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AUTH.NAME AUTHOR AFFILIATION
VAUGHN,G.E. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
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SUBJECT: Application for amend to License DPR-23,changing required refueling shutdown margin accomplished w/required min boron concentration of 1950 ppm from 10% delta K/K to 6% delta K/K.

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Carolina Power & Light Company
P.O. Box 1551 • Raleigh, N.C. 27602

OCT 31 1991

G. E. VAUGHN
Vice President
Nuclear Services Department

SERIAL: NLS-91-264

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
REQUEST FOR LICENSE AMENDMENT - REDUCTION OF REQUIRED SHUTDOWN MARGIN

Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Parts 50.90 and 2.101, Carolina Power & Light Company (CP&L) hereby requests a revision to the Technical Specifications (TSs) for the H. B. Robinson Steam Electric Plant, Unit No. 2.

This amendment request changes the required refueling shutdown margin accomplished with a required minimum boron concentration of 1950 ppm from 10 percent delta K/K to 6 percent delta K/K. The present 10 percent limit was a value selected when the TSs were originally issued. Increases in core average enrichment and cycle length have resulted in higher critical boron concentrations, which ultimately encroach on the shutdown margin achievable at refueling conditions. The proposed change to 6 percent delta K/K at 1950 ppm minimum boron concentration maintains the ability to keep the reactor subcritical in the refueling condition with all rods inserted. The ability of 1950 ppm to keep the core subcritical with all rods withdrawn (as determined by the post-LOCA subcriticality event analysis) will be retained. The change to 6 percent delta K/K will provide a TS similar to other recently licensed Westinghouse plants.

Enclosure 1 is a Supporting Analyses/Safety Analyses.

Enclosure 2 is a Significant Hazards Determination.

Enclosure 3 is marked-up TS pages.

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If you have any questions concerning this request, please contact Mr. R. W. Prunty at (919) 546-7318.

Yours very truly,

G. E. Vaughn

JSK/jbw (1332RNP)

Enclosures

cc: Mr. S. D. Ebneter
Mr. L. Garner
Mr. R. Lo
Mr. G. Shealy (SC)
Attorney General (SC)

G. E. Vaughn, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

Lewis S. Rowell
Notary (Seal)

My commission expires: 7/12/94

LEWIS S. ROWELL
NOTARY
PUBLIC
WAKE COUNTY, N.C.

ENCLOSURE 1

Supporting Analyses/Safety Analyses

The Technical Specification (TS) basis states that a boron concentration of 1950 ppm is sufficient to maintain the reactor subcritical by at least 10 percent delta K/K at refueling conditions with all rod cluster control assemblies (RCCAs) inserted in the core. While this was not unduly restrictive for the original core designs in the late 1960s and early 1970s, the increased enrichment licensed in Cycles 10 and 13 results in a higher critical boron concentration. Today's longer cycle lengths have approached the 10 percent delta K/K limit at the refueling concentration of 1950 ppm. The Beginning of Cycle reactivity, energy content, and/or core average enrichment are all increasing with successive reloads. Siemens Nuclear Power has indicated that 1950 ppm does not fulfill the 10 percent delta K/K requirement for the next refueling for a nominal 355 EFPD Cycle 14 length.

A refueling Shutdown Margin of 6 percent delta K/K safely provides the ability to maintain the core subcritical and avoids less reasonable alternative measures to maintain compliance with 10 percent:

- Limiting cycle length,
- Requiring a higher minimum Refueling Water Storage Tank boron concentration,
- Using burnable poison rod assemblies, or
- Using extraordinary amounts of gadolinia in the fuel as a burnable poison.

Six percent delta K/K is chosen as a new value that is less restrictive than the current 10 percent, but still conservative relative to the value for other Westinghouse plants. As such, this TS change will give H. B. Robinson a refueling Shutdown Margin requirement more in line with many of the other Westinghouse plants in the country. Adequate time would still be available to respond to a boron dilution event.

The statements in the Basis that the 1950 ppm Refueling Boron Concentration is sufficient to keep the core subcritical without control rods are being retained. A brief note is being added to explain that this is similar to (but not quite as restrictive as) the post-LOCA boron requirement.

ENCLOSURE 2

Significant Hazards Determination

CP&L has reviewed the proposed change against the criteria of 10CFR50.92 and determined that the change does not constitute a significant hazard based on the following considerations:

1. Operation of the facility, in accordance with the proposed amendment, would not involve a significant increase in the probability or consequences of an accident previously analyzed.

   Since the purpose for Shutdown Margin during refueling is protection against accidental criticality, Inadvertent Boron Dilution during Refueling is the only Updated FSAR Chapter 15 event pertinent to the parameter being changed. Because changing the shutdown reactivity associated with the same boron concentration of 1950 ppm does not affect the boration/dilution equipment or procedures, the probability that an accidental dilution will occur cannot be affected.

   The purpose of analysis of Inadvertent Boron Dilution in UFSAR Section 15.4.6 is to show that there is sufficient operator response time to avoid accidental criticality. In other words, the calculation is focused on preventing instead of withstanding an accidental criticality. The consequences of this event are not increasing because the accident analysis will continue to make an off-site dose calculation unnecessary.

2. Operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated because inadvertent criticality is the only relevant concern and:

   - Changing the shutdown reactivity requirement associated with the boron concentration of 1950 ppm does not affect the boration/dilution equipment or procedures.

   - Control rods are intentionally withdrawn from fuel assemblies during refueling only one at a time, and the reactivity "worth" of an individual RCCA will always be much less than 6 percent delta K/K.

   - The requirement that the 1950 ppm be enough to keep the core subcritical with no control rods present is being retained.

   - Six percent SDM is more than enough to cover any uncertainty in fuel assembly placement allowed by fuel shuffle procedures.

3. Operation of the facility, in accordance with the proposed amendment, would not involve a significant reduction in a margin of safety.

Since the only purpose for Shutdown Margin during refueling is protection against accidental criticality, Inadvertent Boron Dilution during refueling is the only pertinent FSAR Chapter 15 event. Although analysis in UFSAR does not explicitly mention initial refueling shutdown margin in terms of reactivity, this change can indirectly affect the analysis by allowing a higher refueling critical boron concentration. Since this represents a less restrictive constraint for the analysis at this mode, the estimated time to complete loss of all available shutdown margin (which in this case corresponds to criticality) for Refueling for future core loadings may be less, more closely approaching those of other modes (e.g., Cold Shutdown). In other words, because the acceptance criteria for Inadvertent Boron Dilution is defined in terms of the time available for the operator to terminate the dilution flow before the core goes critical, and because this change will allow the calculation of a shorter "time" for Refueling, the calculated margin to the NRC acceptance limit for this accident may be considered to decrease.

In considering "Time to Loss of Shutdown Margin" as a measure of the "margin of safety," the impact of reducing the required shutdown margin from 10 percent to 6 percent is <u>not</u> <u>significant</u> for several reasons:

(1) As noted, the minimum refueling boron concentration of 1950 ppm is not changing.

(2) Even in the unlikely case that the critical boron concentration increases to the new limit (i.e., 1950 ppm comes to correspond to 6 percent delta K/K), more than half of the original shutdown margin is retained. In rough terms, reducing the shutdown margin by 40 percent can be expected to result in a similar reduction in the calculated "Time to Loss of Shutdown Margin." The 68.4 minutes previously calculated for Cycle 14 for the refueling condition can be reduced considerably and still meet the 30-minute minimum allowable operator response time presented in our Cycle 10 SER as an acceptance criterion. Therefore, a 6 percent delta K/K is consistent with the acceptance limit for our present analysis of Inadvertent Boron Dilution for the refueling condition.

(3) In a practical sense, it is the "Time" estimation in UFSAR (rather than the extent of initial negative reactivity) that provides the assurance that the core will not achieve criticality in the unlikely event of accidental dilution. This more meaningful commitment in UFSAR Section 15.4.6 to maintain adequate operator response time is unchanged.

In summary, since this change will slightly reduce the extent to which the core is required to be subcritical during refueling, it does result in a small increase in the susceptibility to inadvertent criticality. However, maintaining the same acceptance criteria for analysis of Inadvertent Boron Dilution ensures that there is no significant reduction in the margin of safety with respect to this accident. Likewise, the proposed Refueling Shutdown Margin of 6 percent is more than adequate to accommodate the other credible reactivity challenges represented by movement of core components.