



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 163 TO FACILITY OPERATING LICENSE NO. DPR-31
AND AMENDMENT NO. 157 TO FACILITY OPERATING LICENSE NO. DPR-41

FLORIDA POWER AND LIGHT COMPANY

TURKEY POINT UNITS 3 AND 4

DOCKET NOS. 50-250 AND 50-251

1.0 INTRODUCTION

By Generic Letter (GL) 89-19 dated September 19, 1989, the NRC recommended that a system be provided to mitigate main feedwater overflow events for all pressurized water reactors that currently do not have such protection. This action was part of the technical resolution of Unresolved Safety Issue (USI) A-47, "Safety Implications of Control Systems in LWR Nuclear Power Plants." Furthermore, it was requested that all LWR plants modify their Technical Specifications (TS) to include the operability of the overflow protection systems that are provided in response to the GL on USI A-47.

By letter dated December 20, 1993, Florida Power & Light Company (FPL or the licensee) proposed license amendments to change the TS for the Turkey Point Nuclear Generating Units 3 and 4 (Turkey Point or the facility). The proposed changes would revise the TS to include steam generator (SG) water level high-high protection logic, instrumentation trip setpoints, and surveillance requirements.

There are no physical changes to the plant required as a result of the proposed license amendments. The instrumentation required for the SG Overflow Protection function is currently in place and is in use. This amendment simply formalizes the operability and testing requirements of the overflow protection system and prescribes the required actions if the SG overflow protection function is inoperable.

2.0 BACKGROUND

2.1 Description of the General Protection Requested by GL 89-19.

Overflow protection for each LWR consists of protection channels that initiate the termination of main feedwater flow to the SGs on sensing a high water-level condition. The overflow protection mitigates the consequences of main feedwater control system failures as an event which could lead to overflow conditions, as well as limiting the operating water level to within the bounds of the assumptions used in the safety analysis.

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GL 89-19 requested submittal of license amendments that encompass requirements for Limiting Conditions for Operation (LCO), Setpoints, and Surveillance Requirements which are commensurate with the safety actions required by the existing TS for similar functions.

2.2. Description of the Turkey Point Plant Configuration.

The SG Level Protection Channels I, II and III are designed to combine redundant sensor, independent channel circuitry, coincident trip logic and different parameter measurements so that a safe and reliable system is provided. The SG overfill protection at Turkey Point is initiated on an SG Water Level High-High signal, based on a two-out-of-three initiating logic, which is safety-related. Upon actuation, the system responds by: tripping the main Turbine (reactor trip will occur on a turbine trip); tripping the Main Feedwater (MFW) pumps; initiating feedwater isolation; and shutting the MFW regulating valves and the MFW regulating valve bypass valve. Use of the SG level protection system for the SG Water Level High-High trip is similar to its use for the SG Water Level Low-Low trip. As such, the proposed LCO requirements and surveillance requirements are similar.

As described in the GL, Turkey Point corresponds to a Westinghouse designed PWR Plant of a Group I plant design with a two-out-of-three initiating logic.

3.0 EVALUATION

Per GL 89-19, an acceptable overfill protection system design is one which (a) is separate from the feedwater control system so that it is not powered from the same source, (b) is not located in the same cabinet as the feedwater control system, and (c) the cables are not routed so that a fire is likely to affect both the feedwater control system and the overfill protection system simultaneously. Common-mode failures, however, that could disable overfill protection and the feedwater control system, but would still cause a feedwater pump trip, are considered acceptable failure modes.

Enclosure 2 to GL 89-19 identified different groups of plant designs and provided guidance for acceptable designs. For Westinghouse-designed PWR plants, Group I was designated as plants that have an overfill-protection system initiated on a steam generator high-water-level signal based on two-out-of-four initiating logic which is safety grade, or a two-out-of-three initiating logic which is safety grade but uses one out of the three channels for both control and protection. The system isolates MFW by closing the MFW isolation valves and tripping the MFW pumps. The staff concluded that this type of design was acceptable, provided that

- (1) the overfill protection system is sufficiently separated from the control portion of the MFW control system so that it is not powered from the same power source, not located in the same cabinet, and not routed so that a fire is likely to affect both systems, and
- (2) the plant procedures and TS include requirements to periodically verify operability of this system.



With respect to item (1), the licensee stated the following in the March 19, 1990 response to GL 89-19.

SG level protection channels I, II, III, and IV are designed to combine redundant sensors, independent channel circuitry, coincident trip logic and different parameter measurements so that a safe and reliable system is provided that is single-failure proof.

Channels I and II are used for level protection while channel IV is used for level control. Channel III is used for both protection and control. The SG overfill protection is initiated on a SG High-High level signal, based on a two-out-of-three initiating logic which is safety related.

The SG protection and portions of the control systems utilize shared power sources. However, sufficient power and logic diversity exists to ensure SG overfill protection.

Protection channels (I, II and III) are located in separate analog racks, providing adequate physical protection. The major instruments are arranged to physically separate the protection equipment from the control equipment. Power cable routing was not specifically reviewed but, based on the vintage of the units, there is not reasonable assurance that present day separation criteria were used. However, based on the total system design, FPL believes that adequate protection exists such that the effects of environmental factors including fire, electrical transients, and physical accidents are reduced. Channel III electrical separation between protection and control is achieved by employing isolation amplifiers. Redundant HVAC systems are provided for equipment reliability. Redundant trains "A" and "B" ensure that the feedwater pumps are tripped and that the main and by-pass feedwater control valves are closed in a High-High SG level condition.

With respect to item (2) the licensee stated that the surveillance requirements proposed by this amendment are consistent with the requirements of the SG Water Level Low-Low trip.

Based on the above, the staff considers that the system described and the proposed amendment meets the conditions specified in GL 89-19.

The plant's existing TS for systems that initiate safety actions define requirements which the NRC has previously reviewed and found to be in conformance with the applicable regulatory requirements for TS; namely, those set forth in 10 CFR 50.36 in regard to LCO, Limiting Safety System Settings (Setpoints), and Surveillance Requirements. The proposed TS for the overfill protection system is equivalent to similar existing TS for Auxiliary Feedwater actuation on low-low SG water level. The proposed TSs for the overfill protection system ensure operability of the system at appropriate times, are consistent with existing requirements for systems providing a commensurate level of safety and are, therefore, acceptable.



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4.0 STATE CONSULTATION

Based upon the written notice of the proposed amendments, the Florida State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (59 FR 10007). Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

Based on the staff evaluation in Section 3.0 above, the staff concludes that the proposed Technical Specifications changes are acceptable.

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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