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May 25, 1984

Director, Office of Nuclear Reactor Regulation
Attention: D. M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket No. 50-206
Pre-Startup Hot Functional Testing
San Onofre Nuclear Generating Station
Unit 1

References:

1. Letter, M. O. Medford, SCE, to D. M. Crutchfield, NRC, Return-to-Service Requirements, April 16, 1984

2. Letter, D. M. Crutchfield, NRC, to K. P. Baskin, SCE, Technical Specification 3.1.3 - Combined Heatup, Cooldown, and Pressure Limitations, November 22, 1983

3. Letter, K. P. Baskin, SCE, to H. R. Denton, NRC, Heatup and Cooldown Curves, April 18, 1980

4. Letter, J. L. Rainsberry, SCE, to D. M. Crutchfield, NRC, Proposed Change Nos. 76 and 126, April 12,1984

Reference 1 provided you with our plan for San Onofre Unit 1 return-to-service, which included our intention to initiate hot functional testing on August 1, 1984. We stated that we are reviewing any Technical Specification change requirements which may be required to be implemented prior to leaving Mode 5. The results of our review and other information pertinent to the hot functional testing are presented below.

As part of the return to service schedule, San Onofre Unit 1 will be conducting hot functional testing prior to actual start-up in order to survey and test structures and components. In conducting hot functional testing, the reactor coolant system temperature will be raised to more than 500^{o}F with K_{eff} remaining at $\leq$ 0.95. According to Technical Specification definitions, these parameters indicate Operational Mode 3. Since the temperature will be raised by mechanical means, not involving core alterations, there will be no additional decay heat associated with the transition from Mode 5 to Mode 3.

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Furthermore, increasing the RCS temperature will increase the temperature moderator coefficient, thus increasing the shutdown margin. Hot functional testing will entail increasing the RCS temperature in approximately 60°F temperature increments. Between each increment, surveillance and measurement data will be taken. Based on this process, the RCS temperature will increase at a slow rate.

The review of the Technical Specifications identified three areas which should be discussed prior to performing the hot functional test. These three areas are (1) the heatup and cooldown curves in Specification 3.1.3, (2) the source of auxiliary feedwater in Specification 3.4.1, and (3) the DC power supply in Specification 3.7. Each of these areas is discussed in the following paragraphs.

Heatup and Cooldown Curves

As discussed in Reference 2, the heatup and cooldown curves currently included in the technical specifications as Figures 3.1.3a and 3.1.3b have been updated to reflect the service period up to 16 EFPY. Reference 2 requested that we propose a technical specification change to require that revisions to these curves be made by license amendment. You also requested that this change include the current figures 3.1.3a and 3.1.3b. This proposed change was submitted to you by letter dated May 17, 1984. However, since the current technical specifications already incorporate the updated heatup and cooldown curves and since these curves are at least as conservative as the previous curves, it is concluded that this change to the technical specifications does not need to be approved by the NRC and implemented prior to performing the hot functional test.

Source of Auxiliary Feedwater

Specification 3.4.1 requires a minimum of 15,000 gallons of water in the condensate storage tank as a source of water to the auxiliary feedwater pumps prior to pressurizing the reactor above 500 psig. However, during the current outage, a new tank (presently referred to as the auxiliary feedwater storage tank) has been constructed to provide a source of water to these pumps. It is intended that 150,000 gallons in this new tank will be dedicated for auxiliary feedwater. Although the existing condensate storage tank will be available during the hot functional testing, it would normally be valved out by closed manual valves to enable the pumps to take suction from the new tank. In order to permit operational flexibility during the testing, it is our intention to use either tank as a source of water to the auxiliary feedwater pumps. Therefore, the intent of Specification 3.4.1 will be met by maintaining one of these tanks operable with at least 15,000 gallons at all times and no technical specification change is required.

Battery Bank No. 1 Replacement

Due to the approach of DC Battery Bank No. 1 end-of-service life, appropriate actions for replacement of this battery are under way as discussed in Reference 4. Based on the current replacement schedule for Battery Bank No. 1, the construction phase of this schedule may be coincident with the hot functional testing described above. The current Technical Specification 3.7, "Auxiliary Electrical Supply", requires two sources of emergency DC power while in Modes 1 and 2, and one source in Modes 5 and 6, but does not address emergency power sources required for Modes 3 and 4. This specification will be revised by Proposed Change No. 126 to require two sources of emergency DC power while in Modes 1, 2, 3 and 4. By separate correspondence we will request that Proposed Change No. 126 be revised to specify the appropriate surveillances associated with the increased capacity of the replacement battery. Since implementation of the revised Technical Specification would require both battery banks to be in service during the hot functional testing, and it may be necessary for Battery Bank No. 1 to be out of service during the hot functional testing, it is requested that issuance of Proposed Change No. 126 be delayed so that it does not become effective prior to the end of hot functional testing. As explained below, the justification for this request is based upon the low probability of a demand for emergency DC power during hot functional testing and the acceptable consequences of a transient or accident should one occur.

Since the reactor may be in Mode 3 for approximately two to three weeks during the nine week installation phase of the replacement battery, temporary batteries will be connected to the DC Bus served by Battery Bank No. 1. These batteries will be three non-safety related, non-seismic batteries (C&D KCU-9), having a total 8-hour capacity of 1224 Ampere Hours (AH). Their purpose will be to supply DC power to the 125-V DC Bus No. 1 loads to ensure safe shutdown capability of Unit 1 following plant transients or accidents. The most limiting plant transients and accidents have been evaluated and are described in the following paragraphs. These events have a very low probability of occurrence and the consequences are considered acceptable.

The event which requires the largest amount of emergency DC power is the Safety Injection System actuation coincident with Loss of Offsite Power in Mode 3 (without turbine roll) (SISLOP). Under these conditions the load is expected to be 577 amperes during the first minute and 255 amperes thereafter. Calculations indicate that the temporary batteries could sustain this load duty cycle for approximately 3 hours which is much longer than the present required duty cycle for Battery Bank No. 1 (90 minutes) and therefore the consequences of this event are acceptable. Furthermore, the ability of the temporary battery to perform the described function will be verified by conducting a preoperational test and thereafter providing surveillance and maintenance, as follows:

(1) Preoperational Test

125-V DC Bus No. 1 will be served by the temporary batteries for 30 minutes to supply power to existing 125-V DC loads simulating the loads required following a SISLOP in Mode 3 (without turbine roll). These loads include those required to start Emergency Diesel Generator No. 1.

(2) Surveillance and Maintenance

The surveillance and maintenance, presently in effect for existing 125-V DC Battery No. 1, will be performed on the temporary batteries (daily, weekly, etc.).

A second event which would require emergency DC power from the temporary batteries is a LOP. The worst single failure for this scenario would also be the failure of one diesel generator to start. Since the loads for this event are less than those for the SISLOP, the temporary batteries would also be capable of supplying the necessary DC power. Therefore, as in the SISLOP event, the consequences are acceptable.

The above scenarios are the most probable events in which the temporary batteries would be required to function. In each scenario, one diesel generator is operable and can supply emergency power to the required loads. Under normal plant conditions it would not be credible to assume the failure of both diesel generators. However, for this present evaluation, the higher probability event of the two discussed above (i.e., LOP) has been analyzed to determine the impact of failure of both diesel generators to start. For reasons discussed below, previous analysis and experiments have been conducted to determine the amount of decay heat in the reactor core. Based on this value, the consequences of a LOP coincident with failure of both diesel generators to start (i.e., Station Blackout) during the hot functional testing would be acceptable.

By letter dated April 6, 1984, we provided the Region V office with a justification for Mode 5 operation with both trains of RHR inoperable. The justification was based upon the fact that due to the length of the existing outage (approximately 25 months) the decay heat from the San Onofre Unit 1 core has decreased to levels for which an equilibrium with Reactor Coolant System (RCS) ambient losses is attained at 190^{o}F when the RCS is solid and the steam generators are filled to 300 inches. A summary report of the tests which were conducted to demonstrate this equilibrium was provided as an enclosure to the April 6, 1984 letter. Since no core alterations will occur prior to actual start-up, the amount of decay heat in the core will not increase. Therefore, in the highly unlikely event of a station blackout during the hot functional testing, the RCS will begin to cooldown. Although the amount of time before equilibrium is reached is not known, the fact that the RCS is cooling down assures that sufficient time will be available to initiate corrective action to restore onsite or offsite power. Therefore, the consequences of this low probability event are considered acceptable.

In summary, only one source of emergency DC power is required by the current technical specifications for Modes 3, 4 or 5 operation. San Onofre Unit 1 is scheduled to leave Mode 5 on August 1, 1984 for hot functional testing. Since this testing may be coincident with the replacement of Battery Bank No. 1, only Battery Bank No. 2 would be operable during Modes 3 and 4. Although this is consistent with the current technical specifications, a temporary battery of sufficient capacity to power DC Bus No. 1 loads and start Diesel Generator No. 1 will be installed during the replacement period. The ability of the temporary battery to perform its function will be verified by testing and surveillance. Therefore, the power supply for DC Bus No. 1 during the hot functional testing is considered to be adequate.

Based upon the above discussion, there are no significant safety issues regarding the performance of Mode 3 and 4 hot functional testing and in addition, no changes to the technical specifications are required to permit this testing. Accordingly, we will proceed on a schedule to perform the pre-startup hot functional testing on August 1, 1984.

If you have any questions or comments regarding our plans as discussed above, please let me know as soon as possible.

Very truly yours,

M. O. Medford

cc: J. B. Martin, Regional Administrator, Region V
A. E. Chaffee, USNRC Resident Inspector, SO123
A. J. D'Angelo, USNRC Resident Inspector, SO1