UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Application of SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. for a Class 103 License to Acquire, Possess, and Use a Utilization Facility as Part of Unit No. 3 of the San Onofre Nuclear Generating Station	)	Docket No. 50-362 Amendment Application No. 102, Supplement

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. pursuant to 10 CFR 50.90, hereby submit a Supplement to Amendment Application No. 102.

This amendment application consists of Proposed Change Number (PCN)-359 to Facility Operating License No. NPF-15. PCN-359 is a request to revise San Onofre Unit 3 Technical Specification (TS) 3/4.4.8.1, "Pressure-Temperature Limits," TS 3.4.8.3.1, "Overpressure Protection Systems-RCS Temperature ≤302°F," and TS 3.4.8.3.2, "Overpressure Protection Systems-RCS Temperature >302°F." The proposed change 1) revises the Reactor Coolant System (RCS) Pressure-Temperature (P-T) limit curves and the Low Temperature Overpressure Protection (LTOP) enable temperatures to be effective until 8 Effective Full Power Years (EFPY) of operation and 2) makes minor changes which make the Unit 3 TSs consistent with the Unit 2 TSs.

Subscribed on this 30th day of APRIL, 1993.

Respectfully submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

By: Harold B. Ray
Harold B. Ray
Senior Vice President

State of California
County of ORANGE
On 4/30/93 before me, BARBARA A. McCARTHY/NOTARY PUBLIC, personally appeared HAROLD B. RAY, personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Signature Barbara A. McCarthy

OFFICIAL SEAL
BARBARA A. MC CARTHY
Notary Public-California
ORANGE COUNTY
My Commission Expires
March 31, 1996

James A. Beoletto
Attorney for Southern
California Edison Company

By: James A. Beoletto
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DESCRIPTION AND SAFETY ANALYSIS OF THE SUPPLEMENT TO PROPOSED CHANGE NPF-15-359

This is a request to revise Technical Specifications (TSs) 3/4.4.8.1, "Pressure-Temperature Limits," 3.4.8.3.1, "Overpressure Protection Systems-RCS Temperature ≤302°F," and 3.4.8.3.2, "Overpressure Protection Systems-RCS Temperature >302°F," and associated Bases for San Onofre Unit 3. This is also a request to make minor changes which make the Unit 3 TSs consistent with the Unit 2 TSs.

Existing Specifications

Attachment A - Unit 3 Technical Specifications and Bases

Proposed Specifications

Attachment B - Unit 3 Technical Specifications and Bases

DESCRIPTION

Technical Specification (TS) 3/4.4.8.1, "Pressure-Temperature Limits," TS 3.4.8.3.1, "Overpressure Protection Systems-RCS Temperature ≤302°F," and 3.4.8.3.2, "Overpressure Protection Systems-RCS Temperature >302°F," provide the limiting conditions for operation (LCO), actions, and surveillance requirements for the Reactor Coolant System (RCS).

The proposed change revises TSs 3/4.4.8.1, 3.4.8.3.1, 3.4.8.3.2, and associated TS Bases based on 1) the test results and analysis of the first irradiated surveillance capsule which was removed from San Onofre Unit 3 in May 1990 after 4.33 Effective Full Power Years (EFPY) of operation and 2) updated surveillance capsule material properties evaluated in response to Generic Letter (GL) 92-01, Revision 1, "Reactor Vessel Structural Integrity, 10 CFR 50.54(f)."

The proposed change revises Figures 3.4-2, 3.4-4, and 3.4-5, adds new Figures 3.4-6 and 3.4-7, and deletes Figure 3.4-3. These figures represent the curves for RCS heatup Pressure-Temperature (P-T) limitations, RCS cooldown P-T limitations, maximum allowable cooldown rates, Remote Shutdown P-T limitations, and Remote Shutdown maximum allowable cooldown rates, respectively. Figures 3.4-6 and 3.4-7 account for the difference in Total Loop Uncertainties (TLUs) for pressure between shutdown instruments on the Remote Shutdown panels and shutdown instruments in the Control Room. The TLUs for temperature for both the Remote Shutdown instruments and the Control Room shutdown instruments are equal. Figure 3.4-3 is deleted because there are now only two heatup rate restrictions for Unit 3, i.e., 50°F/HR with the RCS cold leg temperature less than or equal to 159°F, or the maximum permitted heatup rate of 60°F/HR with the RCS cold leg temperature greater than 159°F.

The proposed change also revises the Shutdown Cooling System (SDCS) enable temperature for RCS overpressure protection based on the Low Temperature Overpressure Protection (LTOP) range in TS Table 3.4-3. This SDCS Relief Valve (LTOP) enable temperature is based on the methodology recommended in

NUREG-0800, Branch Technical Position RSB 5-2, Revision 1, "Overpressurization Protection of Pressurized Water Reactors While Operating at Low Temperatures."

The proposed P-T limits and LTOP enable temperatures shall be effective until 8 EFPY of plant operation. The specific changes to the above TSs are as follows:

TS INDEX

1. INDEX Page V, Section 3/4.4.8 - RCS temperatures changed from ≤302°F to ≤267°F, and from >302°F to >267°F.

2. INDEX Page XVII:

   a. Figure 3.4-2 - Add "SONGS 3" before "HEATUP," change "FOR 0-5 YEARS" to "UNTIL 8 EFPY," and add "NORMAL OPERATION" to the title of this Figure. These changes and the proposed changes for Unit 2 will result in both Units 2 and 3 TSs being consistent.

   b. Figure 3.4-3 - Delete. This figure is no longer necessary because there are now only two heatup rate restrictions, i.e., 50°F/HR and 60°F/HR.

   c. Figure 3.4-4 - Add "SONGS 3 COOLDOWN" before "RCS," change "FOR 4-8 EFPY" to "UNTIL 8 EFPY," and add "NORMAL OPERATION" to the title of this figure. These changes and the proposed changes for Unit 2 will result in both Units 2 and 3 TSs being consistent.

   d. Figure 3.4-5 - Add "SONGS 3" before "RCS," change "(4-8 EFPY)" to "(UNTIL 8 EFPY)," and add "NORMAL OPERATION" to the title of this figure. These changes and the proposed changes for Unit 2 will result in both Units 2 and 3 TSs being consistent.

   e. Add "Figure 3.4-6 SONGS 3 COOLDOWN RCS PRESSURE/TEMPERATURE LIMITATIONS UNTIL 8 EFPY - REMOTE SHUTDOWN OPERATION," and Page 3/4 4-31b.

   f. Add "Figure 3.4-7 SONGS 3 RCS PRESSURE/TEMPERATURE LIMITS MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 8 EFPY) - REMOTE SHUTDOWN OPERATION," and Page 3/4 4-31c.

   g. Relocate Index Figures 5.6-1, "UNITS 2 AND 3 FUEL MINIMUM BURNUP VS. INITIAL ENRICHMENT FOR REGION II RACKS," 5.6-2, "UNIT 1 FUEL MINIMUM BURNUP VS. INITIAL ENRICHMENT FOR REGION II RACKS," and 5.6-3, "FUEL STORAGE PATTERNS FOR REGION II RACKS" from Page XVII to Page XVIIa.

3. INDEX Page XIX:

   a. Remove Tables 3.3-12, "Radioactive Liquid Effluent Monitoring Instrumentation," and 4.3-8, "Radioactive Liquid Effluent Monitoring Instrumentation Surveillance Requirements," from the TS

Index because these tables were deleted previously by Amendment No. 73.

b. Add "AND ANALYSIS PROGRAM" to the title of Table 4.4-4 to make the table title correct and consistent with the Unit 2 TSs.

c. Change the page number for Table 3.4-3, "Low Temperature RCS Overpressure Protection Range," from Page 3/4 4-31b to Page 3/4 4-31d. This change is due to the proposed addition of Figures 3.4-6 and 3.4-7 to the Unit 3 TSs as Pages 3/4 4-31b and 3/4 4-31c, respectively.

TS 3.4.8.1

The specific changes to TS 3.4.8.1 are as follows:

1. Add new Figures 3.4-6 and 3.4-7 and delete Figure 3.4-3 from the LCO. These new figures provide P-T limits for Remote Shutdown cooldown operation. Figure 3.4-3 is deleted because there are now only two restrictions on the heatup rate, i.e., 50°F/HR with the RCS cold leg temperature less than or equal to 159°F, or 60°F/HR with the RCS cold leg temperature greater than 159°F.

2. LCO 3.4.8.1.a - In the first sentence, replace "as specified by Figure 3.4-3" with "of 50°F" because Figure 3.4-3 is now deleted as discussed above, and change "less than 153°F" to "less than or equal to 159°F" to indicate the new RCS cold leg temperature which restricts the 50°F/HR heatup rate. In the second sentence, change "153°F" to "159°F" to indicate the new RCS cold leg temperature which restricts the 60°F/HR heatup rate.

3. LCO 3.4.8.1.b - In the first sentence, change "less than 126°F" to "less than or equal to 172°F" to indicate the new RCS cold leg temperature which restricts cooldown to the cooldown rates in Figure 3.4-5. In the second sentence, change the RCS cold leg temperature from 126°F to 172°F to indicate the temperature above which the maximum cooldown rate of 100°F/HR is permitted.

4. Delete the "LIMITING CONDITION FOR OPERATION" heading on page 3/4 4-28a. This heading is deleted because it is inappropriate for the Surveillance Requirements section of the TS. This change is editorial.

5. Surveillance Requirement (SR) 4.4.8.1.2:

   a. In the second sentence of the first paragraph, replace "3.4-3" after "Figures 3.4-2 and" with "3.4-4 through 3.4-7." This change makes the TS reflect the correct references to the limit curves.

   b. In the third sentence of the same paragraph, replace "based on the greater of the following:" after "Temperature" with 'in accordance with Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.'

c. Delete SRs 4.4.8.1.2.a and 4.4.8.1.2.b - The existing SRs specify that 1) surveillance data should be used to recalculate the Adjusted Reference Temperature (ART) and update the RCS pressure-temperature limit curves and 2) the ART should be recalculated based on the greater of the actual shift (ART) of the limiting plate determined from surveillance data or the predicted shift (ART) of the limiting weld determined from Regulatory Guide 1.99, Revision 2.

The existing SR 4.4.8.1.2.a and b do not accurately reflect the guidance of Regulatory Guide 1.99, Revision 2 on the use of surveillance data to determine the ART. Regulatory Guide 1.99, Revision 2 specifies that when two or more credible surveillance data sets become available, the ART should be calculated based on the surveillance data and the Regulatory Guide 1.99 methodology and the greater of the two ART values from this calculation should be used. The method of calculating ART applies to both vessel beltline plates and welds as long as the surveillance data are credible (as defined in Regulatory Guide 1.99, Revision 2). Hence, the revised TS 4.4.8.1.2 simply specifies that the surveillance capsule analysis results will be used to update the RCS pressure-temperature limits in accordance with Regulatory Guide 1.99, Revision 2. This change clarifies that no deviations from this guidance are intended.

6. Figures 3.4-2, 3.4-3, 3.4-4, and 3.4-5:

Figure 3.4-2:

a. In the title, add "HEATUP," add "S" to "LIMITATION," change "FOR 4-8" to "UNTIL 8," and add "Normal Operation" so that it reads "SONGS 3 HEATUP RCS PRESSURE/ TEMPERATURE LIMITATIONS UNTIL 8 EFPY, Normal Operation."

b. Inservice Tests Curve - Change the Lowest Service Temperature (LST) from 202°F to 209°F. The allowable inservice test RCS pressure at the LST is decreased from 1650 psia at 202°F to 1100 psia at 209°F.

c. Heatup Curve - Revise the 60°F/HR heatup curve based on the revised calculations. For the portion of the curve above the LTOP alignment temperature, all segments of the curve have shifted to the right, i.e., toward a lower allowed pressure at a given temperature. Delete the references to heatup rates and temperatures for the heatup curve because these heatup rates and temperatures are already given in TS 3.4.8.1.a.

d. Core Critical Curve - Revise the curve corresponding to the change in the 60°F/HR heatup curve (i.e., 40°F above and parallel to the Heatup Curve). Change the minimum indicated RCS temperature from 256°F to 292°F, which is equal to the allowable temperature required to perform an inservice hydrostatic test.

e. The acceptable regions of operation for Inservice Tests, Heatup, and Core Critical are specified in Figure 3.4-2. For the Inservice Tests curve, add the note "* Acceptable operating region - to the right of the inservice tests curve (Applicable in modes other than Modes 1 and 2)." For the Heatup and Core Critical curves, add the note "# Acceptable operating region - to the right of the heatup curve in all modes. In addition, in Modes 1 and 2 operating region to the right of the core critical curve."

f. Change the "Indicated Pressurizer Pressure (Psia)" scale so that the figure starts at "15 psia" instead of "0" psia. The existing Figure 3.4-2 shows the 86°F Minimum Boltup Temperature (MBT) line intersecting the "0" psia line. This change in scale also applies to Figure 3.4-4.

   The proposed Figures 3.4-2 and 3.4-4 correct the existing TS which shows the 86°F MBT line intersecting the "0" psia line. The MBT should intersect the pressure which is equivalent to atmospheric pressure (15 psia) that exists in the RCS when the head is detensioned. Therefore, the "Indicated Pressurizer Pressure (Psia)" scale is changed to commence at "15 psia" instead of "0 psia."

g. Add "T_c" to end of "INDICATED RCS TEMPERATURE (°F)" to indicate RCS cold leg temperature.

Figure 3.4-3:

Delete Figure 3.4-3. Figure 3.4-3 is no longer necessary because there are now only two heatup rate restrictions (50°F/HR with RCS cold leg temperature less than or equal to 159°F or 60°F with RCS cold leg temperature greater than 159°F).

Figure 3.4-4:

a. In the title, add "COOLDOWN," change "FOR 4-8 EFPY" to "UNTIL 8 EFPY," and add "Normal Operation" so that it reads "SONGS 3 COOLDOWN RCS PRESSURE/TEMPERATURE LIMITATIONS UNTIL 8 EFPY, Normal Operation."

b. Change the LST from 202°F to 209°F. The allowable inservice test RCS pressure at the LST is decreased from 1200 psia at 202°F to 709 psia at the new LST of 209°F.

c. Change the pressure scale to start at 15 psia. The existing Figure 3.4-4 shows the pressure scale starting at 0 psia.

d. Add "Acceptable Operating Region" and "Unacceptable Operating Region" notes to the figure.

e. Delete the references to cooldown rates and temperatures for the cooldown curve because these cooldown rates and temperatures are already given in TS 3.4.8.1.b.

f. Add "T_c" to end of "INDICATED RCS TEMPERATURE (°F)" to indicate RCS cold leg temperature.

Figure 3.4-5:

a. In the title, change "(4-8 EFPY)" to "(UNTIL 8 EFPY)," and add "Normal Operation" so that it reads "SONGS 3 RCS PRESSURE/TEMPERATURE LIMITS MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 8 EFPY), Normal Operation.""

b. Decrease the maximum allowable cooldown rate from 30°F/HR to 10°F/HR at the 86°F minimum boltup temperature with the head tensioned.

c. Increase the required RCS cold leg temperature from 126°F to 172°F to permit the maximum cooldown rate of 100°F/HR.

d. Add "T_c" to end of "INDICATED RCS TEMPERATURE (°F)" to indicate RCS cold leg temperature.

7. Add Figure 3.4-6, "SONGS 3 COOLDOWN RCS PRESSURE/TEMPERATURE LIMITATIONS UNTIL 8 EFPY, Remote Shutdown Operation," and Figure 3.4-7, "SONGS 3 RCS PRESSURE/TEMPERATURE LIMITS MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 8 EFPY), Remote Shutdown Operation." These two new curves proposed for TS 3.4.8.1 incorporate the results of an analysis which determined that the TLUs for pressure for the Remote Shutdown panel instruments are higher than the TLUs for pressure for the Control Room shutdown instruments. These new curves will account for the Remote Shutdown instrument TLUs. The TLUs for temperature for both the Remote Shutdown instruments and the Control Room shutdown instruments are equal.

Figure 3.4-6 indicates:

a. A required RCS pressure of 689 psia at the LST of 209°F.

b. The "Acceptable Operating Region" and the "Unacceptable Operating Region" for the figure.

Figure 3.4-7 indicates:

a. A maximum allowable cooldown rate of 5°F/HR at the indicated RCS temperature of 86°F (MBT).

b. An RCS cold leg temperature of 180°F to permit the maximum cooldown rate of 100°F/HR.

8. Table 3.4-3: Low Temperature RCS Overpressure Protection Range

   a. Under "Operating Period, EFPY" column, replace "4 to 8" with "Until 8 (Normal Operation)," and add "Until 8 (Remote Shutdown Operation)."

   b. Under "During Heatup" column, change "302" to "267," and under the "During Cooldown" column, change "267" to "250" for normal operations.

   c. Add "*" under "During Heatup" column and "≤250" under the "During Cooldown" column, for Remote Shutdown Operation.

   d. Add footnote that reads "* Heatup operations are not normally performed from the Remote Shutdown panels."

   e. Change the TS page number from "3/4 4-31b" to "3/4 4-31d."

TS 3.4.8.3.1

Revise the RCS temperature in the title from ≤302°F to ≤267°F. This temperature is also the new SDCS Relief Valve enable temperature for LTOP.

TS 3.4.8.3.2

1. Revise the RCS temperature in the title from >302°F to >267°F. This temperature is also the new SDCS Relief Valve enable temperature for LTOP.

2. In the first sentence of ACTION b, delete "or an RCS vent" after "SDCS Relief Valve," and in the second sentence delete "or RCS vent." The references to RCS vent are deleted because the existing LCO does not permit RCS venting above 267°F.

3. Delete Surveillance Requirement (SR) 4.4.8.3.2.3 - This SR is deleted because the RCS vent is not permitted in the TS 3.4.8.3.2 LCO. Therefore, this SR is not appropriate. This SR is already existing in 4.4.8.3.1.2, where it is appropriate.

BASES to TS 3/4.4.8

Revise the associated Bases to TS 3/4.4.8, "Pressure/Temperature Limits," to document the basis for these TS changes and update Table B 3/4.4-1, "Reactor Vessel Toughness" based on material properties evaluated in the July 6, 1992 and January 29, 1993 SCE response to GL 92-01, Revision 1. The revisions to TS 3/4.4.8 Bases are as follows:

1. On Page B 3/4 4-7

   In the first sentence of the first paragraph, add "for normal operation" after "limit curves," change "Figures 3.4-2 and 3.4-3" in the parenthesis to "Figures 3.4-2 and 3.4-4," and add "and the cooldown

limit curve for remote shutdown operation (Figure 3.4-6)" after the parenthetical "(Figures 3.4-2 and 3.4-4)." Add a new second sentence to the first paragraph to read "The limit curves for Remote Shutdown operation are determined using the Total Loop Uncertainties (TLUs) for temperature and pressure for the Remote Shutdown Panel instruments in which the pressure TLUs are higher than those for the Control Room shutdown instruments." In the last sentence of the first paragraph, replace "indicated on Figures 3.4-2 and 3.4-3" with ", and they include adjustments for instrument uncertainties, and static and dynamic heads."

In the first sentence of the second paragraph, change "have been" to "were," and add "prior to reactor startup" after "tested." In the second sentence, add "and the updates resulting from the evaluation of material properties in response to Generic Letter 92-01, "Reactor Vessel Structural Integrity, Revision 1" after "these tests." In the fourth sentence, change "Table 5.2-5" to Table "5.2-6." In the last sentence, add "limit curve (Figure 3.4-2)" after "heatup," add "the" before "cooldown," replace "Figures 3.4-2 and 3.4-3" with "Figures 3.4-4 and 3.4-6," and replace "possible errors in the pressure and temperature sensing instruments" with "instrument uncertainties, and static and dynamic heads."

In the first sentence of the third paragraph, add "50" after "10 CFR." This change makes the Unit 3 and Unit 2 TSs consistent.

In the last paragraph, change "Figures" to "Figure," and delete "and 3.4-3." The existing Figure 3.4-3 does not show the criticality or the inservice leak and hydrostatic testing pressure-temperature limit lines. In addition, Figure 3.4-3 is being deleted by this license amendment request. This change is made to correct the figure number reference.

2. Add a new Page B3/4 4-7a for the text overflow from Page B3/4 4-7 which resulted from the above changes. The changes to the existing text in this page are:

   In the second sentence of the first paragraph of the new page, change "Figures 3.4-2 and 3.4-3" to "Figures 3.4-2, 3.4-4, and 3.4-6." Add a new third paragraph to read: "The Low Temperature Overpressure Protection (LTOP) enable temperatures are based upon the recommendations of NUREG-0800 Branch Technical Position (BTP) RSB 5-2, Revision 1, "Overpressurization Protection of Pressurized Water Reactors While Operating at Low Temperatures." BTP RSB 5-2, Revision 1 defines the enable temperature as "the water temperature corresponding to a metal temperature of at least RT_{NDT} + 90°F at the beltline location (1/4t or 3/4t) that is controlling in the Appendix G limit calculations."

3. On Page B3/4 4-8, Table B3/4.4-1, "Reactor Vessel Toughness," the changes are:

   In Rows 4, 5, and 6 under the "Temperature of Charpy V-Notch @ 30 ft-lb" column, change "32" to "40," "36" to "40, and "32" to "40," respectively. Under the "Temperature of Charpy V-Notch @ 50 ft-lb" column, change "62" to "70," "64" to "70," and "100" to "80,"

respectively. Under the "Minimum Upper Shelf Cv energy for Longitudinal Direction-ft lb" column, change "115" to "118," "110" to "116," and "90" to "92," respectively.

In Row 7 under the "Drop Weight Results" column, change "-20" to "-10." In Rows 7 and 9 under the "Temperature of Charpy V-Notch @ 30 ft-lb" column, change "56" to "110" and "44" to "60," respectively. In Rows 7 and 8 under the "Temperature of Charpy V-Notch @ 50 ft-lb" column, change "100" to "135" and "66" to "70," respectively.

In Rows 7, 8, and 9 under the "Minimum Upper Shelf Cv energy for Longitudinal Direction-ft lb" column, change "95" to "94," "113" to "115," and "101" to "105," respectively.

The changes above update the TS Bases based on the results of the evaluation of material properties in response to GL 92-01, Revision 1.

BASIS FOR AND ACCEPTABILITY OF THE REQUEST

The new Unit 3 P-T limits in this proposed change were found to be less restrictive than what are currently being administratively implemented at Unit 3. Therefore, SCE will continue to implement the existing Unit 3 administrative P-T limits until the NRC approves this license amendment request.

The existing Unit 3 TS RCS P-T limits were calculated using the fluence for 8 EFPY which were based upon the test results and analysis of the first surveillance capsule withdrawn from Unit 2 in September 1987 after 2.85 EFPY. The existing LTOP enable temperatures (302°F for heatup and 267°F for cooldown) were calculated in accordance with Branch Technical Position (BTP) RSB 5-2 Revision 0, "Overpressurization Protection of Pressurized Water Reactors While Operating at Low Temperatures," based upon 10 CFR 50 Appendix G limits at an RCS pressure equal to the pressurizer safety valve setpoint, i.e., 2500 psia.

The new Unit 3 P-T limits were calculated using 1) the fluence for 8 EFPY from the test results and analysis of the first surveillance capsule withdrawn from Unit 3 in May 1990 after 4.33 EFPY, and 2) updated material properties evaluated in response to Generic Letter (GL) 92-01, Revision 1, "Reactor Vessel Structural Integrity, 10 CFR 50.54." Unit 3 uses the same fluence projections as are used in Unit 2 because both units have identical core designs, fuel loading patterns, and have essentially the same past and projected operating histories. The proposed Unit 3 P-T limits for normal heatup and cooldown, inservice tests, and remote shutdown cooldown conform to the requirements of Appendices G and H to 10 CFR Part 50 and are valid until 8 EFPY. The Unit 3 surveillance program also conforms to the requirements of Appendix H to 10 CFR 50. Therefore, these P-T limit changes are acceptable.

The proposed LTOP enable temperatures were calculated in accordance with BTP RSB 5-2, Revision 1. BTP RSB 5-2, Revision 1 defines the LTOP enable temperature as "the water temperature corresponding to a metal temperature of at least RT_{NDT} + 90°F at the beltline location (1/4t or 3/4t) that is

controlling in the Appendix G limit calculations." This calculational basis changes the LTOP alignment temperature from 302°F to 267°F. Changing the RCS temperature at which LTOP must be aligned from 302°F to 267°F would not change the results of the most limiting energy addition transient which is driven by the differential temperature between the RCS and the steam generator rather than the RCS initial energy. The energy addition transient analysis accounts for a Reactor Coolant Pump (RCP) start with a temperature difference of 100°F between the RCS and the steam generator. Lowering the LTOP enable temperature would not change the existing 100°F differential RCP start limitations in TSs 3.4.1.3, "Hot Shutdown," and 3.4.1.4.1, "Cold Shutdown-Loops Filled." Therefore, the proposed TS for the LTOP system is bounded by the original analysis and, as such, the LTOP change is acceptable.

This proposed change is consistent with design assumptions for RCS pressure-temperature operational requirements, satisfies the stress limits for cyclic operations, and complies with the requirements of 10 CFR 50 Appendix G.

DISCUSSION

The maximum allowable Reactor Coolant System (RCS) pressure at any temperature is based upon the stress limitations for brittle fracture. TS 3/4.4.8.1, "Reactor Coolant System-Pressure Temperature Limits," provides operational constraints in all modes of reactor operation to ensure that the most stress limiting location in the reactor vessel is not susceptible to brittle failure as a consequence of reactor operations. The neutron-induced embrittlement of the reactor vessel wall also affects the temperature below which Low Temperature Overpressure Protection (LTOP) is required. LTOP is provided by the Shutdown Cooling System (SDCS) Relief Valve. The SDCS Relief Valve must be aligned below the specified temperature to provide assurance that the reactor vessel wall will be operated in the ductile region in accordance with 10 CFR 50 Appendix G during both normal operation and overpressurization events due to equipment malfunction or operator error. The existing TSs require alignment of the SDCS relief valve below the temperature corresponding to the P-T curve pressurizer relief valve setpoint of 2500 psia.

The existing Unit 3 TS RCS P-T limit curves in TS 3/4.4.8, Figures 3.4-2 and 3.4-4, were originally valid until 8 EFPY at an Adjusted Reference Temperature (ART)) of 92.4°F at the controlling 1/4t vessel location based on the fluence and test results from the Unit 2 surveillance capsule specimen withdrawn after 2.85 EFPY of operation. The existing LTOP enable temperatures are 302°F for heatup and 267°F for cooldown. These temperatures correspond to the allowable temperatures at the pressurizer safety valve setpoint, i.e., 2500 psia, on the 60°F/hr TS heatup and cooldown curves, respectively.

The new Unit 3 P-T limit curves in TS 3/4.4.8, Figures 3.4-2, 3.4-4, and 3.4-6 are valid until 8 EFPY with an ART of 141.4°F at the controlling 1/4t vessel location. This 141.4°F ART was based on the updated fluence projections from the Westinghouse Report WCAP-12920, "Analysis of the Southern California Edison Company San Onofre Unit 3 Reactor Vessel Surveillance Capsule Removed from the 97° Location," March 1991, and from updated material properties evaluated in our response to GL 92-01, Revision 1. The proposed change will

revise the existing Unit 3 P-T limits for heatup and cooldown in Figures 3.4-2 and 3.4-4. The proposed change also adds P-T limits for Remote Shutdown cooldown operation (Figure 3.4-6). Figure 3.4-6 incorporates the difference in TLUs for pressure between shutdown instruments on the Remote Shutdown panel and those shutdown instruments in the Control Room. The TLUs for temperature for both the Remote Shutdown instruments and the Control Room shutdown instruments are equal.

The proposed amendment changes the LTOP enable temperatures from 302°F to 267°F for heatup and 267°F to 250°F for cooldown during normal operations, and provides an LTOP enable temperature of 250°F for Remote Shutdown operation. These proposed LTOP enable temperatures are based upon the recommendations of NUREG-800 BTP RSB 5-2, Revision 1. These proposed LTOP temperatures also represent the most limiting enable temperatures for normal heatup, normal cooldown, and remote shutdown cooldown operations. Below these LTOP enable temperatures, the SDCS Relief Valve must be aligned during heatup operations and cooldown operations from either the Remote Shutdown panels or the Control Room.

The Minimum Boltup Temperature (MBT), which is used for administrative control, remains at 86°F as presently indicated in TS 3.4.8.1.d. The flux seen in the reactor vessel flange and adjacent regions results in a negligible RT_{NDT} shift. Therefore, the MBT does not change with time.

The effect of the reactor closure flange on P-T limits has been analyzed and determined not to impact the P-T limits. The material correlations in the analysis were based on copper and nickel content in accordance with Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.

Allowable temperatures for heatup and various cooldown rates for operation from 267°F and below were calculated using an RCS pressure of 450 psia. This 450 psia RCS pressure envelops the maximum RCS pressure which could be reached during a postulated overpressurization event for which the LTOP system (SDCS Relief Valve) is aligned. This ensures that with the SDCS Relief Valve aligned from 267°F and below, the proposed heatup and cooldown limits will bound all pressure conditions.

RCS heatup rates with the reactor head bolts tensioned and the RCS cold leg temperature equal to or above the minimum boltup temperature (86°F) are limited to 50°F/HR. The minimum temperature at which the maximum heatup rate of 60°F/hr is permitted is when the RCS cold leg temperature is greater than 159°F.

The core critical limit curve in Figure 3.4-2 is in accordance with 10 CFR 50 Appendix G, which requires the reactor vessel temperature to be 40°F above the heatup P-T limits when the core is critical or at a temperature equal to or greater than the temperature required for inservice hydrostatic test. The Lowest Service Temperature (LST) in Figure 3.4-2 is calculated in accordance with ASME Section III, Article NB-2332(b), which requires an LST of RT_{NDT} + 100°F for piping, pumps, and valves of nominal wall thickness over 2-1/2 inches. Our calculations, including instrument uncertainties, arrived at an

LST of 209°F. Below this LST, 20 percent of the system hydrostatic test pressure cannot be exceeded. Inservice test allowable P-T limits assume hydrostatic pressure tests and RCS inservice leak tests are conducted at isothermal conditions.

For the RCS P-T limits in Figure 3.4-4, the RCS pressure is decreased from 1200 psia at the LST of 202°F to 709 psia at the new LST of 209°F. The 100°F/hr cooldown curve intersects the 450 psia RCS pressure at 172°F. Below this temperature allowable cooldown rates, based upon an RCS pressure of 450 psia, are provided as a function of RCS temperature in Figure 3.4-5. These cooldown rates range from 10°F/hr at 86°F to 100°F/hr at 172°F.

Remote Shutdown cooldown operational limits are depicted in new Figures 3.4-6 and 3.4-7. Figure 3.4-6 provides the P-T limits and Figure 3.4-7 provides the allowable cooldown rates for Remote Shutdown operation to be effective until 8 EFPY. The new Figures 3.4-6 and 3.4-7 provide more conservative limits because they include TLUs for pressure for the shutdown instruments on the Remote Shutdown panel that have been found by analysis to be higher than the TLUs for pressure for the Control Room shutdown instruments. The temperature TLUs for both the Remote Shutdown instruments and the Control Room shutdown instruments are equal.

The results of the transient analysis, i.e., the mass addition transient and the energy addition transient analyses in the Updated Final Safety Analysis Report (UFSAR) Section 5.2.2.11.2, "Design and Analysis," have been reviewed and approved by the NRC. Because there has been no LTOP system hardware or relief pressure setpoint modifications, the previous analyses are valid until 8 EFPY. The UFSAR will be revised to reflect the 1) revised LTOP enable temperatures for heatup and cooldown operations from the Control Room, 2) LTOP enable temperature for cooldown from the Remote Shutdown Panel, and 3) updated material properties evaluated in our response to GL 92-01, Revision 1.

SAFETY ANALYSIS:

The proposed change described above shall be deemed to involve a significant hazards consideration 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 an accident previously evaluated?

   Response: No.

   To compensate for any increase in the reactor vessel nil ductility reference temperature (RT_{NDT}) caused by neutron irradiation, limits on pressure-temperature (P-T) relationships are periodically changed in accordance with 10 CFR 50, Appendix G. This allows the materials for the pressure-retaining components of the reactor coolant pressure boundary to stay within their stress limits during any condition of normal operation, including anticipated operational occurrences and

system hydrostatic tests, over its service lifetime.

The updates to Figures 3.4-2, 3.4-4, and 3.4-5 incorporate the changes to the P-T limits calculated using conservative fluence values. The new P-T limit curves (Figures 3.4-6 and 3.4-7) for Remote Shutdown cooldown operation incorporate the higher Total Loop Uncertainties (TLUs) for pressure for shutdown instruments on the Remote Shutdown panel as compared to the lower TLUs for pressure for Control Room shutdown instruments. The temperature TLUs for both the Remote Shutdown instruments and the Control Room shutdown instruments are equal. These updates maintain margins of safety against nonductile failure of the reactor pressure vessel based on the results of the Unit 3 surveillance capsule analysis and the updated material properties evaluated in response to Generic Letter 92-01, Revision 1, "Reactor Vessel Structural Integrity." Therefore, the proposed change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

The change to the Low Temperature Overpressure Protection (LTOP) enable temperatures is in accordance with NUREG-800 Branch Technical Position RSB 5-2, Revision 1, "Overpressurization Protection of Pressurized Water Reactors While Operating at Low Temperatures." The results of the most limiting energy addition transient which is driven by the differential temperature between the Reactor Coolant System (RCS) and the steam generator are not changed by this revision to the LTOP. As such the proposed change is bounded by the original analysis. Therefore, the proposed LTOP enable temperature change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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 incorporates the change in reactor vessel RT_{NDT} from different irradiation stages to reflect the accumulation of fast neutron exposure. Any increase in RT_{NDT} due to irradiation is compensated for by limiting pressure-temperature relationships in accordance with 10 CFR 50 Appendix G to ensure pressure-retaining components of the reactor coolant pressure boundary stay within their stress limits over their service lives. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

All LTOP design basis energy addition and mass addition transients have been previously evaluated and remain bounding. The proposed changes do not result in any system configuration changes which would affect the capability of the Shutdown Cooling System (SDCS) Relief Valve to respond to design basis transients. Operation of the plant in accordance with TSs 3.4.1.3, "Hot Shutdown," and 3.4.1.4.1, "Cold Shutdown-Loops Filled," remain unchanged. Therefore, the proposed LTOP enable

temperature changes will 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.

   The purpose of the P-T limit curves is to limit thermal stresses induced by the normal load transients, reactor trips, and unit startup and shutdown operations. The proposed revision to the P-T limit curves incorporates the effects of neutron-induced embrittlement in the pressure-retaining component materials to preserve the margin of safety required by 10 CFR 50, Appendix G. Therefore, the proposed change will not involve a significant reduction in a margin of safety.

   The proposed LTOP enable temperatures of 267°F for heatup, and 250°F for normal and Remote Shutdown cooldown meet the recommendations of NUREG-800 Branch Technical Position RSB 5-2, Revision 1. The proposed LTOP enable temperatures will assure the SDCS Relief Valve will be aligned to the RCS system to mitigate the consequences of low temperature overpressure events. Furthermore, the maximum RCS pressure used in the analysis bounds the worst case scenario of the postulated overpressurization event. Hence, it is assured that the P-T limits will not be exceeded by overpressurization transients. Therefore, the proposed change will not involve a significant reduction in a margin of safety.

SAFETY AND SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

Based on the above Safety Analysis, it is concluded that: (1) the proposed change does not constitute a significant hazards consideration as defined by 10 CFR 50.92; (2) there is a reasonable assurance that the health and safety of the public will not be endangered by the proposed change; and (3) 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.