NRC FORM 195 (2-76) U.S. NUCLEAR REGULATORY COMMISSION

DOCKET NUMBER 50-250/251

FILE NUMBER

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

TO:	FROM:	DATE OF DOCUMENT
Mr. George Lear	Florida Power & Light Company Miami, Florida Mr. Robert E. Uhrig	12/10/76
		DATE RECEIVED 12/13/76

LETTER / ORIGINAL / COPY	NOTORIZED / UNCLASSIFIED	PROP	INPUT FORM	NUMBER OF COPIES RECEIVED
☒ / ☒ / ☐	☐ / ☒			One signed

DESCRIPTION

Ltr. w/attached....re their 10/15/76 ltr. and our 8/11/76 ltr....concerning Reactor Vessel Overpressurization.

(1-P)

REACTOR VESSEL OVERPRESSURIZATION
DISTRIBUTION PER G. ZECH 10-21-76

PLANT NAME:
Turkey Point Units 3 & 4

ENCLOSURE

ACKNOWLEDGED
DO NOT REMOVE
(5-P)

FOR ACTION/INFORMATION 12/15/76 RJL

SAFETY	
☒ BRANCH CHIEF: (5)	Lear
☒ LIC. ASST:	Parrish
☒ PROJECT MANAGER:	Elliott

INTERNAL DISTRIBUTION

☒ REG FILE	☒ GOSSICK & STAFF	☒ BAER
☒ NRC PDR	☒ KNIGHT	☒ BUTLER
☒ I & E (2)	☒ PAWLICKI	☒ ZECH
☒ OELD	☒ NOVAK	
	☒ EISENHUT	
	☒ SHAO	

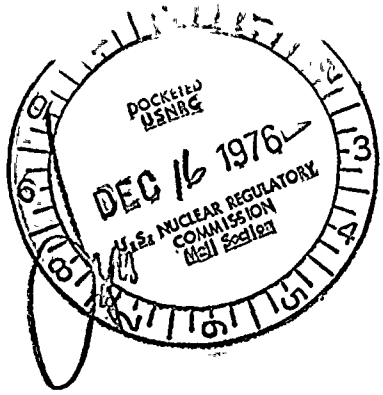
EXTERNAL DISTRIBUTION

☒ LPDR: Miami, Fla.	
☒ TIC:	
☒ NSIC:	
☒ ACRS 16 CYS ~~HOLDING~~/SENT TO ~~NRC~~ Cat. B (12/15/76)	

CONTROL NUMBER
mrl
12570

NRC FORM 195 (2-76)

Regulatory Docket File



FPL
FLORIDA POWER & LIGHT COMPANY

December 10, 1976
L-76-422

Office of Nuclear Reactor Regulation
Attention: Mr. George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Lear:

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Overpressurization Issue

In letter L-76-359 of October 15, 1976, Florida Power & Light Company responded to your letter of August 11, 1976 on the subject of reactor vessel overpressurization events. In that response, we stated that an analysis had been initiated to evaluate how effective the pressurizer power operated relief valves would be for mitigating overpressurization transients. We also discussed general design criteria for overpressurization mitigating systems. Preliminary evaluations indicated that the pressurizer power operated relief valves would be adequate to mitigate overpressurization events except for those initiated by the inadvertent opening of an accumulator isolation valve. We also stated that, since adequate administrative controls are available for assuring that certain valves are open during power operation, similar administrative controls would provide the necessary protection in case of an overpressurization event caused by inadvertent opening of an accumulator isolation valve. This letter is intended to provide additional clarification of our proposed action, including the design criteria we intend to apply to our proposed mitigating system. To accomplish this, a description of the generic "Reference Mitigating System" is attached.

Very truly yours,

J. A. DeMonty
for
Robert E. Uhrig
Vice President

12736

REU/MAS/cpc
Attachment
cc: Mr. Norman C. Moseley
Robert Lowenstein, Esquire

PEOPLE...SERVING PEOPLE

ATTACHMENT

Westinghouse Electric Corporation is proceeding with a thorough analysis of overpressurization transient events by employing the LOFTRAN code. LOFTRAN has been reviewed and accepted by the NRC staff. To utilize the LOFTRAN code, modifications internal to the code are necessary which will require a development and verification effort. The modified LOFTRAN calculational model, when complete, will provide a technically justifiable and conservative means to determine the adequacy of a relief valve system in mitigating an overpressurization event. Until the calculational model is completed and the bounding analysis is performed, size requirements and setpoints for the relief system cannot be accurately established.

Although specific setpoints and relief capacity requirements of the mitigating system are not known at present, meaningful progress towards resolution of the reactor vessel overpressurization issue can be achieved by defining the design criteria for the mitigating system. If design criteria are confirmed upon completion of the bounding analysis, plant specific modifications in accordance with specified design criteria can be implemented promptly. The time needed to resolve this issue can be minimized if the transient analysis and the definition of design criteria are pursued in parallel.

In your letter of August 11, formal guidance on acceptable design criteria was provided on page three. The letter stated:

> "The basic criteria to be applied in determining the adequacy of overpressurization protection are that no single equipment failure or single operator error will result in Appendix G limitations being exceeded."

We embraced this criteria in our letter of October 15. This criteria is the basis for a "Reference Mitigating System" which incorporates the following specific design features:

a. An existing wide-range pressure transmitter is proposed as the sensor. Additional bi-stable(s) will be added to provide a signal to the power operated relief valve(s). Figure 1 presents a logic diagram of the "Reference Mitigating System." Figure 2 presents an instrumentation loop diagram of the pressure monitoring and relief valve actuating equipment. The present control/protection grade of this instrumentation will be retained.

b. The power operated relief valves, as previously stated, will be utilized as the pressure relief mechanism. These relief valves are spring-loaded closed and require air to open. The air is presently supplied by a control air source. If operability

ATTACHMENT (Continued)

b. (Continued)

upon the loss of control air is found to be required (if loss of control air can initiate an overpressurization event and disable the pressurizer power operated relief valves), accumulator(s) will be utilized. The accumulator(s) will provide a sufficient air supply to the pressurizer power operated relief valve to allow five cycles of the valve following a loss of normal control air.

c. The present power supply alignment for the solenoid valves controlling air flow to the pressurizer power operated relief valves will be retained. Installation of the "Reference Mitigating System" will not compromise the existing separation between DC power sources.

d. A keylock switch or an equivalent administratively controlled switch will be used to enable and disable the low setpoint of each relief valve. The enable/disable switches will conform to the separation criteria requirements for the DC buses for the Turkey Point Plant.

e. Seismic design of the electronic equipment presently installed in the Turkey Point Plant will be retained. Additional electronic equipment will be installed so as not to compromise the present seismic qualifications of existing safety systems.

f. The control air supply from the air accumulators will be seismically designed. Typical pressurizer power operated relief valves are designed to withstand seismic loading and retain their function during such loading. The valves will not be degraded by the system modification.

g. Testability will be provided. Verification of operability is possible prior to solid-system, low-temperature operation by use of the remotely operated isolation valve, enable/disable switch, and normal electronics surveillance. Testing requirements could be incorporated in the operating procedures to assure performance prior to existence of plant conditions requiring operability of the mitigating system.

h. Figure 3 presents a typical electrical schematic diagram which would be used for each pressurizer power

ATTACHMENT (Continued)

h. (Continued)

operated relief valve. The additional pressure channel's bi-stable contact or auxiliary relay contact and the enable/disable switch addressed in "d" above are included.

i. The loss of an instrument power bus will not result in an isolation of letdown flow and disabling of the "Reference Mitigating System."

By the time the transient analysis is completed, agreement should be reached on what the design criteria for the "Reference Mitigating System" should be in order to minimize the time needed to install an acceptable system. We have inquired as to the availability of electrical and mechanical equipment required for the "Reference Mitigating System." According to vendors' estimates, delivery of additional equipment needed for the "Reference Mitigating System" could be expected within six months of order placement.

Our desire to resolve this matter by the end of 1977, coupled with the facts that (1) analysis completion is scheduled for the end of March, 1977 and (2) equipment delivery may require an additional six months, makes it imperative that the design criteria include sufficient flexibility to allow us to accomplish the objective of preventing overpressurization transients. Both pressurizer relief valves may be necessary to mitigate the worst-case overpressurization event to be analyzed in our bounding analysis. Contingencies of this nature should be and were considered in selection of design criteria. The "Reference Mitigating System" design includes conformance to the guidelines of your August 11, 1976 letter, provides for the maximum pressure relief possible with available mechanical equipment, and could be installed by the end of 1977.

Overpressurization events are cause for concern, and reasonable modification of operating plant equipment is sound engineering practice in view of the events which have occurred. However, Appendix G limits are based on conservative assumptions, and it should be noted that exceeding Appendix G limits does not necessarily mean that vessel damage, much less fracture, will

ATTACHMENT (Continued)

occur. In fact, additional margin to the Turkey Point pressure-temperature limits could be achieved with the existing Appendix G methodology by performing a plant-specific analysis which included actual plant data and more realistic assumptions of flow, fluence, vessel material properties, etc. Thus, we conclude that, because there is significant margin between the realistic plant analysis and the conservative Appendix G analysis, an Appendix G limit does not represent a Safety Limit.

In our October 15, 1976 letter, we stated that the remote possibility of exceeding Appendix G limits would still exist following installation of any mitigating system. It was also stated that the proper course of action following such an event would be to analyze the event to verify the acceptability of continued operation. We will follow that course of action if Appendix "G" limits are exceeded at the Turkey Point Plant.

In our October 15, 1976 letter, we also stated that administrative controls would be used to prevent inadvertent overpressurization of the reactor coolant system by the safety injection accumulators. Those administrative controls would include de-energizing the accumulator isolation valve motors in the same manner utilized for power operation. Specific procedural verification of valve status and motor breaker status as now used to verify that the valves are open and de-energized for power operation will be incorporated in the plant procedures to verify that the valves are closed and de-energized.

The steady state flow capacities of typical pressurizer power operated relief valves and the mass injection rates for a typical 4 loop Westinghouse plant are presented in Figures 4 and 5 respectively. Note that the steady state relief capacity of a single pressurizer power operated relief valve is of the approximate capacity necessary to compensate for a steady state safety injection mass input. Although the steady state flow rates appear consistent, transient analysis will be necessary to assure the relief capability of the system. Figure 6 presents the typical flow vs. valve plug position relationships which will be incorporated in the analysis.

The "Reference Mitigating System" design, which incorporates the guidance of your letter, uses installed plant equipment as much as possible to avoid equipment procurement delays and provides the maximum pressure relief available without a major plant modification.

ATTACHMENT (Continued)

A testable relief valve system, as described above, coupled with increased administrative control of the accumulator isolation valves will provide a means to mitigate the consequences of an overpressurization event.