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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO.43 TO FACILITY OPERATING LICENSE NO. DPR-23
CAROLINA POWER AND LIGHT COMPANY
H. R. ROBINSON STEAM ELECTRIC PLANT UNIT NO. 2
DOCKET NO. 50-261

Introduction

By letter dated April 18, 1979, supplemented by letter dated August 8, 1979, Carolina Power and Light Company (the licensee) requested a change to the Technical Specifications for H. B. Robinson Unit 2. The proposed change would allow a small positive moderator temperature coefficient (MTC) at power levels below full power.

Discussion

At the beginning of the fuel cycle, with no xenon and low power level, a positive MTC can exist. To compensate for this, control rods must be inserted during power escalation. This can complicate, or even prevent, an expeditious power ascension within the rod insertion limits.

After a short period of power operation, the MTC becomes negative due to reduced boron concentration. The proposed Technical Specification allows critical operation with an MTC no greater than +2.0 pcm/°F below 50% power, linearly decreasing to 0.0 pcm/°F at 100% power.

Evaluation

The model used for plant transient analysis for H. B. Robinson 2 is described in Exxon Report XN-75-14. This model was reviewed and accepted by the staff when Robinson 2 was fueled by Exxon in 1975. For that analysis, the steady state DNBR was forced to a value of 1.86 to match results from a previous fuel vendor analysis so as to provide a basis for comparison. This agreement was forced by increasing the axial peaking factor assumed in the analysis above its actual value until the DNBR matched the target value.

For the analysis supporting operation with a positive MTC, as presented in the licensee submittal of April 18, an appropriately conservative peaking factor was used, and the steady-state DNBR was determined to be 2.29. The same assumptions (including axial peaking factor) were used in the transient analysis.

The MDNBR for the transients are therefore higher than those for the comparable events in XN-75-14, despite the fact that a positive MTC was used. The staff considers that this approach is acceptable since the peaking factors used are conservative relative to operating limits.

The transients that were reanalyzed in the submittal were those which were previously shown to become more limiting with a less negative MTC. These include events such as loss of forced coolant flow and the locked rotor event. The positive MTC results in a small reduction (.07) in MDNBR, with the most limiting case being the locked rotor event, with a MDNBR of 1.58. This is well above the limit of 1.30. This analysis was performed at 102% power, with an MTC of +2.0 pcm/°F to bound the allowable conditions of +2.0 pcm/°F at 50%, decreasing to +0.0 pcm/°F at 100% power.

Other transients which might be adversely affected by a positive MTC, such as loss of load and rod withdrawal, were also reviewed. These transients were previously shown to be less limiting than the locked rotor event. For these events, sufficient thermal lag exists so that the rod heat flux is not increased before the scram even though neutron power does increase. Thus, the MDNBR for these transients is not reduced by operation with a positive MTC.

All other plant analyses are considered to be applicable to operating with the proposed Technical Specifications since either the performance is improved, or it is not affected by the small positive MTC allowed at less than full power.

Other changes have been proposed by the licensee to the Technical Specifications which are administrative in nature and require no technical review (i.e., delete references to deleted early cycle requirements, correct figures and clarify wording). We find these administrative changes acceptable.

Based on our review, we conclude that analysis of plant transients has shown that operation with a small positive moderator temperature coefficient at less than full power does not lead to violation of any safety limits. Therefore, the proposed Technical Specification change is considered acceptable.

Environmental Considerations

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: October 26, 1979