UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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| 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. 2 of the San Onofre Nuclear Generating Station | ) | Docket No. 50-361<br><br>Amendment Application No. 118 |

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. pursuant to 10 CFR 50.90, hereby submit Amendment Application No. 118.

This amendment application consists of Proposed Change Number (PCN)-335 to Facility Operating License No. NPF-10. PCN-335 is a request to revise San Onofre Unit 2 Technical Specification (TS) 3/4.4.8.1, "Pressure-Temperature Limits," TS 3.4.8.3.1, "Overpressure Protection Systems-RCS Temperature ≤312°F," TS 3.4.8.3.2, "Overpressure Protection Systems-RCS Temperature >312°F," and the associated TS Bases. The proposed change 1) revises the Reactor Coolant System (RCS) Pressure-Temperature (P-T) limits 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 2 TSs consistent with the Unit 3 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, 1995

James A. Beoletto
Attorney for Southern
California Edison Company

By: James A. Beoletto
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## DESCRIPTION AND SAFETY ANALYSIS OF PROPOSED CHANGE NPF-10-335

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 ≤312°F," and 3.4.8.3.2, "Overpressure Protection Systems-RCS Temperature >312°F," and associated TS Bases for San Onofre Unit 2. This is also a request to make minor changes which make the Unit 2 TSs consistent with the Unit 3 TSs.

Existing Specifications

Attachment A - Unit 2 Technical Specifications and Bases

Proposed Specifications

Attachment B - Unit 2 Technical Specifications and Bases

DESCRIPTION

Technical Specifications (TSs) 3/4.4.8.1, "Pressure-Temperature Limits," TS 3.4.8.3.1, "Overpressure Protection Systems-RCS Temperature ≤312°F," and 3.4.8.3.2, "Overpressure Protection Systems-RCS Temperature >312°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 and analysis results 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 92-01, Revision 1, "Reactor Vessel Structural Integrity, 10 CFR 50.54(f)."

The proposed change revises existing Figure 3.4-2, revises and renumbers existing Figure 3.4-3 as Figure 3.4-4, and adds new Figures 3.4-5, 3.4-6, and 3.4-7. These figures are 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. Figure 3.4-3 is renumbered as Figure 3.4-4 to make the Unit 2 P-T limits figure numbering system consistent with Unit 3. Figure 3.4-5 is added to make the Unit 2 TSs consistent with the Unit 3 TSs. Figures 3.4-6 and 3.4-7 account for the difference in the Total Loop Uncertainties (TLUs) for pressure between the Remote Shutdown instruments on the Remote Shutdown Panels and the 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 addition of Figures 3.4-5, 3.4-6, and 3.4-7 will result in both the Units 2 and 3 TSs being consistent.

The proposed change also revises the Shutdown Cooling System (SDCS) enable temperatures for RCS overpressure protection based on the Low Temperature Overpressure Protection (LTOP) range in TS Table 3.4-3. This SDCS Relief Valve 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 ope ation. The specific changes to the above TSs are as follows:

TS INDEX

1. INDEX Page V, Section 3/4.4.8

   Change RCS temperatures from ≤312°F to ≤238°F, and from >312°F to >238°F.

2. INDEX Page XIX, "LIST OF TABLES"

   a. Delete "MINIMUM INSTRUMENTS OPERABLE" from the title of Table 3.3-11 to make the table title correct and consistent with the Unit 3 TSs.

   b. Remove deleted Tables 3.3-12, "Radioactive Liquid Effluent Monitoring Instrumentation," and 4.3-8, "Radioactive Liquid Effluent Monitoring Instrumentation Surveillance Requirements," from the TS Index. These tables were deleted previously by Amendment No. 83.

   c. Change the page number for Table 3.4-3, "Low Temperature RCS Overpressure Protection Range," from Page 3/4 4-30a to Page 3/4 4-30d. This change is due to the addition of Figures 3.4-5, 3.4-6, and 3.4-7 to the Unit 2 TSs as Pages 3/4 4-30a, 3/4 4-30b, and 3/4 4-30c, respectively.

3. INDEX Page XXI, "LIST OF FIGURES"

   a. Add "VS FRACTION OF ALLOWABLE THERMAL POWER" after "CEA INSERTION LIMITS" to the title for Figure 3.1-2. This change makes the Unit 2 TSs consistent with the Unit 3 TSs.

   b. Add "VERSUS PERCENT OF RATED THERMAL POWER WITH THE PRIMARY COOLANT SPECIFIC ACTIVITY >1.0 μCi/GRAM DOSE EQUIVALENT I-131" after "ACTIVITY LIMIT" to the title for Figure 3.4-1. This change makes the Unit 2 TSs consistent with the Unit 3 TSs.

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

   d. Renumber Figure "3.4-3" as "3.4-4," add "SONGS 2 COOLDOWN RCS" before "PRESSURE/TEMPERATURE LIMITATIONS," change "FOR 4-8 EFPY" to "UNTIL 8 EFPY," and add "- NORMAL OPERATION" to the title for Figure 3.4-4. These changes and the proposed changes for Unit 3

will result in both Units 2 and 3 TSs being consistent.

e. Add Figure 3.4-5, "SONGS 2 RCS PRESSURE/TEMPERATURE LIMITS MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 8 EFPY) - NORMAL OPERATION," and Page 3/4 4-30a. The addition of this figure makes the Unit 2 TSs consistent with the Unit 3 TSs.

f. Add Figure 3.4-6, "SONGS 2 COOLDOWN RCS PRESSURE/TEMPERATURE LIMITATIONS UNTIL 8 EFPY- REMOTE SHUTDOWN OPERATION," and Page 3/4 4-30b.

g. Add Figure 3.4-7, "SONGS 2 RCS PRESSURE/TEMPERATURE LIMITS MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 8 EFPY) - REMOTE SHUTDOWN OPERATION" and Page 3/4 4-30c.

h. Add TS Index Page XXII for the text overflow from Page XXI. The text overflow was a result of the changes to TS Index Page XXI discussed above.

TS 3.4.8.1

The proposed change revises the existing P-T limits in Figure 3.4-2, revises and renumbers Figure 3.4-3 to 3.4-4, and adds Figures 3.4-5, 3.4-6, and 3.4-7. The proposed change also revises the LTOP enable temperatures in Table 3.4-3. The specific changes are as follows:

1. To start the first paragraph of the LCO, add "With the reactor vessel head bolts tensioned*." Next, "The" is changed to "the," "Figure" to "Figures," and "3.4-3" to "3.4-4," and delete "boltup." These changes make the Unit 2 TS consistent with the Unit 3 TS.

2. Add Figure 3.4-5 to the LCO. This change makes the Unit 2 TS consistent with the Unit 3 TS. Add Figures 3.4-6 and 3.4-7 to the LCO. These last two figures provide P-T limits for Remote Shutdown operation and their addition will result in both the Unit 2 and the Unit 3 TSs being consistent.

3. In LCO 3.4.8.1.a - Delete the first two sentences of the paragraph which read "A maximum heatup of 10°F in any one hour period with RC cold leg temperature less than 112°F. A maximum heatup of 30°F in any one hour period with RC cold leg temperature less than 163°F." This change is made because the maximum heatup rate of 60°F/HR is now permitted when the RCS cold leg temperature is equal to or greater than the minimum boltup temperature of 86°F.

   In the existing third sentence, change "one hour" to "1-hour." This change is editorial and makes the Unit 2 TS consistent with the Unit 3 TS. Add "equal to or" after "temperature" and change "163°F" to "86°F" to indicate the new RCS cold leg temperature restricted by the maximum heatup rate of 60°F/HR.

4. In LCO 3.4.8.1.b - Delete the first sentence of the paragraph which reads "A maximum cooldown of 10°F in any one hour period with RC cold leg temperatures less than 103°F." This change makes the Unit 2 TS consistent with the Unit 3 TS.

   In the existing second sentence, replace "of 30°F" with "as specified by Figure 3.4-5," "one hour" with "1-hour," and "RC" with "RCS" to make the Unit 2 TS consistent with the Unit 3 TS. Also, replace "less than 145°F" with "less than or equal to 143°F" to indicate the new RCS cold leg temperature which restricts cooldown to the cooldown rates in Figure 3.4-5.

   In the existing third sentence, change "one hour" to "1-hour," and "RC" to "RCS" to make the Unit 2 TS consistent with the Unit 3 TS. Also, change "145°F" to "143°F" to indicate the new temperature above which the maximum cooldown rate of 100°F/HR is permitted.

5. In LCO 3.4.8.1.c - Delete "less than or equal to" before "10°F" and change "one hour" to "1-hour." These changes make the Unit 2 TS consistent with the Unit 3 TS.

6. Add to LCO 3.4.8.1 the paragraph which reads: "With the reactor vessel head bolts detensioned, the Reactor Coolant System (except the pressurizer) temperature shall be limited to a maximum heatup or cooldown of 60°F in any 1-hour period." This change, which was made in the Unit 3 TS by Amendment No. 71, makes the Unit 2 TS consistent with the Unit 3 TS.

7. Add the footnote which reads: "* With the reactor vessel head bolts detensioned, RCS cold leg temperature may be less than 86°F." This change makes the Unit 2 TS consistent with the Unit 3 TS.

8. In Surveillance Requirement (SR) 4.4.8.1.2 the changes are:

   a. In the second sentence of the first paragraph, replace "and 3.4-3" after "Figures 3.4-2" with "and 3.4-4 through 3.4-7." This change makes the TS reflect the correct figures that require updating.

   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 1) 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 TS 4.4.8.1.2 does 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.

d. Delete the footnote which reads "The most limiting material in the reactor vessel in accordance with the new Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988, has changed and are plates C-6404-3. Calculative procedures provided in the new guide should be used to obtain the mean values of shift in $RT_{NDT}$ of C-6404-3 plates. Calculations are based on the actual shift in reference temperature as determined by impact testing on the existing plate C-6404-2 surveillance material."

9. Revise existing Figure 3.4-2, "RCS HEATUP PRESSURE/TEMPERATURE LIMITATIONS FOR 4-8 EFPY," as follows:

a. In the title add "SONGS 2," swap the positions of "RCS" and "HEATUP," change "FOR 4-8 EFPY" to "UNTIL 8 EFPY," and add "Normal Operation" so that the title reads "SONGS 2 HEATUP RCS PRESSURE/TEMPERATURE LIMITATIONS UNTIL 8 EFPY - Normal Operation."

b. Inservice Test Curve - Change the Lowest Service Temperature (LST) from 202°F to 209°F. The allowable inservice test RCS pressure is increased from 1336 at 202°F to 1433 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 the Heatup Curve). Change the minimum indicated RCS temperature from 260°F to 263°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 in Figure 3.4-2 to start at "15 psia" instead of "0 psia." The existing Figure 3.4-2 shows this line which represents the Minimum Boltup Temperature (MBT) line as intersecting the "0" psia line.

The proposed Figure 3.4-2 corrects 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 reactor vessel 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.

10. Revise existing Figure 3.4-3, "RCS COOLDOWN PRESSURE/TEMPERATURE LIMITATIONS FOR 4-8 EFPY" as follows:

a. Renumber "FIGURE 3.4-3" to "FIGURE 3.4-4." This change will make the figure numbering system consistent in both Units 2 and 3.

b. In the title of the figure, add "SONGS 2," swap the positions of "RCS" and "COOLDOWN," change "FOR 4-8 EFPY" to "UNTIL 8 EFPY," and add "- Normal Operation" so that the title reads "SONGS 2 COOLDOWN RCS PRESSURE/TEMPERATURE LIMITATIONS UNTIL 8 EFPY - Normal Operation."

c. Change the required RCS pressure from the existing 1000 psia at 202°F LST to 1046 psia at the new LST of 209°F.

d. Change the "Indicated Pressurizer Pressure (Psia)" scale in renumbered Figure 3.4-4 to start at "15 psia" instead of "0 psia." The existing figure shows this line intersecting the "0" psia line.

The proposed Figure 3.4-4 corrects the existing TS figure 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 reactor vessel head is detensioned. Therefore, the "Indicated Pressurizer Pressure (Psia)" scale is changed to commence at "15 psia" instead of "0 psia."

e. Add "Acceptable Operating Region" and "Unacceptable Operating Region" for the figure.

f. 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.

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

11. Add Figure 3.4-5, "SONGS 2 RCS PRESSURE/TEMPERATURE LIMITS MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 8 EFPY) - Normal Operation." This change provides a separate curve for maximum allowable cooldown rates which makes the Unit 2 TS consistent with the Unit 3 TS.

**Figure 3.4-5** indicates:

a. A maximum allowable cooldown rate of 20°F/HR at the indicated RCS temperature of 86°F (MBT).

b. An RCS cold leg temperature of 143°F to permit a maximum cooldown rate of 100°F/HR.

12. Add Figure 3.4-6, "SONGS 2 COOLDOWN RCS PRESSURE/TEMPERATURE LIMITATIONS UNTIL 8 EFPY-Remote Shutdown Operation," and Figure 3.4-7, "SONGS 2 RCS PRESSURE/TEMPERATURE LIMITS MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 8 EFPY) - Remote Shutdown Operation." These two new curves incorporate the results of an analysis which determined the TLUs for pressure for the Remote Shutdown panel instruments are higher than the TLUs for pressure for the Control Room shutdown instruments. 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 1038 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 10°F/HR at the indicated RCS temperature of 86°F (MBT).

b. An RCS cold leg temperature of 151°F to permit a maximum cooldown rate of 100°F/HR.

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

    a. Under "Operating Period, EFPY" column, replace "4 to 10" with "Until 8 (Normal Operation)," and add "Until 8 (Remote Shutdown Operation)."

    b. Under "During Heatup" column, change "312" to "238," and under the "During Cooldown" column, change "287" to "221," for normal operations.

    c. Add "*" under "During Heatup" column and "≤221" 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 4-30a to 3/4 4-30d.

TS 3.4.8.3.1

1. Revise the RCS temperature in the title from ≤312°F to ≤238°F. This temperature is also the new SDCS Relief Valve enable temperature for LTOP.

2. In the existing Footnote on page 3/4 4-32, delete "For," before "valve." Add "The lift setting pressure applicable to," before "valve" and "of" after "temperatures." This change makes the Unit 2 TS consistent with the Unit 3 TS.

TS 3.4.8.3.2

1. Revise the RCS temperature in the title from >312°F to >238°F. This temperature is also the new SDCS 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 238°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.

4. In the first Footnote on page 3/4 4-33, delete "For," before "valve." Add "The lift setting pressure applicable to," before "valve" and "of" after "temperatures." This change makes the Unit 2 TS consistent with the Unit 3 TS.

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 "3.4-3" after "(Figure 3.4-2 and" to "3.4-4," and add "and the cooldown limit curve for remote shutdown operation (Figure 3.4-6)." This proposed change will make both Units 2 and 3 TSs consistent.

   Add a new second sentence to the first paragraph which reads "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, after "adjustments for" replace "possible errors in the pressure and temperature sensing instruments" with "instrument uncertainties, and static and dynamic heads." These changes update the TS Bases and will make the TS Bases for Units 2 and 3 consistent.

   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 fifth sentence, add "limit curve (Figure 3.4-2)" after "heatup," add "the" before "cooldown," change "3.4-3" after "Figure" to "3.4-4," add "and 3.4-6" after "3.4-4," and replace "possible errors in the pressure and temperature sensing instruments" with "instrument uncertainties, and static and dynamic heads." These changes update the TS Bases and make both Units 2 and 3 TSs consistent.

   In the third paragraph add "for" after "$RT_{NDT}$". This change is editorial to make the Unit 2 TSs consistent with the Unit 3 TSs.

   In the fourth paragraph, delete "and 3.4-3" because neither the existing Figure 3.4-3 nor the proposed Figure 3.4-4 shows the criticality or the inservice leak and hydrostatic testing pressure-temperature limit lines. This change is made to correct the description of the reference.

2. Add a new Page B 3/4 4-7a for the text overflow from Page B 3/4 4-7 which resulted from the above changes.

   In the second sentence of the first paragraph, change "Figure 3.4-2 and 3.4-3" to "Figures 3.4-2, 3.4-4, and 3.4-6." This change makes the TS Bases reflect the correct figure references.

Add a new third paragraph which reads '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.' This change updates the TS Bases.

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

In Rows 2-9, 11-17, 19, and 21-23, under the "Material" column, replace the ditto (") signs with the actual material specification numbers. For the rows 2, 3, 5, 6, 8, 9, 14-16, 18, and 22-24 under the "Vessel Location" column, replace the ditto signs with the actual location of the material piece numbers. These changes are editorial and make the Unit 2 TSs consistent with the Unit 3 TSs.

In Row 5 under the "Drop Weight Results" column, change "-20" to "-10."

In Rows 4, 5, and 6 under the "Temperature of Charpy V-Notch @ 30 ft-lb" column, change "10" to "40," "20" to "70, and "10" to "70," respectively. For the same rows under the "Temperature of Charpy V-Notch @ 50 ft-lb" column, change "50" in each row to "80." For the same rows under the "Minimum Upper Shelf $C_v$ energy for Longitudinal Direction-ft lb" column, change "145" to "119," "155" to "113," and "131" to "99," respectively.

In Rows 7, 8, and 9 under the "Temperature of Charpy V-Notch @ 30 ft-lb" column, change "-5" to "-40" and "10" to "50," and "-20" to "50," respectively. For the same rows under the "Temperature of Charpy V-Notch @ 50 ft-lb" column, change "25" to "80," "25" to "70," and "0" to "50," respectively. For the same rows under the "Minimum Upper Shelf $C_v$ energy for Longitudinal Direction-ft lb" column, change "124" to "104," "134" to "118," and "151" to "124," 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.

4. Add a new Page B3/4 4-8a for the text overflow from Page B3/4 4-8. The changes on this new page are as follows:

In rows 2 and 4 through 6 under the "Material" column, replace the ditto signs with the actual material specification numbers. For the rows 2, 4, and 5 under the "Vessel Location" column, replace the ditto signs with the actual location of the material piece numbers. These changes are editorial.

BASIS FOR AND ACCEPTABILITY OF THE REQUEST

The new Unit 2 P-T limits in this proposed change were found to be less restrictive than what are currently being administratively implemented at Unit 2. Therefore, SCE will continue to implement the existing Unit 2 administrative P-T limits until the NRC approves this license amendment request.

The existing Unit 2 TS P-T limits were calculated using the fluence for 8 EFPY based on the test results and analysis of the first surveillance capsule withdrawn from Unit 2 in September 1987 after 2.85 EFPY of operation. The existing LTOP enable temperatures (312°F for heatup and 287°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 2 P-T limits were calculated using 1) the fluence for 8 EFPY based on 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 identified in our response to Generic Letter (GL) 92-01, Revision 1, "Reactor Vessel Structural Integrity, 10 CFR 50.54(f)." Unit 2 uses the same fluence projections as are used in Unit 3 because both units have identical core designs, fuel loading patterns, and have essentially the same past and projected operating histories. The proposed Unit 2 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 2 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 NUREG-800 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 312°F to 238°F. Changing the RCS temperature at which LTOP must be aligned from 312°F to 238°F will 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. 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 2 TS RCS P-T limit curves in TS 3/4.4.8, Figures 3.4-2 and 3.4-3, were originally valid until 8 EFPY of plant operation with an Adjusted Reference Temperature (ART) of 111.5°F at the 1/4t vessel controlling 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 312°F for heatup and 287°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 100°F/hr cooldown curves, respectively.

The new Unit 2 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 112.2°F at the controlling 1/4t vessel location. This 112.2°F ART is 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 response to GL 92-01, Revision 1. The proposed change will revise the existing Unit 2 TS P-T limits for heatup in Figure 3.4-2 and the existing Figure 3.4-3 for cooldown, which is being renumbered as Figure 3.4-4, to make the PT limits figure numbering system for both Units 2 and 3 consistent. The proposed change also adds P-T limit curves for maximum allowable cooldown rates (Figure 3.4-5), and Remote Shutdown operation (Figures 3.4-6 and 3.4-7). 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 proposed amendment changes the LTOP enable temperatures from 312°F to 238°F for heatup and from 287°F to 221°F for cooldown during normal and Remote Shutdown operations. These proposed LTOP enable temperatures are based upon the recommendations of Branch Technical Position RSB 5-2, Revision 1. These proposed LTOP temperatures 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 during 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 currently stated 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 incorporated into these heatup and cooldown curves. The material correlations used in the analysis were based on copper and nickel content in accordance with Regulatory Guide 1.99, "Radiation Embrittlement of Reactor Vessel Materials," Revision 2, May 1988.

Allowable temperatures for heatup and various cooldown rates from 238°F and below were calculated using an RCS pressure of 450 psia. This 450 psia RCS pressure covers the maximum RCS pressure which could be reached during a postulated overpressurization event for which the LTOP (SDCS Relief Valve) system is aligned. This ensures that with the SDCS Relief Valve aligned and operating from 238°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 minimum boltup temperature (86°F) are now only limited to the maximum permitted heatup rate of 60°F/HR.

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 limit 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, resulted in 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 increased from 1000 psia at the LST of 202°F to 1046 psia at the new LST of 209°F. The 100°F/hr cooldown curve intersects the 450 psia pressure at 143°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 20°F/hr at 86°F to 100°F/hr at 143°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 previously by the NRC. Because there has been no LTOP system hardware or relief pressure setpoint modifications, the previous analyses are valid until 8 EFPY. After the NRC approves this amendment request, the UFSAR will be revised to reflect the 1) revised LTOP enable temperatures for heatup and cooldown operations from the Control Room, 2) revised LTOP enable temperature for cooldown from the Remote Shutdown panel, and 3) updated material properties evaluated in response to Generic Letter 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 and 3.4-4, and the new Figure 3.4-5 for normal operation 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 Total Loop Uncertainties (TLUs) for pressure for shutdown instruments on the Remote Shutdown panel which are 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. These updates maintain margins of safety against nonductile failure of the reactor pressure vessel based on the test results and analysis of the Unit 3 surveillance capsule and updated material properties evaluated in response to GL 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-52, 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 238°F for heatup, and 221°F for both normal and Remote Shutdown cooldown meet the recommendations of NUREG-0800 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 overpressurization 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.