



Division of Air
Resources Management

AUG 30 1993

RECEIVED

August 27, 1993

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

Re: Tiger Bay Limited Partnership (formerly Central Florida Power L.P.)
Tiger Bay Cogeneration Plant
AC 53-214903, PSD-FL-190; AC 53-230744

Dear Mr. Fancy:

Enclosed please find an air quality impact analysis for the proposed cogeneration facility with the combustion turbine operating at 60 percent load. This information is provided for this operating load since the air quality impacts for the combustion turbine were originally modeled at 100 and 70 percent operating loads. Based on current operating plans for the unit, an operating load of 60 percent is anticipated to be the lower range of operation for the turbine. The air quality impact analysis is being submitted to inform the Department of this operational change and meet the requirements of the general conditions of the permit. The proposed operating load does not represent a significant change to the project's ambient air quality impacts nor will it affect the permit conditions.

As you know, the proposed facility consists of one combustion turbine and an associated duct-burner-fired heat recovery steam generator (HRSG). These air emission sources received an air construction permit (AC 53-214903) in May 1993. The facility also includes a natural-gas-fired spray dryer unit and baghouse associated with the wastewater treatment system for which an air construction permit (AC 53-230744) was received in June 1993. As part of the permit applications, the maximum pollutant concentrations were predicted for those emission sources. For this submittal, the air quality impact analysis was based on the methods and assumptions used in the previous analyses, which included the use of the ISC2 model using 5 years of meteorological data. The source and emission data for the combustion turbine operating at 60 percent load and the duct burner at 100 percent load are presented in Attachment 1. Information on the spray dryer is presented in Attachment 2. The stack, operating, and emission data considered in the air quality impact modeling are presented in Table 1. The emission rates of the criteria and regulated pollutants for the combustion turbine operating at 60 percent load are compared to the permitted emissions rates in Tables 2 and 3.

A summary of the maximum concentrations predicted for the facility with the combustion turbine operating at 60 percent load for ambient temperatures of 27 and 97 degrees Fahrenheit is presented in Table 4. These results are compared to the results presented in the original application. The total concentration also includes impacts due to duct firing and the spray dryer. For predicting short-term impacts, the emission rates for the combustion turbine were based on firing distillate fuel oil (emissions from firing natural gas are lower than those for natural gas firing) coupled with the exit velocity from firing natural gas (exit velocity from firing fuel oil was lower). For predicting annual impacts, the

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cumulative emissions rates for distillate oil and natural gas (based on 300 and 8,460 hours, respectively) were used. This approach results in a conservative estimate of ambient impacts. As shown, the maximum concentrations for this analysis are well below the significant impact levels for the applicable pollutants and are generally less than or within 10 percent of the results presented in the original application. It should be noted that the impacts presented in the original application were based on the maximum concentrations predicted for a combustion turbine from two vendors [i.e., General Electric (GE) and Westinghouse] being considered at the time of the permit application. The combustion turbine selected for this project is the GE PG7221(FA) equipped with a dry low NOx combustor.

Because these results are less than the significant impact levels and are not significantly different from the previous results, the proposed operation of the combustion turbine at 60 percent load does not represent a significant change to the project's ambient air quality impacts and will not affect the permit conditions.

If you have any questions regarding this information, please do not hesitate to call. We appreciate your efforts in reviewing these results and written confirmation of the conclusion reached in this correspondence is respectfully requested.

Sincerely,

Kennard F. Kosky, P.E.
President

KFK/lcb

Enclosure

cc: Robert I. Taylor, Tiger Bay L.P.
Robert Chatham, Destec Energy, Inc.
Teresa Heron, FDEP
File (2)

Table 1. Stack, Operating, and Emission Data Considered in the Air Quality Impact Modeling for the Proposed Facility

Parameter	General Electric Turbine - 60% Load				Duct Burner	Spray Dryer/ Evaporator ^c	
	Oil		Gas				
	27°F	97°F	27°F	97°F			
<u>Stack Data (ft)</u>							
Height	180	180	180	180	NA	73	
Diameter	18	18	18	18	NA	1.3	
<u>Operating Data</u>							
Temperature (°F)	190	190	190	190	NA	340	
Velocity (ft/sec)	47.7	43.6	46.0 ^b	42.6 ^b	NA	63.4	

Pollutant	Units	General Electric Turbine - 60% Load				Duct Burner	Spray Dryer/ Evaporator
		Oil		Gas			
		27°F	97°F	27°F	97°F		
PM	lb/hr	17.0	17.0	9.0	9.0	1.0	0.021
	TPY ^a	2.6	2.6	38.1	38.1	4.4	0.092 ^c
NO ₂	TPY ^a	35.3	29.2	493.0	419.4	43.8	1.41 ^c
CO	lb/hr	68.2	62.2	34.4	31.2	10.0	0.061

Note: Attachment 1 presents emissions and stack parameter information used to develop this table. Total modeled gas turbine emission rate includes emissions from the duct burner. Higher emission rate of distillate oil used in the modeling to produce maximum short-term impacts. Cumulative emission rates for oil and natural gas (for 300 and 8,460 hours, respectively) for a given temperature were used to produce maximum annual impacts.

NA = Not applicable.

^a Annual emission rates are based on burning distillate oil and natural gas for 300 and 8,460 hours, respectively, in the gas turbine and natural gas for 8,760 hours in the duct burner.

^b Lower exit velocity of two fuels used in the modeling to produce maximum short-term impacts for given ambient temperature. Does not include additional exhaust from duct burner.

^c At design conditions. Assume 8,760 hours of operation for annual emission rates.

Table 2. Maximum Emissions for Criteria Pollutants for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, 60 Percent Load, and Duct Burner

Pollutant	Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a
A	C			C			C					
Particulate:												
lb/hr	17.00	17.00	17.00	9.00	9.00	9.00	1.00	1.00	1.00	18.00	18.00	18.00
TPY	2.55	2.55	2.60	38.07	38.07	39.40	4.38	4.38	4.38	45.00	45.00	46.38
Sulfur Dioxide:												
lb/hr	73.03	60.39	99.70	3.55	3.02	4.86	0.30	0.30	0.30	73.33	60.69	100.00
TPY	10.95	9.06	15.00	15.03	12.77	21.30	1.32	1.32	1.32	27.30	23.15	37.62
Nitrogen Oxides:												
lb/hr	235.22	194.67	326.00	116.55	99.16	161.90	10.00	10.00	10.00	245.22	204.67	336.00
TPY	35.28	29.20	48.90	492.99	419.44	709.10	43.80	43.80	43.80	572.07	492.44	801.80
Carbon Monoxide:												
lb/hr	68.24	62.17	98.40	34.39	31.16	48.80	10.00	10.00	10.00	78.24	72.17	108.40
TPY	10.24	9.32	14.80	145.49	131.82	213.70	43.80	43.80	43.80	199.52	184.94	272.30
VOCs (as methane):												
lb/hr	5.46	2.01	7.50	2.23	2.02	2.80	2.90	2.90	2.90	8.36	4.91	10.40
TPY	0.82	0.30	1.10	9.42	8.54	12.30	12.70	12.70	12.70	22.94	21.54	26.10
Lead:												
lb/hr	1.21E-02	9.97E-03	1.65E-02	NA	NA	NA	NA	NA	NA	1.21E-02	9.97E-03	1.65E-02
TPY	1.81E-03	1.50E-03	2.47E-03	NA	NA	NA	NA	NA	NA	1.81E-03	1.50E-03	2.47E-03

^a Permitted emission rate at 100 percent load.

Table 3. Maximum Emissions of Other Regulated Pollutants for the Tiger Bay Cogeneration Facility
GE PG7221(FA), Dry Low NOx II Combustion System, 60 Percent Load, and Duct Burner

Pollutant	Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions			
		27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a
Arsenic	lb/hr	5.69E-03	4.70E-03	7.77E-03	NA	NA	NA	NA	NA	NA	5.69E-03	4.70E-03	7.77E-03
	TPY	8.53E-04	7.06E-04	1.17E-03	NA	NA	NA	NA	NA	NA	8.53E-04	7.06E-04	1.17E-03
Beryllium	lb/hr	3.39E-03	2.80E-03	4.62E-03	NA	NA	NA	NA	NA	NA	3.39E-03	2.80E-03	4.62E-03
	TPY	5.08E-04	4.20E-04	6.94E-04	NA	NA	NA	NA	NA	NA	5.08E-04	4.20E-04	6.94E-04
Mercury	lb/hr	4.06E-03	3.36E-03	5.55E-03	NA	NA	NA	NA	NA	NA	4.06E-03	3.36E-03	5.55E-03
	TPY	6.10E-04	5.04E-04	8.32E-04	NA	NA	NA	NA	NA	NA	6.10E-04	5.04E-04	8.32E-04
Fluoride	lb/hr	4.41E-02	3.64E-02	NA	NA	NA	NA	NA	NA	NA	4.41E-02	3.64E-02	NA
	TPY	6.61E-03	5.47E-03	NA	NA	NA	NA	NA	NA	NA	6.61E-03	5.47E-03	NA
Sulfuric Acid Mist	lb/hr	8.95E+00	7.40E+00	1.22E+00	4.35E-01	3.70E-01	5.95E-01	3.68E-02	3.68E-02	3.70E-02	8.98E+00	7.43E+00	1.22E+00
	TPY	1.34E+00	1.11E+00	1.83E-01	1.84E+00	1.56E+00	2.60E+00	1.61E-01	1.61E-01	1.61E-01	3.34E+00	2.84E+00	2.78E+00

^a Permitted emission rate at 100 percent load.

Table 4. Summary of Screening and Refined Air Modeling Impacts for the CT/DB and Spray Dryer/Evaporator Unit

DTIMP60
08/27/93

Ambient Temperature (°F)	Pollutant	Averaging Period	Highest Concentration (µg/m³)						Significant Impact Level (µg/m³)
			100% Load		70% Load		60% Load		
			CT/DB Only ^a	CT/DB + SD/Evap ^b	CT/DB Only ^a	CT/DB + SD/Evap ^b	CT/DB Only ^c	CT/DB + SD/Evap ^b	
SCREENING IMPACTS									
27	PM	24-Hour	0.63	0.28	1.59	0.86	NM	1.35	5
		Annual	0.015	0.015	0.020	0.021	NM	0.024	1
	NO2	Annual	0.26	0.26	0.29	0.29	NM	0.31	1
	CO	1-Hour	25.8	16.9	34.3	19.3	NM	20.6	2000
		8-Hour	6.38	3.97	19.5	7.94	NM	8.75	500
97	PM	24-Hour	0.88	0.49	1.94	1.31	NM	1.49	5
		Annual	0.017	0.018	0.022	0.023	NM	0.026	1
	NO2	Annual	0.25	0.26	0.26	0.27	NM	0.29	1
	CO	1-Hour	29.8	18.0	33.0	19.3	NM	20.5	2000
		8-Hour	10.5	5.61	19.4	8.22	NM	8.91	500
REFINED IMPACTS									
97	PM	24-Hour	NM	NM	2.12	1.31	NM	1.49	5
		Annual	NM	NM	0.022	0.023	NM	0.026	1
27	NO2	Annual	NM	NM	0.29	0.29	NM	0.31	1
27/97	CO	1-Hour	NM	NM	45.8	20.4	NM	21.6	2000
		8-Hour	NM	NM	20.8	12.2	NM	13.2	500

Note: NM = not modeled.

Refinements presented for highest impacts for either the 100 or 70 percent load case, and the 60 percent load case.

^a As presented in the original PSD permit application. Emissions modeled were based on the highest emission rate from the GE or Westinghouse gas turbines. Stack velocity and temperature based on GE design information. Short-term rates are based on burning distillate oil in the gas turbine and natural gas in the duct burner. Annual emission rates are based on burning distillate oil and natural gas for 300 and 8,460 hours, respectively, in the gas turbine and natural gas for 8,760 hours in the duct burner.

^b Based on GE gas turbine emission rates and the spray dryer/evaporator operating at design conditions for 8,760 hours per year.

^c This scenario not modeled for this load condition.

ATTACHMENT 1

**DESIGN INFORMATION AND STACK PARAMETERS FOR THE COMBUSTION
TURBINE AT 60 PERCENT OPERATING LOAD AND DUCT BURNER AT
100 PERCENT OPERATING LOAD**

Table 1. Design Information and Stack Parameters for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, Distillate Oil, 60 Percent Load

Data	* Not Available *		* Not Available *		* Not Available *	
	Gas Turbine Fuel Oil 27 °F	Gas Turbine Fuel Oil 64 °F	Gas Turbine Fuel Oil 72 °F	Gas Turbine Fuel Oil 79 °F	Gas Turbine Fuel Oil 97 °F	
A	B	C	D	E	F	G
General						
Power (kW)		111,400.0		95,700.0		86,500.0
Heat Rate (Btu/kwh)		12,160.0		12,570.0		12,950.0
CT Exhaust Flow						
Mass Flow (lb/hr)		2,602,000		2,450,000		2,372,000
Temperature (oF)		1,194		1,200		1,200
Moisture (% Vol.)		11.84		12.09		12.18
Oxygen (% Vol.)		10.63		11.03		11.30
Molecular Weight		28.24		28.18		28.15
Heat Input (MMBtu/hr)= Power (kW) x Heat Rate (Btu/kwh) + 1,000,000 Btu/MMBtu						
Power (kW)		111,400.0		95,700.0		86,500.0
Heat Rate (Btu/kwh)		12,160.0		12,570.0		12,950.0
Heat Input (MMBtu/hr)		1,354.6		1,202.9		1,120.2
Fuel Oil Consumption (lb/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu + Fuel Heat Content, LHV (Btu/lb)						
Heat Input (MMBtu/hr)		1,354.6		1,202.9		1,120.2
Heat Content, LHV (Btu/lb)		18,550		18,550		18,550
Fuel Oil (lb/hr)		73,025.6		64,849.0		60,386.8
Volume Flow (acfm)= [(Mass Flow (lb/hr) x 1,545 x (Temp. (°F)+ 460°F)] + [Molecular weight x 2116.8] + 60 min/hr						
Mass Flow (lb/hr)		2,602,000		2,450,000		2,372,000
Temperature (°F)		1,194		1,200		1,200
Molecular Weight		28.24		28.18		28.15
Volume Flow (acfm)		1,853,998		1,755,772		1,701,700
Volume Flow (scfm)= [(Mass Flow (lb/hr) x 1,545 x (68°F + 460°F)] + [Molecular weight x 2116.8] + 60 min/hr						
Mass Flow (lb/hr)		2,602,000		2,450,000		2,372,000
Temperature (°F)		68		68		68
Molecular Weight		28.24		28.18		28.15
Volume Flow (scfm)		591,845		558,462		541,264
HRSO Stack Data						
Stack Height (ft)		180		180		180
Diameter (ft)		18.0		18.0		18.0
Volume Flow (acfm) from HRSO= [Volume flow (acfm) x (HRSO temp.(°F)+ 460°F)] + [CT temp.(°F)+ 460°F]						
Volume Flow (acfm) from CT		1,853,998		1,755,772		1,701,700
CT Temperature (°F)		1,194		1,200		1,200
HRSO Temperature (°F)		190		190		190
Volume Flow (acfm) from HRSO		728,597		687,501		666,328
Velocity (ft/sec)= Volume flow (acfm) from HRSO + [(((diameter)²+ 4) x 3.14159] + 60 sec/min						
Volume Flow (acfm) from HRSO		728,597		687,501		666,328
Diameter (ft)		18.0		18.0		18.0
Velocity (ft/sec)		47.7		45.0		43.6

Note: Universal gas constant= 1,545 ft-lb(force)/°R; atmospheric pressure= 2,116.8 lb(force)/ft²

Source: General Electric, 1992.

Table 2. Maximum Emissions for Criteria Pollutants for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, Distillate Oil, 60 Percent Load

Pollutant	* Not Available *		* Not Available *		Gas Turbine Fuel Oil 97 °F	
	Gas Turbine Fuel Oil 27 °F	Gas Turbine Fuel Oil 64 °F	Gas Turbine Fuel Oil 72 °F	Gas Turbine Fuel Oil 79 °F		
A	B	C	D	E	F	G
Hours of Operation		300		300		300
Particulate (lb/hr)= Emission rate (lb/hr) from manufacturer						
Basis, lb/hr (manufactur.) (1)		17.0		17.0		17.0
lb/hr		17.0		17.0		17.0
TPY		2.6		2.6		2.6
Sulfur Dioxide (lb/hr)= Fuel oil (lb/hr) x sulfur content(fraction) x (lb SO2/lb S) x fraction emitted as SO2						
Fuel Oil (lb/hr)		73,025.6		64,849.0		60,386.8
Sulfur content (%)		0.05		0.05		0.05
lb SO2/lb S (64/32)		2.0		2.0		2.0
SO2 Fraction emitted		1.00		1.00		1.00
lb/hr		73.03		64.85		60.39
TPY		11.0		9.7		9.1
Nitrogen Oxides (lb/hr)= NOx(ppm) x [(20.9 x (1 - Moisture%)/100)] - Oxygen(%) x 2116.8 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr + [1545 x (CT temp.(°F) + 460°F) x 5.9 x 1,000,000 (adj. for ppm)]						
Basis, ppm* (1)		42.0		42.0		42.0
Moisture (%)		11.84		12.09		12.18
Oxygen (%)		10.63		11.03		11.3
Volume Flow (acfm)		1,853,998		1,755,772		1,701,700
Temperature (°F)		1194		1200		1200
lb/hr		235.2		209.1		194.7
TPY		35.3		31.4		29.2
Carbon Monoxide (lb/hr)= CO(ppm) x [1 - Moisture%/100] x 2116.8 lb/ft2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr + [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]						
Basis, ppm+ (1)		30.0		30.0		30.0
Moisture (%)		11.84		12.09		12.18
Volume Flow (acfm)		1,853,998		1,755,772		1,701,700
Temperature (°F)		1194		1200		1200
lb/hr		68.2		64.2		62.2
TPY		10.2		9.6		9.3
VOCs (lb/hr)= VOC(ppm) x [1 - Moisture%/100] x 2116.8 lb/ft2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr + [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]						
Basis, ppm+ (1)		4.2		4.1		1.7
Moisture (%)		11.84		12.09		12.18
Volume Flow (acfm)		1,853,998		1,755,772		1,701,700
Temperature (°F)		1194		1200		1200
lb/hr		5.46		5.01		2.01
TPY		0.8		0.8		0.3
Lead (lb/hr)= Lead (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (2)		8.9		8.9		8.9
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		1.21E-02		1.07E-02		9.97E-03
TPY		1.81E-03		0.0		0.0

* corrected to 15% O2 dry conditions
+ corrected to dry conditions

Source: (1) General Electric, 1992; (2) EPA, 1990

Table 3. Maximum Emissions of Other Regulated Pollutants for the Tiger Bay Cogeneration Facility
GE PG7221(FA), Dry Low NOx II Combustion System, Distillate Oil, 60 Percent Load

Pollutant	Units	* Not Available *		* Not Available *		Gas Turbine Fuel Oil 97 °F
		Gas Turbine Fuel Oil 27 °F	Gas Turbine Fuel Oil 64 °F	Gas Turbine Fuel Oil 72 °F	Gas Turbine Fuel Oil 79 °F	
A	B	C	D	E	F	G
Hours of Operation		300		300		300
Arsenic (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		4.2		4.2		4.2
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		5.69E-03		5.05E-03		4.70E-03
TPY		8.53E-04		7.58E-04		7.06E-04
Beryllium (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		2.5		2.5		2.5
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		3.39E-03		3.01E-03		2.80E-03
TPY		5.08E-04		4.51E-04		4.20E-04
Mercury (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		3		3		3
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		4.06E-03		3.61E-03		3.36E-03
TPY		6.10E-04		5.41E-04		5.04E-04
Fluoride (lb/hr)= Basis (pg/J) x 2.324 x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, pg/J (2)		14		14		14
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		4.41E-02		3.91E-02		3.64E-02
TPY		6.61E-03		5.87E-03		5.47E-03
Sulfuric Acid Mist (lb/hr) = Fraction of SO2 Emission Rate x SO2 Emission Rate x lb H2SO4/lb SO2						
Fraction SO2 (%)		8		8		8
SO2 (lb/hr)		73.0		64.8		60.4
lb H2SO4/lb SO2 (98/64)		1.53		1.53		1.53
lb/hr		8.95E+00		7.94E+00		7.40E+00
TPY		1.34E+00		1.19E+00		1.11E+00

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

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

Table 4. Maximum Emissions of Non-Regulated Pollutants for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, Distillate Oil, 60 Percent Load

Pollutant	Units	* Not Available *		* Not Available *		Gas Turbine Fuel Oil 97 °F
		Gas Turbine Fuel Oil 27 °F	Gas Turbine Fuel Oil 64 °F	Gas Turbine Fuel Oil 72 °F	Gas Turbine Fuel Oil 79 °F	
A	B	C	D	E	F	G
Hours of Operation		300		300		300
Manganese (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		14		14		14
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		1.90E-02		1.68E-02		1.57E-02
TPY		2.84E-03		2.53E-03		2.35E-03
Nickel (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		170		170		170
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		2.30E-01		2.05E-01		1.90E-01
TPY		3.45E-02		3.07E-02		2.86E-02
Cadmium (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		10.5		10.5		10.5
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		1.42E-02		1.26E-02		1.18E-02
TPY		2.13E-03		1.89E-03		1.76E-03
Chromium (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		47.5		47.5		47.5
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		6.43E-02		5.71E-02		5.32E-02
TPY		9.65E-03		8.57E-03		7.98E-03
Copper (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		280		280		280
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		3.79E-01		3.37E-01		3.14E-01
TPY		5.69E-02		5.05E-02		4.70E-02
Vanadium (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		69.5		69.5		69.5
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		9.41E-02		8.36E-02		7.79E-02
TPY		1.41E-02		1.25E-02		1.17E-02
Selenium (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		23.42		23.42		23.42
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		3.17E-02		2.82E-02		2.62E-02
TPY		4.76E-03		4.23E-03		3.94E-03
Polycyclic Organic Matter (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		0.278		0.278		0.278
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		3.77E-04		3.34E-04		3.11E-04
TPY		5.65E-05		5.02E-05		4.67E-05
Formaldehyde (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		405		405		405
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		5.49E-01		4.87E-01		4.54E-01
TPY		8.23E-02		7.31E-02		6.81E-02

Source: (1) EPA, 1990

Table 5. Maximum Emissions for Additional Non-Regulated Pollutant for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, Distillate Oil, 60 Percent Load

Pollutant	* Not Available *		* Not Available *		Gas Turbine Fuel Oil 97 °F	
	Gas Turbine Fuel Oil 27 °F	Gas Turbine Fuel Oil 64 °F	Gas Turbine Fuel Oil 72 °F	Gas Turbine Fuel Oil 79 °F		
A	B	C	D	E	F	G
Hours of Operation		300		300		300
Antimony (lb/hr)= Basis (pg/J) x 2.324 x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, pg/J (1)		9.4		9.4		9.4
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		2.96E-02		2.63E-02		2.45E-02
TPY		4.44E-03		3.94E-03		3.67E-03
Barium (lb/hr)= Basis (pg/J) x 2.324 x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, pg/J (1)		8.4		8.4		8.4
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		2.64E-02		2.35E-02		2.19E-02
TPY		3.97E-03		3.52E-03		3.28E-03
Cobalt (lb/hr)= Basis (pg/J) x 2.324 x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, pg/J (1)		3.9		3.9		3.9
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		1.23E-02		1.09E-02		1.02E-02
TPY		1.84E-03		1.64E-03		1.52E-03
Zinc (lb/hr)= Basis (pg/J) x 2.324 x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, pg/J (1)		294		294		294
HIR (MMBtu/hr)		1,354.6		1,202.9		1,120.2
lb/hr		9.26E-01		8.22E-01		7.65E-01
TPY		1.39E-01		1.23E-01		1.15E-01
Chlorine (lb/hr)= Basis (ppm) x Fuel oil (lb/hr) + 1,000,000 (adj. for ppm)						
Basis, ppm		0.5		0.5		0.5
Fuel Oil (lb/hr)		73,025.6		64,849.0		60,386.8
lb/hr		3.65E-02		3.24E-02		3.02E-02
TPY		5.48E-03		4.86E-03		4.53E-03

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

Source: (1) EPA, 1979

Table 6. Design Information and Stack Parameters for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, Natural Gas, 60 Percent Load

Data	Gas Turbine Natural Gas 27 °F	Gas Turbine Natural Gas 64 °F	Gas Turbine Natural Gas 72 °F	Gas Turbine Natural Gas 79 °F	Gas Turbine Natural Gas 97 °F	
A	B	C	D	E	F	G
General						
Power (kW)	102,100.0	91,000.0	89,200.0	86,400.0	80,200.0	
Heat Rate (Btu/kwh)	11,570.0	11,970.0	12,050.0	12,206.0	12,520.0	
CT Exhaust Flow						
Mass Flow (lb/hr)	2,526,000	2,453,000	2,403,000	2,375,000	2,319,000	
Temperature (oF)	1,200	1,200	1,200	1,200	1,200	
Moisture (% Vol.)	7.71	8.78	9.11	9.56	9.71	
Oxygen (% Vol.)	12.55	12.58	12.58	12.55	12.68	
Molecular Weight	28.47	28.34	28.30	28.25	28.22	
Heat Input (MMBtu/hr)= Power (kW) x Heat Rate (Btu/kwh) + 1,000,000 Btu/MMBtu						
Power (kW)	102,100.0	91,000.0	89,200.0	86,400.0	80,200.0	
Heat Rate (Btu/kwh)	11,570.0	11,970.0	12,050.0	12,206.0	12,520.0	
Heat Input (MMBtu/hr)	1,181.3	1,089.3	1,074.9	1,054.6	1,004.1	
Natural Gas Consumption (lb/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu + Fuel Heat Content, LHV (Btu/lb) (cf/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu + Fuel Heat Content, LHV (Btu/cf)						
Heat Input (MMBtu/hr)	1,181.3	1,089.3	1,074.9	1,054.6	1,004.1	
Heat Content, LHV (Btu/lb)	21,515	21,515	21,515	21,515	21,515	
Natural Gas (lb/hr)	54,905.7	50,628.4	49,958.6	49,016.9	46,670.0	
Heat Content, LHV (Btu/cf)	950	950	950	950	950	
Natural Gas (cf/hr)	1,243,471	1,146,600	1,131,432	1,110,104	1,056,952	
Volume Flow (acfm)= [(Mass Flow (lb/hr) x 1,545 x (Temp. (°F)+ 460°F)] + [Molecular weight x 2116.8] + 60 min/hr						
Mass Flow (lb/hr)	2,526,000	2,423,000	2,403,000	2,375,000	2,319,000	
Temperature (°F)	1,200	1,200	1,200	1,200	1,200	
Molecular Weight	28.47	28.34	28.30	28.25	28.22	
Volume Flow (acfm)	1,791,791	1,726,673	1,714,707	1,697,954	1,659,410	
Volume Flow (scfm)= [(Mass Flow (lb/hr) x 1,545 x (68°F + 460°F)] + [Molecular weight x 2116.8] + 60 min/hr						
Mass Flow (lb/hr)	2,526,000	2,453,000	2,403,000	2,375,000	2,319,000	
Temperature (°F)	68	68	68	68	68	
Molecular Weight	28.47	28.34	28.30	28.25	28.22	
Volume Flow (scfm)	569,919	556,007	545,401	540,072	527,812	
HRSG Stack Data						
Stack Height (ft)	180	180	180	180	180	
Diameter (ft)	18.0	18.0	18.0	18.0	18.0	
Volume Flow (acfm) from HRSG= [Volume flow (acfm) x (HRSG temp.(°F)+ 460°F)] + [CT temp.(°F)+ 460°F]						
Volume Flow (acfm) from CT	1,791,791	1,726,673	1,714,707	1,697,954	1,659,410	
CT Temperature (°F)	1,200	1,200	1,200	1,200	1,200	
HRSG Temperature (°F)	190	190	190	190	190	
Volume Flow (acfm) from HRSG	701,605	676,107	671,421	664,861	649,769	
Velocity (ft/sec)= Volume flow (acfm) from HRSG + [((diameter)²+ 4) x 3.14159] + 60 sec/min						
Volume Flow (acfm) from HRSG	701,605	676,107	671,421	664,861	649,769	
Diameter (ft)	18.0	18.0	18.0	18.0	18.0	
Velocity (ft/sec)	46.0	44.3	44.0	43.5	42.6	

Note: Universal gas constant= 1,545 ft-lb(force)/°R; atmospheric pressure= 2,116.8 lb(force)/ft²

Source: General Electric, 1992.

Table 7. Maximum Emissions for Criteria Pollutants for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, Natural Gas, 60 Percent Load

Pollutant	Gas Turbine Natural Gas 27 °F		Gas Turbine Natural Gas 64 °F		Gas Turbine Natural Gas 72 °F		Gas Turbine Natural Gas 79 °F		Gas Turbine Natural Gas 97 °F	
	A	B	C	D	E	F	G	H	I	
Hours of Operation			8460	8460	8460	8460	8460	8460	8460	8460
Particulate (lb/hr)= Emission rate (lb/hr) from manufacturer										
Basis, lb/hr (manufactur.) (1)			9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
lb/hr			9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
TPY			38.07	38.07	38.07	38.07	38.07	38.07	38.07	38.07
Sulfur Dioxide (lb/hr)= Natural gas (cf/hr) x sulfur content(gr/100 cf) x 1 lb/7000 gr x (lb SO2/lb S) + 100										
Natural Gas (cf/hr)			1,243,471	1,146,600	1,131,432	1,110,104	1,110,104	1,110,104	1,056,952	1,056,952
Basis, gr/100 cf			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
lb SO2/lb S (64/32)			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
lb/hr			3.55	3.28	3.23	3.17	3.17	3.17	3.02	3.02
TPY			15.03	13.86	13.67	13.42	13.42	13.42	12.77	12.77
Nitrogen Oxides (lb/hr)= NOx(ppm) x {[20.9 x (1 - Moisture%/100)] - Oxygen(%)} x 2116.8 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr + [1545 x (CT temp.(°F) + 460°F) x 5.9 x 1,000,000 (adj. for ppm)]										
Basis, ppm* (1)			25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Moisture (%)			7.71	8.78	9.11	9.11	9.56	9.56	9.71	9.71
Oxygen (%)			12.55	12.58	12.58	12.58	12.55	12.55	12.68	12.68
Volume Flow (acfm)			1,791,791	1,726,673	1,714,707	1,697,954	1,697,954	1,697,954	1,659,410	1,659,410
Temperature (°F)			1200	1200	1200	1200	1200	1200	1200	1200
lb/hr			116.5	108.1	106.2	104.1	104.1	104.1	99.2	99.2
TPY			492.99	457.19	449.20	440.37	440.37	440.37	419.44	419.44
Carbon Monoxide (lb/hr)= CO(ppm) x [1 - Moisture%/100] x 2116.8 lb/ft2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr + [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]										
Basis, ppm+ (1)			15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Moisture (%)			7.71	8.78	9.11	9.11	9.56	9.56	9.71	9.71
Volume Flow (acfm)			1,791,791	1,726,673	1,714,707	1,697,954	1,697,954	1,697,954	1,659,410	1,659,410
Temperature (°F)			1200	1200	1200	1200	1200	1200	1200	1200
lb/hr			34.4	32.8	32.4	31.9	31.9	31.9	31.2	31.2
TPY			145.49	138.57	137.12	135.10	135.10	135.10	131.82	131.82
VOCs (lb/hr)= VOC(ppm) x [1 - Moisture%/100] x 2116.8 lb/ft2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr + [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]										
Basis, ppm+ (1)			1.7	1.6	1.6	1.6	1.6	1.6	1.7	1.7
Moisture (%)			7.71	8.78	9.11	9.11	9.56	9.56	9.71	9.71
Volume Flow (acfm)			1,791,791	1,726,673	1,714,707	1,697,954	1,697,954	1,697,954	1,659,410	1,659,410
Temperature (°F)			1200	1200	1200	1200	1200	1200	1200	1200
lb/hr			2.23	2.00	1.98	1.95	1.95	1.95	2.02	2.02
TPY			9.42	8.45	8.36	8.23	8.23	8.23	8.54	8.54
Lead (lb/hr)= Negligible										
Basis, lb/10E+12 Btu			NA	NA	NA	NA	NA	NA	NA	NA
HIR (MMBtu/hr)			NA	NA	NA	NA	NA	NA	NA	NA
lb/hr			NA	NA	NA	NA	NA	NA	NA	NA
TPY			NA	NA	NA	NA	NA	NA	NA	NA

* corrected to 15% O2 dry conditions
+ corrected to dry conditions

Source: General Electric, 1992.

Table 8. Maximum Emissions of Other Regulated Pollutants for the Tiger Bay Cogeneration Facility
GE PG7221(FA), Dry Low NOx II Combustion System, Natural Gas, 60 Percent Load

Pollutant	Units	Gas Turbine Natural Gas 27 °F	Gas Turbine Natural Gas 64 °F	Gas Turbine Natural Gas 72 °F	Gas Turbine Natural Gas 79 °F	Gas Turbine Natural Gas 97 °F
A	B	C	D	E	F	G
Hours of Operation		8460	8460	8460	8460	8460
Arsenic (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Beryllium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Mercury (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Fluoride (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Sulfuric Acid Mist (lb/hr) = Fraction of SO2 Emission Rate x SO2 Emission Rate x lb H2SO4/lb SO2						
Fraction SO2 (%)		8	8	8	8	8
SO2 (lb/hr)		3.55	3.28	3.23	3.17	3.02
lb H2SO4/lb SO2 (98/64)		1.53	1.53	1.53	1.53	1.53
lb/hr		4.35E-01	4.01E-01	3.96E-01	3.89E-01	3.70E-01
TPY		1.84E+00	1.70E+00	1.68E+00	1.64E+00	1.56E+00

Source: (1) EPA, 1990

Table 9. Maximum Emissions of Non-Regulated Pollutants for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, Natural Gas, 60 Percent Load

Pollutant	Units	Gas Turbine Natural Gas 27 °F	Gas Turbine Natural Gas 64 °F	Gas Turbine Natural Gas 72 °F	Gas Turbine Natural Gas 79 °F	Gas Turbine Natural Gas 97 °F
A	B	C	D	E	F	G
Hours of Operation		8460	8460	8460	8460	8460
Manganese (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Nickel (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Cadmium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Chromium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Copper (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Vanadium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Selenium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Polycyclic Organic Matter (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		1.113	1.113	1.113	1.113	1.113
HIR (MMBtu/hr)		1,181.3	1,089.3	1,074.9	1,054.6	1,004.1
lb/hr		1.31E-03	1.21E-03	1.20E-03	1.17E-03	1.12E-03
TPY		5.56E-03	5.13E-03	5.06E-03	4.97E-03	4.73E-03
Formaldehyde (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		88.12	88.12	88.12	88.12	88.12
HIR (MMBtu/hr)		1,181.3	1,089.3	1,074.9	1,054.6	1,004.1
lb/hr		1.04E-01	9.60E-02	9.47E-02	9.29E-02	8.85E-02
TPY		4.40E-01	4.06E-01	4.01E-01	3.93E-01	3.74E-01

Source: (1) EPA, 1990

Table 10. Maximum Emissions for Additional Non-Regulated Pollutant for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, Natural Gas, 60 Percent Load

Pollutant		Gas Turbine Natural Gas 27 °F	Gas Turbine Natural Gas 64 °F	Gas Turbine Natural Gas 72 °F	Gas Turbine Natural Gas 79 °F	Gas Turbine Natural Gas 97 °F
A	B	C	D	E	F	G
Hours of Operation		8460		8460		8460
Antimony (lb/hr)= Negligible						
Basis, pg/J		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Barium (lb/hr)= Negligible						
Basis, pg/J		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Cobalt (lb/hr)= Negligible						
Basis, pg/J		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Zinc (lb/hr)= Negligible						
Basis, pg/J		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Chlorine (lb/hr)= Negligible						
Basis, ppm		NA	NA	NA	NA	NA
Natural gas (cf)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA

Table 11. Design Information for the Tiger Bay Cogeneration Facility-
Duct Burner, Supplemental Firing, Natural Gas

Data	Natural Gas 27 °F	Natural Gas 64 °F	Natural Gas 72 °F	Natural Gas 79 °F	Natural Gas 97 °F	
A	B	C	D	E	F	G
General						
Power (kW)		NA	NA	NA	NA	NA
Heat Rate (Btu/kwh)		NA	NA	NA	NA	NA
DB Exhaust Flow						
Mass Flow (lb/hr)		5,244	5,244	5,244	5,244	5,244
Temperature (oF)		190	190	190	190	190
Moisture (% Vol.)		NA	NA	NA	NA	NA
Oxygen (% Vol.)		NA	NA	NA	NA	NA
Molecular Weight		28.00	28.00	28.00	28.00	28.00
Heat Input (MMBtu/hr)= As given						
Power (kW)		NA	NA	NA	NA	NA
Heat Rate (Btu/kwh)		NA	NA	NA	NA	NA
Heat Input (MMBtu/hr)		100.0	100.0	100.0	100.0	100.0
Natural Gas Consumption (lb/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu + Fuel Heat Content, LHV (Btu/lb) (cf/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu + Fuel Heat Content, LHV (Btu/cf)						
Heat Input (MMBtu/hr)		100.0	100.0	100.0	100.0	100.0
Heat Content, LHV (Btu/lb)		23,839	23,839	23,839	23,839	23,839
Natural Gas (lb/hr)		4,194.8	4,194.8	4,194.8	4,194.8	4,194.8
Heat Content, LHV (Btu/cf)		950	950	950	950	950
Natural Gas (cf/hr)		105,263	105,263	105,263	105,263	105,263
Volume Flow (acfm)= [(Mass Flow (lb/hr) x 1,545 x (Temp. (°F)+ 460°F)] + [Molecular weight x 2116.8] + 60 min/hr						
Mass Flow (lb/hr)		5,244	5,244	5,244	5,244	5,244
Temperature (°F)		190	190	190	190	190
Molecular Weight		28.00	28.00	28.00	28.00	28.00
Volume Flow (acfm)		1,481	1,481	1,481	1,481	1,481
Volume Flow (scfm)= [(Mass Flow (lb/hr) x 1,545 x (68°F + 460°F)] + [Molecular weight x 2116.8] + 60 min/hr						
Mass Flow (lb/hr)		5,244	5,244	5,244	5,244	5,244
Temperature (°F)		68	68	68	68	68
Molecular Weight		28.00	28.00	28.00	28.00	28.00
Volume Flow (scfm)		1,203	1,203	1,203	1,203	1,203
HRSG Stack Data						
Stack Height (ft)		180	180	180	180	180
Diameter (ft)		18.0	18.0	18.0	18.0	18.0
Volume Flow (acfm) from DB= [Volume flow (acfm) x (HRSG temp.(°F)+ 460°F)] + [CT temp.(°F)+ 460°F]						
Volume Flow (acfm) from DB		1,481	1,481	1,481	1,481	1,481
Assumed DB Exhaust Temp.(°F)		190	190	190	190	190
HRSG Temperature (°F)		190	190	190	190	190
Volume Flow (acfm) from DB		1,481	1,481	1,481	1,481	1,481
Velocity (ft/sec)= Volume flow (acfm) from DB + [((diameter)²+ 4) x 3.14159] + 60 sec/min						
Volume Flow (acfm) from DB		1,481	1,481	1,481	1,481	1,481
Diameter (ft)		18.0	18.0	18.0	18.0	18.0
Velocity (ft/sec)		0.1	0.1	0.1	0.1	0.1

Note: Universal gas constant= 1,545 ft-lb(force)/°R; atmospheric pressure= 2,116.8 lb(force)/ft²

Source: Destec Engineering, Inc., 1992

Table 13. Maximum Emissions of Other Regulated Pollutants for the Tiger Bay Cogeneration Facility
Duct Burner, Supplemental Firing, Natural Gas

Pollutant	Units	Natural Gas				
		27 °F	64 °F	72 °F	79 °F	97 °F
A	B	C	D	E	F	G
Hours of Operation		8760	8760	8760	8760	8760
Arsenic (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Beryllium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Mercury (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Fluoride (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Sulfuric Acid Mist (lb/hr) = Fraction of SO2 Emission Rate x SO2 Emission Rate x lb H2SO4/lb SO2						
Fraction SO2 (%)		8	8	8	8	8
SO2 (lb/hr)		0.30	0.30	0.30	0.30	0.30
lb H2SO4/lb SO2 (98/64)		1.53	1.53	1.53	1.53	1.53
lb/hr		3.68E-02	3.68E-02	3.68E-02	3.68E-02	3.68E-02
TPY		1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01

Source: EPA, 1990

Table 14. Maximum Emissions of Non-Regulated Pollutants for the Tiger Bay Cogeneration Facility-
Duct Burner, Supplemental Firing, Natural Gas

Pollutant	Units	Natural Gas				
		27 °F	64 °F	72 °F	79 °F	97 °F
A	B	C	D	E	F	G
Hours of Operation		8760	8760	8760	8760	8760
Manganese (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Nickel (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Cadmium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Chromium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Copper (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Vanadium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Selenium (lb/hr)= Negligible						
Basis, lb/10E+12 Btu (1)		NA	NA	NA	NA	NA
HIR (MMBtu/hr)		NA	NA	NA	NA	NA
lb/hr		NA	NA	NA	NA	NA
TPY		NA	NA	NA	NA	NA
Polycyclic Organic Matter (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		1.113	1.113	1.113	1.113	1.113
HIR (MMBtu/hr)		100.0	100.0	100.0	100.0	100.0
lb/hr		1.11E-04	1.11E-04	1.11E-04	1.11E-04	1.11E-04
TPY		4.87E-04	4.87E-04	4.87E-04	4.87E-04	4.87E-04
Formaldehyde (lb/hr)= Basis (lb/10E+12 Btu) x Heat Input Rate (MMBtu/hr) + 1,000,000 MMBtu/10E+12 Btu						
Basis, lb/10E+12 Btu (1)		88.12	88.12	88.12	88.12	88.12
HIR (MMBtu/hr)		100.0	100.0	100.0	100.0	100.0
lb/hr		8.81E-03	8.81E-03	8.81E-03	8.81E-03	8.81E-03
TPY		3.86E-02	3.86E-02	3.86E-02	3.86E-02	3.86E-02

Source: (1) EPA, 1990

Table 15. Maximum Emissions for Criteria Pollutants for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, 60 Percent Load, and Duct Burner

Pollutant	Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a
A	C			C			C					
Particulate:												
lb/hr	17.00	17.00	17.00	9.00	9.00	9.00	1.00	1.00	1.00	18.00	18.00	18.00
TPY	2.55	2.55	2.60	38.07	38.07	39.40	4.38	4.38	4.38	45.00	45.00	46.38
Sulfur Dioxide:												
lb/hr	73.03	60.39	99.70	3.55	3.02	4.86	0.30	0.30	0.30	73.33	60.69	100.00
TPY	10.95	9.06	15.00	15.03	12.77	21.30	1.32	1.32	1.32	27.30	23.15	37.62
Nitrogen Oxides:												
lb/hr	235.22	194.67	326.00	116.55	99.16	161.90	10.00	10.00	10.00	245.22	204.67	336.00
TPY	35.28	29.20	48.90	492.99	419.44	709.10	43.80	43.80	43.80	572.07	492.44	801.80
Carbon Monoxide:												
lb/hr	68.24	62.17	98.40	34.39	31.16	48.80	10.00	10.00	10.00	78.24	72.17	108.40
TPY	10.24	9.32	14.80	145.49	131.82	213.70	43.80	43.80	43.80	199.52	184.94	272.30
VOCs (as methane):												
lb/hr	5.46	2.01	7.50	2.23	2.02	2.80	2.90	2.90	2.90	8.36	4.91	10.40
TPY	0.82	0.30	1.10	9.42	8.54	12.30	12.70	12.70	12.70	22.94	21.54	26.10
Lead:												
lb/hr	1.21E-02	9.97E-03	1.65E-02	NA	NA	NA	NA	NA	NA	1.21E-02	9.97E-03	1.65E-02
TPY	1.81E-03	1.50E-03	2.47E-03	NA	NA	NA	NA	NA	NA	1.81E-03	1.50E-03	2.47E-03

^a Permitted emission rate at 100 percent load.

Table 16. Maximum Emissions of Other Regulated Pollutants for the Tiger Bay Cogeneration Facility
GE PG7221(FA), Dry Low NOx II Combustion System, 60 Percent Load, and Duct Burner

Pollutant	Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions			
		27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a
Arsenic	lb/hr	5.69E-03	4.70E-03	7.77E-03	NA	NA	NA	NA	NA	NA	5.69E-03	4.70E-03	7.77E-03
	TPY	8.53E-04	7.06E-04	1.17E-03	NA	NA	NA	NA	NA	NA	8.53E-04	7.06E-04	1.17E-03
Beryllium	lb/hr	3.39E-03	2.80E-03	4.62E-03	NA	NA	NA	NA	NA	NA	3.39E-03	2.80E-03	4.62E-03
	TPY	5.08E-04	4.20E-04	6.94E-04	NA	NA	NA	NA	NA	NA	5.08E-04	4.20E-04	6.94E-04
Mercury	lb/hr	4.06E-03	3.36E-03	5.55E-03	NA	NA	NA	NA	NA	NA	4.06E-03	3.36E-03	5.55E-03
	TPY	6.10E-04	5.04E-04	8.32E-04	NA	NA	NA	NA	NA	NA	6.10E-04	5.04E-04	8.32E-04
Fluoride	lb/hr	4.41E-02	3.64E-02	NA	NA	NA	NA	NA	NA	NA	4.41E-02	3.64E-02	NA
	TPY	6.61E-03	5.47E-03	NA	NA	NA	NA	NA	NA	NA	6.61E-03	5.47E-03	NA
Sulfuric Acid Mist	lb/hr	8.95E+00	7.40E+00	1.22E+00	4.35E-01	3.70E-01	5.95E-01	3.68E-02	3.68E-02	3.70E-02	8.98E+00	7.43E+00	1.22E+00
	TPY	1.34E+00	1.11E+00	1.83E-01	1.84E+00	1.56E+00	2.60E+00	1.61E-01	1.61E-01	1.61E-01	3.34E+00	2.84E+00	2.78E+00

^a Permitted emission rate at 100 percent load.

Table 17. Maximum Emissions of Non-Regulated Pollutants for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, 60 Percent Load, and Duct Burner

Pollutant	Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions			
		27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a
Manganese	lb/hr	1.90E-02	1.57E-02	NA	NA	NA	NA	NA	NA	NA	1.90E-02	1.57E-02	NA
	TPY	2.84E-03	2.35E-03	NA	NA	NA	NA	NA	NA	NA	2.84E-03	2.35E-03	NA
Nickel	lb/hr	2.30E-01	1.90E-01	NA	NA	NA	NA	NA	NA	NA	2.30E-01	1.90E-01	NA
	TPY	3.45E-02	2.86E-02	NA	NA	NA	NA	NA	NA	NA	3.45E-02	2.86E-02	NA
Cadmium	lb/hr	1.42E-02	1.18E-02	NA	NA	NA	NA	NA	NA	NA	1.42E-02	1.18E-02	NA
	TPY	2.13E-03	1.76E-03	NA	NA	NA	NA	NA	NA	NA	2.13E-03	1.76E-03	NA
Chromium	lb/hr	6.43E-02	5.32E-02	NA	NA	NA	NA	NA	NA	NA	6.43E-02	5.32E-02	NA
	TPY	9.65E-03	7.98E-03	NA	NA	NA	NA	NA	NA	NA	9.65E-03	7.98E-03	NA
Copper	lb/hr	3.79E-01	3.14E-01	NA	NA	NA	NA	NA	NA	NA	3.79E-01	3.14E-01	NA
	TPY	5.69E-02	4.70E-02	NA	NA	NA	NA	NA	NA	NA	5.69E-02	4.70E-02	NA
Vanadium	lb/hr	9.41E-02	7.79E-02	NA	NA	NA	NA	NA	NA	NA	9.41E-02	7.79E-02	NA
	TPY	1.41E-02	1.17E-02	NA	NA	NA	NA	NA	NA	NA	1.41E-02	1.17E-02	NA
Selenium	lb/hr	3.17E-02	2.62E-02	NA	NA	NA	NA	NA	NA	NA	3.17E-02	2.62E-02	NA
	TPY	4.76E-03	3.94E-03	NA	NA	NA	NA	NA	NA	NA	4.76E-03	3.94E-03	NA
Polycyclic Organic Matter	lb/hr	3.77E-04	3.11E-04	NA	1.31E-03	1.12E-03	NA	1.11E-04	1.11E-04	NA	1.43E-03	1.12E-03	NA
	TPY	5.65E-05	4.67E-05	NA	5.56E-03	4.73E-03	NA	4.87E-04	4.87E-04	NA	6.11E-03	4.77E-03	NA
Formaldehyde	lb/hr	5.49E-01	4.54E-01	NA	1.04E-01	8.85E-02	NA	8.81E-03	8.81E-03	NA	5.57E-01	4.54E-01	NA
	TPY	8.23E-02	6.81E-02	NA	4.40E-01	3.74E-01	NA	3.86E-02	3.86E-02	NA	5.61E-01	4.42E-01	NA

^a Permitted emission rate not applicable for this pollutant.

Table 18. Maximum Emissions for Additional Non-Regulated Pollutant for the Tiger Bay Cogeneration Facility-
GE PG7221(FA), Dry Low NOx II Combustion System, 60 Percent Load, and Duct Burner

Pollutant	Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions			
		27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a	27 °F	97 °F	Permitted ^a
Antimony	lb/hr	2.96E-02	2.45E-02	NA	NA	NA	NA	NA	NA	NA	2.96E-02	2.45E-02	NA
	TPY	4.44E-03	3.67E-03	NA	NA	NA	NA	NA	NA	NA	4.44E-03	3.67E-03	NA
Barium	lb/hr	2.64E-02	2.19E-02	NA	NA	NA	NA	NA	NA	NA	2.64E-02	2.19E-02	NA
	TPY	3.97E-03	3.28E-03	NA	NA	NA	NA	NA	NA	NA	3.97E-03	3.28E-03	NA
Cobalt	lb/hr	1.23E-02	1.02E-02	NA	NA	NA	NA	NA	NA	NA	1.23E-02	1.02E-02	NA
	TPY	1.84E-03	1.52E-03	NA	NA	NA	NA	NA	NA	NA	1.84E-03	1.52E-03	NA
Zinc	lb/hr	9.26E-01	7.65E-01	NA	NA	NA	NA	NA	NA	NA	9.26E-01	7.65E-01	NA
	TPY	1.39E-01	1.15E-01	NA	NA	NA	NA	NA	NA	NA	1.39E-01	1.15E-01	NA
Chlorine	lb/hr	3.65E-02	3.02E-02	NA	NA	NA	NA	NA	NA	NA	3.65E-02	3.02E-02	NA
	TPY	5.48E-03	4.53E-03	NA	NA	NA	NA	NA	NA	NA	5.48E-03	4.53E-03	NA

^a Permitted emission rate not applicable for this pollutant.

ATTACHMENT 2

**EMISSION RATE BASES AND ESTIMATES FOR THE STRAY DRYER AND
EVAPORATOR UNITS**

Table 1. Design Information and Stack Parameters for Tiger Bay Cogeneration Facility-
Zero Liquid Discharge System- Spray Dryer/ Evaporator

Data	Average Operating Conditions	Design Operating Conditions
General		
Heat Input Rate (MMBtu/hr)	1.35	3.066
Hours of Operation	8560	200
Exhaust Flow Conditions		
Flow rate (acfm)	2,120	5,050
Temperature (°F)	340	340
Moisture Content (% Vol.)	20.00	20.00
Natural Gas Consumption (cf/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu + Fuel Heat Content, HHV (Btu/cf)		
Heat Content, HHV (Btu/cf)	1,022	1,022
Natural Gas Consumption (cf/hr)	1,321	3,000
Natural Gas Consumption (MMcf/hr)	0.001321	0.003000
Volume Flow (dscfm)= Volume flow (acfm) x [(68°F + 460°F)+(Exhaust Temperature(°F) + 460°F)] x [(100-(Moisture Content(%)) + 100]		
Volume Flow (acfm)	2,120	5,050
Exhaust Temperature (°F)	340	340
Moisture Content (%)	20.00	20.00
Volume Flow (dscfm)	1,119	2,666
Stack Data		
Stack Height (ft)	73	73
Diameter (ft)	1.3	1.3
Operating Data		
Velocity (ft/sec)= Volume flow (acfm) + [((diameter) ² + 4) x 3.14159] + 60 sec/min		
Volume Flow (acfm)	2,120	5,050
Diameter (ft)	1.3	1.3
Velocity (ft/sec)	26.6	63.4

Table 2. Maximum Emissions of Criteria Pollutants for the Tiger Bay Cogeneration Facility-
Zero Liquid Discharge System- Spray Dryer/ Evaporator

Pollutant	Average Operating Conditions	Design Operating Conditions	Total Emissions (Maximum)
Hours of Operation	8560	200	
Particulate (lb/hr)= Emission rate (lb/hr) from manufacturer			
Basis, lb/hr (vendor guarantee)	0.009	0.021	
lb/hr	0.009	0.021	0.021
TPY	0.039	0.0021	0.041
Sulfur Dioxide (lb/hr)= Sulfur Content (gr/100 cf) x Fuel Consumption (cf/hr) x 1 lb/7000 gr x (lb SO ₂ /lb S) ÷ 100			
Sulfur content basis, gr/100 cf	1.0	1.0	
Fuel Consumption (cf/hr)	1,321	3,000	
lb SO ₂ /lb S (64/32)	2.0	2.0	
lb/hr	0.0038	0.0086	0.0086
TPY	0.016	0.001	0.017
Nitrogen Oxides (lb/hr)= Emission Factor (lb/MMBtu) x Heat Input Rate (MMBtu/hr)			
Emission Factor (lb/MMBtu) [vendor guarantee]	0.105	0.105	
Heat Input Rate (MMBtu/hr)	1.35	3.066	
lb/hr	0.142	0.322	0.322
TPY	0.607	0.032	0.639
Carbon Monoxide (lb/hr)= Emission Factor (lb/MMBtu) x Heat Input Rate (MMBtu/hr)			
Emission Factor (lb/MMBtu) [vendor guarantee]	0.020	0.020	
Heat Input Rate (MMBtu/hr)	1.35	3.066	
lb/hr	0.027	0.061	0.061
TPY	0.116	0.006	0.122
Volatile Organic Compounds (lb/hr)= Emission Factor (lb/MMBtu) x Heat Input Rate (MMBtu/hr)			
Emission Factor (lb/MMBtu) [vendor guarantee]	0.006	0.006	
Heat Input Rate (MMBtu/hr)	1.35	3.066	
lb/hr	0.008	0.018	0.018
TPY	0.035	0.002	0.037

Patty

DESTEC ENERGY, INC.
2500 CITYWEST BLVD., SUITE 150
P.O. BOX 4411
HOUSTON, TEXAS 77210-4411
(713) 735-4000

August 9, 1993

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Division of Air
Resources Management

Mr. G. Preston Lewis, P.E.
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

**RE: Tiger Bay Limited Partnership (formerly Central Florida Power Limited Partnership) Tiger Bay cogeneration plant
PSD-FL-190
AC 53-214903**

Dear Mr. Lewis:

Please be advised that the ownership name for the Tiger Bay cogeneration facility has been changed from Central Florida Power Limited Partnership to Tiger Bay Limited Partnership. The name change has been made to distinguish the project for marketing purposes and has no effect on the ownership structure.

Should you or your department have questions or comments about this letter please contact me at (713) 735-4087.

Sincerely,

Robert S. Chatham for RSC

Robert S. Chatham, P.E.
Senior Environmental Engineer

RSC:tk

cc: Mr. B. Thomas - SW District

J. Aeron
G. Harper, EPA
J. Bunyal, NPS
Z. Novak, Polk Co.

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DESTEC ENERGY, INC.
2500 CITYWEST BLVD., SUITE 150
P.O. BOX 4411
HOUSTON, TEXAS 77210-4411
(713) 735-4000

July 30, 1993

Mr. Preston Lewis, P.E.
Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RECEIVED

AUG 03 1993

Division of Air
Resources Management

Re: FDER Permit No. AC53-214903 & PSD-FL-190
Tiger Bay cogeneration facility
Central Florida Power, L.P.

Dear Mr. Lewis:

Since the Florida Department of Environmental Regulation (FDER) issued the above-referenced permit to construct the Tiger Bay cogeneration facility, Destec on behalf of the Central Florida Power, L.P. has been finalizing the design details of the facility. During this period, several design changes have been identified which differ from information previously supplied to FDER; the purpose of this letter is to apprise you of these changes in accordance with the requirements of general condition 2 and specific condition 6 of the permit. We do not anticipate this project having any significant impacts to your agency and, in that respect, we are asking for your concurrence. August 9, 1993 is the projected start date for construction activities.

Thank you in advance for your prompt consideration of this information. Should you need additional information, or have any questions, please feel free to contact me at your convenience at (713) 735-4087. Written confirmation of the conclusion reached in this correspondence is respectfully requested.

Sincerely,

Robert S. Chatham, P.E.

Attachments
RSC/tk

cc: Harry Kerns - FDEP, Southwest District
Robert Taylor
Ken Kosky - KBN



A. Need for Additional Temporary Construction Yard

Efforts to schedule construction activities has convinced Destec of the need to develop a temporary laydown area during the approximate 16 month construction period. As shown in Attachment A, the areas proposed to be used are (1) a parcel located immediately south of the cogeneration site boundary which will be used for equipment laydown and (2) a parcel of land located to the east of the cogeneration site which will be used for the construction trailer village and parking.

Laydown Area

Presently, this site is being used as a laydown area by USAC, therefore, Destec anticipates no improvements will be required. Because no earthmoving or grading will be performed in this area, Destec is not proposing to regrade this site to drain into the permitted construction sedimentation pond along the north end of the project site adjacent to County Road 630.

The purpose of this area will be to receive and store in an orderly manner the components and materials needed to construct the facility during the period after they have been shipped by the manufacturer until needed for installation. The materials and equipment to be stored in this area will consist of structural steel, pipe, and equipment such as the transformers, waste water treatment system, and the like.

Trailer Village and Construction Parking

This site has been previously mined and relatively flat. Mobile office trailers and parking will be provided for construction personnel. No earthmoving or grading will be performed in this area. In order to protect against erosion, portions of this site will be graveled and a silt fences will be installed along its perimeter as shown on Attachment A. Upon completion of construction, the gravel will be removed (if requested) and the site will be stabilized.

B. Plot Plan Changes

Attachment B contains the current plot plan and reflects the most recent design information. By incorporating this information you will notice more detail and some minor changes, such as:

1. Elimination of the fuel oil storage tanks.
2. The relocation of the administration and maintenance buildings.
3. The stormwater pond configuration.
4. Other minor equipment changes or moves.

Storm Water Pond

Environmental Consulting & Technology, Inc. (ECT) has investigated the potential for flotation or uplift of the proposed stormwater management pond liner due to buoyant forces. In evaluating the potential for uplift, the minimum groundwater elevation which could be expected to cause uplift was calculated and compared to expected groundwater elevations. ECT has recommended that measures to prevent pond liner uplift should be taken because the occurrence of groundwater levels necessary for pond liner uplift is expected. Based upon this analysis, ECT recommends placement of the liner elevation at 151.00 ft and applying a soil cover measuring 2.75 ft thick. The pond volume and bottom elevation would remain the same. The application of a soil layer is preferable to a drainage layer from both construction cost and environmental performance data.

ATTACHMENTS

- 1. Cogeneration Facility Plot Plan**
- 2. Site Plan**