



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

SAFETY EVALUATION SUPPORTING ISSUANCE OF
AMENDMENT NO. 44 TO NPF-10 AND AMENDMENT NO. 33 TO NPF-15
SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 & 3
DOCKET NOS. 50-361 AND 50-382

1.0 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-165, is evaluated herein. This change would revise Surveillance Requirement 4.4.8.2.2 of Technical Specification 3/4.4.8.2, "Reactor Coolant System - Pressurizer - Heatup/Cooldown", and Table 5.7-1 of Technical Specification 5.7, "Component Cycle or Transient Limits". Specifically, the change would revise Surveillance Requirement 4.4.8.2.2 to incorporate additional thermal transient conditions for calculation of cumulative thermal cycle usage factors.

The proposed change also would revise Table 5.7-1, which identifies components subject to thermal fatigue when subjected to thermal cycling. The pressurizer spray system (used for control of pressurizer level and RCS pressure) is one such system identified in Table 5.7-1 which is routinely subjected to thermal cycling. Table 5.7-1 identifies the number of thermal cycles to which a component can be subjected and actions to be taken when the limit is approached. The severity of a thermal cycle on the pressurizer spray system is a function of the temperature differential between the pressurizer and the pressurizer spray. The greater this temperature differential, the fewer the number of spray cycles allowed before action must be taken. The threshold for determining when action must be taken is identified as the cumulative usage factor which is the sum of the usage factors for each differential temperature range. The usage factor for each temperature range is defined as the number of cycles accumulated in that temperature range divided by the number allowed.

Table 5.7-1 defines a spray cycle, the threshold temperature, the threshold differential temperature above which a spray cycle must be counted, differential temperature ranges and the number of spray cycles allowed for each range, the method for calculating the usage factor, the cumulative usage factor limit, and the action to be taken when the cumulative usage factor is exceeded. The proposed change revises Table 5.7-1 as follows: It (1) makes the table apply to the entire pressurizer spray system rather than just the pressurizer spray nozzle; (2) redefines a spray cycle; (3) increases the differential threshold pressurizer

temperature from 150°F to 200°F; (4) redefines the temperature differential ranges and the number of allowed spray cycles for each range; and (5) reduces the cumulative usage factor limit from 0.75 to 0.65.

2.0 EVALUATION OF CHANGE

The NRC staff has evaluated each part of the proposed change and has concluded that each is acceptable. The staff's evaluation of each is given below.

The proposed change to Surveillance Requirement 4.4.8.2.2 would state that the spray water temperature differential shall be determined for use in Table 5.7-1 for each cycle of main spray when less than four reactor coolant pumps are operating and for each cycle of auxiliary spray operation. This would change the existing requirement specifying that the temperature differential be determined at least once per twelve hours during auxiliary spray operation.

This change constitutes an additional restriction or control not presently included in the technical specifications. The proposed change would provide a more accurate and stringent evaluation of the modified pressurizer spray system by incorporating the temperature transient effect for each cycle of main spray when less than four reactor coolant pumps are operating and for each cycle of auxiliary spray operation. This new surveillance requirement will therefore cover thermal transients which are not considered in the existing one. Because the change imposes a monitoring requirement to include thermal transients which are more severe and more numerous than those previously accounted for, it is more restrictive and, therefore, is acceptable.

Currently, Table 5.7-1 applies only to the pressurizer spray nozzle. The proposed change will make this table apply to the entire pressurizer spray system and will require accounting for both main spray cycles when less than four reactor coolant pumps are operating and for all auxiliary spray cycles if the temperature differential is greater than 200°F. This change is an additional restriction which is currently not included in the current technical specification since the existing specification only applies to the pressurizer spray nozzle; therefore, this change is acceptable.

The existing specification defines a spray cycle as the opening and closing of spray valve by main or auxiliary spray. The proposed change redefines the spray cycle as any initiation and termination of main or auxiliary spray flow through the pressurizer spray nozzle. This proposed change redefines the spray cycle to more closely correspond to the actual monitoring of spray cycles within the plant. Spray cycles are monitored by counting demands made by the spray valves in conjunction with monitoring spray line temperature rather than by monitoring actual opening and closing of the spray valves. This is more accurate since the spray valves often are not completely closed and a small bypass flow is allowed to minimize thermal transients on the system. This change is essentially a change in nomenclature and, therefore, is acceptable.

The existing Table 5.7-1 requires logging of all pressurizer spray cycles where the differential temperature is greater than 150°F. The proposed change would require logging of pressurizer spray cycles only if the differential temperature is greater than 200°F. The increase in the threshold temperature may be perceived to reduce, in some way, a margin of safety. However, the new threshold limit has been incorporated into the analysis of the pressurizer spray system and is compensated for by a decrease in the cumulative usage factor. Although the proposed change may result in fewer spray cycles being logged, with the lower cumulative usage factor limit, fewer cycles will have to be logged before action must be taken. The reanalysis of the pressurizer spray system and the revised criteria for logging of thermal cycles is consistent with the requirements of SRP Section 3.9.1 "Specific Topics and Mechanical Components." On this basis, the staff finds this change to be acceptable.

The existing specification defines the differential temperature ranges and the number of allowed spray cycles for each range. Currently, 50,000 spray cycles are allowed in the temperature range of 150°F to 200°F, 7,000 cycles are allowed in the range 201°F to 300°F, 2,000 cycles in the range 301°F to 400°F, 1,000 cycles in the range of 401°F to 500°F and 800 cycles in the range of 501°F to 600°F. The proposed change allows unlimited cycles below 200°F since, as discussed above, 200°F is the new threshold limit. The new ranges are defined in 50°F increments from 201°F to 600°F with 11,000 cycles allowed to 250°F, 4,000 cycles between 251°F and 300°F, 2,200 cycles allowed between 301°F and 350°F, 1,300 cycles between 351°F and 400°F, 900 cycles between 401°F and 450°F, 500 cycles between 451°F and 500°F, 300 cycles between 501°F and 550°F and 200 cycles between 551°F and 600°F. Comparing the number of spray cycles allowed by the existing specification between 201°F and 300°F and by the proposed specification, the existing specification allows 7,000 cycles whereas the proposed change would allow a total of 15,000 cycles (11,000 cycles between 201°F and 250°F, and 4,000 cycles between 251°F and 300°F).

Because the severity of the transient increases with the differential temperature, splitting the ranges into smaller increments allows considerably more cycles at the lower temperature without significantly increasing the overall severity of the allowed transient. For example, in the existing technical specification, in the range of 201°F to 300°F, 7,000 cycles are allowed, but from an analysis standpoint, all 7,000 cycles could occur at 300°F, whereas in the proposed change, 11,000 cycles are allowed to 250°F which are less severe than cycles at 300°F and 4,000 cycles are allowed at 300°F. Although the increased number of spray cycles allowed by the proposed change represents a relaxation of requirements, the number of allowed spray cycles are accounted for in the analysis of the spray system in accordance with SRP Section 3.9.1; therefore, this change is acceptable.

Currently, the cumulative usage factor limit is 0.75. When the cumulative factor limit is exceeded, spray cycles must be limited to less than the threshold differential temperature and an engineering evaluation must be performed to show

that the spray system remains acceptable prior to removing this restriction. The proposed change reduces the cumulative usage factor limit to 0.65. This reduction in the cumulative usage factor limit is an additional restriction and, in some ways, compensates for the relaxations in the threshold differential temperature and the increased number of allowed spray cycles in the redefined temperature ranges. Because this change is an additional restriction, it is acceptable.

In summary, the NRC staff has reviewed each part of the proposed change and has found each to be acceptable, either on the basis of it being an additional restriction, or, if it is a relaxation of requirements, it nevertheless meets the applicable requirements given in the SRP.

3.0 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 determination of no significant hazards consideration. No comments were received.

4.0 ENVIRONMENTAL CONSIDERATION

These amendments involve changes in the installation or use of facility components located within 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 cumulative 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.

5.0 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 into the San Onofre 2 and 3 Technical Specifications.

Dated: April 4, 1986