



February 19, 1993

FPL-JEN-DER-170-93-12

Mr. C. H. Fancy, Chief
Bureau of Air Permitting
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RECEIVED

FEB 26 1993

DIVISION of Air
Resources Management

RE: **Martin Units 3 & 4**
PA89-27, PSD-FL-146
Revised Information

Dear Mr. Fancy:

The FPL Martin Units 3 & 4 were licensed (PA89-27) in 1991 under the Power Plant Siting Act (Ch 403 Part II F.S.) and a corresponding PSD permit (PSD-FL-146). These units consist of 4 "advanced" General Electric (GE) Model 7001 F/A combustion turbines, each with a heat recovery steam generator, firing natural gas and light distillate oil. Condition of Certification II.A.15 and PSD Condition 16 require FPL to obtain DER approval for any change in the method of operation, fuels, or equipment for these two units.

With the completion of detailed engineering and shop testing, refinement of the information previously provided to DER as part of the certification process has occurred in two general areas. The first area is the development of the peak mode of operation (i.e. power augmentation). The second area is refinement of the combustion turbine stack parameters. Each of these areas are addressed below.

Power Augmentation

Units 3 & 4 at Martin utilize advanced combustion turbines (CT's). The term "advanced" refers to a very high firing temperature design. The higher firing temperature requires use of exotic materials coupled with very sophisticated internal cooling techniques. This design approach results in a machine which operates very close to its true maximum capability in normal operation (e.g., base load).

Conventional power generation combustion turbines have two ratings, base and peak loads. Conventional units operate at a base load firing temperature of 1900° F to 2100° F and have reasonable design margins. Peak load is a temporary operating mode which is accomplished by simply raising the firing temperature by 50° F to 100° F in the conventional combustion turbine.

Peak load operation for Units 3 & 4 cannot be accomplished by simply raising the firing temperature since these units operate at 2350° F. To obtain a peak load rating for these units, steam is injected into the combustion turbine at temperatures lower than the combustion gases.

must be demonstrated

8760 hrs/yr

*155 MW
151 MW 20%*

cross

*extra 11 MW
Demstrate compliance
testing
mode of operation*

The lower temperature steam allows overfiring of the CT without exceeding 2350° F. Furthermore, the additional mass flow contributed by the steam produces more power from the turbine. GE refers to this peaking mode of operation as "power augmentation". When operating in this mode, emission limits will remain within the already permitted levels.

Operating in this mode has economic and environmental benefits. Economically, the additional power supply is at a very desirable incremental heat rate, thus lowering fuel costs. Environmentally, the use of this peaking mode displaces other higher emission units in the FPL system. Therefore, the benefits accrue to both the environment and FPL customers.

Martin Units 3 & 4 are designed to use the power augmentation mode sparingly. The auxiliary equipment necessary to support power augmentation is limited in capacity. For example, the water treatment plant and demineralizer can support continuous power augmentation for only 48 hours at a time. On a consistent daily use basis, Units 3 & 4 would only be able to run two hours per day in the power augmentation mode. FPL expects to use this peak mode of operation approximately 228 hours per year. This estimate is based on several assumptions that cannot be verified without actual plant operational data and yearly weather patterns.

48 hr per day

CT Stack Refinements

As a result of final detailed design and a cost reduction program, certain design features have been refined from what was originally permitted. The refined combustion turbine stack parameters are presented in the enclosed table.

If you have any question about these design refinements, please call me at (407) 625-7624 or Dan MacDougall at (407) 625-7661.

Sincerely,

Wayne Ondler

Wayne Ondler
Environmental Licensing Project Manager
Environmental Affairs

Enclosure

cc: Jewel Harper-EPA/Atlanta
H.S. Owen-DER/TAL
Tom Tittle-DER/WPB

J. Heron
K. Zhang
llpowaag

48 hr = 2 days

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FPL MARTIN UNITS 3 & 4 DESIGN REFINEMENTS

CHANGE IN CT/HRSG STACK PARAMETERS

	ORIGINAL DESIGN				REFINED DESIGN			
	GAS		OIL		GAS		OIL	
FUEL								
AMBIENT TEMPERATURE (°F)	40	95	40	95	40	95	40	95
HRSG STACK DIAMETER (FT)	20	20	20	20	18	18	18	18
HRSG EXHAUST TEMP. (°F)	280	280	280	280	209	204	275	274
HRSG EXIT VELOCITY (FT/SEC)	61	54.1	61.7	54.8	68.1	59.9	76.2	67.7

HRSG - HEAT RECOVERY STEAM GENERATOR

STCKDIAM DRW