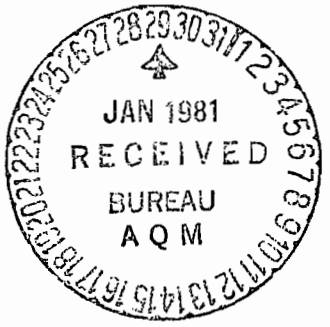
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30308

JAN 21 1981



REF: 4AH-AP

Mr. Gus Shaefer
Florida Power Corporation
P. O. Box 14042
St. Petersburg, Florida 33733

RE: Gas Turbine Peaking Units at
Avon Park Plant (PSD-FL-017)

Dear Mr. Shaefer:

Review of your August 2, 1978 application to modify your steam electric generating plant at Avon Park, Florida has been completed. The construction is subject to rules for the Prevention of Significant Air Quality Deterioration (PSD), contained in 40 CFR 52.21.

We have determined that the construction, as described in the application, meets all applicable requirements of the PSD regulations, subject to the conditions in the conclusions section to the final determination (enclosed). EPA has performed the preliminary determination concerning the proposed construction, and published a request for public comment on November 26, 1980. No comments were received. Authority to Construct a Stationary Source is hereby issued for the facility described above, subject to the conditions in the conclusions section to the final determination. This Authority to Construct is based solely on the requirements of 40 CFR 52.21, the Federal regulations governing significant deterioration of air quality. It does not apply to NPDES or other permits issued by this agency or permits issued by other agencies. Information regarding EPA permitting requirements can be provided if you contact Mr. Joe Franzmathes, Director, Office of Program Integration and Operations, at (404) 881-3476. Additionally, construction covered by this Authority to Construct must be initiated within 18 months from the receipt of this letter.

Please be advised that a violation of any condition issued as part of this approval, as well as any construction which proceeds in material variance with information submitted in your application will be subject to enforcement action.

Authority to Construct will take effect on the date of this letter. The complete analysis which justifies this approval has been fully documented for future reference, if necessary. Any questions concerning this approval may be direct to Mr. Kent Williams, Chief, New Source Review Section (404/881-4552).

Sincerely yours,

Thomas W. Devine
Director
Air and Hazardous Materials Division

TWD:JLS:clu

Enclosure

cc: S. Smallwood
Florida Department of Environmental Regulation

FINAL DETERMINATION

Florida Power Corporation

PSD-FL-017

I. Applicant

Florida Power Corporation
Thirty-fourth Street South
Post Office Box 14042
St. Petersburg, Florida 33733

II. Location

The proposed modification is to an existing power plant located in the city of Avon Park, Florida (Highlands County). The UTM coordinates are 451.4 East and 3050.6 North.

III. Project Description

The applicant proposes to modify an existing steam electric generating plant at Avon Park, Florida by constructing and operating four gas turbine peaking units. The existing units are described in Table 1. Each proposed unit will have an output capacity of 63 MW and will normally operate at full load utilizing low sulfur fuel oil (maximum 0.5% sulfur). Once in operation, the peaking units will be operated a maximum of 1500 hours per year each and will normally be brought online during hours of peak electricity consumption. The proposed peaking units will release nitrogen oxides, carbon monoxide, sulfur oxides, hydrocarbons and particulate matter into the atmosphere.

IV. Source Impact Analysis

The proposed modification has the potential to emit greater than 100 tons per year of sulfur dioxide, nitrogen oxides and carbon monoxide, respectively, as shown in Table 2. Therefore, in accordance with the provisions of Federal Regulation 40 CFR 52.21 promulgated August 7, 1980, the construction is a major modification subject to Prevention of Significant Deterioration (PSD) review. Moreover, the modification causes a significant net increase in emissions of SO_2, NO_x, CO, PM and VOC and review requirements therefore apply to each of these pollutants. PSD review includes analyses of Best Available Control Technology (BACT), Class I area impact, National Ambient Air Quality Standards (NAAQS) impact, increment impact, growth impact, and additional impacts on soils, vegetation and visibility.

Table 1

EXISTING UNITS AT AVON PARK

Unit	Use	Output Capacity	Fuel	Pertinent Dates
No. 1	Baseload	-	-	Retired March 31, 1975
No. 2	Baseload	46 MW	Oil	Startup November 25, 1952
P1	Peaking	35 MW	Oil	Startup December 14, 1968
P2	Peaking	35 MW	Oil	Startup December 20, 1968

Table 2

POTENTIAL EMISSIONS FROM PROPOSED PEAKING UNITS

Pollutant	Emission (Tons/Year)
Sulfur dioxide[a]	1136
Nitrogen dioxide[b]	750
Carbon monoxide[c]	258
Particulate matter[a]	99
Volatile organic compounds[c]	84.5

[a] Calculated by the applicant based on 37,910 lb/hr fuel use and 1500 hr/yr operation; equals allowable emissions.

[b] Based on BACT determined allowable emissions rate.

[c] Calculated by EPA using AP-42 emission factors; equals allowable emissions.

A. Best Available Control Technology (BACT)

A major modification is required by 40 CFR 52.21 paragraph (j) to install BACT for each applicable pollutant. Thus, the applicant shall install and utilize BACT for sulfur dioxide, nitrogen dioxide, and carbon monoxide emissions from the proposed units. The modification is exempt, however, from BACT review for particulate matter and VOC consistent with the provisions of 40 CFR 52.21 (i)(9) for applications complete before August 7, 1980. The applicant must meet only the BACT requirements of the 1978 PSD regulation and not the more stringent requirements of the 1980 PSD regulation.

Sulfur Dioxide

The applicant considered only the use of low sulfur distillate fuel oil as BACT for the following reasons:

- low sulfur fuel oil provides maximum reliability for peaking operations
- there are no available control devices for the removal of sulfur dioxide from the exhaust of turbines burning high sulfur fuel.

The applicant has proposed to burn 0.5% sulfur distillate fuel oil. The Federal NSPS for gas turbines (40 CFR 60, Subpart GG) prohibits the burning of any fuel containing sulfur in excess of 0.8% by weight or the release of sulfur dioxide in concentrations in excess of 150 parts per million (ppm). Actual total emissions from the four turbines are estimated to be 1516 lb/hr (1137 tons per year).

Nitrogen Dioxide

The applicant has considered both the wet and the dry methods of nitrogen oxides control, although sufficient data on the dry method were not available at the time the PSD permit application was made to determine its efficiency and costs. However, the applicant has proposed limiting emissions to 75 PPM (adjusted for thermal efficiency and fuel-bound nitrogen) as BACT. This is feasible with the use of the wet method (i.e., water injection) and is the same as the Federal NSPS for gas turbines (40 CFR, Subpart GG). The four turbines will utilize water injection techniques and total emissions will not exceed 1000 lb/hr (750 tons per year).

Carbon Monoxide

Although no carbon monoxide control systems were discussed in the application, BACT is achieved by combustion control to avoid incomplete combustion (and consequent inefficient operation). EPA has determined that this should limit emissions to 15.4 pounds per thousand gallons of fuel oil burned. This figure is the emission factor for oil-fired gas turbine units as found in the EPA publication #AP-42, "Compilation of Air Pollutant Emission Factors." Total carbon monoxide emissions for the four turbines will be 344 lb/hr (258 tons per year).

Summary

The BACT specifications and the corresponding allowable emission rates for each of the four turbines are shown in Table 3. EPA agrees that the applicant's proposed technologies constitute BACT for the modification.

B. Increment Impact

EPA has promulgated increments for sulfur dioxide and particulate matter as shown in Table 4. Highlands County is presently classified as a Class II attainment area. As shown in the following section, emissions of particulate matter from the proposed modification are insignificant. An increment analysis for particulate matter therefore was not required.

This area is relatively undeveloped industrially, and no increment-consuming sources were identified in a search of the Florida Department of Environmental Regulations air permit files. The application, determined complete in September of 1978, predates several increment consuming sources proposed for construction in this area since this time.

The applicant, through the utilization of the EPA approved atmospheric dispersion models AQDM, PTMTPW and CRSTER, has estimated the impacts on the sulfur dioxide increments due to the proposed units. Meteorological data (5 years) from the Orlando Airport was used as input to the models. The modeling runs are described in Table 5. In this analysis, it was assumed that the proposed units were operating

Table 3

BEST AVAILABLE CONTROL TECHNOLOGY AND ALLOWABLE EMISSIONS FOR EACH TURBINE

Pollutant	BACT	Corresponding Emission Factor[a] ($lb/10^6$ Btu)	Corresponding Allowable Emission Rates[b] (lb/hr)	(tons/yr)
Sulfur Dioxide	Low Sulfur Fuel (0.5%)	0.513	379	284
Nitrogen Oxides	Water Inject (75 PPM)	0.338	250	187.5
Carbon Monoxide	Controlled Combustion	0.116	86	64.5

[a] Calculated from the emission rates and verified by calculations based on the BACT specifications and the following operating conditions, as specified by the applicant:

Exhaust temperature = 726 F
Exhaust flow rate (each turbine) = 1,347,000 ACFM
Fuel flow rate (each turbine) = 632 lb/min
Fuel density = 6.8 lb/gal
Fuel heating value = 19,500 Btu/lb

[b] Provided by the applicant and verified by EPA.

Table 4

PREVENTION OF SIGNIFICANT DETERIORATION INCREMENTS FOR SULFUR DIOXIDE

Averaging Time	Increments (ug/m^3)		
	Class I	Class II	Class III
Annual Arithmetic Mean	2	20	40
24 Hour Maximum[a]	5	91	182
3 Hour Maximum[a]	25	512	700

[a] Increment can be exceeded once per year.

Table 5

COMPUTER MODELING ANALYSES FOR SO_2

Analysis	Averaging Period	Model Used	Sources Input	Result
Increment	Annual	AQDM	Proposed units only	Expected arithmetic mean at each receptor[a]
	24 Hr	CRSTER & PTMTPW	Proposed units only	Highest expected in annual period
	3 Hr	CRSTER & PTMTPW	Proposed units only	Highest expected in annual period
NAAQS	Annual	AQDM	All within 50 km (24 sources)	Expected arithmetic mean at each receptor
	24 Hr	CRSTER & PTMTPW	All within 15 km (7 sources)	Highest expected in annual period
	3 Hr	CRSTER & PTMTPW	All within 15 km (7 sources)	Highest expected in annual period
Source Interaction	24 Hr	PTMTPW	FPC and Sebring (5 sources)	Highest expected in annual period
	3 Hr	PTMTPW	FPC and Sebring (5 sources)	Highest expected in annual period
	24 Hr	CRSTER	All at Avon Park (3 sources)	Highest expected in annual period
	3 Hr	CRSTER	All at Avon Park (3 sources)	Highest expected in annual period

[a] Computer results were converted to annual geometric mean from arithmetic mean by method of Larsen.

at 100 percent load. The results of the analysis are shown in Table 6. Operation of the proposed modification is expected to consume a small percentage of the Class II increments in this area.

C. National Ambient Air Quality Standards Impact

The applicant has assessed the impact of the proposed units on the National Ambient Air Quality Standard (NAAQS) for sulfur dioxide by the methods shown in Table 5. In this analysis, it was assumed that both existing and proposed Avon Park units were operating at 100 percent load. The source inventory used for predicting the annual average sulfur dioxide concentration is shown in Table 7. Sources within 15 kilometers of the proposed units were used in the runs predicting 24-hour and 3-hour maximum concentrations and are indicated in this table also. Source interaction effects were estimated by meteorologically aligning Avon Park and Sebring Utilities; the closest major and dominant existing source in the area.

The results of the analysis are compared with the NAAQS in Table 8, which indicates that no standards will be violated through the operation of the proposed units.

Meteorological data for Orlando, sixty miles northeast of the proposed source, were used in the analysis. These data included a five-year correlation of wind speed versus frequency of stability classes. No air quality monitoring was required for this source, since the PSD application was submitted prior to August 7, 1978, the date after which monitoring was required by 40 CFR 52.21 m. The analysis, however, modeled all significant air pollution sources in the vicinity and assumed background concentrations consistent with those recommended in the PSD Ambient Monitoring Guideline (EPA 450/2-78-019). These values are reasonable for a rural source of this type. Table 8 shows a sizeable margin of safety for each averaging time and EPA agrees that the analysis adequately demonstrates that the proposed modification does not threaten the NAAQS for sulfur dioxide.

Since the proposed modification also has significant increases in particulate matter, nitrogen dioxide and carbon monoxide, NAAQS analysis

Table 6

SO_2 INCREMENTAL IMPACT OF PROPOSED UNITS

Averaging Time	Predicted ug/m^3	Increment Consumption % of Class II Increments
Annual Arithmetic Mean	0.3	1.5%
24 Hour Maximum	6	6.6%
3 Hour Maximum	44	8.6%

Table 7

SOURCES WITHIN 50 KM OF PROPOSED UNITS

Source Number	Source Location (Kilometers) Horizontal	Vertical	Sulfur Dioxide Emission Rate (Tons/Day)	Source Name
1	451.4	3050.6	19.292	AVONPARK#2 b.
2	451.4	3050.6	0.132	AVONPARKGT1&2 b.
3	451.4	3050.6	3.112	AVONPARKGT3-6 a., b
4	452.4	3085.5	0.016	ALCOMA
5	452.4	3085.5	0.030	ALCOMA
6	441.0	3087.3	0.330	CITWORLD
7	441.0	3087.3	0.150	CITWORLD
8	441.0	3087.3	0.330	CITWORLD
9	403.8	3070.5	1.300	BREWPHOS
10	411.2	3074.5	2.080	SWIFTCHE
11	411.2	3074.5	0.520	SWIFTCHE
12	411.2	3074.5	3.164	SWIFTCHE
13	445.3	3083.0	0.020	HUNTBROS
14	415.3	3063.3	2.340	GARDINER
15	418.7	3083.6	1.830	ORANGE
16	413.2	3066.3	3.540	USSAGRI
17	418.3	3079.3	0.260	KAPLAN
18	465.0	3083.0	0.300	URANIUM
19	464.6	3059.4	0.575	AVPKCORR b.
20	448.3	3057.7	0.180	FLAJUICE b.
21	456.2	3043.7	0.950	SEBRING b.
22	456.2	3043.7	0.050	SEBRING b.
23	466.5	3009.4	0.200	ST.REGIS
24	419.8	3006.5	0.493	WACHULA

[a] Proposed units.

[b] Sources used for runs predicting 24-hour and 3-hour maximums.

Table 8

SULFUR DIOXIDE AIR QUALITY IMPACT OF PROPOSED UNITS

	Concentrations (ug/m^3)		
	Annual Average	24-Hour Maxiumum	3-Hour Maximum
Background	20	20	20
Maximum Predicted 1981 Concentrations in Vicinity of Avon Park Plant	8	137	639
Source Interaction Effects	-	62	324
Total Impact (Background & Predicted)	28	157	659
Federal Primary Standard	80	365	-
Federal Secondary Standard	60	260	1300
State of Florida Standards	60	260	1300

for these pollutants is required also. However, a screening procedure or significance analysis was performed for these pollutants which obviates the necessity for carrying out a full NAAQS analysis. Table 9 shows the results of this analysis in which incremental impact values for particulate matter, nitrogen dioxide and carbon monoxide have been predicted by ratioing each pollutant's emissions rate with the sulfur dioxide emissions rate and applying these ratios to the sulfur dioxide impacts predicted by modeling. The results of this process indicate that, even though the averaging periods for predicted carbon monoxide increments are not consistent with those for the significance levels, incremental impacts for particulate matter, nitrogen dioxide and carbon monoxide are below the levels of significance. Full NAAQS impact analysis are not necessary, therefore, for these three pollutants.

EPA has carried out an analysis to determine the likelihood that aerodynamic downwash from the turbogenerator stacks will affect the air quality at ground level in the immediate vicinity of the turbogenerators. This analysis was based on approved downwash screening techniques included in the Industrial Source Complex (ISC) Dispersion Model and considered both the turbogenerator housing itself and nearby buildings, as shown in the site plan in Figure 1. This screening indicates that downwash is not likely, even under expected worst case meteorological conditions.

On the basis of the analysis presented EPA determines that emissions from the proposed modification do not threaten the NAAQS levels for sulfur dioxide, particulate matter, nitrogen oxides, or carbon monoxide. No accepted modeling procedures exist for predicting the effects of VOC emissions on the NAAQS for ozone. For this reason, no analysis was performed for VOC emissions.

D. Class I Area Impact

There are no mandatory Class I PSD areas within a 100 kilometer radius of the proposed modification (the nearest Class I area is Chassahowitzka Bay which is over 100 kilometers away). Modeling techniques cannot accurately predict concentrations for distances greater than 100 kilometers.

Table 9

SIGNIFICANCE ANALYSIS FOR NITROGEN DIOXIDE AND CARBON MONOXIDE AND PARTICULATE MATTER

	SO_2	PM	NO_2	CO
Emissions (tons/year)	1136	99	1030	234
Significance Levels (ug/m^3)				
Annual	1	1	1	-
24 Hour	5	5	-	-
8 Hour	-	-	-	500
3 Hour	25	25	-	-
1 Hour	-	-	-	2000
Predicted Impacts (ug/m^3)				
Annual	0.3[a]	<0.3[b]	<0.3[b]	-
24 Hour	6[a]	0.5[b]	-	1[b]
3 Hour	44[a]	3.8[b]	-	9[b]

[a] Predicted by modeling.

[b] Predicted by ratioing emissions and SO_2 modeling results.

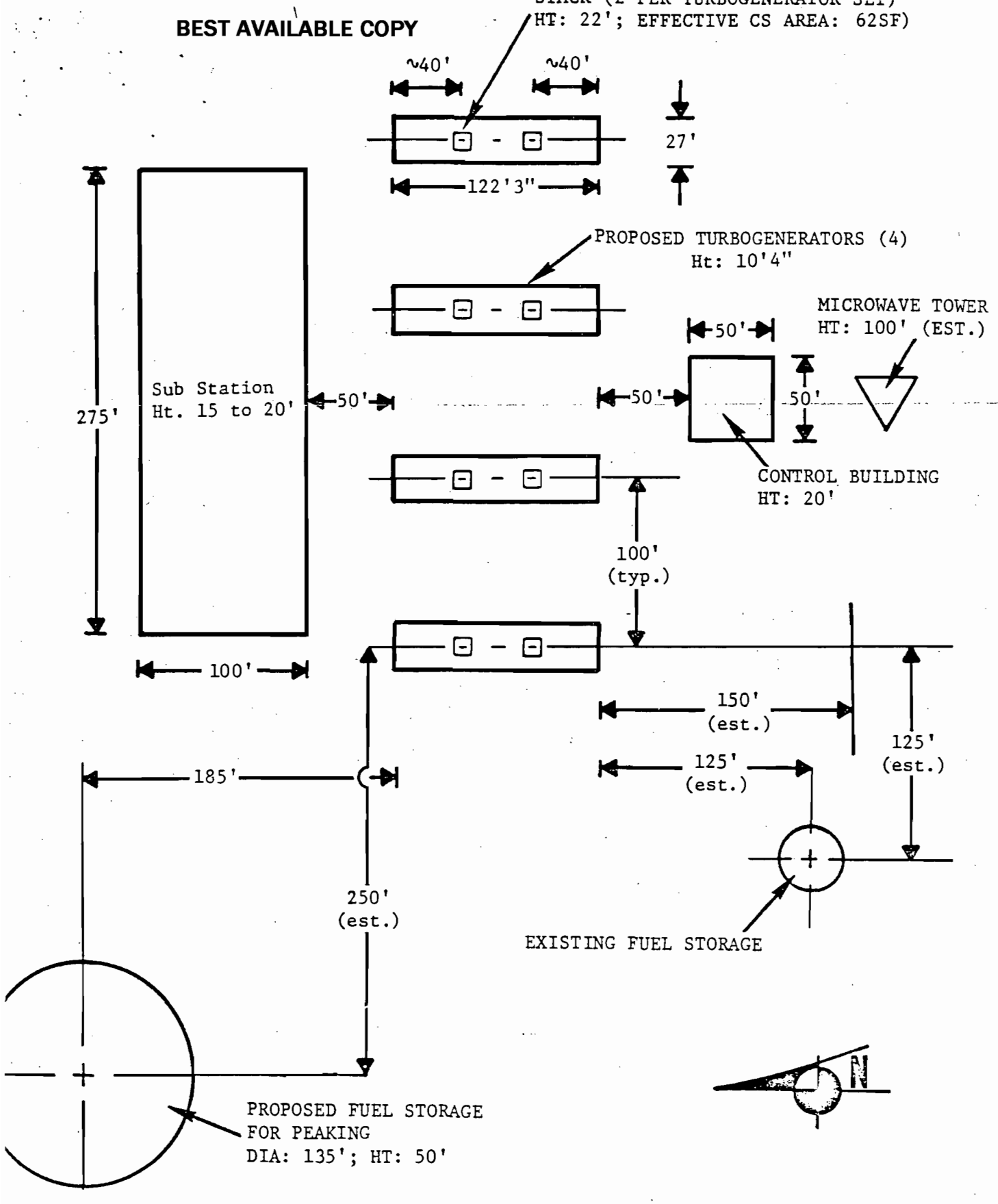


FIGURE 1. SITE PLAN FOR AREA ADJACENT TO PROPOSED TURBOGENERATORS

Furthermore, significant dispersion of pollutant emissions will occur at this distance. Consequently it is expected that the proposed modification will have no significant impact on any mandatory Class I area.

E. Growth Impact

The construction and operation of the proposed source is not anticipated to result in substantial long-term population growth in the Avon Park area. During the construction phase, temporary in-migration of workers may be necessary if the local labor pool proves to be insufficient. The operational phase of the facility will not require additional manpower.

F. Soils, Vegetation and Visibility Impact

Significant impact of the proposed units upon the soils, vegetation, and visibility of the area is not expected. Ambient air quality standards are not predicted to be violated; these standards are set to protect the health and welfare of the general public. Furthermore, the proposed units do not emit greater than 100 tons per year for particulate matter, which can influence visibility. For these reasons, no significant adverse impact on soils, vegetation, and visibility are anticipated.

V. Conclusions

EPA Region IV proposes a final determination of approval for construction of the modification to Florida Power Corporation's generating facility at Avon Park, Florida, proposed in their application submitted August 2, 1978. This approval is based on the information provided in their application. The conditions set forth in the permit are as follows:

1. The total allowable emissions for each of the four turbines are as follows:

Pollutant	LB/HR	LB/mm Btu (Each Turbine)
Sulfur Dioxide	379	0.513
Nitrogen Oxides	250	0.388
Carbon Monoxide	86	0.116
Particulate Matter	33	0.045
Volatile Organic Compounds	28	0.038

2. The modification and facilities constructed will be in accordance with the capacities stated in the application. This includes a maximum operation of 1500 hours per year for each turbine. Startup will be defined by the initiation of combustion in each of the four turbines. Shutdown will be defined by the cessation of combustion in that turbine. A log will be kept which shows the hours and dates of startup and shutdown for each turbine and the daily cummulative operating hours for the previous 365 day period.

3. The sulfur content of the fuel oil utilized by the proposed units will be limited to 0.5% by weight. A record will be kept showing the fuel analysis (including both sulfur and nitrogen content) for each quantity of fuel delivered to the source for use in the turbines, in accordance with 40 CFR 60.334.

4. Emissions of nitrogen oxides will be limited to 75 PPM by volume in the exhaust gas (adjusted for thermal efficiency and fuel-bound nitrogen) and will otherwise be in accordance with the New Source Performance Standard for nitrogen oxides, 40 CFR 60.332.

5. The applicant will continuously monitor the fuel rate and the ratio of injected water to fuel for each turbine consistent with the provisions of 40 CFR 60.334 and 335. The water to fuel ratio to each turbine will be maintained at or above that level shown during compliance testing to meet the NO_x allowable emissions limits in Conditions 1 and 4.

6. To determine compliance with the allowable emission limits, performance tests for sulfur dioxide, nitrogen oxides, and carbon monoxides and particulate emissions will be conducted with EPA standard methods and in accordance with the applicable provisions of 40 CFR 60.8, 60.334, and 60.335, and the attached "General Conditions". The results of these tests will be reported to EPA Region IV. Operation during these tests will include points within 10% of rated maximum capacity of each turbine. CO emissions tests will be performed at maximum water injection rates anticipated as necessary to maintain the NO_x allowable emissions limits. Compliance with the VOC allowable emissions rate will be demonstrated through performance tests conducted in accordance with the reference method outlined in the document Measurement of Volatile Organic Compounds, EPA-450/2-78-041 as revised in September of 1979. Testing of emissions will be carried out isokentically with a minimum sampling time of 60 minutes for each run and three runs per test. Grab samples for nitrogen oxides analysis will be obtained at 15 minute intervals.

7. The applicant will meet the requirements and provisions of the attached General Conditions.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitations contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing within five (5) days of such conditions:

   (a) description of noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

   (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

   and

   (e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

   Failure to provide the above information when appropriate shall constitute a violation of the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increased emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the State environmental control agency and/or representatives of the Environmental Protection Agency, upon the the presentation of credentials:

   (a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

   (b) to have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

   (c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit;

   (d) to sample at reasonable times any emission of pollutants;

   and

   (e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

9. All correspondence required to be submitted by this permit to the permitting agency shall be mailed to the:

   Chief, Air Facilities Branch
   Air and Hazardous Materials Division
   U.S. Environmental Protection Agency
   Region IV
   345 Courtland Street
   Atlanta, Georgia 30365

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

he emission of any pollutant more frequently or at a level in excess of that uthorized by this permit shall constitute a violation of the terms and conditions f this permit.

DEPARTMENT OF ENVIRONMENTAL REGULATION

ROUTING AND TRANSMITTAL SLIP

ACTION NO.

ACTION DUE DATE

1. TO: (NAME, OFFICE, LOCATION)			INITIAL / DATE
KAHEL	FANCY	STARNES	
2.			INITIAL / DATE
BLOMMEL	THOMAS	MARY CLARK	
3.			INITIAL / DATE
BARKER	GEORGE	HODGES	
4.			INITIAL / DATE
	J. ROGERS		

REMARKS:

FYI file

Mark, are you keeping a file on EPA prelim. and final determinations?

INFORMATION	
	REVIEW & RETURN
	REVIEW & FILE
	INITIAL & FORWARD
DISPOSITION	
	REVIEW & RESPOND
	PREPARE RESPONSE
	FOR MY SIGNATURE
	FOR YOUR SIGNATURE
X	LET'S DISCUSS
	SET UP MEETING
	INVESTIGATE & REPT
	INITIAL & FORWARD
	DISTRIBUTE
	CONCURRENCE
	FOR PROCESSING
	INITIAL & RETURN

FROM:

STEVE SMALLWOOD SS

DATE 11-18

PHONE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30308

NOV 13 1980

REF: 4AH-AF

RECEIVED

NOV 17 1980

DEPT. OF
ENVIRONMENTAL REGULATION

Mr. Steve Smallwood, Chief
Bureau of Air Quality Management
Division of Environmental Programs
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

RE: Florida Power Avon Park Peaking Units (PSD-FL-017)

Dear Mr. Smallwood:

Enclosed for your review and comment are the Public Notice and Preliminary PSD Determination for the Florida Power Corporation proposed plant modification near Avon Park, Florida. The public notice will appear in a local newspaper, The Avon Park Sun, in the near future.

Please let my office know if you have comments or questions regarding this determination. You may contact Mr. Kent Williams of my staff at 404/881-4552 or Jeffrey L. Shumaker of TRW Inc. at 919/541-9100. TRW Inc. is under contract to EPA, and TRW personnel are acting as authorized representatives of the Agency in providing aid to the Region IV PSD review program.

Sincerely yours,

Tommie A. Gibbs

Tommie A. Gibbs, Chief
Air Facilities Branch

TAB:JLS:clu

Enclosure

PRELIMINARY DETERMINATION
Florida Power Corporation
PSD-FL-017

I. Applicant

Florida Power Corporation
Thirty-fourth Street South
Post Office Box 14042
St. Petersburg, Florida 33733

II. Location

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The proposed modification has the potential to emit greater than 100 tons per year of sulfur dioxide, nitrogen oxides and carbon monoxide, respectively, as shown in Table 2. Therefore, in accordance with the provisions of Federal Regulation 40 CFR 52.21 promulgated August 7, 1980, the construction is a major modification subject to Prevention of Significant Deterioration (PSD) review. Moreover, the modification causes a significant net increase in emissions of SO_2, NO_x, CO, PM and VOC and review requirements therefore apply to each of these pollutants. PSD review includes analyses of Best Available Control Technology (BACT), Class I area impact, National Ambient Air Quality Standards (NAAQS) impact, increment impact, growth impact, and additional impacts on soils, vegetation and visibility.

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Volatile organic compounds[c]	84.5

[a] Calculated by the applicant based on 37,910 lb/hr fuel use and 1500 hr/yr operation; equals allowable emissions.

[b] Based on BACT determined allowable emissions rate.

[c] Calculated by EPA using AP-42 emission factors; equals allowable emissions.

A. Best Available Control Technology (BACT)

A major modification is required by 40 CFR 52.21 paragraph (j) to install BACT for each applicable pollutant. Thus, the applicant shall install and utilize BACT for sulfur dioxide, nitrogen dioxide, and carbon monoxide emissions from the proposed units. The modification is exempt, however, from BACT review for particulate matter and VOC consistent with the provisions of 40 CFR 52.21 (i)(9) for applications complete before August 7, 1980. The applicant must meet only the BACT requirements of the 1978 PSD regulation and not the more stringent requirements of the 1980 PSD regulation.

Sulfur Dioxide

The applicant considered only the use of low sulfur distillate fuel oil as BACT for the following reasons:

- low sulfur fuel oil provides maximum reliability for peaking operations
- there are no available control devices for the removal of sulfur dioxide from the exhaust of turbines burning high sulfur fuel.

The applicant has proposed to burn 0.5% sulfur distillate fuel oil. The Federal NSPS for gas turbines (40 CFR 60, Subpart GG) prohibits the burning of any fuel containing sulfur in excess of 0.8% by weight or the release of sulfur dioxide in concentrations in excess of 150 parts per million (ppm). Actual total emissions from the four turbines are estimated to be 1516 lb/hr (1137 tons per year).

Nitrogen Dioxide

The applicant has considered both the wet and the dry methods of nitrogen oxides control, although sufficient data on the dry method were not available at the time the PSD permit application was made to determine its efficiency and costs. However, the applicant has proposed limiting emissions to 75 PPM (adjusted for thermal efficiency and fuel-bound nitrogen) as BACT. This is feasible with the use of the wet method (i.e., water injection) and is the same as the Federal NSPS for gas turbines (40 CFR, Subpart GG). The four turbines will utilize water injection techniques and total emissions will not exceed 1000 lb/hr (750 tons per year).

Carbon Monoxide

Although no carbon monoxide control systems were discussed in the application, BACT is achieved by combustion control to avoid incomplete combustion (and consequent inefficient operation). EPA has determined that this should limit emissions to 15.4 pounds per thousand gallons of fuel oil burned. This figure is the emission factor for oil-fired gas turbine units as found in the EPA publication #AP-42, "Compilation of Air Pollutant Emission Factors." Total carbon monoxide emissions for the four turbines will be 344 lb/hr (258 tons per year).

Summary

The BACT specifications and the corresponding allowable emission rates for each of the four turbines are shown in Table 3. EPA agrees that the applicant's proposed technologies constitute BACT for the modification.

B. Increment Impact

EPA has promulgated increments for sulfur dioxide and particulate matter as shown in Table 4. Highlands County is presently classified as a Class II attainment area. As shown in the following section, emissions of particulate matter from the proposed modification are insignificant. An increment analysis for particulate matter therefore was not required.

This area is relatively undeveloped industrially, and no increment-consuming sources were identified in a search of the Florida Department of Environmental Regulations air permit files. The application, determined complete in September of 1978, predates several increment consuming sources proposed for construction in this area since this time.

The applicant, through the utilization of the EPA approved atmospheric dispersion models AQDM, PTMTPW and CRSTER, has estimated the impacts on the sulfur dioxide increments due to the proposed units. Meteorological data (5 years) from the Orlando Airport was used as input to the models. The modeling runs are described in Table 5. In this analysis, it was assumed that the proposed units were operating

Table 3

BEST AVAILABLE CONTROL TECHNOLOGY AND ALLOWABLE EMISSIONS FOR EACH TURBINE

Pollutant	BACT	Corresponding Emission Factor[a] ($lb/10^6$ Btu)	Corresponding Allowable Emission Rates[b] (lb/hr)	(tons/yr)
Sulfur Dioxide	Low Sulfur Fuel (0.5%)	0.513	379	284
Nitrogen Oxides	Water Inject (75 PPM)	0.338	250	187.5
Carbon Monoxide	Controlled Combustion	0.116	86	64.5

[a] Calculated from the emission rates and verified by calculations based on the BACT specifications and the following operating conditions, as specified by the applicant:

Exhaust temperature = 726 F
Exhaust flow rate (each turbine) = 1,347,000 ACFM
Fuel flow rate (each turbine) = 632 lb/min
Fuel density = 6.8 lb/gal
Fuel heating value = 19,500 Btu/lb

[b] Provided by the applicant and verified by EPA.

Table 4

PREVENTION OF SIGNIFICANT DETERIORATION INCREMENTS FOR SULFUR DIOXIDE

Averaging Time	Increments (ug/m^3)		
	Class I	Class II	Class III
Annual Arithmetic Mean	2	20	40
24 Hour Maximum[a]	5	91	182
3 Hour Maximum[a]	25	512	700

[a] Increment can be exceeded once per year.

Table 5

COMPUTER MODELING ANALYSES FOR SO_2

Analysis	Averaging Period	Model Used	Sources Input	Result
Increment	Annual	AQDM	Proposed units only	Expected arithmetic mean at each receptor[a]
	24 Hr	CRSTER & PTMTPW	Proposed units only	Highest expected in annual period
	3 Hr	CRSTER & PTMTPW	Proposed units only	Highest expected in annual period
NAAQS	Annual	AQDM	All within 50 km (24 sources)	Expected arithmetic mean at each receptor
	24 Hr	CRSTER & PTMTPW	All within 15 km (7 sources)	Highest expected in annual period
	3 Hr	CRSTER & PTMTPW	All within 15 km (7 sources)	Highest expected in annual period
Source Interaction	24 Hr	PTMTPW	FPC and Sebring (5 sources)	Highest expected in annual period
	3 Hr	PTMTPW	FPC and Sebring (5 sources)	Highest expected in annual period
	24 Hr	CRSTER	All at Avon Park (3 sources)	Highest expected in annual period
	3 Hr	CRSTER	All at Avon Park (3 sources)	Highest expected in annual period

[a] Computer results were converted to annual geometric mean from arithmetic mean by method of Larsen.

at 100 percent load. The results of the analysis are shown in Table 6. Operation of the proposed modification is expected to consume a small percentage of the Class II increments in this area.

C. National Ambient Air Quality Standards Impact

The applicant has assessed the impact of the proposed units on the National Ambient Air Quality Standard (NAAQS) for sulfur dioxide by the methods shown in Table 5. In this analysis, it was assumed that both existing and proposed Avon Park units were operating at 100 percent load. The source inventory used for predicting the annual average sulfur dioxide concentration is shown in Table 7. Sources within 15 kilometers of the proposed units were used in the runs predicting 24-hour and 3-hour maximum concentrations and are indicated in this table also. Source interaction effects were estimated by meteorologically aligning Avon Park and Sebring Utilities; the closest major and dominant existing source in the area.

The results of the analysis are compared with the NAAQS in Table 8, which indicates that no standards will be violated through the operation of the proposed units.

Meteorological data for Orlando, sixty miles northeast of the proposed source, were used in the analysis. These data included a five-year correlation of wind speed versus frequency of stability classes. No air quality monitoring was required for this source, since the PSD application was submitted prior to August 7, 1978, the date after which monitoring was required by 40 CFR 52.21 m. The analysis, however, modeled all significant air pollution sources in the vicinity and assumed background concentrations consistent with those recommended in the PSD Ambient Monitoring Guideline (EPA 450/2-78-019). These values are reasonable for a rural source of this type. Table 8 shows a sizeable margin of safety for each averaging time and EPA agrees that the analysis adequately demonstrates that the proposed modification does not threaten the NAAQS for sulfur dioxide.

Since the proposed modification also has significant increases in particulate matter, nitrogen dioxide and carbon monoxide, NAAQS analysis

Table 6

SO_2 INCREMENTAL IMPACT OF PROPOSED UNITS

Averaging Time	Predicted ug/m^3	Increment Consumption % of Class II Increments
Annual Arithmetic Mean	0.3	1.5%
24 Hour Maximum	6	6.6%
3 Hour Maximum	44	8.6%

Table 7

SOURCES WITHIN 50 KM OF PROPOSED UNITS

Source Number	Source Location (Kilometers) Horizontal	Vertical	Sulfur Dioxide Emission Rate (Tons/Day)	Source Name
1	451.4	3050.6	19.292	AVONPARK#2 b.
2	451.4	3050.6	0.132	AVONPARKGT1&2 b.
3	451.4	3050.6	3.112	AVONPARKGT3-6 a., b.
4	452.4	3085.5	0.016	ALCOMA
5	452.4	3085.5	0.030	ALCOMA
6	441.0	3087.3	0.330	CITWORLD
7	441.0	3087.3	0.150	CITWORLD
8	441.0	3087.3	0.330	CITWORLD
9	403.8	3070.5	1.300	BREWPHOS
10	411.2	3074.5	2.080	SWIFTCHE
11	411.2	3074.5	0.520	SWIFTCHE
12	411.2	3074.5	3.164	SWIFTCHE
13	445.3	3083.0	0.020	HUNTBROS
14	415.3	3063.3	2.340	GARDINER
15	418.7	3083.6	1.830	ORANGE
16	413.2	3066.3	3.540	USSAGRI
17	418.3	3079.3	0.260	KAPLAN
18	465.0	3083.0	0.300	URANIUM
19	464.6	3059.4	0.575	AVPKCORR b.
20	448.3	3057.7	0.180	FLAJUICE b.
21	456.2	3043.7	0.950	SEBRING b.
22	456.2	3043.7	0.050	SEBRING b.
23	466.5	3009.4	0.200	ST.REGIS
24	419.8	3006.5	0.493	WACHULA

[a] Proposed units.

[b] Sources used for runs predicting 24-hour and 3-hour maximums.

Table 8

SULFUR DIOXIDE AIR QUALITY IMPACT OF PROPOSED UNITS

	Concentrations (ug/m^3)		
	Annual Average	24-Hour Maxiumum	3-Hour Maximum
Background	20	20	20
Maximum Predicted 1981 Concentrations in Vicinity of Avon Park Plant	8	137	639
Source Interaction Effects	-	62	324
Total Impact (Background & Predicted)	28	157	659
Federal Primary Standard	80	365	-
Federal Secondary Standard	60	260	1300
State of Florida Standards	60	260	1300

for these pollutants is required also. However, a screening procedure or significance analysis was performed for these pollutants which obviates the necessity for carrying out a full NAAQS analysis. Table 9 shows the results of this analysis in which incremental impact values for particulate matter, nitrogen dioxide and carbon monoxide have been predicted by ratioing each pollutant's emissions rate with the sulfur dioxide emissions rate and applying these ratios to the sulfur dioxide impacts predicted by modeling. The results of this process indicate that, even though the averaging periods for predicted carbon monoxide increments are not consistent with those for the significance levels, incremental impacts for particulate matter, nitrogen dioxide and carbon monoxide are below the levels of significance. Full NAAQS impact analysis are not necessary, therefore, for these three pollutants.

EPA has carried out an analysis to determine the likelihood that aerodynamic downwash from the turbogenerator stacks will affect the air quality at ground level in the immediate vicinity of the turbogenerators. This analysis was based on approved downwash screening techniques included in the Industrial Source Complex (ISC) Dispersion Model and considered both the turbogenerator housing itself and nearby buildings, as shown in the site plan in Figure 1. This screening indicates that downwash is not likely, even under expected worst case meteorological conditions.

On the basis of the analysis presented EPA determines that emissions from the proposed modification do not threaten the NAAQS levels for sulfur dioxide, particulate matter, nitrogen oxides, or carbon monoxide. No accepted modeling procedures exist for predicting the effects of VOC emissions on the NAAQS for ozone. For this reason, no analysis was performed for VOC emissions.

D. Class I Area Impact

There are no mandatory Class I PSD areas within a 100 kilometer radius of the proposed modification (the nearest Class I area is Chassahowitzka Bay which is over 100 kilometers away). Modeling techniques cannot accurately predict concentrations for distances greater than 100 kilometers.

Table 9

SIGNIFICANCE ANALYSIS FOR NITROGEN DIOXIDE AND CARBON MONOXIDE AND PARTICULATE MATTER

	SO_2	PM	NO_2	CO
Emissions (tons/year)	1136	99	1030	234
Significance Levels (ug/m^3)				
Annual	1	1	1	-
24 Hour	5	5	-	-
8 Hour	-	-	-	500
3 Hour	25	25	-	-
1 Hour	-	-	-	2000
Predicted Impacts (ug/m^3)				
Annual	0.3[a]	<0.3[b]	<0.3[b]	-
24 Hour	6[a]	0.5[b]	-	1[b]
3 Hour	44[a]	3.8[b]	-	9[b]

[a] Predicted by modeling.

[b] Predicted by ratioing emissions and SO_2 modeling results.

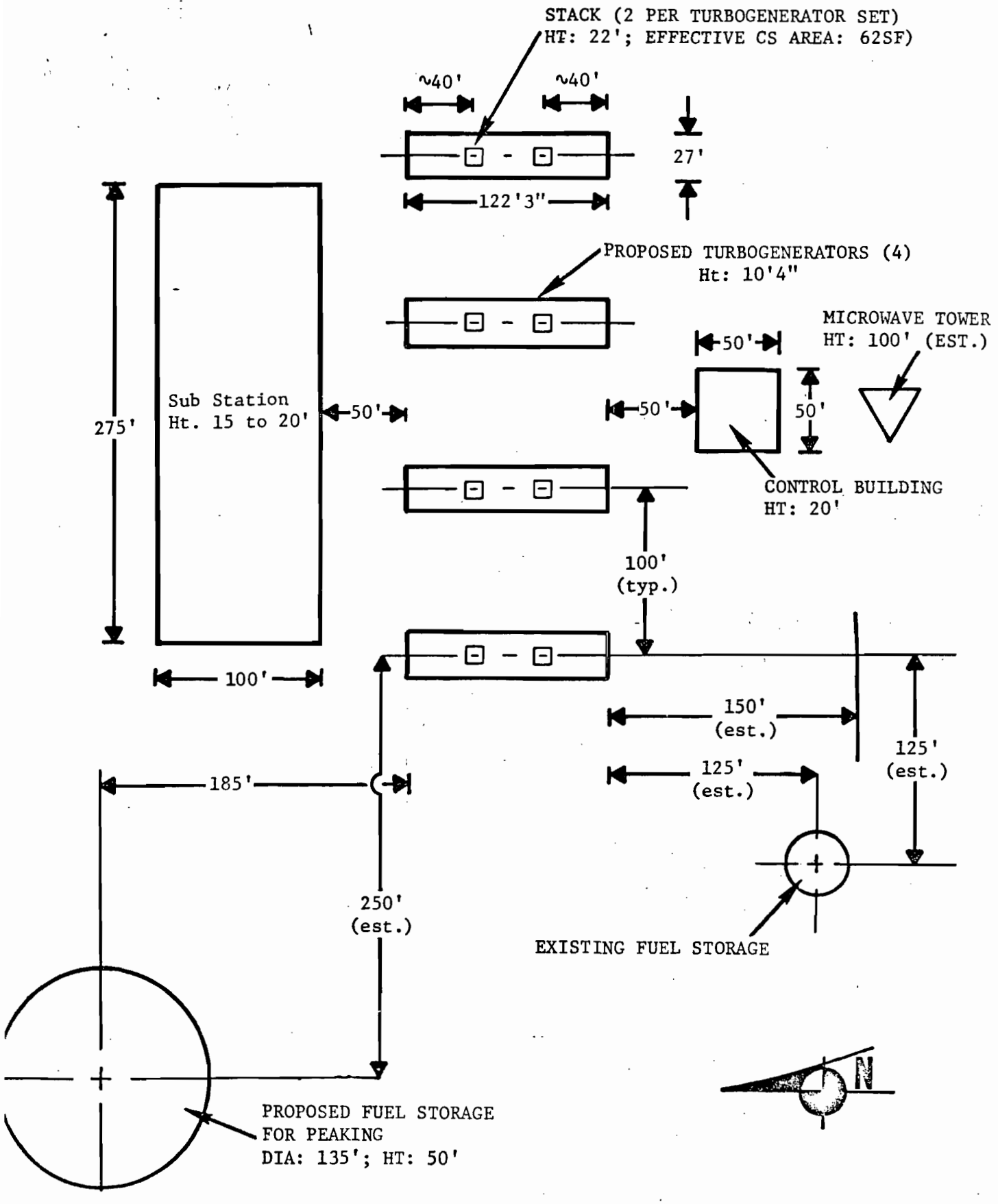

FIGURE 1. SITE PLAN FOR AREA ADJACENT TO PROPOSED TURBOGENERATORS

Furthermore, significant dispersion of pollutant emissions will occur at this distance. Consequently it is expected that the proposed modification will have no significant impact on any mandatory Class I area.

E. - Growth Impact

The construction and operation of the proposed source is not anticipated to result in substantial long-term population growth in the Avon Park area. During the construction phase, temporary in-migration of workers may be necessary if the local labor pool proves to be insufficient. The operational phase of the facility will not require additional manpower.

F. Soils, Vegetation and Visibility Impact

Significant impact of the proposed units upon the soils, vegetation, and visibility of the area is not expected. Ambient air quality standards are not predicted to be violated; these standards are set to protect the health and welfare of the general public. Furthermore, the proposed units do not emit greater than 100 tons per year for particulate matter, which can influence visibility. For these reasons, no significant adverse impact on soils, vegetation, and visibility are anticipated.

V. Conclusions

EPA Region IV proposes a preliminary determination of approval for construction of the modification to Florida Power Corporation's generating facility at Avon Park, Florida, proposed in their application submitted August 2, 1978. This approval is based on the information provided in their application. The conditions set forth in the permit are as follows:

1. The total allowable emissions for each of the four turbines are as follows:

Pollutant	LB/HR	LB/mm Btu (Each Turbine)
Sulfur Dioxide	379	0.513
Nitrogen Oxides	250	0.388
Carbon Monoxide	86	0.116
Particulate Matter	33	0.045
Volatile Organic Compounds	28	0.038

2. The modification and facilities constructed will be in accordance with the capacities stated in the application. This includes a maximum operation of 1500 hours per year for each turbine. Startup will be defined by the initiation of combustion in each of the four turbines. Shutdown will be defined by the cessation of combustion in that turbine. A log will be kept which shows the hours and dates of startup and shutdown for each turbine and the daily cummulative operating hours for the previous 365 day period.

3. The sulfur content of the fuel oil utilized by the proposed units will be limited to 0.5% by weight. A record will be kept showing the fuel analysis (including both sulfur and nitrogen content) for each quantity of fuel delivered to the source for use in the turbines, in accordance with 40 CFR 60.334.

4. Emissions of nitrogen oxides will be limited to 75 PPM by volume in the exhaust gas (adjusted for thermal efficiency and fuel-bound nitrogen) and will otherwise be in accordance with the New Source Performance Standard for nitrogen oxides, 40 CFR 60.332.

5. The applicant will continuously monitor the fuel rate and the ratio of injected water to fuel for each turbine consistent with the provisions of 40 CFR 60.334 and 335. The water to fuel ratio to each turbine will be maintained at or above that level shown during compliance testing to meet the NO_x allowable emissions limits in Conditions 1 and 4.

6. To determine compliance with the allowable emission limits, performance tests for sulfur dioxide, nitrogen oxides, and carbon monoxides and particulate emissions will be conducted with EPA standard methods and in accordance with the applicable provisions of 40 CFR 60.8, 60.334, and 60.335, and the attached "General Conditions". The results of these tests will be reported to EPA Region IV. Operation during these tests will include points within 10% of rated maximum capacity of each turbine. CO emissions tests will be performed at maximum water injection rates anticipated as necessary to maintain the NO_x allowable emissions limits. Compliance with the VOC allowable emissions rate will be demonstrated through performance tests conducted in accordance with the reference method outlined in the document Measurement of Volatile Organic Compounds, EPA-450/2-78-041 as revised in September of 1979. Testing of emissions will be carried out isokentically with a minimum sampling time of 60 minutes for each run and three runs per test. Grab samples for nitrogen oxides analysis will be obtained at 15 minute intervals.

7. The applicant will meet the requirements and provisions of the attached General Conditions.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitations contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing within five (5) days of such conditions:

   (a) description of noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

   (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

   and

   (e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

   Failure to provide the above information when appropriate shall constitute a violation of the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increased emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the State environmental control agency or representatives of the Environmental Protection Agency, upon the the presentation of credentials:

   (a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

   (b) to have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

   (c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit;

   (d) to sample at reasonable times any emission of pollutants;

   and

   (e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

9. All correspondence required to be submitted by this permit to the permitting agency shall be mailed to the:

   Chief, Air Facilities Branch
   Air and Hazardous Materials Division
   U.S. Environmental Protection Agency
   Region IV
   345 Courtland Street
   Atlanta, Georgia 30308

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit shall constitute a violation of the terms and conditions of this permit.

PUBLIC NOTICE

PSD-FL-017

A modification to an air pollution source is proposed for construction by the Florida Power Corporation at their plant near Avon Park, Florida. The project includes construction of four 63 megawatt gas turbines to increase peak electrical generating capacity at the plant.

The proposed construction has been reviewed by the U.S. Environmental Protection Agency (EPA) under Federal Prevention of Significant Deterioration (PSD) Regulations (40 CFR 52.21), and EPA has made a Preliminary Determination that the construction can be approved provided certain conditions are met. A summary of the basis for this determination and the application for a permit submitted by Florida Power are available for public review at the Office of the City Clerk in Avon Park, Florida.

The total allowable emissions from the proposed construction are as follows in tons per year:

PM	SO_2	NO_x	CO	VOC
99	1136	750	258	84

Further, the maximum increment consumed by the source is as follows:

	Annual	24-Hour	3-Hour
PM	-------Insignificant Impact---------		
SO_2	1.5%	6.6%	8.6%

Any person may submit written comments to EPA regarding the proposed modification. All comments, postmarked not later than 30 days from the date of this notice, will be considered by EPA in making a Final Determination regarding approval for construction of this source. These comments will be made available for public review at the above location. Furthermore, a public hearing can be requested by any person. Such requests should be submitted within 15 days of the date of this notice. Letters should be addressed to:

Mr. Tommie A. Gibbs, Chief
Air Facilities Branch
U.S. Environmental Protection Agency
345 Courtland Street, NE
Atlanta, Georgia 30308