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ACCESSION NBR: 8601280110 DOC. DATE: 86/01/24 NOTARIZED: NO DOCKET #
FACIL: 50-361 San Onofre Nuclear Station, Unit 2, Southern Californ 05000361
50-362 San Onofre Nuclear Station, Unit 3, Southern Californ 05000362
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SUBJECT: Application for amends to Licenses NPF-10 & NPF-15, revising Tech Specs to reduce Mode 6 shutdown cooling sys flow requirements from 4,000 to 2,200 gpm. Safety analysis description encl. Fee paid.

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January 24, 1986

Director, Office of Nuclear Reactor Regulation
Attention: Mr. George W. Knighton, Director
PWR Project Directorate No. 7
Division of PWR Licensing - B
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

Enclosed for your review and approval is a proposed change to the San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 Technical Specifications. The proposed change, NPF-10/15-3 (PCN-3), revises Technical Specification 3/4.9.8.1 "Shutdown Cooling and Coolant Circulation-High Water Level," and Technical Specification 3/4.9.8.2 "Shutdown Cooling and Coolant Circulation-Low Water Level." The proposed change would reduce the Mode 6 shutdown cooling system (SDCS) flow requirements from 4,000 gpm to 2,200 gpm.

The current 4,000 gpm SDCS flow rate prohibits certain operations to be carried out concurrently during a refueling outage. The high flow rate necessitates maintaining a high water level in the reactor coolant system (RCS) to prevent vortexing in the SDCS suction, thus the RCS reactor can not be reduced to mid-loop while the plant is in Mode 6 (i.e., without reactor fuel head closure bolts not fully tensioned). The high water level requirement results in delaying the removal of steam generator nozzle dams and reactor coolant pump seal (RCP) replacement, both activities requiring RCS water level to be lowered to mid-loop, until reactor vessel head installation is completed. The proposed reduction in SDCS flow rate would allow mid-loop operation in Mode 6 and permit steam generator nozzle dam removal and RCP seal replacement to be carried out concurrently with reactor vessel head installation. The resultant savings in critical path outage time would be on the order of five days.

These activities are next scheduled to begin on April 6, 1986 during the upcoming Unit 2 refueling outage. SCE therefore requests approval of PCN-3 by that date in order to take advantage of the outage time savings. In accordance with

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10CFR170.2, enclosed is the required amendment application fee of $150.00. A formal request for this change will be included in the formal amendment application which we plan to submit in the near future.

If you have any questions regarding the enclosed information, please call me.

Very truly yours,

M. O. Medford

cc: Joseph O. Ward, California Department of Health Services
Harry Rood, NRC (to be opened by addressee only)
F. R. Huey (USNRC Senior Resident Inspector)

DESCRIPTION AND SAFETY ANALYSIS
OF PROPOSED CHANGE NPF 10/15-003, REVISION 2

This is a request to revise Technical Specifications 3/4.9.8.1, "Shutdown Cooling and Coolant Circulation - High Water Level" and Technical Specification 3/4.9.8.2, "Shutdown Cooling and Coolant Circulation - Low Water Level."

Existing Specifications:

Unit 2: See Attachment A
Unit 3: See Attachment B

Proposed Specifications:

Unit 2: See Attachment C
Unit 3: See Attachment D

Description

The proposed change would revise Technical Specifications 3/4.9.8.1 "Shutdown Cooling and Coolant Circulation - High Water Level," and Technical Specification 3/4.9.8.2 "Shutdown Cooling and Coolant Circulation - Low Water Level." Technical Specifications 3/4.9.8.1 and 3/4.9.8.2 define requirements for the Shutdown Cooling System (SDCS) when the plant is in Mode 6 (refueling). Mode 6 is defined as having reactor vessel head closure bolts not fully tensioned with reactor coolant system (RCS) temperature less than 140°F. The purpose of TS 3/4.9.8 is to ensure that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140° F as required during the refueling mode, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effects of a boron dilution incident and prevent boron stratification.

Technical Specifications 3/4.9.8.1 and 3/4.9.8.2 define the number of (SDCS) trains required to be operable or in operation depending on refueling water level, actions to be taken when the operability requirements are not met, and periodic surveillance requirements to verify operability. Specifically, surveillance requirements 4.9.8.1 and 4.9.8.2 require a minimum SDCS flow rate of 4000 gpm while in Mode 6. This high flow rate necessitates maintaining a high water level in the RCS to prevent vortexing in the SDCS suction. Thus, the RCS water level cannot be reduced to mid-loop until entry is made into Mode 5 (i.e., with the reactor vessel head closure bolts fully tensioned), where SDCS flow can be reduced. The high water level necessitates delaying removal of steam generator nozzle dams and reactor coolant pump seal replacement, both activities requiring RCS water level to be lowered to mid-loop, until entry into Mode 5. A reduction in the minimum required Mode 6 shutdown cooling flow rate requirements would allow mid-loop operation in Mode 6 without vortexing and would permit steam generator nozzle dam removal and RCP seal replacement to be carried out concurrently

with reactor vessel head installation. The resultant savings in critical path outage time would be approximately five days. The proposed change would reduce Technical Specification 3/4.9.8.2 to the minimum required SDCS flow to greater than or equal to 2200 gpm. Technical Specification 3/4.9.8.1 is similarly revised for consistency.

Safety Analysis

The proposed change described above shall be deemed to involve significant hazards considerations if there is a positive finding in any of the following areas:

1. Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of any accident previously evaluated?

   Response: No

   The Shutdown Cooling train requirements of 3/4.9.8 are specified to ensure 1) sufficient cooling capacity is available to remove decay heat and maintain reactor coolant temperature below 140° F and 2) sufficient coolant circulation is maintained to minimize the effects of a boron dilution incident and prevent boron stratification. Regardless of the minimum SDCS flow requirement, the Mode 6 requirement for maintaining RCS temperature below 140°F will determine actual SDCS flow rate. A flow rate of 2200 gpm will provide sufficient mixing in the RCS to minimize the effects of a boron dilution event. FSAR Section 15.4.1.4 demonstrates good mixing because of the large ratio between SDCS flow and maximum possible charging flow. Currently, this ratio assumes that all three charging pumps are available for a total maximum flow of 132 gpm; however, the boron dilution analysis assumes that a maximum of one charging pump would be available with a 44 gpm maximum capacity. Administrative controls allow only one charging pump to be operable in Mode 6. Therefore, consistent with the assumptions of the boron dilution event, good mixing will still be maintained because the 2200 gpm SDCS flow to 44 gpm charging pump flow ratio is bounded by the 4000 gpm to 132 gpm flow ratio used in demonstrating good mixing. Therefore, the proposed change does not affect the probability or consequences of the boron dilution event as presented in the FSAR.

2. Will operation of the facility in accordance with this proposed change create the possibility of a new or different kind of accident from any accident previously evaluated.

   Response: No

   The proposed change does not alter the configuration of the facility; therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Will operation of the facility in accordance with this proposed change involve a significant reduction in a margin of safety?

   Response: No

   A flow rate of 2200 gpm is sufficient to ensure reactor coolant mixing and prohibiting operations involving boron dilution minimize the effects of a boron dilution incident. Thus, the proposed change does not involve a significant reduction in a margin of safety.

The Commission has provided guidance concerning the application of standards for determining whether a significant hazards consideration exists by providing certain examples (48 FR 14870) of amendments that are considered not likely to involve significant hazards considerations. Example (vi) relates to a change which either may result in some increase in the probability or consequences of a previously analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptance criteria with respect to the system or component specified in the Standard Review Plan.

In this case, the pertinent acceptance criteria are found in SRP Sections 5.4.7, "Residual Heat Removal System," and 15.4.6, "Chemical and Volume Control System (CVCS) Malfunctions Resulting in a Decrease in Boron Concentrations in the Reactor Coolant (PWR)." SRP Section 5.4.7 requires, in part, that the RHR provide long-term cooling for the RCS. SRP Section 15.4.6 requires that a minimum of 30 minutes be available to credit operator action for mitigation of a boron dilution event in Mode 6. The proposed change reduces the minimum SDCS flow requirements from 4000 gpm to 2200 gpm. Regardless of the minimum SDCS flow requirement, the Mode 6 requirement for maintaining RCS temperature below 140°F defines the actual SDCS flow rate. Thus at any point in time after shutdown the proposed change will still require adequate SDCS flow to remove the decay heat generated to maintain RCS temperature below 140°F. Therefore the proposed change satisfies the SRP section 5.4.7 criteria. The proposed reduced minimum flow is also sufficient to ensure good mixing in the RCS thereby minimizing the effects of an inadvertent boron dilution event. Good mixing is provided by a high ratio of SDCS flow to charging flow (the charging pumps are the postulated source of demineralized water during a boron dilution event in Mode 6). FSAR Section 15.4.6 demonstrates good mixing exists because of the high ratio of SDCS flow to charging flow. The FSAR analysis to demonstrate good mixing assumes that 3 charging pumps are available. The resultant SDCS/charging flow ratio is 4000 gpm/132 gpm. However, the FSAR boron dilution event analysis assumes only one charging pump (44 gpm) is available. (Administrative controls allow only one charging pump to be available in Mode 6. With the proposed change, the actual SDCS/charging flow ratio for the boron dilution event is 2200 gpm/44 gpm which is bounded by the existing FSAR analysis. Therefore, good mixing is maintained and the analyses of the boron dilution event presented in the FSAR remain bounding. These analyses demonstrate that more than 60 minutes are available for operator action, satisfying the 30 minute SRP acceptance criteria. Because the SRP acceptance criteria continue to be satisfied, the proposed change is similar to Example (vi) of 48 FR 14870.

Safety and Significant Hazards Determination

Based on the above Safety Analysis, it is concluded that: (1) there is a reasonable assurance that the health and safety of the public will not be endangered by the proposed change; and (2) this action will not result in a condition which significantly alters the impact of the station on the environment as described in the NRC Final Environmental Statement.

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ATTACHMENT A

EXISTING SPECIFICATION - UNIT 2

3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

HIGH WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.1 At least one shutdown cooling train shall be OPERABLE and in operation.#

APPLICABILITY: MODE 6 when the water level above the top of the reactor pressure vessel flange is greater than or equal to 23 feet.

ACTION:

With no shutdown cooling train OPERABLE and in operation, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required shutdown cooling train to OPERABLE and operating status as soon as possible. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

SURVEILLANCE REQUIREMENTS

4.9.8.1 At least one shutdown cooling train shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 4000 gpm at least once per 12 hours.

#The shutdown cooling train may be removed from operation for up to 1 hour per 8 hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor pressure vessel hot legs.

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.2 Two independent shutdown cooling trains shall be OPERABLE and at least one shutdown cooling train shall be in operation.

APPLICABILITY: MODE 6 when the water level above the top of the reactor pressure vessel flange is less than 23 feet.

ACTION:

a. With less than the required shutdown cooling trains OPERABLE, immediately initiate corrective action to return the required shutdown cooling trains to OPERABLE status, or to establish greater than or equal to 23 feet of water above the reactor pressure vessel flange as soon as possible.

b. With no shutdown cooling train in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required shutdown cooling train to operation. Close all containment penetrations providing direct access from the containment atmophere to the outside atmosphere within 4 hours.

SURVEILLANCE REQUIREMENTS

4.9.8.2 At least one shutdown cooling train shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 4000 gpm at least once per 12 hours.

ATTACHMENT B

EXISTING SPECIFICATION - UNIT 3

3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

HIGH WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.1 At least one shutdown cooling train shall be OPERABLE and in operation.#

APPLICABILITY: MODE 6 when the water level above the top of the reactor pressure vessel flange is greater than or equal to 23 feet.

ACTION:

With no shutdown cooling train OPERABLE and in operation, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required shutdown cooling train to OPERABLE and operating status as soon as possible. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

SURVEILLANCE REQUIREMENTS

4.9.8.1 At least one shutdown cooling train shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 4000 gpm at least once per 12 hours.

#The shutdown cooling train may be removed from operation for up to 1 hour per 8 hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor pressure vessel hot legs.

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LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.2 Two independent shutdown cooling trains shall be OPERABLE and at least one shutdown cooling train shall be in operation.#

APPLICABILITY: MODE 6 when the water level above the top of the reactor pressure vessel flange is less than 23 feet.

ACTION:

a. With less than the required shutdown cooling trains OPERABLE, immediately initiate corrective action to return the required shutdown cooling trains to OPERABLE status, or to establish greater than or equal to 23 feet of water above the reactor pressure vessel flange as soon as possible.

b. With no shutdown cooling train in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required shutdown cooling train to operation. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

SURVEILLANCE REQUIREMENTS

4.9.8.2 At least one shutdown cooling train shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 4000 gpm at least once per 12 hours.

Both shutdown cooling trains may be removed from operation for up to 1 hour per 8-hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor pressure vessel hot legs provided all operations involving a reduction in boron concentration of the RCS are suspended.