STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

$7,500 pd. 6-15-92 Rcpt. # 180772

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Bureau of Air Regulation

AC 53-214903
PSD-FL-190

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APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Cogeneration Power Plant [x] New[1] [ ] Existing[1]

APPLICATION TYPE: [x] Construction [ ] Operation [ ] Modification

COMPANY NAME: Central Florida Power Limited Partnership COUNTY: Polk

Identify the specific emission point source(s) addressed in this application (i.e., Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) GT/HRSG Stack

SOURCE LOCATION: Street County Road 630 City 5 miles west of Ft. Meade

UTM: East 416.22 km Zone 17 North 3069.22 km

Latitude 27 ° 44 ' 46.7 "N Longitude 81 ° 51 ' 0.3 "W

APPLICANT NAME AND TITLE: Robert I. Taylor, Project Manager

APPLICANT ADDRESS: Suite 150, 2500 City West Blvd., Houston, Texas 77042

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Central Florida Power Limited Partnership

I certify that the statements made in this application for an air construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: R I Taylor

Robert I. Taylor, Project Manager
Name and Title (Please Type)

Date: 6/12/92 Telephone No. (713) 735-4330

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)
This is to certify that the engineering features of this pollution control project have been ~~designed~~/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgement, that

[1]See Florida Administration Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed Kennard F. Kosky

Kennard F. Kosky
Name (Please Type)

KBN Engineering and Applied Sciences, Inc.
Company Name (Please Type)

1034 N.W. 57th Street, Gainesville, FL 32605
Mailing Address (Please Type)

Florida Registration No. *14996* Date: *6/12/92* Telephone No. *(904) 331-9000*

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Construction and operation of cogeneration facility. The power plant consists of one combustion turbine and an associated duct-burner-fired heat recovery steam generator (HRSG). See Sections 1.0 and 2.0 in PSD Application.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction *6/1/93* Completion of Construction *1/1/95*

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

The cost of control is integral to the overall design of the project. Dry low-NO_x combustion technology and water injection will be used to reduce air pollutant emissions.

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

No previous DER permits.

3.0 AIR QUALITY REVIEW REQUIREMENTS AND APPLICABILITY

The following discussion pertains to the federal and state air regulatory requirements and their applicability to the proposed project. These regulations must be satisfied before the proposed facility (combined cycle gas turbine) can begin operation. The specific applicability of the proposed facility's maximum potential emissions and predicted impacts to air regulatory requirements for PSD, nonattainment, and hazardous pollutant reviews is presented in Section 3.1. General discussions concerning the AAQS, PSD review requirements, and nonattainment rules are presented in Sections 3.2 through 3.4.

3.1 SOURCE APPLICABILITY

3.1.1 AREA CLASSIFICATION

The project site is located in Polk County, which has been designated by EPA and FDER as an attainment area for all criteria pollutants. Polk County and surrounding counties are designated as PSD Class II areas for SO_2, PM(TSP), and NO_x. The site is located approximately 120 km from the closest part of the Chassahowitzka National Wilderness Area, a PSD Class I area.

3.1.2 PSD REVIEW

3.1.2.1 Pollutant Applicability

As presented in Table 3-1, the proposed project is considered to be a major new source because emissions of any regulated pollutant will exceed 250 TPY; therefore, PSD review is required for any pollutant for which the net increase in emissions exceeds the PSD significant emission rates. As shown, potential emissions from the proposed project will exceed the PSD significant emission rates for PM(TSP), PM(PM10), NO_2, CO, VOC, Be, and inorganic As. Therefore, the project is subject to PSD review for these pollutants.

3.1.2.2 Ambient Monitoring

Based on the net increase in emissions from the proposed project, presented in Table 3-1, a PSD preconstruction ambient monitoring analysis is required for PM(TSP), PM(PM10), NO_2, CO, VOC (O_3), Be, and As. However, if the

Table 3-1. Net Increase in Emissions Due To the Central Florida Cogeneration Facility Compared to the PSD Significant Emission Rates

Pollutant	Emissions (TPY) Potential Emissions From Proposed Facility[a]	Significant Emission Rate	PSD Review
Sulfur Dioxide[b]	33.1	40	No
Particulate Matter (TSP)	45.0 (GE)	25	Yes
Particulate Matter (PM10)	45.0 (GE)	15	Yes
Nitrogen Dioxide	702.1 (GE)	40	Yes
Carbon Monoxide	243.1 (GE)	100	Yes
Volatile Organic Compounds	45.3 (W)	40	Yes
Lead	0.00219 (GE)	0.6	No
Sulfuric Acid Mist	4.2 (GE)	7	No
Total Fluorides	0.00802 (GE)	3	No
Total Reduced Sulfur	NEG	10	No
Reduced Sulfur Compounds	NEG	10	No
Hydrogen Sulfide	NEG	10	No
Asbestos	NEG	0.007	No
Beryllium	0.000616 (GE)	0.0004	Yes
Mercury	0.000739 (GE)	0.1	No
Vinyl Chloride	NEG	1	No
Benzene	NEG	0	No
Radionuclides	NEG	0	No
Inorganic Arsenic	0.00104 (GE)	0	Yes

Note: GE = General Electric.
NEG = Negligible.
W = Westinghouse.

All calculations based on 72°F base load condition.

[a] Maximum annual emissions based on the gas turbine firing distillate oil and natural gas for 300 and 8,460 hours, respectively, and duct burner firing natural gas for 8,760 hours. Tables A-15 through A-18 present emissions for the GE machine while Tables A-33 through A-36 present emissions for the Westinghouse machine.

[b] Based on a maximum sulfur content specification of 0.05 percent in fuel oil.

1.0 INTRODUCTION

Central Florida Power Limited Partnership is proposing to construct and operate a nominal 206-megawatt (MW) cogeneration facility at the U.S. Agri-Chemicals Complex near Fort Meade, Florida. The facility is referred to as the Central Florida Cogeneration Plant. The Central Florida Cogeneration Plant is a combined cycle cogeneration power plant located on County Road 630 approximately 5 miles west of Fort Meade (see Figure 1-1). Destec Engineering, Inc. is under contract to the limited partnership to perform engineering services for the project, including air permitting. KBN Engineering and Applied Sciences, Inc. (KBN) has been contracted by Destec Engineering to provide air permitting services and perform air quality impact assessments for the project.

The plant will consist of one advanced technology heavy-duty industrial gas turbine (GT) electric generating unit, with a duct burner-fired heat recovery steam generator (HRSG) and one steam turbine generator. The GT will have a nominal electrical output of about 147 MW to the transmission system at average ambient conditions. The primary fuel for the GT is natural gas; distillate fuel oil will be used as the backup fuel. The GT uses advanced dry low NO_x combustors to limit nitrogen oxide (NO_x) emissions. Exhaust gas from the GT will be routed to a duct burner-fired HRSG. The natural gas-fired duct burner is expected to have a maximum heat input of about 100 million British thermal units per hour (MMBtu/hr). The steam from the HRSG will power a steam turbine to generate electrical power of no greater than 74 MW. Low-pressure steam will be exported to the U.S. Agri-Chemicals complex for process uses.

Because the proposed plant will be located in an attainment area for all criteria pollutants, the plant's emissions are subject to new source review requirements under the Prevention of Significant Deterioration (PSD) regulations. The PSD review includes control technology review, source impact analysis, air quality analysis (monitoring), and additional impact analyses.

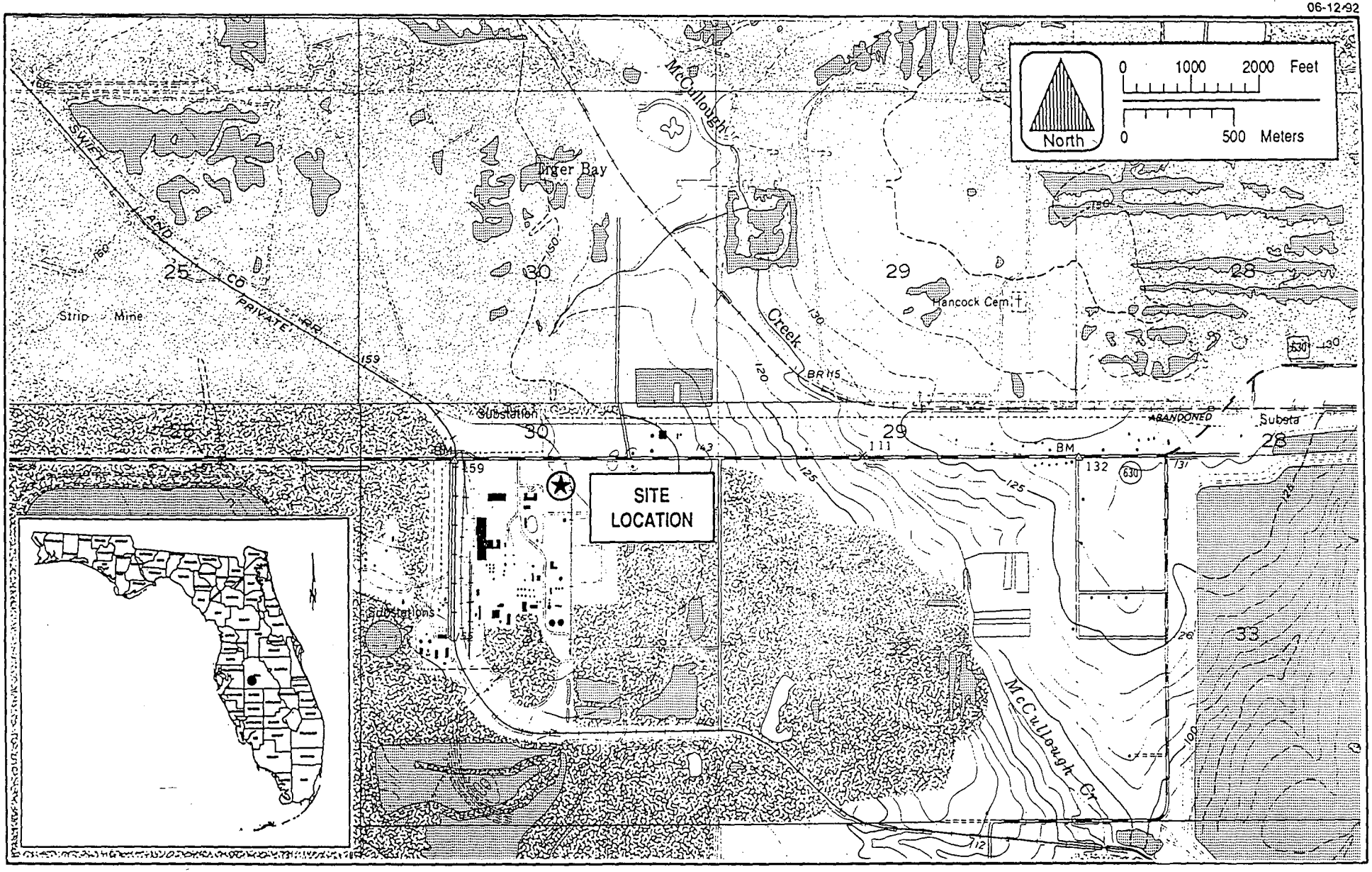


Figure 1-1 CENTRAL FLORIDA LIMITED PROJECT LOCATION MAP

SOURCE: USGS, 1986,1987; KBN, 1992.

KBN

The proposed plant will be a major new source because emissions of at least one regulated pollutant exceeds 250 tons per year (TPY). PSD review is required for these emissions and for any pollutant for which the net increase in emissions exceeds the PSD significant emission rates. The potential emissions from the proposed project will exceed the PSD significant emission rates for nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter (PM), particulate matter with an aerodynamic diameter of 10 micrometers (PM10), volatile organic compounds (VOC), beryllium (Be), and arsenic (As). Therefore, the project is subject to PSD review for these pollutants.

This report is presented in seven sections.

- Section 2.0 -- A general description of the proposed operation.
- Section 3.0 -- The air quality review requirements and applicability of the project to the PSD and nonattainment regulations.
- Section 4.0 -- The control technology review for the project applicable under the U.S. Environmental Protection Agency's (EPA's) current (draft) top-down approach.
- Section 5.0 -- A discussion of the need for air quality monitoring data to satisfy the PSD preconstruction monitoring requirements.
- Section 6.0 -- The air source impact analysis approach.
- Section 7.0 -- The results of the air quality analyses and additional impact analyses associated with the project's impacts on vegetation, soils, and associated growth.

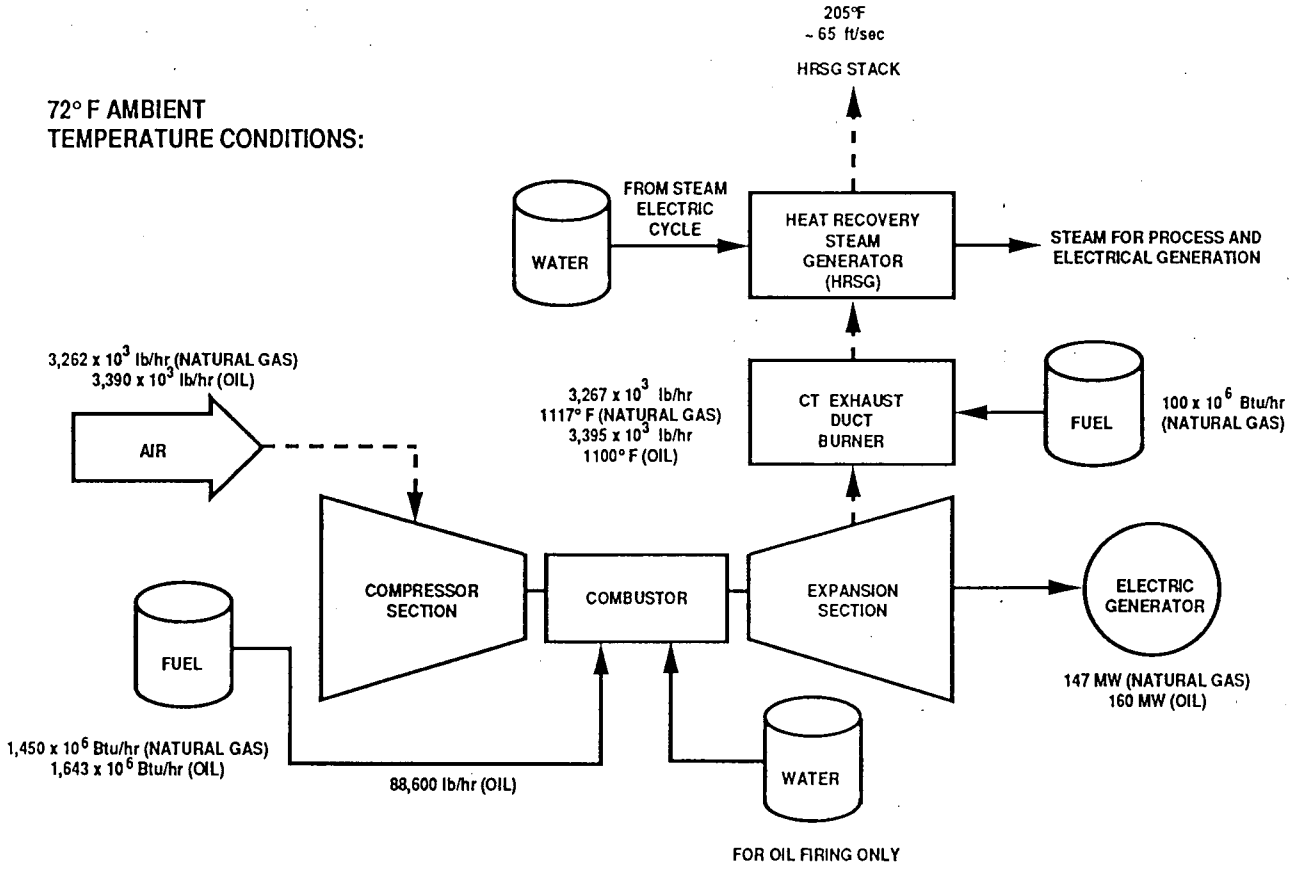
2.0 PROJECT DESCRIPTION

The Central Florida Cogeneration Plant will consist of one GT electrical generating unit, equipped with a duct burner-fired HRSG. The GT will be an advanced technology heavy-duty industrial gas turbine that will use advanced dry low-NO_x combustors to control NO_x emissions. The GT combustion gases will exhaust through the HRSG and into a single stack. There will be no bypass for simple cycle operation. A flow diagram is presented in Figure 2-1. Stack, operating, and emission data for the proposed combustion turbine are presented in Table 2-1. Emission data for the duct burner are presented in Table 2-2. Detailed information on the combustion calculations for the fuels to be fired in the GT and duct burner is presented in Appendix A. A plot plan of the facility is presented in Figure 2-2.

The GT/HRSG unit will be fired primarily with natural gas; distillate fuel oil will be used as the backup fuel for the GT. The annual distillate oil usage is anticipated to be no greater than 300 hours per year. The distillate oil will have an annual average sulfur content of 0.05 percent. The duct burner will be fired with natural gas only and is assumed to operate for 8,760 hours in a year.

The GT will have a nominal electrical output of about 147 MW and a maximum heat input of about 1,607 MMBtu/hr at average ambient conditions. The natural gas-fired duct burner will have a maximum heat input of 100 MMBtu/hr. The steam from the HRSG will power a steam turbine electrical generator with maximum output of about 74 MW. Low-pressure steam (approximately 40,000 lb/hr) will be exported to the U.S. Agri-Chemicals complex for process uses. Electrical power will be sold to the electric utility grid.

At this time, two types of advanced GTs are being considered for this project: General Electric (GE) PG7221 (FA) and Westinghouse 501F. Operating and emission data are available for these turbines for operating



NOTE: SEE APPENDIX A FOR DESIGN INFORMATION AND STACK PARAMETERS FOR EACH FUEL.

Figure 2-1 SIMPLIFIED FLOW DIAGRAM OF PROPOSED CENTRAL FLORIDA COGENERATION POWER PLANT

Table 2-1. Stack, Operating, and Emission Data for the Proposed Combustion Turbine

Parameter	Fuel Type[a] Natural Gas		Fuel Oil	
Stack Data (ft)				
Height	180		180	
Diameter	18		18	
Operating Data (72°F)[b]				
Temperature (°F)	205		205	
Velocity (ft/sec)	61.1		63.8	
Maximum Hourly Emission Data (lb/hr)/Fuel Type (27°F)[c]				
SO_2	4.86	(GE)	99.7	(GE)
PM	9.0	(GE)	40.4	(W)
NO_x	169.0	(W)	326.2	(GE)
CO	48.8	(GE)	163.5	(W)
VOC	8.0	(W)	18.9	(W)
Pb	Neg.		0.0165	(GE)
Sulfuric Acid Mist	0.63	(GE)	1.22	(GE)
F	Neg.		0.0602	(GE)
Be	Neg.		0.00462	(GE)
Hg	Neg.		0.00555	(GE)
As	Neg.		0.00777	(GE)
Annual Potential Emission Data (TPY)/Fuel Type (72°F)[c]				
SO_2	18.5	(GE)	13.3	(GE)
PM	38.1	(GE)	5.9	(W)
NO_x	614.8	(GE)	43.5	(GE)
CO	186.0	(GE)	23.6	(W)
VOC	29.8	(W)	2.7	(W)
Pb	Neg.		0.00219	(GE)
Sulfuric Acid Mist	2.38	(GE)	1.63	(GE)
F	Neg.		0.0080	(GE)
Be	Neg.		0.000616	(GE)
Hg	Neg.		0.000739	(GE)
As	Neg.		0.00104	(GE)

Note: GE = General Electric.
Neg. = negligible emissions for applicable pollutant.
W = Westinghouse.

[a] Refer to Appendix A for detailed information on each fuel. Annual emission data are based on the turbine firing fuel oil and natural gas for 300 and 8,460 hours, respectively. Tables A-1 through A-10 provide information on the GE machine while Tables A-19 through A-28 provide information on the Westinghouse machine.

[b] Does not account for additional exhaust flow from duct burner.

[c] Other regulated pollutants are assumed to have negligible emissions. These pollutants include reduced sulfur compounds, hydrogen sulfide, asbestos, vinyl chloride, and radionuclides.

Table 2-2. Emission Data for the Proposed Duct Natural Gas-Fired Burner

	Emissions[a] (Natural Gas Firing Only)
Maximum Hourly Emissions (lb/hr)[c]:	
SO_2	0.30
PM	1.00
NO_x	10.0
CO	10.0
VOC	2.90
Pb	Neg.
Sulfuric Acid Mist	0.0388
F	Neg.
Be	Neg.
Hg	Neg.
As	Neg.
Maximum Annual Emissions (TPY)[c]:	
SO_2	1.32
PM	4.38
NO_x	43.8
CO	43.8
VOC	12.7
Pb	Neg.
Sulfuric Acid Mist	0.170
F	Neg.
Be	Neg.
Hg	Neg.
As	Neg.

Note: Neg. = negligible emissions for applicable pollutant.

[a] Based on the duct burner operating for 8,760 hours at 100 MM Btu per hour and the following emission factors:
PM = 0.01 lb/MM Btu; SO_2 = 1 grain/100 cf of natural gas;
NO_x = 0.10 lb/MM Btu; CO = 0.10 lb/MM Btu; VOC = 0.029 lb/MM Btu, and
H_2SO_4 = 8% of SO_2

Tables A-11A through A-14A present duct burner emissions.

[c] Other regulated pollutants are assumed to have negligible or no emissions.

loads of 100 and 70 percent and ambient temperatures ranging from 27 to 97 degrees Fahrenheit (°F).

Maximum hourly emissions occur for the lowest ambient temperature of 27°F when the GT is firing fuel oil. The hourly emission data for a given pollutant in Table 2-1 are based on the higher emission rate from either the GE or Westinghouse GT. The annual emissions are based on an ambient temperature of 72°F with GT firing fuel oil and natural gas for 300 and 8,460 hours, respectively. Similar to the maximum hourly emissions, the annual emissions are based on the higher emission rate from either type of GT.