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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 72 TO FACILITY OPERATING LICENSE NO. NPF-30

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

1.0 INTRODUCTION

In a letter dated January 14, 1992 (Ref. 1), Union Electric Company (the licensee) requested changes to Technical Specifications (TS) that are primarily revisions regarding the Limiting Condition for Operation (LCO), the Surveillance Requirements (SR), and the associated Bases for Power Distribution Limits TS 3/4.2 in order to implement Relaxed Axial Offset Control (RAOC) for Cycle 6. The RAOC methodology supporting these changes is in accordance with WCAP-10216-PA (Ref. 2) which has been previously reviewed and approved by the N[illegible] (Ref. 3).

Background

Westinghouse plants initially operated under an axial power distribution control and load following procedure. This methodology used the Constant Axial Offset Control (CAOC) strategy described in Westinghouse Topical Report WCAP-10216(P) dated February 28, 1983 (Ref. 4). The strategy assures that peaking factors and departure from nucleate boiling ratio (DNBR) will remain below the limiting values assumed as input for accident analyses. The CAOC strategy achieves this by requiring plant operation to maintain the axial flux difference (AFD or delta-I) within a specified band (typically +/-5% for low burnup initial cores) around a measured target value during normal operation (including power change maneuvers).

The AFD is a measure of axial power distribution skewing to the top or bottom half of the core. The limits on AFD assure that the Heat Flux Hot Channel Factor $F_Q(Z)$ is not exceeded during either normal operation or in the event of xenon redistribution following power changes. By controlling the axial power distribution, the possible skewing of the axial xenon distribution is limited, minimizing xenon oscillations and their effects on the power distribution.

Specific plants have varying degrees of margin to the peaking factor limits which can be supported by CAOC. Westinghouse developed the RAOC methodology to more directly determine the allowed band of delta-I operation required to support any plant-specific peaking factor limit. This strategy was developed to provide larger control band widths and more operator freedom than with

Constant Axial Offset Control (CAOC). RAOC provides wider control bands, particularly at reduced power, by effectively utilizing some of the available core margin to the peaking factor limits specified in the Core Operating Limits Report (COLR). The wider operating space increases plant availability by allowing quicker plant startups and increased operating flexibility without reactor trip or reportable occurrences.

The staff has approved RAOC for referencing in licensing actions by a letter to E. P. Rahe (W) from C. Thomas (NRC), "Acceptance for Referencing of Licensing Topical Report WCAP-10216(P)(NS-EPR-2649)," dated February 28, 1983.

2.0 EVALUATION

The affected sections of the Technical Specifications are Sections 3/4.2.1, 4.2.2.2 through 4.2.2.4, and 6.9.1.9, Table 2.2-1 and Figure B 3/4.2.1, and the associated Bases Section 3/4.2.1. The changes have all been made in accordance with the TS outlined in WCAP-10216PA. Cycle-specific evaluations are made to determine if the allowable delta-I band curve requires revision (by COLR update or Technical Specification change). The procedure outlined in WCAP-10216-PA was used for the analysis performed for Cycle 6 of the Callaway Plant.

The current CAOC-based Technical Specification 3.2.1, via the COLR, specifies a target band of (+12%, -7%) for normal operation in Mode 1 above 15% rated thermal power (RTP). This target band is applicable only through Cycle 5 EOL conditions and was changed from (+8%, -12%) via Revision 1 of the COLR (ULNRC-2551 dated January 29, 1992).

The RAOC changes allow an AFD operating space relaxation, in Mode 1 above 50% RTP, to (+12%, -15%) delta-I at 100% RTP and linearly increasing to (+26%, -30%) delta-I at 50% RTP. 1 surveillances, consistent with the current Technical Specification 3.2., , are included to assure that the AFD of the operable excore channels are updated periodically to account for indication changes due to burnup.

Surveillance Requirements 4.2.2.2. and 4.2.2.4.b are revised to require Limiting Condition for Operation (LCO) 3.2.2 to be evaluated against the measured $F_Q(Z)$ after accounting for fuel manufacturing tolerances and flux map measurement uncertainty.

The footnote for Surveillance Requirement 4.2.2.2.d.1 is modified to clarify the timing required for obtaining a power distribution map during startup at the beginning of each cycle and to state that extended operation is defined as the expected operation at a power level for greater than 72 hours.

Surveillance Requirement 4.2.2.2.f.2.a is added to provide the option of an AFD operating space reduction while maintaining the same surveillance power level. This revision is also consistent with WCAP-10216-PA.

Surveillance Requirements 4.2.2.3.a and 4.2.2.4.c are revised to define k(z) and $F_Q^M(Z)$, as done in Specification 4.2.2.2.c. For Restricted AFD Operation (RAFDO) limits, Surveillance Requirement 4.2.2.4.f.1 is added which allows a return to normal operation in the event that sufficient margin is not available to remain in RAFDO.

Technical Specification 6.9.1.9 is revised to reflect the change to RAOC, i.e., RAFDO only target band and RAOC references. Figure B3/4.2-1 is deleted since it is not applicable to RAOC operation. The basis for AFD B3/4.2.1 is also modified to describe how RAOC and RAFDO allow operation at the maximum permissible power and AFD consistent with safety analyses. It also describes how the two computer alarms function for RAOC application. The first alarm indicates operation outside the RAOC operating space while the second indicates operation outside RAFDO.

The AFD bands and the over-temperature delta T trip setpoints have been verified by the RAOC analysis in accordance with the approved WCAP-9272-PA methodology (Ref. 5).

The staff has reviewed the submittal for the RAOC technical specification change for Callaway and determined that the methodology used had previously been reviewed and approved by the staff. Based on the information presented in the above evaluations, the change from CAOC to RAOC will not affect the conclusions of the safety analyses presented in the Callaway FSAR. The proposed technical specification changes are consistent with those outlined in the approved topical report (WCAP-10216PA). Therefore, the proposed technical specification changes are acceptable.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATIONS

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change to a surveillance requirement. The 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding (57 FR 28207). Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). This amendment also involves changes in recordkeeping, reporting or administrative procedures or requirements. Accordingly, with respect to these items, the amendments meet

the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(10). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

5.0 CONCLUSIONS

The staff 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 REFERENCES

1. Letter from D. F. Schnell (UEC) to USNRC, "Relaxed Axial Offset Control," ULNRC-2546 dated January 14, 1992.

2. "Relaxation of Constant Axial Offset Control and F_Q Surveillance Technical Specification," WCAP-10216-PA, Rev. 2, June 1983.

3. Letter from C. Thomas (NRC) to E. P. Rahe (W), "Acceptance for Referencing of Licensing Topical Report WCAP-10216(P)(NS-EPR-2649)," dated February 28, 1983.

4. "Power Distribution Control and Load Following Procedures - Topical Report," WCAP-8385-P, September 1974.

5. "Westinghouse Reload Safety Evaluation Methodology," WCAP-9272-PA, June 1983.

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