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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 86 TO PROVISIONAL OPERATING LICENSE NO. DPR-13

SOUTHERN CALIFORNIA EDISON COMPANY

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT NO. 1

DOCKET NO. 50-206

1.0 INTRODUCTION

By letter dated June 8, 1984, Southern California Edison Company (the licensee) proposed changes to the Technical Specifications for San Onofre Nuclear Generating Station, Unit No. 1. These changes would modify limiting conditions for operation in the Technical Specifications to address both the auxiliary salt water cooling (ASWC) pump and the screen wash pumps as backup systems for short periods of time when one of the SWC system pumps is inoperable.

A Notice of Consideration of Issuance of Amendment to License and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing related to the requested action was published in the Federal Register on July 24, 1984 (49 FR 29920). A request for hearing and public comments were not received.

2.0 DISCUSSION

The ultimate heat sink requirements for San Onofre Unit 1 are satisfied by the SWC system. The existing Technical Specifications require that the reactor not be made or maintained critical unless two SWC pumps (North and South) or one SWC pump (North or South) and the Auxiliary Salt Water Cooling (ASWC) pump are operable. The two SWC pumps are located in a sealed, common pit, which is protected against design basis flooding and tsunami concerns. Also located in this pit are the screen wash pumps. The ASWC pump is located in a separate pit. Figure 1 depicts the salt water cooling system configuration.

By letter dated August 27, 1980 (Proposed Change No. 98, Ref. 1), Southern California Edison Company requested a revision to Technical Specification Section 3.3.1. The change would eliminate consideration of the non-seismically qualified ASWC pump in determining the operability of the SWC system. Only the North and South SWC pumps, which are seismically qualified, would be considered when establishing the operability of the SWC system. The stated intent in proposing these changes was to increase the reliability of the system by eliminating reliance on a non-qualified component.

In a Safety Evaluation (SE) dated October 28, 1983 (Ref. 3), the staff rejected the licensee's request to delete the ASWC pump from the Technical Specifications. The staff argued that by eliminating the option of including the ASWC pump in the SWC system and not placing it as a backup or standby unit, the residual heat removal (RHR) cooling system will depend only on the two SWC pumps which have the following design characteristics which have shown the system to be less reliable than desired.

(1) Both pumps are located in a common pit (circulating water pump (CWP) pit) and, thus, are subjected to common mode failure by flooding. On May 13, 1982 both pumps were made inoperable due to flooding.

(2) During normal operation either one of the two pumps is capable of performing its function. However, when the RHR system is first placed in service during plant shutdown, both component cooling water (CCW) heat exchangers and hence both the SWC pumps are relied upon (Ref. 5).

(3) The reliability of the SWC system has been poor with four system failures within 3 years.

The ASWC pump does not have seismic qualification but does contribute significantly to the overall system reliability. In addition, the two screen wash pumps were used as backup pumps during some of the SWC system failures. The staff further pointed out that the licensee is reviewing the SWC system for the single failure criterion under SEP Topic IX-3. References 5 and 6 have considered the ASWC pump as a backup to the SWC pumps. The ASWC pump can be used as backup if the SWC pumps are inoperable or insufficient as previously indicated. The ASWC pump is suitable for the backup function for the following reasons.

(1) It is located in a separate pit, remote from CWP pit.

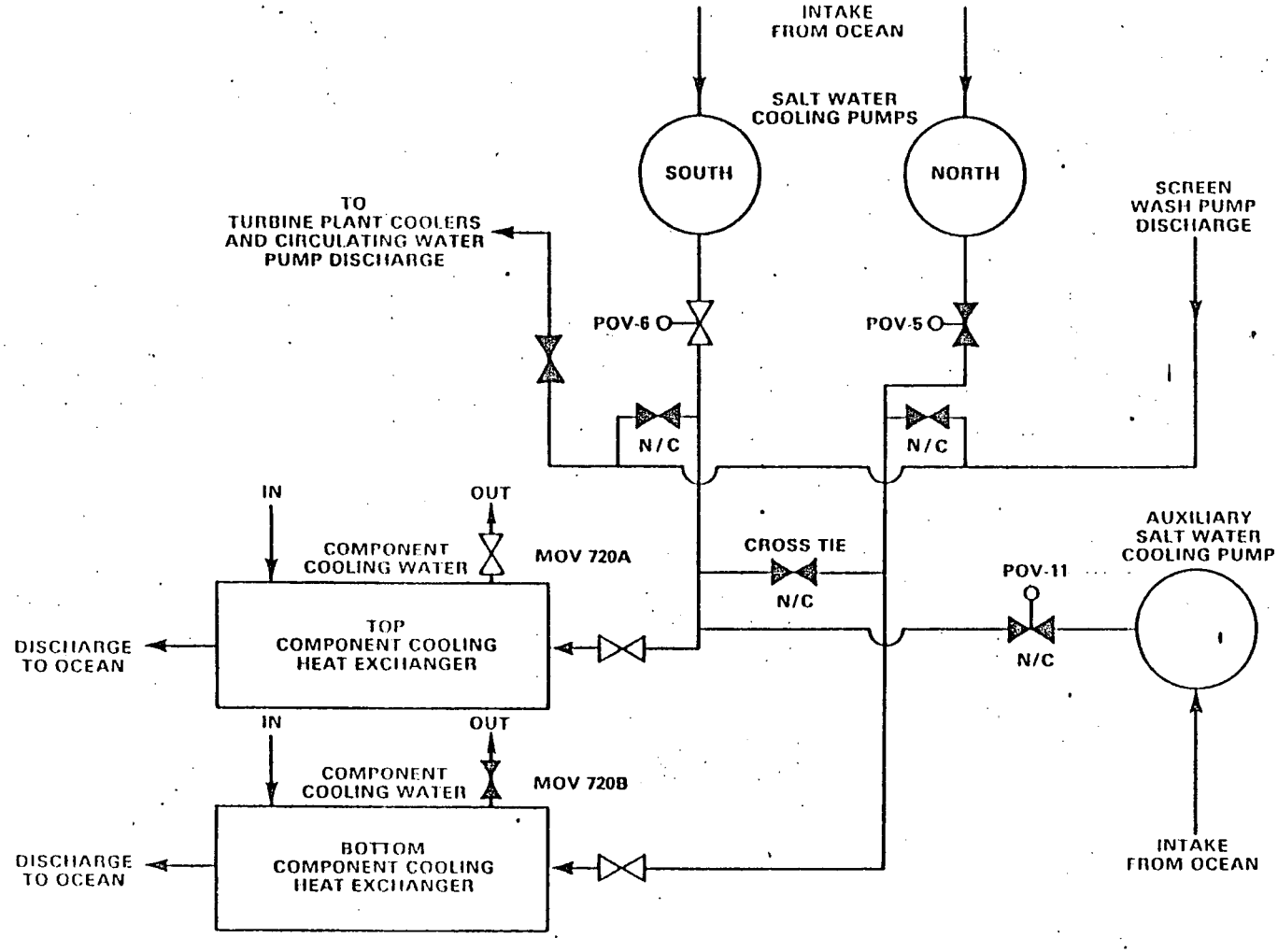
(2) Its motor is supplied from a safety-related 480-volt load center and, as such is electrically as qualified as the SWC pumps.

(3) Its capacity is the same as that of a SWC pump (4600 gpm).

(4) The licensee intends to enhance the pumps reliability and dependability by improving the vacuum priming system, installing mechanical seals to minimize air inleakage or provision for gland sealing water (Ref. 4).

(5) The pump is different in design (a horizontal rather than vertical pump) and therefore adds diversity to the SWC system.

The staff concluded that the Technical Specifications should address both the ASWC pump and the screen wash pumps as backup sources of cooling, in addition to the two SWC pumps, to be available during periods when the plant is in Modes 1, 2, 3, and 4.



N/C = normally closed.

Figure 1 Salt water cooling system.

By letter dated June 8, 1984 (Ref. 7), the licensee submitted revised Technical Specification changes to the San Onofre Unit 1 facility. This revised package reflected recommendations made in the staff's October 28, 1983 SE.

3.0 EVALUATION

The proposed Technical Specifications have been revised to address the ASWC pump and screen wash pumps as backup pumps. They also include:

(1) a time limit for operation in Modes 1-4 with the backup pumps should a salt water pump become inoperable.

(2) an action statement if the time limit is exceeded, and

(3) appropriate testing of the backup pumps.

The revised Technical Specifications utilize a 72-hour time period for operation with the backup pumps. It is considered there is a low probability that an earthquake would occur which would make the backup pump inoperable, and a single failure which would make the second SWC inoperable during the 72-hour time period. The revised Technical Specification includes a statement to be in Hot Standby within 6 hours and Cold Shutdown within 30 hours if the 72-hour time period is exceeded. These time limits are based on the Westinghouse Standard Technical Specifications (NUREG-0452, Rev. 4) for Service Water Systems. The revised Technical Specification also includes a requirement for testing the backup pump during the 72-hour time period.

The affected Technical Specifications currently read as follows:

3.3.1.A.(1)h (relating to equipment that must be operable during modes of reactor operation)

"Two saltwater cooling pumps are operable, or one saltwater cooling pump and the auxiliary saltwater cooling pump are operable."

3.3.1.B.(6) (relating to individual components that may be taken out of service for maintenance purposes during modes of reactor operation)

"One of the two required saltwater cooling pumps or auxiliary saltwater cooling pump for a period of time not longer than 72 consecutive hours."

The proposed Technical Specifications are:

3.3.1.A.(1)h: Two saltwater cooling pumps are operable. The reactor may be maintained critical with one saltwater cooling pump provided the auxiliary saltwater cooling pump or two screen wash pumps are available as backup. Return the

inoperable pump to operable status within 72 hours or be in Hot Standby within the next 6 hours and in Cold Shutdown within the next 30 hours. The backup pump(s) shall be demonstrated operable by test within 1 hour of declaring the saltwater cooling pump inoperable.

3.3.1.B(6): One of the two saltwater cooling pumps with the auxiliary saltwater cooling pump or the screen wash pumps available as backup for a period of time not longer than 72 consecutive hours. The backup pump(s) shall be demonstrated operable by test within 1 hour of declaring the saltwater pump inoperable.

The design flow rates for the affected pumps are:

SWC pumps	- 4600 gpm each
ASWC pumps	- 4620 gpm
screen wash pumps	- 1000 gpm each

According to the licensee's letter of October 8, 1980 (Ref. 2), the limiting temperature for the CCW is 200°F. Reference 5 provides a detailed discussion on the potential effects resulting from degraded SWC flows. This report concludes that the worst case conditions (start of RHR cooling using both RHR heat exchangers and only a single SWC pump) result in maximum CCW temperature of 150°F. Although the referenced report states that operator action might be needed to manually reduce loads if sustained CCW temperatures of 150°F exist, it is apparent that a single SWC pump could provide sufficient cooling capacity if necessary. The licensee's proposal, which only allows for 72 hours of operation with a SWC pump inoperable, will have a minimum of one SWC pump and either the ASWC pump or the two screen wash pumps as backup sources of cooling. The staff considers this to be an adequate supply of SWC capacity.

Based on the above evaluation, the staff concludes that the proposed changes to the Technical Specifications are acceptable. The addition of the ASWC and screen wash pumps, which have been used as backup pumps during some of the SWC system failures, contribute significantly to the overall system reliability.

The staff further concludes that during the 72-hour period of time when one of the SWC pumps may be inoperable, with the ASWC pump or the screen wash pumps available as backups, there is an acceptably low probability that a combined earthquake and/or a set of single failures would occur to make all forms of SWC inoperable.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined by 10 CFR Part 20. 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. Accordingly, this amendment meets 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 this amendment.

5.0 CONCLUSION

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 the 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 ACKNOWLEDGEMENT

D. Pickett contributed to this evaluation.

7.0 REFERENCES

1. Southern California Edison Co. letter (R. Dietch) to NRC (H. Denton) dated August 27, 1980.

2. Southern California Edison Co. letter (K. Baskin) to NRC (D. Crutchfield) dated October 8, 1980.

3. NRC letter (D. Crutchfield) to Southern California Edison Co. (R. Dietch) dated October 28, 1983.

4. Southern California Edison Co. letter (L. T. Papay) to NRC (R. Engelken, Region V) dated May 12, 1981.

5. AEOD memo (C. Michelson) to NRR (H. Denton) dated March 4, 1982.

6. NRC Letter (D. Crutchfield) to Southern California Edison Co. (R. Dietch) dated March 18, 1981.

7. Southern California Edison Co. letter (C. B. McCarthy) to NRC (H. R. Denton) dated June 8, 1984.

Dated: November 26, 1984