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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 143 TO FACILITY OPERATING LICENSE NO. NPF-10

AND AMENDMENT NO. 134 TO FACILITY OPERATING LICENSE NO. NPF-15

SOUTHERN CALIFORNIA EDISON COMPANY

SAN DIEGO GAS AND ELECTRIC COMPANY

THE CITY OF RIVERSIDE, CALIFORNIA

THE CITY OF ANAHEIM, CALIFORNIA

SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3

DOCKET NOS. 50-361 AND 50-362

1.0 INTRODUCTION

By application dated March 6, 1998, Southern California Edison Company, et al. (SCE or the licensee) requested changes to the Technical Specifications (Apendix A to Facility Operating License Nos. NPF-10 and NPF-15) for San Onofre Nuclear Generating Station, Unit Nos. 2 and 3. The proposed changes would modify the technical specifications (TS) to eliminate reference to shutdown cooling (SDC) system isolation bypass valve inverters. This would allow the licensee to replace the inverters with transfer switches.

During an Integrated Performance Assessment Process (IPAP) assessment conducted in October 1995, the team identified an unresolved item concerning undersized inverters at the San Onofre Nuclear Generating Station (SONGS). Two inverters in each unit are designed to supply power to two redundant shutdown cooling system (SDCS) isolation bypass valves should one train of emergency power be lost during the accident mitigation sequence. The licensee has known about the undersized condition since 1988. The undersized inverters have resulted in commutation problems and current surges which have blown supply fuses on several occasions.

In 1994, instead of replacing the inverters with properly sized units, the licensee installed two more identical fuses into the supply circuit; these fuses can be selected via a local, manually operated switch. In a letter dated July 12, 1996, the staff concluded that the current design of the inverters does not comply with the applicable industry guidance, and the licensee's modifications are not acceptable as a permanent solution. In a letter dated August 26, 1996, the licensee committed to replace the inverters either with AC/DC motor-generator sets or with larger inverters, or to replace the current valve actuators with a DC actuator motor.

After further consideration and evaluating several options, the licensee submitted a request in a letter dated March 6, 1998, to install manual transfer switches to provide selectable emergency ac power to the SDCS isolation bypass valves HV9377 and HV9378.

2.0 EVALUATION

The licensee stated that SDCS inverters will be disconnected and removed from their existing mounting locations. New switch cabinets as shown in Figures 4-2 and 4-4 of the licensee's March 6, 1998, letter will be installed on the existing mounting pads and will contain the following components:

1. Three-pole, double throw manual transfer switches with a separation barrier between line side compartments;

2. Three-pole input and output circuit breakers installed in separate compartments;

3. Four kirk key interlocks designed to prevent operation of the transfer switch while an input breaker is shut;

4. Terminal blocks, 120 Vac control power transformers, and reversing motor starter contactors; and

5. Regulating transformers.

Material required for this modification will be safety-related, Quality Class II. These cabinets will provide means to supply motive and control power to HV9377 and HV9378 from either Train A or Train B motor control centers (MCCs) as determined by the transfer switch position. Valve position indication will be powered from the Channel C (for HV9377) and Channel D (for HV9378) vital bus inverters. New cable and raceway will be installed from the Train A and Train B 480V switchgear rooms on the 50' elevation of the control building into 125Vdc switchgear rooms for the input to each of the new switch cabinets. The output of the new switch cabinets will utilize existing cables and raceway.

The SDCS isolation valves inside containment have the function to remain closed during normal operation. The safety function of these valves is to open to place the SDCS in operation. Two parallel suction paths are provided each with two valves in series as shown in Figure 4-1 of the licensee's March 6, 1998, letter. In the 16" suction path HV9337 (during normal operation, the circuit breaker at the starter for this valve is maintained open) and HV9339 are powered from opposite ESF switchgear Trains A and Train B respectively. In the 10" path HV9377 (during normal operation, the circuit breaker at the starter for this valve is maintained open) and HV9378 are powered from available diesel generator-backed ESF bus through a manual transfer switch. The SDCS design basis requires that a single failure of an isolation valve or power supply does not preclude availability of the SDCS or preclude positive isolation of the reactor coolant system (RCS) boundary.

The licensee stated that the modification containing manual transfer switches and associated kirk key interlocks will not create any additional operator burden at the 50' elevation of the control building for normal or abnormal conditions. Aligning the new transfer switches for HV9377 and HV9378 in preparation for initiating shutdown cooling will be similar to the actions presently performed since all operator actions will be performed in the 125 Vdc switchgear rooms.

Additionally, under the present system configuration, during a station blackout (SBO) operator action is required to strip loads from the Channels 'C' and 'D' 125 Vdc Class 1E buses, including the core protection calculators (CPC) and control element assembly calculator (CEAC), in order to minimize loads imposed on the Class 1E batteries in anticipation of battery power needed for the SDCS inverter operation. With the removal of the SDCS inverters upon completion of this modification, no operator actions will be required to shed battery loads and the battery load profile will be reduced. These valves are not required to operate during an SBO that occurs during normal plant operation. Additionally, an SBO that occurs while the auxiliary feedwater system and atmospheric dump valves are providing decay heat removal does not require the actuation of shutdown cooling system and therefore does not require that these valves be operated. An SBO that occurs while the SDCS is providing decay heat removal does not require that the valves be closed. If the operator maintains RCS pressure below about 408 psia at the low temperature overpressure protection (LTOP) value (i.e., stays below 440°F if saturation is maintained), the SDCS suction isolation valves do not need to be closed. Only if RCS pressure exceeds this value would an operator need to close the valves to prevent loss of RCS inventory. This design change does not preclude manual action inside containment to open valves and meet the assumptions of the analysis submitted to the NRC in response to Generic Letter 81-04. This analysis described that the operator would maintain a sufficiently low RCS temperature (<385°F) that valve operation would not be expected to be required, but would be accomplished locally, if needed. Hence, the assumptions of the safety analyses are met and there is no increase in the frequency of an SBO event over that assumed in the UFSAR nor is there the possibility that a more challenging design basis accident sequence needs to be considered.

Placing the motor and control power for HV9377 and HV9378 directly on the Class 1E MCC will not adversely affect the EDG loading since MOVs are not considered a continuous load burden. The reliability of SDCS isolation valves operability and control circuit operability will be increased by removal of the inverter and hence removing the inverter fuse failure-induced inoperability. The regulating transformer design will provide voltage somewhat above that assumed in the MOV set point program (460V per calculation M-8910-SP-2HV9378, Section 5.0) so valve operator performance should become even more reliable after the change. The time period during which valve operability will be assured is increased by the removal of valve power as a load upon their respective station batteries.

Furthermore, the addition of new cables and raceways will retain the physical independence of electric systems per RG 1.75 and IEEE 384-1974, by installing a qualified isolation device in the manual transfer switch cabinet for each valve. Because of its current limiting characteristics, the regulating transformer included in this modification will be utilized as an isolation device between the Train A or Train B power source and the Channel C or Channel D circuits, which

share the same raceways. Although each valve can receive power from a Train A or B power source, the regulating transformer allows those portions of the circuit downstream of it to be designated as and remain with Train C and D circuits. Additionally, a kirk key interlock scheme will prevent cross-train interactions by restricting operation of the manual transfer switch only when both input breakers are open.

The licensee provided a list of calculations which will be affected by this change and a list of license document change summaries.

On the basis of its review, the staff finds the modification as proposed will meet the design basis requirement of the SDCS in that a single failure of an isolation valve or power supply does not preclude availability of the SDCS or preclude positive isolation of the reactor coolant system boundary. The staff concludes, therefore, that the proposed modification is acceptable.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a surveillance requirement. The NRC staff has determined that the amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (63 FR 50939). Accordingly, the amendments meet 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 amendments.

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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

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