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

SAFETY EVALUATION
AMENDMENT NO. 28 TO NPF-10
AMENDMENT NO. 17 TO NPF15
SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 & 3
DOCKET NOS. 50-361 AND 50-362

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, Units 2 and 3. The evaluations of four such requests are presented below.

I. By letter dated July 9, 1984, SCE requested that the NRC revise San Onofre Unit 2 Technical Specification 3/4.5.2, ECCS Subsystems (PCN-126). Technical Specification 4.5.2.a specifies valve functions and positions required for emergency core cooling system operability. The change is being made to conform the Unit 2 technical specifications to plant modifications required by the San Onofre 2 and 3 Safety Evaluation Report (SER) at the first refueling outage.

The amendment revises Technical Specification 3/4.5.2, ECCS Subsystems - Tavg Greater Than or Equal to 350°F. Technical Specification 3/4.5.2 requires emergency core cooling system (ECCS) operability and specifies surveillance requirements to verify such operability. Technical Specification 4.5.2.a specifies valve positions required for ECCS subsystem operability. The amendment revises Technical Specification 4.5.2.a to be consistent with modifications made to the shutdown cooling system (SDCS) in accordance with NRC Branch Technical Position RSB 5-1. The SDCS modifications provide remote valve alignment capability from the control room. Previously, manual valve prealignment was required prior to SDCS operation, for Unit 2. The Unit 3 Technical specifications already include this change.

II. By letters dated April 24, August 7, and September 12, 1984, SCE proposed to add a new specification, 3/4.7.10, Emergency Chilled Water System, to the San Onofre Unit 2 and Unit 3 technical specifications (PCN-127).

The new Technical Specification 3/4.7.10 defines the operability requirements for the emergency chilled water system (ECWS), the surveillance requirements to verify operability, and the compensatory measures (Actions) to be taken when the ECWS is inoperable. Previously, operability of the ECWS was not directly addressed by the technical specifications.

III. By letter dated August 27, 1984, SCE requested that the NRC revise San Onofre Units 2 and 3 Technical Specifications 3/4.1.1.2 and bases, as well as Technical Specifications 3.1.2.2., 3.1.2.4, 3.1.2.6, 3.1.2.8, and 3/4.1.2 bases (PCN-161). Supplemental information regarding this change was provided by SCE by letter dated October 1, 1984. These technical specifications define the

shutdown margin required when the core average moderator temperature is less than or equal to 200°F (Mode 5). The amendment increases the required shutdown margin from 2.0% to 3.0% delta K/K, consistent with the safety analysis for cycle 2 operation. In addition, a new surveillance requirement is added which verifies that one and only one charging pump is operable in Mode 5 when the reactor coolant system is drained below the hot leg centerline, as assumed in the cycle 2 safety analysis.

IV. By letter dated August 21, 1984, SCE requested that the NRC staff revise San Onofre Unit 2 Technical Specifications 3.1.2.7, 3.1.2.8, and Bases 3/4.1.2 (PCN-163). Technical Specifications 3.1.2.7 and 3.1.2.8 require borated water source operability and specify volume, temperature and boron concentration requirements which assure that sufficient negative reactivity control is available during each mode of facility operation. These technical specifications define the minimum boric acid storage tank water volume and temperature required as a function of the boric acid concentration. The amendment increases the boric acid storage tank volume/concentration and the minimum refueling water storage tank water volume specified by Technical Specification 3.1.2.7, consistent with the revised safety analysis associated with plant refueling and cycle 2 operation. In addition, the amendment decreases the boric acid storage tank water volume/concentration specified in Technical Specification 3.1.2.8, but nevertheless maintains the reactivity control required for cycle 2 operation, as is demonstrated by the cycle 2 safety analysis.

EVALUATION

I. Revise San Onofre Unit 2 Technical Specification 3/4.5.2, ECCS Subsystems (PCN-126).

This change revises Technical Specification 4.5.2.a to include (1) the addition of two new SDCS bypass flow control valves (HV 8160 and HV 8161) and low pressure safety injection (LPSI) pump miniflow isolation valves (HV 8162 and HV 8163), (2) replacement of the existing SDCS flow control valve (FV 0306 replaced by HV 0396), and (3) deletion of the SDCS heat exchanger flow control valve and isolation valves (HV 9316, 14-78 and 14-80), SDCS bypass flow control/isolation valve 14-153 and isolation valves 14-81 and 14-82. The changes require the plant operators to verify the correct valve alignment for ECCS subsystem operability including the recently-completed SDCS design modifications.

The new SDCS bypass flow control valves (HV 8160 and HV 8161) provide for redundant, remotely operable, Class 1E bypass flow control. HV 0396 and HV 8161 are powered by the opposite train from HV 8160 in order to meet the single failure criterion (specifically, if power to HV 8160 (normally used for flow control) is lost, HV 8161 will be closed and HV 0396 will be used to provide the required bypass flow control). HV 0396, HV 8160 and HV 8161 replace FV 0306 and 14-153 to provide remote operation capability, consistent with BTP RSB 5-1. The previously-used, non Class 1E-powered SDCS heat exchanger flow control valve and associated isolation valves (HV 9316, 14-80) have been removed and the flow control function is now performed by new HV 8150 and HV 8151, which are redundant, remotely operable and Class 1E powered.

Motor-operated LPSI miniflow isolation valves HV 8162 and HV 8163 have been added to provide remote isolation capability consistent with BTP 5-1. Isolation of the miniflow lines is required to prevent transport of potentially contaminated primary coolant to the refueling water storage tank (RWST). The valves are powered from the train not used to power the associated LPSI pump. This will prevent the loss of one train of emergency power from resulting in a potentially uncontrolled flow path from the reactor coolant system to the RWST.

Isolation valves 14-81 and 14-82 have been removed from Technical Specification 4.5.2.a. The closure of 14-81 and 14-82 [isolation valves for HV 0396 (normally closed)] has been previously analyzed for this configuration in the FSAR failure modes and effects analysis of the Unit 3 safety injection system (FSAR Table 6.3-1 for Unit 3, Item 14). It was concluded that inadvertent closure of these valves would have no effect on ECCS operation, since HV 8160 (open) and HV 8161 (open) bypass 14-81 and 14-82 and provide the normal ECCS flowpath. In addition, surveillance of these valves requires frequent personnel entry into a confined contaminated area (14-81 and 14-82 are not equipped with remote position indication) with associated radiation exposure.

The SDCS design change has been reviewed and approved by the licensees and was found not to involve an unresolved safety issue. A similar design change was implemented at Unit 3 prior to initial plant startup.

The NRC staff has reviewed the SDCS changes and finds them acceptable because they provide the remote isolation capability recommended by Branch Technical Position RSB 5-1 (reference SRP section 5.4.7). The staff has reviewed the associated technical specification changes and finds them to be acceptable because they make the technical specifications consistent with the modified plant design. The revised design and technical specifications have previously been reviewed and found acceptable for use at San Onofre Unit 3.

II. Add Technical Specification 3/4.10.7, Emergency Chilled Water System, to the San Onofre 2 and 3 Technical Specifications (PCN-127).

The new technical specification is being added because the ECWS is a support system which maintains acceptable environmental conditions for various safety systems in the event that the normal heating, ventilating, and air conditioning (HVAC) system becomes inoperable.

The new Technical Specification 3.7.10 states as the limiting condition for plant operation that two independent emergency chilled water systems must be operable. For a situation in which one ECWS becomes inoperable, the action statement requires that the inoperable ECWS must be restored to operable status within seven days and that the operability of the following systems must be verified within the specified time period: (1) the portion of the normal HVAC system which maintains environmental conditions in rooms associated with vital power distribution to safety systems, within one hour; (2) the safety-related shutdown systems which do not depend on the inoperable ECWS, within eight hours; and (3) the required systems which depend on the operable ECWS, within twenty-four hours. Technical Specification 4.7.10 requires that the operability of the emergency chilled water systems and specific safety-related equipment be demonstrated periodically. The surveillance requirements of Technical Specification 3/4.7.10 provide specific tests for verifying ECWS operability.

The NRC staff has reviewed the proposed technical specification and finds it to be acceptable, because it provides additional assurance that the ECWS will be available if needed.

III. Revise Technical Specifications 3/4.1.1.2 and bases, and T.S. 3.1.2.2, 3.1.2.4, 3.1.2.6, 3.1.2.8, and 3/4.1.2 bases (PCN-161).

Technical Specification 3.1.1.2 specfies the shutdown margin required in Mode 5. The change in this specification increases the Mode 5 requirement from 2.0% to 3.0% delta k/k. Technical Specifications 3.1.2.2, 3.1.2.4, 3.1.2.6, 3.1.2.8, B 3/4.1.1 and B 3/4.1.2 have been revised accordingly, to assure compliance with the revised Mode 5 shutdown margin requirement. In addition, a new surveillance requirement is implemented for Technical Specification 4.1.1.2, to assure that one and only one charging pump is operable in Mode 5 when the RCS is drained below the hot leg centerline, in order to be consistent with the cycle 2 safety analysis.

The requirement for a limiting condition for operation governing the shutdown margin is based on 10 CFR Part 50, Appendix A, General Design Criterion 26 - "Reactivity Control System Redundancy and Capability" (GDC-26), which requires reliable control of reactivity changes to assure that the fuel design limits are not exceeded during design basis accidents and anticipated operational occurrences. This is accomplished, in part, by providing adequate shutdown margin. Specific criteria necessary to meet the relevant requirements of GDC-26 are given in NUREG-0800, the Standard Review Plan (SRP) Section 15.4.6 - "Chemical and Volume Control System Malfunction that Results in a Decrease in Boron Concentration in the Reactor Coolant." The criteria of SRP 15.4.6 are used in evaluating the safety analysis of the inadvertent boron dilution event. Analysis results are used to establish the Mode 5 shutdown margin.

This approach is consistent with 10 CFR 50.36, which states that the technical specifications are to be derived from the saiety analyses and evaluations included in the safety analysis report.

Core performance analyses of the cycle 2 reactor fuel management design show that the critical boron concentrations have increased due to the change in core performance characteristics from cycle 1. As a consequence, the minimum Mode 5 shutdown margin required during cycle 2 has increased. Also, constraints on the operability of the charging pumps are required to assure that assumptions used in the safety analysis are valid. The cycle 1 inadvertent boron dilution analyses showed that greater than 60 minutes were available between the initiation of an unplanned moderator dilution event and the time of loss of shutdown margin. The cycle 2 analyses, incorporating the proposed changes discussed above, also show that greater than 60 minutes remain available between initiation of an unplanned moderator dilution event and the time of loss of shutdown margin. In both cycles, the operator will be alerted to this event with a minimum of 15 minutes remaining before criticality, by the alarm on the startup channel nuclear instrumentation, as required by SRP 15.4.6. Thus, the cycle 2 analyses show no significant increase in the probability or consequences of any accident previously evaluated, nor is there any significant reduction in a margin of safety.

To clarify the usage of borated water from various sources during plant shutdown operation, the licensee stated that for Cycle 1 operation, the boric acid makeup tank (BAMT) contained sufficient borated water to provide the required shutdown margin and makeup requirement to the RCS to compensate for reactor coolant volume contraction. For Cycle 2 operation, the required shutdown margin will be provided by injecting borated water to the RCS from the BAMT. The BAMT will also provide portions of the makeup requirement to the RCS. The remaining portion of the required RCS shrinkage makeup will be provided through the refueling water storage tank (RWST).

The licensee indicates that boron mixing under natural circulation is rather rapid, and meets the criteria specified in BTP RSB 5-1. The mixing mechanism is mainly influenced by the system configuration and is independent of the charging fluid temperature. Since the boron delivery path configuration beyond the charging pump discharge remain unchanged during all modes of plant operation for San Onofre Unit 2, the results of adequate boron mixing in the RCS and nuclear vessel during the natural circulation test performed at the San Onofre Nuclear Station, Unit 2 should not be affected by the proposed TS change.

Based on the above, the staff finds that this change is consistent with GDC-26, SRP 15.4.6, and BTP RSB 5-1 (SRP 5.4.7) and is acceptable.

IV. Revise San Onofre Unit 2 Technical Specifications 3.1.2.7, 3.1.2.8, and Bases 3/4.1.2 (PCN-163).

The borated water source required by these technical specifications is part of the boron injection system which assures that negative reactivity control is available during each mode of facility operation. This system is required to satisfy 10 CFR Part 50, Appendix A, General Design Criterion 26, "Reactivity Control System Redundancy and Capability." GDC-26 states that a nuclear power plant must contain two independent reactivity control systems, one of which is capable of holding the reactor core subcritical under shutdown conditions.

Core performance analyses of the cycle 2 reactor fuel management design show that the boron concentration required to (1) maintain the required shutdown margin after xenon decay and cooldown to 200°F, and (2) satisfy GDC-26, has increased due to the differences in core design and core performance characteristics from cycle 1. As a consequence, the minimum borated water volume in the refueling water storage tanks and the minimum boric acid makeup tank water volume must be revised for cycle 2 operation in order to meet the limiting conditions for operation on shutdown margin. The minimum water volume required in the boric acid makeup tank and refueling water storage tank in Modes 5 and 6 has been increased due to the increased Mode 5 shutdown margin required for cycle 2 operation. In addition, the Modes 1 through 4 boric acid makeup tank water volume requirement has been decreased in order to facilitate plant operation while nevertheless providing the required shutdown margin. For cycle 1 operation, borated water from the boric acid storage tank was used during plant shutdown to provide makeup for reactor coolant system (RCS) shrinkage. Makeup for RCS shrinkage during cycle 2 will be provided from the refueling water storage tank.

Therefore, the proposed Technical Specifications 3.1.2.8 and B3/4.1.2 would specify the boric acid storage tank water volume/concentration and the refueling water storage tank volume required for negative reactivity control consistent with the requirements of cycle 2 operation. On this basis, the NRC staff finds the proposed change to be acceptable.

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 comments were received.

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 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 this amendment 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.

Dated: December 19, 1984

DL:LB#3	DL:LB#3
HRood	GWKnighton
12/11/84	12/19/84

December 19, 1984

ISSUANCE OF AMENDMENT NO. 28 TO FACILITY OPERATING LICENSE NPF-10
AND AMENDMENT NO. 17 TO FACILITY OPERATING LICENSE NPF-15
SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3

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