



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

SAFETY EVALUATION

AMENDMENT NO. 41 TO NPF-10

AMENDMENT NO. 30 TO NPF-15

SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 & 3

DOCKET NOS. 50-361 AND 50-382

INTRODUCTION

Southern California Edison Company (SCE), on behalf of itself and the other licensees, San Diego Gas and Electric Company, The City of Riverside, California, and The City of Anaheim, California, has submitted several applications for license amendments for San Onofre Nuclear Generating Station (SONGS), Units 2 and 3. One such request, Proposed Change PCN-213, is evaluated herein. This change was submitted by letter dated November 27, 1985, and would revise Technical Specification 3/4.1.1.3, "Moderator Temperature Coefficient," to reflect the use of a more negative moderator temperature coefficient (MTC) needed for end-of-cycle operations in Cycle 2.

A recent full-power measurement of the MTC, required by the Surveillance Requirements of Technical Specification 3/4.1.1.3, was performed at 173 effective full-power days (EFPD) in SONGS 2. It indicated that the projected end-of-cycle value of MTC for Cycle 2 may be as negative as  $-2.76 \times 10^{-4} \Delta k/k^{\circ}F$ . The proposed change would revise the present MTC value to a more negative value of  $-3.0 \times 10^{-4} \Delta k/k^{\circ}F$ .

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The coolant boron concentration is reduced as the time in cycle increases in order to compensate for the reactivity decrease due to fuel burnup. With this boron reduction, the MTC becomes more negative, reaching its most negative value at end-of-cycle. Because of the negative MTC, moderator cooldown results in a reactivity increase and, therefore, a power increase. Previously analyzed accidents which involve overcooling of the reactor coolant system in SONGS 2 and 3 are the steam line break post-trip return to power, the increased main steam flow, the loss of load to one steam generator, and the dropped CEA event.

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The increased main steam flow and the dropped CEA events were analyzed previously for Cycle 2 assuming a larger negative MTC value ( $-3.3 \times 10^{-4} \Delta k/k/^\circ F$ ) than the present Technical Specification limit of  $-2.5 \times 10^{-4} \Delta k/k/^\circ F$ . Since this is conservative, the results of these two events are still valid and bounding. The loss of load to one steam generator is the limiting asymmetric event and is initiated by the inadvertent closure of a single main steam isolation valve. The event was previously analyzed assuming an MTC of  $-2.5 \times 10^{-4} \Delta k/k/^\circ F$ . The licensee has reevaluated this event with the more negative MTC requested in the Technical Specification change and has found it to be less limiting than the loss of flow event.

The remaining event requiring a reanalysis is the steam line break post trip return to power in which the MTC assumed in the reference analysis corresponded to the most negative value allowed by the present Technical Specifications ( $-2.5 \times 10^{-4} \Delta k/k/^\circ F$ ). Since the reactivity change associated with moderator feedwater varies significantly over the moderator density covered in the analysis, a curve of reactivity insertion versus moderator density rather than a single value of MTC was assumed in the analysis. This moderator cooldown curve was calculated assuming that on reactor trip, the highest worth CEA is stuck in the fully withdrawn position. The licensee and CE have reexamined the assumptions used in this analysis and have discovered that the calculation uncertainty associated with the calculated CEA reactivity worth was inappropriately accounted for twice. The licensee further states that a reevaluation of the moderator cooldown curve based on an MTC of  $-3.0 \times 10^{-4} \Delta k/k/^\circ F$  and a correct accounting of CEA reactivity worth uncertainty yields a cooldown curve which approximates, and is bounded by, the original Cycle 2 curve. Therefore, the results of a post trip return to power with the more negative MTC would be bounded by the previous analysis, and acceptable.

#### Summary of Evaluation

The staff has reviewed the proposed change to the SONGS 2 and 3 Technical Specifications to reflect the use of a more negative MTC needed for end-of-cycle operations in Cycle 2. This change would increase the most negative MTC limit to  $-3.0 \times 10^{-4} \Delta k/k/^\circ F$ . We conclude that the proposed change is acceptable since all accidents which may be adversely affected by a more negative MTC have been reevaluated and remain bounded by the original Cycle 2 analyses.

#### Contact with State Official

The NRC staff has advised the Chief of the Radiological Health Branch, State Department of Health Services, State of California, of the proposed determinations of no significant hazards consideration. No comment were received.

#### Environmental Consideration

These amendments involve changes in the installation or use of facility

components located with the restricted area. The staff has determined that the amendments involve no significant increase in the amounts of any effluents that may be released offsite and that there is no significant increase in individual or commulative occupation radiation exposure. The Commission has previously issued proposed findings that the amendments involve no significant hazards consideration, and there has been no public comment on such findings. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR Sec. 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need to be prepared in connection with the issuance of these amendments.

#### Conclusion

Based upon our evaluation of the proposed changes to the San Onofre Units 2 and 3 Technical Specifications, we have concluded that: there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and such activities will be conducted in compliance with the Commission's regulations and the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public. We, therefore, conclude that the proposed changes are acceptable, and are hereby incorporated in to the San Onofre 2 and 3 Technical Specifications.

Dated: January 27, 1986

- January 27, 1986

ISSUANCE OF AMENDMENT NO. 41 TO FACILITY OPERATING LICENSE NPF-10  
AND AMENDMENT NO. 30 TO FACILITY OPERATING LICENSE NPF-15  
SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3

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