THIS IS A NOTIFICATION - NOT A REQUEST FOR MODIFICATION - NO IMPACT ON EMISSIONS

KBN

February 19, 1993

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MAR 05 1993
Division of Air Resources Management

Mr. Clair H. Fancy, P.E.
Bureau of Air Regulation
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Mulberry Cogeneration Project
DER File No. AC53-211670
PSD-FL-187
Specific Condition Request

Dear Clair:

This correspondence is submitted on behalf of Polk Power Partners, L.P. to notify the Department Florida Department of Environmental Regulation (FDER) of a design change for the facility (stack addition).

The design for the facility permitted by FDER includes stacks for the primary heat recovery steam generator (HRSG) and carbon dioxide (CO_2) plant. The emissions from the CO_2 plant include a portion of the emissions from the combustion turbine, the emissions generated by the secondary HRSG, and emissions associated with the CO_2 absorption process. A stack for the secondary HRSG was not originally included in the design. Based on the final design requirements for the facility, a separate stack for the secondary HRSG is necessary. Emissions will occur at the secondary HRSG stack when:

1. The power plant, including the combustion turbine and duct burner are operating and the CO_2 plant may be either down or experiencing additional problems; or

2. The duct burner is operating alone.

For air quality impact assessments, the highest emissions will occur when the power plant is in operation (CO_2 plant not operating). The secondary HRSG stack would be operated only as necessary during such conditions that would not exceed 180 days per year. The emissions from the facility would not change. A footnote to the specific conditions of the permit (see Attachment 1) would be sufficient to allow emissions from a secondary HRSG stack.

Since the addition of a stack will affect the manner by which emissions from the facility are discharged to the atmosphere, the air quality impacts may change even though no increase in emissions will occur. To address this issue, air quality modeling analyses have been performed and are attached (see Attachment 2). The analyses demonstrate that the facility's impacts are not significantly different from those presented in the air construction permit application. Based on these results, the facility's impacts are expected to comply with the applicable ambient air quality standards (AAQS), prevention of significant deterioration (PSD) increments, and Florida's no threat levels (NTLs) for toxic air pollutants.

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

On behalf of Polk Power Partners, L.P., and KBN, we greatly appreciated the efforts in completing the permits. Your continued cooperation is appreciated.

Sincerely,

Kennard F. Kosky, P.E.
President
Registration No. 14996

KFK/ehj

cc: W. Malenius, Ark Energy
W. Marshall, Central and South West Services
R. Anderson, KBN
G. Sams, HBG&S
J. Reynolds/C. Holladay
B. Thomas, SW Dist.
J. Harper, EPA
J. Dunyak, NPS
V. Martin, Polk Co.

91193A2/1

ATTACHMENT 1

SPECIFIC CONDITIONS:

2. Emissions from these facilities shall not exceed the limits listed below (based on operation at 59°F):

Pollutant	Source	Fuel	Through 12/31/97 lbs/hr	Through 12/31/97 tons/yr	After 12/31/97 [9] (See notes) lbs/hr	After 12/31/97 [9] (See notes) tons/yr
NO_x	HRSG Stack	Gas	87.8	384.5	52.7	230.7
	CO_2 Plant Stack[a]	Gas	19.9	87.1	18.3	80.0
	HRSG Stack	Oil	164.0	718.2	164.0	59.0
	CO_2 Plant Stack[a]	Oil	23.4	102.4	23.4	8.4
SO_2	HRSG Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	CO_2 Plant Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack	Gas	10% Opacity		10% Opacity	
	CO_2 Plant Stack	Gas	10% Opacity		10% Opacity	
	HRSG Stack	Oil	20% Opacity		20% Opacity	
	CO_2 Plant Stack	Oil	20% Opacity		20% Opacity	
VOC	CO_2 Plant Stack	--	18.2	79.6	17.7	77.6
CO	HRSG Stack	Gas	42.9	187.8	42.9	187.8
	CO_2 Plant Stack[a]	Gas	11.9	52.0	11.9	52.0
	HRSG Stack	Oil	75.3	329.9	75.3	27.1
	CO_2 Plant Stack[a]	Oil	13.4	58.5	13.4	4.8

Notes: (1) Oil may be used as backup fuel for up to 30 days per year.
(2) NO_x limits after 12/31/97 based on 15 ppmvd.
(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.

[a] Or secondary HRSG Stack.

ATTACHMENT 2
AIR QUALITY IMPACT ANALYSES FOR THE PROPOSED COMBUSTION TURBINE AND DUCT BURNER WITH SEPARATE STACKS FOR THE MULBERRY COGENERATION FACILITY

1.0 INTRODUCTION

KBN Engineering and Applied Sciences, Inc. (KBN) has performed air quality impact analyses to determine the maximum concentrations for the operation of the combustion turbine (CT) and duct burner with separate stacks for the integrated cogeneration facility proposed by Polk Power Partners, L.P., dba Polk Power Partners, L.P., Ltd. The modeling analyses assumed that the exhaust gases from the duct burner are vented through a stack separate from the CT and CO_2 stacks and that the CO_2 plant is not in operation (i.e., no emissions occur at the CO_2 plant). Air quality impacts have been performed already for the facility, which is referred to as the Mulberry Cogeneration Facility, as part of the air construction permit application for the CT and CO_2 plant. The results presented in the present analysis supplement the previous analyses and compare the maximum concentrations predicted for the operation of the CT and duct burner alone with those predicted for the CT and CO_2 plant. These results are also compared to the significance levels and *de minimis* monitoring levels under the prevention of significant deterioration (PSD) regulations to determine if additional analyses would be required due to emissions from the duct burner stack (i.e., analyses that were not performed for the permit application). For toxic air pollutants, the maximum predicted concentrations are compared to the no threat levels (NTL) established by the Florida Department of Environmental Regulation (FDER).

The following sections present the approaches, methods, and results of the air quality impact analyses.

2.0 EMISSION DATA AND AIR QUALITY IMPACTS METHODS

An air quality modeling analysis was performed to determine the maximum pollutant concentrations, including the regulated pollutants of sulfur dioxide (SO_2), particulate matter (PM), nitrogen dioxide (NO_2), carbon monoxide (CO), beryllium (Be), and toxic air pollutants, from the operation of the CT and duct burner. This analysis included modeling with the Industrial Source Complex Short-Term (ISCST) model using the emissions from the proposed combustion turbine using distillate fuel oil for the maximum emission case (i.e., 20°F) and minimum exit gas flow rate (i.e., 100°F). Emission data for fuel oil were used because the emissions for natural gas, the other fuel proposed for this project, were lower and would result in lower ambient impacts. The

with other sources or submittal of preconstruction monitoring data are not warranted for these pollutants.

For SO_2, although the maximum impacts with the CT and duct burner operating alone are predicted to be greater than the significance and *de minimis* levels, these results are similar to those produced with the CO_2 plant in operation. The permit application for the CT and CO_2 plant did include air quality modeling analyses with other sources and preconstruction monitoring data. Since the addition of the proposed stack for the duct burner does not produce a significant increase in impacts from the previous model results, no additional modeling is warranted. The proposed facility's impacts are still expected to comply with ambient air quality standards (AAQS) and maximum allowable PSD increments.

For NO_2, the maximum impacts with the CT and duct burner operating alone are predicted to be greater than the significance level for the annual averaging period. These results are conservative (i.e., higher than expected) since they assume that the duct burner is in operation for the entire year while the CO_2 plant is shutdown. By operating the duct burner for no more than 180 days per year when the CO_2 plant is shutdown, the annual average NO_2 impacts are expected to be less than the significance level of 1 $\mu g/m^3$.

Maximum impacts of toxic air pollutants predicted for the proposed facility with the CT and duct burner in operation are presented in Table 4. These results show that the maximum impacts are below the Florida NTL.

4.0 CONCLUSIONS

The proposed facility's impacts are expected to comply with AAQS, maximum allowable PSD increments, and Florida's NTL with the CO_2 plant operating or shutdown. For all pollutants except SO_2 and NO_2, the maximum concentrations are predicted to be less than significance levels and *de minimis* monitoring levels and, therefore, additional modeling analyses with other sources or submittal of preconstruction monitoring data are not warranted.

For SO_2, the maximum impacts with the CT and duct burner operating alone are similar to those produced with the CO_2 plant in operation (i.e., also greater than the significance and *de minimis* levels). Since the addition of the proposed stack for the duct burner does not produce a

other fuel proposed for this project, were lower and would result in lower ambient impacts. The duct burner was assumed to have a maximum heat input rate of 99 pounds per million British thermal units (10^6 Btu/hr) and use natural gas only. The design information and stack parameters of the duct burner are presented in Table 1-A (the design information, stack parameters, and emissions for the CT are presented in the permit application). The maximum emission rates from the duct burner for the applicable pollutants are presented in Tables 1-B through 1-E. Summaries of the total project's emissions for the CT using fuel oil and duct burner, including each unit's contribution, for ambient temperatures of 20, 59, and 100°F are presented in Tables 2-A through 2-D.

The impacts were predicted using the ISCST2 (Version 92273) model at 360 receptors surrounding the proposed facility. The receptors were located in a radial grid, which was the same as that used in the permit application. The grid consisted of 36 receptors along the plant property and 324 receptors along 36 radials with each radial spaced at 10-degree increments. Along each radial, receptors were located at distances of 300; 500; 700; 1,000; 1,500; 2,000; 3,000; 4,000; and 5,000 meters (m) from the CT stack. The impacts were predicted using a 5-year meteorological record (1982 through 1986) of surface and mixing height data from the National Weather Service (NWS) stations in Tampa and Ruskin, respectively.

The proposed duct burner's stack will be 125 feet (ft) tall and located near the CT stack. Similar to the proposed CT's stack of 125 ft, the proposed duct burner's stack will be less than good engineering practice (GEP) height. As a result, building downwash effects were included in the modeling using the same building data assigned to the CT's stack.

3.0 MODEL RESULTS

Maximum impacts predicted for the proposed facility with the CT and duct burner in operation using 5 years of meteorological data are presented in Table 3. These results indicate that, except for PM, there is a slight increase in predicted impacts with the emissions from the stacks of the CT and duct burner compared to the impacts from stack emissions of the CT and CO_2 plant. For PM, the maximum impacts are lower for the facility with the CT and duct burner operating only (i.e., CO_2 plant not operating) than when the CO_2 plant is operating.

For all pollutants except SO_2 and NO_2, the maximum concentrations are predicted to be less than significance levels and *de minimis* monitoring levels. Therefore, additional modeling analyses

significant increase in impacts from the previous model results, no additional modeling is warranted.

For NO_2, although the maximum impacts with the CT and duct burner operating alone are predicted to be greater than the significance level for the annual averaging period, these results assume that the duct burner is in operation for the entire year while the CO_2 plant is shutdown. By operating the duct burner for no more than 30 days per year when the CO_2 plant is shutdown, the annual average NO_2 impacts are expected to be less than the significance level of 1 $\mu g/m^3$.

Table 1-A. Design Information and Stack Parameters for Mulberry Cogeneration Project--Duct Burner, Natural Gas

Data	Duct Burner Data at Ambient Temperature				
	20°F	40°F	59°F	80°F	100°F
General:					
Power (kW)	NA	NA	NA	NA	NA
Heat Rate (Btu/kwh)	NA	NA	NA	NA	NA
Heat Input (MMBtu/hr)	99.0	99.0	99.0	99.0	99.0
Fuel Natural Gas (lb/hr)	5,128.7	5,128.7	5,128.7	5,128.7	5,128.7
(cf/hr)	104,211	104,211	104,211	104,211	104,211
Fuel:					
Heat Content,LHV (Btu/lb)	19,303	19,303	19,303	19,303	19,303
(Btu/cf)	950.0	950.0	950.0	950.0	950.0
From CT and Duct Burner Exhaust:					
Volume Flow (acfm)	41,273	41,273	41,273	41,273	41,273
Volume Flow (scfm)	28,674	28,674	28,674	28,674	28,674
Mass Flow (lb/hr)^a	125,000	125,000	125,000	125,000	125,000
Temperature (°F)	300	300	300	300	300
Moisture (% Vol.)					
Oxygen (% Vol.)					
Molecular Weight	28.00	28.00	28.00	28.00	28.00
By-pass Stack:					
Volume Flow (acfm)	41,273	41,273	41,273	41,273	41,273
Temperature (°F)	300	300	300	300	300
Diameter (ft)	6.50	6.50	6.50	6.50	6.50
Velocity (ft/sec)	20.7	20.7	20.7	20.7	20.7
Stack Height (ft)	125	125	125	125	125

^a Based on 120,000 lb/hr from CT; 5,000 lb/hr from duct burner.

Table 1-B. Maximum Criteria Pollutant Emissions for Mulberry Cogeneration Project--Duct Burner, Natural Gas

Pollutant	Duct Burner Data at Ambient Temperature				
	20°F	40°F	59°F	80°F	100°F
Particulate:					
Basis, lb/MMBtu	0.01	0.01	0.01	0.01	0.01
lb/hr	0.99	0.99	0.99	0.99	0.99
TPY	4.3	4.3	4.3	4.3	4.3
Sulfur Dioxide:					
Basis, gr S/100 cf	1.0	1.0	1.0	1.0	1.0
lb/hr	0.30	0.30	0.30	0.30	0.30
TPY	1.3	1.3	1.3	1.3	1.3
Nitrogen Oxides:					
Basis, lb/MMBtu	0.13	0.13	0.13	0.13	0.13
lb/hr	12.87	12.87	12.87	12.87	12.87
TPY	56.4	56.4	56.4	56.4	56.4
Carbon Monoxide:					
Basis, lb/MMBtu	0.1	0.1	0.1	0.1	0.1
lb/hr	9.9	9.9	9.9	9.9	9.9
TPY	43.4	43.4	43.4	43.4	43.4
VOCs:					
Basis, lb/MMBtu	0.03	0.03	0.03	0.03	0.03
lb/hr	2.97	2.97	2.97	2.97	2.97
TPY	13.0	13.0	13.0	13.0	13.0
Lead:					
Basis, lb/10E+12 Btu	Neg.	Neg.	Neg.	Neg.	Neg.
lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPY	0.000	0.000	0.000	0.000	0.000

Table 1-C. Maximum Other Regulated Pollutant Emissions for Mulberry Cogeneration Project--Duct Burner, Natural Gas

Pollutant	Units	Duct Burner Data at Ambient Temperature				
		20°F	40°F	59°F	80°F	100°F
Arsenic	lb/10E+12 Btu (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	lb/10E+12 Btu (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	lb/10E+12 Btu (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoride	lb/10E+12 Btu (2)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfuric Acid	% of SO_2	5	5	5	5	5
Mist	lb/hr	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02
	TPY	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01

Sources: (1) EPA, 1990; (2) EPA, 1980.

Table 1-D. Maximum Nonregulated Pollutant Emissions for Mulberry Cogeneration Project--Duct Burner, Natural Gas

Pollutant	Units	Duct Burner Data at Ambient Temperature				
		20°F	40°F	59°F	80°F	100°F
Manganese	lb/10E+12 Btu (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	lb/10E+12 Btu (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	lb/10E+12 Btu (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium	lb/10E+12 Btu (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	lb/10E+12 Btu (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	pg/J (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	pg/J (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Polycyclic	pg/J (1)	0.48	0.48	0.48	0.48	0.48
Organic	lb/hr	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04
Matter	TPY	4.84E-04	4.84E-04	4.84E-04	4.84E-04	4.84E-04
Formaldehyde	lb/10E+12 Btu (1)	38	38	38	38	38
	lb/hr	3.76E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03
	TPY	1.65E-02	1.65E-02	1.65E-02	1.65E-02	1.65E-02
Carbon Dioxide	% Exhaust Gas	8.04	0.00	0.00	0.00	0.00
	lb/hr	1.42E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	6.23E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Note: Multiply by 2.324 to convert picogram/Joule (pg/J) to lb/10E+12 Btu.

Source: (1) EPA, 1990.

Table 1-E. Maximum Emissions for Additional Nonregulated Pollutant--Duct Burner, Natural Gas

Pollutant		Duct Burner Data at Ambient Temperature				
		20°F	40°F	59°F	80°F	100°F
Antimony	pg/J (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Barium	pg/J (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Colbalt	pg/J (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	pg/J (1)	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorine	ppm	Neg.	Neg.	Neg.	Neg.	Neg.
	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	TPY	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Note: Multiply by 2.324 to convert picogram/Joule (pg/J) to lb/10E+12 Btu.

Table 2-A. Emissions for CT and Duct Burner Stack Exhausts--Criteria Pollutants

Pollutant	Fuel Oil at 20°F			Ratio CT/DB Emission	Fuel Oil at 59°F			Ratio CT/DB Emission	Fuel Oil at 100°F			Ratio CT/DB Emission
	CT	Duct Burner	Total		CT	Duct Burner	Total		CT	Duct Burner	Total	
Particulate:												
lb/hr	14.31	1.68	15.99	8.51	14.24	1.75	15.99	8.16	14.16	1.83	15.99	7.72
TPY	62.67	7.36	70.04	8.51	62.39	7.64	70.04	8.16	62.01	8.03	70.04	7.72
Sulfur Dioxide:												
lb/hr	100.78	5.16	105.95	19.51	90.30	5.08	95.38	17.76	78.17	4.96	83.13	15.77
TPY	441.42	22.62	464.04	19.51	395.51	22.27	417.77	17.76	342.40	21.71	364.10	15.77
Nitrogen Oxides:												
lb/hr	173.81	21.26	195.07	8.17	155.72	21.12	176.84	7.37	134.79	20.90	155.69	6.45
TPY	761.27	93.13	854.40	8.17	682.05	92.52	774.57	7.37	590.40	91.55	681.94	6.45
Carbon Monoxide:												
lb/hr	78.77	13.70	92.47	5.75	71.53	13.69	85.22	5.22	62.81	13.64	76.45	4.60
TPY	345.01	60.02	405.04	5.75	313.31	59.97	373.28	5.22	275.12	59.75	334.87	4.60
VOCs:												
lb/hr	9.65	3.44	13.08	2.81	8.76	3.43	12.19	2.55	7.69	3.43	11.12	2.24
TPY	42.25	15.05	57.30	2.81	38.36	15.04	53.41	2.55	33.69	15.02	48.70	2.24
Lead:												
lb/hr	8.76E-03	4.23E-04	9.18E-03	20.71	7.85E-03	4.16E-04	8.26E-03	18.87	6.79E-03	4.05E-04	7.20E-03	16.78
TPY	3.84E-02	1.85E-03	4.02E-02	20.71	3.44E-02	1.82E-03	3.62E-02	18.87	2.98E-02	1.77E-03	3.15E-02	16.78

Table 2-B. Emissions for CT and Duct Burner Stack Exhausts--Other Regulated Pollutants

Pollutant	Units	Fuel Oil at 20°F			Ratio CT/DB Emission	Fuel Oil at 59°F			Ratio CT/DB Emission	Fuel Oil at 100°F			Ratio CT/DB Emission
		CT	Duct Burner	Total		CT	Duct Burner	Total		CT	Duct Burner	Total	
Arsenic													
	lb/hr	4.13E-03	2.00E-04	4.33E-03	20.71	3.70E-03	1.96E-04	3.90E-03	18.87	3.21E-03	1.91E-04	3.40E-03	16.78
	TPY	1.81E-02	8.74E-04	1.90E-02	20.71	1.62E-02	8.60E-04	1.71E-02	18.87	1.40E-02	8.37E-04	1.49E-02	16.78
Beryllium													
	lb/hr	2.46E-03	1.19E-04	2.58E-03	20.71	2.20E-03	1.17E-04	2.32E-03	18.87	1.91E-03	1.14E-04	2.02E-03	16.78
	TPY	1.08E-02	5.20E-04	1.13E-02	20.71	9.65E-03	5.12E-04	1.02E-02	18.87	8.36E-03	4.98E-04	8.86E-03	16.78
Mercury													
	lb/hr	2.95E-03	1.43E-04	3.09E-03	20.71	2.64E-03	1.40E-04	2.78E-03	18.87	2.29E-03	1.36E-04	2.43E-03	16.78
	TPY	1.29E-02	6.24E-04	1.36E-02	20.71	1.16E-02	6.14E-04	1.22E-02	18.87	1.00E-02	5.98E-04	1.06E-02	16.78
Fluoride													
	lb/hr	3.20E-02	1.54E-03	3.35E-02	20.71	2.87E-02	1.52E-03	3.02E-02	18.87	2.48E-02	1.48E-03	2.63E-02	16.78
	TPY	1.40E-01	6.76E-03	1.47E-01	20.71	1.25E-01	6.65E-03	1.32E-01	18.87	1.09E-01	6.47E-03	1.15E-01	16.78
Sulfuric Acid Mist	lb/hr	8.12E+00	4.16E-01	8.54E+00	19.51	7.28E+00	4.10E-01	7.69E+00	17.76	6.30E+00	3.99E-01	6.70E+00	15.77
	TPY	3.56E+01	1.82E+00	3.74E+01	19.51	3.19E+01	1.79E+00	3.37E+01	17.76	2.76E+01	1.75E+00	2.93E+01	15.77

Table 2-C. Emissions for CT and Duct Burner Stack Exhausts--Nonregulated Pollutants

Pollutant	Units	Fuel Oil at 20°F			Ratio CT/DB Emission	Fuel Oil at 59°F			Ratio CT/DB Emission	Fuel Oil at 100°F			Ratio CT/DB Emission
		CT	Duct Burner	Total		CT	Duct Burner	Total		CT	Duct Burner	Total	
Manganese													
	lb/hr	6.34E-03	3.06E-04	6.64E-03	20.71	5.68E-03	3.01E-04	5.98E-03	18.87	4.92E-03	2.93E-04	5.21E-03	16.78
	TPY	2.78E-02	1.34E-03	2.91E-02	20.71	2.49E-02	1.32E-03	2.62E-02	18.87	2.15E-02	1.28E-03	2.28E-02	16.78
Nickel													
	lb/hr	1.67E-01	8.08E-03	1.75E-01	20.71	1.50E-01	7.94E-03	1.58E-01	18.87	1.30E-01	7.73E-03	1.37E-01	16.78
	TPY	7.33E-01	3.54E-02	7.68E-01	20.71	6.56E-01	3.48E-02	6.91E-01	18.87	5.68E-01	3.39E-02	6.02E-01	16.78
Cadmium													
	lb/hr	1.03E-02	4.99E-04	1.08E-02	20.71	9.26E-03	4.91E-04	9.75E-03	18.87	8.01E-03	4.77E-04	8.49E-03	16.78
	TPY	4.53E-02	2.19E-03	4.74E-02	20.71	4.05E-02	2.15E-03	4.27E-02	18.87	3.51E-02	2.09E-03	3.72E-02	16.78
Chromium													
	lb/hr	4.67E-02	2.26E-03	4.90E-02	20.71	4.19E-02	2.22E-03	4.41E-02	18.87	3.63E-02	2.16E-03	3.84E-02	16.78
	TPY	2.05E-01	9.89E-03	2.15E-01	20.71	1.83E-01	9.72E-03	1.93E-01	18.87	1.59E-01	9.46E-03	1.68E-01	16.78
Copper													
	lb/hr	2.76E-01	1.33E-02	2.89E-01	20.71	2.47E-01	1.31E-02	2.60E-01	18.87	2.14E-01	1.27E-02	2.26E-01	16.78
	TPY	1.21E+00	5.83E-02	1.26E+00	20.71	1.08E+00	5.73E-02	1.14E+00	18.87	9.36E-01	5.58E-02	9.92E-01	16.78
Vanadium													
	lb/hr	6.86E-02	3.31E-03	7.19E-02	20.71	6.15E-02	3.26E-03	6.47E-02	18.87	5.32E-02	3.17E-03	5.64E-02	16.78
	TPY	3.00E-01	1.45E-02	3.15E-01	20.71	2.69E-01	1.43E-02	2.83E-01	18.87	2.33E-01	1.39E-02	2.47E-01	16.78
Selenium													
	lb/hr	2.31E-02	1.12E-03	2.42E-02	20.71	2.07E-02	1.10E-03	2.18E-02	18.87	1.79E-02	1.07E-03	1.90E-02	16.78
	TPY	1.01E-01	4.88E-03	1.06E-01	20.71	9.06E-02	4.80E-03	9.54E-02	18.87	7.85E-02	4.68E-03	8.31E-02	16.78
Polycyclic Organic Matter	lb/hr	2.74E-04	1.24E-04	3.98E-04	2.22	2.46E-04	1.23E-04	3.69E-04	1.99	2.13E-04	1.23E-04	3.36E-04	1.73
	TPY	1.20E-03	5.42E-04	1.74E-03	2.22	1.08E-03	5.41E-04	1.62E-03	1.99	9.32E-04	5.39E-04	1.47E-03	1.73
Formaldehyde													
	lb/hr	3.98E-01	2.30E-02	4.22E-01	17.32	3.57E-01	2.27E-02	3.80E-01	15.74	3.09E-01	2.22E-02	3.31E-01	13.94
	TPY	1.75E+00	1.01E-01	1.85E+00	17.32	1.56E+00	9.94E-02	1.66E+00	15.74	1.35E+00	9.71E-02	1.45E+00	13.94
Carbon Dioxide													
	lb/hr	1.58E+05	2.99E+04	1.88E+05	5.30	1.41E+05	1.54E+04	1.57E+05	9.19	1.21E+05	1.49E+04	1.36E+05	8.15
	TPY	6.94E+05	1.31E+05	8.25E+05	5.30	6.19E+05	6.73E+04	6.86E+05	9.19	5.32E+05	6.53E+04	5.97E+05	8.15

Table 2-D. Emissions for CT and Duct Burner Stack Exhausts--Additional Nonregulated Pollutants

Pollutant	Units	Fuel Oil at 20°F			Ratio CT/DB	Fuel Oil at 59°F			Ratio CT/DB	Fuel Oil at 100°F			Ratio CT/DB
		CT	Duct Burner	Total	Emission	CT	Duct Burner	Total	Emission	CT	Duct Burner	Total	Emission
Antimony													
	lb/hr	2.15E-02	1.04E-03	2.25E-02	20.71	1.93E-02	1.02E-03	2.03E-02	18.87	1.67E-02	9.93E-04	1.77E-02	16.78
	TPY	9.41E-02	4.55E-03	9.87E-02	20.71	8.44E-02	4.47E-03	8.88E-02	18.87	7.30E-02	4.35E-03	7.74E-02	16.78
Barium													
	lb/hr	1.92E-02	9.28E-04	2.01E-02	20.71	1.72E-02	9.12E-04	1.81E-02	18.87	1.49E-02	8.88E-04	1.58E-02	16.78
	TPY	8.41E-02	4.06E-03	8.82E-02	20.71	7.54E-02	4.00E-03	7.94E-02	18.87	6.53E-02	3.89E-03	6.91E-02	16.78
Colbalt													
	lb/hr	8.92E-03	4.31E-04	9.35E-03	20.71	7.99E-03	4.24E-04	8.41E-03	18.87	6.92E-03	4.12E-04	7.33E-03	16.78
	TPY	3.91E-02	1.89E-03	4.09E-02	20.71	3.50E-02	1.86E-03	3.69E-02	18.87	3.03E-02	1.81E-03	3.21E-02	16.78
Zinc													
	lb/hr	6.72E-01	3.25E-02	7.05E-01	20.71	6.02E-01	3.19E-02	6.34E-01	18.87	5.21E-01	3.11E-02	5.53E-01	16.78
	TPY	2.94E+00	1.42E-01	3.09E+00	20.71	2.64E+00	1.40E-01	2.78E+00	18.87	2.28E+00	1.36E-01	2.42E+00	16.78
Chlorine													
	lb/hr	2.65E-02	1.28E-03	2.78E-02	20.71	2.38E-02	1.26E-03	2.50E-02	18.87	2.06E-02	1.23E-03	2.18E-02	16.78
	TPY	1.16E-01	5.61E-03	1.22E-01	20.71	1.04E-01	5.52E-03	1.10E-01	18.87	9.01E-02	5.37E-03	9.55E-02	16.78

Table 3. Summary of Maximum Pollutant Impacts for the Mulberry Cogeneration Project--Comparison of CT and CO2 Plant Impacts to CT and Duct Burner Stack Impacts (CT- Oil, DB-Nat.Gas) (Page 1 of 2)

Pollutant	Averaging Period	Year	Maximum Predicted Impacts ($\mu g/m^3$) 20°F CT,CO2	20°F CT,DB	100°F CT,CO2	100°F CT,DB	Regulatory Levels ($\mu g/m^3$) Significance	De minimis Monitoring	More Analysis Required for CT,DB ?
SO_2	3-hour	1982	23.9	28.1	26.8	31.0	25	NA	No^a
		1983	18.1	23.1	19.1	23.4	25	NA	
		1984	33.1	38.7	37.5	43.1	25	NA	
		1985	23.0	26.3	26.7	29.9	25	NA	
		1986	12.1	17.1	12.5	19.6	25	NA	
	24-hour	1982	4.9	6.2	5.7	7.3	5	13	No^a
		1983	5.1	7.4	6.5	8.8	5	13	
		1984	11.2	14.5	15.1	18.4	5	13	
		1985	9.0	11.1	10.2	12.7	5	13	
		1986	3.1	4.7	3.5	5.1	5	13	
	Annual	1982	0.25	0.25	0.25	0.32	1	NA	No
		1983	0.19	0.19	0.19	0.24	1	NA	
		1984	0.24	0.24	0.24	0.27	1	NA	
		1985	0.24	0.23	0.23	0.28	1	NA	
		1986	0.28	0.27	0.27	0.27	1	NA	
PM	24-hour	1982	1.90	1.11	1.98	1.54	5	10	No
		1983	2.08	1.46	2.14	2.00	5	10	
		1984	1.76	2.63	2.74	3.89	5	10	
		1985	1.86	2.01	1.92	2.75	5	10	
		1986	1.88	0.96	1.94	1.21	5	10	
	Annual	1982	0.18	0.076	0.19	0.099	1	NA	No
		1983	0.15	0.057	0.16	0.073	1	NA	
		1984	0.18	0.071	0.19	0.088	1	NA	
		1985	0.17	0.067	0.18	0.086	1	NA	
		1986	0.22	0.055	0.23	0.065	1	NA	
NO_2	Annual	1982	0.75	0.97	0.76	1.10	1	14	No^b
		1983	0.61	0.73	0.62	0.81	1	14	
		1984	0.73	0.90	0.74	0.99	1	14	
		1985	0.67	0.85	0.69	0.96	1	14	
		1986	0.83	0.69	0.85	0.71	1	14	
CO	1-hour	1982	32.3	51.2	36.6	55.6	2000	NA	No
		1983	37.3	45.9	37.0	50.9	2000	NA	
		1984	46.0	48.8	50.7	53.6	2000	NA	
		1985	31.0	50.6	33.9	57.8	2000	NA	
		1986	23.7	38.8	27.5	44.2	2000	NA	

Table 3. Summary of Maximum Pollutant Impacts for the Mulberry Cogeneration Project--Comparison of CT and CO2 Plant Impacts to CT and Duct Burner Stack Impacts (CT- Oil, DB-Nat.Gas) (Page 2 of 2)

Pollutant	Averaging Period	Year	Maximum Predicted Impacts ($\mu g/m^3$) 20°F CT,CO2	20°F CT,DB	100°F CT,CO2	100°F CT,DB	Regulatory Levels ($\mu g/m^3$) Significance	De minimis Monitoring	More Analysis Required for CT,DB ?
	8-hour	1982	8.9	14.2	10.2	15.4	500	575	No
		1983	10.8	20.4	11.7	21.6	500	575	
		1984	16.1	30.9	19.8	34.7	500	575	
		1985	12.3	21.9	15.3	25.2	500	575	
		1986	11.0	13.2	10.9	15.8	500	575	
Be	24-hour	1982	0.00013	0.00015	0.00014	0.00017	NA	0.001	No
		1983	0.00014	0.00018	0.00017	0.00021	NA	0.001	
		1984	0.00029	0.00035	0.00038	0.00044	NA	0.001	
		1985	0.00024	0.00027	0.00025	0.00030	NA	0.001	
		1986	0.00009	0.00011	0.00011	0.00012	NA	0.001	

Note: For 20°F condition, modeled CT exit gas temperature is 220°F and velocity is 67.8 ft/sec.
For 100°F condition, modeled CT exit gas temperature is 220°F and velocity is 55.5 ft/sec.

NA - Not applicable because pollutant has no ambient standard or measurement method.

^a Additional analyses were performed in permit application to address CT and CO_2 plant impacts.

^b Based on emissions from DB stack for 8,760 hours. If emissions from stack are limited to 180 days per year, predicted impacts will be less than the significance level.

Table 4. Summary of Maximum Pollutant Emission Rates and Concentrations for the Air Toxic Modeling Analysis For Combustion Turbine and Duct Burner Stacks (Page 1 of 3)

Pollutant	Emission Rate (lb/hr) at 20°F Temperature CT	Emission Rate (lb/hr) at 20°F Temperature DB	Emission Rate (lb/hr) at 100°F Temperature CT	Emission Rate (lb/hr) at 100°F Temperature DB	Averaging Period	Maximum Predicted Concentration (μg/m³) 20°F Temperature CT (A)	DB (B)	Total (A+B)	100°F Temperature CT (C)	DB (D)	Total (C+D)	Florida No Threat Level (μg/m³)
Antimony	2.15E-02	1.04E-03	1.67E-02	9.93E-04	8-hour	4.42E-03	1.11E-03	5.53E-03	5.33E-03	1.04E-03	6.37E-03	5
					24-hour	2.42E-03	6.43E-04	3.06E-03	3.25E-03	6.07E-04	3.86E-03	1.2
					Annual	4.26E-05	1.48E-05	5.74E-05	2.11E-05	4.30E-05	6.40E-05	0.3
Arsenic	4.13E-03	2.00E-04	3.21E-03	1.91E-04	8-hour	8.50E-04	2.14E-04	1.06E-03	1.02E-03	2.00E-04	1.22E-03	2
					24-hour	4.65E-04	1.24E-04	5.89E-04	6.25E-04	1.17E-04	7.42E-04	0.48
					Annual	8.20E-06	2.85E-06	1.10E-05	4.05E-06	8.27E-06	1.23E-05	0.00023
Barium	1.92E-02	9.28E-04	1.49E-02	8.88E-04	8-hour	3.95E-03	9.92E-04	4.94E-03	4.76E-03	9.30E-04	5.69E-03	5
					24-hour	2.16E-03	5.73E-04	2.74E-03	2.90E-03	5.43E-04	3.45E-03	1.2
					Annual	3.81E-05	1.32E-05	5.13E-05	1.88E-05	3.84E-05	5.72E-05	50
Beryllium	2.46E-03	1.19E-04	1.91E-03	1.14E-04	8-hour	5.06E-04	1.27E-04	6.33E-04	6.10E-04	1.19E-04	7.29E-04	0.02
					24-hour	2.77E-04	7.34E-05	3.50E-04	3.72E-04	6.95E-05	4.42E-04	0.0048
					Annual	4.88E-06	1.69E-06	6.57E-06	2.41E-06	4.92E-06	7.33E-06	0.00042
Cadmium	1.03E-02	4.99E-04	8.01E-03	4.77E-04	8-hour	2.13E-03	5.33E-04	2.66E-03	2.56E-03	5.00E-04	3.06E-03	0.5
					24-hour	1.16E-03	3.08E-04	1.47E-03	1.56E-03	2.92E-04	1.85E-03	0.12
					Annual	2.05E-05	7.10E-06	2.76E-05	1.01E-05	2.07E-05	3.08E-05	0.00056
Chlorine	2.65E-02	1.28E-03	2.06E-02	1.23E-03	8-hour	5.46E-03	1.37E-03	6.82E-03	6.58E-03	1.28E-03	7.86E-03	15
					24-hour	2.99E-03	7.91E-04	3.78E-03	4.01E-03	7.49E-04	4.76E-03	3.6
					Annual	5.26E-05	1.82E-05	7.08E-05	2.60E-05	5.30E-05	7.90E-05	0.4
Chromium III,IV	4.67E-02	2.26E-03	3.63E-02	2.16E-03	8-hour	9.61E-03	2.41E-03	1.20E-02	1.16E-02	2.26E-03	1.39E-02	5
					24-hour	5.26E-03	1.39E-03	6.66E-03	7.07E-03	1.32E-03	8.39E-03	1.2
					Annual	9.27E-05	3.21E-05	1.25E-04	4.58E-05	9.35E-05	1.39E-04	1000 ^a
Cobalt	8.92E-03	4.31E-04	6.92E-03	4.12E-04	8-hour	1.83E-03	4.60E-04	2.29E-03	2.21E-03	4.31E-04	2.64E-03	0.5
					24-hour	1.00E-03	2.66E-04	1.27E-03	1.35E-03	2.52E-04	1.60E-03	0.12
					Annual	1.77E-05	6.13E-06	2.38E-05	8.74E-06	1.78E-05	2.66E-05	NE

Table 4. Summary of Maximum Pollutant Emission Rates and Concentrations for the Air Toxic Modeling Analysis For Combustion Turbine and Duct Burner Stacks (Page 2 of 3)

Pollutant	Emission Rate (lb/hr) at 20°F Temperature CT	Emission Rate (lb/hr) at 20°F Temperature DB	Emission Rate (lb/hr) at 100°F Temperature CT	Emission Rate (lb/hr) at 100°F Temperature DB	Averaging Period	Maximum Predicted Concentration (μg/m³) 20°F Temperature CT (A)	20°F Temperature DB (B)	20°F Temperature Total (A+B)	100°F Temperature CT (C)	100°F Temperature DB (D)	100°F Temperature Total (C+D)	Florida No Threat Level (μg/m³)
Copper	2.76E-01	1.33E-02	2.14E-01	1.27E-02	8-hour	5.67E-02	1.42E-02	7.09E-02	6.83E-02	1.33E-02	8.16E-02	2
					24-hour	3.10E-02	8.22E-03	3.92E-02	4.17E-02	7.78E-03	4.94E-02	0.48
					Annual	5.47E-04	1.89E-04	7.36E-04	2.70E-04	5.51E-04	8.21E-04	NE
Fluoride	3.20E-02	1.54E-03	2.48E-02	1.48E-03	8-hour	6.58E-03	1.65E-03	8.23E-03	7.93E-03	1.55E-03	9.48E-03	25
					24-hour	3.60E-03	9.54E-04	4.56E-03	4.84E-03	9.03E-04	5.74E-03	6
					Annual	6.34E-05	2.20E-05	8.54E-05	3.13E-05	6.40E-05	9.53E-05	NE
Formaldehyde	3.98E-01	2.30E-02	3.09E-01	2.22E-02	8-hour	8.20E-02	2.46E-02	1.07E-01	9.88E-02	2.32E-02	1.22E-01	12
					24-hour	4.49E-02	1.42E-02	5.91E-02	6.03E-02	1.36E-02	7.38E-02	2.88
					Annual	7.81E-04	3.27E-04	1.12E-03	3.80E-04	9.60E-04	1.35E-03	0.077
Lead	8.76E-03	4.23E-04	6.79E-03	4.05E-04	8-hour	1.80E-03	4.52E-04	2.25E-03	2.17E-03	4.24E-04	2.60E-03	0.5
					24-hour	9.86E-04	2.61E-04	1.25E-03	1.32E-03	2.47E-04	1.57E-03	0.12
					Annual	1.74E-05	6.02E-06	2.34E-05	8.58E-06	1.75E-05	2.61E-05	0.09
Manganese	6.34E-03	3.06E-04	4.92E-03	2.93E-04	8-hour	1.30E-03	3.27E-04	1.63E-03	1.57E-03	3.07E-04	1.88E-03	50
					24-hour	7.14E-04	1.89E-04	9.03E-04	9.58E-04	1.79E-04	1.14E-03	12
					Annual	1.26E-05	4.35E-06	1.69E-05	6.21E-06	1.27E-05	1.89E-05	0.4
Mercury	2.95E-03	1.43E-04	2.29E-03	1.36E-04	8-hour	6.07E-04	1.52E-04	7.60E-04	7.32E-04	1.43E-04	8.75E-04	0.5
					24-hour	3.32E-04	8.81E-05	4.20E-04	4.46E-04	8.34E-05	5.30E-04	0.12
					Annual	5.86E-06	2.03E-06	7.88E-06	2.89E-06	5.90E-06	8.80E-06	0.3
Nickel	1.67E-01	8.08E-03	1.30E-01	7.73E-03	8-hour	3.44E-02	8.64E-03	4.30E-02	4.15E-02	8.09E-03	4.96E-02	10
					24-hour	1.88E-02	4.99E-03	2.38E-02	2.53E-02	4.73E-03	3.00E-02	2.4
					Annual	3.32E-04	1.15E-04	4.47E-04	1.64E-04	3.35E-04	4.98E-04	0.0042
Polycyclic Organic Matter	2.74E-04	1.24E-04	2.13E-04	1.23E-04	8-hour	5.64E-05	1.32E-04	1.89E-04	6.80E-05	1.29E-04	1.97E-04	NE
					24-hour	3.09E-05	7.64E-05	1.07E-04	4.15E-05	7.53E-05	1.17E-04	NE
					Annual	5.44E-07	1.76E-06	2.30E-06	2.69E-07	5.33E-06	5.60E-06	NE

Table 4. Summary of Maximum Pollutant Emission Rates and Concentrations for the Air Toxic Modeling Analysis For Combustion Turbine and Duct Burner Stacks (Page 3 of 3)

Pollutant	Emission Rate (lb/hr) at 20°F Temperature CT	Emission Rate (lb/hr) at 20°F Temperature DB	Emission Rate (lb/hr) at 100°F Temperature CT	Emission Rate (lb/hr) at 100°F Temperature DB	Averaging Period	Maximum Predicted Concentration (μg/m³) 20°F Temperature CT (A)	DB (B)	Total (A+B)	100°F Temperature CT (C)	DB (D)	Total (C+D)	Florida No Threat Level (μg/m³)
Selenium	2.31E-02	1.12E-03	1.79E-02	1.07E-03	8-hour	4.75E-03	1.19E-03	5.94E-03	5.73E-03	1.12E-03	6.84E-03	2
					24-hour	2.60E-03	6.89E-04	3.29E-03	3.49E-03	6.53E-04	4.15E-03	0.48
					Annual	4.58E-05	1.59E-05	6.17E-05	2.26E-05	4.62E-05	6.88E-05	NE
Sulfuric Acid Mist	8.12E+00	4.16E-01	6.30E+00	3.99E-01	8-hour	1.67E+00	4.44E-01	2.11E+00	2.02E+00	4.26E-01	2.44E+00	10
					24-hour	9.10E-01	2.56E-01	1.17E+00	1.23E+00	2.46E-01	1.48E+00	2.4
					Annual	1.61E-02	5.80E-03	2.20E-02	7.98E-03	1.77E-02	2.57E-02	NE
Vanadium	6.86E-02	3.31E-03	5.32E-02	3.17E-03	8-hour	1.41E-02	3.54E-03	1.77E-02	1.70E-02	3.32E-03	2.03E-02	0.5
					24-hour	7.72E-03	2.05E-03	9.77E-03	1.04E-02	1.94E-03	1.23E-02	0.12
					Annual	1.36E-04	4.71E-05	1.83E-04	6.72E-05	1.37E-04	2.04E-04	20
Zinc	6.72E-01	3.25E-02	5.21E-01	3.11E-02	8-hour	1.38E-01	3.47E-02	1.73E-01	1.67E-01	3.25E-02	1.99E-01	50
					24-hour	7.57E-02	2.01E-02	9.58E-02	1.02E-01	1.90E-02	1.21E-01	12
					Annual	1.33E-03	4.62E-04	1.80E-03	6.59E-04	1.34E-03	2.00E-03	NE

Note: Impacts for beryllium and sulfuric acid mist were predicted by modeling these pollutants at their actual emission rates. All other impacts presented were derived by using a ratio method based on the impacts predicted for beryllium.

NE = none established.

[a] Based on 40 CFR 266, Subpart H, Hazardous Waste Burned in Boilers and Industrial Furnaces, Appendix IV, Reference Air Concentration.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

DEC 16 1992

4APT-AEB

Mr. Clair H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental
Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Polk Power Partners,
Mulberry Cogeneration Project (PSD-FL-187)

Dear Mr. Fancy:

This is to acknowledge receipt of the final determination and Prevention of Significant Deterioration (PSD) permit for the above referenced facility, by your letter dated November 24, 1992. The proposed facility will be an integrated cogeneration facility, producing approximately 120,000 kilowatts net power to the transmission system and approximately 150 tons per day of liquid CO_2. The cogeneration project consists of one General Electric PG 7111EA combustion turbine, with a primary heat recovery steam generator (HRSG), a secondary HRSG, and a steam turbine generator. The CO_2 equipment includes two, 75 ton per day CO_2 recovery units.

Your determination proposes to limit NO_x emissions from the combustion turbine through water injection and dry low-NO_x combustion technology (through 4/30/97), to limit NO_x emissions from the combustion turbine through advanced dry low-NO_x combustion technology, selective catalytic reduction, or an equivalent NO_x control system (after 4/30/97), to limit SO_2 and H_2SO_4 Mist emissions from the combustion turbine through limiting the sulfur content of the No. 2 distillate fuel oil, to limit CO emissions from the combustion turbine and duct burner through efficient combustion, to limit VOC emissions through efficient combustion for the combustion turbine and through a scrubber for CO_2 absorber exhausts, and to limit PM/PM_{10}, Be, and As emissions from the combustion turbine through combustion control and the use of clean fuels.

We have reviewed the package as submitted and have no adverse comments. Thank you for the opportunity to review and comment on this package. If you have any questions or comments, please contact Mr. Scott Davis of my staff at (404) 347-5014.

Sincerely yours,

Brian L. Beals, Chief
Source Evaluation Unit
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: J. Reynolds
C. Holladay
B. Thomas, SW Dist.
J. Bunyak, NPS
D. Martin, Polk Co.
K. [illegible], NBN

Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Virginia B. Wetherell, Secretary

March 19, 1993

Mr. Kennard F. Kosky, P.E.
President
KBN Engineering and Applied Sciences, Inc.
1034 N.W. 57th Street
Gainesville, Florida 32605

Dear Mr. Kosky:

This is in response to your recent letter notifying the Department of a design change for the Mulberry Cogeneration Project (PSD-FL-187) consisting of a separate stack for the secondary HRSG. This design change will involve no increase in emissions or result in a substantially different ambient impact. The secondary HRSG stack will have no impact as far as the construction permit emission limits are concerned since normal compliance testing will not involve this secondary stack. It will be in use only during atypical operating situations. Consequently, a construction permit modification is not required for this design change. However, it is required that this and all other substantive changes in the final design and construction be reported in the operation permit application.

If you have further questions, please contact Preston Lewis or John Reynolds at (904) 488-1344.

Sincerely,

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

CHF/JR/kbw

cc: W. Thomas, SWD
D. Martin, Polk County

KBN

August 27, 1993

Mr. C. H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Mulberry Cogeneration Project
DER File No. AC53-211670, PSD-FL-187
Request for Change in Permit Specific Condition

Dear Clair:

In my letter to you dated August 17, 1993, a request was made to change the carbon monoxide (CO) emission limitation for the combustion turbine when firing natural gas. Also, a discussion was presented that addressed the potential reduction of the maximum allowable nitrogen oxides (NO_x) emission rate to 15 parts per million corrected to dry conditions (ppmvd) and 15 percent oxygen prior to December 31, 1997, (the current permit conditions limit NO_x emissions to 25 ppmvd prior to December 31, 199,7 and to 15 ppmvd after December 31, 1997). Although discussions with GE (the combustion turbine vendor selected for the project) have indicated the potential emission rate of 15 ppmvd may be achievable when the turbine is initially operated, GE provides no guarantee that the emission limit will be met throughout the period from initial operation in November, 1994 to December, 1997. As a result, this potential reduction in NO_x emission rate is not considered a viable option for this project.

Based on this correspondence, the proposed change to the air construction permit is limited to the CO emission limitation for the combustion turbine when firing natural gas as requested on August 17, 1993. No change to the NO_x emission rate is proposed at this time. Attachment 1 contains the requested change to the CO emission limit (see Note 4).

If you have any questions or concerns regarding the requested change, please don't hesitate to call me. Again, on behalf of Polk Power Partners, L.P. and KBN, we appreciate you and your staff's review of this requested change to the permit.

Sincerely,

Kennard F. Kosky, P.E.
President
Registration No. 14996

cc: Mr. William R. Malenius, Ark Energy, Inc.
Mr. Ward C. Marshall, Central and South West Services, Inc.

91193A3/1

KBN ENGINEERING AND APPLIED SCIENCES, INC.

1034 Northwest 57th Street, Gainesville, Florida 32605, 904-331-9000, FAX 904-332-4189
5680 West Cypress Street, Suite I, Tampa, Florida 33607, 813-287-1717, FAX 813-287-1716
1501 Clint Moore Road, Suite 105, Boca Raton, Florida 33487, 407-994-9910, FAX 407-994-9393
6621 Southpoint Drive North, Suite 216, Jacksonville, Florida 32216, 904-296-9663 FAX 904-296-0146
One Church Street, Suite 801, Rockville, Maryland 20850, 301-738-1100, FAX 301-738-1105

ATTACHMENT 1

SPECIFIC CONDITIONS:

2. Emissions from these facilities shall not exceed the limits listed below (based on operation at 59°F):

Pollutant	Source	Fuel	Through 12/31/97 lbs/hr	Through 12/31/97 tons/yr	After 12/31/97 (See notes) [2] lbs/hr	After 12/31/97 (See notes) [2] tons/yr
NO_x	HRSG Stack	Gas	87.8	384.5	52.7	230.7
	CO_2 Plant Stack[a]	Gas	19.9	87.1	18.3	80.0
	HRSG Stack	Oil	164.0	718.2	164.0	59.0
	CO_2 Plant Stack[a]	Oil	23.4	102.4	23.4	8.4
SO_2	HRSG Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	CO_2 Plant Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack	Gas	10% Opacity		10% Opacity	
	CO_2 Plant Stack	Gas	10% Opacity		10% Opacity	
	HRSG Stack	Oil	20% Opacity		20% Opacity	
	CO_2 Plant Stack	Oil	20% Opacity		20% Opacity	
VOC	CO_2 Plant Stack	–	18.2	79.6	17.7	77.6
CO	HRSG Stack	Gas	42.9	187.8	53	232
	CO_2 Plant Stack[a]	Gas	11.9	52.0	12.6	55.2
	HRSG Stack	Oil	75.3	329.9	75.3	27.1
	CO_2 Plant Stack[a]	Oil	13.4	58.5	13.4	4.8

Notes: (1) Oil may be used as backup fuel for up to 30 days per year.
(2) NO_x limits after 12/31/97 based on 15 ppmvd.
(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.
(4) CO limits after 12/21/97 based on CO emission rate of 25 ppmvd from the combustion turbine and is coincident with NO_x limit of 15 ppmvd.

[a] Or secondary HRSG Stack.

Florida Department of
Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

August 19, 1993

Mr. Kennard F. Kosky, P.E.
President
KBN Engineering and Applied Sciences, Inc.
1034 Northwest 57th Street
Gainesville, Florida 32605

Re: Permit No. AC53-211670, PSD-FL-187
Mulberry Cogeneration Project

Dear Mr. Kosky:

This is in reply to your August 17 letter requesting revised emission limits for the Mulberry combustion turbine project. The requested changes are based on recent information from the turbine manufacturer and would result in an increase in allowable emissions of 47.4 TPY of CO and a decrease of 153.8 TPY of NO_x.

Although we understand the reasons for requesting the changes now, we recommend waiting until the performance test has been completed. At that time the Department will adjust the limits as called for by the data. This approach avoids the need for further changes later. Your letter will remain on file as a pending request for adjustment of the limits prior to issuing the operation permit.

Sincerely,

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

CHF/JR/bb

August 17, 1993

Mr. C. H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Mulberry Cogeneration Project
DER File No. AC53-211670, PSD-FL-187
Request for Change in Permit Specific Condition

Dear Clair:

This correspondence is submitted on behalf of Polk Power Partners, L.P. to request a change in the carbon monoxide (CO) emission limitation for the combustion turbine when firing natural gas and provide a potential reduction of the maximum allowable nitrogen oxides (NO_x) emission rate when the unit becomes operational. These changes affect Specific Condition No. 2 of the air construction permit (AC53-211670).

CARBON MONOXIDE EMISSIONS FOR NATURAL GAS FIRING

The request for this change is based on recent performance information obtained for the General Electric PG7111(EA) combustion turbine when it achieves a maximum NO_x emission rate of 15 parts per million (ppm), corrected for dry conditions (ppmvd) and 15 percent oxygen (O_2). At this NOx emission level, GE expects only a maximum CO emission rate of 25 ppmvd. As a result, the CO emission limit would be revised from the current limit of 20 ppmvd to 25 ppmvd and would be in effect when the NO_x emission rate is equal to or less than 15 ppmvd, corrected to 15 percent O_2 (i.e., after December 31, 1997). Prior to December 31, 1997, the CO emission limit of 20 ppmvd is achievable with a NO_x emission limit of 25 ppmvd, corrected to 15 percent O_2, respectively.

The net change in maximum allowable CO emissions is approximately 44.2 TPY for the HRSG stack (i.e., 232 TPY at 25 ppmvd compared to 187.8 TPY at 20 ppmvd) and 3.2 TPY for the CO_2 stack (or secondary boiler) (i.e., 55.2 TPY with the turbine's emissions at 25 ppmvd compared to 52.0 TPY at 20 ppmvd) These increases in CO emissions are not significant and do not significantly change conclusions drawn from the economic, environmental, and energy analyses performed as part of the Best Available Control Technology (BACT) review for this project. Combustion design is still proposed as BACT as a result of the technical and economic consequences of using catalytic oxidation on combustion turbines. Catalytic oxidation is considered unreasonable for the following reasons:

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904-331-9000
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407-994-9910
FAX 407-994-9393

6821 Southpoint Drive North,
Suite 216
Jacksonville, Florida 32216
904-296-9663 FAX 904-296-0146

One Church Street, Suite 801
Rockville, Maryland 20850
301-738-1100
FAX 301-738-1105

1. Catalytic oxidation will not produce a measurable reduction in air quality impacts from those produced using combustion controls. The maximum air quality impacts produced from either the oxidation catalyst or combustion design control techniques are below the significant impact levels for CO.

2. Based on an estimated annualized cost of a CO oxidation catalyst of $1,041,267 (see Table 4-9 in the air construction permit application), the cost effectiveness is approximately $5,570/ton of CO removed (i.e., oxidation catalyst will remove 187 TPY more than combustion design). The cost effectiveness is based on 50 percent operation on gas and 50 percent operation on oil, both at 10 ppmvd, for a maximum total emissions of 94 TPY (i.e., 47 TPY for both gas and oil). With combustion design controls and based on 50 percent operation on gas at 25 ppmvd and 50 percent operation on oil at 35 ppmvd, the maximum emissions are 281 TPY (i.e., 116 TPY on gas and 165 TPY on oil).

Indeed, recent BACT decisions for combustion turbines have set limits in the 30 ppmvd range. The recent air construction permit for the Cane Island Combustion Turbine Project for Kissimmee Utility Authority (AC49-205703/PSD-FL-182) established the CO emission limit as 54 lb/hr, equivalent to 25 ppmvd, for the GE 7EA turbine. This CO limit was established when the proposed unit is limited to NO_x emissions of either 15 or 25 ppmvd.

POTENTIAL REDUCTION IN NITROGEN OXIDES EMISSIONS

From discussions with GE, the combustion turbine may achieve a maximum NO_x emission rate of 15 ppmvd, corrected to 15 percent O_2, when the turbine is initially operated. As a result, a change in the specific permit condition would be submitted to DER to limit the NO_x emission rate from 25 ppmvd to 15 ppmvd. If this occurs, the total reduction in NO_x emissions from the HRSG stack would be approximately 153.8 TPY each year (i.e., 384.5 TPY at 25 ppmvd minus 230.7 TPY at 15 ppmvd) until after December 31, 1997 (when 15 ppmvd is required to be achieved). However, the CO emission limit would need to be revised from the current limit of 20 ppmvd to 25 ppmvd for the reasons previously cited. Again, the combustion design is still considered as BACT as a result of the technical and economic consequences of using catalytic oxidation on combustion turbines. The cost of an oxidation catalyst would be significant and not cost-effective given the proposed CO emission limit of 25 ppmvd when firing gas and 35 ppmvd when firing distillate oil.

Should the combustion turbine achieve a maximum NO_x emission rate of 15 ppmvd, corrected to 15 percent O_2, when initially operated in November, 1994, the revision to Specific Condition No. 2 is attached that would allow a CO emission rate of 25 ppmvd and limit the NO_x emission rate to 15 ppmvd, corrected to 15 percent O_2 prior to December 31, 1997 (see Attachment 1).

We will contact you in several days to discuss any questions or concerns you may have with regards to these requested changes. On behalf of Polk Power Partners, L.P. and KBN, we greatly appreciated you and your staff's review of these requested changes to the permit. Your continued cooperation is appreciated.

Sincerely,

Kennard F. Kosky, P.E.
President
Registration No. 14996

ATTACHMENT 1

SPECIFIC CONDITIONS:

2. Emissions from these facilities shall not exceed the limits listed below (based on operation at 59°F):

Pollutant	Source	Fuel	Through 12/31/97 lbs/hr	Through 12/31/97 tons/yr	After 12/31/97 (See notes) [2] lbs/hr	After 12/31/97 (See notes) [2] tons/yr
NO_x	HRSG Stack	Gas	87.8[b]	384.5[b]	52.7	230.7
	CO_2 Plant Stack[a]	Gas	19.9[b]	87.1[b]	18.3	80.0
	HRSG Stack	Oil	164.0	718.2	164.0	59.0
	CO_2 Plant Stack[a]	Oil	23.4	102.4	23.4	8.4
SO_2	HRSG Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	CO_2 Plant Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack	Gas	10% Opacity		10% Opacity	
	CO_2 Plant Stack	Gas	10% Opacity		10% Opacity	
	HRSG Stack	Oil	20% Opacity		20% Opacity	
	CO_2 Plant Stack	Oil	20% Opacity		20% Opacity	
VOC	CO_2 Plant Stack	–	18.2	79.6	17.7	77.6
CO	HRSG Stack	Gas	42.9[b]	187.8[b]	53	232
	CO_2 Plant Stack[a]	Gas	11.9[b]	52.0[b]	12.6	55.2
	HRSG Stack	Oil	75.3	329.9	75.3	27.1
	CO_2 Plant Stack[a]	Oil	13.4	58.5	13.4	4.8

Notes: (1) Oil may be used as backup fuel for up to 30 days per year.
(2) NO_x limits after 12/31/97 based on 15 ppmvd.
(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.
(4) CO limits after 12/21/97 based on CO emission rate of 25 ppmvd from the combustion turbine and is coincident with NO_x limit of 15 ppmvd.

[a] Or secondary HRSG Stack.

[b] Should the combustion turbine achieve a maximum NO_x emission rate of 15 ppmvd, corrected to 15 percent O_2, when initially operated, the NO_x and CO limits would be identical to those conditions specified after 12/31/97.

Florida Department of
Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

November 18, 1993

Mr. Douglas S. Roberts
Hopping Boyd Green & Sams
P.O. Box 6526
Tallahassee, Florida 32314

Dear Mr. Roberts:

The Department received your November 16 letter making another request for increased carbon monoxide (CO) limits for the Polk Power Partners, L.P./Mulberry Cogeneration Project (PSD-FL-187). Since the original request was based on information not available at the time the permit was issued, the Department agreed on August 19, 1993, to adjust the CO limits higher if necessary based on results of the compliance test. That agreement should provide sufficient assurance to lenders that the facility will not be faced with unattainable limits in the operation permit. We are not aware of any case involving financing being withheld where the Department has agreed to adjust emission limits as required by the test data.

As indicated in Specific Condition No. 9 of the permit, the Department's practice is to address deviations from the original design at the time the operation permit is issued. Otherwise, considerable paperwork and staff time would be consumed making modifications that would be made anyway in the process of issuing the operation permit. Moreover, if the construction permit is modified, another public notice and comment period would be required due to emissions being higher than previously stated in the permit.

In summary, neither Polk Power Partners, L.P., nor their lenders should doubt that the Department will adjust limits so that the Mulberry Cogeneration Facility can be operated and in a manner that is environmentally responsible.

Sincerely,

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

CHF/JR/bb

c: K. Kosky, P.E., KBN

HOPPING BOYD GREEN & SAMS
ATTORNEYS AND COUNSELORS
123 SOUTH CALHOUN STREET
POST OFFICE BOX 6526
TALLAHASSEE, FLORIDA 32314
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CARLOS ALVAREZ
JAMES S. ALVES
BRIAN H. BIBEAU
KATHLEEN BLIZZARD
ELIZABETH C. BOWMAN
WILLIAM L. BOYD, IV
RICHARD S. BRIGHTMAN
PETER C. CUNNINGHAM
RALPH A. DEMEO
THOMAS M. DEROSE
WILLIAM H. GREEN
WADE L. HOPPING
FRANK E. MATTHEWS
RICHARD D. MELSON
WILLIAM D. PRESTON
CAROLYN S. RAEPPLE
GARY P. SAMS
ROBERT P. SMITH
CHERYL G. STUART

C. ALLEN CULP, JR.
JONATHAN S. FOX
JAMES C. GOODLETT
GARY K. HUNTER, JR.
DALANA W. JOHNSON
RICHARD W. MOORE
ANGELA R. MORRISON
MARIBEL N. NICHOLSON
GARY V. PERKO
MICHAEL P. PETROVICH
DOUGLAS S. ROBERTS
KRISTIN C. RUBIN
JULIE ROME STEINMEYER

OF COUNSEL
W. ROBERT FOKES

John - Discuss with Doug Outlaw & Clark Co Boards high Preston 11/16

November 16, 1993

RECEIVED
NOV 16 1993
Division of Air Resources Management

Clair Fancy, Chief
Bureau of Air Regulation
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Mulberry Cogeneration Project
PSD-FL-187

Dear Mr. Fancy:

On behalf of Polk Power Partners, L.P. (Polk Power), I am writing concerning the above-referenced prevention of significant deterioration (PSD) permit. Polk Power is in the process of obtaining financing for the project and is requesting corrections and updates of the permit to reflect the permitted facilities and the applicable emission limits. Such changes are needed to satisfy the lenders that the permits for the Mulberry Project are complete and current.

Deletion of Carbon Dioxide Plant.

As conceived and described in the PSD permit, the Mulberry Cogeneration Project consisted of a 125 MW combined cycle electrical power plant unit and a carbon dioxide recovery plant which would serve as the thermal host for the cogeneration plant. Recent economic factors have caused Polk Power to eliminate the planned CO2 plant. To qualify as a cogeneration facility, steam from Mulberry project will now serve an ethanol production plant to be located adjacent to the project site. This ethanol plant will be developed by a legally separate entity not under the control of Polk Power. Necessary permits are now being obtained separately for that ethanol plant. It would therefore be appropriate to now revise the PSD permit for the Mulberry Project to delete references to the CO2 plant, including the reference to the CO2 plant in the table of permitted emissions.

Recent design changes to the plant identified the necessity for a separate stack for the secondary heat recovery steam

generator (duct burner). This change was described in a February 19, 1993 letter to you from Ken Kosky of KBN Engineering and Applied Sciences and was approved by the Department by letter on March 19, 1993. This secondary HRSG stack is an alternate to the CO2 plant stack, as identified in the KBN letter and in the revised table of emissions. In revising the table of permitted emissions in Specific Condition 2, the CO2 stack and its emissions should now be labeled solely as the "secondary HRSG stack".

Carbon Monoxide Emission Rates

As you are aware, NOx and CO emission rates in combined cycle units move in opposite directions from one another, such that if NOx emissions are reduced, CO emissions often increase. The current permitted emissions for the Mulberry project establish one set of NOX and CO emissions through December 31, 1997 and a lower set of NOx (but not CO) emissions after December 31, 1997. The PSD permit initially limits NOx emissions to 87.8 lbs/hr, based on an emission rate of 25 PPM NOx, and CO to 42.9 lbs/hr, based on an emission rate of 20 PPM. The permit then establishes a limit of 52.7 lbs/hr NOx based on an emission rate of 15 PPM after December 31, 1997. However, the permitted emissions for CO after December 31, 1997, were not changed to account for this lower NOx emission rate.

NO adjustment of CO limit was requested in the application. The change in CO was not requested until 9 months after the permit was issued.

In a second letter to you from KBN (attached) dated August 17, 1993, the Department was requested to approve a change in the CO emissions from the unit when the emission limit for NOx is reduced in December 1997. This was based upon subsequent information from General Electric that the unit could only meet 25 PPM CO when NOx emissions are at 15 PPM.

In a reply letter dated August 19, 1993 (attached), signed by John Brown on your behalf, the Department deferred making any further changes to the permit until the initial performance tests were completed, at which time the Department would adjust permit limits.

Polk Power requests that the Department grant the above requested change in CO emissions at this time and not defer such revisions until the completion of the performance tests. Based on past experience, the financial lenders for this project will require that the permits reflect the design emissions for the project at the time financial closing for this Project occurs. Leaving the permitted emission limits for CO unchanged at this time may cause the lenders to withhold financing since the permit will include a CO emission limit the project is known to be unable to meet when NOx emissions are reduced in the future. Polk Power therefore requests that the Department modify the PSD permit to approve the change in the CO emissions, consistent with the values

This suggests that the lenders haven't actually req'd any changes, only that Polk Power anticipates that they will.

requested in the August 17, 1993, KBN letter, to be applicable upon the change in the permitted NOx emissions, whenever that change may occur.

Revised Permit Conditions

Polk Power requests that the Department issue a formal letter modification of the PSD permit to reflect the recent design changes, including deletion of the CO2 plant, addition of the secondary HRSG stack and the changed CO emissions as requested. Several recent letters from the Department have approved these changes. However, it would seem appropriate to issue a formal change to the permit that incorporates all of these approved changes.

To facilitate your issuance of such a letter, a draft letter is enclosed (along with a disk version in WordPerfect 5.1), which reflects the several changes to the PSD permit that have been proposed and we believe concurred in by the Department. The suggested revised conditions also reflect deletion of VOC limits for the CO2 plant as a result of the elimination of the CO2 plant and its VOC producing processes and reduced limits on hours of operation of the secondary HRSG consistent with the recent identified design changes. None of these changes will result in a significant increase in permitted emissions from the Project.

We appreciate your attention to this request and the Department's past cooperation in this permitting effort. Polk Power realizes many of these changes and requests may seem minor and somewhat annoying. However, it reflects the circumstances that arise when obtaining significant financial investment in projects such as this.

Should you have any questions concerning this matter, please do not hesitate to call either Ward Marshall of Central and Southwest Services (214/777-1374, Ken Kosky or Bob McCann of KBN (904/331-9000) or myself.

Sincerely,

Douglas S. Roberts

Attachments

cc: Preston Lewis, DEP

William Malenius
Polk Power Partners
23923 South Pointe Drive
Laguna Hills, California 92653

Re: Polk County - A.P.
Polk Power Partners, L.P.
Mulberry Cogeneration Project
PSD-FL-187; Permit Modification

Dear Mr. Malenius:

The Department received a request from Mr. Douglas S. Roberts on November -, 1993, for administrative changes to the prevention of significant deterioration permit (PSD-FL- 187) issued to Polk Power Partners for the above referenced project. That request sought formal approval of various project changes that had received previous preliminary approval by the Department. The Department concurs with that request as authorized herein. The Department modifies the permit to delete references to the carbon dioxide recovery plant which is no longer proposed to be constructed as part of the project. The emissions identified as associated with the CO2 plant and the secondary heat recovery steam generator jointly are now assigned solely to the secondary heat recovery steam generator. The Department authorizes an increase in the carbon monoxide emissions from the Project at such time as the nitrogen oxide emissions from the plant are reduced.

The proposed changes are acceptable to the Department and will not result in the increase in permitted annual emissions of any pollutant subject to PSD regulations. As an administrative change, this revision will not require additional public participation procedures.

NOT TRUE ! CO IS SUBJECT TO PSD REGULATIONS AND IS INCLUDED IN THE BACT DETERMINATIONS

The Department grants the following amendments to the above referenced permit:

SPECIFIC CONDITION NO. 2

Change From:

2. Emissions from these facilities shall not exceed the limits listed below (based on operation at 59°F):

			Through 12/31/97		After 12/31/97 (See notes) 9	
Pollutant	Source	Fuel	lbs/hr	tons/yr	lbs/hr	tons/yr
NO_x	HRSG Stack	Gas	87.8	384.5	52.7	230.7
	CO_2 Plant Stack[1]	Gas	19.9	87.1	18.3	80.0
	HRSG Stack	Oil	164.0	718.2	164.0	59.0
	CO_2 Plant Stack[1]	Oil	23.4	102.4	23.4	8.4
SO_2	HRSG Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	CO_2 Plant Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack	Gas	10% Opacity		10% Opacity	
	CO_2 Plant Stack	Gas	10% Opacity		10% Opacity	
	HRSG Stack	Oil	20% Opacity		20% Opacity	
	CO_2 Plant Stack	Oil	20% Opacity		20% Opacity	
VOC	CO_2 Plant Stack	--	18.2	79.6	17.7	77.6
CO	HRSG Stack	Gas	42.9	187.8	42.9	187.8
	CO_2 Plant Stack[a]	Gas	11.9	52.0	11.9	52.0
	HRSG Stack	Oil	75.3	329.9	75.3	27.1
	CO_2 Plant Stack[a]	Oil	13.4	58.5	13.4	4.8

Notes:
(1) Oil may be used as backup fuel for up to 30 days per year.
(2) NO_x limits after 12/31/97 based on 15 ppmvd.
(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.

[1] Or secondary HRSG Stack.

Change To:

2. Emissions from these facilities shall not exceed the limits listed below (based on operation at 59°F):

Pollutant	Source	Fuel[5]	Through 12/31/97[3] lbs/hr	Through 12/31/97[3] tons/yr	After 12/31/97 [1][2][3][4] lbs/hr	After 12/31/97 [1][2][3][4] tons/yr
NO_x	HRSG Stack	Gas	87.8	384.5	52.7	230.7
	Secondary HRSG Stack	Gas	19.9	87.1	18.3	80.0
	HRSG Stack	Oil	164.0	718.2	164.0	59.0
	Secondary HRSG Stack	Oil	23.4	102.4	23.4	8.4
SO_2	HRSG Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	Secondary HRSG Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack	Gas	10% Opacity		10% Opacity	
	Secondary HRSG Stack	Gas	10% Opacity		10% Opacity	
	HRSG Stack	Oil	20% Opacity		20% Opacity	
	Secondary HRSG Stack	Oil	20% Opacity		20% Opacity	
CO	HRSG Stack	Gas	42.9	187.8	53	232 − 187.8 = 44.2 TPY
	Secondary HRSG Stack	Gas	11.9	52.0	12.6	55.2 − 52.0 = 3.2 TPY
	HRSG Stack	Oil	75.3	329.9	75.3	27.1
	Secondary HRSG Stack	Oil	13.4	58.5	13.4	4.8

47.4 TPY

Note: (1) Oil may be used as backup fuel for up to 30 days per year.

(2) NO_x limits **for combustion turbine firing natural gas** after 12/31/97 based on 15 ppmvd.

(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.

(4) CO limits based on CO emission rate of 25 ppmvd from the combustion turbine and is coincident with NO_x limit of 15 ppmvd.

(5) Although only natural gas will be combusted in the duct burner and vented through the secondary HRSG stack, a portion of the exhaust flow from the combustion turbine which serves as combustion air to the secondary HRSG will also be vented through the secondary HRSG stack.

2. SPECIFIC CONDITIONS NO. 3

Change From:

3. The cogeneration facility shall be permitted to fire natural gas and No. 2 fuel oil until December 31, 1997, after which the primary fuel will be natural gas. Fuel consumption rates (based on operation at 20°F) and hours of operation for the turbine and duct burner shall not exceed those listed below:

	Natural Gas			No. 2 Fuel Oil		
	M ft^3/hr	MM ft^3/yr	hrs/yr	Mlb/hr	M lb/yr	hrs/yr
Turbine	1,013.4	8,877.4	8,760	55.6	379.9	6,833[1]
Duct Burner	104.2	912.8	8,760	0	0	0

[1] After December 31, 1997, fuel oil can be used permanently as backup fuel for no more than 720 hours per year.

Change To:

3. The cogeneration facility shall be permitted to fire natural gas and No. 2 fuel oil until December 31, 1997, after which the primary fuel will be natural gas. Fuel consumption rates (based on operation at 20°F) and hours of operation for the turbine and duct burner shall not exceed those listed below:

	Natural Gas			No. 2 Fuel Oil		
	M ft^3/hr	MM ft^3/yr	hrs/yr	lb/hr	M lb/yr	hrs/yr
Turbine	1,013.4	8,877.4	8,760	55.6	379.9	6,833[1]
Duct Burner	104.2	450.2[2]	8,760	0	0	0

[1] After December 31, 1997, fuel oil can be used permanently as backup fuel for no more than 720 hours per year.

[2] **Effective annual fuel consumption based on the duct burner operating for 4,320 hours and firing at the maximum hourly fuel consumption rate.**

3. SPECIFIC CONDITION NO. 4

Change From:

4. Before this construction permit expires, the cogeneration facility and CO_2 Recovery Plant stacks shall be sampled or tested as applicable according to the emission limits in Specific Condition No. 2. Annual compliance tests shall be conducted each year thereafter. Compliance tests shall be run at 96 percent to 100 percent of the maximum capacity achievable for the

average ambient temperature during the compliance tests. The turbine manufacturer's capacity vs. temperature (ambient) curve shall be included with the compliance test results. Tests shall be conducted using the following reference methods:

NO_x: EPA Method 20
SO_2: Fuel supplier's sulfur analysis
VE: EPA Method 9
CO: EPA Method 10
VOC: EPA Method 25A

Change To:
4. Before this construction permit expires, the cogeneration facility and **secondary HRSG** stacks shall be sampled or tested as applicable according to the emission limits in Specific Condition No. 2. Annual compliance tests shall be conducted each year thereafter. Compliance tests shall be run at 96 percent to 100 percent of the maximum capacity achievable for the average ambient temperature during the compliance tests. The turbine manufacturer's capacity vs. temperature (ambient) curve shall be included with the compliance test results. Tests shall be conducted using the following reference methods:

NO_x: EPA Method 20
SO_2: Fuel supplier's sulfur analysis
VE: EPA Method 9
CO: EPA Method 10

All other conditions remain as issued. This letter must be attached to the PSD-FL-187 permit and shall become a part of the permit.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the public notice or within 14 days of their receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information:

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by Petitioner, if any;
(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and
(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this intent. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt of this intent in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

Sincerely,

Virginia Wetherell
Secretary

cc: Jewell A. Harper, EPA
William Thomas, SWD
James W. Coleman, Jr., NPS
D. Martin, Polk County
Ken Kosky, KBN

Florida Depa
Environmenta

Lawton Chiles
Governor

Twin Towers Office
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

August 19, 1993

Mr. Kennard F. Kosky, P.E.
President
KBN Engineering and Applied Sciences, Inc.
1034 Northwest 57th Street
Gainesville, Florida 32605

Re: Permit No. AC53-211670, PSD-FL-187
Mulberry Cogeneration Project

Dear Mr. Kosky:

This is in reply to your August 17 letter requesting revised emission limits for the Mulberry combustion turbine project. The requested changes are based on recent information from the turbine manufacturer and would result in an increase in allowable emissions of 47.4 TPY of CO and a decrease of 153.8 TPY of NO_X.

Although we understand the reasons for requesting the changes now, we recommend waiting until the performance test has been completed. At that time the Department will adjust the limits as called for by the data. This approach avoids the need for further changes later. Your letter will remain on file as a pending request for adjustment of the limits prior to issuing the operation permit.

Sincerely,

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

CHF/JR/bb

ATTACHMENT 1

SPECIFIC CONDITIONS:

2. Emissions from these facilities shall not exceed the limits listed below (based on operation at 59°F):

Pollutant	Source	Fuel	Through 12/31/97 lbs/hr	Through 12/31/97 tons/yr	After 12/31/97 (See notes) lbs/hr	After 12/31/97 (See notes) tons/yr
NO_x	HRSG Stack	Gas	87.8[b]	384.5[b]	52.7	230.7
	CO_2 Plant Stack[a]	Gas	19.9[b]	87.1[b]	18.3	80.0
	HRSG Stack	Oil	164.0	718.2	164.0	59.0
	CO_2 Plant Stack[a]	Oil	23.4	102.4	23.4	8.4
SO_2	HRSG Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	CO_2 Plant Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack	Gas	10% Opacity		10% Opacity	
	CO_2 Plant Stack	Gas	10% Opacity		10% Opacity	
	HRSG Stack	Oil	20% Opacity		20% Opacity	
	CO_2 Plant Stack	Oil	20% Opacity		20% Opacity	
VOC	CO_2 Plant Stack	–	18.2	79.6	17.7	77.6
CO	HRSG Stack	Gas	42.9[b]	187.8[b]	53	232
	CO_2 Plant Stack[a]	Gas	11.9[b]	52.0[b]	12.6	55.2
	HRSG Stack	Oil	75.3	329.9	75.3	27.1
	CO_2 Plant Stack[a]	Oil	13.4	58.5	13.4	4.8

Notes: (1) Oil may be used as backup fuel for up to 30 days per year.
(2) NO_x limits after 12/31/97 based on 15 ppmvd.
(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.
(4) CO limits after 12/21/97 based on CO emission rate of 25 ppmvd from the combustion turbine and is coincident with NO_x limit of 15 ppmvd.

[a] Or secondary HRSG Stack.

[b] Should the combustion turbine achieve a maximum NO_x emission rate of 15 ppmvd, corrected to 15 percent O_2, when initially operated, the NO_x and CO limits would be identical to those conditions specified after 12/31/97.

We will contact you in several days to discuss any questions or concerns you may have with regards to these requested changes. On behalf of Polk Power Partners, L.P. and KBN, we greatly appreciated you and your staff's review of these requested changes to the permit. Your continued cooperation is appreciated.

Sincerely,

Kennard F. Kosky, P.E.
President
Registration No. 14996

1. Catalytic oxidation will not produce a measurable reduction in air quality impacts from those produced using combustion controls. The maximum air quality impacts produced from either the oxidation catalyst or combustion design control techniques are below the significant impact levels for CO.

2. Based on an estimated annualized cost of a CO oxidation catalyst of $1,041,267 (see Table 4-9 in the air construction permit application), the cost effectiveness is approximately $5,570/ton of CO removed (i.e., oxidation catalyst will remove 187 TPY more than combustion design). The cost effectiveness is based on 50 percent operation on gas and 50 percent operation on oil, both at 10 ppmvd, for a maximum total emissions of 94 TPY (i.e., 47 TPY for both gas and oil). With combustion design controls and based on 50 percent operation on gas at 25 ppmvd and 50 percent operation on oil at 35 ppmvd, the maximum emissions are 281 TPY (i.e., 116 TPY on gas and 165 TPY on oil).

Indeed, recent BACT decisions for combustion turbines have set limits in the 30 ppmvd range. The recent air construction permit for the Cane Island Combustion Turbine Project for Kissimmee Utility Authority (AC49-205703/PSD-FL-182) established the CO emission limit as 54 lb/hr, equivalent to 25 ppmvd, for the GE 7EA turbine. This CO limit was established when the proposed unit is limited to NO_x emissions of either 15 or 25 ppmvd.

POTENTIAL REDUCTION IN NITROGEN OXIDES EMISSIONS

From discussions with GE, the combustion turbine may achieve a maximum NO_x emission rate of 15 ppmvd, corrected to 15 percent O_2, when the turbine is initially operated. As a result, a change in the specific permit condition would be submitted to DER to limit the NO_x emission rate from 25 ppmvd to 15 ppmvd. If this occurs, the total reduction in NO_x emissions from the HRSG stack would be approximately 153.8 TPY each year (i.e., 384.5 TPY at 25 ppmvd minus 230.7 TPY at 15 ppmvd) until after December 31, 1997 (when 15 ppmvd is required to be achieved). However, the CO emission limit would need to be revised from the current limit of 20 ppmvd to 25 ppmvd for the reasons previously cited. Again, the combustion design is still considered as BACT as a result of the technical and economic consequences of using catalytic oxidation on combustion turbines. The cost of an oxidation catalyst would be significant and not cost-effective given the proposed CO emission limit of 25 ppmvd when firing gas and 35 ppmvd when firing distillate oil.

Should the combustion turbine achieve a maximum NO_x emission rate of 15 ppmvd, corrected to 15 percent O_2, when initially operated in November, 1994, the revision to Specific Condition No. 2 is attached that would allow a CO emission rate of 25 ppmvd and limit the NO_x emission rate to 15 ppmvd, corrected to 15 percent O_2 prior to December 31, 1997 (see Attachment 1).

KBN

August 17, 1993

Mr. C. H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Mulberry Cogeneration Project
DER File No. AC53-211670, PSD-FL-187
Request for Change in Permit Specific Condition

Dear Clair:

This correspondence is submitted on behalf of Polk Power Partners, L.P. to request a change in the carbon monoxide (CO) emission limitation for the combustion turbine when firing natural gas and provide a potential reduction of the maximum allowable nitrogen oxides (NO_x) emission rate when the unit becomes operational. These changes affect Specific Condition No. 2 of the air construction permit (AC53-211670).

CARBON MONOXIDE EMISSIONS FOR NATURAL GAS FIRING

The request for this change is based on recent performance information obtained for the General Electric PG7111(EA) combustion turbine when it achieves a maximum NO_x emission rate of 15 parts per million (ppm), corrected for dry conditions (ppmvd) and 15 percent oxygen (O_2). At this NOx emission level, GE expects only a maximum CO emission rate of 25 ppmvd. As a result, the CO emission limit would be revised from the current limit of 20 ppmvd to 25 ppmvd and would be in effect when the NO_x emission rate is equal to or less than 15 ppmvd, corrected to 15 percent O_2 (i.e., after December 31, 1997). Prior to December 31, 1997, the CO emission limit of 20 ppmvd is achievable with a NO_x emission limit of 25 ppmvd, corrected to 15 percent O_2, respectively.

The net change in maximum allowable CO emissions is approximately 44.2 TPY for the HRSG stack (i.e., 232 TPY at 25 ppmvd compared to 187.8 TPY at 20 ppmvd) and 3.2 TPY for the CO_2 stack (or secondary boiler) (i.e., 55.2 TPY with the turbine's emissions at 25 ppmvd compared to 52.0 TPY at 20 ppmvd). These increases in CO emissions are not significant and do not significantly change conclusions drawn from the economic, environmental, and energy analyses performed as part of the Best Available Control Technology (BACT) review for this project. Combustion design is still proposed as BACT as a result of the technical and economic consequences of using catalytic oxidation on combustion turbines. Catalytic oxidation is considered unreasonable for the following reasons:

KBN ENGINEERING AND APPLIED SCIENCES INC.

Gainesville, Florida 32605
352-336-5600
FAX 352-336-6603

Tampa, Florida 33607
813-287-1717
FAX 813-287-1716

Boca Raton, Florida 33487
407-994-0050
FAX 407-994-0051

Suite 216
Jacksonville, Florida 32256
904-296-9663 FAX 904-296-0146

Rockville, Maryland 20850
301-738-1100
FAX 301-738-1105

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

September 22, 1992

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. William R. Malenius
Senior Program Manager
Polk Power Partners
23293 South Pointe Drive
Laguna Hills, California 92653

Dear Mr. Malenius:

Attached is one copy of the Technical Evaluation and Preliminary Determination and proposed permit for Polk Power Partners to construct a cogeneration and CO_2 recovery facility in Polk County.

Please submit any written comments you wish to have considered concerning the Department's proposed action to Mr. Preston Lewis of the Bureau of Air Regulation.

Sincerely,

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

CHF/JR/plm

Attachments

c: B. Thomas, SWD
J. Harper, EPA
C. Shaver, NPS
K. Kosky, KBN
D. Martin, Polk County

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

CERTIFIED MAIL

In the Matter of an
Application for Permit by:

DER File No. AC 53-211670
PSD-FL-187

Polk Power Partners
23293 South Pointe Drive
Laguna Hills, California 92653

_____/

INTENT TO ISSUE

The Department of Environmental Regulation gives notice of its intent to issue a permit (copy attached) for the proposed project as detailed in the application specified above, for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

The applicant, Polk Power Partners, applied on April 6, 1992, to the Department of Environmental Regulation for a permit to construct a cogeneration and CO_2 recovery facility 3.7 miles southwest of Bartow in Polk County, Florida.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes and Florida Administrative Code (F.A.C.) Chapters 17-2 and 17-4. The project is not exempt from permitting procedures. The Department has determined that a construction permit is required for the proposed work.

Pursuant to Section 403.815, Florida Statutes and Rule 17-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Notice of Intent to Issue Permit. The notice shall be published one time only within 30 days in the legal ad section of a newspaper of general circulation in the area affected. For the purpose of this rule, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. Where there is more than one newspaper of general circulation in the county, the newspaper used must be one with significant circulation in the area that may be affected by the permits. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed on the fourth page. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within seven days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

The Department will issue the permit with the attached conditions unless a petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the public notice or within 14 days of their receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by Petitioner, if any;
(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and
(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this intent. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt of this intent in the Office of General Counsel at the above address of the Department.

Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this INTENT TO ISSUE and all copies were mailed by certified mail before the close of business on 9-25-92 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Clerk

9-25-92
Date

Copies furnished to:
B. Thomas, SWD
J. Harper, EPA
C. Shaver, NPS
K. Kosky, KBN

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF INTENT TO ISSUE PERMIT

The Department of Environmental Regulation gives notice of its intent to issue a permit to Polk Power Partners, 23293 South Pointe Drive, Laguna Hills, California 92653, to construct a cogeneration and CO_2 recovery facility 3.7 miles southwest of Bartow, Polk County, Florida. A determination of Best Available Control Technology (BACT) is required. The proposed project is subject to Prevention of Significant Deterioration (PSD) regulations and federal new source performance standards. Modeling results show that increases in ground-level concentrations are less than PSD significant impact levels. The Department is issuing this Intent to Issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information; (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by Petitioner, if any; (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this

Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Regulation
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Department of Environmental Regulation
Southwest District
4520 Oak Fair Blvd.
Tampa, Florida 33610-7347

Any person may send written comments on the proposed action to Mr. Preston Lewis at the Department's Tallahassee address. All comments received within 30 days of the publication of this notice will be considered in the Department's final determination.

Further, a public hearing can be requested by any person. Such requests must be submitted within 30 days of this notice.

Technical Evaluation
and
Preliminary Determination

Polk Power Partners
Cogeneration/CO_2 Recovery Project
Polk County, Florida

Permit No. AC 53-211670
PSD-FL-187

Department of Environmental Regulation
Division of Air Resources Management
Bureau of Air Regulation

September 22, 1992

I. Application Information

A. Applicant

Polk Power Partners
23293 South Pointe Drive
Laguna Hills, Florida 92653

B. Request

The applicant submitted an application on April 6, 1992, for a permit to construct a 126 megawatt (MW) combined cycle cogeneration/CO_2 recovery facility near Bartow, Florida. The Department received incompleteness items which made the application complete on July 9, 1992. However, on August 14, 1992, the applicant submitted a letter proposing new NO_x emission limits. This had the effect of moving up the completion date to August 14, 1992.

C. Classification/Location

The proposed facility (SIC Codes 4911 and 2813) will be located on County Road 555 approximately 3.7 miles southwest of Bartow, Polk County, Florida. Latitude and longitude are 27°50'56"N and 81°52'38.9"W, respectively. The UTM coordinates of the site are: Zone 17, 413.6 km E and 3,080.6 km N.

II. Project Description/Emissions

The applicant proposes to construct a 126 MW combined cycle cogeneration power plant along with a 150 ton per day carbon dioxide (CO_2) plant that will recover CO_2 from the power plant flue gas. Cogeneration equipment will include a General Electric combustion turbine (CT), a non-auxiliary fired primary and an auxiliary-fired secondary heat recovery steam generator (HRSG), and a steam turbine generator. CO_2 plant equipment consists of two identical 75 TPD recovery units, each including a CO_2 absorber using monoethanolamine (MEA) solvent, MEA stripper, potassium permanganate ($KMnO_4$) scrubber, carbon adsorption tower, CO_2 compression and refrigeration equipment.

The permanent fuel for the power plant will be natural gas, although the plant will not have a firm contact for natural gas until the fourth year of operation. During the first three years, natural gas will provide a minimum of 22% of fuel requirements with the balance supplied by distillate fuel oil. About two-thirds of the facility's power output will come from the gas turbine generator. Steam from the primary and secondary HRSG will drive a steam turbine to generate the other third of the power output.

Combustion gases from the turbine will be routed to the primary HRSG which provides steam for additional power generation. Part of the turbine exhaust will go to the secondary HRSG to be burned with natural gas forming CO_2-rich feed gas for the CO_2 recovery plant.

The CO_2-enriched flue gas is compressed and scrubbed with MEA solvent to absorb most of the CO_2. MEA is then stripped off the absorbed CO_2 in a steam-heated reboiler with the CO_2 being released through the stripper tower overhead. Purification of the stripped CO_2 is accomplished by scrubbing first with recirculating $KMnO_4$ to remove remaining MEA, then with water to remove soluble impurities. Activated carbon provides the final purification step. The purified CO_2 is compressed, cooled and dried before being liquified in an ammonia refrigeration system. Final products include liquid, solid and gaseous CO_2.

Emission estimates below are based on the initial three-year operation using a 22% gas/78% oil fuel mix followed by natural gas as the permanent fuel. Annual estimates are based on full load operation at 59°F and 0.1% sulfur content of the fuel oil.

Projected Emissions (TPY)

	First 3 yrs (22% Gas/78% Oil)(1)			After First 3 yrs (100% Gas)(2)		
	HRSG Stack	CO_2 Plant Stack	Total	HRSG Stack	CO_2 Plant Stack	Total
NO_x	644.8	99.1	743.9	230.7	80.0	310.7
SO_2	327.4	16.4	343.8	11.4	1.8	13.2
PM/PM_{10}	58.0	28.9	86.9	30.7	27.7	58.4
CO	298.6	57.1	355.7	187.8	52.0	239.8
VOC	37.7	79.3	117.0	28.2	78.8	107.0
H_2SO_4	26.4	1.3	27.7	0.9	0.1	1.0
Be	.008	--	.008	--	--	--
As	.013	--	.013	--	--	--

(1) Based on 25 ppm NO_x (gas) and 42 ppm NO_x (oil).
(2) Based on 15 ppm NO_x (gas).

III. Rule Applicability

The construction permit application is subject to review under Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.) Chapters 17-2 and 17-4. The proposed facility is subject to the provisions of F.A.C. Rule 17-2.500, Prevention of Significant Deterioration (PSD). The facility is located in an area classified as attainment for all regulated air pollutants. The proposed emissions exceed the significant levels set forth in Table 500-2 of F.A.C. Rule 17-2.500. Preconstruction review must include a determination of Best Available Control Technology (BACT), good-engineering practice stack height, ambient impact

analysis, impact on soils, vegetation and visibility. Applicable emission limit rules are F.A.C. Rules 17-2.660, Table 660-1, Section 60.330, New Source Performance Standards (NSPS) for Stationary Gas Turbines, Subpart GG, and F.A.C. Rule 17-2.600(b), Fossil Fuel Steam Generators with Less than 250 Million Btu per Hour Heat Input. Contrary to the applicant's analysis, the emission limits under Subpart Dc of the federal NSPS do not apply to the duct burner since this rule requires only recordkeeping and reporting for natural gas applications. BACT limits will be based on the turbine manufacturer's performance guarantees since they are more stringent than the NSPS limits.

IV. Air Quality Analysis

a. Introduction

The operation of the proposed facility will result in emissions increases which are projected to be greater than the PSD significant emission rates for the following pollutants: NO_x, SO_2, PM, PM_{10}, Be, CO, VOC, inorganic arsenic, and H_2SO_4 mist. Therefore, the project is subject to the PSD NSR requirements contained in F.A.C. Rule 17-2.500(5) for these pollutants. Part of these requirements is an air quality impact analysis for these pollutants, which includes:

- An analysis of existing air quality;
- A PSD increment analysis (for SO_2, PM, PM_{10}, and NO_2);
- An ambient Air Quality Standards analysis (AAQS);
- An analysis of impacts on soils, vegetation, visibility a growth-related air quality impacts; and,
- A Good Engineering Practice (GEP) stack height determination.

The analysis of existing air quality generally relies on preconstruction monitoring data collected in accordance with EPA-approved methods. The PSD increment and AAQS analyses are based on air quality dispersion modeling completed in accordance with EPA guidelines.

Based on these required analyses, the Department has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any PSD increment or ambient air quality standard. A brief description of the modeling methods used and results of the required analyses follow. A more complete description is contained in the permit application on file.

b. Analysis of the Existing Air Quality

Preconstruction ambient air quality monitoring may be required for pollutants subject to PSD review. However, an exemption to the monitoring requirement can be obtained if the maximum air quality impact resulting from the projected emissions increase, as determined through air quality modeling, is less than a pollutant-specific de minimus concentration. The predicted maximum concentration increase for each pollutant subject to PSD (NSR) is given below:

	SO_2	TSP & PM_{10}	NO_2	CO	Be
PSD de minimus Concentra. (ug/m^3)	13	10	14	575	.001
Averaging Time	24-hr	24-hr	Annual	8-hr	24-hr
Maximum Predicted Impact (ug/m^3)	15.5	2.8	0.85	23.6	0.00038

There are no monitoring de minumus concentrations for H_2SO_4 mist and inorganic arsenic. Preconstruction monitoring may be required for ozone concentrations when the maximum potential VOC emissions from a proposed source are projected to be greater than 100 tons per year. The applicant projected emissions from VOCs to be greater than 100 tons per year based on 100% fuel oil firing. The Department is limiting VOC emissions to 79.6 TPY; therefore, no preconstruction monitoring is required. As shown above, the predicted impacts for TSP/PM_{10}, NO_2, CO, and Be are all less than the corresponding de minimus concentrations; therefore, no preconstruction monitoring is required for these pollutants. However, since the predicted SO_2 impact is greater than the de minimus concentration, a preconstruction ambient monitoring analysis is required for SO_2. The Department determined that the use of existing FDER air quality monitoring data collected in 1991 from the Mulberry SO_2 monitoring site in Polk County would be appropriate to satisfy the ambient monitoring analysis requirement. Background SO_2 values of 176 ug/m^3, 3-hr average; 40 ug/m^3, 24-hr average; and 12 ug/m^3, annual average, were based on these data. This site is located 9.7 km away from the project.

c. Modeling Method

The EPA-approved Industrial Source Complex Short-Term (ISCST) dispersion model was used by the applicant to predict the impact of the proposed project on the surrounding ambient air. All recommended EPA default options were used. Downwash parameters were used because the stacks were less than the good engineering practice (GEP) stack height. Five years of sequential hourly surface and mixing depth data from the Tampa, Florida National

Weather Service (NWS) station collected during 1982 through 1986 were used in the model. Since five years of data were used, the highest-second-high (HSH) short-term predicted concentrations are compared with the appropriate ambient air quality standards or PSD increments. For the annual averages, the highest predicted yearly average was compared with the standards.

d. Modeling Results

The applicant first evaluated the potential increase in ambient ground-level concentrations associated with the project to determine if these predicted ambient concentration increases would be greater than specified PSD significant impact levels for SO_2, CO, NO_x, PM and PM_{10}. This evaluation was based on the proposed facility operating at maximum load conditions and 20°F and 100°F design temperatures. Maximum load conditions along with these two design temperatures were used because the highest emissions and flow rate occur at the 20°F design condition while the lowest emissions and flow rate occur at the 100°F design condition. This approach ensured that the maximum impacts from the proposed facility were obtained either for the maximum emission condition or minimum flow rate condition. The applicant modeled emissions based on the use of fuel oil with a maximum sulfur content of 0.1%. Dispersion modeling was performed with receptors placed along the 36 standard radial directions (10 degrees apart) surrounding the proposed units at the following downwind distances: (1) the first 36 receptors were located at the plant property boundaries; (2) subsequent receptors were located at distances of 0.3, 0.5, 0.7, 1.0, 1.5, 2.0, 3.0, 4.0 and 5.0 km from the facility, all of which are off plant property. The results of this modeling presented below show that the increases in ambient ground-level concentrations for all averaging times are less than the PSD significant impact levels for CO, NO_x, PM and PM_{10}.

	SO_2			NO_2	CO		PM and PM_{10}	
Avg. Time	Annual	3-hr	24-hr	Annual	1-hr	8-hr	Ann.	24-hr
PSD Signifi. Level (ug/m^3)	1.0	25.0	5.0	1.0	2000	800	1.0	5.0
Ambient Concen. Increase (ug/m^3)	0.3	42.5	15.5	0.9	58.9	23.6	0.2	2.8

Therefore, further dispersion modeling for comparison with AAQS and PSD increment consumption were not required for CO, NOx, PM and PM_{10}. However, the results also show that the increases in maximum ambient ground level concentrations for the 3-hr and 24-hr averaging times for SO_2 were greater than the PSD significant impact levels, thus requiring the applicant to do a full impact analysis for SO_2. The significant impact area for the facility was determined to be 0.7 km; therefore, all sources within 51 km of the

facility were evaluated by the applicant. Screening analyses were performed to predict maximum SO_2 concentrations for comparison to the PSD Class II increments and the AAQS using the same receptor grid described above. Refined AAQS and PSD Class II analyses were based on modeling the years during which the overall HSH 3-hour and HSH 24-hour concentrations were predicted in the screening analyses. The refined 3-hr and 24-hr modeling was conducted using a receptor grid centered on the receptor which had the HSH 3-hr or 24-hr concentration determined from the screening analysis. These receptors were located at intervals of 200m between the distances considered in the screening phase, along 9 radials spaced at 2-degree increments centered on the radial along which the maximum concentration was predicted. The results of these analyses for SO_2 and their comparison with the appropriate standards and increments are summarized in the following tables. The tables show that the maximum predicted SO_2 concentrations are all less than the appropriate AAQS and PSD increments.

AAQS Analysis (all values in ug/m^3)

Avg. Time	Annual	3-hr	24-hr
Maximum Predicted Concentration	42	837	234
Includes Background Value	12	176	40
AAQS	60	1300	260

Cumulative PSD Class II
Increment Analysis (all values in ug/m^3)

Avg. Time	Annual	3-hr	24-hr
Max. Predicted Consumption Concen.	-0.42	139	39
Increment	20	512	91

The nearest PSD Class I area is the Chassahowitzka National Wilderness Area located 120 km from the facility. The predicted impact of the proposed project on this area was evaluated by first using the ISCST model to predict maximum increment consumptions by the source alone and by comparing these predicted values to the appropriate recommended significance levels to determine whether further modeling was necessary. The significance levels used by the Department were the more stringent National Park Service (NPS) recommended levels. The predicted maximum PM/PM_{10} and NO_2 increment consumptions for all applicable averaging times were less

than these significance levels. Therefore, no further modeling for PM/PM_{10} and NO_2 was required. In addition, the predicted maximum SO_2 annual average increment consumption by the source alone was also below the NPS significance level. However, the predicted maximum SO_2 24-hour and 3-hour concentrations were predicted to be greater than the NPS levels. The Department and the NPS directed the applicant to further evaluate the SO_2 short term impacts on the Class I area. The applicant used ISCST and modeled the inventory of all PSD increment consuming and expanding sources using 1982-1986 Tampa meteorological data. The applicant also modeled the proposed facility's impacts during this time period and compared the results to the NPS significance levels. Results of this evaluation show that on the days and at the location of significant impacts due to the proposed facility, total 3-hour and 24-hour SO_2 impacts at Chassahowitzka were predicted to be less than the allowable 3-hour and 24-hour PSD Class I increments except for one case. In that case, the total 24-hour concentration was predicted to be 5.22 ug/m^3 with the proposed source contributing 0.09 ug/m^3. The allowable 24-hour Class I increment is 5.0 ug/m^3 and the NPS significance level is 0.07 ug/m^3. However, the NPS has stated by verbal communication that they do not expect the proposed facility to adversely impact the Class I area since the maximum predicted impacts were based on the use of fuel oil and the applicant is committed to using and will be limited by the Department to using natural gas as the permanent fuel after the first three years.

Sulfuric acid mist, beryllium and inorganic arsenic are noncriteria pollutants, which means that neither national AAQS nor PSD Significant Impacts have been defined for these pollutants. However, the Department does have a draft Air Toxics Permitting Strategy, which defines no threat levels for these pollutants. The Department and the applicant have used the same modeling procedure described above for the screening analysis to evaluate the maximum increase in ground level concentration of these pollutants for comparison with the no-threat levels. The results of this analysis are shown below:

Avg. Time	H_2SO_4 Mist 24-hr	Be Annual	As Annual
No Threat-Level (ug/m^3)	2.38	0.00042	0.00023
Max. Concen. Increase	1.24	0.00001	0.00001

All of these values are less than their respective no-threat levels.

e. Additional Impacts Analysis

A Level-1 screening analysis using the EPA model, VISCREEN was used to determine any potential adverse visibility impacts on the Class I Chassahowitzka National Wilderness Area located about 120 km away. Based on this analysis, the maximum predicted visual impacts due to the proposed project are less than the screening criteria both inside and outside the Class I area. A comprehensive air quality related values (AQRV) analysis for this Class I area was performed by the applicant.

In addition, the maximum predicted concentrations from NOx, CO, SO_2, PM and PM_{10} are predicted to be less than the AAQS, including the national secondary standards designed to protect public welfare-related values. As such, no harmful effects on soil and vegetation are expected in the area of the project. Also, the proposed modification will not significantly change employment, population, housing or commercial/industrial development in the area to the extent that a significant air quality impact will result.

VI. Conclusion

Based on the information provided by Polk Power Partners, L.P., the Department has reasonable assurance that the proposed installation, as described in this evaluation, and subject to the conditions proposed herein, will not cause or contribute to a violation of any air quality standard, PSD increment, or any other technical provision of Chapter 17-2 of the Florida Administrative Code.

P. Linero #41755

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

PERMITTEE:
Polk Power Partners, L.P.
23293 South Pointe Drive
Laguna Hills, CA 92653

Permit Number: AC 53-211670
PSD-FL-187
Expiration Date: December 31, 1994
County: Polk
Latitude/Longitude: 27°50'56"N
81°52'39"W
Project: Mulberry Cogeneration Project

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the construction of a 126 Megawatt cogeneration unit along with a 150 ton per day CO_2 recovery plant. The facility will be located off County Road 555 approximately 3.7 miles southwest of Bartow in Polk County, Florida. UTM coordinates of the site are: Zone 17, 413.6 km E and 3080.6 km N.

Particulate emissions shall be controlled by using clean fuels and good combustion practices. CO emissions shall be controlled by proper combustion techniques. NO_X emissions shall be initially controlled by water injection and Low NO_X Burners. Future control technology for NOx (SCR) will depend on whether the Low NO_X Burners can achieve the levels specified by this permit.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:
1. DER letter dated May 5, 1992.
2. KBN letter dated April 15, 1992.
3. KBN letter dated June 2, 1992.
4. EPA letter dated July 1, 1992.
5. KBN submittal dated July 8, 1992.
6. KBN letter dated July 29, 1992.
7. KBN letter dated August 12, 1992.
8. DER letter dated August 13, 1992.
9. KBN letter dated August 26, 1992.

GENERAL CONDITIONS:

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.

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, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any 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 of 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.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgement 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.

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.

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.

GENERAL CONDITIONS:

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 any 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.

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.

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.

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 extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

GENERAL CONDITIONS:

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.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-30.300, 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.

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

13. This permit also constitutes:

(x) Determination of Best Available Control Technology (BACT)
(x) Determination of Prevention of Significant Deterioration (PSD)
(x) Compliance with New Source Performance Standards (NSPS)

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 for 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:

- the date, exact place, and time of sampling or measurements;

PERMITTEE:
Polk Power Partners, L.P.

Permit Number: AC 53-211670
PSD-FL-187
Expiration Date: December 31, 1994

GENERAL CONDITIONS:

- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

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.

SPECIFIC CONDITIONS:

1. Unless otherwise indicated, the construction and operation of the subject facilities shall be in accordance with the capacities and specifications stated in the application.

2. Emissions from these facilities shall not exceed the limits listed below (based on operation at 59°F):

Pollutant	Source	Fuel	Through 12/31/97 lbs/hr	Through 12/31/97 tons/yr	After 12/31/97 (See notes) lbs/hr	After 12/31/97 (See notes) tons/yr
NOx	HRSG Stack	Gas	87.8	384.5	52.7	230.7
	CO_2 Plant Stack	Gas	19.9	87.1	18.3	80.0
	HRSG Stack	Oil	164.0	718.2	164.0	59.0
	CO_2 Plant Stack	Oil	23.4	102.4	23.4	8.4
SO2	HRSG Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	CO_2 Plant Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack	Gas	10% Opacity		10% Opacity	
	CO_2 Plant Stack	Gas	10% Opacity		10% Opacity	
	HRSG Stack	Oil	20% Opacity		20% Opacity	
	CO_2 Plant Stack	Oil	20% Opacity		20% Opacity	
VOC	CO_2 Plant Stack	--	18.2	79.6	17.7	77.6
CO	HRSG Stack	Gas	42.9	187.8	42.9	187.8
	CO_2 Plant Stack	Gas	11.9	52.0	11.9	52.0
	HRSG Stack	Oil	75.3	329.9	75.3	~~329.9~~ 27.1
	CO_2 Plant Stack	Oil	13.4	58.5	13.4	~~58.5~~ 4.8

~~Except for one 6-minute period per hour of not more than 27% opacity.~~

~~Based on 15 ppmvd NO_x.~~

Notes:
(1) Oil may be used as backup fuel for up to 30 days per year.
(2) NO_x limits after 12/31/97 based on 15 ppmvd.
(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.

SPECIFIC CONDITIONS:

3. The cogeneration facility shall be permitted to fire natural gas ~~permanently~~ and No. 2 fuel oil ~~for the first three years of operation~~ Until December 31, 1997, after which the primary fuel will be natural gas. Fuel consumption rates (based on operation at 20°F) and hours of operation for the turbine and duct burner shall not exceed those listed below:

	Natural Gas			No. 2 Fuel Oil		
	M ft3/hr	MM ft3/yr	hrs/yr	M lb/hr	M lb/yr	hrs/yr
Turbine	1013.4 ~~914.5~~	8,872 ~~8011.0~~	8760	~~55.6~~	~~379.4~~ ~~487.0~~	~~6701~~ 6838 (1)
Duct Burner	104.2	912.8	8760	0	0	0

(1) After December 31, 1997, fuel oil can be used permanently as backup fuel for no more than 720 hours per year.

4. Before this construction permit expires, the cogeneration facility and CO_2 Recovery Plant stacks shall be sampled or tested as applicable according to the emission limits in Specific Condition No. 2. Annual compliance tests shall be conducted each year thereafter. Compliance tests shall be run at 96% to 100% of the maximum capacity achievable for the average ambient temperature during the compliance tests. The turbine manufacturer's capacity vs. temperature (ambient) curve shall be included with the compliance test results. Tests shall be conducted using the following reference methods:

NO_x: EPA Method 20
SO_2: Fuel supplier's sulfur analysis
VE: EPA Method 9
CO: EPA Method 10
VOC: EPA Method 25A

5. The DER Southwest District office shall be notified at least 30 days prior to the compliance tests. Compliance test results shall be submitted to the DER Southwest District office in Tampa and the DER Bureau of Air Regulation office in Tallahassee (third annual compliance test only) within 45 days after completion of the tests. Sampling facilities, methods, and reporting shall be in accordance with F.A.C. Rule 17-2.700 and 40 CFR 60, Appendix A.

6. A continuous operations monitoring system shall be installed, operated, and maintained in accordance with 40 CFR 60.334. The natural gas, fuel oil and water injection flows to the cogeneration turbine along with the power output of the generators shall be metered and continuously recorded. The data shall be logged daily and maintained so that it can be provided to DER upon request.

7. The permittee shall have the option of including, in the initial construction, adequate modules and other provisions

SPECIFIC CONDITIONS:

necessary for future installation of state-of-the-art catalytic abatement or equivalent NOx control systems. Within 90 days of receipt of the third annual compliance test results, the Bureau of Air Regulation shall, if NO_X emission limits are not met, review the need for making a revised determination of Best Available Control Technology. If test results show that it is unlikely that NO_X limits can be met, a revised BACT determination shall be made. The Department may revise the BACT determination to require installation of such technology if so indicated by the revised BACT cost/benefit analysis. The retrofit costs associated with not making provisions for such technology initially shall not be considered by the Department in the retrofit cost analysis.

8. The permittee, for good cause, may request that this construction 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 (F.A.C. Rule 17-4.090).

9. An application for an operation permit must be submitted to the Southwest District office at least 90 days prior to the expiration date of this construction permit. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rules 17-4.055 and 17-4.220).

Issued this _____ day
of _____, 1992

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

_____
Carol M. Browner, Secretary

Best Available Control Technology (BACT) Determination
Mulberry Cogeneration Project
Polk County

The applicant proposes to install a 126 MW combined cycle cogeneration unit along with a 150 TPD carbon dioxide plant that will recover CO_2 from the power plant flue gas. The Polk County facility will consist of a General Electric PG7111EA Gas Turbine Generator exhausting through a primary heat recovery steam generator which will produce steam for the steam-electric cycle. Initially, the turbine will be fired by natural gas and No. 2 fuel oil, with natural gas becoming the permanent fuel after the first three years of operation. A secondary heat recovery steam generator will be auxiliary-fired by natural gas to provide a CO_2-enriched flue gas feed to the CO_2 recovery plant.

Date of Receipt of a Complete Application

August 14, 1992

BACT Determination Requested by Applicant

NO_x - Dry Low NO_x Combustion
CO - Combustion Design
H_2SO_4/SO_2 - Low Sulfur Fuel Oil (0.1%S)
VOC - Combustion Design for CT
Scrubber for CO_2 Absorber Exhaust
PM/PM_{10} - Combustion Design/Clean Fuel

BACT Determination by the Department

NO_x - Dry Low NO_x Combustion with potential future SCR capability
CO - Combustion Design
H_2SO_4/SO_2 - Low Sulfur Fuel Oil (0.1%S)
VOC - Combustion Design for CT
Scrubber for CO_2 Absorber Exhaust
PM/PM_{10} - Combustion Design/Clean Fuel

Proposed Emission Limits (tons per year)

	First 3 yrs (22% Gas/78% Oil)			After First 3 yrs (100% Gas)			PSD
	HRSG	CO_2 Plant	Total	HRSG	CO_2 Plant	Total	
NO_x	644.8	99.1	743.9	230.7	80.0	310.7	40.0
SO_2	327.4	16.4	343.8	11.4	1.8	13.2	40.0
PM/PM_{10}	58.0	28.9	86.9	30.7	27.7	58.4	25/15
CO	298.6	57.1	355.7	187.8	52.0	239.8	100.0
VOC	37.7	79.3	117.0	28.2	78.8	107.0	40.0
H_2SO_4	26.4	1.3	27.7	0.9	0.1	1.0	7.0
Be	.008	--	.008	--	--	--	0.0004
As	.013	--	.013	--	--	--	0.0

These limits assume that 4.6% of the turbine exhaust mass flow is diverted to the CO_2 plant. Emissions for the first three years are based on firing 22% gas - 78% oil in the turbine for 8,760 hours/yr at 1016 MMBtu/hr and natural gas in the duct burner for 8,760 hours/yr at 99 MMBtu/hr. Emissions after the first three years are based on firing only natural gas at 868.8 MMBtu/hr. Turbine performance under natural gas firing is based on NO_x emissions of 25 ppm (corrected to 15 percent O_2) for the first three years and 15 ppm thereafter. Performance on oil firing is based on NO_x emissions of 42 ppmvd (corrected to 15 percent O_2). SO_2 emissions are based on 0.1 percent sulfur.

BACT Determination Procedure

In accordance with Florida Administrative Code Chapter 17-2, Air Pollution, this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the 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:

(a) Any Environmental Protection Agency determination of Best Available Control Technology 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).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) 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 source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, than 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.

BACT Determination Rationale

Particulate Matter (PM/PM_{10})

Particulate emissions will be minimized by combustion control and the use of clean fuels. The particulate emissions from the combustion turbine when burning natural gas and fuel oil will not cause visible emissions to exceed 10% and 20% opacity, respectively.

Arsenic and Berylium (As, Be)

The Department agrees that there are no feasible methods to control beryllium and arsenic except by specifying the quality of the fuel.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

The majority of BACT emissions limitations have been based on controlling carbon monoxide and volatile organic compounds through efficient combustion. Advanced control is achievable through the use of catalytic oxidation. Catalytic oxidation is a postcombustion control that has been employed in CO nonattainment areas where regulations have required CO emission levels to be less than those associated with wet injection. These installations have been required to use LAER technology and typically have CO limits in the 10-ppm range (corrected to dry conditions).

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst such as platinum. Combustion of CO starts at about 300°F, with efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, which reduces the amount of thermal energy required. For CT/HRSG combinations, the oxidation catalyst can be located directly after the CT or in the HRSG. Catalyst size depends upon the exhaust flow, temperature, and desired efficiency.

Due to the oxidation of sulfur compounds and excessive formation of H_2SO_4 mist emissions, oxidation catalyst systems are not considered to be technically feasible for gas turbines fired with fuel oil. Catalytic oxidation has not been demonstrated on a continuous basis when using fuel oil.

Use of oxidation catalyst technology would be feasible for a natural gas-fired unit; however, the cost effectiveness of over $6,000 per ton of CO removed will have a significant economic impact on this project. Therefore, efficient combustion will be the control method for CO and VOC.

Nitrogen Oxides (NO_X)

The applicant requested that BACT for nitrogen oxides during the first three years be water injection and Low NO_X Burners. This would limit emissions to 25 ppmvd when burning natural gas and 42 ppmvd when burning fuel oil.

A review of the EPA's BACT/LAER Clearinghouse indicates that the lowest NO_X emission limit established to date for a combustion turbine is 4.5 ppmvd (corrected to 15% O_2). This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system.

Selective catalytic reduction is a post-combustion method for control of NO_X emissions. The SCR process combines vaporized ammonia with NO_X in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed. The SCR process can achieve up to 90% reduction of NO_X with a new catalyst. As the catalyst ages, the maximum NO_X reduction will decrease to approximately 86 percent.

Although feasible, the applicant rejected using SCR because of economic, energy, and environmental impacts. The following factors were considered in the decision not to propose SCR:

a) Disposal of hazardous waste generated (spend catalyst).
b) An energy penalty of $0.05/KWH due to back pressure from the catalyst bed.
c) A power loss penalty based on lost capacity.
d) Potential for public exposure to high concentrations from ammonia storage and handling leaks and ammonia slip.
e) Ammonium bisulfate and ammonium sulfate particulate emissions (ammonium salts) due to the reaction of NH_3 with SO_3 present in the exhaust gases.
f) Cost effectiveness for SCR technology was determined to be in the range of $6,000 per ton of NO_X removed.

A concern associated with the use of SCR on combined cycle projects is the formation of ammonium bisulfate which can be formed by reaction of sulfur in the fuel and the ammonia injected. The ammonium bisulfate has a tendency to plug the tubes of the heat recovery steam generator leading to operational problems. The latest information available indicates that SCR can be used for oil firing provided that adjustments are made in the ammonia to NO_X injection ratio. For natural gas firing, NO_X emissions can be controlled with up to a 90 percent efficiency using a 1 to 1 or greater injection ratio. By lowering the injection ratio for oil firing, testing has indicated that NO_X can be controlled with efficiencies ranging from 60 to 75 percent. When the injection

ratio is lowered there is not a problem with ammonium bisulfate formation since essentially all of the ammonia is able to react with the nitrogen oxides present in the combustion gases. SCR has been established as BACT for oil fired combined cycle facilities with NO_X emission limits ranging from 11.7 to 25 ppmvd depending on the efficiency of control.

The applicant determined that the total annual cost of SCR for this project is $1,957,700 with an average cost effectiveness in the range of $6,000 to $7,000 per ton of NO_X removed. The maximum annual NO_X emissions using water injection and Low NO_X combustor design will be 744 tons/year for the first three years. Assuming that SCR would reduce the NO_X emissions by 65%, about 484 tons/year of NO_X would be removed initially followed by 200 tons/year thereafter. When this reduction is factored into the total annual cost, the cost per ton of controlling NO_X is in the range of $6,000 to $6,500. This calculated cost is higher than has previously been approved as BACT.

The latest DER BACT determinations have a NO_X limit of 15 ppmvd (natural gas) using Low-NO_X burner technology. Although the turbine manufacturer does not presently guarantee this limit, they have agreed to lower NO_X to 15 ppm by 4/30/97. This lower NO_X limit will be achieved by application of low-NO_X burners or SCR. Therefore, the Department accepts water injection and Low NO_X Burner design as BACT for a limited time (up to 4/30/97).

The calculations that the applicant presented and Department findings indicate that the cost of controlling NO_X is high compared to other BACT determinations which require SCR. Based on the information presented by the applicant, the Department believes that the use of SCR for NO_X control is not justifiable as BACT at this time.

The Department will revise ~~and lower~~ the allowable BACT limit for this project, no later than 4/30/97. It is the Department's understanding that the turbine manufacturer will be able to achieve 15 ppmvd NO_X emission limits within this period. If the 15 (gas)/42 (oil) ppmvd emission rates cannot be met ~~by April 30, 1997,~~ SCR ~~will be installed.~~ may be required if necessary no later than December 31, 1997.

Sulfur Dioxide(SO_2) and Sulfuric Acid Mist (H_2SO_4)

In accordance with "top down" BACT review, only two alternatives exist that would result in stringent SO_2 emissions; using low sulfur content fuel oil or flue gas desulfurization (FGD). EPA has recognized that FGD technology is inappropriate to apply to these combustion units due to negative environmental, economic and energy impacts. Sludge would be generated that would have to be disposed of properly, and there would be increased utility (electricity and

water) costs associated with the operation of a FGD system. Finally, there is no information in the literature to indicate that FGD has ever been applied to stationary gas turbines burning distillate oil.

This leaves the use of low sulfur fuel oil as the best option. The Department accepts the use of No. 2 fuel oil with a 0.1% sulfur by weight as BACT for this project.

Details of the Analysis May be Obtained by Contacting:

Preston Lewis, BACT Coordinator
Department of Environmental Regulation
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:

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

_____ 1992
Date

Approved by:

Carol M. Browner, Secretary
Dept. of Environmental Regulation

_____ 1992
Date

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT

In the matter of an
Application for Permit by:

Mr. William R. Malenius
Polk Power Partners
23293 South Pointe Drive
Laguna Hills, CA 92653

DER File No. AC53-211670
PSD-FL-187
Polk County

Enclosed is Permit Number AC53-211670 to construct a cogeneration and CO_2 recovery facility at County Road 555 approximately 3.7 miles southwest of Bartow, Polk County, Florida, issued pursuant to Section(s) 403, Florida Statutes.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on 11-24-92 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED,
on this date, pursuant to
§120.52(11), Florida Statutes,
with the designated Department
Clerk, receipt of which is hereby
acknowledged.

Kurt Doper (Clerk) 11-24-92 (Date)

Copies furnished to:
W. Thomas, SWD
D. Martin, Polk Co.
J. Harper, EPA
C. Shaver, NPS
K. Kosky, KBN

Final Determination

Polk Power Partners
Cogeneration/CO_2 Recovery Project
Polk County, Florida

Permit No. AC 53-211670
PSD-FL-187

Department of Environmental Regulation
Division of Air Resources Management
Bureau of Air Regulation

November 19, 1992

Final Determination

The Technical Evaluation and Preliminary Determination for the permit to construct a cogeneration and CO_2 recovery facility approximately 3.7 miles southwest of Bartow in Polk County, Florida, was distributed on September 22, 1992. The Notice of Intent to Issue was published in the Polk County Democrat on October 8, 1992. Copies of the evaluation were available for public inspection at the Department's Tallahassee and Tampa offices.

On October 26, 1992, a letter was received from the EPA concurring with the Department's proposed action. Comments were received from the applicant on October 13 and November 4, 1992, requesting minor modifications of certain specific conditions. The Department made the following changes in response to those comments:

Specific Condition No. 2 - The emission limits were modified to show fuel oil use as backup after the first three years of operation. Oil use is limited to 30 days per year after December 31, 1997.

Specific Condition No. 3 - Fuel consumption rates and hours of operation were modified to show fuel oil use as backup after the first three years of operation and limited use (30 days per year) after December 31, 1997.

BACT Determination - Minor revisions were made to the last paragraph of the NO_x section to clarify that SCR may be required if the emission limits are not achieved by April 30, 1997.

The final action of the Department will be to issue construction permit AC53-211670 (PSD-FL-187) as modified.

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

PERMITTEE:
Polk Power Partners, L.P.
23293 South Pointe Drive
Laguna Hills, CA 92653

Permit Number: AC 53-211670
PSD-FL-187
Expiration Date: December 31, 1994
County: Polk
Latitude/Longitude: 27°50'56"N
81°52'39"W
Project: Mulberry Cogeneration Project

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the construction of a 126 Megawatt cogeneration unit along with a 150 ton per day CO_2 recovery plant. The facility will be located off County Road 555 approximately 3.7 miles southwest of Bartow in Polk County, Florida. UTM coordinates of the site are: Zone 17, 413.6 km E and 3080.6 km N.

Particulate emissions shall be controlled by using clean fuels and good combustion practices. CO emissions shall be controlled by proper combustion techniques. NO_x emissions shall be initially controlled by water injection and Low NO_x Burners. Future control technology for NOx (SCR) will depend on whether the Low NO_x Burners can achieve the levels specified by this permit.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:
1. DER letter dated May 5, 1992.
2. KBN letter dated April 15, 1992.
3. KBN letter dated June 2, 1992.
4. EPA letter dated July 1, 1992.
5. KBN submittal dated July 8, 1992.
6. KBN letter dated July 29, 1992.
7. KBN letter dated August 12, 1992.
8. DER letter dated August 13, 1992.
9. KBN letter dated August 26, 1992.
10. KBN letter dated October 12, 1992.
11. KBN letter dated November 2, 1992.

GENERAL CONDITIONS:

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.

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, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any 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 of 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.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgement 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.

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.

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.

GENERAL CONDITIONS:

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 any 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.

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.

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.

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 extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

GENERAL CONDITIONS:

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.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-30.300, 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.

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

13. This permit also constitutes:

(x) Determination of Best Available Control Technology (BACT)
(x) Determination of Prevention of Significant Deterioration (PSD)
(x) Compliance with New Source Performance Standards (NSPS)

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 for 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:

- the date, exact place, and time of sampling or measurements;

GENERAL CONDITIONS:

- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

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.

SPECIFIC CONDITIONS:

1. Unless otherwise indicated, the construction and operation of the subject facilities shall be in accordance with the capacities and specifications stated in the application.

2. Emissions from these facilities shall not exceed the limits listed below (based on operation at 59°F):

Pollutant	Source	Fuel	Through 12/31/97 lbs/hr	Through 12/31/97 tons/yr	After 12/31/97 (See notes) lbs/hr	After 12/31/97 (See notes) tons/yr
NOx	HRSG Stack	Gas	87.8	384.5	52.7	230.7
	CO_2 Plant Stack	Gas	19.9	87.1	18.3	80.0
	HRSG Stack	Oil	164.0	718.2	164.0	59.0
	CO_2 Plant Stack	Oil	23.4	102.4	23.4	8.4
SO2	HRSG Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	CO_2 Plant Stack	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack	Gas	10% Opacity		10% Opacity	
	CO_2 Plant Stack	Gas	10% Opacity		10% Opacity	
	HRSG Stack	Oil	20% Opacity		20% Opacity	
	CO_2 Plant Stack	Oil	20% Opacity		20% Opacity	
VOC	CO_2 Plant Stack	--	18.2	79.6	17.7	77.6
CO	HRSG Stack	Gas	42.9	187.8	42.9	187.8
	CO_2 Plant Stack	Gas	11.9	52.0	11.9	52.0
	HRSG Stack	Oil	75.3	329.9	75.3	27.1
	CO_2 Plant Stack	Oil	13.4	58.5	13.4	4.8

Notes: (1) Oil may be used as backup fuel for up to 30 days per year.
(2) NO_x limits after 12/31/97 based on 15 ppmvd.
(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.

SPECIFIC CONDITIONS:

3. The cogeneration facility shall be permitted to fire natural gas and No. 2 fuel oil until December 31, 1997, after which the primary fuel will be natural gas. Fuel consumption rates (based on operation at 20°F) and hours of operation for the turbine and duct burner shall not exceed those listed below:

	Natural Gas			No. 2 Fuel Oil		
	M ft3/hr	MM ft3/yr	hrs/yr	M lb/hr	M lb/yr	hrs/yr
Turbine	1013.4	8877.4	8760	55.6	379.9	6833(1)
Duct Burner	104.2	912.8	8760	0	0	0

(1) After December 31, 1997, fuel oil can be used permanently as backup fuel for no more than 720 hours per year.

4. Before this construction permit expires, the cogeneration facility and CO_2 Recovery Plant stacks shall be sampled or tested as applicable according to the emission limits in Specific Condition No. 2. Annual compliance tests shall be conducted each year thereafter. Compliance tests shall be run at 96% to 100% of the maximum capacity achievable for the average ambient temperature during the compliance tests. The turbine manufacturer's capacity vs. temperature (ambient) curve shall be included with the compliance test results. Tests shall be conducted using the following reference methods:

NO_X: EPA Method 20
SO_2: Fuel supplier's sulfur analysis
VE: EPA Method 9
CO: EPA Method 10
VOC: EPA Method 25A

5. The DER Southwest District office shall be notified at least 30 days prior to the compliance tests. Compliance test results shall be submitted to the DER Southwest District office in Tampa and the DER Bureau of Air Regulation office in Tallahassee (third annual compliance test only) within 45 days after completion of the tests. Sampling facilities, methods, and reporting shall be in accordance with F.A.C. Rule 17-2.700 and 40 CFR 60, Appendix A.

6. A continuous operations monitoring system shall be installed, operated, and maintained in accordance with 40 CFR 60.334. The natural gas, fuel oil and water injection flows to the cogeneration turbine along with the power output of the generators shall be metered and continuously recorded. The data shall be logged daily and maintained so that it can be provided to DER upon request.

7. The permittee shall have the option of including, in the initial construction, adequate modules and other provisions

SPECIFIC CONDITIONS:

necessary for future installation of state-of-the-art catalytic abatement or equivalent NOx control systems. Within 90 days of receipt of the third annual compliance test results, the Bureau of Air Regulation shall, if NO_x emission limits are not met, review the need for making a revised determination of Best Available Control Technology. If test results show that it is unlikely that NO_x limits can be met, a revised BACT determination shall be made. The Department may revise the BACT determination to require installation of such technology if so indicated by the revised BACT cost/benefit analysis. The retrofit costs associated with not making provisions for such technology initially shall not be considered by the Department in the retrofit cost analysis.

8. The permittee, for good cause, may request that this construction 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 (F.A.C. Rule 17-4.090).

9. An application for an operation permit must be submitted to the Southwest District office at least 90 days prior to the expiration date of this construction permit. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rules 17-4.055 and 17-4.220).

Issued this 20th day
of November, 1992

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Carol M. Browner, Secretary

Best Available Control Technology (BACT) Determination
Mulberry Cogeneration Project
Polk County

The applicant proposes to install a 126 MW combined cycle cogeneration unit along with a 150 TPD carbon dioxide plant that will recover CO_2 from the power plant flue gas. The Polk County facility will consist of a General Electric PG7111EA Gas Turbine Generator exhausting through a primary heat recovery steam generator which will produce steam for the steam-electric cycle. Initially, the turbine will be fired by natural gas and No. 2 fuel oil, with natural gas becoming the permanent fuel after the first three years of operation. A secondary heat recovery steam generator will be auxiliary-fired by natural gas to provide a CO_2-enriched flue gas feed to the CO_2 recovery plant.

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August 14, 1992

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NO_x	- Dry Low NO_x Combustion
CO	- Combustion Design
H_2SO_4/SO_2	- Low Sulfur Fuel Oil (0.1%S)
VOC	- Combustion Design for CT Scrubber for CO_2 Absorber Exhaust
PM/PM_{10}	- Combustion Design/Clean Fuel

BACT Determination by the Department

NO_x	- Dry Low NO_x Combustion with potential future SCR capability
CO	- Combustion Design
H_2SO_4/SO_2	- Low Sulfur Fuel Oil (0.1%S)
VOC	- Combustion Design for CT Scrubber for CO_2 Absorber Exhaust
PM/PM_{10}	- Combustion Design/Clean Fuel

Proposed Emission Limits (tons per year)

	First 3 yrs (22% Gas/78% Oil)			After First 3 yrs (100% Gas)			PSD
	HRSG	CO_2 Plant	Total	HRSG	CO_2 Plant	Total	
NO_x	644.8	99.1	743.9	230.7	80.0	310.7	40.0
SO_2	327.4	16.4	343.8	11.4	1.8	13.2	40.0
PM/PM_{10}	58.0	28.9	86.9	30.7	27.7	58.4	25/15
CO	298.6	57.1	355.7	187.8	52.0	239.8	100.0
VOC	37.7	79.3	117.0	28.2	78.8	107.0	40.0
H_2SO_4	26.4	1.3	27.7	0.9	0.1	1.0	7.0
Be	.008	--	.008	--	--	--	0.0004
As	.013	--	.013	--	--	--	0.0

These limits assume that 4.6% of the turbine exhaust mass flow is diverted to the CO_2 plant. Emissions for the first three years are based on firing 22% gas - 78% oil in the turbine for 8,760 hours/yr at 1016 MMBtu/hr and natural gas in the duct burner for 8,760 hours/yr at 99 MMBtu/hr. Emissions after the first three years are based on firing only natural gas at 868.8 MMBtu/hr. Turbine performance under natural gas firing is based on NO_x emissions of 25 ppm (corrected to 15 percent O_2) for the first three years and 15 ppm thereafter. Performance on oil firing is based on NO_x emissions of 42 ppmvd (corrected to 15 percent O_2). SO_2 emissions are based on 0.1 percent sulfur.

BACT Determination Procedure

In accordance with Florida Administrative Code Chapter 17-2, Air Pollution, this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the 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:

(a) Any Environmental Protection Agency determination of Best Available Control Technology 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).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) 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 source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, than 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.

BACT Determination Rationale

Particulate Matter (PM/PM_{10})

Particulate emissions will be minimized by combustion control and the use of clean fuels. The particulate emissions from the combustion turbine when burning natural gas and fuel oil will not cause visible emissions to exceed 10% and 20% opacity, respectively.

Arsenic and Berylium (As, Be)

The Department agrees that there are no feasible methods to control beryllium and arsenic except by specifying the quality of the fuel.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

The majority of BACT emissions limitations have been based on controlling carbon monoxide and volatile organic compounds through efficient combustion. Advanced control is achievable through the use of catalytic oxidation. Catalytic oxidation is a postcombustion control that has been employed in CO nonattainment areas where regulations have required CO emission levels to be less than those associated with wet injection. These installations have been required to use LAER technology and typically have CO limits in the 10-ppm range (corrected to dry conditions).

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst such as platinum. Combustion of CO starts at about 300°F, with efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, which reduces the amount of thermal energy required. For CT/HRSG combinations, the oxidation catalyst can be located directly after the CT or in the HRSG. Catalyst size depends upon the exhaust flow, temperature, and desired efficiency.

Due to the oxidation of sulfur compounds and excessive formation of H_2SO_4 mist emissions, oxidation catalyst systems are not considered to be technically feasible for gas turbines fired with fuel oil. Catalytic oxidation has not been demonstrated on a continuous basis when using fuel oil.

Use of oxidation catalyst technology would be feasible for a natural gas-fired unit; however, the cost effectiveness of over $6,000 per ton of CO removed will have a significant economic impact on this project. Therefore, efficient combustion will be the control method for CO and VOC.

Nitrogen Oxides (NO_X)

The applicant requested that BACT for nitrogen oxides during the first three years be water injection and Low NO_X Burners. This would limit emissions to 25 ppmvd when burning natural gas and 42 ppmvd when burning fuel oil.

A review of the EPA's BACT/LAER Clearinghouse indicates that the lowest NO_X emission limit established to date for a combustion turbine is 4.5 ppmvd (corrected to 15% O_2). This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system.

Selective catalytic reduction is a post-combustion method for control of NO_X emissions. The SCR process combines vaporized ammonia with NO_X in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed. The SCR process can achieve up to 90% reduction of NO_X with a new catalyst. As the catalyst ages, the maximum NO_X reduction will decrease to approximately 86 percent.

Although feasible, the applicant rejected using SCR because of economic, energy, and environmental impacts. The following factors were considered in the decision not to propose SCR:

a) Disposal of hazardous waste generated (spent catalyst).
b) An energy penalty of $0.05/KWH due to back pressure from the catalyst bed.
c) A power loss penalty based on lost capacity.
d) Potential for public exposure to high concentrations from ammonia storage and handling leaks and ammonia slip.
e) Ammonium bisulfate and ammonium sulfate particulate emissions (ammonium salts) due to the reaction of NH_3 with SO_3 present in the exhaust gases.
f) Cost effectiveness for SCR technology was determined to be in the range of $6,000 per ton of NO_X removed.

A concern associated with the use of SCR on combined cycle projects is the formation of ammonium bisulfate which can be formed by reaction of sulfur in the fuel and the ammonia injected. The ammonium bisulfate has a tendency to plug the tubes of the heat recovery steam generator leading to operational problems. The latest information available indicates that SCR can be used for oil firing provided that adjustments are made in the ammonia to NO_X injection ratio. For natural gas firing, NO_X emissions can be controlled with up to a 90 percent efficiency using a 1 to 1 or greater injection ratio. By lowering the injection ratio for oil firing, testing has indicated that NO_X can be controlled with efficiencies ranging from 60 to 75 percent. When the injection

ratio is lowered there is not a problem with ammonium bisulfate formation since essentially all of the ammonia is able to react with the nitrogen oxides present in the combustion gases. SCR has been established as BACT for oil fired combined cycle facilities with NO_X emission limits ranging from 11.7 to 25 ppmvd depending on the efficiency of control.

The applicant determined that the total annual cost of SCR for this project is $1,957,700 with an average cost effectiveness in the range of $6,000 to $7,000 per ton of NO_X removed. The maximum annual NO_X emissions using water injection and Low NO_X combustor design will be 744 tons/year for the first three years. Assuming that SCR would reduce the NO_X emissions by 65%, about 484 tons/year of NO_X would be removed initially followed by 200 tons/year thereafter. When this reduction is factored into the total annual cost, the cost per ton of controlling NO_X is in the range of $6,000 to $6,500. This calculated cost is higher than has previously been approved as BACT.

The latest DER BACT determinations have a NO_X limit of 15 ppmvd (natural gas) using Low-NO_X burner technology. Although the turbine manufacturer does not presently guarantee this limit, they have agreed to lower NO_X to 15 ppm by 4/30/97. This lower NO_X limit will be achieved by application of low-NO_X burners or SCR. Therefore, the Department accepts water injection and Low-NO_X Burner design as BACT for a limited time (up to 4/30/97).

The calculations that the applicant presented and Department findings indicate that the cost of controlling NO_X is high compared to other BACT determinations which require SCR. Based on the information presented by the applicant, the Department believes that the use of SCR for NO_X control is not justifiable as BACT at this time.

The Department will revise the allowable BACT limit for this project if necessary no later than 4/30/97. It is the Department's understanding that the turbine manufacturer will be able to achieve 15 ppmvd NO_X emission limits within this period. If the 15 (gas)/42 (oil) ppmvd emission rates cannot be met, SCR or another technology will be required no later than December 31, 1997.

Sulfur Dioxide(SO_2) and Sulfuric Acid Mist (H_2SO_4)

In accordance with "top down" BACT review, only two alternatives exist that would result in stringent SO_2 emissions; using low sulfur content fuel oil or flue gas desulfurization (FGD). EPA has recognized that FGD technology is inappropriate to apply to these combustion units due to negative environmental, economic and energy impacts. Sludge would be generated that would have to be disposed of properly, and there would be increased utility (electricity and

water) costs associated with the operation of a FGD system. Finally, there is no information in the literature to indicate that FGD has ever been applied to stationary gas turbines burning distillate oil.

This leaves the use of low sulfur fuel oil as the best option. The Department accepts the use of No. 2 fuel oil with a 0.1% sulfur by weight as BACT for this project.

Details of the Analysis May be Obtained by Contacting:

Preston Lewis, BACT Coordinator
Department of Environmental Regulation
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:

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

November 18, 1992
Date

Approved by:

Carol M. Browner, Secretary
Dept. of Environmental Regulation

November 20, 1992
Date

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF PERMIT

In the matter of an
Application for Permit by:

DEP File No. AC53-211670
PSD-FL-187
Polk County

Mr. William R. Malenius
Polk Power Partners
23293 South Pointe Drive
Laguna Hills, CA 92653

/

Enclosed is Permit Number AC53-211670 to construct a cogeneration facility at County Road 555 approximately 3.7 miles southwest of Bartow, Polk County, Florida, issued pursuant to Section (s) 403, Florida Statutes.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on Feb. 21, 1994 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED,
on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Charlotte J. Hayes (Clerk) 2/21/94 (Date)

Copies furnished to:
W. Thomas, SWD
D. Martin, Polk Co.
J. Harper, EPA
J. Bunyak, NPS
K. Kosky, KBN
D. Roberts, HBGS

Final Determination

Polk Power Partners
Mulberry Cogeneration Project
Polk County, Florida

Permit No. AC 53-211670
PSD-FL-187

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

February 9, 1994

Final Determination

The Revised Technical Evaluation and Preliminary Determination for the permit to construct a cogeneration facility approximately 3.7 miles southwest of Bartow in Polk County, Florida, was distributed on December 29, 1994. The Notice of Intent to Issue was published in the Polk County Democrat on January 5, 1994. Copies of the evaluation were available for public inspection at the Department's Tallahassee and Tampa offices.

Comments were received from the applicant on January 28, 1994 requesting minor modifications of certain specific conditions. The Department made the following changes to the permit:

Specific Condition No. 2 - A statement was added clarifying that if the NO_x limit of 15 ppmvd is achieved prior to 12/31/97, the CO emission limit prior to 12/31/97 will be based on 25 ppmvd.

Specific Condition No. 4 - A statement was added to emphasize a rule requirement that sampling ports and access platforms be provided.

BACT Determination - Minor revisions were made to the last paragraph of the NO_x section to clarify that SCR or another technology may be required if the emission limits are not achieved.

The final action of the Department will be to issue construction permit AC53-211670 (PSD-FL-187) as modified.

Florida Department of
Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

PERMITTEE:
Polk Power Partners, L.P.
23293 South Pointe Drive
Laguna Hills, CA 92653

Permit Number: AC 53-211670
PSD-FL-187
Expiration Date: December 31, 1995
County: Polk
Latitude/Longitude: 27°50'56"N
81°52'39"W
Project: Mulberry Cogeneration Project

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-212 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and specifically described as follows:

For the construction of a 126 Megawatt cogeneration unit. The facility will be located off County Road 555 approximately 3.7 miles southwest of Bartow in Polk County, Florida. UTM coordinates of the site are: Zone 17, 413.6 km E and 3080.6 km N.

Particulate emissions shall be controlled by using clean fuels and good combustion practices. CO emissions shall be controlled by proper combustion techniques. NO_x emissions shall be initially controlled by water injection and Low NO_x Burners. Future control technology for NOx will depend on whether the Low NO_x Burners can achieve the levels specified by this permit.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:
1. DER letter dated May 5, 1992.
2. KBN letter dated April 15, 1992.
3. KBN letter dated June 2, 1992.
4. EPA letter dated July 1, 1992.
5. KBN submittal dated July 8, 1992.
6. KBN letter dated July 29, 1992.
7. KBN letter dated August 12, 1992.
8. DER letter dated August 13, 1992.
9. KBN letter dated August 26, 1992.
10. KBN letter dated October 12, 1992.
11. KBN letter dated November 2, 1992.

Attachments are listed below: (Cont'd)
12. EPA letter dated December 16, 1992.
13. KBN letter dated February 19, 1993.
14. DER letter dated March 19, 1993.
15. KBN letter dated August 17, 1993.
16. DER letter dated August 19, 1993.
17. KBN letter dated August 27, 1993.
18. HBG&S letter dated November 16, 1993.
19. DEP letter dated November 18, 1993.
20. HBG&S letter dated December 20, 1993.
21. PPP letter dated December 17, 1993.
22. GECC letter dated December 16, 1993.
23. HBG&S letter dated December 22, 1993.
24. KBN letter dated January 28, 1994.

GENERAL CONDITIONS:

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.

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, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any 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 of 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.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgement 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.

GENERAL CONDITIONS:

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.

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.

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 any 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.

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

GENERAL CONDITIONS:

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.

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.

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 extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

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.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-30.300, 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.

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

13. This permit also constitutes:

(x) Determination of Best Available Control Technology (BACT)
(x) Determination of Prevention of Significant Deterioration (PSD)
(x) Compliance with New Source Performance Standards (NSPS)

GENERAL CONDITIONS:

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 for 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:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

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.

SPECIFIC CONDITIONS:

1. This permit supersedes the initial permit issued on November 24, 1992. Unless otherwise indicated, the construction and operation of the subject facilities shall be in accordance with the capacities and specifications stated in the application and subsequent submittals by the permittee.

SPECIFIC CONDITIONS:

2. Emissions from the facility shall not exceed the limits listed below based on operation at 59°F and 60% relative humidity (ISO conditions):

Pollutant	Source	Fuel	Through 12/31/97 lbs/hr	Through 12/31/97 tons/yr	After 12/31/97 (See notes) lbs/hr	After 12/31/97 (See notes) tons/yr
NOx	HRSG Stack 1	Gas	87.8	384.5	52.7	230.7
	HRSG Stack 2	Gas	19.9	87.1	18.3	80.0
	HRSG Stack 1	Oil	164.0	718.2	164.0	59.0
	HRSG Stack 2	Oil	23.4	102.4	23.4	8.4
SO2	HRSG Stack 1	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	HRSG Stack 2	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack 1	Gas	10% Opacity		10% Opacity	
	HRSG Stack 2	Gas	10% Opacity		10% Opacity	
	HRSG Stack 1	Oil	20% Opacity		20% Opacity	
	HRSG Stack 2	Oil	20% Opacity		20% Opacity	
VOC	HRSG Stack 1	Oil	9.2	40.4	--	--
CO	HRSG Stack 1	Gas	42.9	187.8	53.0	232.0
	HRSG Stack 2	Gas	11.9	52.0	12.6	55.2
	HRSG Stack 1	Oil	75.3	329.9	75.3	27.1
	HRSG Stack 2	Oil	13.4	58.5	13.4	4.8

Notes:
(1) NO_x limits for turbine after 12/31/97 based on 15 ppmvd (gas firing) achievable by 4/30/97 but not effective until after 12/31/97.
(2) CO limits for turbine after 12/31/97 based on 25 ppmvd (gas firing). Should the NO_x emission limit for the turbine based on 15 ppmvd (gas firing) be achieved prior to 12/31/97, the CO emission limit prior to 12/31/97 will be based on 25 ppmvd.
(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.
(4) HRSG Stack 1 = primary; HRSG Stack 2 = secondary (portion of exhaust from combustion turbine is vented through secondary stack along with exhaust from gas-fired duct burner).

3. The cogeneration facility shall be permitted to fire natural gas and No. 2 fuel oil until December 31, 1997, after which the primary fuel will be natural gas. Fuel consumption rates (based on operation at 20°F) and hours of operation for the turbine and duct burner shall not exceed those listed below:

	Natural Gas			No. 2 Fuel Oil		
	M ft3/hr	MM ft3/yr	hrs/yr	M lb/hr	MM lb/yr	hrs/yr
Turbine	1013.4	8877.4	8760	55.6	379.9	6833(1)
Duct Burner	104.2	450.2(2)	8760	0	0	0

9327 6

SPECIFIC CONDITIONS:

(1) After December 31, 1997, fuel oil can be used permanently as backup fuel for no more than 720 hours per year.
(2) Based on maximum firing rate for 4,320 hours per year.

4. Before this construction permit expires, the cogeneration facility stack and secondary HRSG stack shall be sampled or tested as applicable according to the emission limits in Specific Condition No. 2. Annual compliance tests shall be conducted each year thereafter. Compliance tests shall be run at 95% to 100% of the maximum capacity achievable for the average ambient temperature during the compliance tests. The turbine manufacturer's capacity vs. temperature (ambient) curve shall be included with the compliance test results. Tests shall be conducted using the following reference methods:

NO_X: EPA Method 20
SO_2: Fuel supplier's sulfur analysis
VE: EPA Method 9
CO: EPA Method 10
VOC: EPA Method 25A

The Permittee shall provide sampling ports in the air pollution control equipment outlet duct or stack and shall provide access to the sampling ports in accordance with Rule 17-297, F.A.C. Detailed drawings of the stacks showing testing facilities and sampling port locations as required by Rule 17-297.345 shall be submitted to the Southwest District Office for approval at least 60 days prior to construction of the duct and stack.

5. The Southwest District office shall be notified at least 30 days prior to the compliance tests. Compliance test results shall be submitted to the Southwest District office in Tampa and the Bureau of Air Regulation office in Tallahassee (third annual compliance test only) within 45 days after completion of the tests. Sampling facilities, methods, and reporting shall be in accordance with F.A.C. Rule 17-2.700 and 40 CFR 60, Appendix A.

6. A continuous operations monitoring system shall be installed, operated, and maintained in accordance with 40 CFR 60.334. The natural gas, fuel oil and water injection flows to the cogeneration turbine along with the power output of the generators shall be metered and continuously recorded. The data shall be logged daily and maintained so that it can be provided to DEP upon request.

7. The permittee shall have the option of including, in the initial construction, adequate modules and other provisions necessary for future installation of state-of-the-art catalytic abatement or equivalent NOx control systems. The Bureau of Air Regulation shall, if NO_X emission limits are not met, review the

SPECIFIC CONDITIONS:

need for making a revised determination of Best Available Control Technology. If test results show that it is unlikely that NO_x limits can be met, a revised BACT determination shall be made. The Department may revise the BACT determination to require installation of such technology if so indicated by the revised BACT cost/benefit analysis. The retrofit costs associated with not making provisions for such technology initially shall not be considered by the Department in the retrofit cost analysis.

8. The permittee, for good cause, may request that this construction 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 (F.A.C. Rule 17-4.090).

9. An application for an operation permit must be submitted to the Southwest District office at least 90 days prior to the expiration date of this construction permit. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rules 17-4.055 and 17-4.220).

Issued this 21st day
of February, 1994

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Virginia B. Wetherell

Virginia B. Wetherell, Secretary

Best Available Control Technology (BACT) Determination
Mulberry Cogeneration Project
Polk County

The applicant proposes to install a 126 MW combined cycle cogeneration unit. The Polk County facility will consist of a General Electric PG7111EA Gas Turbine Generator exhausting through a primary heat recovery steam generator which will produce steam for the steam-electric cycle. Initially, the turbine will be fired by natural gas and No. 2 fuel oil, with natural gas becoming the permanent fuel after December 31, 1997. A secondary heat recovery steam generator will be auxiliary-fired by natural gas.

BACT Determination Requested by Applicant

NO_x	- Dry Low NO_x Combustion
CO	- Combustion Design
H_2SO_4/SO_2	- Low Sulfur Fuel Oil (0.1%S)
PM/PM_{10}	- Combustion Design/Clean Fuel
VOC	- Combustion Design

BACT Determination by the Department

NO_x	- Dry Low NO_x Combustion with potential future SCR capability
CO	- Combustion Design
H_2SO_4/SO_2	- Low Sulfur Fuel Oil (0.1%S)
PM/PM_{10}	- Combustion Design/Clean Fuel
VOC	- Combustion Design

Proposed Emissions (tons per year)

	Through 12/31/97 (22% Gas/78% Oil)			After 12/31/97 (100% Gas)			PSD
	HRSG	Secondary HRSG	Total	HRSG	Secondary HRSG	Total	
NO_x	644.8	99.1	743.9	230.7	80.0	310.7	40.0
SO_2	327.4	16.4	343.8	11.4	1.8	13.2	40.0
PM/PM_{10}	58.0	28.9	86.9	30.7	27.7	58.4	25/15
CO	298.6	57.1	355.7	232.0	55.2	287.2	100.0
VOC	37.7	--	37.7*	28.2	--	28.2	40.0
H_2SO_4	26.4	1.3	27.7	0.9	0.1	1.0	7.0
Be	.008	--	.008	--	--	--	0.0004
As	0.13	--	.013	--	--	--	0.0

*Would be 40.4 TPY at 100% oil firing

Emissions after December 31, 1997, are based on firing only natural gas at 868.8 MMBtu/hr. Turbine performance under natural gas firing is based on NOx emissions of 25 ppm (corrected to 15 percent O_2) through December 31, 1997 and 15 ppm thereafter. Performance on oil firing is based on NO_x emissions of 42 ppmvd (corrected to 15 percent O_2). SO_2 emissions are based on 0.1 percent sulfur.

BACT Determination Procedure

In accordance with Florida Administrative Code Chapter 17-212, Air Pollution, this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the 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:

(a) Any Environmental Protection Agency determination of Best Available Control Technology 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).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) 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 source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source 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.

BACT Determination Rationale

Particulate Matter (PM/PM_{10})

Particulate emissions will be minimized by combustion control and the use of clean fuels. The particulate emissions from the combustion turbine when burning natural gas and fuel oil will not cause visible emissions to exceed 10% and 20% opacity, respectively.

Arsenic and Beryllium (As, Be)

The Department agrees that there are no feasible methods to control beryllium and arsenic except by specifying the quality of the fuel.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

The majority of BACT emissions limitations have been based on controlling carbon monoxide and volatile organic compounds through efficient combustion. Advanced control is achievable through the use of catalytic oxidation. Catalytic oxidation is a postcombustion control that has been employed in CO nonattainment areas where regulations have required CO emission levels to be less than those associated with wet injection. These installations have been required to use LAER technology and typically have CO limits in the 10-ppm range (corrected to dry conditions).

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst such as platinum. Combustion of CO starts at about 300°F, with efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, which reduces the amount of thermal energy required. For CT/HRSG combinations, the oxidation catalyst can be located directly after the CT or in the HRSG. Catalyst size depends upon the exhaust flow, temperature, and desired efficiency.

Due to the oxidation of sulfur compounds and excessive formation of H_2SO_4 mist emissions, oxidation catalyst systems are not considered to be technically feasible for gas turbines fired with fuel oil. Catalytic oxidation has not been demonstrated on a continuous basis when using fuel oil.

Use of oxidation catalyst technology would be feasible for a natural gas-fired unit; however, the cost effectiveness of over $6,000 per ton of CO removed will have a significant economic impact on this project. Therefore, efficient combustion will be the control method for CO and VOC.

Nitrogen Oxides (NO_x)

The applicant requested that BACT for nitrogen oxides through December 31, 1997, be water injection and Low NO_x Burners. This would limit emissions to 25 ppmvd when burning natural gas and 42 ppmvd when burning fuel oil.

A review of the EPA's BACT/LAER Clearinghouse indicates that the lowest emission limit established to date for a combustion turbine is 4.5 ppmvd (corrected to 15% O_2). This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system.

Selective catalytic reduction is a post-combustion method for control of NO_x emissions. The SCR process combines vaporized ammonia with NO_x in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed. The SCR process can achieve up to 90% reduction of NO_x with a new catalyst. As the catalyst ages, the maximum NO_x reduction will decrease to approximately 86 percent.

Although feasible, the applicant rejected using SCR because of economic, energy, and environmental impacts. The following factors were considered in the decision not to propose SCR:

a) Disposal of hazardous waste generated (spent catalyst).
b) An energy penalty of $0.05/KWH due to back pressure from the catalyst bed.
c) A power loss penalty based on lost capacity.
d) Potential for public exposure to high concentrations from ammonia storage and handling leaks and ammonia slip.
e) Ammonium bisulfate and ammonium sulfate particulate emissions (ammonium salts) due to the reaction of NH_3 with SO_3 present in the exhaust gases.
f) Cost effectiveness for SCR technology was determined to be in the range of $6,000 per ton of NO_x removed.

A concern associated with the use of SCR on combined cycle projects is the formation of ammonium bisulfate which can be formed by reaction of sulfur in the fuel and the ammonia injected. The ammonium bisulfate has a tendency to plug the tubes of the heat recovery steam generator leading to operational problems. The latest information available indicates that SCR can be used for oil firing provided that adjustments are made in the ammonia to NO_x injection ratio. For natural gas firing, NO_x emissions can be controlled with up to a 90 percent efficiency using a 1 to 1 or greater injection ratio. By lowering the injection ratio for oil firing, testing has indicated that NO_x can be controlled with efficiencies ranging from 60 to 75 percent. When the injection ratio is lowered there is not a problem with ammonium bisulfate formation since essentially all of the ammonia is able to react with the nitrogen oxides present in the combustion gases. SCR has been established as BACT for oil fired combined cycle facilities with NO_x emission limits ranging from 11.7 to 25 ppmvd depending on the efficiency of control.

The applicant determined that the total annual cost of SCR for this project is $1,957,700 with an average cost effectiveness in the range of $6,000 to $7,000 per ton of NO_x removed. The maximum annual NO_x emissions using water injection and Low NO_x combustor design will be 744 tons/year through December 31, 1997. Assuming that SCR would reduce the NO_x emissions by 65%, about 484 tons/year of NO_x would be removed initially followed by 200 tons/year thereafter. When this reduction is factored into the total annual cost, the cost per ton of controlling NO_x is in the range of $6,000

to $6,500. This calculated cost is higher than has previously been approved as BACT.

The latest DEP BACT determinations have a NO_x limit of 15 ppmvd (natural gas) using Low-NO_x burner technology. Although the turbine manufacturer does not presently guarantee this limit, they have agreed to lower NO_x to 15 ppm by April 30, 1997. If the 15 (gas)/42 (oil) ppmvd emission rates cannot be met, SCR or another technology will be required no later than December 31, 1997.

Sulfur Dioxide (SO_2) and Sulfuric Acid Mist (H_2SO_4)

In accordance with "top down" BACT review, only two alternatives exist that would result in stringent SO_2 emissions; using low sulfur content fuel oil or flue gas desulfurization (FGD). EPA has recognized that FGD technology is inappropriate to apply to these combustion units due to negative environmental, economic and energy impacts. Sludge would be generated that would have to be disposed of properly, and there would be increased utility (electricity and water) costs associated with the operation of a FGD system. Finally, there is no information in the literature to indicate that FGD has ever been applied to stationary gas turbines burning distillate oil.

This leaves the use of low sulfur fuel oil as the best option. The Department accepts the use of No. 2 fuel oil with a 0.1% sulfur by weight as BACT for this project.

Details of the Analysis May be Obtained by Contacting:

Douglas Outlaw, BACT Coordinator
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

February 16, 1994
Date

Approved by:

Virginia B. Wetherell,
Secretary
Dept. of Environmental Protection

February 21, 1994
Date

Mail to: RACT/BACT/LAER CLEARINGHOUSE
RBLC (MD-12)
US EPA
RTP, NC 27711

RACT/BACT/LAER CLEARINGHOUSE INPUT FORM

Date Submitted _____

Facility Information

Company/Plant Name: Polk Power Partners PSD-FL-187

Plant/Facility Contact Information: ☐ check here if plant contact address is the same as the facility address

Plant Contact Name: William Malenius
Telephone Number: 714-568-3767 Fax: _____
E-Mail Address: _____

Facility Address: County Road 555
City: Bartow
State: FL County: Polk Zip Code: 33830

Physical Plant Location Information: UTM Coordinates: X: 413.6 Y: 3080.6 Zone: 17

Class One Areas Affected within 100km and/or 250km of source:

Source Name	Distance (km)		
Chassahowitzka	120		

Public Hearing Held? Y N

Permitting Agency Contact Information:

Permitting Agency: _____ Address: _____
Agency Contact: _____
Telephone Number: _____ Fax: _____
E-Mail Address: _____ County: _____ State: _____ Zip Code: _____

The Source is: New Modified (circle one)

Permit Number: PSD-FL-187
AIRS Facility Number: _____
EPA ID Number: _____
SIC Code: 4911

Scheduling Information:

	Date	(circle one)
Received Application:	4/6/92	Estimated/Actual
Final Permit Issued:	2/24/94	Estimated/Actual
Start Up Operation:	1/1/	Estimated/Actual
Compliance Verification:	1/1	Estimated/Actual

RACT/BACT/LAER Clearinghouse Input Form, page 2 (Plantwide Information)

Source Name: Polk Power Partners Permit Number: PSD-FL-187

PLANTWIDE INFORMATION

Facility Notes: MERCHANT POWER PLANT

Plant Information - On this attached form, please include the following information on the facility being permitted:

Brief Plant Description/Narrative (for example - Chemical Plant, Steel Mill, Paint Manufacturing, etc.): POWER PLANT

Brief Emission Source(s) Description (for example - boiler, paint spray booth, furnace, etc.): COGEN TURBINE

Type(s) of Fuel Used at this Facility: NAT. GAS / NO. 2 FUEL OIL

Description of the Pollution Abatement Strategy (for example - fabric filter, ESP, carbon adsorbers, powder coatings, etc.):

Plantwide Emissions/Emissions Increase Information (Rate After Control):

Pollutant:	Emissions (T/YR):	Pollutant:	Emissions (T/YR):	Pollutant:	Emissions (T/YR):
SEE TABLE ATTACHED					

RACT/BACT/LAER Clearinghouse Input Form, page 3 (Process/Pollutant Information)

Source Name: Polk Power Partners Permit Number: PSD-FL-187

Process Information

Process Name/Description: COGEN POWER PLANT WITH DUCT BURNER

RBLC Process Code: _____ SCC Code: 20100201

Throughput Capacity/Size: 9327.6 MM FT³/YR NAT. GAS Primary Fuel: NAT. GAS

Compliance Verified? (Y) N If so, By What Method? (circle those that apply): Stack Test? (Y) N Calculation? Y N
Other Test? Y N Inspection? Y N

Other Method? _____

Process Notes : _____

Pollutant Information

Pollutant Name: NOx

CAS Number: _____

Pollution Reduction Method Description:
- ☐ Pollution Prevention (P2)
- ☐ Add-on Control Device
- ☐ Both P2 and Add-on
- ☑ No Controls Feasible

Pollution Prevention/Add-on Control Equipment Description: _____

Basis of Limit (circle one): (BACT-PSD) BACT-Other LAER MACT GACT RACT NSPS NESHAPS OTHER

No. of Pollution Reduction Options Examined: _____ Overall % Efficiency of Control/ Prevention System: _____

Rank of Pollution Reduction Option Selected: _____ Emission Type? (circle one): area (point) fugitive

Emission Limits: Primary: 71.0 lb/hr Alternative: _____

RBLC Standard Emission Limit (where applicable): _____

Pollution Control Cost Info: Costs verified by Agency? Yes No O & M Costs: _____ Annualized Costs: _____

Capital Costs: _____ Costs are in _____ (year) dollars. Cost Effectiveness ($/T of poll. removed): _____

RBLC Input Form, page 4 (Pollutant Information - continuation page) Source Name: POLK POWER PARTNERS

Process Description: _____ Permit Number: PSD-FL-187 RBLC Process Code: _____

Information on Additional Pollutants

Pollutant Information

Pollutant Name: VE CAS Number: _____

Pollution Reduction Method Description:

☐ Pollution Prevention (P2) ☐ Both P2 and Add-on
☐ Add-on Control Device ☑ No Controls Feasible

Pollution Prevention/Add-on Control Equipment Description: _____

Basis of Limit (circle one): (BACT-PSD) BACT-Other LAER MACT GACT RACT NSPS NESHAPS OTHER

No. of Pollution Reduction Options Examined: _____ Overall % Efficiency of Control/ Prevention System: _____

Rank of Pollution Reduction Option Selected: _____ Emission Type? (circle one): area point fugitive

Emission Limits: Primary: 10% opacity Alternative: _____

RBLC Standard Emission Limit (where applicable): _____

Pollution Control Cost Info: Costs verified by Agency? Yes No O & M Costs: _____ Annualized Costs: _____

Capital Costs: _____ Costs are in _____ (year) dollars. Cost Effectiveness ($/T of poll. removed): _____

Pollutant Information

Pollutant Name: CO CAS Number: _____

Pollution Reduction Method Description:

☐ Pollution Prevention (P2) ☐ Both P2 and Add-on
☐ Add-on Control Device ☑ No Controls Feasible

Pollution Prevention/Add-on Control Equipment Description: _____

Basis of Limit (circle one): (BACT-PSD) BACT-Other LAER MACT GACT RACT NSPS NESHAPS OTHER

No. of Pollution Reduction Options Examined: _____ Overall % Efficiency of Control/ Prevention System: _____

Rank of Pollution Reduction Option Selected: _____ Emission Type? (circle one): area point fugitive

Emission Limits: Primary: 65.6 lb/hr Alternative: _____

RBLC Standard Emission Limit (where applicable): _____

Pollution Control Cost Info: Costs verified by Agency? Yes No O & M Costs: _____ Annualized Costs: _____

Capital Costs: _____ Costs are in _____ (year) dollars. Cost Effectiveness ($/T of poll. removed): _____

SPECIFIC CONDITIONS:

2. Emissions from the facility shall not exceed the limits listed below based on operation at 59°F and 60% relative humidity (ISO conditions):

Pollutant	Source	Fuel	Through 12/31/97 lbs/hr	Through 12/31/97 tons/yr	After 12/31/97 (See notes) lbs/hr	After 12/31/97 (See notes) tons/yr
NOx	HRSG Stack 1	Gas	87.8	384.5	52.7	230.7
	HRSG Stack 2	Gas	19.9	87.1	18.3	80.0
	HRSG Stack 1	Oil	164.0	718.2	164.0	59.0
	HRSG Stack 2	Oil	23.4	102.4	23.4	8.4
SO2	HRSG Stack 1	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
	HRSG Stack 2	Oil	0.1% Sulfur Max.		0.1% Sulfur Max.	
VE	HRSG Stack 1	Gas	10% Opacity		10% Opacity	
	HRSG Stack 2	Gas	10% Opacity		10% Opacity	
	HRSG Stack 1	Oil	20% Opacity		20% Opacity	
	HRSG Stack 2	Oil	20% Opacity		20% Opacity	
VOC	HRSG Stack 1	Oil	9.2	40.4	--	--
CO	HRSG Stack 1	Gas	42.9	187.8	53.0	232.0
	HRSG Stack 2	Gas	11.9	52.0	12.6	55.2
	HRSG Stack 1	Oil	75.3	329.9	75.3	27.1
	HRSG Stack 2	Oil	13.4	58.5	13.4	4.8

Notes:
(1) NO_x limits for turbine after 12/31/97 based on 15 ppmvd (gas firing) achievable by 4/30/97 but not effective until after 12/31/97.
(2) CO limits for turbine after 12/31/97 based on 25 ppmvd (gas firing). Should the NO_x emission limit for the turbine based on 15 ppmvd (gas firing) be achieved prior to 12/31/97, the CO emission limit prior to 12/31/97 will be based on 25 ppmvd.
(3) Opacity limit will allow one 6-minute period per hour of not more than 27% opacity.
(4) HRSG Stack 1 = primary; HRSG Stack 2 = secondary (portion of exhaust from combustion turbine is vented through secondary stack along with exhaust from gas-fired duct burner).

3. The cogeneration facility shall be permitted to fire natural gas and No. 2 fuel oil until December 31, 1997, after which the primary fuel will be natural gas. Fuel consumption rates (based on operation at 20°F) and hours of operation for the turbine and duct burner shall not exceed those listed below:

	Natural Gas			No. 2 Fuel Oil		
	M ft3/hr	MM ft3/yr	hrs/yr	M lb/hr	MM lb/yr	hrs/yr
Turbine	1013.4	8877.4	8760	55.6	379.9	6833(1)
Duct Burner	104.2	450.2(2)	8760	0	0	0

KBN

June 2, 1992

Mr. Clair H. Fancy
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Polk County--A.P.
Polk Power Partners, L.P.--Mulberry Cogeneration Project
Permit Application AC 53-211670 and PSD-FL-187

Dear Clair:

This correspondence and attachments present the information requested by the Department's May 5, 1992 letter.

1. A computer disk containing the Lotus 1-2-3 spreadsheets used to calculate emissions and presented in Tables A-1 through A-27 of the application is included with this correspondence. The spreadsheets are contained in files named TABA0105.WK3 through TABA2327.WK3. Because of the number and repetition of the calculations, a computerized spreadsheet is the only feasible way to perform the calculations. The computerized spreadsheet shows all calculations used to generate all the numerical quantities involving emissions.

   Please note that these spreadsheets are work products of KBN Engineering and Applied Sciences Inc., (KBN), and must be considered as confidential business information.

2. During the first 3 years of operation, the cogeneration facility will use only natural gas and fuel oil. Current project design does not include propane and therefore it should not be considered further in the application. The amount of natural gas under firm contract for the project during the first 3 years is sufficient to operate the facility at 22 percent of full load in any 24 hour period. The remainder of the fuel will be oil, i.e. 78 percent of full load in any 24-hour period.

   After the first 3 years of operation, the primary fuel will be natural gas. Fuel oil will only be used as backup (maximum of 30 days of operation).

3. Attachment 1 contains additional analyses to address the prevention of significant deterioration (PSD) Class I increment consumption and potential impacts on the air quality related values (AQRVs) of the Chassahowitska National Wilderness Area. As discussed, the proposed project's impacts are expected to be less than the National Park Service's proposed significant impact levels when potential violations of the Class I increment are predicted. Also, the proposed project's impacts are not expected to have an adverse effect on AQRVs. A disk copy and paper copy of the air dispersion modeling printouts are included with this letter.

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

Submittal of this information should clarify all questions raised by the Department in the completeness determination for the above-referenced project. Please call if there are any further questions on the material submitted herein.

Sincerely,

Robert E McLean Jr
for

Kennard F. Kosky, P.E.
President

KFK/dmpm

Enclosure

cc: William Malenius, Ark Energy, Inc.
Ward Marshall, Central and South West Services, Inc.
File (2)
J. Reynolds
C. Holladay
B. Thomas, SW Dist
J. Harper, EPA
C. Shaver, NPS
D. Martin, Polk Co. Planning Dir.

ATTACHMENT 1

Prevention of Significant Deterioration (PSD) Class I Increment Consumption and Air Quality Related Values (AQRV) Analyses of the Proposed Mulberry Cogeneration Facility

1.0 INTRODUCTION

KBN Engineering and Applied Sciences, Inc. (KBN) has performed air quality analyses to determine the prevention of significant deterioration (PSD) Class I increment consumption and air quality related values (AQRVs) analyses for the Chassahowitzka National Wilderness Area (NWA) due to emissions from the integrated cogeneration facility proposed by Polk Power Partners, L.P., d/b/a Polk Power Partners, L.P., Ltd. The facility, which is referred to as the Mulberry Cogeneration Facility, is located approximately 120 km from the closest part of the Chassahowitzka NWA, a PSD Class I area. Because the proposed facility alone had predicted 3-hour and 24-hour sulfur dioxide (SO_2) impacts greater than the National Park Service's (NPS's) proposed significant impact levels of 0.07 and 0.48 $\mu g/m^3$, respectively, the Florida Department of Environmental Regulation (FDER) has requested that a cumulative PSD Class I increment consumption analysis be performed for the 3-hour and 24-hour averaging periods. Based on verbal communications between FDER and NPS's, the AQRV analyses need only address the impacts of increased emissions of SO_2, nitrogen dioxide (NO_2), and volatile organic compounds for this project.

The following sections present the approaches, methods, and results of the respective PSD Class I increment consumption and AQRV analyses.

2.0 PREVENTION OF SIGNIFICANT DETERIORATION CLASS I INCREMENT ANALYSIS

An air quality modeling analysis was performed to determine the maximum SO_2 PSD Class I increment consumption at the Chassahowitzka PSD Class I area. This analysis included modeling with the Industrial Source Complex Short-Term (ISCST) model using the SO_2 emissions from the proposed project for the maximum emission case (i.e., 20 °F) with an inventory of other increment-consuming major and minor sources. The inventory for other sources, presented in Table 1, was based on data submitted in recent permit applications to FDER. The SO_2 impacts were predicted using the ISCST model at 13 discrete receptors surrounding the PSD Class I area which have also been included in recent permit applications. The impacts were predicted using a

5-year meteorological record (1982 through 1986) of surface and mixing height data from the National Weather Service (NWS) stations in Tampa and Ruskin, respectively.

Maximum predicted impacts for the 5 years of meteorological data are presented in Table 2. The overall highest, second-highest 3- and 24-hour impacts due to all sources are predicted to be 38.0 micrograms per cubic meter ($\mu g/m^3$) and 7.7 $\mu g/m^3$, respectively. The 3-hour and 24-hour impacts are above the SO_2 PSD Class I increment values. An additional modeling analysis was performed to determine the proposed project's contribution to the predicted violations. This analysis involved identifying the receptors and time periods for which the proposed source's impacts were greater than the NPS's proposed significant impact levels and then calculating the cumulative impacts from PSD sources for those periods and receptors. A summary of these results is presented in Table 3.

As shown in Table 3, when the proposed source's impacts are greater than the NPS's proposed significant impact levels, there were no predicted violations of the PSD Class I increment, except for one 24-hour event in 1986. For that event, the predicted 24-hour concentration was 5.22 $\mu g/m^3$ with the proposed source contributing approximately 0.09 $\mu g/m^3$. An investigation of the meteorological conditions which occurred on the day during which the proposed source had a predicted "significant" impact (see Table 4) revealed that the wind speeds were generally low (i.e., average of approximately 2.6 m/s) for the entire 24-hour period, including 2 hours of calm conditions, with wind direction change of about 130 degrees between the first and last hours of predicted source impacts. Because the proposed source's plume is not likely to be transported to the Class I area under those meteorological conditions, the proposed source's contribution is a conservative and unrealistic impact associated with the predicted violation. Also, with 2 hours of calm, the calculated 24-hour concentration of 5.22 $\mu g/m^3$ was based on 22 hours of impact (the 2 hours of calm were excluded from calculating the 24-hour concentration), instead of 24 hours. By considering only 22 hours of potential impacts, the 24-hour concentration is artificially increased by a factor of 1.09 (i.e., 24 hours/22 hours), or approximately 9 percent. Therefore, if a more realistic assessment of the proposed source's 24-hour impact was performed (i.e., long-range transport modeling) and all hours were used in the calculation, the predicted impact is expected to be less than the NPS's proposed significant impact levels. As a result, the total cumulative impact is also expected to be less than the PSD Class I increment.

3.0 AIR QUALITY RELATED VALUE ANALYSIS

3.1 POTENTIAL IMPACTS ON VEGETATION

The Chassahowitzka NWA is characterized by vegetation that includes flatwoods and brackish-water, marine, and halophytic terrestrial species. Predominant tree species are slash pine, laurel oak, sweetgum, and palm. Other plants in the preserve include needlegrass rush, seashore saltgrass, marsh hay, and red mangrove.

SO_2 concentrations at elevated levels have long been known to cause injury to plants. Acute SO_2 injury usually develops within a few hours or days of exposure, and symptoms include marginal, flecked, and/or intercoastal necrotic areas which appear water-soaked and dullish green initially. This injury generally occurs to younger leaves. Chronic injury usually is evident by signs of chlorosis, bronzing, premature senescence, reduced growth, and possible tissue necrosis (EPA, 1982). Phytotoxic symptoms demonstrated by plants can occur as low as 88 $\mu g/m^3$ (USDHEW, 1971). However, this occurs with the more primitive plants (i.e., mosses, ferns, lichens).

Many studies have been conducted to determine the effects of high-concentration, short-term SO_2 exposure on natural community vegetation. Sensitive plants include ragweed, legumes, blackberry, southern pine, and red and black oak. These species are injured by exposure to 3-hour SO_2 concentrations from 790 to 1,570 $\mu g/m^3$. Intermediate plants include locust and sweetgum. These species are injured by exposure to 3-hour SO_2 concentrations from 1,570 to 2,100 $\mu g/m^3$. Resistant species (injured at concentrations above 2,100 $\mu g/m^3$ for 3 hours) include white oak and dogwood (EPA, 1982).

A study of native Floridian species (Woltz and Howe, 1981) demonstrated that cypress, slash pine, live oak, and mangrove exposed to 1,300 $\mu g/m^3$ SO_2 for 8 hours were not visibly damaged. This supports the levels cited by other researchers on the effects of SO_2 on vegetation. A corroborative study (McLaughlin and Lee, 1974) demonstrated that approximately 20 percent of a cross-section of plants ranging from sensitive to tolerant were visibly injured at 3-hour SO_2 concentrations of 920 $\mu g/m^3$.

In order to assess the total air quality impacts at the Class I area that can be compared to the reported effects levels, the predicted impacts due to the PSD increment-affecting sources were added to background concentrations applicable to the 3-hour, 24-hour, and annual averaging periods. The background concentrations are assumed to be representative of impacts from sources

not modeled and available from existing ambient monitoring data. In this analysis, ambient data collected in 1990 from a monitoring station (Station No. 0580-005-J02) located about 20 kilometers (km) from the Class I area were used to represent background concentrations. The annual concentration of 7 $\mu g/m^3$ and second-highest 3-hour and 24-hour concentrations of 248 and 53 $\mu g/m^3$, respectively, were assumed to represent background concentrations.

By adding the maximum predicted 3-hour SO_2 concentration of 38.0 $\mu g/m^3$ to the assumed background SO_2 concentration of 248 $\mu g/m^3$, a maximum total SO_2 concentration of 286 $\mu g/m^3$ would be expected in the Class I area. By comparing this concentration to those causing injury to native species, the SO_2-sensitive species (as well as more tolerant species) would not be damaged by the maximum predicted concentrations. By comparison with concentrations that cause plant injury, the maximum predicted SO_2 concentration of 286 $\mu g/m^3$ is approximately 36 percent of the most conservative concentration (i.e., 790 $\mu g/m^3$) that causes injury to SO_2-sensitive species.

The maximum total 24-hour and annual SO_2 concentrations of 60.7 and 8.2 $\mu g/m^3$, respectively, that would be predicted within the Class I area represent levels which are lower than those known to cause damage to test species. Jack pine seedlings exposed to SO_2 concentrations of 470 to 520 $\mu g/m^3$ for 24 hours demonstrated inhibition of foliar lipid synthesis; however, this inhibition was reversible (Malhotra and Kahn, 1978). Black oak exposed to 1,310 $\mu g/m^3$ SO_2 for 24 hours a day for 1 week demonstrated a 48 percent reduction in photosynthesis (Carlson, 1979). By comparison of these levels, it is apparent that the maximum predicted 24-hour concentrations are well below the concentrations that cause damage in SO_2-sensitive plants. The maximum annual concentration of 1.2 $\mu g/m^3$ due to the PSD sources adds slightly to the background levels and poses a minimal threat to area vegetation.

Nitrogen dioxide (NO_2) can injure plant tissue with symptoms usually appearing as irregular white to brown collapsed lesions between the leaf veins and near the margins. Conversely, non-injurious levels of NO_2 can be absorbed by plants, enzymatically transformed into ammonia, and incorporated into plant constituents such as amino acids (Matsumaru et al., 1979).

Plant damage can occur through either acute (short-term, high-concentration) or chronic (long-term, relatively low-concentration) exposure. For plants that have been determined to be more sensitive to NO_2 exposure than others, acute (1, 4, 8 hours) exposure caused 5 percent predicted foliar injury at concentrations ranging from 3,800 to 15,000 $\mu g/m^3$ (Heck and Tingey, 1979).

Chronic exposure of selected plants (some considered NO_2-sensitive) to NO_2 concentrations of 2,000 to 4,000 $\mu g/m^3$ for 213 to 1,900 hours caused reductions in yield of up to 37 percent and some chlorosis (Zahn, 1975).

By comparison of published toxicity values for NO_2 exposure to short-term (i.e., 1-, 3-, and 8-hour averaging times) and long-term (annual averaging time) modeled concentrations, the possibility of plant damage in the preserve can be examined for both acute and chronic exposure situations, respectively. The 1-, 3-, and 8-hour estimated NO_2 concentrations at the point of maximum impact are 3.8, 2.3, and 1.1 $\mu g/m^3$, respectively. These concentrations are approximately $7x10^{-5}$ to $1x10^{-3}$ of the levels that could potentially injure 5 percent of the plant foliage. For a chronic exposure, the annual estimated NO_2 concentration at the point of maximum impact in the preserve (0.020 $\mu g/m^3$) is $0.5x10^{-6}$ to $1.0x10^{-5}$ of the levels that caused minimal yield loss and chlorosis in plant tissue.

With the exception of ethylene, little information exists that examines the effects of gaseous organic compounds on plant growth. Ethylene is produced naturally by plants and is responsible for many of the responses a plant produces as it ages and enters the reproductive stage of development. Ethylene is also produced by the combustion of organic material such as agricultural and industrial waste. Losses due to ethylene have been documented in a cotton field when levels of ethylene rose above 7,500 $\mu g/m^3$. Lemons are affected by ethylene concentrations as low as 62 to 125 $\mu g/m^3$, at which point epinastic symptoms are observed (U.S. Department of Health, Education, and Welfare, 1969)

By assuming a threshold concentration of 62 $\mu g/m^3$ as a basis for risk assessment for the group of organic gases, an estimate of the impact of this group of compounds can be constructed. The maximum 1-hour concentrations of polycyclic organic matter and formaldehyde of 0.00001 and 0.0078 $\mu g/m^3$, respectively, are in the range of $1.6x10^{-7}$ to $1.3x10^{-4}$ of the values causing injury.

3.2 POTENTIAL IMPACTS ON SOILS

The majority of the soil in the Class I area is classified as Weekiwachee-Durbin muck. This is an euic, hyperthermic typic sufihemist that is characterized by high levels of sulfur and organic matter. This soil is flooded daily with the advent of high tide, and the pH ranges between 6.1 and 7.8. The upper level of this soil may contain as much as 4 percent sulfur (USDA, 1991).

The greatest threat to soils from increased SO_2 deposition is a decrease in pH or an increase of sulfur to levels considered unnatural or potentially toxic. Although ground deposition was not calculated, it is evident that the amount of SO_2 deposited would be inconsequential in light of the inherent sulfur content. The regular flooding of these soils by the Gulf of Mexico regulates the pH, and any rise in acidity in the soil would be buffered by this activity.

3.3 POTENTIAL IMPACTS ON WILDLIFE

The predicted SO_2 and NO_2 concentrations are well below the lowest observed effect levels in animals (Newman and Schreiber, 1988). Given these conditions, the proposed source's emissions poses no risk to wildlife. Because predicted levels are below those known to cause effect to vegetation, there is also no risk.

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Table 1. Summary of SO2 Emission Source Stack and Operating Data Used in the Modeling Analysis (Metric Units)
(Page 1 of 2)

Modeled Source ID	Source Description	UTM Coordinates (m)		Stack Data (m)		Operating Data		Modeled SO2 Emissions (g/sec)
		East	North	Height	Diameter	Temperature (K)	Velocity (m/sec)	
99002	FPC Debary	467500	3197200	15.24	4.21	819.8	56.21	466.40
99005	FPC Int City/7EA	446300	3126000	15.24	4.21	819.8	56.21	310.90
99008	FPC Int City/7FA	446300	3126000	15.24	7.04	880.8	32.07	276.10
1	FL Crushed Stone Kiln 1	360000	3162398	97.60	4.88	442.0	23.23	98.40
6	CF Ind. Baseline C	388000	3116000	60.35	2.44	353.0	16.40	-50.40
7	CF Ind. Proposed C	388000	3116000	60.35	2.44	353.0	17.77	54.60
9	CF Ind. Baseline D	388000	3116000	60.35	2.44	353.0	16.40	-50.40
10	CF Ind. Proposed D	388000	3116000	60.35	2.44	353.0	17.77	54.60
22	FL Mining and Mtls Kiln	356200	3169900	27.40	4.88	470.2	7.48	1.45
30	TECO Big Bend - Unit 4	361900	3075000	149.40	7.32	342.2	19.81	654.70
31	TECO Big Bend - Units 1,2 (24-hr)	361900	3075000	149.40	7.32	422.0	28.65	-2436.00
33	TECO Big Bend - Unit 3 (24-hr)	361900	3075000	149.40	7.32	418.0	14.33	-1218.00
40	Pasco Cty RRF	347100	3139200	83.82	3.05	394.3	15.70	14.10
46	Crystal River 4	334200	3204500	182.90	6.90	398.0	21.00	1008.80
47	Crystal River 5	334200	3204500	182.90	6.90	398.0	21.00	1008.00
48	Crystal River 1	334200	3204500	152.00	4.57	422.0	42.00	-314.00
49	Crystal River 2	334200	3204500	153.00	4.86	422.0	42.00	-1859.00
50	OUC Stanton 1	334200	3204500	167.60	5.80	325.7	21.60	105.40
51	OUC Stanton 2 (24-hr)	483500	3150600	167.60	5.80	324.2	23.50	359.00
52	Kissimmee Util Exist	460100	3129300	18.30	3.66	422.0	38.00	32.10
53	Hardee	404800	3057400	22.90	4.88	389.0	23.90	277.60
54	Stauffer Shutdown	325600	3116700	49.00	1.20	293.0	3.60	-52.07
55	Lakeland McIntosh 3	408500	3105800	76.20	4.88	350.0	19.70	500.10
56	Hillsborough Cty RRF	368200	3092700	50.00	1.80	491.0	18.30	21.40
57	Pinellas	335300	3084400	49.10	2.74	522.0	27.72	62.24
61	Evans Packing	383300	3135800	12.30	0.40	466.2	9.20	0.20
70	Asphalt Pavers 4	361400	3168400	8.50	1.08	357.4	10.95	2.25
71	Asphalt Pavers 3	359900	3162400	12.20	1.37	377.0	10.58	2.25
90	Lakeland Util CT	409185	3102754	30.48	5.79	783.2	28.22	29.11
91	IMC SAP 1,2,3 Baseline	396600	3078900	61.00	2.60	350.0	14.28	-170.10
92	IMC SAP 1,2,3 Projected	396600	3078900	61.00	2.60	350.0	15.31	182.85
93	IMC SAP 4,5 Projected	396600	3078900	60.70	2.60	350.0	15.31	121.90
94	IMC DAP	396600	3078900	36.60	1.83	319.1	20.15	5.54
101	Prop Pasco Cogen	385600	3139000	30.48	3.35	384.3	17.13	5.04
102	Prop Lake Cogen	434000	3198800	30.48	3.35	384.3	17.13	5.04
111	CF Bartow Retired H2SO4	408500	3083000	30.50	1.68	350.0	14.60	-110.60
112	CF Bartow DAP	408500	3083000	9.10	0.70	450.0	22.50	4.30
113	CF Bartow #7 H2SO4	408500	3083000	67.10	2.40	351.0	9.80	52.90
114	CLM Chl	361800	3088300	30.00	0.61	375.0	20.00	21.02
115	Conserve	398400	3084200	30.50	1.80	308.0	18.90	-15.20
116	Conserve #1 H2SO4	398400	3084200	45.70	2.30	352.0	10.30	42.00
117	Farmland 1,2 H2SO4	409500	3079500	30.48	1.37	311.0	20.18	-54.56
118	Farmland 3,4 H2SO4	409500	3079500	30.48	2.29	355.0	9.27	67.16
119	Farmland 5 H2SO4	409500	3079500	45.72	2.44	355.0	9.65	41.96
120	IMC Lonesome Mine Dryer 1	389550	3067930	38.10	2.90	339.0	10.13	18.40

Table 1. Summary of SO2 Emission Source Stack and Operating Data Used in the Modeling Analysis (Metric Units)
(Page 2 of 2)

Modeled Source ID	Source Description	UTM Coordinates (m)		Stack Data (m)		Operating Data		Modeled SO2 Emissions (g/sec)
		East	North	Height	Diameter	Temperature (K)	Velocity (m/sec)	
121	IMC Lonesome Mine Dryer 2	389550	3067930	38.10	2.44	346.0	18.40	21.17
136	Royster #1	406700	3085200	51.00	2.13	356.0	9.90	-257.60
137	Royster #2	406700	3085200	61.00	2.13	360.0	12.20	35.70
140	USSAC Ft Meade H2SO4 1	416120	3068620	53.40	2.59	355.0	15.91	63.00
141	USSAC Ft Meade H2SO4 2	416120	3068620	53.40	2.59	355.0	15.91	63.00
142	USSAC Ft Meade H2SO4 X	416210	3068740	29.00	3.02	314.0	6.77	-78.80
143	WR Grace Retired H2SO4	409700	3086000	45.70	1.40	352.0	16.50	-216.00
144	WR Grace 2 46 16	409700	3086000	61.00	2.80	346.0	7.30	73.60
145	WR Grace 2 46 17	409500	3086500	61.00	1.52	347.0	28.40	72.00
147	Gardinier SAP 4,5,6	363400	3082400	22.60	1.52	322.0	19.50	-196.30
148	Gardinier SAP 7 Exist	363400	3082400	45.70	2.29	355.0	9.20	-50.71
149	Gardinier SAP 7 Mod	363400	3082400	45.70	2.29	355.0	9.20	36.75
150	AMAX	394800	3067720	8.20	0.41	505.0	7.57	0.60
151	AMAX	394850	3069770	30.50	1.82	334.0	7.26	16.35
154	Mobil-Nichols	398290	3084290	25.90	2.29	339.0	15.20	2.44
250	FDOC Boiler #3	382200	3166100	9.14	0.61	478.0	4.57	2.99
260	E R Jahna (Lime Dryer)	386700	3155800	10.67	1.83	327.0	8.99	0.82
270	Oman Const (Asphalt)	359800	3164900	7.62	1.83	347.0	6.29	2.09
280	Dris Paving (Asphalt)	340600	3119200	12.20	3.05	339.0	6.47	0.23
290	Overstreet Paving (Asphalt)	355900	3143700	9.14	1.30	408.0	16.00	3.67
300	New Pt Richey Hosp Blr#1	331200	3124500	10.98	0.31	544.0	3.88	0.06
310	New Pt Richey Hosp Blr#2	331200	3124500	10.98	0.31	544.0	3.88	0.03
320	Hosp Corp of Am Boiler #1	333400	3141000	10.98	0.31	533.0	4.00	0.08
330	Hosp Corp of Am Boiler #2	333400	3141000	10.98	0.31	533.0	4.00	0.08
340	Couch Const-Odessa (Asphalt)	340700	3119500	9.14	1.40	436.0	22.30	7.25
350	Couch Const-Zephyrhills (Asphalt)	390300	3129400	6.10	1.38	422.0	21.00	3.54
400	Agrico Baseline	407500	3071300	45.73	1.60	350.0	26.40	-75.60
410	Agrico Proposed	407500	3071300	45.73	1.60	350.0	39.06	113.50
88020	Ark Energy - CO2 Plant	413600	3080600	51.82	0.91	320.0	20.27	0.65
99020	Ark Energy - Combustion Turbine	413600	3080600	38.10	4.57	378.0	20.67	12.70

Note: Ark Energy modeled at 20°F design temperature.

Table 2. Maximum Predicted SO2 Concentrations from the Screening Analysis for Comparison to PSD Class I Increments

Averaging Period	Maximum Concentration (µg/m)	Receptor Location (UTM) East (km)	Receptor Location (UTM) North (km)	Period Julian Day	Period Hour Ending	Period Year
3-Hour*	35.5	331.5	3183.4	161	3	1982
	27.2	336.5	3183.4	136	6	1983
	37.9	331.5	3183.4	156	12	1984
	38.0	331.5	3183.4	29	12	1985
	33.9	331.5	3183.4	108	12	1986
24-Hour*	7.40	340.3	3169.8	335	24	1982
	7.06	340.3	3165.7	211	24	1983
	7.24	331.5	3183.4	156	24	1984
	7.22	340.3	3169.8	334	24	1985
	7.71	343.0	3176.2	193	24	1986
Annual	1.03	340.3	3165.7	-	-	1982
	0.84	340.3	3165.7	-	-	1983
	1.06	340.3	3165.7	-	-	1984
	0.96	340.3	3165.7	-	-	1985
	1.18	342.0	3174.0	-	-	1986

Note: - = Not applicable.
µg/m = micrograms per cubic meter.
km = kilometers.

* Highest, second-highest concentrations predicted for this averaging period.

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 1 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1982	3	232	3	343.7	3178.3	5.58	0.49
1982	3	240	6	339.0	3183.4	3.42	0.51
1982	3	240	6	343.7	3178.3	3.31	0.50
1982	3	240	6	343.0	3176.2	2.49	0.49
1982	3	248	3	343.7	3178.3	0.82	0.49
1982	3	248	3	339.0	3183.4	0.30	0.51
1982	3	355	3	340.3	3165.7	-1.18	0.51
1982	3	22	24	336.5	3183.4	-2.47	0.49
1982	3	345	6	342.0	3174.0	-2.59	0.49
1982	3	232	3	339.0	3183.4	-3.43	0.50
1982	3	232	3	343.0	3176.2	-3.66	0.49
1982	3	345	6	343.0	3176.2	-3.93	0.49
1982	3	22	24	342.0	3174.0	-6.75	0.48
1982	3	199	6	343.7	3178.3	-8.29	0.49
1982	3	240	3	342.0	3174.0	-8.88	0.49
1982	3	49	6	340.3	3169.8	-9.74	0.48
1982	3	240	3	334.0	3183.4	-10.50	0.49
1982	3	210	3	342.0	3174.0	-10.85	0.79
1982	3	248	3	343.0	3176.2	-11.82	0.49
1982	3	145	3	343.0	3176.2	-12.00	0.56
1982	3	354	24	340.3	3167.7	-12.19	0.52
1982	3	49	6	340.3	3167.7	-12.35	0.52
1982	3	79	24	336.5	3183.4	-12.57	0.49
1982	3	199	6	339.0	3183.4	-12.68	0.50
1982	3	80	6	340.3	3165.7	-12.91	0.52
1982	3	264	3	340.3	3165.7	-13.37	0.54
1982	3	363	6	331.5	3183.4	-15.62	0.73
1982	3	199	6	343.0	3176.2	-16.20	0.49
1982	3	145	3	336.5	3183.4	-16.60	0.59
1982	3	210	3	334.0	3183.4	-16.89	0.85
1982	3	363	6	340.7	3171.9	-17.22	0.80
1982	3	176	24	342.0	3174.0	-17.35	0.84
1982	3	79	24	342.0	3174.0	-17.97	0.48
1982	3	263	9	340.3	3165.7	-18.17	0.64
1982	3	210	24	341.1	3183.4	-18.49	0.60
1982	3	210	24	342.4	3180.6	-21.19	0.57
1982	3	176	24	334.0	3183.4	-21.75	0.90
1982	3	210	24	343.7	3178.3	-22.49	0.55
1982	3	145	3	342.0	3174.0	-23.52	0.58
1982	3	210	3	340.7	3171.9	-23.81	1.07
1982	3	210	3	331.5	3183.4	-27.06	0.97
1982	3	363	6	340.3	3169.8	-27.19	0.81
1982	3	363	6	340.3	3167.7	-29.77	0.55
1982	3	210	3	340.3	3169.8	-32.94	0.81

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 2 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1982	3	176	24	331.5	3183.4	-38.35	1.07
1982	3	176	24	340.7	3171.9	-40.87	1.17
1982	3	176	24	340.3	3167.7	-44.95	0.54
1982	3	176	24	340.3	3169.8	-49.80	0.91
1982	24	205	24	340.3	3169.8	3.89	0.09
1982	24	49	24	340.3	3169.8	2.88	0.08
1982	24	205	24	340.3	3167.7	2.45	0.10
1982	24	204	24	343.7	3178.3	2.37	0.08
1982	24	263	24	340.3	3165.7	2.34	0.11
1982	24	204	24	342.4	3180.6	2.27	0.08
1982	24	155	24	340.3	3165.7	2.24	0.07
1982	24	49	24	340.3	3167.7	2.16	0.09
1982	24	364	24	334.0	3183.4	2.07	0.07
1982	24	339	24	342.4	3180.6	2.04	0.10
1982	24	339	24	343.7	3178.3	2.02	0.10
1982	24	339	24	341.1	3183.4	2.01	0.09
1982	24	204	24	341.1	3183.4	1.98	0.07
1982	24	22	24	343.0	3176.2	1.93	0.07
1982	24	155	24	340.3	3167.7	1.89	0.07
1982	24	339	24	343.0	3176.2	1.62	0.10
1982	24	49	24	340.3	3165.7	1.62	0.08
1982	24	362	24	343.0	3176.2	1.55	0.07
1982	24	339	24	339.0	3183.4	1.50	0.09
1982	24	263	24	340.3	3167.7	1.46	0.09
1982	24	364	24	336.5	3183.4	1.39	0.09
1982	24	145	24	343.0	3176.2	1.35	0.07
1982	24	116	24	340.3	3165.7	1.30	0.08
1982	24	205	24	340.3	3165.7	1.15	0.09
1982	24	339	24	336.5	3183.4	1.12	0.09
1982	24	204	24	339.0	3183.4	1.06	0.08
1982	24	191	24	342.0	3174.0	0.88	0.07
1982	24	345	24	343.0	3176.2	0.88	0.07
1982	24	339	24	342.0	3174.0	0.86	0.09
1982	24	204	24	336.5	3183.4	0.83	0.08
1982	24	232	24	340.3	3165.7	0.80	0.07
1982	24	364	24	339.0	3183.4	0.78	0.10
1982	24	204	24	343.0	3176.2	0.65	0.09
1982	24	248	24	339.0	3183.4	0.62	0.07
1982	24	22	24	336.5	3183.4	0.60	0.08
1982	24	145	24	336.5	3183.4	0.38	0.07
1982	24	339	24	334.0	3183.4	0.38	0.08
1982	24	364	24	341.1	3183.4	0.28	0.11
1982	24	364	24	340.7	3171.9	0.28	0.07

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 3 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1982	24	22	24	342.0	3174.0	0.17	0.08
1982	24	364	24	340.3	3169.8	0.10	0.07
1982	24	364	24	343.0	3176.2	0.05	0.10
1982	24	364	24	342.4	3180.6	0.03	0.11
1982	24	204	24	342.0	3174.0	-0.04	0.08
1982	24	191	24	334.0	3183.4	-0.05	0.08
1982	24	364	24	343.7	3178.3	-0.25	0.11
1982	24	145	24	342.0	3174.0	-0.28	0.07
1982	24	199	24	343.7	3178.3	-0.39	0.07
1982	24	364	24	342.0	3174.0	-0.45	0.09
1982	24	307	24	340.7	3171.9	-0.47	0.07
1982	24	363	24	340.7	3171.9	-0.47	0.10
1982	24	240	24	336.5	3183.4	-0.50	0.09
1982	24	210	24	341.1	3183.4	-0.64	0.09
1982	24	191	24	340.7	3171.9	-0.77	0.10
1982	24	80	24	340.3	3167.7	-0.78	0.07
1982	24	199	24	343.0	3176.2	-0.88	0.07
1982	24	199	24	339.0	3183.4	-0.89	0.07
1982	24	240	24	334.0	3183.4	-0.99	0.08
1982	24	240	24	339.0	3183.4	-1.03	0.09
1982	24	65	24	340.3	3167.7	-1.16	0.08
1982	24	240	24	343.0	3176.2	-1.22	0.10
1982	24	144	24	340.7	3171.9	-1.23	0.07
1982	24	176	24	342.0	3174.0	-1.28	0.11
1982	24	307	24	340.3	3169.8	-1.31	0.07
1982	24	240	24	341.1	3183.4	-1.36	0.08
1982	24	240	24	342.4	3180.6	-1.51	0.09
1982	24	240	24	342.0	3174.0	-1.51	0.09
1982	24	210	24	342.4	3180.6	-1.54	0.09
1982	24	65	24	340.3	3165.7	-1.59	0.08
1982	24	80	24	340.3	3165.7	-1.67	0.09
1982	24	191	24	340.3	3169.8	-1.73	0.08
1982	24	176	24	334.0	3183.4	-1.74	0.12
1982	24	191	24	331.5	3183.4	-1.75	0.09
1982	24	240	24	343.7	3178.3	-1.85	0.09
1982	24	173	24	334.0	3183.4	-2.04	0.07
1982	24	210	24	334.0	3183.4	-2.15	0.13
1982	24	210	24	343.7	3178.3	-2.19	0.09
1982	24	210	24	339.0	3183.4	-2.21	0.08
1982	24	264	24	340.3	3167.7	-2.39	0.09
1982	24	210	24	336.5	3183.4	-2.48	0.09
1982	24	363	24	331.5	3183.4	-2.53	0.09
1982	24	144	24	340.3	3169.8	-2.57	0.08
1982	24	210	24	331.5	3183.4	-2.76	0.14

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 4 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1982	24	363	24	340.3	3169.8	-2.97	0.10
1982	24	153	24	343.0	3176.2	-3.49	0.07
1982	24	173	24	342.0	3174.0	-3.54	0.08
1982	24	176	24	331.5	3183.4	-3.91	0.14
1982	24	264	24	340.3	3165.7	-4.25	0.12
1982	24	210	24	343.0	3176.2	-4.34	0.09
1982	24	355	24	340.3	3165.7	-4.36	0.09
1982	24	153	24	342.0	3174.0	-4.45	0.08
1982	24	153	24	334.0	3183.4	-4.49	0.07
1982	24	210	24	342.0	3174.0	-4.84	0.13
1982	24	176	24	340.7	3171.9	-4.88	0.15
1982	24	153	24	340.7	3171.9	-5.05	0.08
1982	24	176	24	340.3	3167.7	-5.11	0.07
1982	24	153	24	340.3	3169.8	-5.24	0.07
1982	24	153	24	331.5	3183.4	-5.44	0.07
1982	24	210	24	340.3	3167.7	-5.47	0.07
1982	24	210	24	340.7	3171.9	-5.60	0.16
1982	24	176	24	340.3	3169.8	-6.08	0.12
1982	24	210	24	340.3	3169.8	-6.52	0.12
1983	3	225	3	342.0	3174.0	-2.83	0.58
1983	3	264	6	334.0	3183.4	-4.60	0.48
1983	3	224	6	340.3	3165.7	-5.74	0.54
1983	3	135	6	342.0	3174.0	-8.63	0.51
1983	3	225	3	334.0	3183.4	-8.77	0.59
1983	3	336	24	343.0	3176.2	-9.02	0.60
1983	3	135	6	334.0	3183.4	-9.36	0.51
1983	3	30	3	341.1	3183.4	-10.17	0.51
1983	3	225	3	340.7	3171.9	-10.38	0.56
1983	3	30	3	334.0	3183.4	-10.58	0.49
1983	3	247	3	342.0	3174.0	-10.98	0.72
1983	3	30	3	342.4	3180.6	-11.24	0.50
1983	3	186	21	340.7	3171.9	-11.83	0.51
1983	3	225	3	331.5	3183.4	-11.90	0.51
1983	3	129	24	343.0	3176.2	-12.01	0.56
1983	3	174	6	343.0	3176.2	-12.06	0.57
1983	3	30	3	343.7	3178.3	-12.19	0.50
1983	3	39	24	342.0	3174.0	-12.87	0.54
1983	3	122	3	341.1	3183.4	-14.01	0.49
1983	3	279	3	341.1	3183.4	-14.55	0.50
1983	3	135	6	331.5	3183.4	-14.56	0.66
1983	3	242	6	340.3	3165.7	-14.61	0.54
1983	3	336	24	336.5	3183.4	-14.67	0.73
1983	3	285	21	331.5	3183.4	-14.90	0.56

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 5 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1983	3	30	3	342.0	3174.0	-15.01	0.51
1983	3	39	24	334.0	3183.4	-15.56	0.55
1983	3	247	3	334.0	3183.4	-16.03	0.73
1983	3	285	21	340.7	3171.9	-16.11	0.61
1983	3	135	6	340.7	3171.9	-16.44	0.74
1983	3	129	24	336.5	3183.4	-16.60	0.59
1983	3	174	6	336.5	3183.4	-16.68	0.60
1983	3	258	24	340.3	3167.7	-16.97	0.55
1983	3	186	21	340.3	3169.8	-18.80	0.51
1983	3	135	6	340.3	3169.8	-22.02	0.84
1983	3	39	24	331.5	3183.4	-22.87	0.48
1983	3	247	3	331.5	3183.4	-22.96	0.63
1983	3	135	6	340.3	3165.7	-23.52	0.59
1983	3	129	24	342.0	3174.0	-23.63	0.58
1983	3	174	6	342.0	3174.0	-23.78	0.59
1983	3	39	24	340.7	3171.9	-24.62	0.53
1983	3	135	6	340.3	3167.7	-24.79	0.78
1983	3	336	24	342.0	3174.0	-25.17	0.94
1983	3	285	21	340.3	3169.8	-25.32	0.62
1983	3	247	3	340.7	3171.9	-26.55	0.70
1983	3	244	3	339.0	3183.4	-26.71	0.61
1983	3	336	24	334.0	3183.4	-26.83	0.87
1983	3	244	3	342.4	3180.6	-27.92	0.56
1983	3	244	3	343.7	3178.3	-28.38	0.59
1983	3	336	24	331.5	3183.4	-31.92	0.64
1983	3	336	24	340.7	3171.9	-37.16	0.70
1983	3	244	3	343.0	3176.2	-39.79	0.59
1983	24	247	24	342.0	3174.0	3.82	0.13
1983	24	247	24	336.5	3183.4	3.03	0.09
1983	24	285	24	342.4	3180.6	2.83	0.09
1983	24	285	24	341.1	3183.4	2.82	0.09
1983	24	336	24	343.0	3176.2	2.69	0.09
1983	24	285	24	343.7	3178.3	2.55	0.09
1983	24	174	24	343.0	3176.2	2.41	0.09
1983	24	285	24	339.0	3183.4	2.22	0.07
1983	24	122	24	343.7	3178.3	2.06	0.07
1983	24	135	24	336.5	3183.4	1.85	0.07
1983	24	99	24	343.7	3178.3	1.55	0.07
1983	24	247	24	334.0	3183.4	1.54	0.13
1983	24	285	24	334.0	3183.4	1.51	0.08
1983	24	122	24	342.4	3180.6	1.46	0.08
1983	24	247	24	340.7	3171.9	1.34	0.13
1983	24	285	24	342.0	3174.0	1.26	0.07

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 6 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1983	24	135	24	342.0	3174.0	1.19	0.09
1983	24	174	24	336.5	3183.4	1.06	0.09
1983	24	122	24	341.1	3183.4	1.04	0.08
1983	24	99	24	339.0	3183.4	1.02	0.08
1983	24	174	24	342.0	3174.0	0.81	0.09
1983	24	135	24	334.0	3183.4	0.68	0.09
1983	24	247	24	340.3	3169.8	0.56	0.08
1983	24	258	24	340.3	3169.8	0.54	0.09
1983	24	336	24	336.5	3183.4	0.36	0.10
1983	24	135	24	340.7	3171.9	0.30	0.12
1983	24	99	24	343.0	3176.2	0.26	0.09
1983	24	36	24	341.1	3183.4	0.23	0.07
1983	24	135	24	340.3	3165.7	0.18	0.09
1983	24	285	24	331.5	3183.4	0.06	0.11
1983	24	135	24	340.3	3167.7	-0.10	0.11
1983	24	135	24	340.3	3169.8	-0.27	0.12
1983	24	135	24	331.5	3183.4	-0.29	0.10
1983	24	36	24	342.4	3180.6	-0.37	0.07
1983	24	285	24	340.7	3171.9	-0.50	0.12
1983	24	99	24	336.5	3183.4	-0.50	0.08
1983	24	247	24	331.5	3183.4	-0.54	0.12
1983	24	244	24	341.1	3183.4	-0.62	0.08
1983	24	258	24	340.3	3167.7	-0.69	0.10
1983	24	174	24	334.0	3183.4	-0.73	0.08
1983	24	244	24	343.7	3178.3	-0.77	0.10
1983	24	36	24	343.7	3178.3	-0.80	0.08
1983	24	225	24	342.0	3174.0	-0.88	0.08
1983	24	244	24	339.0	3183.4	-0.98	0.10
1983	24	244	24	342.4	3180.6	-0.99	0.09
1983	24	285	24	340.3	3165.7	-1.01	0.08
1983	24	99	24	342.0	3174.0	-1.03	0.09
1983	24	264	24	342.0	3174.0	-1.12	0.08
1983	24	336	24	342.0	3174.0	-1.13	0.13
1983	24	264	24	334.0	3183.4	-1.14	0.08
1983	24	224	24	340.3	3165.7	-1.19	0.08
1983	24	99	24	340.3	3165.7	-1.20	0.07
1983	24	99	24	340.3	3167.7	-1.30	0.07
1983	24	336	24	334.0	3183.4	-1.30	0.12
1983	24	258	24	340.3	3165.7	-1.35	0.09
1983	24	256	24	340.3	3165.7	-1.41	0.07
1983	24	99	24	340.3	3169.8	-1.45	0.08
1983	24	249	24	336.5	3183.4	-1.47	0.07
1983	24	39	24	342.0	3174.0	-1.51	0.07
1983	24	99	24	340.7	3171.9	-1.52	0.09

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 7 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1983	24	244	24	336.5	3183.4	-1.56	0.08
1983	24	98	24	340.3	3167.7	-1.59	0.08
1983	24	99	24	334.0	3183.4	-1.83	0.08
1983	24	285	24	340.3	3169.8	-1.83	0.12
1983	24	285	24	340.3	3167.7	-1.94	0.10
1983	24	186	24	340.7	3171.9	-2.01	0.08
1983	24	129	24	343.0	3176.2	-2.03	0.09
1983	24	186	24	331.5	3183.4	-2.20	0.08
1983	24	39	24	334.0	3183.4	-2.28	0.08
1983	24	279	24	341.1	3183.4	-2.37	0.08
1983	24	244	24	343.0	3176.2	-2.39	0.10
1983	24	279	24	342.4	3180.6	-2.40	0.08
1983	24	99	24	331.5	3183.4	-2.45	0.08
1983	24	279	24	343.7	3178.3	-2.53	0.08
1983	24	336	24	331.5	3183.4	-2.68	0.10
1983	24	129	24	336.5	3183.4	-2.78	0.10
1983	24	336	24	340.7	3171.9	-2.92	0.11
1983	24	98	24	340.3	3165.7	-2.94	0.12
1983	24	186	24	340.3	3169.8	-3.19	0.08
1983	24	39	24	340.7	3171.9	-3.20	0.07
1983	24	264	24	340.7	3171.9	-3.27	0.07
1983	24	225	24	340.7	3171.9	-3.45	0.07
1983	24	129	24	342.0	3174.0	-3.97	0.10
1983	24	129	24	334.0	3183.4	-4.04	0.08
1983	24	225	24	334.0	3183.4	-4.07	0.08
1983	24	242	24	340.3	3165.7	-4.34	0.08
1984	3	145	6	342.4	3180.6	-9.17	0.55
1984	3	110	9	340.3	3165.7	-9.33	0.53
1984	3	145	6	343.7	3178.3	-10.77	0.59
1984	3	110	24	331.5	3183.4	-11.78	0.55
1984	3	193	24	334.0	3183.4	-12.04	0.48
1984	3	357	9	340.3	3165.7	-14.16	0.53
1984	3	123	6	331.5	3183.4	-14.22	0.55
1984	3	246	24	340.3	3167.7	-14.68	0.52
1984	3	110	24	341.1	3183.4	-15.11	0.60
1984	3	145	6	339.0	3183.4	-15.13	0.61
1984	3	123	6	340.7	3171.9	-15.52	0.60
1984	3	110	24	340.7	3171.9	-15.92	0.60
1984	3	194	3	340.3	3165.7	-19.11	0.65
1984	3	145	6	343.0	3176.2	-20.10	0.59
1984	3	110	24	342.4	3180.6	-20.11	0.57
1984	3	110	24	340.3	3169.8	-20.72	0.60
1984	3	110	24	343.7	3178.3	-22.06	0.55

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 8 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1984	3	123	6	340.3	3169.8	-24.48	0.61
1984	24	145	24	341.1	3183.4	1.87	0.08
1984	24	145	24	342.4	3180.6	1.32	0.10
1984	24	145	24	343.7	3178.3	1.08	0.10
1984	24	246	24	340.3	3167.7	0.96	0.07
1984	24	145	24	339.0	3183.4	0.72	0.11
1984	24	145	24	342.0	3174.0	0.25	0.08
1984	24	141	24	342.0	3174.0	0.19	0.07
1984	24	145	24	343.0	3176.2	0.16	0.11
1984	24	110	24	340.7	3171.9	0.09	0.11
1984	24	110	24	341.1	3183.4	0.07	0.15
1984	24	110	24	331.5	3183.4	-0.06	0.10
1984	24	55	24	334.0	3183.4	-0.13	0.08
1984	24	110	24	340.3	3169.8	-0.35	0.13
1984	24	55	24	342.0	3174.0	-0.38	0.08
1984	24	145	24	336.5	3183.4	-0.84	0.09
1984	24	110	24	342.4	3180.6	-1.13	0.14
1984	24	110	24	340.3	3167.7	-1.53	0.12
1984	24	110	24	339.0	3183.4	-1.58	0.10
1984	24	110	24	340.3	3165.7	-1.74	0.11
1984	24	194	24	340.3	3165.7	-1.80	0.09
1984	24	110	24	343.7	3178.3	-1.81	0.13
1984	24	193	24	334.0	3183.4	-1.93	0.08
1984	24	193	24	342.0	3174.0	-2.13	0.08
1984	24	193	24	331.5	3183.4	-2.75	0.07
1984	24	55	24	340.7	3171.9	-2.91	0.07
1984	24	193	24	340.7	3171.9	-3.25	0.08
1984	24	110	24	343.0	3176.2	-3.53	0.08
1984	24	123	24	331.5	3183.4	-4.83	0.08
1984	24	123	24	340.7	3171.9	-5.47	0.09
1984	24	123	24	340.3	3169.8	-7.05	0.09
1985	3	234	6	342.0	3174.0	10.29	0.48
1985	3	234	6	334.0	3183.4	9.51	0.48
1985	3	302	3	340.3	3165.7	-4.07	0.54
1985	3	206	6	342.0	3174.0	-4.38	0.49
1985	3	231	9	340.7	3171.9	-4.98	0.50
1985	3	233	24	342.0	3174.0	-5.46	0.49
1985	3	140	3	340.3	3167.7	-5.85	0.48
1985	3	206	6	336.5	3183.4	-6.78	0.50
1985	3	168	6	334.0	3183.4	-7.32	0.48
1985	3	288	6	340.7	3171.9	-7.58	0.50
1985	3	231	9	340.3	3169.8	-9.24	0.51

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 9 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1985	3	87	6	342.0	3174.0	-9.48	0.56
1985	3	88	24	341.1	3183.4	-10.76	0.49
1985	3	64	3	340.3	3169.8	-11.12	0.57
1985	3	233	24	331.5	3183.4	-11.21	0.57
1985	3	198	6	340.7	3171.9	-11.34	0.51
1985	3	198	24	336.5	3183.4	-11.44	0.50
1985	3	303	3	343.0	3176.2	-11.51	0.53
1985	3	87	6	334.0	3183.4	-11.59	0.57
1985	3	24	6	340.7	3171.9	-12.20	0.52
1985	3	288	6	340.3	3169.8	-12.48	0.51
1985	3	303	3	336.5	3183.4	-12.67	0.50
1985	3	24	6	340.3	3165.7	-13.55	0.52
1985	3	27	24	340.7	3171.9	-14.22	0.58
1985	3	24	6	340.3	3169.8	-14.44	0.54
1985	3	27	24	331.5	3183.4	-14.62	0.53
1985	3	24	6	340.3	3167.7	-14.81	0.54
1985	3	168	6	342.0	3174.0	-16.00	0.48
1985	3	303	3	342.0	3174.0	-16.56	0.49
1985	3	140	3	340.3	3165.7	-16.66	0.66
1985	3	233	24	340.7	3171.9	-16.73	0.63
1985	3	198	24	342.0	3174.0	-16.81	0.49
1985	3	198	6	340.3	3169.8	-17.64	0.51
1985	3	233	24	340.3	3169.8	-20.69	0.57
1985	3	64	3	340.3	3167.7	-20.95	0.67
1985	3	87	6	331.5	3183.4	-21.29	0.50
1985	3	27	24	340.3	3169.8	-21.79	0.58
1985	3	3	3	339.0	3183.4	-21.99	0.48
1985	3	3	3	343.7	3178.3	-22.91	0.56
1985	3	3	3	341.1	3183.4	-22.94	0.58
1985	3	3	3	342.4	3180.6	-23.59	0.57
1985	3	87	6	340.7	3171.9	-23.73	0.55
1985	3	64	3	340.3	3165.7	-26.78	0.58
1985	24	335	24	341.1	3183.4	2.42	0.11
1985	24	335	24	342.4	3180.6	1.73	0.11
1985	24	335	24	343.7	3178.3	1.45	0.12
1985	24	303	24	340.3	3169.8	1.09	0.07
1985	24	335	24	339.0	3183.4	1.04	0.10
1985	24	303	24	340.3	3167.7	1.01	0.08
1985	24	206	24	334.0	3183.4	0.83	0.07
1985	24	335	24	336.5	3183.4	0.82	0.08
1985	24	303	24	340.3	3165.7	0.80	0.07
1985	24	233	24	331.5	3183.4	0.76	0.08
1985	24	233	24	334.0	3183.4	0.57	0.07

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 10 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1985	24	303	24	343.0	3176.2	0.22	0.07
1985	24	206	24	336.5	3183.4	0.14	0.09
1985	24	335	24	343.0	3176.2	0.02	0.10
1985	24	233	24	342.0	3174.0	-0.07	0.07
1985	24	168	24	334.0	3183.4	-0.08	0.07
1985	24	87	24	342.0	3174.0	-0.12	0.09
1985	24	24	24	334.0	3183.4	-0.29	0.07
1985	24	302	24	340.3	3165.7	-0.51	0.08
1985	24	24	24	342.0	3174.0	-0.52	0.08
1985	24	27	24	340.7	3171.9	-0.58	0.08
1985	24	206	24	342.0	3174.0	-0.65	0.09
1985	24	87	24	334.0	3183.4	-0.70	0.09
1985	24	24	24	331.5	3183.4	-0.76	0.08
1985	24	140	24	340.3	3167.7	-0.89	0.08
1985	24	24	24	340.3	3165.7	-1.07	0.08
1985	24	24	24	340.7	3171.9	-1.12	0.09
1985	24	206	24	343.0	3176.2	-1.24	0.09
1985	24	233	24	340.7	3171.9	-1.33	0.09
1985	24	27	24	331.5	3183.4	-1.36	0.08
1985	24	24	24	340.3	3169.8	-1.39	0.09
1985	24	24	24	340.3	3167.7	-1.40	0.08
1985	24	233	24	341.1	3183.4	-1.41	0.08
1985	24	198	24	340.3	3169.8	-1.50	0.07
1985	24	233	24	342.4	3180.6	-1.64	0.08
1985	24	87	24	340.7	3171.9	-1.69	0.09
1985	24	198	24	336.5	3183.4	-1.69	0.08
1985	24	168	24	342.0	3174.0	-1.77	0.07
1985	24	198	24	331.5	3183.4	-1.91	0.08
1985	24	27	24	340.3	3169.8	-1.93	0.08
1985	24	87	24	331.5	3183.4	-1.98	0.08
1985	24	140	24	340.3	3165.7	-2.00	0.10
1985	24	64	24	340.3	3169.8	-2.13	0.07
1985	24	88	24	343.7	3178.3	-2.23	0.09
1985	24	198	24	334.0	3183.4	-2.29	0.09
1985	24	233	24	343.7	3178.3	-2.35	0.08
1985	24	233	24	340.3	3169.8	-2.38	0.08
1985	24	88	24	341.1	3183.4	-2.63	0.10
1985	24	198	24	342.0	3174.0	-2.67	0.09
1985	24	198	24	340.7	3171.9	-2.85	0.09
1985	24	88	24	342.4	3180.6	-3.05	0.09
1985	24	64	24	340.3	3167.7	-3.18	0.08
1985	24	64	24	340.3	3165.7	-3.83	0.07
1985	24	19	24	341.1	3183.4	-4.32	0.08
1985	24	3	24	343.7	3178.3	-5.34	0.07

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 11 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1985	24	3	24	342.4	3180.6	-5.81	0.07
1985	24	3	24	341.1	3183.4	-6.00	0.08
1986	3	215	6	340.3	3167.7	1.06	0.55
1986	3	344	24	341.1	3183.4	-3.52	0.57
1986	3	344	24	342.4	3180.6	-3.59	0.65
1986	3	139	6	340.3	3169.8	-4.73	0.56
1986	3	344	24	343.7	3178.3	-4.74	0.69
1986	3	139	6	340.3	3167.7	-7.17	0.60
1986	3	163	3	334.0	3183.4	-7.21	0.59
1986	3	163	3	342.0	3174.0	-7.55	0.58
1986	3	344	24	339.0	3183.4	-7.84	0.69
1986	3	299	3	340.3	3167.7	-9.70	0.57
1986	3	139	6	340.3	3165.7	-10.20	0.59
1986	3	335	3	342.0	3174.0	-10.47	0.48
1986	3	344	24	343.0	3176.2	-11.22	0.69
1986	3	321	6	340.3	3165.7	-11.24	0.53
1986	3	345	3	331.5	3183.4	-11.30	0.60
1986	3	75	6	340.7	3171.9	-11.41	0.52
1986	3	227	6	341.1	3183.4	-11.60	0.50
1986	3	344	24	336.5	3183.4	-12.53	0.54
1986	3	70	24	336.5	3183.4	-12.59	0.49
1986	3	150	6	340.3	3165.7	-12.94	0.53
1986	3	345	3	340.7	3171.9	-13.87	0.66
1986	3	163	3	331.5	3183.4	-14.09	0.52
1986	3	150	3	340.3	3167.7	-14.10	0.54
1986	3	225	24	340.3	3165.7	-14.62	0.54
1986	3	299	3	340.3	3165.7	-14.80	0.68
1986	3	75	6	340.3	3169.8	-15.10	0.54
1986	3	335	3	340.7	3171.9	-15.11	0.48
1986	3	75	6	340.3	3167.7	-15.94	0.49
1986	3	47	24	340.7	3171.9	-17.40	0.52
1986	3	70	24	342.0	3174.0	-18.00	0.48
1986	3	47	24	340.3	3169.8	-19.65	0.50
1986	3	163	3	340.7	3171.9	-20.27	0.57
1986	3	345	3	340.3	3169.8	-22.41	0.71
1986	3	345	3	340.3	3167.7	-25.12	0.57
1986	3	168	3	340.3	3165.7	-25.22	0.65
1986	3	217	3	342.0	3174.0	-34.66	0.58
1986	3	217	3	334.0	3183.4	-40.09	0.58
1986	3	217	3	340.7	3171.9	-43.82	0.56
1986	3	217	3	331.5	3183.4	-51.02	0.51
1986	24	215	24	331.5	3183.4	5.22	0.09

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 12 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1986	24	215	24	340.7	3171.9	4.52	0.11
1986	24	344	24	331.5	3183.4	2.97	0.08
1986	24	344	24	341.1	3183.4	2.87	0.13
1986	24	344	24	342.4	3180.6	2.57	0.14
1986	24	344	24	343.7	3178.3	2.23	0.15
1986	24	215	24	340.3	3169.8	2.03	0.15
1986	24	344	24	340.7	3171.9	1.74	0.09
1986	24	163	24	342.0	3174.0	1.72	0.09
1986	24	168	24	340.3	3167.7	1.68	0.07
1986	24	344	24	339.0	3183.4	1.52	0.15
1986	24	163	24	334.0	3183.4	1.34	0.09
1986	24	335	24	343.0	3176.2	0.90	0.07
1986	24	344	24	342.0	3174.0	0.82	0.13
1986	24	335	24	342.0	3174.0	0.61	0.12
1986	24	344	24	343.0	3176.2	0.54	0.16
1986	24	215	24	340.3	3167.7	0.50	0.16
1986	24	168	24	340.3	3165.7	0.49	0.10
1986	24	344	24	334.0	3183.4	0.09	0.10
1986	24	205	24	341.1	3183.4	0.07	0.10
1986	24	335	24	340.7	3171.9	-0.10	0.14
1986	24	150	24	340.3	3169.8	-0.20	0.11
1986	24	205	24	343.7	3178.3	-0.38	0.09
1986	24	335	24	331.5	3183.4	-0.39	0.12
1986	24	335	24	336.5	3183.4	-0.39	0.09
1986	24	205	24	342.4	3180.6	-0.42	0.10
1986	24	335	24	334.0	3183.4	-0.44	0.11
1986	24	163	24	331.5	3183.4	-0.55	0.08
1986	24	344	24	336.5	3183.4	-0.69	0.14
1986	24	215	24	340.3	3165.7	-0.69	0.14
1986	24	299	24	340.3	3169.8	-0.87	0.09
1986	24	205	24	339.0	3183.4	-0.95	0.08
1986	24	335	24	340.3	3167.7	-1.30	0.09
1986	24	70	24	342.4	3180.6	-1.37	0.08
1986	24	227	24	341.1	3183.4	-1.43	0.08
1986	24	239	24	340.3	3169.8	-1.57	0.08
1986	24	335	24	340.3	3169.8	-1.62	0.12
1986	24	239	24	340.7	3171.9	-1.65	0.08
1986	24	139	24	340.3	3169.8	-1.72	0.09
1986	24	239	24	340.3	3167.7	-1.72	0.07
1986	24	70	24	343.7	3178.3	-1.77	0.09
1986	24	227	24	342.4	3180.6	-1.86	0.08
1986	24	299	24	340.3	3167.7	-1.88	0.11
1986	24	70	24	339.0	3183.4	-1.90	0.10
1986	24	163	24	340.7	3171.9	-2.14	0.09

Table 3. Summary of PSD Class I Impacts for which the Proposed Project Has a Significant Contribution Based on the Proposed National Park Service Significant Impact Levels (Page 13 of 13)

Year	Averaging Period	Julian Day	Hour Ending	Receptor Location UTM East (km)	Receptor Location UTM North (km)	Total Class I Impact (ug/m3)	Proposed Source Contribution (ug/m3)*
1986	24	75	24	340.3	3169.8	-2.16	0.07
1986	24	139	24	340.3	3167.7	-2.17	0.11
1986	24	227	24	343.7	3178.3	-2.19	0.07
1986	24	225	24	343.0	3176.2	-2.22	0.08
1986	24	150	24	340.3	3167.7	-2.40	0.14
1986	24	139	24	340.3	3165.7	-2.48	0.12
1986	24	299	24	340.3	3165.7	-2.59	0.12
1986	24	217	24	342.0	3174.0	-2.87	0.08
1986	24	70	24	343.0	3176.2	-3.12	0.13
1986	24	70	24	336.5	3183.4	-3.27	0.13
1986	24	225	24	342.0	3174.0	-3.41	0.09
1986	24	345	24	340.7	3171.9	-3.50	0.11
1986	24	141	24	341.1	3183.4	-3.75	0.07
1986	24	345	24	331.5	3183.4	-3.80	0.10
1986	24	225	24	336.5	3183.4	-3.83	0.08
1986	24	225	24	334.0	3183.4	-3.84	0.07
1986	24	208	24	343.7	3178.3	-3.87	0.07
1986	24	70	24	334.0	3183.4	-4.23	0.11
1986	24	225	24	340.7	3171.9	-4.42	0.08
1986	24	150	24	340.3	3165.7	-4.43	0.15
1986	24	208	24	342.4	3180.6	-4.46	0.08
1986	24	70	24	340.7	3171.9	-4.52	0.08
1986	24	70	24	342.0	3174.0	-4.68	0.13
1986	24	208	24	341.1	3183.4	-4.85	0.09
1986	24	225	24	340.3	3169.8	-4.96	0.09
1986	24	217	24	334.0	3183.4	-4.97	0.08
1986	24	217	24	340.7	3171.9	-5.17	0.08
1986	24	225	24	340.3	3167.7	-5.53	0.11
1986	24	345	24	340.3	3169.8	-5.78	0.12
1986	24	225	24	340.3	3165.7	-6.09	0.13
1986	24	345	24	340.3	3167.7	-6.97	0.11
1986	24	345	24	340.3	3165.7	-7.13	0.08

* Ark Energy modeled at 20°F design temperature.

Table 4. Detail of Hourly Meteorological Data Used in the Modeling Analysis - Tampa 1986, Julian Day 215

Hour	Flow Vector (degrees)	Random Flow Vector (degrees)	Wind Speed (m/sec)	Mixing Height (m)		Temperature (°K)	Input Stability Category	Proposed Project Impact (µg/m)
				Rural	Urban			
1	330	330	2.06	1312	925	298.2	5	0.0
2	340	337	2.06	1299	925	298.7	5	0.0
3	320	320	2.06	1285	925	298.7	5	0.767
4	320	320	2.06	1272	925	298.2	6	0.681
5	330	329	2.57	1259	925	298.2	6	0.0
6	330	331	3.60	7	926	298.2	5	0.0
7	340	339	2.57	148	953	299.3	4	0.0
8	320	317	2.57	289	979	300.9	3	0.016
9	320	325	2.57	431	1006	302.6	2	0.299
10	40	39	4.12	572	1032	303.7	3	0.0
11	10	6	4.63	714	1059	304.8	2	0.0
12	360	4	4.12	855	1085	304.3	2	0.0
13	40	40	3.60	997	1112	303.7	2	0.0
14	80	79	4.12	1138	1138	304.3	2	0.0
15	90	90	4.12	1138	1138	303.7	3	0.0
16	290	293	2.06	1138	1138	303.7	4	0.0
17	320	322	1.54	1138	1138	299.8	3	0.324
18	320	325	1.00	1138	1138	302.0	2	0.0
19	320	324	1.00	1138	1138	301.5	3	0.0
20	270	271	1.54	1153	1153	300.4	4	0.0
21	300	297	2.06	1172	1068	299.8	5	0.0
22	300	297	2.57	1192	1028	299.3	5	0.0
23	280	277	1.54	1212	987	299.3	6	0.0
24	300	300	2.57	1232	947	298.7	6	0.0