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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 54 AND 43 TO

FACILITY OPERATING LICENSE NOS. NPF-76 AND NPF-80

HOUSTON LIGHTING & POWER COMPANY

CITY PUBLIC SERVICE BOARD OF SAN ANTONIO

CENTRAL POWER AND LIGHT COMPANY

CITY OF AUSTIN, TEXAS

DOCKET NOS. 50-498 AND 50-499

SOUTH TEXAS PROJECT, UNITS 1 AND 2

1.0 INTRODUCTION

By application dated August 5, 1993, Houston Lighting & Power Company, et. al., (the licensee) requested changes to the Technical Specifications (Appendix A to Facility Operating License No. NPF-76 and NPF-80) for the South Texas Project, Units 1 and 2. The proposed changes would revise Technical Specification (TS) Section 3.1 (Reactivity Control Systems), Section 3.5 (Emergency Core Cooling Systems), and Section 3.9 (Refueling Operations). These sections would be revised to allow an increased boron concentration in the refueling water storage tank (RWST) and related changes. The licensee requested this change to support the use of more reactive core loads in order to achieve longer fuel cycle lengths. This evaluation only addresses changes in boron concentration and boric acid storage volume requirements; it does not address the use of more reactive cores. A separate request should be submitted if the licensee wishes to use more reactive core loads than currently allowed.

The licensee proposed the following specific changes: (1) revise the minimum required soluble boron concentration in the reactor coolant system and refueling canal during refueling (Mode 6) from 2500 ppm (parts per million) to 2800 ppm (TS Section 3.9.1); (2) revise the soluble boron concentration range required in the RWST from 2500 to 2700 ppm to a range of 2800 to 3000 ppm (TS Sections 3.1.2.5, 3.1.2.6, and 3.5.5); (3) revise the soluble boron concentration range required in the safety injection (SI) accumulators from 2400 to 2700 ppm to a range of 2800 to 3000 ppm (TS Section 3.5.1); (4) revise the required minimum contained water volume in the Boric Acid Storage System during refueling from 2900 gallons to 3200 gallons (TS Section 3.1.2.5).

The original change request of January 14, 1993 was granted on May 25, 1993, which had an implementation of the third refueling outage for Unit 2. The implementation for Unit 1 was not granted at that time. The staff's letter stated that for Unit 1, HL&P must reapply for the necessary final implementation amendments and state any changes that have been made in the intervening period which would affect the original application or the NRC staff's original safety evaluation.

The updated change request of August 5, 1993, only changed the implementation from "Unit 1 fifth refueling outage" to "prior to Unit 1 restart from the current (fourth) refueling outage." After review, HL&P determined that no changes had been made that would affect the original application or the NRC staff's original safety evaluation and it involves no significant hazards consideration. Therefore, the safety evaluation prepared for the original amendment is appropriate for this amendment.

2.0 EVALUATION

The licensee presented the results of an evaluation of the impact of the proposed changes on the reactor containment building analyses presented in Chapter 6 and the transient analyses presented in Chapter 15 of the South Texas Project Updated Final Safety Analysis Report (UFSAR). The evaluation was conducted by the Westinghouse Electric Corporation, as referenced in the licensee's submittal. The proposed change did not adversely affect the Chapter 6 analyses. The only impact of the proposed changes on the Chapter 15 analyses is a revision of the post-LOCA time to switchover to hot leg recirculation to prevent boron precipitation in the reactor vessel.

LOCA Analyses

The licensee stated that no credit is taken for boron concentration in the core for the analysis of the performance of the emergency core cooling system (ECCS) for large or small breaks. Therefore, the LOCA analyses contained in the UFSAR are not affected by the proposed changes. The NRC staff has reviewed the licensee's determination of the effects of the proposed changes on the UFSAR LOCA analyses and concludes that the proposed changes do not affect these analyses.

Post-LOCA Analyses

Since the large break LOCA analysis does not take credit for insertion of the control rods (reactor subcriticality during a large break LOCA is provided by void formation in the core), long-term reactor subcriticality must be maintained by borated water alone. The water provided by the RWST and accumulators must contain enough boron, when combined with other borated and non-borated water sources in the reactor building sump, to maintain the reactor subcritical during the long-term recirculation phase of a LOCA.

The licensee stated that increasing the boron concentration in the RWST and accumulators would tend to make the reactor more subcritical, so the current analysis is conservative with respect to the proposed changes. The licensee

stated that this conclusion is confirmed with each refueling via the normal reload evaluation process. The staff has reviewed the proposed changes and concludes that sufficient boron will be available in the containment sump water following a LOCA to ensure that the core will remain subcritical.

After a LOCA, boric acid solution injected by the ECCS will concentrate in the core region due to water boil-off. Continued concentration buildup would cause boric acid to precipitate in the core region, which could potentially have an adverse effect on the ability to cool the core. In order to prevent boric acid precipitation, core cooling should be switched from cold leg to hot leg recirculation at some time after the initiation of the LOCA. The switchover time is dependent on the concentration of boric acid in the safety injection water. The licensee evaluated the increase in boron concentration with respect to the potential for boric acid precipitation in the core. The analysis resulted in a reduction in the switchover time from 13.6 hours to 10.5 hours. The staff has reviewed the proposed change and finds the modified hot leg switchover time acceptable.

The increase in boric acid concentration in the RWST and the SI accumulators affects the pH values of the containment spray and containment sump water. The licensee analyzed the effect of the proposed changes on the sump solution pH and determined that it remains within the acceptable range of 7.0 to 9.5. The licensee stated that this remains within the range used in the analysis of containment spray iodine removal effectiveness. The staff has reviewed the information provided by the licensee regarding the effect of the proposed changes on sump pH and finds it acceptable.

Non-LOCA Analyses

The licensee stated that the minimum RWST and SI accumulator boron concentrations currently in the technical specifications are assumed in the UFSAR analyses for secondary system failures resulting in the addition of significant positive reactivity (e.g., steamline breaks and inadvertent opening of a steam generator relief or safety valve). Boron is used to mitigate these reactivity excursions; therefore, the higher boron concentration provided by the proposed changes improves the results of the analyses for these transients. The staff has reviewed the licensee's determination of the effects of the proposed changes on the UFSAR non-LOCA analyses and concludes that the proposed changes are acceptable.

Boric Acid Solubility Analysis

The proposed change will increase the boric acid concentration in the RWST, SI accumulators, and associated piping. This increase in concentration will increase the minimum temperature at which the boric acid will precipitate. The licensee has verified that for a solution of 3000 ppm boron, the precipitation temperature is below that to which the fluid systems affected are ever expected to be exposed. The staff has reviewed the licensee's determination of the effects of the proposed changes on the solubility of boron in the affected fluid systems and concludes that the proposed changes are acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Texas State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 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 (58 FR 46236). 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.

5.0 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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