



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 151 TO FACILITY OPERATING LICENSE NO. DPR-67
FLORIDA POWER AND LIGHT COMPANY
ST. LUCIE PLANT, UNIT NO. 1
DOCKET NO. 50-335

1.0 INTRODUCTION

By letter dated December 20, 1996, and supplemented February 13, and April 17, 1997, Florida Power & Light Company (FPL) requested changes to the St. Lucie Unit 1 Technical Specifications (TS) to delete a footnote associated with TS 2.1.1, "Reactor Core Safety Limits." This footnote required reactor thermal power to be limited to 90% of 2700 Megawatts for operation beyond 7000 Effective Full Power Hours (EFPH) for Cycle 14. This limit had been imposed as a result of increased tube plugging of the Unit 1 steam generators. The February 13, and April 17, 1997, letters provided clarifying information and did not change the scope of the December 20, 1996, application and the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

Amendment No. 145 to the St. Lucie Unit 1 TS was issued July 9, 1996, to permit plant operation with up to 30% (average) steam generator tubes plugged (SGTP) and 345,000 gpm minimum Reactor Coolant System (RCS) flow. In support of this amendment, FPL had determined that conservatism in the existing small break loss-of-coolant accident (SBLOCA) analysis, which had previously been performed for conditions corresponding to 25% SGTP and 355,000 gpm RCS flow, would offset any adverse effects due to the increased SGTP and decreased reactor coolant system flow for full power operation up to 7000 EFPH. To offset any adverse effects for operation beyond 7000 EFPH, it was determined that limiting core thermal power to 90% of rated thermal power would provide sufficient margin to ensure 10 CFR 50.46 conformity for the remainder of operating Cycle 14.

Subsequent to issuance of Amendment No. 145, a reanalysis of the SBLOCA was completed, using input assumptions corresponding to 30% (average) SGTP and 345,000 gpm RCS flow. The licensee submitted that analysis in support of its request to operate St. Lucie Unit 1 at the full (2700 Megawatts thermal) rated power for the remainder of Cycle 14.

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3.0 EVALUATION

The SBLOCA was reanalyzed to support Cycle 14 operation at 100% power for the entire operating cycle. This analysis was performed by Siemens Power Corporation (SPC), using an NRC-approved SBLOCA evaluation model (Reference 1). The reanalysis was done with changes to input assumptions with respect to the loop seal clearing and the location of cold leg injection point. The loop seals in the broken loop and one of the intact loops were biased to remain plugged. In the current analysis of record (Reference 2), the loop seal in the broken loop did not stay plugged. Also, in the reanalysis, the safety injection point was moved a node away from the reactor coolant pump to represent a more realistic configuration.

In the February 13, 1997, supplement, the licensee provided clarifying information concerning these changes. This information consisted of a discussion by SPC in which it was stated that SPC performed sensitivity calculations to determine the appropriate loop seal clearing behavior. SPC discussed these calculations and the effect on the fuel Peak Cladding Temperature (PCT). Based on the results of these calculations, the analysis assumptions were changed such that the loop seals for both the broken loop and one of the intact loops remained plugged. In a licensee submittal dated March 6, 1997, this change was quantified as an increase in the PCT. The staff finds this acceptable for the St. Lucie Unit 1 application because the assumptions are based on the results of the sensitivity studies.

With regard to the noding change, the licensee's submittal indicated that the location of the cold leg injection point node was moved to conform with the model described in Reference 1. The licensee also indicated that the injection point more realistically reflects the actual plant installation. The March 6, 1997, submittal quantified this change as a decrease in the PCT. The staff evaluated this change for application at St. Lucie Unit 1 and determined it was acceptable for this specific use, because it appears to be more realistic than the previous model and retains an acceptable amount of conservatism. The final estimated PCT, including consideration of the above changes, remained below 2200 degrees F.

In the supplement dated April 17, 1997, the licensee addressed a postulated SBLOCA scenario in which RCP loop seals would refill or remain full of water and in which conditions would be established resulting in sustained long-term core uncover. For this scenario and set of conditions, the postulated concern is that 10 CFR 50.46(b) cladding oxidation, core geometry, and long-term cooling requirements might not be satisfied.

The licensee described the results of its assessment of the scenario and concluded that, in the present plant design configuration, St. Lucie is not vulnerable to the scenario. The licensee also described technical specifications and emergency operating procedure provisions which would address the specific SBLOCA scenario of concern, and prevent conditions of sustained long-term core uncover from occurring. In discussions with the NRC staff on May 13, 1997, the licensee proposed a License Condition which would require procedural guidance to be in place to instruct operators to implement actions which are designed to mitigate a SBLOCA prior to a calculated time of

sustained core uncover. With this license condition in place, the licensee could make changes to the SBLOCA procedures described in the April 17, 1997 letter, provided such changes continue to provide adequate guidance to the operators. Changes to the procedures, pursuant to existing plant procedures, would be documented and available for auditing during routine inspections by the NRC staff. Consideration for removal of this license condition will be given upon application and contingent upon the results of SBLOCA analysis using an acceptable evaluation model that explicitly simulates the scenario of concern as described in the April 17, 1997, letter. The staff finds that the licensee's submittal resolves near-term concerns associated with this issue.

Since this SBLOCA scenario is not simulated by the licensee's current model of record, 10 CFR 50.46 requires licensees to submit a proposed schedule for providing a reanalysis or taking other action as may be needed to show compliance with 10 CFR 50.46 requirements. The licensee stated in the April 17, 1997, supplement that St. Lucie Unit 1 would have an SBLOCA model that would be capable of simulating this scenario beginning with Cycle 16. The staff finds that the licensee has satisfied the requirement of 50.46(a)(3)(ii) to propose a schedule for correcting an error in the SBLOCA evaluation model.

The licensee's assessments discussed above are based on a model (Reference 1) generically approved by the NRC on October 3, 1994, and, with two modelling changes, applicable to these St. Lucie calculations. As discussed above, the staff finds these changes acceptable based on information provided by the licensee. These assessments and the licensee's provisions to address the SBLOCA long-term core uncover scenario described above demonstrate that all the criteria of 10 CFR 50.46 are met for St. Lucie Unit 1 small break LOCA analyses. Therefore, the proposed change to delete the footnote associated with TS 2.1.1 is acceptable, based on the results of the SBLOCA analyses.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to 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 amendment involves 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 amendment involves no significant hazards consideration and there has been no public comment on such finding (62 FR 2190). Accordingly, the amendment meets 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 amendment.

6.0 CONCLUSION

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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: May 16, 1997

REFERENCES

1. Exxon Nuclear Company Evaluation Model-EXEM PWR Small Break Model, XN-NF-82-49(P)(A), Revision 1, Supplement 1 and Correspondence, December 1994.
2. Siemens Power Corporation - Nuclear Division St. Lucie Unit 1 Small Break LOCA Analysis, EMF-92-148, Revision 1, May 1994.