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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 45 TO FACILITY OPERATING LICENSE NO. DPR-67

FLORIDA POWER & LIGHT COMPANY

ST. LUCIE PLANT, UNIT NO. 1

DOCKET NO. 50-335

Introduction:

Due to TMI related changes in the operation of St. Lucie Unit 1 (plant), specifically automatic initiation of Auxiliary Feedwater and manual tripping of reactor coolant pumps (RCP) on safety injection, Florida Power & Light Company (FPL or the licensee) has reanalyzed the Main Steamline Break (MSLB) event. FPL's analysis and associated Technical Specification changes were submitted on July 23, 1981. Additional information was provided by FPL's letters dated September 4 and 11 and October 20, 1981. We have evaluated FPL's submittals.

Evaluation:

I. Analysis

The MSLB event is analyzed to assure that the primary coolant system can be maintained in safe status for a range of steamline breaks. We used the criteria of Standard Review Plan section 15.1.5 in evaluating the MSLB analysis. Conservative assumptions for core burnup, scram characteristics, core flow, loss of offsite power, power level, and the worst single active component failure are required.

The MSLB event was analyzed at both hot zero power and 2754 Mwt (Ref. 1&4). The currently authorized maximum reactor core steady state power level is 2560 Mwt. In a separate action FPL, on November 14, 1980, requested authorization to operate the plant at a stretch power level of 2700 Mwt. The subject MSLB analysis, which assumes an initial power level of 2754 Mwt. (102% of 2700 Mwt), updated the stretch power submittal. Although we have not yet approved the stretch power request, this MSLB analysis envelopes and is acceptable for operation at 2560 Mwt.

The MSLB analyses assume that the reactor coolant pumps are tripped upon receipt of the low pressure (1578 psi) safety injection actuation signal. This is in accordance with TMI action plan requirements and we find that this is conservative.

Fuel and core characteristics are based on conservative end-of-cycle values with the most negative moderator coefficient of reactivity allowed. This maximizes the potential for return-to-power following the primary system cooldown initiated by the steamline break. In addition, the most reactive control element assembly (CEA) was assumed to be stuck in the fully withdrawn position.

Main feedwater flow is isolated 60 seconds after the steamline break, and auxiliary feedwater flow is initiated 180 seconds after the safety injection actuation signal. Normally, main feedwater is isolated automatically following the trip signals, so the delayed isolation assumed permits more heat transfer from the primary system, which is conservative.

The results for the full power analysis show that the pressures in the primary and secondary systems do not exceed 110% of design pressure. The peak post-trip power was calculated to rise to 14% of rated power. The minimum departure from nucleate boiling ratio (DNBR) experienced during this event was 1.27 (Ref. 2). This led to 0.5% predicted fuel failure, with resultant dosage well below the 10 CFR 100 guidelines.

FPL has provided analyses of the MSLB event for St. Lucie Unit 1. The assumptions, methods, and results provided in the analyses are in conformance with SRP Section 15.1.5. We conclude that the MSLB analyses and associated operating restrictions (discussed below) are acceptable for St. Luice Unit 1.

II. Technical Specifications

A. Shutdown Margin for Modes 1, 2, 3 and 4

The shutdown margin for $T_{ave} > 200^{o}F$ has been increased from 3.3 percent $\Delta k/k$ for Cycle 4 to 5.0 percent $\Delta k/k$ for Cycle 5 to yield acceptable consequences from a steamline break event initiated at no load conditions. The staff has reviewed the CEA reactivity worths and allowances for Cycle 5 presented in Reference 3 and concludes that sufficient CEA worth is available for this required shutdown margin. This change is, therefore, acceptable. The pages affected are 3/4 1-1, B3/4 1-1 and 3/4 4-1.

B. Surveillance Requirements for Shutdown Margin in Modes 3 or 4

During the calculation of shutdown margin for modes 3 and 4, FPL proposes that the highest reactivity worth CEA need not be assumed to be stuck in the fully withdrawn position if all CEAs are verified to be fully inserted. This change will only exempt the stuck rod assumption when complying with the surveillance requirements of paragraph e of Technical Specification 3.1.1.1 (for modes 3 and 4) upon verification of all CEAs fully inserted. Once CEA withdrawal has commenced during reactor startup, the stuck CEA penalty will be included in the calculation of shutdown margin and the RCS boron concentration will be determined accordingly. We find this acceptable. The page affected is 3/4 1-2.

C. Steam Generator Pressure - Low Trip and Bypass Setpoints

To minimize the consequences of a MSLB event the setpoint for the steam generator pressure - low trip has been increased from $\geq$ 500 psia to $>$ 600 psia. This would cause CEA's to drop into the core earlier in the accident. The bypass setpoint of 585 psig has been increased to 685 psig to be consistent with the new trip value. The revised trip setpoint is consistent with the MSLB analysis and is acceptable. The pages affected are 2-4 (Table 2.2-1), 2-5 (Table 2.2-1 Notation), B2-5, 3/4 3-4 (Table 3.3-1 Notation), 3/4 3-12 (Table 3.3-3 Notation) and 3/4 3-14 (Table 3/3-4).

Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: November 3, 1981

References

1. FPL letter to D. Eisenhut, NRC, from R. E. Uhrig, dated July 23, 1981.
2. FPL letter to R. A. Clark, NRC, from R. E. Uhrig, dated September 4, 1981.
3. FPL letter to R. A. Clark, NRC, from R. E. Uhrig, dated September 11, 1981.
4. FPL letter to D. G. Eisenhut, NRC, from R. E. Uhrig, dated October 20, 1981.