64	4.23	0
1/10/02	9:27:12	13.49	0.7	4.23	0
1/10/02	9:27:27	13.49	0.67	4.23	0
1/10/02	9:27:42	13.49	0.54	4.24	0
1/10/02	9:27:57	13.49	0.63	4.23	0
1/10/02	9:28:12	13.49	0.7	4.22	0
1/10/02	9:28:27	13.5	0.74	4.24	0
1/10/02	9:28:42	13.5	0.85	4.18	0
1/10/02	9:28:57	13.49	0.72	4.22	0
1/10/02	9:29:12	13.49	0.71	4.17	0
1/10/02	9:29:27	13.5	0.57	4.22	0
1/10/02	9:29:42	13.49	0.57	4.26	0
1/10/02	9:29:57	13.5	0.63	4.24	0
1/10/02	9:30:12	13.5	0.57	4.24	0
1/10/02	9:30:27	13.5	0.72	4.22	0
1/10/02	9:30:42	13.5	0.74	4.24	0
1/10/02	9:30:57	13.5	0.69	4.22	0
1/10/02	9:31:12	13.5	0.7	4.21	0
1/10/02	9:31:27	13.5	0.7	4.26	0
1/10/02	9:31:42	13.5	0.69	4.22	0
1/10/02	9:31:57	13.5	0.68	4.21	0
1/10/02	9:32:12	13.5	0.63	4.27	0
1/10/02	9:32:27	13.5	0.67	4.26	0
1/10/02	9:32:42	13.5	0.71	4.24	0
1/10/02	9:32:57	13.49	0.71	4.27	0
1/10/02	9:33:12	13.5	0.73	4.27	0
1/10/02	9:33:27	13.5	0.6	4.25	0
1/10/02	9:33:42	13.5	0.62	4.24	0
1/10/02	9:33:57	13.49	0.66	4.3	0
1/10/02	9:34:12	13.49	0.58	4.28	0
1/10/02	9:34:27	13.49	0.68	4.26	0
1/10/02	9:34:42	13.48	0.74	4.28	0
1/10/02	9:34:57	13.49	0.67	4.27	0
1/10/02	9:35:12	13.48	0.70	4.29	0
1/10/02	9:35:27	13.48	0.79	4.27	0
1/10/02	9:35:42	13.48	0.73	4.29	0
1/10/02	9:35:57	13.48	0.66	4.29	0
1/10/02	9:36:12	13.47	0.53	4.29	0
01/10/02	9:36:27	13.47	0.64	4.27	0
1/10/02	9:36:42	13.47	0.6	4.27	0
1/10/02	9:36:57	13.47	0.67	4.28	0
1/10/02	9:37:12	13.47	0.64	4.29	0
1/10/02	9:37:27	13.47	0.7	4.34	0
1/10/02	9:37:42	13.47	0.83	4.32	0
1/10/02	9:37:57	13.46	0.86	4.29	0
1/10/02	9:38:12	13.46	0.82	4.29	0
1/10/02	9:38:27	13.47	0.75	4.29	0
1/10/02	9:38:42	13.46	0.71	4.3	0
1/10/02	9:38:57	13.46	0.74	4.27	0
1/10/02	9:39:12	13.46	0.9	4.3	0
1/10/02	9:39:27	13.46	0.82	4.33	0
1/10/02	9:39:42	13.46	0.7	4.31	0
1/10/02	9:39:57	13.47	0.59	4.31	0
1/10/02	9:40:12	13.46	0.69	4.3	0
1/10/02	9:40:27	13.47	0.69	4.28	0
1/10/02	9:40:42	13.47	0.67	4.29	0
1/10/02	9:40:57	13.47	0.69	4.3	0
1/10/02	9:41:12	13.47	0.64	4.25	0

1/10/02	9:41:27	13.47		0.79		4.19		0	
1/10/02	9:41:42	13.47		0.76		4.14		0	
1/10/02	9:41:57	13.47		0.7		4.13		0	
1/10/02	9:42:12	13.47		0.74		4.11		0	
1/10/02	9:42:27	13.47		0.66		4.14		0	
1/10/02	9:42:42	13.47		0.63		4.12		0	
1/10/02	9:42:57	13.47		0.66		4.11		0	
1/10/02	9:43:12	13.47		0.68		4.12		0	
1/10/02	9:43:27	13.47		0.57		4.1		0	
1/10/02	9:43:42	13.47		0.47		4.11		0	
AVERAGES:		13.53		0.74		4.05		0.00	
1/10/02	9:43:57	13.6		0.61		4.16		3.27	
1/10/02	9:44:12	15.79		0.70		3.09		1.47	
1/10/02	9:44:27	18.66		1.5		1.42		1.36	
1/10/02	9:44:42	19.91		2.69		0.58		0.73	
1/10/02	9:44:57	17.81		2.71		1.22		0	
1/10/02	9:45:12	9.08		2.24		5.56	**9.5 NOx**	0	
1/10/02	9:45:27	2.96		1.55		8.19		0	
1/10/02	9:45:42	0.87		0.76		9.06		0	
1/10/02	9:45:57	0.31		0.31		9.35		0	
1/10/02	9:46:12	0.16		0.07		9.45		0	
1/10/02	9:46:27	0.12		0.03		9.44		0	
1/10/02	9:46:42	0.1		0.13		9.42		0	
1/10/02	9:46:57	0.1		0.02		**9.44**		0	
1/10/02	9:47:12	0.09		0.03		**9.44**		0	
1/10/02	9:47:27	0.09		0.12		**9.44**	**9.44**	0	
1/10/02	9:47:42	0.09		0.01		9.43		0	
1/10/02	9:47:57	0.1		-0.01		9.45		0	
1/10/02	9:48:12	0.13		0.08		9.44		0.81	
1/10/02	9:48:27	3.34		-0.02		8.42		2.45	**2.83 C3H8**
1/10/02	9:48:42	12.51		0.21		4.96		**2.78**	
1/10/02	9:48:57	17.6		0.57		1.53		**2.76**	
1/10/02	9:49:12	19.53		0.79		0.43		**2.76**	
1/10/02	9:49:27	20.08		0.55		0.16		**2.75**	
1/10/02	9:49:42	20.18		0.28		0.08		**2.68**	**2.75**
1/10/02	9:49:57	20.23		0.18		0.06		1.83	
1/10/02	9:50:12	19.99		0.11		0.07		0.03	
1/10/02	9:50:27	14.66		0.32		0.14		0	
1/10/02	9:50:42	6.96		1.1		0.1		0	**ZERO C3H8**
1/10/02	9:50:57	2.41		2		0.06		0	
1/10/02	9:51:12	0.7		2.91		0.04		0	**-.6 METER**
1/10/02	9:51:27	0.26		3.25		0.03		0	
1/10/02	9:51:42	0.14		3.39		0.02		0	
1/10/02	9:51:57	0.11		3.36		0.03		0	
1/10/02	9:52:12	**0.09**	**ZERO O2**	3.37	**3.2 CO**	0.02		0	
1/10/02	9:52:27	**0.09**		3.27		0.02		0	
1/10/02	9:52:42	**0.09**	**0.09**	**3.36**		0.01		0	
1/10/02	9:52:57	0.1		**3.49**		0.02		0.1	
1/10/02	9:53:12	0.91		**3.38**	**3.41**	0.02		0.77	
1/10/02	9:53:27	6.93		3.19		0.04		0.41	
1/10/02	9:53:42	11.7		2.68		0.04		0.4	
1/10/02	9:53:57	13.18	**13.99 O2**	1.8		0.02		0.39	
1/10/02	9:54:12	13.61		0.87		0.01		0.38	
1/10/02	9:54:27	13.73		0.45		0		0.39	
1/10/02	9:54:42	13.76		0.26		0	**ZERO NOx**	0.39	
1/10/02	9:54:57	13.78		0.11		**0**		0.4	
1/10/02	9:55:12	13.79		0.11		**0**		0.37	
1/10/02	9:55:27	13.79		0.05		**0**	**0**	0.36	
1/10/02	9:55:42	**13.80**		0.09		0.00		0.35	
1/10/02	9:55:57	**13.8**		0.09		0		0.35	
1/10/02	9:56:12	**13.81**		0.13		0		0.35	

1/10/02	9:56:27	**13.8**		0.16		0	0.35
1/10/02	9:56:42	**13.8**	**13.8**	0.13		0	1.48
1/10/02	9:56:57	13.84		0.09		0.01	2.35
1/10/02	9:57:12	15.44		0.05		0.02	1.64
1/10/02	9:57:27	17.09		0.4		0.11	0.33
1/10/02	9:57:42	15.62		0.79		0.1	0.28
1/10/02	9:57:57	14.43		0.81		0.04	0.24
1/10/02	9:58:12	13.94		0.53		0.01	0.24
1/10/02	9:58:27	13.82		0.15	**ZERO CO**	0.01	0.24
1/10/02	9:58:42	13.78		-0.12		0	0.24
1/10/02	9:58:57	13.77		**-0.13**		0	0.24
1/10/02	9:59:12	13.77		**-0.13**		0.00	0.23
1/10/02	9:59:27	13.77		**-0.13**		0	0.24
1/10/02	9:59:42	13.76		**-0.25**	**-0.16**	-0.01	0.24



1/10/02	9:56:27	-0.003	0.02	
1/10/02	9:56:42	0.000	0.03	
1/10/02	9:56:57	0.006	0.03	
1/10/02	9:57:12	0.026	0.06	
1/10/02	9:57:27	0.166	0.8	
1/10/02	9:57:42	0.112	2.59	
1/10/02	9:57:57	0.036	3.52	
1/10/02	9:58:12	0.013	3.78	
1/10/02	9:58:27	0.007	3.85	**3.6 CO2**
1/10/02	9:58:42	0.000	3.87	
1/10/02	9:58:57	0.003	**3.88**	
1/10/02	9:59:12	-0.002	**3.88**	
1/10/02	9:59:27	-0.002	**3.87**	**3.88**
1/10/02	9:59:42	-0.004	3.87	

1/10/02	9:41:27	3.330	4.62	
1/10/02	9:41:42	3.284	4.62	
1/10/02	9:41:57	3.280	4.63	
1/10/02	9:42:12	3.263	4.62	
1/10/02	9:42:27	3.290	4.63	
1/10/02	9:42:42	3.272	4.63	
1/10/02	9:42:57	3.267	4.63	
1/10/02	9:43:12	3.271	4.63	
1/10/02	9:43:27	3.259	4.63	
1/10/02	9:43:42	3.268	4.63	
		3.24	4.58	
1/10/02	9:43:57	3.362	4.52	
1/10/02	9:44:12	3.574	2.96	
1/10/02	9:44:27	3.738	1.16	
1/10/02	9:44:42	3.432	0.43	
1/10/02	9:44:57	2.342	0.2	
1/10/02	9:45:12	2.785	0.09	
1/10/02	9:45:27	2.695	0.05	
1/10/02	9:45:42	2.668	0.03	
1/10/02	9:45:57	2.680	0.03	
1/10/02	9:46:12	2.689	0.03	
1/10/02	9:46:27	2.680	0.03	
1/10/02	9:46:42	2.674	0.03	
1/10/02	9:46:57	2.678	0.03	
1/10/02	9:47:12	2.676	0.03	
1/10/02	9:47:27	2.676	0.03	
1/10/02	9:47:42	2.674	0.02	
1/10/02	9:47:57	2.680	0.03	
1/10/02	9:48:12	2.681	0.03	
1/10/02	9:48:27	2.841	0.05	
1/10/02	9:48:42	3.502	0.07	
1/10/02	9:48:57	2.630	0.04	
1/10/02	9:49:12	1.795	0.03	
1/10/02	9:49:27	1.163	0.03	
1/10/02	9:49:42	0.687	0.02	
1/10/02	9:49:57	0.559	0.03	
1/10/02	9:50:12	0.483	0.05	
1/10/02	9:50:27	0.153	0.07	
1/10/02	9:50:42	0.046	0.05	
1/10/02	9:50:57	0.020	0.03	
1/10/02	9:51:12	0.011	0.03	
1/10/02	9:51:27	0.009	0.02	
1/10/02	9:51:42	0.007	0.02	
1/10/02	9:51:57	0.007	0.02	
1/10/02	9:52:12	0.005	0.02	
1/10/02	9:52:27	0.005	0.02	
1/10/02	9:52:42	0.004	0.02	
1/10/02	9:52:57	0.005	0.02	
1/10/02	9:53:12	0.005	0.03	
1/10/02	9:53:27	0.017	0.05	
1/10/02	9:53:42	0.026	0.03	
1/10/02	9:53:57	0.015	0.03	
1/10/02	9:54:12	0.005	0.02	
1/10/02	9:54:27	0.003	0.02	
1/10/02	9:54:42	0.002	0.02	**ZERO CO2**
1/10/02	9:54:57	0.002	**0.02**	
1/10/02	9:55:12	0.002	**0.02**	
1/10/02	9:55:27	0.003	**0.02**	
1/10/02	9:55:42	-0.001	**0.02**	**0.02**
1/10/02	9:55:57	-0.002	0.02	
1/10/02	9:56:12	-0.003	0.02	

1/10/02	9:25:27	3.376	4.62
1/10/02	9:25:42	3.359	4.61
1/10/02	9:25:57	3.383	4.61
1/10/02	9:26:12	3.361	4.62
1/10/02	9:26:27	3.344	4.62
1/10/02	9:26:42	3.370	4.62
1/10/02	9:26:57	3.366	4.61
1/10/02	9:27:12	3.365	4.62
1/10/02	9:27:27	3.364	4.62
1/10/02	9:27:42	3.377	4.62
1/10/02	9:27:57	3.370	4.62
1/10/02	9:28:12	3.360	4.62
1/10/02	9:28:27	3.375	4.61
1/10/02	9:28:42	3.329	4.61
1/10/02	9:28:57	3.363	4.62
1/10/02	9:29:12	3.324	4.62
1/10/02	9:29:27	3.365	4.62
1/10/02	9:29:42	3.391	4.62
1/10/02	9:29:57	3.377	4.62
1/10/02	9:30:12	3.379	4.62
1/10/02	9:30:27	3.363	4.62
1/10/02	9:30:42	3.385	4.61
1/10/02	9:30:57	3.365	4.62
1/10/02	9:31:12	3.356	4.62
1/10/02	9:31:27	3.397	4.61
1/10/02	9:31:42	3.363	4.61
1/10/02	9:31:57	3.354	4.62
1/10/02	9:32:12	3.406	4.62
1/10/02	9:32:27	3.399	4.62
1/10/02	9:32:42	3.381	4.62
1/10/02	9:32:57	3.404	4.62
1/10/02	9:33:12	3.405	4.61
1/10/02	9:33:27	3.387	4.62
1/10/02	9:33:42	3.380	4.62
1/10/02	9:33:57	3.422	4.62
1/10/02	9:34:12	3.405	4.61
1/10/02	9:34:27	3.390	4.62
1/10/02	9:34:42	3.403	4.62
1/10/02	9:34:57	3.395	4.62
1/10/02	9:35:12	3.410	4.62
1/10/02	9:35:27	3.400	4.62
1/10/02	9:35:42	3.407	4.62
1/10/02	9:35:57	3.412	4.62
1/10/02	9:36:12	3.409	4.62
01/10/02	9:36:27	3.390	4.62
1/10/02	9:36:42	3.392	4.62
1/10/02	9:36:57	3.401	4.62
1/10/02	9:37:12	3.403	4.62
1/10/02	9:37:27	3.447	4.62
1/10/02	9:37:42	3.427	4.62
1/10/02	9:37:57	3.403	4.62
1/10/02	9:38:12	3.401	4.62
1/10/02	9:38:27	3.404	4.62
1/10/02	9:38:42	3.413	4.62
1/10/02	9:38:57	3.386	4.62
1/10/02	9:39:12	3.411	4.62
1/10/02	9:39:27	3.435	4.63
1/10/02	9:39:42	3.423	4.63
1/10/02	9:39:57	3.421	4.62
1/10/02	9:40:12	3.414	4.62
1/10/02	9:40:27	3.396	4.62
1/10/02	9:40:42	3.406	4.62
1/10/02	9:40:57	3.411	4.63
1/10/02	9:41:12	3.371	4.62

1/10/02	8:53:27	3.286	4.54
1/10/02	**8:53:42**	**3.382**	**4.47**
1/10/02	**8:53:57**	**3.668**	**2.61**
1/10/02	**8:54:12**	**2.880**	**1.95**
1/10/02	**8:54:27**	**3.108**	**3.8**
1/10/02	**8:54:42**	**3.206**	**4.42**
1/10/02	**8:54:57**	**3.240**	**4.53**
1/10/02	**8:55:12**	**3.171**	**4.54**
1/10/02	**8:55:27**	**3.113**	**4.54**
1/10/02	8:55:42	3.119	4.55
1/10/02	8:55:57	3.172	4.55
1/10/02	8:56:12	3.176	4.55
1/10/02	8:56:27	3.203	4.55
1/10/02	8:56:42	3.223	4.55
1/10/02	8:56:57	3.246	4.55
1/10/02	8:57:12	3.256	4.55
1/10/02	8:57:27	3.231	4.56
1/10/02	8:57:42	3.218	4.55
1/10/02	8:57:57	3.203	4.55
1/10/02	8:58:12	3.196	4.56
1/10/02	8:58:27	3.227	4.56
1/10/02	8:58:42	3.189	4.56
1/10/02	8:58:57	3.156	4.56
1/10/02	8:59:12	3.134	4.56
1/10/02	8:59:27	3.154	4.56
1/10/02	8:59:42	3.154	4.56
1/10/02	8:59:57	3.150	4.56
1/10/02	9:00:12	3.162	4.56
1/10/02	9:00:27	3.160	4.56
1/10/02	9:00:42	3.125	4.56
1/10/02	9:00:57	3.143	4.56
1/10/02	9:01:12	3.146	4.56
1/10/02	9:01:27	3.146	4.56
1/10/02	9:01:42	3.174	4.56
1/10/02	9:01:57	3.201	4.56
1/10/02	9:02:12	3.176	4.56
1/10/02	9:02:27	3.198	4.56
1/10/02	9:02:42	3.163	4.56
1/10/02	9:02:57	3.147	4.57
1/10/02	9:03:12	3.165	4.57
1/10/02	9:03:27	3.156	4.57
1/10/02	9:03:42	3.176	4.57
1/10/02	9:03:57	3.158	4.57
1/10/02	9:04:12	3.145	4.57
1/10/02	9:04:27	3.157	4.57
1/10/02	9:04:42	3.169	4.57
1/10/02	9:04:57	3.197	4.58
1/10/02	9:05:12	3.208	4.57
1/10/02	9:05:27	3.185	4.57
1/10/02	9:05:42	3.179	4.57
1/10/02	9:05:57	3.161	4.57
1/10/02	9:06:12	3.205	4.57
01/10/02	9:06:27	3.181	4.57
1/10/02	9:06:42	3.162	4.57
1/10/02	9:06:57	3.205	4.58
1/10/02	9:07:12	3.208	4.58
1/10/02	9:07:27	3.210	4.58
1/10/02	9:07:42	3.225	4.58
1/10/02	9:07:57	3.216	4.58
1/10/02	9:08:12	3.194	4.58
1/10/02	9:08:27	3.186	4.58
1/10/02	9:08:42	3.215	4.58
1/10/02	9:08:57	3.268	4.58
1/10/02	9:09:12	3.254	4.58

1/10/02	8:37:27	3.050	4.5
1/10/02	8:37:42	3.009	4.5
1/10/02	8:37:57	3.005	4.51
1/10/02	8:38:12	2.992	4.5
1/10/02	8:38:27	2.978	4.5
1/10/02	8:38:42	2.979	4.5
1/10/02	8:38:57	2.985	4.5
1/10/02	8:39:12	3.005	4.51
1/10/02	8:39:27	2.986	4.51
1/10/02	8:39:42	2.991	4.51
1/10/02	8:39:57	2.961	4.51
1/10/02	8:40:12	2.972	4.51
1/10/02	8:40:27	2.983	4.51
1/10/02	8:40:42	3.014	4.52
1/10/02	8:40:57	3.055	4.52
1/10/02	8:41:12	3.012	4.51
1/10/02	8:41:27	3.026	4.52
1/10/02	8:41:42	3.013	4.52
1/10/02	8:41:57	2.995	4.52
1/10/02	8:42:12	3.000	4.53
1/10/02	8:42:27	2.999	4.52
1/10/02	8:42:42	3.005	4.52
1/10/02	8:42:57	3.010	4.53
1/10/02	8:43:12	3.029	4.53
1/10/02	8:43:27	2.993	4.53
1/10/02	8:43:42	2.995	4.53
1/10/02	8:43:57	2.985	4.54
1/10/02	8:44:12	3.024	4.54
1/10/02	8:44:27	3.033	4.54
1/10/02	8:44:42	3.062	4.54
1/10/02	8:44:57	3.042	4.54
1/10/02	8:45:12	3.057	4.55
1/10/02	8:45:27	3.046	4.55
1/10/02	8:45:42	3.037	4.56
1/10/02	8:45:57	3.011	4.57
1/10/02	8:46:12	3.030	4.57
1/10/02	8:46:27	3.014	4.17
1/10/02	8:46:42	3.059	4.15
1/10/02	8:46:57	3.057	4.39
1/10/02	8:47:12	3.048	4.59
1/10/02	8:47:27	3.055	4.58
1/10/02	8:47:42	3.128	4.56
1/10/02	8:47:57	3.152	4.53
1/10/02	8:48:12	3.139	4.53
1/10/02	8:48:27	3.169	4.54
1/10/02	8:48:42	3.175	4.54
1/10/02	8:48:57	3.177	4.54
1/10/02	8:49:12	3.164	4.53
1/10/02	8:49:27	3.115	4.54
1/10/02	8:49:42	3.131	4.54
1/10/02	8:49:57	3.166	4.53
1/10/02	8:50:12	3.182	4.53
1/10/02	8:50:27	3.207	4.53
1/10/02	8:50:42	3.248	4.53
1/10/02	8:50:57	3.184	4.53
1/10/02	8:51:12	3.223	4.54
1/10/02	8:51:27	3.246	4.54
1/10/02	8:51:42	3.230	4.54
1/10/02	8:51:57	3.236	4.54
1/10/02	8:52:12	3.259	4.54
1/10/02	8:52:27	3.267	4.54
1/10/02	8:52:42	3.265	4.54
1/10/02	8:52:57	3.276	4.54
1/10/02	8:53:12	3.256	4.54

APPENDIX D

AMMONIA DATA

AIR CONSULTING and ENGINEERING, INC.
COMPLETE EMISSION DATA

COMPANY NAME:	KISSIMMEE UTILITY AUTHORITY
LOCATION:	INTERCESSION CITY, FLORIDA
SOURCE:	COMBUSTION TURBINE 3 OUTLET
DATE:	01-09-02

RUN NUMBER:	1-GAS		IMPINGER ml.	72.0
BEGIN TIME (hour : minute):	2:28 PM		SILICA GEL. gms.	8.6
END TIME (hour : minute):	3:43 PM		% O2:	13.00
TOTAL RUN TIME:	60	MINUTES	% CO2:	6.00
BAROMETRIC PRESSURE:	30.24	inches Hg.	"F" FACTOR:	NA
STACK PRESSURE:	30.22	inches Hg.		
NOZZLE DIAMETER:	0.195	INCHES		
METER CORR. FACTOR:	0.996		AMMONIA DATA:	
FINAL METER:	917.247	CUBIC FT.		
INITIAL METER:	872.618	CUBIC FT.		
STACK AREA:	233.705	SQ. FT.	1st IMPINGER mg:	0.911
PITOT Cp:	0.84		2nd IMPINGER mg:	0.008

EMISSION RESULTS

NOZZLE AREA (SQ. FT.):	0.000207	VOLUMETRIC FLOW(ACFM):	1159549
AVG. SQ. RT. VEL. HEAD:	1.2986	VOLUMETRIC FLOW(WVSCFM):	71468
		VOLUMETRIC FLOW(DSCFM):	838779
AVG. STACK TEMP. (F):	219.1	VOLUMETRIC FLOW(SCFMwet):	910247
AVG. METER TEMP. (F):	74.4		
AVG. ORIFICE DIFFERENTIAL:	1.552	**AMMONIA EMISSION DATA**	
METER ACF:	44.629		
METER SCF:	44.526	POUNDS PER HOUR:	2.290
MEASURED SCF MOISTURE:	3.794	POUNDS PER SCF.:	4.55E-08
MEASURED MOISTURE %:	7.85	GRAINS PER SCF.:	0.0003
STACK TEMP. (deg. C):	103.9	GRAINS PER SCF @ 7% O2:	0.0006
VAPOR PRESSURE:	34.3	GRAINS PER SCF @ 50% E.A.:	0.0005
SATURATION MOISTURE %:	NA	PPM NH3:	1.0314
PERCENT WATER VAPOR:	7.85		
GAS MOLECULAR WT.(dry):	29.48		
GAS MOLECULAR WT.(wet):	28.58		
PERCENT EXCESS AIR:	155.057		
AVERAGE VELOCITY(FPS):	82.7		
MMBTUH(if applicable):	NA		
PERCENT ISOKINETIC:	99.72		

AIR CONSULTING and ENGINEERING, INC.
COMPLETE EMISSION DATA

COMPANY NAME:	KISSIMMEE UTILITY AUTHORITY
LOCATION:	INTERCESSION CITY, FLORIDA
SOURCE:	COMBUSTION TURBINE 3 OUTLET
DATE:	01-09-02

RUN NUMBER:	2-GAS		IMPINGER ml.	75.0
BEGIN TIME (hour : minute):	4:18 PM		SILICA GEL. gms.	7.8
END TIME (hour : minute):	5:30 PM		% O2:	13.00
TOTAL RUN TIME:	60	MINUTES	% CO2:	6.00
BAROMETRIC PRESSURE:	30.24	inches Hg.	"F" FACTOR:	NA
STACK PRESSURE:	30.22	inches Hg.		
NOZZLE DIAMETER:	0.195	INCHES		
METER CORR. FACTOR:	0.996		AMMONIA DATA:	
FINAL METER:	962.776	CUBIC FT.		
INITIAL METER:	917.789	CUBIC FT.		
STACK AREA:	233.705	SQ. FT.	1st IMPINGER mg:	0.230
PITOT Cp:	0.84		2nd IMPINGER mg:	0.008

EMISSION RESULTS

NOZZLE AREA (SQ. FT.):	0.000207	VOLUMETRIC FLOW(ACFM):	1147352
AVG. SQ. RT. VEL. HEAD:	1.2884	VOLUMETRIC FLOW(WVSCFM):	72959
		VOLUMETRIC FLOW(DSCFM):	833218
AVG. STACK TEMP. (F):	215.0	VOLUMETRIC FLOW(SCFMwet):	906177
AVG. METER TEMP. (F):	78.9		
AVG. ORIFICE DIFFERENTIAL:	1.563	**AMMONIA EMISSION DATA**	
METER ACF:	44.987		
METER SCF:	44.510	POUNDS PER HOUR:	0.589
MEASURED SCF MOISTURE:	3.897	POUNDS PER SCF.:	1.18E-08
MEASURED MOISTURE %:	8.05	GRAINS PER SCF.:	0.0001
STACK TEMP. (deg. C):	101.6	GRAINS PER SCF @ 7% O2:	0.0001
VAPOR PRESSURE:	31.6	GRAINS PER SCF @ 50% E.A.:	0.0001
SATURATION MOISTURE %:	NA	PPM NH3:	0.2672
PERCENT WATER VAPOR:	8.05		
GAS MOLECULAR WT.(dry):	29.48		
GAS MOLECULAR WT.(wet):	28.56		
PERCENT EXCESS AIR:	155.057		
AVERAGE VELOCITY(FPS):	81.8		
MMBTUH(if applicable):	NA		
PERCENT ISOKINETIC:	100.35		

AIR CONSULTING and ENGINEERING, INC.
COMPLETE EMISSION DATA

COMPANY NAME:	KISSIMMEE UTILITY AUTHORITY
LOCATION:	INTERCESSION CITY, FLORIDA
SOURCE:	COMBUSTION TURBINE 3 OUTLET
DATE:	01-10-02

RUN NUMBER:	3-GAS		IMPINGER ml.	68.0
BEGIN TIME (hour : minute):	8:37 AM		SILICA GEL. gms.	8.9
END TIME (hour : minute):	9:48 AM		% O2:	13.00
TOTAL RUN TIME:	60	MINUTES	% CO2:	6.00
BAROMETRIC PRESSURE:	30.24	inches Hg.	"F" FACTOR:	NA
STACK PRESSURE:	30.22	inches Hg.		
NOZZLE DIAMETER:	0.195	INCHES		
METER CORR. FACTOR:	0.996		AMMONIA DATA:	
FINAL METER:	1006.432	CUBIC FT.		
INITIAL METER:	963.126	CUBIC FT.		
STACK AREA:	233.705	SQ. FT.	1st IMPINGER mg:	0.185
PITOT Cp:	0.84		2nd IMPINGER mg:	0.005

EMISSION RESULTS

NOZZLE AREA (SQ. FT.):	0.000207	VOLUMETRIC FLOW(ACFM):	1149349
AVG. SQ. RT. VEL. HEAD:	1.2914	VOLUMETRIC FLOW(WVSCFM):	67522
		VOLUMETRIC FLOW(DSCFM):	839113
AVG. STACK TEMP. (F):	215.8	VOLUMETRIC FLOW(SCFMwet):	906635
AVG. METER TEMP. (F):	53.1		
AVG. ORIFICE DIFFERENTIAL:	1.437	**AMMONIA EMISSION DATA**	
METER ACF:	43.306		
METER SCF:	44.983	POUNDS PER HOUR:	0.468818
MEASURED SCF MOISTURE:	3.620	POUNDS PER SCF.:	9.31E-09
MEASURED MOISTURE %:	7.45	GRAINS PER SCF.:	0.0001
STACK TEMP. (deg. C):	102.1	GRAINS PER SCF @ 7% O2:	0.0001
VAPOR PRESSURE:	32.1	GRAINS PER SCF @ 50% E.A.:	0.0001
SATURATION MOISTURE %:	NA	PPM NH3:	0.2111
PERCENT WATER VAPOR:	7.45		
GAS MOLECULAR WT.(dry):	29.48		
GAS MOLECULAR WT.(wet):	28.63		
PERCENT EXCESS AIR:	155.057		
AVERAGE VELOCITY(FPS):	82.0		
MMBTUH(if applicable):	NA		
PERCENT ISOKINETIC:	100.70		

AIR CONSULTING and ENGINEERING, INC.

COMPANY NAME: KISSIMMEE UTILITY AUTHORITY
LOCATION: INTERCESSION CITY, FLORIDA
SOURCE: COMBUSTION TURBINE 3 OUTLET
DATE: 01-09-02
RUN NUMBER: 1-GAS **START:** 14:28 **END:** 15:43

SOURCE PARAMETER ENTRIES

PORT-POINT	"Inches"	VELOCITY HEAD	ORIFICE CALC.	DELTA P ACTUAL	STACK TEMP. F	METER TEMP.F
1 - 1	73.62	1.75	1.61	1.61	219	70
1 - 2	51.75	1.60	1.47	1.47	219	70
1 - 3	36.69	1.50	1.38	1.38	219	71
1 - 4	24.45	1.60	1.47	1.47	218	71
1 - 5	13.87	1.70	1.56	1.56	217	71
1 - 6	4.41	1.80	1.66	1.66	217	71
2 - 1		1.65	1.52	1.52	218	71
2 - 2		1.70	1.56	1.56	219	71
2 - 3		1.70	1.56	1.56	219	71
2 - 4		1.75	1.61	1.61	220	72
2 - 5		1.85	1.70	1.70	220	73
2 - 6		1.75	1.61	1.61	220	74
3 - 1		1.75	1.61	1.61	219	75
3 - 2		1.60	1.47	1.47	220	75
3 - 3		1.60	1.47	1.47	221	76
3 - 4		1.75	1.61	1.61	221	77
3 - 5		1.65	1.52	1.52	220	77
3 - 6		1.85	1.70	1.70	219	77
4 - 1		1.65	1.52	1.52	218	78
4 - 2		1.70	1.56	1.56	219	78
4 - 3		1.65	1.52	1.52	219	79
4 - 4		1.60	1.47	1.47	219	79
4 - 5		1.60	1.47	1.47	219	79
4 - 6		1.75	1.61	1.61	219	79
AVERAGES:		1.688		1.552	219.08	74.38

AIR CONSULTING and ENGINEERING, INC.

COMPANY NAME: KISSIMMEE UTILITY AUTHORITY
LOCATION: INTERCESSION CITY, FLORIDA
SOURCE: COMBUSTION TURBINE 3 OUTLET
DATE: 01-09-02
RUN NUMBER: 2-GAS **START:** 16:18 **END:** 17:30

SOURCE PARAMETER ENTRIES

PORT-POINT	"inches"	VELOCITY HEAD	ORIFICE CALC.	DELTA P ACTUAL	STACK TEMP. F	METER TEMP.F
1 - 1	73.62	1.50	1.41	1.41	218	76
1 - 2	51.75	1.55	1.46	1.46	219	76
1 - 3	36.69	1.70	1.60	1.60	218	76
1 - 4	24.45	1.75	1.65	1.65	218	77
1 - 5	13.87	1.85	1.74	1.74	218	77
1 - 6	4.41	1.90	1.79	1.79	217	78
2 - 1		1.45	1.36	1.36	218	78
2 - 2		1.45	1.36	1.36	217	78
2 - 3		1.55	1.46	1.46	216	79
2 - 4		1.65	1.55	1.55	215	79
2 - 5		1.75	1.65	1.65	213	80
2 - 6		1.70	1.60	1.60	212	80
3 - 1		1.80	1.69	1.69	213	80
3 - 2		1.60	1.50	1.50	213	80
3 - 3		1.55	1.46	1.46	213	80
3 - 4		1.65	1.55	1.55	213	80
3 - 5		1.85	1.74	1.74	214	80
3 - 6		1.80	1.69	1.69	213	80
4 - 1		1.70	1.60	1.60	213	80
4 - 2		1.60	1.50	1.50	213	80
4 - 3		1.45	1.36	1.36	213	80
4 - 4		1.60	1.50	1.50	214	80
4 - 5		1.70	1.60	1.60	214	80
4 - 6		1.80	1.69	1.69	214	79
AVERAGES:		1.663		1.563	214.96	78.88

AIR CONSULTING and ENGINEERING, INC.

COMPANY NAME: KISSIMMEE UTILITY AUTHORITY
LOCATION: INTERCESSION CITY, FLORIDA
SOURCE: COMBUSTION TURBINE 3 OUTLET
DATE: 01-10-02
RUN NUMBER: 3-GAS **START:** 8:37 **END:** 9:48

SOURCE PARAMETER ENTRIES

PORT-POINT	"inches"	VELOCITY HEAD	ORIFICE CALC.	DELTA P ACTUAL	STACK TEMP. F	METER TEMP.F
1 - 1	73.62	1.80	1.55	1.55	217	46
1 - 2	51.75	1.75	1.51	1.51	216	47
1 - 3	36.69	1.75	1.51	1.51	216	47
1 - 4	24.45	1.70	1.46	1.46	216	48
1 - 5	13.87	1.60	1.38	1.38	216	49
1 - 6	4.41	1.50	1.29	1.29	216	49
2 - 1		1.70	1.46	1.46	216	50
2 - 2		1.75	1.51	1.51	217	50
2 - 3		1.65	1.42	1.42	217	51
2 - 4		1.75	1.51	1.51	217	51
2 - 5		1.80	1.55	1.55	217	51
2 - 6		1.65	1.42	1.42	216	52
3 - 1		1.75	1.51	1.51	216	53
3 - 2		1.65	1.42	1.42	216	54
3 - 3		1.50	1.29	1.29	216	55
3 - 4		1.50	1.29	1.29	216	56
3 - 5		1.65	1.42	1.42	216	56
3 - 6		1.70	1.46	1.46	216	56
4 - 1		1.60	1.38	1.38	215	57
4 - 2		1.65	1.42	1.42	215	58
4 - 3		1.70	1.46	1.46	215	59
4 - 4		1.70	1.46	1.46	214	60
4 - 5		1.65	1.42	1.42	214	60
4 - 6		1.60	1.38	1.38	213	60
AVERAGES:		1.669		1.437	215.79	53.13

AIR CONSULTING and ENGINEERING, INC.
SAMPLE CALCULATIONS

KISSIMMEE UTILITY AUTHORITY
INTERCESSION CITY, FLORIDA
COMBUSTION TURBINE 3 OUTLET
01-09-02

RUN NUMBER: 1-GAS

NOZZLE AREA SQ.FT.:
An=Pi*(Rn)E2 = Pi*(Dn/2)E2 = Pi*[(Dn/2)E2]*[(1ft/12in)E2]
=Pi*(Dn)E2 / (576) = (3.1416)*[(0.195)E2]/(576)
= 0.000207

METER ACTUAL CU. FEET:
Vm = (Vm final) - (Vm initial)
= (917.247) - (872.618)
= 44.629

METER STANDARD CU. FEET:
VMstd=(K1)*(Vm)*(Y)*{(Pbar)+[(DHavg)/(13.6)]}/[(TMavg)+(460)]
= (17.64)*(44.629)*(0.9957)*{(30.24)+[(1.55)/(13.6)]}/[(74.4)+(460)]
= 44.526

MEASURED SCF MOISTURE:
VWstd=(K2)*(Vlc)
= (0.04707)*(72 + 8.6)
= 3.794

MEASURED % MOISTURE:
Bwm%={(VWstd)/[(VMstd)+(VWstd)]}*100%
= {(3.794)/[(44.526)+(3.794)]}*100%
= 7.85%

STACK TEMP. Deg C
Tsc=[(TSavg)-32]*5/9
= [(219.1)-32]*5/9
= 103.9

VAPOR PRESSURE (in Hg):
Pv={2.718E[18.6866-0.00244*(273+(Tsc))-4509.47/(273+(Tsc))-
149541/((273+(Tsc))E2)]}/3.375
= {2.718E[18.688-0.00244*(273+(103.9))-4509.47/(273+(103.9))-
149541/((273+(103.9))E2)]}/3.375
= 34.26

SATURATION MOISTURE %:
Bwsat%=NA
NA
NA

PERCENT WATER VAPOR:
Bwo% = Bwm% IF Bwm% < Bwsat%
Bwo% = Bwsat% IF Bwsat% < Bwm%
= 7.85

GAS MOLECULAR WT.(dry):
Md = [(0.440)*(%CO2)]+[(0.320)*(%O2)]+{(0.280)*[(%N2)+(%CO)]}
= [(0.440)*(%CO2)]+[(0.320)*(%O2)]+{(0.280)*[(100)-(%CO2)-(%O2)]}
= [(0.440)*(6)]+[(0.032)*(13)]+{(0.280)*(81)]}
= 29.5

GAS MOLECULAR WT.(wet):
Ms= {(Md)*[1-(Bwo%/100)]}+[(18.0)*(Bwo%/100)]
= {(29.5)*[1-(0.0785)]}+[(18.0)*(0.0785)]
= 28.58

PERCENT EXCESS AIR:
%EA={(%O2)/{[(0.264)*(%N2)]-(%O2)}}*(100%)
= {(13)/{[(0.264)*(81)]-(13)}}*(100%)
= 155.06

AVERAGE VELOCITY(FPS): VSavg=(85.48)*(Cp)*(ASRVH)*{[(TSavg)+(460)]/[(Ms)*(Ps)]}E1/2
= (85.48)*(0.84)*(1.3)*{[(219.1)+(460)]/[(28.6)*(30.22)]}E1/2
= 82.69

PERCENT ISOKINETIC: %Iso={(K4)*(TSavg+460)*(VMstd)/{(Ps)*(Vs)*(An)*(time)*[1-(Bwo%/100)]}}
*100
={ (0.09450)*(219.1+460)*(44.526)/{(30.22)*(82.69)*(0.000207)*(60)*[1-(7.85/100)]} }*100%
= 99.7

VOLUMETRIC FLOW(ACFM): QS=(VSavg)*(As)*(60)
= (82.69)*(233.705)*(60)
= 1159548.9

VOLUMETRIC FLOW(WVSCFM): WVSCFM=(QS)*(17.64)*(Bwo%/100)*(Ps)/(TSavg+460)
= (1159548.9)*(17.64)*(7.85/100)*(30.22)/(219.1+460)
= 71467.9

VOLUMETRIC FLOW(DSCFM): QSstd=(QS)*(17.64)*[1-(Bwo%/100)]*(Ps)/(TSavg+460)
= (1159548.9)*(17.64)*[1-(7.85/100)]*(30.22)/(219.1+460)
= 838778.6

AMMONIA EMISSION DATA:

POUNDS PER HOUR: lb/Hr=(mg)*(QSstd)*(60)/[(VMstd)*(453600)]
= (0.919)*(838778.6)*(60)/[(44.526)*(453600)]
= 2.29

POUNDS PER SCF.: lb/SCF=(lb/Hr)/[(60)*(QSstd)]
= (2.29/[(60)*(838778.6)]
= 0

GRAINS PER SCF.: Gr/SCF=(lb/SCF)*(7000)
= (0)*(7000)
= 0

GRAINS PER SCF @ 7% O2: =(Gr/SCF)*(20.9-7.0)/[(20.9)-(%O2)]
= (0)*(13.9)/[(20.9)-(13)]
= 0.001

GRAINS PER SCF @ 50% E.A.: =(Gr/SCF)*[(100)+(%EA)]/(150)
= (0)*[(100)+(155.06)]/(150)
= 0.001

POUNDS PER MMBTU: NA
NA
NA

AIR CONSULTING and ENGINEERING, INC.
NOMENCLATURE

%CO - Percent Carbon Monoxide.
%CO2 - Percent Carbon Dioxide.
%EA - Percent excess air.
%Iso - Percent isokenetics.
%N2 - Percent Nitrogen.
%O2 - Percent Oxygen.
An - Area of the nozzle, square feet.
As - Stack area, square feet.
ASRVH - Average of the square roots of the velocity heads.
Bwm% - Percent water vapor as measured.
Bwo% - Percent water vapor.
Bwsat% - Percent water vapor at saturation.
C3H8 - Propane.
CH4 - Methane.
CO - Carbon Monoxide
CO - Carbon Monoxide.
CO2 - Carbon Dioxide
Cp - Pitot coefficient.
Cso2 - Concentration of Sulfur Dioxide, pounds per dry standard cubic foot.
DHavg - Average meter orifice pressure differential.
Dn - Nozzle diameter.
E - Denotes exponent.
F - Fuel factor,standard cubic feet per million BTU.
Gr/SCF - Grains per dry standard cubic foot.
Hr - Hour.
K1 - A constant =17.64.
K2 - A constant = 0.04707.
K4 - A constant = 0.09450.
lb - pound.
lb/Hr - pounds per hour.
lb/MMBTU - Pounds per million British Thermal Units.
lb/SCF - Pounds per dry standard cubic foot.
Md - Molecular weight of dry stack gas.
mg - Mass of filter and dried probe wash, milligrams.
MMBTU - million British Thermal Units.
Ms - Molecular weight of wet stack gas.
NOx - Oxides of Nitrogen.
Pbar - Barometric pressure, inches of Mercury.
Pi - A constant = 3.14159....
PPM - Parts per million.
Ps - Stack pressure, inches Mercury.
Pv - Vapor pressure of water at stack temperature, inches Mercury.
Qs - Volumetric flow rate, actual cubic feet per minute.
QSstd - Volumetric flow rate, dry standard cubic feet per minute.
Rn - Nozzle radius, inches.
SCF - Standard cubic feet.
SO2 - Sulfur Dioxide.
TMavg - Average meter temperature, degrees Farenheit.
TSavg - Average stack temperature, degrees Farenhiet.
Tsc - Average stack temperature, degrees Celcious.
Vlc - Volume of moisture collected in the impingers and silica gel, milliliters.
Vm - Metered volume, actual cubic feet.
Vm final - Final meter reading, actual cubic feet.
Vm initial - Initial meter reading, actual cubic feet.
VMstd - Metered volume corrected to standard conditions, standard cubic feet.
VOC - Volitile organic compounds.
VSavg - Average stack velocity, feet per second.
VWstd - Standard volume of water vapor, standard cubic feet.
WVSCFM - Volumetric flow rate of water vapor, standard cubic feet per minute.
Y - Meter correction factor.

PLANT KISSIMMEE UTILITY Authority
SOURCE CT # 3
PLANT LOCATION INTERCESSION City, FL
TYPE OF SAMPLING TRAIN Mod. EPA 26
TYPE OF SAMPLES AMMONIA
DATE 1-9-02 RUN NUMBER 1
TIME START 1428 TIME END 1543
SAMPLE TIME 2.5 / ____ (MIN/PT)= 60 TOTAL MIN
ASSUMED MOISTURE(%) 8 FDA 0.92
NOMOGRAPH Cf 0.92 PITOT Cf 0.84
Pb ("Hg) 30.24 Ps ("Hg) 30.22
WEATHER CLEAR TEMP (F) 57
METER BOX NO. 3 H 1.5826 Y 0.9957
NOZZLE IDENTIFICATION NO. BDK # 3
NOZZLE CAL .195 / .195 / .195 = 0.195
STACK DIMENSIONS 207"
STACK AREA (FT2) 233.705 EFFECTIVE (FT2) 233.705
STACK DIAMETERS:(UPSTREAM)____(DOWNSTREAM)____
PORT SIZE 6" NIPPLE LENGTH 6"
STACK HEIGHT (FT) ~150' UMBILICAL LENGTH 200'
AGENCY OBSERVER(S) GARY KUBERSKI
TEST COORDINATOR(S) ____
V. E. OBSERVER ____

ACE AIR CONSULTING & ENGINEERING, INC.
2106 NW 67TH PLACE SUITE 4
GAINESVILLE, FLORIDA 32653
(352) 335-1889 - OFFICE / (352) 335-1891 - FAX

STACK CONFIGURATION

REMARKS:
GAS-FIRED

TEST ID ____
PAGE 1 OF 2
MATERIAL PROCESSING RATE ____
GAS METER READINGS: FINAL 917.247 (FT3)
INITIAL 872.618 (FT3)
NET 44.629 (FT3)
FILTER NO. 9784 IMP. VOL.GAIN 72.0 (ml)
SILICA GEL NO. 530 WT. GAIN 8.6 (ml)
TOTAL CONDENSATE 80.6 (ml)

ORSAT

	1	2	3	4	AVG.
%CO2					
%O2					
%CO					
%N2					

Fo= N/A Fo RANGE= N/A ORSAT ANALYZER ____

LEAK CHECKS
PRE 0.00 CFM 17 ("Hg) POST 0.00 CFM 12 ("Hg)
METER BOX/PUMP ✓ GAS SYSTEM ✓ ORSAT BAG N/A
PITOT TUBE NO. 116 PRE-TEST LEAK CHECK OK
POST TEST (+) 9.0 / 0.0 "H20 (15 SECONDS)
POST TEST (-) 8.0 / 0.0 "H20 (15 SECONDS)
PYROMETER NUMBER ATK-3
BOX OPERATOR KESHARD PROBE HOLDER GP/JS

PORT & TRAVERSE PT. NUMBER	COMMENTS	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF.("H2O) CALC.	METER ORIFICE PRESS. DIFF.("H2O) ACTUAL	STACK GAS TEMP (F)	SAMPLE BOX TEMP (F)	LAST IMPINGER TEMP (F)	DRY GAS METER TEMP (F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1			874.410	1.75	1.61	1.61	219	254	53	70	3.0
2		1433	876.035	1.60	1.47	1.47	219	253	53	70	3.0
3			877.650	1.50	1.38	1.38	219	255	51	71	3.0
4		1438	879.345	1.60	1.47	1.47	218	254	48	71	3.5
5			881.140	1.70	1.56	1.56	217	255	46	71	3.5
6		1443	883.010	1.80	1.66	1.66	217	254	45	71	4.0

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID _____

PAGE 2 OF 2

PORT & TRAVERSE NUMBER	COMMENTS	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF ("H2O) CALC.	METER ORIFICE PRESS. DIFF ("H2O) ACTUAL	STACK GAS TEMP (F)	SAMPLE BOX TEMP (F)	LAST IMPINGER TEMP (F)	DRY GAS METER TEMP (F)	VACUUM ON SAMPLE TRAIN ("Hg)
2-1			884.880	1.65	1.52	1.52	218	255	49	71	4.0
2		1453	886.640	1.70	1.56	1.56	219	253	48	71	4.0
3			888.432	1.70	1.56	1.56	219	254	48	71	4.0
4		1458	890.235	1.75	1.61	1.61	220	255	47	72	4.0
5			892.220	1.85	1.70	1.70	220	254	46	73	4.5
6		1503	894.203	1.75	1.61	1.61	220	255	46	74	4.0
3-1			896.120	1.75	1.61	1.61	219	254	48	75	4.0
2		1513	898.000	1.60	1.47	1.47	220	253	48	75	4.0
3			899.900	1.60	1.47	1.47	221	254	47	76	4.0
4		1518	901.830	1.75	1.61	1.61	221	256	47	77	4.5
5			903.750	1.65	1.52	1.52	220	255	47	77	4.0
6		1523	905.761	1.85	1.70	1.70	219	253	48	77	4.5
4-1			907.615	1.65	1.52	1.52	218	255	50	78	4.0
2		1533	909.515	1.70	1.56	1.56	219	256	49	78	4.0
3			911.510	1.65	1.52	1.52	219	255	48	79	4.0
4		1538	913.300	1.60	1.47	1.47	219	254	49	79	4.5
5			915.325	1.60	1.47	1.47	219	256	49	79	4.0
6		1543	917.247	1.75	1.61	1.61	219	255	48	79	4.5
END		1543	44.629	1.688		1.552	219.08			74.38	

PLANT KISSIMMEE UTILITY Authority
SOURCE CT #3
PLANT LOCATION INTERCESSION City, FL.
TYPE OF SAMPLING TRAIN Mod. EPA 26
TYPE OF SAMPLES AMMONIA
DATE 1-9-02 RUN NUMBER 2
TIME START 1618 TIME END 1730
SAMPLE TIME 2.5 / 24 (MIN/PT)= 60 TOTAL MIN
ASSUMED MOISTURE(%) 8 FDA 0.92
NOMOGRAPH Cf 0.94 PITOT Cf 0.84
Pb ("Hg) 30.24 Ps ("Hg) 30.22
WEATHER CODY CLEAR TEMP (F) 58
METER BOX NO. 3 H 1.5826 Y 0.9957
NOZZLE IDENTIFICATION NO. BOX # 3
NOZZLE CAL .195 / .195 / .195 = 0.195
STACK DIMENSIONS 207"
STACK AREA (FT2) 233.705 EFFECTIVE (FT2) 233.705
STACK DIAMETERS:(UPSTREAM)_____(DOWNSTREAM)_____
PORT SIZE 6" NIPPLE LENGTH 6"
STACK HEIGHT (FT) ~150' UMBILICAL LENGTH 200'
AGENCY OBSERVER(S) _____
TEST COORDINATOR(S) _____
V. E. OBSERVER _____

ACE AIR CONSULTING & ENGINEERING, INC.
2106 NW 67TH PLACE SUITE 4
GAINESVILLE, FLORIDA 32653
(352) 335-1889 - OFFICE / (352) 335-1891 - FAX

STACK CONFIGURATION

REMARKS: GAS-FIRED

TEST ID _____
PAGE 1 OF 2
MATERIAL PROCESSING RATE _____
GAS METER READINGS: FINAL 962.776 (FT3)
INITIAL 917.789 (FT3)
NET 44.987 (FT3)
FILTER NO. 9785 IMP. VOL.GAIN 75.0 (ml)
SILICA GEL NO. 527 WT. GAIN 7.8 (ml)
TOTAL CONDENSATE 82.8 (ml)

ORSAT

	1	2	3	4	AVG.
%CO2					
%O2					
%CO					
%N2					

Fo= N/A Fo RANGE= N/A ORSAT ANALYZER _____

LEAK CHECKS
PRE 0.00 CFM 16 ("Hg) POST 0.00 CFM 11 ("Hg)
METER BOX/PUMP ✓ GAS SYSTEM ✓ ORSAT BAG N/A
PITOT TUBE NO. 116 PRE-TEST LEAK CHECK OK
POST TEST (+) 9.0 / 0.0 "H20 (15 SECONDS)
POST TEST (-) 8.0 / 0.0 "H20 (15 SECONDS)
PYROMETER NUMBER 116
BOX OPERATOR RESHARD PROBE HOLDER GP/JS

PORT & TRAVERSE PT. NUMBER	COMMENTS	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF.("H2O) CALC.	METER ORIFICE PRESS. DIFF.("H2O) ACTUAL	STACK GAS TEMP (F)	SAMPLE BOX TEMP (F)	LAST IMPINGER TEMP (F)	DRY GAS METER TEMP (F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1			919.595	1.50	1.41	1.41	218	251	58	76	4.5
2		1623	921.555	1.55	1.46	1.46	219	254	56	76	4.5
3			923.410	1.70	1.60	1.60	218	253	54	76	5.0
4		1628	925.310	1.75	1.65	1.65	218	255	53	77	5.0
5			927.240	1.85	1.74	1.74	218	255	53	77	5.5
6		1633	929.296	1.90	1.79	1.79	217	257	51	78	5.5

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID _____

PAGE 2 OF 2

PORT & TRAVERSE PT. NUMBER	COMMENTS	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF ("H2O)		STACK GAS TEMP (F)	SAMPLE BOX TEMP (F)	LAST IMPINGER TEMP (F)	DRY GAS METER TEMP (F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
2-1			931.075	1.45	1.36	1.36	218	254	54	78	4.0
2		1642	933.010	1.45	1.36	1.36	217	255	54	78	4.0
3			934.915	1.55	1.46	1.46	216	253	55	79	4.5
4		1647	936.700	1.65	1.55	1.55	215	253	54	79	4.5
5			938.760	1.75	1.65	1.65	213	256	52	80	6.0
6		1652	940.598	1.70	1.60	1.60	212	255	51	80	5.0
3-1			942.415	1.80	1.69	1.69	213	256	52	80	5.0
2		1701	944.260	1.60	1.50	1.50	213	252	50	80	4.5
3			946.035	1.55	1.46	1.46	213	254	50	80	4.0
4		1706	947.850	1.65	1.55	1.55	213	256	48	80	4.6
5			949.840	1.85	1.74	1.74	214	255	48	80	5.5
6		1711	961.767	1.80	1.69	1.69	213	254	47	80	5.5
4-1			953.550	1.70	1.60	1.60	213	257	47	80	5.0
2		1720	955.390	1.60	1.50	1.50	213	256	48	80	5.0
3			957.190	1.45	1.36	1.36	213	255	47	80	4.5
4		1725	958.995	1.60	1.50	1.50	214	254	47	80	6.0
5			960.870	1.70	1.60	1.60	214	253	46	80	5.5
6		1730	962.776	1.80	1.69	1.69	214	254	46	79	
END		1730	44.987	1.663		1.563	214.96			78.88	

PLANT KISSIMMEE UTILITY AUTHORITY
SOURCE CT #3
PLANT LOCATION INTERCESSION City, FL.
TYPE OF SAMPLING TRAIN Mod. EPA-26
TYPE OF SAMPLES AMMONIA
DATE 1-10-02 RUN NUMBER 3
TIME START 0837 TIME END 0948
SAMPLE TIME 2.5/24 (MIN/PT)= 60 TOTAL MIN
ASSUMED MOISTURE(%) 8 FDA 0.92
NOMOGRAPH Cf 0.86 PITOT Cf 0.84
Pb ("Hg) 30.24 Ps ("Hg) 30.22
WEATHER CLEAR TEMP (F) 60
METER BOX NO. 3 H 1.5826 Y 0.9957
NOZZLE IDENTIFICATION NO. BOX #3
NOZZLE CAL .195 / .195 / .195 = 0.195
STACK DIMENSIONS 207"
STACK AREA (FT2) 233.705 EFFECTIVE (FT2) 233.705
STACK DIAMETERS:(UPSTREAM)_____(DOWNSTREAM)_____
PORT SIZE 6" NIPPLE LENGTH 6"
STACK HEIGHT (FT) ~150' UMBILICAL LENGTH 200'
AGENCY OBSERVER(S) _____
TEST COORDINATOR(S) _____
V. E. OBSERVER GREG PROVIS

ACE AIR CONSULTING & ENGINEERING, INC.
2106 NW 67TH PLACE SUITE 4
GAINESVILLE, FLORIDA 32653
(352) 335-1889 - OFFICE / (352) 335-1891 - FAX

STACK CONFIGURATION

REMARKS:
GAS-FIRED

TEST ID _____
PAGE 1 OF 2
MATERIAL PROCESSING RATE _____
GAS METER READINGS: FINAL 1006.432 (FT3)
INITIAL 963.126 (FT3)
NET 43.306 (FT3)
FILTER NO. 9786 IMP. VOL.GAIN 68.0 (ml)
SILICA GEL NO. 48 WT. GAIN 8.9 (ml)
TOTAL CONDENSATE 76.9 (ml)

ORSAT

	1	2	3	4	AVG.
%CO2					
%O2					
%CO					
%N2					

Fo= N/A Fo RANGE= N/A ORSAT ANALYZER _____
LEAK CHECKS
PRE 0.00 CFM 18 ("Hg) POST 0.00 CFM 10 ("Hg)
METER BOX/PUMP ✓ GAS SYSTEM ✓ ORSAT BAG ____
PITOT TUBE NO. 116 PRE-TEST LEAK CHECK OK
POST TEST (+) 9.0 / 0.0 "H20 (15 SECONDS)
POST TEST (-) 8.0 / 0.0 "H20 (15 SECONDS)
PYROMETER NUMBER ATK-3
BOX OPERATOR RESHARD PROBE HOLDER GP/JS

PORT & TRAVERSE PT. NUMBER	COMMENTS	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF.("H2O) CALC.	METER ORIFICE PRESS. DIFF.("H2O) ACTUAL	STACK GAS TEMP (F)	SAMPLE BOX TEMP (F)	LAST IMPINGER TEMP (F)	DRY GAS METER TEMP (F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1			964.840	1.80	1.55	1.55	217	248	52	46	4.5
2		0842	966.640	1.75	1.51	1.51	216	250	47	47	4.5
3			968.515	1.75	1.51	1.51	216	253	45	47	4.5
4		0847	970.395	1.70	1.46	1.46	216	252	44	48	4.0
5			972.240	1.60	1.38	1.38	216	256	43	49	4.0
6		0852	973.968	1.50	1.29	1.29	216	255	43	49	4.0

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID _____

PAGE 2 OF 2

PORT & TRAVERSE POINT NUMBER	COMMENTS	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD	METER ORIFICE PRESS DIFF.("H2O)		STACK GAS TEMP (F)	SAMPLE BOX TEMP (F)	LAST IMPINGER TEMP (F)	DRY GAS METER TEMP (F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
2-1			975.710	1.70	1.46	1.46	216	256	46	50	4.5
2		0901	977.530	1.75	1.51	1.51	217	255	46	50	4.5
3			979.350	1.65	1.42	1.42	217	255	45	51	4.0
4		0906	981.180	1.75	1.51	1.51	217	254	45	51	4.5
5			983.150	1.80	1.55	1.55	217	255	43	51	4.5
6		0911	984.841	1.65	1.42	1.42	216	255	43	52	4.0
3-1			986.670	1.75	1.51	1.51	216	254	45	53	4.5
2		0919	988.475	1.65	1.42	1.42	216	257	43	54	4.0
3			990.280	1.50	1.29	1.29	216	256	43	55	4.0
4		0924	992.005	1.50	1.29	1.29	216	254	42	56	4.0
5			993.730	1.65	1.42	1.42	216	255	42	56	4.0
6		0929	995.538	1.70	1.46	1.46	216	256	42	56	4.0
4-1			997.380	1.60	1.38	1.38	215	253	44	57	4.0
2		0938	999.105	1.65	1.42	1.42	215	257	43	58	4.0
3			000.830	1.70	1.46	1.46	215	256	43	59	4.0
4		0943	002.710	1.70	1.46	1.46	214	255	44	60	4.0
5			004.610	1.65	1.42	1.42	214	254	44	60	4.0
6		0948	006.432	1.60	1.38	1.38	213	254	44	60	3.5
END		0948	43.306	1.669		1.437	215.79			53.13	

Galbraith Laboratories, Inc.

Accuracy with Speed – Since 1950

January 24, 2002

Dagmar Fick
Air Consulting & Engineering Inc
2106 NW 67th Pl, Ste 4
Gainesville, FL 32653

Reference: Lab I.D.#'s: L-8972-85

Dear Ms Fick:

Attached is an amended laboratory report, which provides the supplementary information you requested. This report is complete and supercedes the one previously issued. If you have any questions regarding this report, please contact our technical staff toll-free at 877-449-8797.

Sincerely,

Kerri Bryan
Report Coordinator

KB:csh

U.S. Mail: P.O. Box 51610 ◆ Knoxville, TN 37950-1610
Other Carriers: 2323 Sycamore Drive ◆ Knoxville, TN 37921-1750
Tel: 865/546-1335 ◆ Fax: 865/546-7209 ◆ Internet: www.galbraith.com ◆ e-mail: labinfo@galbraith.com

Galbraith Laboratories, Inc.

Accuracy with Speed – Since 1950

LABORATORY REPORT

Dagmar Fick
Air Consulting & Engineering Inc
2106 NW 67th Pl, Ste 4
Gainesville, FL 32653

AMENDED REPORT
Date Amended: 01/24/02
Original Report Date: 01/23/02
Fax Number: 352-335-1891

SAMPLE ID	LAB ID	ANALYSIS	RESULTS		TOTAL SAMPLE VOLUME		SOLUTION READING	
02010337-1 Run 1 Gas Imp#1	L-8972	Ammonium	911	µg	260	mL	3.505	µg/mL
02010338-1 Run 1 Gas Imp#2	L-8973	Ammonium	<15	µg	145	mL	N/D	
02010339-1 Run 2 Gas Imp#1	L-8974	Ammonium	230	µg	225	mL	1.022	µg/mL
02010340-1 Run 2 Gas Imp#2	L-8975	Ammonium	<16	µg	155	mL	N/D	
02010341-1 Run 3 Gas Imp#1	L-8976	Ammonium	185	µg	220	mL	0.841	µg/mL
02010342-1 Run 3 Gas Imp#2	L-8977	Ammonium	<10	µg	95	mL	0.003	µg/mL
02010343-1 Run 1 Oil Imp#1	L-8978	Ammonium	1910	µg	245	mL	7.79	µg/mL
02010344-1 Run 1 Oil Imp#2	L-8979	Ammonium	<14	µg	135	mL	0.002	µg/mL
02010345-1 Run 2 Oil Imp#1	L-8980	Ammonium	1740	µg	255	mL	6.81	µg/mL
02010346-1 Run 2 Oil Imp#2	L-8981	Ammonium	<18	µg	175	mL	0.003	µg/mL
02010347-1 Run 3 Oil Imp#1	L-8982	Ammonium	<8	µg	80	mL	0.004	µg/mL
02010348-1 Run 3 Oil Imp#2	L-8983	Ammonium	<1790	µg	245	mL	7.32	µg/mL
02010349-1 0.1N H2SO4 Blank	L-8984	Ammonium	<20	µg	200	mL	N/D	
02010350-1 DI H2O Blank	L-8985	Ammonium	<25	µg	250	mL	N/D	

KB/DSR:csh

4

02010337-1 thru 0350-1

ACE AIR CONSULTING & ENGINEERING, INC

2106 NW 67TH PLACE SUITE 4
GAINESVILLE, FLORIDA 32653
(352) 335-1889 - OFFICE / (352) 335-1891 - FAX

SAMPLE RECOVERY AND CHAIN OF CUSTODY

PLANT KISSIMMEE UTILITY Authority
SOURCE COMBUSTION TURBINE #3
TEST DATE(S) 1-9 & 10-02
TEST TEAM SLN, CR, GP, JS

RUN NUMBER(S) 1,2,3 (GAS) 1,2,3 (OIL)
TYPE OF SAMPLING TRAIN MODIFIED EPA-26A
TYPE OF SAMPLES AMMONIA
PROJECT NO. _____

SAMPLE INVENTORY PAGE 1 OF 1

SAMPLE ID	DESCRIPTION/COMPONENTS	RINSE TYPE	COLOR	NO. OF CONTAINERS
RUN 1	IMPINGER # 1 0.1N H2SO4	DI H2O	CLEAR	1
"	" 2			1
RUN 2	" 1			1
"	" 2			1
RUN 3	" 1			1
"	" 2			1
RUN 1	" 1			1
"	" 2			1
RUN 2	" 1			1
"	" 2			1
RUN 3	" 1			1
"	" 2			1
BLANK	0.1 N H2SO4		CLEAR	1
BLANK	DI H2O		CLEAR	1

-AS
-IL

TOTAL CONTAINERS SHIPPED: 14

*NOTE: ALL SILICA GEL WEIGHED AND DISCARDED.

SAMPLES COLLECTED/CHARGED BY: CR, GP, JS
REAGENTS PREPARED BY: CR

METHOD OF SHIPMENT
FROM FIELD: VAN
FROM ACE LABORATORY: VAN

ANALYSES TO BE PERFORMED BY: TSI
RECEIVED BY: [signature] DATE: 1-14-02 TIME: 1735
REMARKS: _____

APPENDIX E

VISIBLE EMISSION DATA SHEETS

ACE AIR CONSULTING & ENGINEERING, INC.

VISIBLE EMISSION OBSERVATION FORM

START TIME: 0849 END TIME: 0949

OBSERVATION DATE 1-10.02 TIME ZONE E PAGE 1 OF 1

COMPANY NAME K.U.A.

SOURCE UNIT #3

ADDRESS KISSIMMEE 00 Tampa Rd

CITY KISSIMMEE STATE FL. ZIP

PHONE SOURCE ID NO. PSD FL254

PROCESS	OPERATING MODE
TURBIN	FULLOAD GAS
CONTROL EQUIPMENT	OPERATING MODE
E.S.P	NORMAL (GREEN)

DESCRIBE EMISSION POINT
MOST N.W. CIRCULAR STEEL STACK

HEIGHT OF EMISSION POINT	HEIGHT RELATIVE TO OBSERVER
START ~100' END ~100'	START ~100' END ~100'
DISTANCE TO EMISSION POINT	DIRECTION TO EM. PT. (DEGREES)
START ~150yds END ~150yds	START 332° END 332°
VERTICAL ANGLE TO OBS. PT.	DIRECTION TO OBS. PT. (DEGREES)
START 8° END 8°	START 332° END 332°

DISTANCE AND DIRECTION TO OBS. PT. FROM EM. PT.
START 0-25 STACK EXIT END SAME

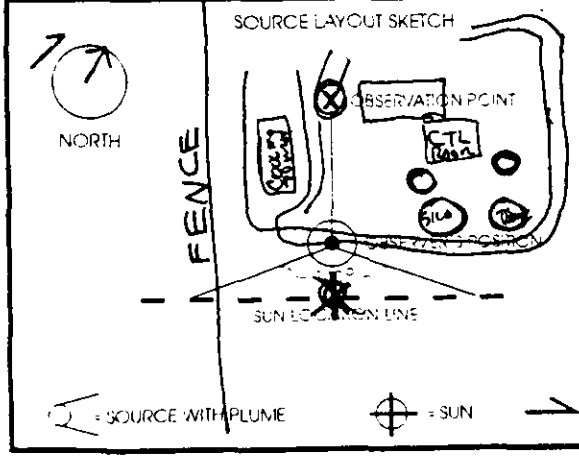
DESCRIBE EMISSIONS
START NONE END NONE

EMISSION COLOR	WATER DROPLET PLUME: NONE
START Clear END Clear	ATTACHED DETACHED

DESCRIBE PLUME BACKGROUND
START SKY END SKY

BACKGROUND COLOR	SKY CONDITIONS
START BLUE END BLUE	START Clear END Clear
WIND SPEED	WIND DIRECTION
START 0-1 END 0-1	START SOUTH END SOUTH
AMBIENT TEMPERATURE	WET BULB TEMP. / %RH
START ~60 END ~62	

SOURCE LAYOUT SKETCH



SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

OBSERVER'S NAME (PRINT) GREG B. BROWN

OBSERVER'S SIGNATURE [signature] DATE 1-10-02

ORGANIZATION ACE CONSULTING & ENGINEERING INC.

CERTIFIED BY E.T.A. 45585 DATE 2-01

COMMENTS

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Gregory Prows

met the specifications of Federal Reference Method 9 and qualified 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, North Carolina. This certificate is valid for six months from date of issue.

287183	*Orlando, Florida*	*August 15, 2001*
Certificate Number	Location	Date of Issue

Thomas Hoel
President

Michael W. Sandford
Director of Training

Congratulations, Here is your wallet card signifying your successful certification at the recent Florida Department of Environmental Protection Smoke School conducted by Eastern Technical Associates.

GREGORY PROWS

has completed the STATE OF FLORIDA visible emissions evaluation training and is a qualified observer of visible emissions as specified by EPA Reference Method 9.

2/14/2002	ORLF03
FIELD EXPIRATION DATE	LECTURE EXPIRATION DATE

287183

CERTIFICATION NUMBER

BEARER'S SIGNATURE

Your certificate is valid for (6) months. To keep your certification current, you must recertify on or before the expiration date on the card

If FIELD CERTIFICATION is not continuous, CLASSROOM CERTIFICATION must be obtained prior to your next field certification

If you have any questions about your certification, please contact Eastern Technical Associates, 919-878-3188.

Dotty Diltz, Florida Department of Environmental Protection

APPENDIX F

QUALITY ASSURANCE

CONTINUOUS MONITOR Q/A
LINEARITY and DRIFT DATA
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9/02
GAS FIRING

RELATIVE ACCURACY

GAS I.D. CO
CEM: TE MODEL 48C
RANGE: 10 PPM

GAS VALUE	CEM	DIFF.	% RANGE
6	6.04	0.04	0.40
3.2	3.3	0.1	1.00
0	0.03	0.03	0.15

GAS I.D. CO2
CEM: ROSEMOUNT 880A
RANGE: 20 %

GAS VALUE	CEM	DIFF.	% RANGE
	NA		

SPAN DRIFTS

RUN NO.	BEGIN	CO END	% RANGE
1	3.3	3.39	-0.9
2	3.39	3.31	0.8
3	3.33	3.41	-0.8

ZERO DRIFTS

RUN NO.	BEGIN	CO END	% RANGE
1	0.03	0.21	-1.8
2	0.21	0.04	1.7
3	-0.01	-0.16	1.5

SPAN DRIFTS

RUN NO.	BEGIN	CO2 END	% RANGE
1	NA	NA	NA
2	NA	NA	NA
3	3.88	3.88	0

ZERO DRIFTS

RUN NO.	BEGIN	CO2 END	% RANGE
1	NA	NA	NA
2	NA	NA	NA
3	0.02	0.02	0

GAS I.D. C3H8
CEM: TE MODEL 51
RANGE: 10 PPM

GAS VALUE	CEM	DIFF.	% RANGE	% of CAL. GAS
8.52	8.49	-0.03	-0.30	-0.35
5.04	5.36	0.32	3.20	6.35
2.83	3.14	0.31	3.10	10.95
0	0	0	0.00	NA

SPAN DRIFTS

RUN NO.	BEGIN	C3H8 END	% RANGE
1	3.14	3.07	0.7
2	3.07	3.07	0
3	2.71	2.75	-0.4

ZERO DRIFTS

RUN NO.	BEGIN	C3H8 END	% RANGE
1	0	0	0
2	0	0	0
3	0	-0.6	6

CONTINUOUS MONITOR Q/A
LINEARITY and DRIFT DATA
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9/02
GAS FIRING

RELATIVE ACCURACY

GAS I.D.	NOx			GAS I.D.	O2		
CEM:	TE MODEL 10S			CEM:	TELEDYNE 320		
RANGE:	20 PPM			RANGE:	25		
GAS VALUE	CEM	DIFF.	% RANGE	GAS VALUE	CEM	DIFF.	% RANGE
18.5	18.44	-0.06	-0.30	20.9	20.85	-0.05	-0.20
10.4	10.28	-0.12	-0.60	13.99	13.92	-0.07	-0.28
5.27	4.94	-0.33	-1.65				
0	-0.04	-0.04	-0.20	0	0.13	0.13	0.52

SPAN DRIFTS

	NOx				O2		
RUN NO.	BEGIN	END	% RANGE	RUN NO.	BEGIN	END	% RANGE
1	5.14	5.06	0.4	1	13.78	13.76	0.08
2	5.06	5.08	-0.1	2	13.76	14	-0.96
3	9.64	9.44	1	3	14.23	13.8	1.72

ZERO DRIFTS

		NOx				O2	
1	-0.04	0.01	-0.25	1	0.13	0.06	0.28
2	0.01	-0.02	0.15	2	0.06	0.07	-0.04
3	-0.05	0	-0.25	3	0.19	0.09	0.4

Date	Time	15% NOx PPMd Average	Channel 2-CO2% % Average
1/10/02	8:36:57	3.119	4.5
1/10/02	8:37:12	3.061	4.5

BIAS TESTS RECORD
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9/02

THERMOENVIRONMENTAL MODEL 10S NOx
RANGE: 20 PPM

RUN NUMBER	BIAS GAS VALUE	INITIAL	FINAL	BIAS % of RANGE INITIAL	FINAL
1	5.27	5.14	5.06	0.65	1.05
1	0	-0.04	0.01	0.2	-0.05
2	5.27	5.06	5.08	1.05	0.95
2	0	0.01	-0.02	-0.05	0.1
3	9.5	9.64	9.44	-0.7	0.3
3	0	-0.05	0	0.25	0

BIAS TESTS RECORD
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9/02

TELEDYNE MODEL 320P O2

RANGE: 25 %

RUN NUMBER	BIAS GAS VALUE	INITIAL	FINAL	BIAS % of RANGE INITIAL	FINAL
1	13.99	13.78	13.76	0.84	0.92
1	0	0.13	0.06	-0.52	-0.24
2	13.99	13.76	14	0.92	-0.04
2	0	0.06	0.07	-0.24	-0.28
3	13.89	14.23	13.8	-1.36	0.36
3	0	0.19	0.09	-0.76	-0.36

CONTINUOUS MONITOR Q/A
LINEARITY and DRIFT DATA
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY INITIAL CALS
INTERCESSION CITY, FLORIDA
1/9/02

Date	Time	Channel 5-STACK O2% % Average		Channel 6-48C CO PPM Average	
1/9/02	9:59:33	0.16		-0.02	
1/9/02	9:59:48	0.16		-0.04	
1/9/02	10:00:03	0.15	**ZERO O2**	-0.04	**ZERO CO**
1/9/02	10:00:18	0.15		-0.02	
1/9/02	10:00:33	0.14		0.08	
1/9/02	10:00:48	**0.13**		**0.07**	
1/9/02	10:01:03	**0.13**		**0.04**	
1/9/02	10:01:18	**0.13**	**0.13**	**-0.01**	**0.03**
1/9/02	10:01:33	0.18		0.16	
1/9/02	10:01:48	0.19		0.01	
1/9/02	10:02:03	4.81		0.05	
1/9/02	10:02:18	13.79		0.09	
1/9/02	10:02:33	18.5		0.11	
1/9/02	10:02:48	20.09		0.05	
1/9/02	10:03:03	20.53		0.09	
1/9/02	10:03:18	20.65		0.1	
1/9/02	10:03:33	20.7	**20.9 O2**	0.01	
1/9/02	10:03:48	20.78		0.11	
1/9/02	10:04:03	20.82		0.06	
1/9/02	10:04:18	**20.85**		0.02	
1/9/02	10:04:33	**20.85**		0.06	
1/9/02	10:04:48	**20.86**	**20.85**	0.15	
1/9/02	10:05:03	20.81		0.17	
1/9/02	10:05:18	20.76		0.16	
1/9/02	10:05:33	20.76		0.23	
1/9/02	10:05:48	20.79		0.25	
1/9/02	10:06:03	20.78		0.21	
1/9/02	10:06:18	20.77		0.14	
1/9/02	10:06:33	20.77		0.18	
1/9/02	10:06:48	20.76		0.21	
1/9/02	10:07:03	20.76		0.24	
1/9/02	10:07:18	20.75		0.26	
1/9/02	10:07:33	20.75		0.27	
1/9/02	10:07:48	20.75		0.29	
1/9/02	10:08:03	20.78		0.16	
1/9/02	10:08:18	20.78		0.16	
1/9/02	10:08:33	20.77		0.12	
1/9/02	10:08:48	20.76		0.02	
1/9/02	10:09:03	20.75		0.27	

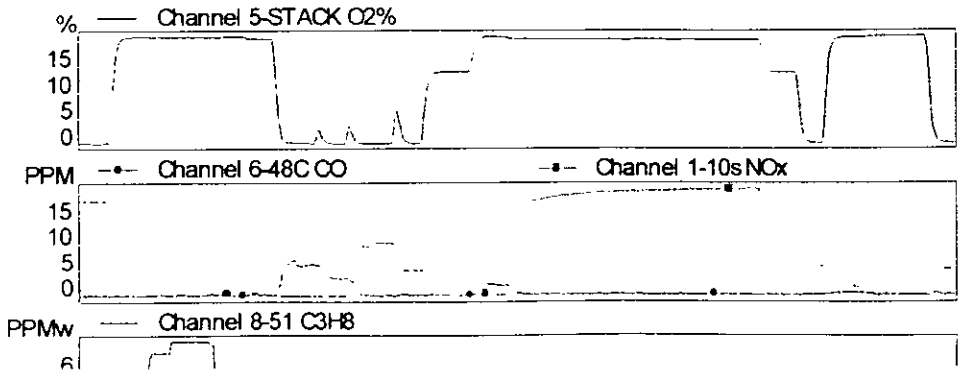
1/9/02	10:09:18	20.75	0.17	
1/9/02	10:09:33	20.74	0.23	
1/9/02	10:09:48	20.73	0.34	
1/9/02	10:10:03	20.72	0.27	
1/9/02	10:10:18	20.72	0.34	
1/9/02	10:10:33	20.73	0.33	
01/09/02	10:10:48	20.8	0.45	
1/9/02	10:11:03	20.84	0.44	
1/9/02	10:11:18	20.84	0.23	
1/9/02	10:11:33	20.84	0.08	
1/9/02	10:11:48	20.83	0.13	
1/9/02	10:12:03	20.82	0.13	
1/9/02	10:12:18	20.81	0.19	
1/9/02	10:12:33	20.67	0.15	
1/9/02	10:12:48	20.48	0.44	
1/9/02	10:13:03	20.38	0.42	
1/9/02	10:13:18	20.35	0.42	
1/9/02	10:13:33	20.35	0.27	
1/9/02	10:13:48	20.34	0.15	
1/9/02	10:14:03	20.34	0.3	
1/9/02	10:14:18	20.34	0.18	
1/9/02	10:14:33	20.37	0.15	
1/9/02	10:14:48	19.24	0.09	
1/9/02	10:15:03	11.7	0.61	
1/9/02	10:15:18	4.4	2.48	
1/9/02	10:15:33	1.37	4.33	
1/9/02	10:15:48	0.52	5.94	**6.0 CO**
1/9/02	10:16:03	0.31	6.49	
1/9/02	10:16:18	0.24	6.79	
1/9/02	10:16:33	0.2	6.77	
1/9/02	10:16:48	0.18	5.91	
1/9/02	10:17:03	0.17	5.76	
1/9/02	10:17:18	0.16	**5.99**	
1/9/02	10:17:33	0.15	**5.96**	
1/9/02	10:17:48	0.14	**6.08**	
1/9/02	10:18:03	0.14	**6.14**	**6.04**
1/9/02	10:18:18	1.67	5.93	
1/9/02	10:18:33	2.48	5.7	
1/9/02	10:18:48	1.14	4.78	
1/9/02	10:19:03	0.43	4.06	
1/9/02	10:19:18	0.19	3.6	**3.2 CO**
1/9/02	10:19:33	0.12	3.46	
1/9/02	10:19:48	0.11	**3.37**	
1/9/02	10:20:03	0.1	**3.31**	
1/9/02	10:20:18	0.11	**3.22**	**3.30**
1/9/02	10:20:33	0.21	3.41	
1/9/02	10:20:48	2.74	3.31	
1/9/02	10:21:03	2.79	2.94	
1/9/02	10:21:18	1.14	2.02	
1/9/02	10:21:33	0.4	0.96	
1/9/02	10:21:48	0.17	0.29	

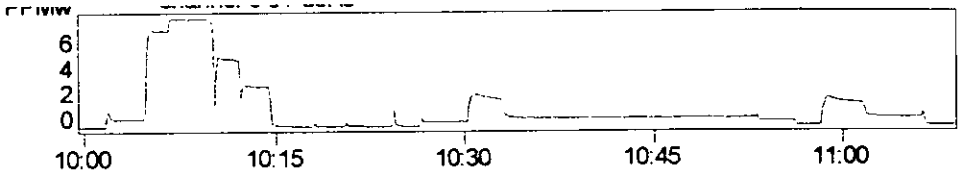
1/9/02	10:22:03	0.12		0.1
1/9/02	10:22:18	0.1		0.1
1/9/02	10:22:33	0.1		0.03
1/9/02	10:22:48	0.1		0.02
1/9/02	10:23:03	0.09		0.05
01/09/02	10:23:18	0.09		-0.04
1/9/02	10:23:33	0.09		-0.05
1/9/02	10:23:48	0.09		0.05
1/9/02	10:24:03	0.09		0.1
1/9/02	10:24:18	0.31		-0.06
1/9/02	10:24:33	4.32		-0.06
1/9/02	10:24:48	5.66		0.06
1/9/02	10:25:03	2.64		0.29
1/9/02	10:25:18	0.9		0.29
1/9/02	10:25:33	0.31		0.19
1/9/02	10:25:48	0.15		0.13
1/9/02	10:26:03	0.11		0.21
1/9/02	10:26:18	0.1		0.2
1/9/02	10:26:33	0.12		0.19
1/9/02	10:26:48	3.51		0.14
1/9/02	10:27:03	9.74		0.13
1/9/02	10:27:18	12.49		0.17
1/9/02	10:27:33	13.42		0.23
1/9/02	10:27:48	13.7	**13.99 O2**	0.15
1/9/02	10:28:03	13.79		0.04
1/9/02	10:28:18	13.83		0.1
1/9/02	10:28:33	13.85		0.17
1/9/02	10:28:48	13.87		0.1
1/9/02	10:29:03	13.89		0.03
1/9/02	10:29:18	13.9		0.04
1/9/02	10:29:33	13.91		0
1/9/02	10:29:48	**13.92**		0.02
1/9/02	10:30:03	**13.92**		0.09
1/9/02	10:30:18	**13.92**	**13.92**	0.15
1/9/02	10:30:33	14.57		0.1
1/9/02	10:30:48	17.53		0.26
1/9/02	10:31:03	19.63		0.87
1/9/02	10:31:18	20.38		1.64
1/9/02	10:31:33	20.62		2
1/9/02	10:31:48	20.68		2.27
1/9/02	10:32:03	20.69		2.17
1/9/02	10:32:18	20.7		2.15
1/9/02	10:32:33	20.7		2.08
1/9/02	10:32:48	20.69		2.05
1/9/02	10:33:03	20.69		1.98
1/9/02	10:33:18	20.64		2.01
1/9/02	10:33:33	20.43		1.89
1/9/02	10:33:48	20.28		1.42
1/9/02	10:34:03	20.22		0.91
1/9/02	10:34:18	20.21		0.41
1/9/02	10:34:33	20.24		0.3

1/9/02	10:34:48	20.3	0.21
1/9/02	10:35:03	20.28	0.25
1/9/02	10:35:18	20.25	0.21
1/9/02	10:35:33	20.24	0.2
01/09/02	10:35:48	20.23	0.19
1/9/02	10:36:03	20.22	0.24
1/9/02	10:36:18	20.21	0.2
1/9/02	10:36:33	20.21	0.13
1/9/02	10:36:48	20.21	0.23
1/9/02	10:37:03	20.24	0.28
1/9/02	10:37:18	20.25	0.3
1/9/02	10:37:33	20.23	0.2
1/9/02	10:37:48	20.21	0.11
1/9/02	10:38:03	20.2	0.22
1/9/02	10:38:18	20.2	0.1
1/9/02	10:38:33	20.19	0.11
1/9/02	10:38:48	20.19	0.2
1/9/02	10:39:03	20.19	0.13
1/9/02	10:39:18	20.18	0.13
1/9/02	10:39:33	20.18	0.14
1/9/02	10:39:48	20.19	0.13
1/9/02	10:40:03	20.22	0.1
1/9/02	10:40:18	20.21	0.17
1/9/02	10:40:33	20.2	0.26
1/9/02	10:40:48	20.19	0.23
1/9/02	10:41:03	20.19	0.14
1/9/02	10:41:18	20.18	0.08
1/9/02	10:41:33	20.18	0.2
1/9/02	10:41:48	20.17	0.25
1/9/02	10:42:03	20.17	0.22
1/9/02	10:42:18	20.17	0.18
1/9/02	10:42:33	20.17	0.25
1/9/02	10:42:48	20.17	0.17
1/9/02	10:43:03	20.17	0.21
1/9/02	10:43:18	20.19	0.17
1/9/02	10:43:33	20.2	0.19
1/9/02	10:43:48	20.2	0.24
1/9/02	10:44:03	20.19	0.16
1/9/02	10:44:18	20.18	0.14
1/9/02	10:44:33	20.18	0.15
1/9/02	10:44:48	20.18	0.04
1/9/02	10:45:03	20.18	0.1
1/9/02	10:45:18	20.17	0.15
1/9/02	10:45:33	20.17	0.17
1/9/02	10:45:48	20.17	0.11
1/9/02	10:46:03	20.17	0.16
1/9/02	10:46:18	20.17	0.21
1/9/02	10:46:33	20.16	0.15
1/9/02	10:46:48	20.16	0.14
1/9/02	10:47:03	20.16	0.25
1/9/02	10:47:18	20.2	0.2

1/9/02	10:47:33	20.19		0.18
1/9/02	10:47:48	20.18		0.13
1/9/02	10:48:03	20.18		0.13
01/09/02	10:48:18	20.17		0.11
1/9/02	10:48:33	20.16		0.17
1/9/02	10:48:48	20.16		0.14
1/9/02	10:49:03	20.15		0.09
1/9/02	10:49:18	20.15		0.1
1/9/02	10:49:33	20.15		0.13
1/9/02	10:49:48	20.14		0.25
1/9/02	10:50:03	20.14		0.21
1/9/02	10:50:18	20.13		0.2
1/9/02	10:50:33	20.13		0.23
1/9/02	10:50:48	20.13		0.27
1/9/02	10:51:03	20.12		0.19
1/9/02	10:51:18	20.12		0.19
1/9/02	10:51:33	20.13		0.17
1/9/02	10:51:48	20.16		0.25
1/9/02	10:52:03	20.15		0.2
1/9/02	10:52:18	20.14		0.16
1/9/02	10:52:33	20.14		0.18
1/9/02	10:52:48	20.13		0.16
1/9/02	10:53:03	20.13		0.09
1/9/02	10:53:18	20.12		0.14
1/9/02	10:53:33	19.37		0.1
1/9/02	10:53:48	16.61		0.12
1/9/02	10:54:03	14.75		0.27
1/9/02	10:54:18	14.04	**13.99 O2**	0.18
1/9/02	10:54:33	13.87	**BIAS**	0.17
1/9/02	10:54:48	13.81		0.1
1/9/02	10:55:03	13.8		0.16
1/9/02	10:55:18	**13.79**		0.18
1/9/02	10:55:33	**13.79**		-0.02
1/9/02	10:55:48	**13.78**		0.09
1/9/02	10:56:03	**13.78**		0.09
1/9/02	10:56:18	**13.78**	**13.78**	0.05
1/9/02	10:56:33	12.5		0.12
1/9/02	10:56:48	6.58		0.11
1/9/02	10:57:03	2.28		0.2
1/9/02	10:57:18	0.77		0.15
1/9/02	10:57:33	0.3		0.12
1/9/02	10:57:48	0.18		0.13
1/9/02	10:58:03	0.14		0.13
1/9/02	10:58:18	0.13		0.15
1/9/02	10:58:33	0.39		0.19
1/9/02	10:58:48	6.53		0.22
1/9/02	10:59:03	14.79		0.3
1/9/02	10:59:18	18.54		0.33
1/9/02	10:59:33	19.94		0.49
1/9/02	10:59:48	20.37		0.49
1/9/02	11:00:03	20.51		0.61

1/9/02	11:00:18	20.56	0.64
1/9/02	11:00:33	20.58	0.61
1/9/02	11:00:48	20.59	0.55
1/9/02	11:01:03	20.6	0.53
1/9/02	11:01:18	20.61	0.5
1/9/02	11:01:33	20.61	0.49
1/9/02	11:01:48	20.63	0.44
1/9/02	11:02:03	20.65	0.33
1/9/02	11:02:18	20.7	0.4
1/9/02	11:02:33	20.77	0.32
1/9/02	11:02:48	20.8	0.15
1/9/02	11:03:03	20.81	0.1
1/9/02	11:03:18	20.82	0.24
1/9/02	11:03:33	20.82	0.17
1/9/02	11:03:48	20.82	0.05
1/9/02	11:04:03	20.83	0.1
1/9/02	11:04:18	20.86	0.06
1/9/02	11:04:33	20.86	0.04
1/9/02	11:04:48	20.85	0.13
1/9/02	11:05:03	20.84	0.09
1/9/02	11:05:18	20.84	0.17
1/9/02	11:05:33	20.83	0.12
1/9/02	11:05:48	20.83	0.01
1/9/02	11:06:03	20.82	0.03
1/9/02	11:06:18	20.81	0.14
1/9/02	11:06:33	20.81	0.05
1/9/02	11:06:48	19.17	0
1/9/02	11:07:03	11.11	0.19
1/9/02	11:07:18	3.88	0.51
1/9/02	11:07:33	1.25	0.5
1/9/02	11:07:48	0.46	0.4
1/9/02	11:08:03	0.25	0.15
1/9/02	11:08:18	0.17	0.17
1/9/02	11:08:33	0.14	0.24
1/9/02	11:08:48	0.13	0.19




6
4
2
0
10:00
10:15
10:30
10:45
11:00

CONTINUOUS MONITOR Q/A
LINEARITY and DRIFT DATA
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9/02

Date	Time	Channel 1-10s NOx PPM Average		Channel 8-51 C3H8 PPMw Average	
1/9/02	9:59:33	**18.42**	**18.5 NOx**	0	**ZERO C3H8**
1/9/02	9:59:48	**18.45**		0	
1/9/02	10:00:03	**18.45**		0	
1/9/02	10:00:18	**18.47**		0	
1/9/02	10:00:33	**18.46**		0	
1/9/02	10:00:48	**18.47**		0	
1/9/02	10:01:03	**18.42**		0	
1/9/02	10:01:18	**18.41**		0	
1/9/02	10:01:33	**18.44**	**18.44**	0	**0**
1/9/02	10:01:48	18.36		0.96	
1/9/02	10:02:03	15.64		0.81	
1/9/02	10:02:18	7.49		0.62	
1/9/02	10:02:33	2.02		0.6	
1/9/02	10:02:48	0.46		0.59	
1/9/02	10:03:03	0.09		0.61	
1/9/02	10:03:18	0		0.61	
1/9/02	10:03:33	-0.02		0.61	
1/9/02	10:03:48	-0.02		0.61	
1/9/02	10:04:03	-0.03		0.6	
1/9/02	10:04:18	-0.03		0.6	
1/9/02	10:04:33	-0.04		0.61	
1/9/02	10:04:48	-0.04		3.53	
1/9/02	10:05:03	-0.02		7.29	
1/9/02	10:05:18	0		7.63	
1/9/02	10:05:33	-0.02		7.58	
1/9/02	10:05:48	-0.03		7.58	
1/9/02	10:06:03	-0.04		7.59	
1/9/02	10:06:18	-0.04		7.57	
1/9/02	10:06:33	-0.03		7.95	
1/9/02	10:06:48	-0.04		8.53	**8.52 C3H8**
1/9/02	10:07:03	-0.04		8.5	
1/9/02	10:07:18	-0.04	**ZERO NOx**	**8.50**	
1/9/02	10:07:33	**-0.04**		**8.49**	
1/9/02	10:07:48	**-0.04**		**8.49**	
1/9/02	10:08:03	**-0.04**		**8.48**	
1/9/02	10:08:18	**-0.04**		**8.49**	
1/9/02	10:08:33	**-0.04**		**8.49**	
1/9/02	10:08:48	**-0.04**		**8.49**	
1/9/02	10:09:03	**-0.04**		**8.49**	

1/9/02	10:09:18	**-0.04**	**-0.04**	**8.49**	**8.49**
1/9/02	10:09:33	-0.04		8.48	
1/9/02	10:09:48	-0.04		8.34	
1/9/02	10:10:03	-0.04		6.24	
1/9/02	10:10:18	-0.04		3.56	**5.04 C3H8**
1/9/02	10:10:33	0		5.45	
01/09/02	10:10:48	0		**5.38**	
1/9/02	10:11:03	-0.02		**5.37**	
1/9/02	10:11:18	-0.03		**5.34**	
1/9/02	10:11:33	-0.04		**5.33**	**5.36**
1/9/02	10:11:48	-0.04		5.28	
1/9/02	10:12:03	-0.04		4.48	
1/9/02	10:12:18	-0.04		2.79	
1/9/02	10:12:33	-0.01		3.25	
1/9/02	10:12:48	-0.02		3.21	
1/9/02	10:13:03	-0.03		3.16	
1/9/02	10:13:18	-0.04		**3.15**	**2.83 C3H8**
1/9/02	10:13:33	-0.04		**3.14**	
1/9/02	10:13:48	-0.04		**3.15**	
1/9/02	10:14:03	-0.05		**3.16**	
1/9/02	10:14:18	-0.04		**3.12**	**3.14**
1/9/02	10:14:33	-0.05		1.92	
1/9/02	10:14:48	-0.03		0.2	
1/9/02	10:15:03	-0.01		0.09	
1/9/02	10:15:18	-0.02		0.04	
1/9/02	10:15:33	-0.03		0.04	
1/9/02	10:15:48	-0.04		0.04	
1/9/02	10:16:03	-0.04		0.04	
1/9/02	10:16:18	-0.04		0.02	
1/9/02	10:16:33	-0.05		0	
1/9/02	10:16:48	-0.04		0	
1/9/02	10:17:03	-0.04		0	
1/9/02	10:17:18	-0.05		0	
1/9/02	10:17:33	-0.05		0	
1/9/02	10:17:48	-0.05		0	
1/9/02	10:18:03	-0.05		0.13	
1/9/02	10:18:18	-0.04		0.02	
1/9/02	10:18:33	-0.04		0.04	
1/9/02	10:18:48	-0.04		0.04	
1/9/02	10:19:03	-0.04		0.01	
1/9/02	10:19:18	-0.04		0	
1/9/02	10:19:33	-0.05		0	
1/9/02	10:19:48	-0.05		0.01	
1/9/02	10:20:03	-0.05		0.02	
1/9/02	10:20:18	-0.04		0	
1/9/02	10:20:33	-0.05		0.21	
1/9/02	10:20:48	0.68		0.04	
1/9/02	10:21:03	5.27		0.04	
1/9/02	10:21:18	8.27		0.04	
1/9/02	10:21:33	9.27		0.02	
1/9/02	10:21:48	9.51		0.01	

1/9/02	10:22:03	9.6		0
1/9/02	10:22:18	9.59		0
1/9/02	10:22:33	9.89		0
1/9/02	10:22:48	**10.25**	**10.4 NOx**	0
1/9/02	10:23:03	**10.3**		0
01/09/02	10:23:18	**10.25**		0
1/9/02	10:23:33	**10.28**		0
1/9/02	10:23:48	**10.27**		0
1/9/02	10:24:03	**10.33**		0
1/9/02	10:24:18	**10.29**	**10.28**	0.76
1/9/02	10:24:33	8.27		0.15
1/9/02	10:24:48	5.27		0.05
1/9/02	10:25:03	4.84	**5.27 NOx**	0.01
1/9/02	10:25:18	**4.89**		0
1/9/02	10:25:33	**4.92**		0
1/9/02	10:25:48	**4.95**		0
1/9/02	10:26:03	**4.96**		0
1/9/02	10:26:18	**4.94**		0
1/9/02	10:26:33	**4.95**	**4.94**	0.37
1/9/02	10:26:48	4.15		0.36
1/9/02	10:27:03	2.19		0.36
1/9/02	10:27:18	0.63		0.36
1/9/02	10:27:33	0.21		0.36
1/9/02	10:27:48	0.07		0.36
1/9/02	10:28:03	0.03		0.36
1/9/02	10:28:18	0.01		0.36
1/9/02	10:28:33	0		0.36
1/9/02	10:28:48	-0.01		0.36
1/9/02	10:29:03	-0.02		0.36
1/9/02	10:29:18	-0.02		0.36
1/9/02	10:29:33	-0.02		0.36
1/9/02	10:29:48	-0.03		0.4
1/9/02	10:30:03	-0.03		0.36
1/9/02	10:30:18	-0.03		0.79
1/9/02	10:30:33	-0.02		2
1/9/02	10:30:48	0.15		2.46
1/9/02	10:31:03	0.24		2.47
1/9/02	10:31:18	0.23		2.42
1/9/02	10:31:33	0.2		2.32
1/9/02	10:31:48	0.18		2.27
1/9/02	10:32:03	0.15		2.22
1/9/02	10:32:18	0.13		2.2
1/9/02	10:32:33	0.12		2.13
1/9/02	10:32:48	0.11		2.11
1/9/02	10:33:03	0.1		1.81
1/9/02	10:33:18	0.32		0.85
1/9/02	10:33:33	4.12		0.72
1/9/02	10:33:48	9.83		0.68
1/9/02	10:34:03	13.41		0.67
1/9/02	10:34:18	15.48		0.64
1/9/02	10:34:33	16.6		0.64

1/9/02	10:34:48	17.23		0.6
1/9/02	10:35:03	17.75		0.63
1/9/02	10:35:18	18.09		0.64
1/9/02	10:35:33	18.41		0.62
01/09/02	10:35:48	18.56		0.59
1/9/02	10:36:03	18.77		0.59
1/9/02	10:36:18	18.83		0.62
1/9/02	10:36:33	18.96		0.61
1/9/02	10:36:48	19.15		0.61
1/9/02	10:37:03	19.18		0.63
1/9/02	10:37:18	19.27		0.61
1/9/02	10:37:33	19.37		0.6
1/9/02	10:37:48	19.46		0.59
1/9/02	10:38:03	19.46		0.59
1/9/02	10:38:18	19.53		0.59
1/9/02	10:38:33	19.61		0.6
1/9/02	10:38:48	19.65		0.6
1/9/02	10:39:03	19.7		0.59
1/9/02	10:39:18	19.73		0.59
1/9/02	10:39:33	19.79		0.59
1/9/02	10:39:48	19.83		0.59
1/9/02	10:40:03	19.96		0.57
1/9/02	10:40:18	19.97		0.59
1/9/02	10:40:33	20.04		0.59
1/9/02	10:40:48	20.04		0.59
1/9/02	10:41:03	20.08		0.59
1/9/02	10:41:18	20.12		0.59
1/9/02	10:41:33	20.13		0.59
1/9/02	10:41:48	20.13		0.59
1/9/02	10:42:03	20.15		0.6
1/9/02	10:42:18	20.17		0.59
1/9/02	10:42:33	20.22		0.57
1/9/02	10:42:48	20.15		0.57
1/9/02	10:43:03	20.28		0.59
1/9/02	10:43:18	20.32		0.59
1/9/02	10:43:33	20.28		0.62
1/9/02	10:43:48	20.24		0.59
1/9/02	10:44:03	20.35		0.59
1/9/02	10:44:18	20.36		0.59
1/9/02	10:44:33	20.32		0.58
1/9/02	10:44:48	20.34		0.56
1/9/02	10:45:03	20.4		0.56
1/9/02	10:45:18	20.38		0.59
1/9/02	10:45:33	20.35		0.59
1/9/02	10:45:48	20.34		0.56
1/9/02	10:46:03	20.34		0.54
1/9/02	10:46:18	20.43		0.54
1/9/02	10:46:33	20.43		0.58
1/9/02	10:46:48	20.45		0.58
1/9/02	10:47:03	20.44		0.59
1/9/02	10:47:18	20.5	**23.03 NO2**	0.58

1/9/02	10:47:33	20.57		0.59
1/9/02	10:47:48	20.52		0.59
1/9/02	10:48:03	20.62		0.59
01/09/02	10:48:18	20.55		0.59
1/9/02	10:48:33	20.59		0.59
1/9/02	10:48:48	20.55		0.59
1/9/02	10:49:03	20.58		0.59
1/9/02	10:49:18	20.57		0.59
1/9/02	10:49:33	20.54		0.59
1/9/02	10:49:48	20.61		0.59
1/9/02	10:50:03	20.57		0.59
1/9/02	10:50:18	20.63		0.59
1/9/02	10:50:33	20.71		0.57
1/9/02	10:50:48	20.64		0.54
1/9/02	10:51:03	20.59	**NOx**	0.57
1/9/02	10:51:18	20.69	**CONVER-**	0.59
1/9/02	10:51:33	20.59	**TER**	0.57
1/9/02	10:51:48	20.61	**CHECK**	0.56
1/9/02	10:52:03	**20.74**		0.59
1/9/02	10:52:18	**20.71**		0.59
1/9/02	10:52:33	**20.83**		0.55
1/9/02	10:52:48	**20.77**		0.59
1/9/02	10:53:03	**20.86**	**20.78**	0.59
1/9/02	10:53:18	20.71	**(90.2 %**	0.6
1/9/02	10:53:33	18.3	**CONVER-**	0.36
1/9/02	10:53:48	10.62	**SION)**	0.36
1/9/02	10:54:03	5.43		0.36
1/9/02	10:54:18	3.26		0.36
1/9/02	10:54:33	2.41		0.36
1/9/02	10:54:48	1.95		0.36
1/9/02	10:55:03	1.68		0.36
1/9/02	10:55:18	1.49		0.36
1/9/02	10:55:33	1.34		0.36
1/9/02	10:55:48	1.24		0.36
1/9/02	10:56:03	1.15		0.36
1/9/02	10:56:18	1.07		0.23
1/9/02	10:56:33	1.38		0
1/9/02	10:56:48	3.55		0
1/9/02	10:57:03	5.12		0
1/9/02	10:57:18	5.66		0
1/9/02	10:57:33	5.78		0
1/9/02	10:57:48	5.75		0
1/9/02	10:58:03	5.76		0.02
1/9/02	10:58:18	5.74		0
1/9/02	10:58:33	5.69		1.15
1/9/02	10:58:48	5.09		1.97
1/9/02	10:59:03	4.73		2.14
1/9/02	10:59:18	4.25		2.04
1/9/02	10:59:33	3.69		1.97
1/9/02	10:59:48	3.15		1.92
1/9/02	11:00:03	2.75		1.87

1/9/02	11:00:18	2.41		1.83
1/9/02	11:00:33	2.14		1.79
1/9/02	11:00:48	1.92		1.79
1/9/02	11:01:03	1.75		1.75
1/9/02	11:01:18	1.59		1.74
1/9/02	11:01:33	1.49		1.72
1/9/02	11:01:48	1.39		1.6
1/9/02	11:02:03	1.28		0.82
1/9/02	11:02:18	1.18		0.69
1/9/02	11:02:33	1.02		0.68
1/9/02	11:02:48	0.83		0.65
1/9/02	11:03:03	0.68		0.64
1/9/02	11:03:18	0.57		0.65
1/9/02	11:03:33	0.51		0.64
1/9/02	11:03:48	0.47		0.64
1/9/02	11:04:03	0.42		0.64
1/9/02	11:04:18	0.38		0.62
1/9/02	11:04:33	0.36		0.63
1/9/02	11:04:48	0.34		0.61
1/9/02	11:05:03	0.33		0.63
1/9/02	11:05:18	0.31		0.62
1/9/02	11:05:33	0.3		0.6
1/9/02	11:05:48	0.3		0.62
1/9/02	11:06:03	0.29		0.63
1/9/02	11:06:18	0.28		0.64
1/9/02	11:06:33	0.29		0.94
1/9/02	11:06:48	0.54		0.05
1/9/02	11:07:03	2.55		0
1/9/02	11:07:18	4.29	**5.27 NOx**	0
1/9/02	11:07:33	4.9	**BIAS**	0
1/9/02	11:07:48	5.05		0
1/9/02	11:08:03	**5.14**		0
1/9/02	11:08:18	**5.15**		0
1/9/02	11:08:33	**5.15**		0
1/9/02	11:08:48	**5.12**	**5.14**	0

CONTINUOUS MONITOR Q/A
LINEARITY and DRIFT DATA
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA INITIAL CAL
1/10/02

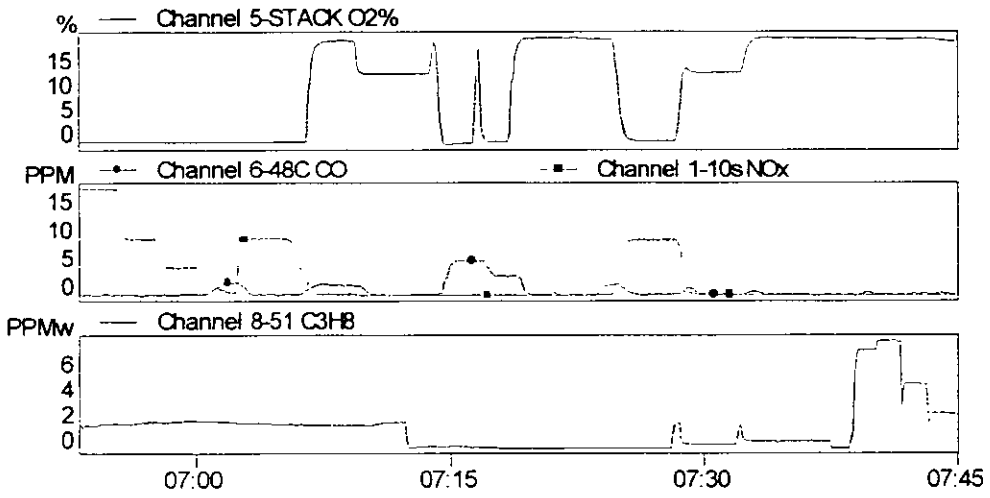
Date	Time	Channel 5-STACK O2% % Average		Channel 6-48C CO PPM Average
1/10/02	6:53:15	0.01		0
1/10/02	6:53:30	0.01	**ZERO O2**	-0.02
1/10/02	6:53:45	**0.01**		0.01
1/10/02	6:54:00	**0.01**		-0.06
1/10/02	6:54:15	**0.01**		-0.12
1/10/02	6:54:30	**0.01**		0
1/10/02	6:54:45	**0.01**		0.11
1/10/02	6:55:00	**0.01**		0
1/10/02	6:55:15	**0.01**		-0.05
1/10/02	6:55:30	**0.01**		-0.06
1/10/02	6:55:45	**0.01**	**0.01**	0
1/10/02	6:56:00	0.01		0.07
1/10/02	6:56:15	0.01		0.01
1/10/02	6:56:30	0.01		-0.06
1/10/02	6:56:45	0.01		-0.15
1/10/02	6:57:00	0.01		-0.15
1/10/02	6:57:15	0.01		-0.03
1/10/02	6:57:30	0.01		0.01
1/10/02	6:57:45	0.01		-0.04
1/10/02	6:58:00	0.01		-0.05
1/10/02	6:58:15	0.01		0
1/10/02	6:58:30	0.01		-0.11
1/10/02	6:58:45	0.01		-0.01
1/10/02	6:59:00	0.01		0.06
1/10/02	6:59:15	0.01		0.08
1/10/02	6:59:30	0.01		0.06
1/10/02	6:59:45	0.01		0.13
1/10/02	7:00:00	0.01		0.15
1/10/02	7:00:15	0.01		0.1
1/10/02	7:00:30	0.01		0.13
1/10/02	7:00:45	0.01		0.47
1/10/02	7:01:00	0.01		1.01
1/10/02	7:01:15	0.01		1.33
1/10/02	7:01:30	0.01		1.69
1/10/02	7:01:45	0.01		2
1/10/02	7:02:00	0.01		2.15
1/10/02	7:02:15	0.01		2.1
1/10/02	7:02:30	0.01		1.93
1/10/02	7:02:45	0.01		1.48

1/10/02	7:03:00	0.01		0.53
1/10/02	7:03:15	0.01		0.12
1/10/02	7:03:30	0.01		0.08
1/10/02	7:03:45	0.01		0.02
1/10/02	7:04:00	0.01		0.02
1/10/02	7:04:15	0.01		0.11
1/10/02	7:04:30	0.01		0.11
1/10/02	7:04:45	0.01		-0.02
1/10/02	7:05:00	0.01		0
1/10/02	7:05:15	0.01		0.06
1/10/02	7:05:30	0.01		0.1
1/10/02	7:05:45	0.01		-0.02
1/10/02	7:06:00	0.01		0.1
1/10/02	7:06:15	0.01		0.43
1/10/02	7:06:30	0.64		0.85
1/10/02	7:06:45	13.69		1.16
1/10/02	7:07:00	19.21	**20.9 O2**	1.57
1/10/02	7:07:15	20.18		1.79
1/10/02	7:07:30	20.62		1.89
1/10/02	7:07:45	20.81		1.8
1/10/02	7:08:00	**20.89**		1.69
1/10/02	7:08:15	**20.93**		1.73
1/10/02	7:08:30	**20.94**		1.73
1/10/02	7:08:45	**20.94**		1.66
1/10/02	7:09:00	**20.9**	**20.92**	1.72
1/10/02	7:09:15	20.85		1.63
1/10/02	7:09:30	16.77		1.6
1/10/02	7:09:45	14.28		1.4
1/10/02	7:10:00	14.05	**13.99 O2**	0.81
1/10/02	7:10:15	14		0.24
1/10/02	7:10:30	**13.98**		0.04
1/10/02	7:10:45	**13.98**		-0.03
1/10/02	7:11:00	**13.99**		0.13
1/10/02	7:11:15	**13.99**		-0.05
1/10/02	7:11:30	**13.99**		-0.07
1/10/02	7:11:45	**14**		-0.03
1/10/02	7:12:00	**14**	**13.99**	-0.05
1/10/02	7:12:15	14.01		-0.03
1/10/02	7:12:30	14.06		0.03
1/10/02	7:12:45	14.05		0.04
1/10/02	7:13:00	14.03		0.18
1/10/02	7:13:15	14		0.1
1/10/02	7:13:30	14.03		0.06
1/10/02	7:13:45	14.31		0.03
1/10/02	7:14:00	19.48		0.06
1/10/02	7:14:15	14.42		0.14
1/10/02	7:14:30	1.82		0.71
1/10/02	7:14:45	-0.49		2.69
1/10/02	7:15:00	-0.5		4.78
1/10/02	7:15:15	-0.41		5.7
1/10/02	7:15:30	-0.34		5.94

1/10/02	7:15:45	-0.29		**5.97**	**6.0 CO**
1/10/02	7:16:00	-0.24		**5.96**	
1/10/02	7:16:15	-0.19		**5.96**	
1/10/02	7:16:30	10.68		**5.89**	
1/10/02	7:16:45	12.9		**5.92**	**5.94**
1/10/02	7:17:00	1.03		5.79	
1/10/02	7:17:15	0.18		4.78	
1/10/02	7:17:30	0.05		3.65	**3.2 CO**
1/10/02	7:17:45	0.03		**3.32**	
1/10/02	7:18:00	0.02		**3.34**	
1/10/02	7:18:15	0.02		**3.32**	**3.33**
1/10/02	7:18:30	2.64		3.23	
1/10/02	7:18:45	14.55		3.37	
1/10/02	7:19:00	19.49		3.12	
1/10/02	7:19:15	21		1.98	
1/10/02	7:19:30	21.34		0.62	
1/10/02	7:19:45	21.43		0.11	
1/10/02	7:20:00	21.46		0.08	
1/10/02	7:20:15	21.47		0.13	
1/10/02	7:20:30	21.53		0.12	
1/10/02	7:20:45	21.56		0.04	
1/10/02	7:21:00	21.55		0.27	
1/10/02	7:21:15	21.52		0.19	
1/10/02	7:21:30	21.48		0	
1/10/02	7:21:45	21.46		-0.04	
1/10/02	7:22:00	21.49		-0.01	
1/10/02	7:22:15	21.53		0.17	
1/10/02	7:22:30	21.48		0.11	
1/10/02	7:22:45	21.44		0.02	
1/10/02	7:23:00	21.36		-0.02	
1/10/02	7:23:15	21.19		0.1	
1/10/02	7:23:30	21.24		0.03	
1/10/02	7:23:45	21.27		0.22	
1/10/02	7:24:00	21.19		0.8	
1/10/02	7:24:15	21.15		1.52	
1/10/02	7:24:30	21.09		1.7	
1/10/02	7:24:45	17.42		1.8	
1/10/02	7:25:00	8.36		1.63	
1/10/02	7:25:15	2.71		1.16	
1/10/02	7:25:30	0.78		0.65	
1/10/02	7:25:45	0.35		0.24	**ZERO CO**
1/10/02	7:26:00	0.24		0.05	
1/10/02	7:26:15	0.21		**-0.06**	
1/10/02	7:26:30	0.2		**-0.07**	
1/10/02	7:26:45	0.2	**ZERO O2**	**-0.02**	
1/10/02	7:27:00	**0.19**	**BIAS**	**-0.03**	
1/10/02	7:27:15	**0.19**		**0.03**	
1/10/02	7:27:30	**0.18**		**0.03**	
1/10/02	7:27:45	**0.18**		**-0.03**	
1/10/02	7:28:00	**0.19**	**0.19**	**0.05**	**-0.01**
1/10/02	7:28:15	0.22		0.14	

1/10/02	7:28:30	2.15		0.14
1/10/02	7:28:45	11.35		0.29
1/10/02	7:29:00	14.96		0.88
1/10/02	7:29:15	14.67		1.2
1/10/02	7:29:30	14.28		0.8
1/10/02	7:29:45	14.17		0.36
1/10/02	7:30:00	14.16		0.09
1/10/02	7:30:15	14.17	**13.99 O2**	0.02
1/10/02	7:30:30	14.19	**BIAS**	0
1/10/02	7:30:45	14.25		0.04
1/10/02	7:31:00	**14.24**		0.05
1/10/02	7:31:15	**14.23**		0.08
1/10/02	7:31:30	**14.23**		0.06
1/10/02	7:31:45	**14.22**		-0.07
1/10/02	7:32:00	**14.21**	**14.23**	-0.02
1/10/02	7:32:15	14.57		0.06
1/10/02	7:32:30	17.31		0.1
1/10/02	7:32:45	19.91		0.43
1/10/02	7:33:00	20.99		0.61
1/10/02	7:33:15	21.31		0.45
1/10/02	7:33:30	21.42		0.2
1/10/02	7:33:45	21.5		0.02
1/10/02	7:34:00	21.46		0.07
1/10/02	7:34:15	21.43		0.03
1/10/02	7:34:30	21.41		0
1/10/02	7:34:45	21.45		0.08
1/10/02	7:35:00	21.48		0.08
1/10/02	7:35:15	21.42		0.02
1/10/02	7:35:30	21.4		0.03
1/10/02	7:35:45	21.38		0.05
1/10/02	7:36:00	21.42		0.04
1/10/02	7:36:15	21.45		-0.03
1/10/02	7:36:30	21.4		-0.07
1/10/02	7:36:45	21.38		-0.1
1/10/02	7:37:00	21.37		-0.12
1/10/02	7:37:15	21.37		0.03
1/10/02	7:37:30	21.43		0.07
1/10/02	7:37:45	21.4		-0.01
1/10/02	7:38:00	21.38		0.05
1/10/02	7:38:15	21.36		-0.08
1/10/02	7:38:30	21.34		0
1/10/02	7:38:45	21.35		0.02
1/10/02	7:39:00	21.37		-0.1
1/10/02	7:39:15	21.27		-0.08
1/10/02	7:39:30	21.21		0.25
1/10/02	7:39:45	21.19		0.41
1/10/02	7:40:00	21.18		0.27
1/10/02	7:40:15	21.2		0.14
1/10/02	7:40:30	21.25		0.16
1/10/02	7:40:45	21.21		0.13
1/10/02	7:41:00	21.19		0.07

1/10/02	7:41:15	21.18	-0.05
1/10/02	7:41:30	21.17	-0.02
1/10/02	7:41:45	21.17	0.08
1/10/02	7:42:00	21.23	-0.01
1/10/02	7:42:15	21.25	0.09
1/10/02	7:42:30	21.27	0.22
1/10/02	7:42:45	21.28	0.15
1/10/02	7:43:00	21.27	0.19
1/10/02	7:43:15	21.26	0.2
1/10/02	7:43:30	21.24	0.08
1/10/02	7:43:45	21.11	0.14
1/10/02	7:44:00	20.91	0.28
1/10/02	7:44:15	20.83	0.27
1/10/02	7:44:30	20.8	0.21
1/10/02	7:44:45	20.78	0.06
1/10/02	7:45:00	20.78	0.02



CONTINUOUS MONITOR Q/A
LINEARITY and DRIFT DATA
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA INITIAL CAL
01/10/02

Date	Time	Channel 1-10s NOx PPM Average		Channel 8-51 C3H8 PPMw Average
1/10/02	6:53:15	**18.74**	**18.5 NOx**	1.79
1/10/02	6:53:30	**18.74**		1.7
1/10/02	6:53:45	**18.74**		1.78
1/10/02	6:54:00	**18.74**		1.75
1/10/02	6:54:15	**18.7**		1.8
1/10/02	6:54:30	**18.74**		1.87
1/10/02	6:54:45	**18.72**		1.88
1/10/02	6:55:00	**18.75**	**18.73**	1.88
1/10/02	6:55:15	18.68		1.92
1/10/02	6:55:30	17.39		1.9
1/10/02	6:55:45	10.56	**10.4 NOx**	1.88
1/10/02	6:56:00	9.9		1.88
1/10/02	6:56:15	**9.77**		1.88
1/10/02	6:56:30	**9.79**		1.93
1/10/02	6:56:45	**9.8**		1.97
1/10/02	6:57:00	**9.78**		2.01
1/10/02	6:57:15	**9.76**		2.02
1/10/02	6:57:30	**9.77**	**9.78**	2.05
1/10/02	6:57:45	7.45		2.04
1/10/02	6:58:00	5.04		2.02
1/10/02	6:58:15	4.85		2.01
1/10/02	6:58:30	4.82		2.03
1/10/02	6:58:45	4.81		2.06
1/10/02	6:59:00	4.8	**5.27 NOx**	2.09
1/10/02	6:59:15	**4.83**		2.13
1/10/02	6:59:30	**4.82**		2.18
1/10/02	6:59:45	**4.82**		2.18
1/10/02	7:00:00	**4.83**	**4.83**	2.17
1/10/02	7:00:15	4.34		2.16
1/10/02	7:00:30	3.16		2.16
1/10/02	7:00:45	2.21		2.16
1/10/02	7:01:00	1.52		2.15
1/10/02	7:01:15	1.09		2.11
1/10/02	7:01:30	0.79		2.1
1/10/02	7:01:45	0.56		2.06
1/10/02	7:02:00	0.42		2.03
1/10/02	7:02:15	0.75		2.01
1/10/02	7:02:30	7.14		1.97
1/10/02	7:02:45	9.63		1.97

1/10/02	7:28:30	9.18	1.93	
1/10/02	7:28:45	5.39	0.51	
1/10/02	7:29:00	1.56	0.36	
1/10/02	7:29:15	0.45	0.33	
1/10/02	7:29:30	0.15	0.32	
1/10/02	7:29:45	0.07	0.32	
1/10/02	7:30:00	0.03	0.32	
1/10/02	7:30:15	0.01	0.32	
1/10/02	7:30:30	0	0.32	
1/10/02	7:30:45	-0.01	0.32	
1/10/02	7:31:00	-0.01	0.32	
1/10/02	7:31:15	-0.02	0.32	
1/10/02	7:31:30	-0.02	0.32	
1/10/02	7:31:45	-0.03	0.32	
1/10/02	7:32:00	-0.03	0.64	
1/10/02	7:32:15	-0.03	1.39	
1/10/02	7:32:30	0.02	0.65	
1/10/02	7:32:45	0.02	0.58	
1/10/02	7:33:00	0	0.55	
1/10/02	7:33:15	-0.02	0.54	
1/10/02	7:33:30	-0.03	0.54	
1/10/02	7:33:45	-0.03	0.54	
1/10/02	7:34:00	-0.04	0.54	
1/10/02	7:34:15	-0.04	0.54	
1/10/02	7:34:30	-0.04	0.48	
1/10/02	7:34:45	-0.05	0.54	
1/10/02	7:35:00	-0.04	0.55	
1/10/02	7:35:15	-0.04	0.56	
1/10/02	7:35:30	-0.04	0.54	
1/10/02	7:35:45	-0.05	0.55	
1/10/02	7:36:00	-0.05	0.57	
1/10/02	7:36:15	-0.05	0.56	
1/10/02	7:36:30	-0.05	0.55	
1/10/02	7:36:45	-0.05	0.55	
1/10/02	7:37:00	-0.05	0.55	
1/10/02	7:37:15	-0.05	0.54	**ZERO C3H8**
1/10/02	7:37:30	-0.05	0.47	
1/10/02	7:37:45	-0.05	**0**	
1/10/02	7:38:00	-0.05	**0**	
1/10/02	7:38:15	-0.05	**0**	
1/10/02	7:38:30	-0.05	**0**	**0**
1/10/02	7:38:45	-0.05	0.5	
1/10/02	7:39:00	-0.05	5.81	
1/10/02	7:39:15	-0.03	7.77	
1/10/02	7:39:30	-0.03	7.81	
1/10/02	7:39:45	-0.04	7.83	
1/10/02	7:40:00	-0.04	7.8	
1/10/02	7:40:15	-0.04	8.04	
1/10/02	7:40:30	-0.05	8.54	
1/10/02	7:40:45	-0.05	**8.54**	**8.52 C3H8**
1/10/02	7:41:00	-0.05	**8.54**	

	1/10/02	7:41:15	-0.05		**8.58**	**8.55**
	1/10/02	7:41:30	-0.05		8.45	
	1/10/02	7:41:45	-0.05		5.79	
•	1/10/02	7:42:00	-0.05		5.07	**5.04 C3H8**
	1/10/02	7:42:15	-0.05		**5.12**	
	1/10/02	7:42:30	-0.05		**5.12**	
	1/10/02	7:42:45	-0.05		**5.12**	**5.12**
	1/10/02	7:43:00	-0.05		5.02	
	1/10/02	7:43:15	-0.05		3.87	
	1/10/02	7:43:30	-0.05	**ZERO NOx**	2.6	**2.83 C3H8**
	1/10/02	7:43:45	-0.05	**BIAS**	2.76	
	1/10/02	7:44:00	-0.05		2.73	
	1/10/02	7:44:15	**-0.05**		2.73	
	1/10/02	7:44:30	**-0.05**		**2.71**	
	1/10/02	7:44:45	**-0.05**		**2.71**	
	1/10/02	7:45:00	**-0.05**	**-0.05**	**2.71**	**2.71**

DRY GAS METER CALIBRATION STANDARD

Air Consulting and Engineering, Inc. (ACE) uses a Precision Scientific model 63123 wet test meter (Serial Number PS 001105) as its dry gas meter calibration standard. The wet test meter has a one cubic foot per revolution capacity and is verified by water displacement annually. The latest verification occurred September 25, 2001.

AIR CONSULTING AND ENGINEERING,INC. *WET TEST METER ANNUAL CALIBRATION*

DATE 9-25-01 CALIBRATED BY C. R WET TEST METER SERIAL NUMBER PSC01105

RANGE OF WET TEST METER FLOW RATE 0-120 (l/min) VOLUME OF TEST FLASK 28.32 (V_s) SATISFACTORY LEAK CHECK? ✓

Ambient Temperature of Equilliberate Liquid In Wet Test Meter and Reservoir 64 (Deg. F)

TEST NUMBER	FINAL VOLUME (V_f), (l)	INITIAL VOLUME (V_i), (l)	TOTAL VOLUME (V_m) .b (l)	FLASK VOLUME (V_s), (l)	PERCENT ERROR, c %
1	28.29	0	28.29	28.32	-0.11
2	28.27	0	28.27	28.32	-0.18
3	28.28	0	28.28	28.32	-0.14

CALCULATIONS:

b $V_m = V_f - V_i$.

c % Error = 100 ($V_m - V_s$) / V_s = -0.14 (+/- 1%)

ACE AIR CONSULTING & ENGINEERING, INC.

AIR CONSULTING AND ENGINEERING,INC.

ANNUAL METER CALIBRATION

DATE 4-02-01 CALIBRATED BY C. RESHARD LEAK CHECK 0.00 CFM at 15 (Hg)

METER BOX NUMBER 3 BAROMETRIC PRESSURE (" Hg) 30.08

DRY GAS METER TEMPERATURE (F) 68 ASTM GLASS THERMOMETER TEMPERATURE (F) 68

DH	AVERAGE DH	GAS VOLUME, WET TEST METER			GAS VOLUME, DRY GAS METER			TEMP. WET METER (F)	TEMP. DRY METER (F)	TIME (MIN)	TIMER (MIN)
		INITIAL	FINAL	ACTUAL (FT3)	INITIAL	FINAL	ACTUAL (FT3)				
-0.39	2.0	0.0	5.718	5.718	125.998	131.915	5.917	55	70	7	7
-0.20	0.5	6.149	11,569	5.420	132.351	137.971	5.620	55	70	13	13
-0.65	4.0	17.661	23.331	5.670	144.015	149.896	5.881	55	71	5	5
-0.28	1.0	27.926	33.185	5.259	154.478	159.810	5.332	55	71	9	9
-0.54	3.0	34.146	40.102	5.956	160.795	166.958	6.163	55	72	6	6
-0.33	1.5	40.850	46.431	5.581	167.719	173.443	5.724	55	72	8	8

RESULTS

DELTA H@	SCFM	Y
1.5807	0.8420	0.9897
1.5170	0.4297	0.9913
1.6373	1.1688	0.9844
1.5416	0.6023	1.0145
1.5996	1.0232	0.9910
1.6193	0.7191	1.0035
MEAN: 1.5826		0.9957

ACCEPTABLE (YES) / NO (CIRCLE) INITIALS [signature] DATE 4/2/01

AIR CONSULTING AND ENGINEERING,INC.

PITOT TUBE CALIBRATION

DATE CALIBRATED 10/17/01 CALIBRATED BY JDC PITOT TUBE NUMBER 116A

IS PITOT TUBE ASSEMBLY LEVEL (YES) / NO (circle) ARE PITOT TUBE OPENINGS DAMAGED YES / (NO) (circle)

α_1= 2 °(<10°), α_2= 0 °(<10°), β_1= 2.5 °(<5°), β_2= 3 °(<5°)

γ= 1.5 ° θ= 1 ° A= 1.070 in. = (Pa + Pb)

z = A sinγ = .028 in.; <0.125 in.

w = A sinθ = .019 in.; <0.031 in.

P_a .535 in. P_b .535 in. D_t .375 in.

Was calibration required? YES / (NO) (circle)

THERMOCOUPLE CALIBRATION

SOURCE (SPECIFY)	GLASS THERMOMETER WITH NBS MERCURY (F)	PYROMETER (F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	34	34	0	0
AMBIENT	73	73	0	0
HOT OVEN	511	510	1	0.1

FDEP - MAXIMUM 5 DEGREE DIFFERENCE

EPA - $\left[\frac{(\text{REF. TEMP. F} + 460) - (\text{PYROMETER TEMP. F} + 460)}{(\text{REF. TEMP. F} + 460)}\right] 100 \leq 1.5\%$

ACCEPTABLE? (YES) / NO (CIRCLE) INITIALS _____ DATE 10/17/01

AIR CONSULTING AND ENGINEERING,INC.

PYROMETER CALIBRATION

DATE 10/22/01 CALIBRATED BY PEB PYROMETER NUMBER ATK-3

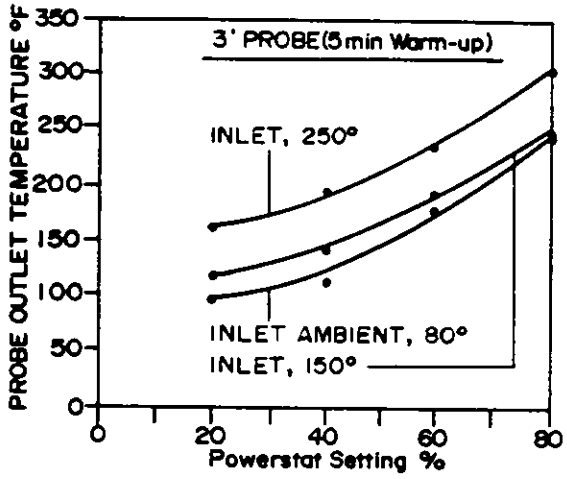
SOURCE (SPECIFY)	GLASS THERMOMETER WITH NBS MERCURY (F)	PYROMETER (F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	34	33	1	0.20
AMBIENT	69	69	0	0
HOT OVEN	396	396	0	0

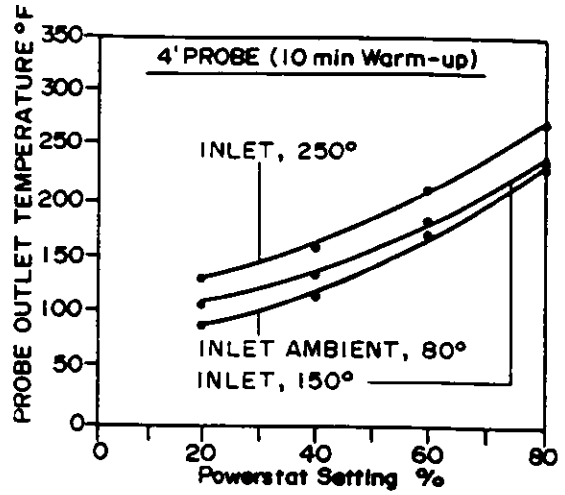
FDEP - MAXIMUM 5 DEGREE DIFFERENCE

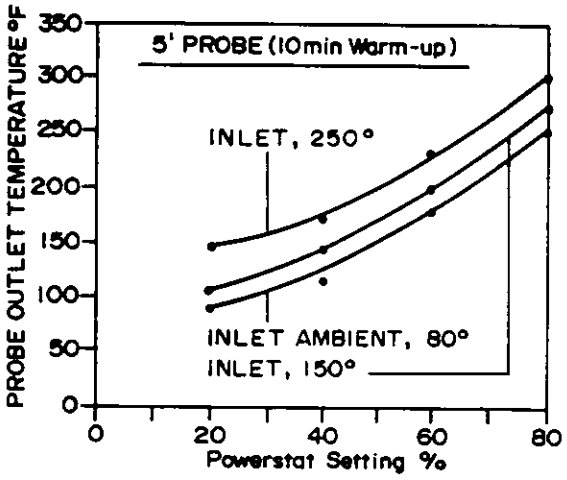
EPA - $\left[\frac{\text{(REF. TEMP. F + 460) - (PYROMETER TEMP. F + 460)}}{\text{(REF. TEMP. F + 460)}}\right] 100 \leq 1.5\%$

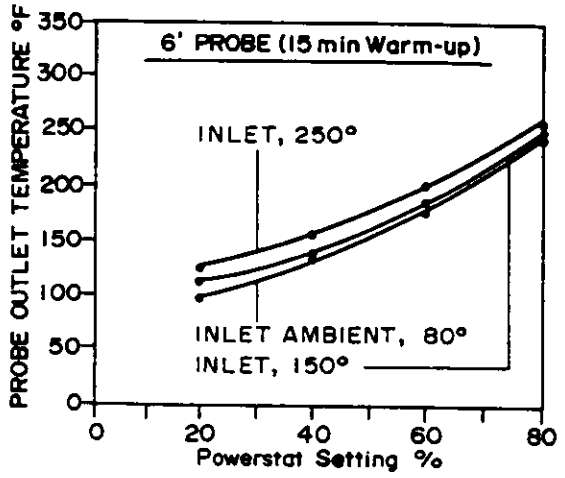
ACCEPTABLE? (YES) / NO (CIRCLE) INITIALS PEB DATE 10/22/01

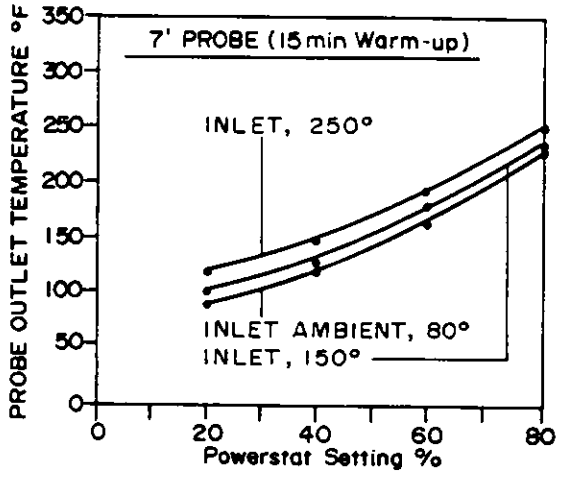
ACE AIR CONSULTING & ENGINEERING, INC.











NOTE: Flow rate held constant at 0.75; 50% change in flow rate has little effect on probe temperature.

PROBE GRAPH

AIR CONSULTING
and
ENGINEERING

Airgas
Specialty Gases
5480 Hamilton Blvd.
Theodore, AL 36582
P.O. Box 190969
Mobile, AL 36619
Phone: (334) 653-2500
FAX: (334) 653-2530

CERTIFICATE OF ANALYSIS

Date: May 30, 2001 Reference number: 000403/0828

Customer Name: Airgas South
Address: Ocala, FL

Purchase Order: 452810

Grade of Product: Certified Gas Standard (± 2%)
Cylinder Number: CC10653
Cylinder Pressure: 800 psi
Cylinder Contents: 56.6 scf
Expiration Date: 05/30/02

Components	Requested Concentration (mole %)	Actual Concentration (mole %)
Carbon Monoxide	3.35ppm	3.20ppm
Nitrogen	Balance	Balance

Carol Stewart
Approval Signature

This mixture is made to a pressure such that the dewpoint of condensable gases is below zero degrees Centigrade.

The accuracy of each scale used to manufacture this blend is checked before use by means of NIST traceable weights.

Airgas
Specialty Gases
5480 Hamilton Blvd.
Theodore, AL 36582
P.O. Box 190969
Mobile, AL 36619
Phone: (334) 653-2500
FAX. (334) 653-2530

CERTIFICATE OF ANALYSIS

Date: May 30, 2001

Reference number: 000403/0829

Customer Name: Airgas South
Address: Ocala, FL

Purchase Order: 452810

Grade of Product: Certified Gas Standard (± 2%)
Cylinder Number: CC13797
Cylinder Pressure: 800 psi
Cylinder Contents: 56.6 scf
Expiration Date: 05/30/02

Components	Requested Concentration (mole %)	Actual Concentration (mole %)
Carbon Monoxide	6.24ppm	6.00ppm
Nitrogen	Balance	Balance

Approval Signature

This mixture is made to a pressure such that the dewpoint of condensable gases is below zero degrees Centigrade.

The accuracy of each scale used to manufacture this blend is checked before use by means of NIST traceable weights.

Airgas
Specialty Gases
11711 S. Alameda Street
Los Angeles, CA 90059-2130
(323) 357-6891
FAX: (323) 567-3686

Certificate of Analysis: E.P.A. Protocol Gas Mixture

Customer:	Airgas South	P.O.	450776
Cylinder No :	CC36405	Order No.	300623-00
Cylinder Pressure:	2000 PSIG	Expiration Date:	5/21/03
Certification Date	5/22/01	Laboratory:	LOS ANGELES

Reference Standard Information:

Type	Component	Cyl. Number	Concentration
GMIS	Nitric Oxide	CC44615	5.34 PPM

Instrumentation:

Instrument/Model/Serial No.	Analytical Principle
Thermo Electron/10AR	Chemiluminescent

Analytical Methodology does not require correction for analytical interferences.

Certified Concentrations:

Component	Concentration		Accuracy	Procedure
Nitric Oxide	4.96	PPM	+/- 1%	G1
NOx	5.27	PPM		
Nitrogen	Balance			

Analytical Results:

1st Component: Nitric Oxide

1st Analysis Date:		5/14/01					
R	21.900	S	20.400	Z	0.000	Conc	4.974 PPM
S	20.400	Z	0.000	R	21.900	Conc	4.974 PPM
Z	0.000	R	21.900	S	20.400	Conc	4.974 PPM
						AVG:	4.974 PPM

2nd Analysis Date:		5/21/01					
R	22.000	S	20.400	Z	0.000	Conc	4.952 PPM
S	20.400	Z	0.000	R	22.000	Conc	4.952 PPM
Z	0.000	R	22.000	S	20.400	Conc	4.952 PPM
						AVG:	4.952 PPM

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.

Do not use cylinder below 150 psig.

Approved for Release

Airgas
Specialty Gases
[illegible] S. Alameda Street
[illegible] Angeles, CA 90059-[illegible]
(323) 357-6891
FAX (323) 567-3686

Certificate of Analysis: E.P.A. Protocol Gas Mixture

Customer:	Airgas South	P.O.	450776
Cylinder No :	CC71830	Order No.	300623-00
Cylinder Pressure:	2000 PSIG	Expiration Date:	5/21/03
Certification Date	5/22/01	Laboratory:	LOS ANGELES

Reference Standard Information:

Type	Component	Cyl. Number	Concentration
NTRM 81684	Nitric Oxide	CC66803	96.9 PPM

Instrumentation:

Instrument/Model/Serial No.	Analytical Principle
Thermo Electron/10AR	Chemiluminescent

Analytical Methodology does not require correction for analytical interferences.

Certified Concentrations:

Component	Concentration	Accuracy	Procedure
Nitric Oxide	10.4 PPM	+/- 1%	G1
NOx	10.4 PPM		
Nitrogen	Balance		

Analytical Results:

1st Component: Nitric Oxide

1st Analysis Date: 5/14/01

R	96.600	S	10.400	Z	0.000	Conc	10.432 PPM
S	10.400	Z	0.000	R	96.600	Conc	10.432 PPM
Z	0.000	R	96.600	S	10.400	Conc	10.432 PPM
						AVG:	10.432 PPM

2nd Analysis Date: 5/21/01

R	96.600	S	10.300	Z	0.000	Conc	10.332 PPM
S	10.300	Z	0.000	R	96.600	Conc	10.332 PPM
Z	0.000	R	96.600	S	10.300	Conc	10.332 PPM
						AVG:	10.332 PPM

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.

Do not use cylinder below 150 psig.

Approved for Release

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

6141 EASTON ROAD, BLDG 1,PLUMSTEADVILLE,PA 18949-0310 Phone: 800-331-4953 Fax: 215-766-7226

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE,PA 18949-0310

P.O. No.: 2219
Project No.: 01-57611-001

Customer

AIR CONSULTING & ENGRING
PO#2219
SUITE #4
2106 NW 67TH PLACE
GAINESVILLE FL 32606

ANALYTICAL INFORMATION

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

Cylinder Number: ALM007675 **Certification Date:** 7/26/01 **Exp. Date:** 7/26/2003
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
NITRIC OXIDE	18.40	PPM	+/- 1%	Direct NIST and NMi
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	18.50	PPM		Reference Value Only

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

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

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2629	5/01/03	AAL5579	19.77 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/CLA220/5708850810	07/09/01	CHEMILUMINESCENCE

ANALYZER READINGS

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

NITRIC OXIDE

First Triad Analysis

Date:07/19/01	Response Unit:VOLTS	
Z1 = 0.00150	R1 = 4.11790	T1 = 3.82170
R2 = 4.12010	Z2 = 0.00200	T2 = 3.81990
Z3 = 0.00390	T3 = 3.18770	R3 = 4.12230
Avg. Concentration:	18.36	PPM

Second Triad Analysis

Date: 07/26/01	Response Unit: VOLTS	
Z1 = 0.00240	R1 = 4.11150	T1 = 3.82250
R2 = 4.11670	Z2 = 0.00280	T2 = 3.82480
Z3 = 0.00400	T3 = 3.81830	R3 = 4.12930
Avg. Concentration:	18.40	PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = 0.999998	2629
Constants:	A = -0.005094741
B = 4.816527	C =
D =	E =

APPROVED BY: _____
COLIN MCCARTY

Airgas
Specialty Gases
5480 Hamilton Blvd.
Theodore, AL 36582
P.O. Box 190969
Mobile, AL 36619
Phone: (334) 653-2500
FAX: (334) 653-2530

Certificate of Analysis: E.P.A. Protocol Gas Mixture

Cylinder No :	CC135810	Order No.	468270
Cylinder Pressure:	2000 PSIG	Expiration Date:	9/4/04
Certification Date	9/4/01	Laboratory:	ASG-MOBILE

Reference Standard Information:

Type	Component	Cyl. Number	Concentration
NTRM 82659	OXYGEN	CC45577	20.11%

Instrumentation:

Instrument/Model/Serial No.	Analytical Principle
SERVOMEX 244/701/742	PARAMAGNETIC

Analytical Methodology does not require correction for analytical interferences.

Certified Concentrations:

Component	Concentration	Accuracy	Procedure
OXYGEN	13.99 %	+/-1%	G1
NITROGEN	Balance		

Analytical Results:

1st Component: OXYGEN

1st Analysis Date: 9/4/01

R	20.11	S	14.00	Z	0.000	Conc	14.00 %
S	13.99	Z	0.000	R	20.11	Conc	13.99 %
Z	0.000	R	20.11	S	13.99	Conc	13.99 %
						AVG:	13.99 %

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.

Do not use cylinder below 150 psig.

Beverly Hart
Approved for Release

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

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

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1750 EAST CLUB BLVD
DURHAM,NC 27704

P.O. No.: 2116
Project No.: 12-34759-011

Customer

AIR CONSULTING & ENGRING
STEVE NECK
SUITE #4
2106 NW 67TH PLACE
GAINESVILLE FL 32606

ANALYTICAL INFORMATION

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

Cylinder Number: AAL11181 **Certification Date:** 6/16/99 **Exp. Date:** 6/16/2002
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
PROPANE	2.83	PPM	+/- 1%	Direct NIST and NMi
AIR		BALANCE		

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

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

REFERENCE STANDARD

TYPE/SRM NO:	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1666	9/01/99	AAL8237	9.620 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/16804-C3H8	05/17/99	GC / TCD

ANALYZER READINGS

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

First Triad Analysis

PROPANE

Date:06/16/99	Response Unit:AREA	
Z1 = 0.0000	R1 = 101055	T1 = 29770.
R2 = 101011	Z2 = 0.0000	T2 = 29757.
Z3 = 0.0000	T3 = 29754.	R3 = 101059
Avg. Concentration:	2.830	PPM

Second Triad Analysis

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.99999

Constants:	A = 0.00
B = 1.00	C = 0.00
D = 0.00	E = 0.00

APPROVED BY: _____
L. TAYLOR

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC
27713
(919)544-3772

CERTIFICATE OF ANALYSIS * EPA PROTOCOL MIXTURES

REFERENCE #:	88-63146	CYLINDER #:	CC 50799	CYL. PRESSURE:	2000 PSIG	P.O. #:	W191394GALC
EXP. DATE:	6/18/02	LAST ANALYSIS DATE:	6/18/99	CUSTOMER:	AIR LIQUIDE		

METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1997:G-1 THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150 PSIG).

COMPONENT: PROPANE

STANDARD

SRM #: 1666B

CYL. #: ~~CAL 011058~~

CONC: 9.73 PPM

INSTRUMENT: VARIAN

MODEL #: 3400

SERIAL #: 10056

LAST CAL.: 6/1/99

MEAN CONC.: 5.04 PPM +/- 0.05 PPM

REPLICATE CONC.

DATE:	6/18/99
5.04	PPM
5.04	PPM
5.04	PPM

BALANCE GAS: AIR

REPLICATE DATA						REPLICATE DATA		REPLICATE DATA	
DATE:	6/18/99								
Z	0	R	14564	C	7544				
R	14566	Z	0	C	7545				
Z	0	C	7545	R	14566				

Z- ZERO C-CANDIDATE R=REFERENCE

ANALYST: Terence M. Fogue APPROVED BY: Richard Sykes

THIS REPORT STATED ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIAL SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY THE INFORMATION REQUESTED, HOWEVER, IN CONNECTION WITH THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE ASSAYED AT. NATIONAL SPECIALTY GASES, 630 UNITED DRIVE, DURHAM, NC 27713 (919)544-3772

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC
27713
(919)544-3772

CERTIFICATE OF ANALYSIS * EPA PROTOCOL MIXTURES

REFERENCE #:	88-63147	CYLINDER #:	CC 117366	CYL. PRESSURE:	2000 PSIG	P.O. #:	W191394GALC
EXP. DATE:	6/18/02	LAST ANALYSIS DATE:	6/18/99	CUSTOMER:	AIR LIQUIDE		

METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1997:G-1 THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150 PSIG).

COMPONENT: PROPANE

STANDARD

SRM #: 1666B
CYL. #: CAL 011058
CONC: 9.73 PPM

INSTRUMENT: VARIAN
MODEL #: 3400
SERIAL #: 10056
LAST CAL.: 6/1/99

MEAN CONC.: 8.52 PPM +/- 0.08 PPM

REPLICATE CONC.

DATE: 6/18/99

8.52 PPM
8.52 PPM
8.52 PPM

BALANCE GAS: AIR

REPLICATE DATA						REPLICATE DATA	REPLICATE DATA
DATE: 6/18/99							
Z	0	R	14564	C	12753		
R	14566	Z	0	C	12755		
Z	0	C	12755	R	14566		

Z= ZERO C=CANDIDATE R=REFERENCE

ANALYST: Terrence Hogue APPROVED BY: Richard Sykes

APPENDIX G

PRODUCTION DATA AND FUEL ANALYSES

Calculation of Lower Heating Value of Fuel
COMBUSTION TURBINE 3
KISSIMMEE ELECTRIC AUTHORITY
INTERCESSION CITY, FLORIDA
1/9-10/02 **USING FGT ANALYSIS FOR 1/10/02**
GAS FIRING

Calculation of Lower Heating Value of Fuel

1. Amount of H2O in combustion gas

Basis: n atoms of H produces n/2 moles of H2O

Methane (CH4)	4 atoms of H produces 2 moles of H2O
Ethane (C2H6)	6 atoms of H produces 3 moles of H2O
Propane (C3H8)	8 atoms of H produces 4 moles of H2O
Butane (C4H10)	10 atoms of H produces 5 moles of H2O
Pentane (C5H12)	12 atoms of H produces 6 moles of H2O
Hexane (C6H14)	14 atoms of H produces 7 moles of H2O

From Fuel Analysis:

Compoun	MW	
Methane	16	0.94947
Ethane	30	0.027
Propane	44	0.0065
Butane	58	0.00304
Pentane	72	0.0077
Hexane	86	0.0007
Nitrogen	14	0.003
CO2	44	0.0093
Relative Density		0.592
HHV		1045

Moles of H2O produced per mole of gas:

Methane	0.94947	(2) +	
Ethane	0.027	(3) +	
Propane	0.0065	(4) +	
Butane	0.00304	(5) +	
Pentane	0.0077	(6) +	
Hexane	0.0007	(7) =	**2.07224 mole H2O/mole of gas**

2. Molecular weight of gas

Methane	0.94947	(16) +	
Ethane	0.027	(30) +	
Propane	0.0065	(44) +	
Butane	0.00304	(58) +	
Pentane	0.0077	(72) +	
Hexane	0.0007	(86) +	
Nitrogen	0.003	(14) +	
CO2	0.0093	(44) =	**17.52964 lb gas**

3. Weight of water per dry cubic foot at 60 degrees F and 14.73 psia

density of air = 0.0765 lbs/cuft

$$2.07224 \frac{\text{mole H2O}}{\text{mole gas}} \times \frac{18 \text{ lb gas}}{1 \text{ mole H2O}} \times \frac{1 \text{ mole gas}}{17.52964 \text{ lb gas}} \times 0.592 \times \frac{0.0765 \text{ lb gas}}{\text{cuft gas}} = \mathbf{0.09636575} \frac{\text{lbs H2O}}{\text{cuft gas}}$$

4. Lower heating value (LHV) of gas

LHV = HHV - (lb H2O / cuft gas) x 1020 BTU/lb H2O

LHV = 1045 -1020 btu/lb) 0.096366 lb H2O/cuft gas

LHV = **946.7069 BTU/cuft**

5. SPECIFIC GRAVITY OF FUEL

0.0765 LBS/CF x 0.592 REL. DEN. = 0.0453 LBS/CF

SG = 1/DENSITY = **22.08 CUBIC FT/LB**

daily chromatograph

date requested: Jan 11 2002 7:03AM

The data contained herein is preliminary data and therefore should be used for contemporaneous operational purposes only and may be subject to change at month end. This data is provided to assist our customers in tracking their gas usage as closely as possible on a real-time basis. The information contained on this web page is not to be considered billable information. This data will be subject to additional verification and possible modification prior to billing.

Chromatograph Report For: 8030 - PERRY STREAM #1

download

Date	BTU	CO2	N2	Grav	Methan	Ethane	Propan	Ibutan	Nbutan	Ipenta	Npenta	C6	C7	H2	Helium	Oxygen
01/10/2002	1045	0.931	0.301	0.592	94.947	2.724	0.651	0.169	0.135	0.050	0.027	0.066	0	0	0	0
01/08/2002	1045	0.970	0.309	0.593	94.850	2.763	0.661	0.172	0.135	0.049	0.026	0.064	0	0	0	0
01/07/2002	1046	0.955	0.300	0.594	94.725	2.910	0.666	0.169	0.135	0.049	0.026	0.064	0	0	0	0
01/06/2002	1045	0.915	0.300	0.593	94.851	2.865	0.641	0.161	0.129	0.048	0.026	0.066	0	0	0	0
01/05/2002	1047	0.985	0.301	0.595	94.566	3.009	0.691	0.172	0.137	0.050	0.026	0.063	0	0	0	0
01/04/2002	1049	1.009	0.322	0.597	94.392	3.037	0.738	0.180	0.153	0.057	0.033	0.079	0	0	0	0
01/03/2002	1053	0.989	0.304	0.599	94.236	3.063	0.822	0.203	0.183	0.067	0.041	0.092	0	0	0	0
01/02/2002	1047	0.933	0.299	0.594	94.782	2.808	0.689	0.167	0.151	0.055	0.034	0.082	0	0	0	0
01/01/2002	1049	0.902	0.307	0.595	94.667	2.914	0.713	0.171	0.156	0.056	0.035	0.079	0	0	0	0

947 BTU

22.05 CF/lb

FGT
Last Updated 1/11/02 6:55

Station Name	Total Sulfur Previous Day Avg ppm	Total Sulfur Previous Day Avg Grains/hcf
Perry 36" Stream #1	01/09/02 2.4	01/09/02 0.150

Enertec NTDAHS®
Average Values Report
Generated : 01/31/02 06:59

Company: Kissimmee Utility Authority
Plant: 6075 Old Tampa Highway
City/St: Intercession City, FL 33848
Source: Combined cycle

Period Start: 01/09/02 14:28
Period End: 01/09/02 15:35
Validation Type: 1/1 min
Averaging Period: 1 min
Type: Block Avg

Period Start	Average NOx_cor_3B ppm	Average O2_3B %	Average LOAD_3B MW	Average GAS_FL_3B #/S	Average DB_GAS_3B KSCFH
1/9/02 14:28	3	13.76	167.9	19.6	11.6
1/9/02 14:29	3	13.76	167.9	19.6	11.6
1/9/02 14:30	2.8	13.78	167.9	19.7	11.5
1/9/02 14:31	2.9	13.77	167.9	19.6	11.7
1/9/02 14:32	3	13.77	167.9	19.6	11.4
1/9/02 14:33	3	13.77	167.9	19.6	11.1
1/9/02 14:34	3	13.76	167.9	19.6	11.4
1/9/02 14:35	3	13.76	167.9	19.6	11.8
1/9/02 14:36	2.9	13.76	167.7	19.6	11.9
1/9/02 14:37	2.9	13.75	167.8	19.6	11.8
1/9/02 14:38	2.9	13.76	167.9	19.7	12.2
1/9/02 14:39	2.9	13.77	167.8	19.7	12.1
1/9/02 14:40	2.9	13.77	167.9	19.6	11.8
1/9/02 14:41	2.9	13.76	168.2	19.7	11.9
1/9/02 14:42	3	13.76	167.9	19.7	12
1/9/02 14:43	2.9	13.76	168.2	19.7	12.1
1/9/02 14:44	3	13.77	167.8	19.7	11.9
1/9/02 14:45	2.9	13.77	167.9	19.6	12
1/9/02 14:46	2.9	13.76	167.8	19.6	12.1
1/9/02 14:47	2.9	13.78	167.9	19.6	12.2
1/9/02 14:48	2.9	13.77	167.9	19.6	12.3
1/9/02 14:49	2.9	13.77	167.8	19.7	12.1
1/9/02 14:50	2.9	13.77	167.8	19.7	12.1
1/9/02 14:51	2.9	13.77	167.8	19.7	11.9
1/9/02 14:52	2.9	13.77	167.8	19.7	12.2
1/9/02 14:53	3	13.76	167.9	19.7	12.1
1/9/02 14:54	2.9	13.76	167.9	19.6	12.2
1/9/02 14:55	3	13.76	167.9	19.7	12.3
1/9/02 14:56	2.9	13.76	167.8	19.6	12.1
1/9/02 14:57	N/A	N/A	N/A	N/A	N/A
1/9/02 14:58	0	0	167.9	19.7	44.3
1/9/02 14:59	2.9	13.78	167.9	19.6	43.6
1/9/02 15:00	2.9	13.77	167.8	19.6	42.9
1/9/02 15:01	2.9	13.77	167.9	19.7	42.2
1/9/02 15:02	2.9	13.77	167.9	19.7	42.6
1/9/02 15:03	2.8	13.76	167.8	19.7	42.9
1/9/02 15:04	2.9	13.76	167.9	19.6	43.3

1/9/02 15:05	2.9	13.76	167.9	19.6	44.1
1/9/02 15:06	3	13.75	167.8	19.6	43.1
1/9/02 15:07	3	13.76	167.9	19.6	43.8
1/9/02 15:08	2.9	13.76	167.9	19.7	41.4
1/9/02 15:09	2.9	13.75	167.9	19.7	42.4
1/9/02 15:10	3	13.75	167.9	19.7	41.2
1/9/02 15:11	2.9	13.76	167.8	19.6	42.8
1/9/02 15:12	2.9	13.75	167.8	19.6	43.4
1/9/02 15:13	2.9	13.75	167.9	19.6	42
1/9/02 15:14	3	13.75	167.9	19.7	42.4
1/9/02 15:15	3	13.76	167.9	19.6	42
1/9/02 15:16	2.9	13.75	167.9	19.7	41.7
1/9/02 15:17	2.8	13.76	167.9	19.6	41.7
1/9/02 15:18	2.8	13.76	167.8	19.6	42.4
1/9/02 15:19	2.9	13.76	167.8	19.6	42.3
1/9/02 15:20	3.1	13.75	167.8	19.6	42.4
1/9/02 15:21	3.1	13.75	167.8	19.6	41.3
1/9/02 15:22	3.1	13.75	167.9	19.7	43.7
1/9/02 15:23	3.1	13.75	167.9	19.6	42.7
1/9/02 15:24	3.1	13.75	167.8	19.6	43.1
1/9/02 15:25	3.1	13.75	167.9	19.6	43.7
1/9/02 15:26	3.1	13.75	167.8	19.6	43.4
1/9/02 15:27	3.1	13.75	167.8	19.6	42
1/9/02 15:28	3.1	13.75	167.8	19.6	42.3
1/9/02 15:29	3.1	13.75	167.9	19.7	43
1/9/02 15:30	3.1	13.75	167.9	19.6	42
1/9/02 15:31	3.1	13.75	167.8	19.6	43.4
1/9/02 15:32	3	13.75	167.9	19.7	43
1/9/02 15:33	3	13.75	167.8	19.6	42.7
1/9/02 15:34	3	13.75	167.8	19.6	38
1/9/02 15:35	3	13.79	167.9	19.6	4
Final Average*	2.9	13.55	167.9	19.6	28.7
Maximum*	3.1	13.79	168.2	19.7	44.3
Minimum*	0	0	167.7	19.6	4

*Does not include Invalid Averaging Periods (N/A")"

Enertec NTDAHS®
Average Values Report
Generated : 01/31/02 06:59

Company: Kissimmee Utility Authority
Plant: 6075 Old Tampa Highway
City/St: Intercession City, FL 33848
Source: Combined cycle

Period Start: 01/09/02 16:28
Period End: 01/09/02 17:34
Validation Type: 1/1 min
Averaging Period: 1 min
Type: Block Avg

Period Start	Average NOx_cor_3B ppm	Average O2_3B %	Average LOAD_3B MW	Average GAS_FL_3B #/S	Average DB_GAS_3B KSCFH
1/9/02 16:28	2.5	13.76	167.8	19.6	30.1
1/9/02 16:29	2.5	13.75	167.9	19.7	29.1
1/9/02 16:30	2.5	13.75	167.8	19.6	29.1
1/9/02 16:31	2.4	13.75	167.9	19.7	30.1
1/9/02 16:32	2.4	13.75	167.9	19.6	29.1
1/9/02 16:33	2.4	13.74	167.9	19.6	30.1
1/9/02 16:34	2.4	13.74	167.9	19.5	30.1
1/9/02 16:35	2.4	13.73	167.8	19.6	30.5
1/9/02 16:36	2.4	13.73	167.9	19.6	30.5
1/9/02 16:37	2.4	13.72	167.5	19.6	29.1
1/9/02 16:38	2.3	13.72	167.8	19.6	29.5
1/9/02 16:39	2.4	13.72	167.9	19.6	29.5
1/9/02 16:40	2.4	13.71	167.8	19.6	29.5
1/9/02 16:41	2.4	13.71	167.9	19.6	29.1
1/9/02 16:42	2.4	13.71	167.9	19.6	30.1
1/9/02 16:43	2.3	13.71	167.9	19.6	29.6
1/9/02 16:44	2.3	13.71	167.8	19.6	29.6
1/9/02 16:45	2.4	13.7	167.9	19.6	29.6
1/9/02 16:46	2.4	13.71	167.8	19.6	29.6
1/9/02 16:47	2.4	13.7	167.9	19.6	29.1
1/9/02 16:48	2.4	13.7	167.9	19.5	29.1
1/9/02 16:49	2.4	13.69	167.9	19.6	29
1/9/02 16:50	2.4	13.69	167.8	19.6	30.5
1/9/02 16:51	2.4	13.69	167.9	19.6	31
1/9/02 16:52	2.4	13.69	167.9	19.7	30.5
1/9/02 16:53	2.4	13.68	167.9	19.6	30.5
1/9/02 16:54	2.4	13.68	167.8	19.6	30.5
1/9/02 16:55	2.4	13.67	167.8	19.6	31
1/9/02 16:56	2.4	13.67	167.8	19.6	31
1/9/02 16:57	2.3	13.67	167.8	19.6	30.5
1/9/02 16:58	2.3	13.67	167.8	19.7	30.5
1/9/02 16:59	2.3	13.67	167.9	19.6	31.4
1/9/02 17:00	2.4	13.67	167.8	19.6	30
1/9/02 17:01	2.3	13.66	167.8	19.7	30
1/9/02 17:02	2.3	13.67	167.9	19.6	30.5
1/9/02 17:03	2.4	13.67	167.8	19.5	29.5
1/9/02 17:04	2.4	13.66	167.8	19.7	29

1/9/02 17:05	2.3	13.67	167.9	19.6	30.5
1/9/02 17:06	2.3	13.65	167.9	19.7	29.5
1/9/02 17:07	2.4	13.66	167.9	19.7	30.4
1/9/02 17:08	2.4	13.65	167.9	19.6	30.9
1/9/02 17:09	2.4	13.65	167.8	19.7	29.5
1/9/02 17:10	2.4	13.65	167.9	19.7	30
1/9/02 17:11	2.4	13.65	167.8	19.7	30
1/9/02 17:12	2.3	13.64	167.9	19.6	30.9
1/9/02 17:13	2.4	13.64	167.9	19.7	30.4
1/9/02 17:14	2.4	13.64	167.7	19.6	29.5
1/9/02 17:15	2.4	13.64	167.9	19.6	29
1/9/02 17:16	2.4	13.64	167.8	19.6	30.4
1/9/02 17:17	2.4	13.64	167.8	19.7	30
1/9/02 17:18	2.3	13.64	167.9	19.7	30.9
1/9/02 17:19	2.4	13.63	167.9	19.7	31.4
1/9/02 17:20	2.4	13.64	167.8	19.7	31.9
1/9/02 17:21	2.4	13.63	167.9	19.6	30.4
1/9/02 17:22	2.4	13.63	167.8	19.7	30.9
1/9/02 17:23	2.3	13.63	167.8	19.7	30
1/9/02 17:24	2.4	13.63	167.9	19.7	30.4
1/9/02 17:25	2.3	13.63	167.8	19.8	30.9
1/9/02 17:26	2.3	13.63	167.9	19.7	30
1/9/02 17:27	2.4	13.62	167.9	19.7	30.9
1/9/02 17:28	2.4	13.62	167.9	19.7	30.4
1/9/02 17:29	2.4	13.62	168.5	19.7	29.5
1/9/02 17:30	2.3	13.61	169.8	19.8	30.4
1/9/02 17:31	2.3	13.61	169.8	19.7	30.9
1/9/02 17:32	2.3	13.6	169.9	19.8	31.9
1/9/02 17:33	2.3	13.6	169.9	19.8	30.9
1/9/02 17:34	2.3	13.6	169.8	19.8	30.4
Final Average*	2.4	13.67	168	19.6	30.2
Maximum*	2.5	13.76	169.9	19.8	31.9
Minimum*	2.3	13.6	167.5	19.5	29

*Does not include Invalid Averaging Periods (N/A")"

Enertec NTDAHS®
Average Values Report
Generated : 01/31/02 07:00

Company: Kissimmee Utility Authority
Plant: 6075 Old Tampa Highway
City/St: Intercession City, FL 33848
Source: Combined cycle

Period Start: 01/10/02 08:37
Period End: 01/10/02 09:34
Validation Type: 1/1 min
Averaging Period: 1 min
Type: Block Avg

Period Start	Average NOx_cor_3B ppm	Average O2_3B %	Average LOAD_3B MW	Average GAS_FL_3E #/S	Average DB_GAS_3B KSCFH
1/10/02 8:37	3	13.52	178.3	20.6	34.5
1/10/02 8:38	2.9	13.52	178.4	20.6	34.5
1/10/02 8:39	2.8	13.52	178.2	20.7	34.5
1/10/02 8:40	2.8	13.52	178.2	20.7	34.5
1/10/02 8:41	2.9	13.52	178.2	20.6	34.4
1/10/02 8:42	2.8	13.52	178.3	20.6	34.4
1/10/02 8:43	2.9	13.52	178.2	20.6	34.5
1/10/02 8:44	2.8	13.51	178.2	20.6	34.4
1/10/02 8:45	2.9	13.51	178.3	20.6	34.4
1/10/02 8:46	2.9	13.51	178.2	20.5	34.4
1/10/02 8:47	2.9	13.5	178.2	20.5	34.4
1/10/02 8:48	2.9	13.5	178.3	20.6	34.4
1/10/02 8:49	3	13.5	178.3	20.5	34.4
1/10/02 8:50	3	13.5	178.2	20.5	34.4
1/10/02 8:51	3.1	13.5	178.2	20.5	34.4
1/10/02 8:52	3.1	13.5	178.2	20.5	34.4
1/10/02 8:53	3.1	13.5	178.2	20.5	34.4
1/10/02 8:54	3.2	13.5	178.2	20.6	34.3
1/10/02 8:55	3.1	13.49	178.2	20.5	34.3
1/10/02 8:56	3.2	13.48	178.2	20.5	34.4
1/10/02 8:57	3.3	13.48	177.6	20.5	34.3
1/10/02 8:58	3.2	13.48	176.5	20.5	34.3
1/10/02 8:59	3.1	13.48	177.1	20.5	34.3
1/10/02 9:00	3.2	13.48	176.8	20.4	34.3
1/10/02 9:01	3.1	13.48	176.2	20.5	34.2
1/10/02 9:02	3.2	13.48	177.1	20.5	34.3
1/10/02 9:03	3.2	13.48	176.2	20.4	34.2
1/10/02 9:04	3.1	13.47	176.3	20.5	34.2
1/10/02 9:05	3.2	13.47	176.1	20.4	34.2
1/10/02 9:06	3.2	13.48	176.1	20.4	34.2
1/10/02 9:07	3.2	13.46	176.1	20.5	34.2
1/10/02 9:08	3.2	13.46	176.1	20.5	34.3
1/10/02 9:09	3.3	13.46	176.2	20.4	34.2
1/10/02 9:10	3.3	13.46	176.2	20.4	34.2
1/10/02 9:11	3.3	13.46	176.1	20.4	34.2
1/10/02 9:12	3.3	13.46	176.1	20.4	34.2
1/10/02 9:13	3.3	13.46	176.2	20.4	34.2

1/10/02 9:14	3.3	13.46	176.1	20.3	34.2
1/10/02 9:15	3.3	13.46	176.1	20.4	34.2
1/10/02 9:16	3.3	13.46	176.1	20.4	34.1
1/10/02 9:17	3.3	13.46	176.1	20.5	34.2
1/10/02 9:18	3.3	13.46	176.1	20.4	34.2
1/10/02 9:19	3.3	13.46	176.1	20.4	34.2
1/10/02 9:20	3.3	13.45	176.1	20.4	34.2
1/10/02 9:21	3.3	13.45	176.1	20.3	34.2
1/10/02 9:22	3.3	13.45	175.8	20.4	34.2
1/10/02 9:23	3.3	13.44	174.6	20.4	34.2
1/10/02 9:24	3.3	13.44	175.2	20.3	34.1
1/10/02 9:25	3.3	13.44	175.2	20.3	34.1
1/10/02 9:26	3.3	13.44	175.2	20.3	34.1
1/10/02 9:27	3.3	13.44	175.2	20.3	34.1
1/10/02 9:28	3.3	13.44	175.2	20.3	34.1
1/10/02 9:29	3.3	13.44	175.2	20.3	34.1
1/10/02 9:30	3.3	13.44	175.2	20.3	34.1
1/10/02 9:31	3.3	13.44	175.2	20.3	34.1
1/10/02 9:32	3.4	13.44	174	20.3	34.2
1/10/02 9:33	3.4	13.43	174	20.3	34.2
1/10/02 9:34	3.4	13.43	174	20.3	34.3
Final Average*	3.2	13.47	176.7	20.5	34.3
Maximum*	3.4	13.52	178.4	20.7	34.5
Minimum*	2.8	13.43	174	20.3	34.1

*Does not include Invalid Averaging Periods (N/A")"

APPENDIX H

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

Air Consulting and Engineering, Inc.

Stephen L. Neck, P.E.
Field Testing

Charles Reshard
Field Testing

Gregory Prows
Field Testing
Visible Emission Observer

John Simon
Field Testing

Dagmar Fick
Report Preparation

Gloria Gagich
Document Production

KUA

Larry Mattern
Plant Manager
Test Coordinator

FDEP

Garry Kuberski
Observer