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SUBJECT: Forwards response to 821028 request for addl info re degraded grid protection for Class IE power sys.Proposed Tech Specs re 821116 application to amend Licenses DPR-31 & DPR-41 revised.

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AUTH.NAME AUTHOR AFFILIATION
[illegible] Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
[illegible] Operating Reactors Branch 1

SUBJECT: Forwards response to 821028 request for addl info re upgraded grid protection for Class 1E power sys.Proposed Tech Specs re [illegible] application to amend Licenses DPR-31 & DPR-41 revised.

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	RGN2	1	1	RM/DDAMI/MIB	1	1
EXTERNAL:	ACRS 10	6	6	INPO,J.STARNES	1	1
	LPDR 03	1	1	NRC PDR 02	1	1
	NSIC 05	1	1	NTIS	1	1

P. O. BOX 14000, JUNO BEACH, FL 33408

FLORIDA POWER & LIGHT COMPANY

January 3, 1983
L-83-1

Office of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactor Branch #1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Varga:

Re: Turkey Point Units 3 & 4
Dockets Nos. 50-250 & 50-251
Adequacy of Station Electric
Distribution System Voltages

Florida Power & Light has reviewed your letter dated October 28, 1982, which provided a Safety Evaluation concerning degraded grid protection for Class 1E power systems. This letter also requested additional information concerning relay curves and proposed technical specifications.

Our response to Item 1 is attached. Please replace Tables 4.1.1 Sheet 3, 3.5.-2, and 3.5.4 Sheet 2 of our 11/16/82 (L-82-506) proposed Technical Specification Amendment with the Attachments 1,2, and 3 enclosed.

Item 2a requested modifications to our proposed Technical Specification dated August 6, 1982 to add standard Technical Specification surveillance requirements for our loss of voltage relays. Those relays are General Electric HGA relays which are used to detect a total loss of voltage condition as we discussed with members of your staff on December 16, 1982. There are no provisions to allow for calibration of these relays but they are tested during refueling outages as part of the safeguards testing and as currently required by the Turkey Point Technical Specifications.

Item 2b requested additional surveillance of diesel generator load shedding and load sequencing features. Our letter (L-82-389) dated September 1, 1982, addressed this issue. The load shedding and load sequencing caused by the action of the undervoltage relays are adequately tested by current Technical Specification 4.8.1.c.4.

Should you or your staff have any additional questions on ths subject, please contact us.

A015

Very truly yours,

Jack E. Vaz for

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/JEM/cab

Attachment

cc: J. P. O'Reilly, Region II
Harold F. Reis, Esquire

IN RESPONSE TO NRC LETTER DATED October 28, 1982

RE: Request for Additional Information, Turkey Point Units 3 & 4
Degraded Grid Protection for Class IE Power Systems

The NRC has expressed concern as to how the undervoltage relay setpoints given by the Technical Specifications insure that safety related operating equipment is not thermally damaged. The explanation herein demonstrates that equipment operating at lower voltages for short periods of times allowed by the relay scheme is possible without equipment damage.

It should be noted that the relays discussed below are General Electric IAV relays. There are two relays on each 480V load center bus. For brevity sake the Technical Specifications only indicated the maximum voltage and time for the relay curve.

Typical relay curves are given in figures 1 and 2. The relay protection of the 4 kV motors is provided by the 480V relays at the present load center transformer tap settings. In the future should the load center transformer taps be changed to a value which would not allow such protection, then 4 kV undervoltage relays would be utilized.

The proposed Technical Specifications have been changed to reflect this as well as the required changes in the 480 volt undervoltage relay settings (see Attachments 1, 2 and 3).

Relay setpoints are based on approximately 87% of rated motor voltage. The motors were specified with a 1.15 service factor. Therefore, they are capable of operation at this voltage without thermal damage. For 4kV motors this corresponds to 3480 volts and for 460 volt motors this corresponds to 400 volts at the motor terminals.

The actual setpoints take into consideration voltage drops in cable between the motor terminals and the bus on which the relay is located. In addition motor ratings are based on an altitude of 3300 feet above sea level. Since Turkey Point motors are used at 100 feet or less the thermal capability of the motor is increased by 9.7% which would allow continuous operation of the motor at 79.24% of nameplate voltage (364.5 volts and 3169.6 volts respectively). Therefore, operation for up to 90 seconds in the range of 364.5 - 400 volts for 480 volt motors and 3170-3480 volts for 4 kV motors poses no problem.

Considering cable voltage drops to the worst case motor, the following relay times and relay voltages are given;

equivalent relay voltages	relay time	motor terminal volts
3605	60 sec	3600
3176	12 sec	3170
431	90 sec	400
397.1	20 sec	366.5

Short excursions to bus voltages less than those above for less than 20 seconds are also of no concern. Such short durations of low voltages are within the motors' general thermal capability, starting/stall times, and locked rotor currents which are characterized by an inverse time relationship similar to figures 1 and 2.

MOTOR OPERATED VALVES

Motor operated valves employ special torque motors for their operation. Manufacturer's data and FPL tests reveal that these motors generally operate near or in the saturated region. That is, with a decrease in voltage the current also decreases. Therefore, at low voltages there is less temperature rise and

thermal overheating is not a problem for these valves to continue to operate.

CHARGERS

According to the manufacturer, the battery chargers can operate at 368 volts with full regulation at a load of 75% or less. Also should the voltage decrease further the charger would not suffer any adverse effects or blow fuses although its output would not be within the specific voltage regulation limits. When voltage returns, the charger output returns to normal.

The Turkey Point chargers are approximately 30% loaded. Therefore the chargers are not a concern for short periods of low bus voltages.