UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 27, 1994

Docket Nos. 50-361
and 50-362

Mr. Harold B. Ray
Senior Vice President
Southern California Edison Co.
Irvine Operations Center
23 Parker Street
Irvine, California 92718

Mr. Edwin A. Guiles
Vice President
Engineering and Operations
San Diego Gas & Electric Co.
101 Ash Street
San Diego, California 92112

Gentlemen:

SUBJECT: ISSUANCE OF AMENDMENT FOR SAN ONOFRE NUCLEAR GENERATING STATION, UNIT NO. 2 (TAC NO. M85653) AND UNIT NO. 3 (TAC NO. M85654)

The Commission has issued the enclosed Amendment No. 113 to Facility Operating License No. NPF-10 and Amendment No. 102 to Facility Operating License No. NPF-15 for San Onofre Nuclear Generating Station, Unit Nos. 2 and 3. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated December 31, 1992, designated by you as PCN-325.

These amendments revise Technical Specification (TS) 3.2.1, "LINEAR HEAT RATE," and TS 3.2.4, "DNBR MARGIN," to (1) distinguish between the core operating limit supervisory system (COLSS) in service and the COLSS out of service (OOS), (2) add surveillances to monitor departure from nucleate boiling ratio (DNBR) and/or linear heat rate (LHR) every 15 minutes when the COLSS is OOS and the corresponding parameter is not being maintained as required, (3) increase the ACTION time from 1 hour to 4 hours when the COLSS is OOS and either the LHR or DNBR margin is not being maintained within the required limits, (4) change the power reduction requirements from "HOT STANDBY" to "less than or equal to 20 percent of Rated Thermal Power" when the DNBR margin and/or the LHR limiting condition for operation (LCO) cannot be met within the allowed ACTION time, and (5) revise the Bases to the TS to reflect these changes.

Also included in the enclosed amendments are changes to TS 3/4.5.2, "ECCS Subsystems - T_{avg} Greater than or Equal to 350°F." During the last update of this TS section (Amendment 98 for Unit 2 and Amendment 87 for Unit 3), some of the pumps values in the TS amendments transmitted by NRC letter dated September 5, 1991, were incorrect. The enclosed changes to TS 3.5.2 correct these typographical errors by reinstating the pump values that were in the TS before the September 5, 1991, letter.

DF01

A copy of our related Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

Mel B. Fields

Mel B. Fields, Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 113to NPF-10
2. Amendment No. 102to NPF-15
3. Safety Evaluation

cc w/enclosures:
See next page

Messrs. Ray and Guiles
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San Onofre Nuclear Generating Station
Unit Nos. 2 and 3

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A copy of our related Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

Original signed by:

Mel B. Fields, Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 113 to NPF-10
2. Amendment No. 102 to NPF-15
3. Safety Evaluation

cc w/enclosures:
See next page

DISTRIBUTION:

Docket File	NRC & Local PDRs
	DFoster-Curseen
DHagan, T4A43	GHill (4), T5C3
OPA, O2G5	OC/LFDCB, T9E10
JRoe	PDIV-2 Reading
TQuay	OGC, O15B18
CGrimes, O11E22	ACRS (10), T2E26
Region IV	MFields
KPerkins, RIV/WCFO	MShuaibi

OFC	LA/DRPW	PM/PD4-2	RSXB	OGC	D:PD4-2	OTSB 94-233
NAME	DFoster-Curseen	MFields:pk	TCollins for RJones	C MARCO	TQuay	CGrimes CG
DATE	9/19/94	9/12/94	9/21/94	9/ /94	/ /94	10/25/94

OFFICIAL RECORD COPY DOCUMENT NAME: S085653.AMD

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SOUTHERN CALIFORNIA EDISON COMPANY

SAN DIEGO GAS AND ELECTRIC COMPANY

THE CITY OF RIVERSIDE, CALIFORNIA

THE CITY OF ANAHEIM, CALIFORNIA

DOCKET NO. 50-361

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 113
License No. NPF-10

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Southern California Edison Company, et al. (SCE or the licensee) dated December 31, 1992, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Facility Operating License No. NPF-10 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 113 , are hereby incorporated in the license. Southern California Edison Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and must be fully implemented no later than 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Mel B. Fields

Mel B. Fields, Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications

Date of Issuance: October 27, 1994

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. NPF-10

DOCKET NO. 50-361

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the areas of change. The corresponding overleaf pages are also provided to maintain document completeness.

REMOVE	INSERT
3/4 2-1	3/4 2-1
3/4 2-5	3/4 2-5
3/4 2-6	3/4 2-6
3/4 5-5	3/4 5-5
3/4 5-6	3/4 5-6
B 3/4 2-1	B 3/4 2-1
-	B 3/4 2-1a
B 3/4 2-4	B 3/4 2-4
B 3/4 2-5	B 3/4 2-5

3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 LINEAR HEAT RATE

LIMITING CONDITION FOR OPERATION

3.2.1 The linear heat rate shall not exceed 13.9 kw/ft.

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER.

ACTION:

a. With COLSS in service and the linear heat rate not being maintained as indicated by COLSS calculated core power exceeding the COLSS calculated core power operating limit based on linear heat rate (kw/ft):

   1. Restore the linear heat rate to within its limits within 1 hour, or

   2. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

b. With COLSS not in service and the linear heat rate not being maintained as indicated by any OPERABLE Local Power Density channel exceeding the linear heat rate limit:

   1. Within 15 minutes initiate surveillance requirements 4.2.1.3 and restore the linear heat rate to within limits within 4 hours, or

   2. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.2.1.1 The provisions of Specification 4.0.4 are not applicable.

4.2.1.2 The linear heat rate shall be determined to be within its limits when THERMAL POWER is above 20% of RATED THERMAL POWER by continuously monitoring the core power distribution with the Core Operating Limit Supervisory System (COLSS) or, with the COLSS out of service, by verifying at least once per 2 hours that the linear heat rate, as indicated on all OPERABLE Local Power Density channels, is within the limit of 13.9 kw/ft.

4.2.1.3 With COLSS not in service and the linear heat rate not being maintained as indicated by any OPERABLE Local Power Density Channel exceeding the linear heat rate limit, verify every 15 minutes that there is no adverse trend in the linear heat rate.

4.2.1.4 At least once per 31 days, the COLSS Margin Alarm shall be verified to actuate at a THERMAL POWER level less than or equal to the core power operating limit based on kw/ft.

3/4.2.2 PLANAR RADIAL PEAKING FACTORS - F_{xy}

LIMITING CONDITION FOR OPERATION

3.2.2 The measured PLANAR RADIAL PEAKING FACTORS (F^m_{xy}) shall be less than or equal to the PLANAR RADIAL PEAKING FACTORS (F^c_{xy}) used in the Core Operating Limit Supervisory System (COLSS) and in the Core Protection Calculators (CPC).

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER.*

ACTION:

With a F^m_{xy} exceeding a corresponding F^c_{xy}, within 6 hours either:

a. Adjust the CPC and COLSS addressable constants to increase the multiplier applied to PLANAR RADIAL PEAKING FACTORS to a factor greater than or equal to (F^m_{xy}/F^c_{xy}); or

b. Adjust only the CPC addressable constants as in (a). Restrict subsequent operation so that a margin to the COLSS operating limits of at least [(F^m_{xy}/F^c_{xy}) - 1.0] x 100% is maintained; or

c. Adjust the affected PLANAR RADIAL PEAKING FACTORS (F^c_{xy}) used in the COLSS and CPC to a value greater than or equal to the measured PLANAR RADIAL PEAKING FACTORS (F^m_{xy}) or

d. Be in at least HOT STANDBY.

SURVEILLANCE REQUIREMENTS

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 The measured PLANAR RADIAL PEAKING FACTORS (F^m_{xy}) obtained by using the incore detection system, shall be determined to be less than or equal to the PLANAR RADIAL PEAKING FACTORS (F^c_{xy}), used in the COLSS and CPC at the following intervals:

a. After each fuel loading with THERMAL POWER greater than 40% but prior to operation above 70% of RATED THERMAL POWER, and

b. At least once per 31 EFPD.

*See Special Test Exception 3.10.2.

3/4.2.4 DNBR MARGIN

LIMITING CONDITION FOR OPERATION

3.2.4 The DNBR margin shall be maintained by one of following methods:

a. Maintaining COLSS calculated core power less than or equal to COLSS calculated core power operating limit based on DNBR (when COLSS is in service, and either one or both CEACs are operable); or

b. Maintaining COLSS calculated core power less than or equal to COLSS calculated core power operating limit based on DNBR decreased by 13.0% RATED THERMAL POWER (when COLSS is in service and neither CEAC is operable): or

c. Operating within the region of acceptable operation of Figure 3.2-1 using any operable CPC channel (when COLSS is out of service and either one or both CEACs are operable); or

d. Operating within the region of acceptable operation of Figure 3.2-2 using any operable CPC channel (when COLSS is out of service and neither CEAC is operable).

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER.

ACTION:

a. With COLSS in service and the DNBR limit not being maintained as indicated by COLSS calculated core power exceeding the COLSS calculated core power operating limit based on DNBR:

   1. Restore the DNBR to within its limits within 1 hour, or

   2. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

b. With COLSS not in service and the DNBR limit not being maintained as indicated by operation outside the region of acceptable operation of Figure 3.2-1 or 3.2-2 using any operable CPC channel;

   1. Within 15 minutes initiate surveillance requirement 4.2.4.3 and restore the DNBR to within its limits within 4 hours, or

   2. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.2.4.1 The provisions of Specification 4.0.4 are not applicable.

4.2.4.2 The DNBR shall be determined to be within its limits when THERMAL POWER is above 20% of RATED THERMAL POWER by continuously monitoring the core power distribution with the Core Operating Limit Supervisory System (COLSS) or, with the COLSS out of service, by verifying at least once per 2 hours that the DNBR, as indicated on any OPERABLE DNBR channel, is within the limit shown on Figures 3.2-1 or 3.2-2, as applicable.

4.2.4.3 With COLSS not in service and the DNBR margin not being maintained as indicated by operation outside the region of acceptable operation of Figure 3.2-1 or 3.2-2 using any operable CPC channel, verify every 15 minutes that there is no adverse trend in DNBR margin.

4.2.4.4 At least once per 31 days, the COLSS Margin Alarm shall be verified to actuate at a THERMAL POWER level less than or equal to the core power operating limit based on DNBR.

SURVEILLANCE REQUIREMENTS (Continued)

d. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:

   1. For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and

   2. Of the areas affected within containment at the completion of containment entry when CONTAINMENT INTEGRITY is established.

e. At least once per refueling interval by:

   1. Verifying automatic interlock action of the shutdown cooling system with the Reactor Coolant System by ensuring that when simulated RCS pressure is greater than or equal to 376 psia, the interlocks prevent opening the shutdown cooling system isolation valves.

   2. A visual inspection of the containment sump and verifying that the subsystem suction inlets are not restricted by debris and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or abnormal corrosion.

f. At least once per refueling interval, during shutdown, by:

   1. Verifying that each automatic valve in the flow path actuates to its correct position on SIAS and RAS test signals.

   2. Verifying that each of the following pumps start automatically upon receipt of a Safety Injection Actuation Test Signal:

      a. High-Pressure Safety Injection pump.
      b. Low-Pressure Safety Injection pump.
      c. Charging pump.

   3. Verifying that on a Recirculation Actuation Test Signal, the containment sump isolation valves open; and that on a RAS test signal coincident with a high-high containment sump test signal, all the recirculation valves to the refueling water tank close.

g. By verifying that each of the following pumps develops the indicated developed head and/or flow rate when tested pursuant to Specification 4.0.5:

   1. High-Pressure Safety Injection pumps developed head, at an indicated flow rate of 650 gpm, greater than or equal to 2142 feet for P017, 2101 feet for P018 and 2103 for P019 (see NOTE 1).

2. Low-Pressure Safety Injection pump developed head greater than or equal to 406.1 feet at miniflow.

3. Charging pump flow rate greater than or equal to 40 gpm.

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying the following flow rates:

1. For High-Pressure Safety Injection pump cold leg injection with a single pump running:

   a. The sum of the injection lines flow rates, excluding the highest flow rate, is greater than or equal to 657 gpm for P017 running, 667 gpm for P018 running and 672 gpm for P019 running, and

   b. The total pump flow rate is greater than or equal to 900 gpm for P017 running, 913 gpm for P018 running and 918 gpm for P019 running.

2. For a single High-Pressure Safety Injection pump hot/cold leg injection.

   a. The sum of the cold leg injection flow rates is greater than or equal to 385 gpm, and

   b. The hot leg injection flow rate is greater than or equal to 385 gpm.

   c. The combined total hot/cold legs injection flow rate is greater than or equal to 896 gpm.

3. For the Low-Pressure Safety Injection pump with a single pump running:

   a. The flow through each injection leg shall be greater than or equal to 3000 gpm when tested individually and corrected to the same pump suction source and leg back pressure conditions. The difference between high and low flow legs shall be less than or equal to 100 gpm.

   b. The total ECCS flow through 2 cold leg injection lines shall be greater than or equal to 4450 gpm when corrected for elevation head.

3/4.2.1 LINEAR HEAT RATE

The limitation on linear heat rate ensures that in the event of a LOCA, the peak temperature of the fuel cladding will not exceed 2200°F.

Either of the two core power distribution monitoring systems, the Core Operating Limit Supervisory System (COLSS) and the Local Power Density channels in the Core Protection Calculators (CPCs), provide adequate monitoring of the core power distribution and are capable of verifying that the linear heat rate does not exceed its limits. The COLSS performs this function by continuously monitoring the core power distribution and calculating a core power operating limit corresponding to the allowable peak linear heat rate. Reactor operation at or below this calculated power level assures that the limits of 13.9 kw/ft are not exceeded.

The COLSS calculated core power and the COLSS calculated core power operating limits based on linear heat rate are continuously monitored and displayed to the operator. A COLSS alarm is annunciated in the event that the core power exceeds the core power operating limit. This provides adequate margin to the linear heat rate operating limit for normal steady state operation. Normal reactor power transients or equipment failures which do not require a reactor trip may result in this core power operating limit being exceeded. In the event this occurs, COLSS alarms will be annunciated. If the event which causes the COLSS limit to be exceeded results in conditions which approach the core safety limits, a reactor trip will be initiated by the Reactor Protective Instrumentation. The COLSS calculation of the linear heat rate includes appropriate penalty factors which provide, with a 95/95 probability/ confidence level, that the maximum linear heat rate calculated by COLSS is conservative with respect to the actual maximum linear heat rate existing in the core. These penalty factors are determined from the uncertainties associated with planar radial peaking measurement, engineering design factors, axial densification, software algorithm modelling, computer processing, rod bow and core power measurement.

The core power distribution and a corresponding power operating limit based on Linear Hear Rate (LHR) are more accurately determined by the COLSS using the incore detector system. The CPCs determine LHR less accurately with the excore detectors. When COLSS is not available the TS LCOs are more restrictive due to the uncertainty of the CPCs. However, when COLSS becomes inoperable the added margin associated with CPC uncertainty is not immediately required and a 4 hour ACTION is provided for appropriate corrective action.

Parameters required to maintain the operating limit power level based on linear heat rate, margin to DNB and total core power are also monitored by the CPCs assuming minimum core power of 20% RATED THERMAL POWER. The 20% Rated Thermal Power threshold is due to the neutron flux detector system being inaccurate below 20% core power. Core noise level at low power is too large to obtain usable detector readings. Therefore, in the event that the COLSS is not being used, operation within the limits of Figure 3.2-2 can be maintained by utilizing a predetermined local power density margin and a total core power limit in the CPC trip channels. The above listed uncertainty penalty factors plus those associated with startup test acceptance criteria are also included in the CPCs.

3/4.2.1 LINEAR HEAT RATE (Continued)

While operating with the COLSS out of service, the CPC calculated LHR is monitored every 15 minutes to identify any adverse trend in thermal margin. The increased monitoring of LHR during the 4 hour action period ensures that adequate safety margin is maintained for anticipated operational occurrences and no postulated accident results in consequences more severe than those described in Chapter 15 of the UFSAR.

AZIMUTHAL POWER TILT - Tq (Continued)

T_q is the peak fractional tilt amplitude at the core periphery

g is the radial normalizing factor

θ is the azimuthal core location

θ_o is the azimuthal core location of maximum tilt

P_{tilt}/P_{untilt} is the ratio of the power at a core location in the presence of a tilt to the power at that location with no tilt.

3/4.2.4 DNBR MARGIN

The limitation on DNBR as a function of AXIAL SHAPE INDEX represents a conservative envelope of operating conditions consistent with the safety analysis assumptions and which have been analytically demonstrated adequate to maintain an acceptable minimum DNBR throughout all anticipated operational occurrences, of which the loss of flow transient is the most limiting. Operation of the core with a DNBR at or above this limit provides assurance that an acceptable minimum DNBR will be maintained in the event of a loss of flow transient.

Either of the two core power distribution monitoring systems, the Core Operating Limit Supervisory System (COLSS) and the DNBR channels in the Core Protection Calculators (CPCs), provide adequate monitoring of the core power distribution and are capable of verifying that the DNBR does not violate its limits. The COLSS performs this function by continuously monitoring the core power distribution and calculating a core operating limit corresponding to the allowable minimum DNBR. The COLSS calculation of core power operating limit based on the minimum DNBR limit includes appropriate penalty factors which provide, with a 95/95 probability/confidence level, that the core power limit calculated by COLSS (based on the minimum DNBR limit) is conservative with respect to the actual core power limit. These penalty factors are determined from the uncertainties associated with planar radial peaking measurement, engineering design factors, state parameter measurement, software algorithm modelling, computer processing, rod bow and core power measurement.

Parameters required to maintain the margin to DNB and total core power are also monitored by the CPCs. In the event that the COLSS is not being used, the DNBR margin can be maintained by monitoring with any operable CPC channel so that the DNBR remains above the predetermined limit as a function of Axial Shape Index. The above listed uncertainty penalty factors are also included in the CPCs, which assume a minimum of 20% of RATED THERMAL POWER. The 20% RATED THERMAL POWER threshold is due to the excore neutron flux detector system being less accurate below 20% core power. Core noise level at low power is too large to obtain usable detector readings. The additional uncertainty terms taken into account in the CPCs for transient protection are removed from Figures 3.2-1 and 3.2-2 since the curves are intended to monitor the LCO only during steady state operation.

DNBR Margin (Continued)

The core power distribution and a corresponding power operating limit based on DNBR are more accurately determined by the COLSS using the incore detector system. The CPCs determine DNBR less accurately with the excore detectors. In addition, the COLSS reserves a DNBR overpower margin to ensure that the specified acceptable fuel design limits are not exceeded in the event of an anticipated operational occurrence. Therefore, the COLSS out of service TS LCOs are more restrictive due to the uncertainty of the CPCs and the overpower margin reserved for anticipated operational occurrences. However, when COLSS becomes inoperable the added margin associated with the CPCs is not immediately required and a 4 hour ACTION is provided for appropriate corrective action.

The DNBR penalty factors listed in section 4.2.4.4 are penalties used to accommodate the effects of rod bow. The amount of rod bow in each assembly is dependent upon the average burnup experienced by that assembly. Fuel assemblies that incur higher average burnup will experience a greater magnitude of rod bow. Conversely, lower burnup assemblies will experience less rod bow. The penalty for each batch required to compensate for rod bow is determined from a batch's maximum average assembly burnup applied to the batch's maximum integrated planar-radial power peak. A single net penalty for COLSS and CPC is then determined from the penalties associated with each batch, accounting for the offsetting margins due to the lower radial power peaks in the higher burnup batches.

While operating with the COLSS out of service, the CPC calculated DNBR is monitored every 15 minutes to identify any adverse trend in thermal margin. The increased monitoring of DNBR during the 4 hour action period ensures that adequate safety margin is maintained for anticipated operational occurrences and no postulated accident results in consequences more severe than those described in Chapter 15 of the UFSAR.

3/4.2.5 RCS FLOW RATE

This specification is provided to ensure that the actual RCS total flow rate is maintained at or above the minimum value used in the LOCA safety analyses.

3/4.2.6 REACTOR COOLANT COLD LEG TEMPERATURE

This specification is provided to ensure that the actual value of reactor coolant cold leg temperature is maintained within the range of values used in the safety analyses.

2.4.2.7 AXIAL SHAPE INDEX

The Axial Shape Index (ASI) is a measure of the power generated in the lower half of the core less the power generated in the upper half of the core divided by the sum of these powers. This specification is provided to ensure that the core average ASI is maintained within the range of values assumed as an initial condition in the safety analyses. This range is specified as $-0.3 \leq ASI \leq 0.3$.

2.4.2.7 AXIAL SHAPE INDEX (Continued)

The ASI can be determined by utilizing either the Core Operating Limit Supervisory System (COLSS) or any operable Core Protection Calculator (CPC) channel. The real time monitoring capability and accuracy of COLSS allows COLSS to monitor power limit margins closely. Consequently, the ASI limit is broader than it would be with the same core without COLSS. The COLSS continuously calculates the ASI and compares the calculated value to the parameter established for the COLSS ASI alarm limit. In addition, there is an uncertainty associated with the COLSS calculated ASI, therefore the COLSS ASI alarm limit includes this uncertainty. If the LCO is exceeded, COLSS alarms are initiated. The ASI safety setting is selected so that no safety limit will be exceeded as a result of an anticipated operational occurrence, and so that the consequence of a design basis accident will be acceptable.

With COLSS out of service, any operable CPC channel may be used to calculate the ASI (using three axially spaced excore detectors). The axial shape synthesis in the CPC's shows the relative power produced as a function of core height in each third of the core. Due to the uncertainty associated with the CPC estimate, the ASI is restricted to a smaller range than the range calculated using the COLSS.

The 20% rated thermal power threshold is imposed due to the inaccuracy of the neutron flux detector below the threshold. Core noise level is too large to obtain usable detector readings.

3/4.2.8 PRESSURIZER PRESSURE

This specification is provided to ensure that the actual value of pressurizer pressure is maintained within the range of values used in the safety analyses.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SOUTHERN CALIFORNIA EDISON COMPANY

SAN DIEGO GAS AND ELECTRIC COMPANY

THE CITY OF RIVERSIDE, CALIFORNIA

THE CITY OF ANAHEIM, CALIFORNIA

DOCKET NO. 50-362

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 102
License No. NPF-15

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Southern California Edison Company, et al. (SCE or the licensee) dated December 31, 1992, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Facility Operating License No. NPF-15 is hereby amended to read as follows:

   (2) <u>Technical Specifications</u>

   The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 102 , are hereby incorporated in the license. Southern California Edison Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and must be fully implemented no later than 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Mel B. Fields

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Project Directorate IV-2
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Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 27, 1994

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 102 TO FACILITY OPERATING LICENSE NO. NPF-15

DOCKET NO. 50-362

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the areas of change. The corresponding overleaf pages are also provided to maintain document completeness.

REMOVE	INSERT
3/4 2-1	3/4 2-1
3/4 2-5	3/4 2-5
3/4 2-6	3/4 2-6
3/4 5-6	3/4 5-6
B 3/4 2-1	B 3/4 2-1
-	B 3/4 2-1a
B 3/4 2-4	B 3/4 2-4
B 3/4 2-5	B 3/4 2-5

3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 LINEAR HEAT RATE

LIMITING CONDITION FOR OPERATION

3.2.1 The linear heat rate shall not exceed 13.9 kw/ft.

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER.

ACTION:

a. With COLSS in service and the linear heat rate not being maintained as indicated by COLSS calculated core power exceeding the COLSS calculated core power operating limit based on linear heat rate (kw/ft):

   1. Restore the linear heat rate to within its limits within 1 hour, or

   2. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

b. With COLSS not in service and the linear heat rate not being maintained as indicated by any OPERABLE Local Power Density channel exceeding the linear heat rate limit:

   1. Within 15 minutes initiate surveillance requirement 4.2.1.3 and restore the linear heat rate to within limits within 4 hours, or

   2. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.2.1.1 The provisions of Specification 4.0.4 are not applicable.

4.2.1.2 The linear heat rate shall be determined to be within its limits when THERMAL POWER is above 20% of RATED THERMAL POWER by continuously monitoring the core power distribution with the Core Operating Limit Supervisory System (COLSS) or, with the COLSS out of service, by verifying at least once per 2 hours that the linear heat rate, as indicated on all OPERABLE Local Power Density channels, is within the limit of 13.9 kw/ft.

4.2.1.3 With COLSS not in service and the linear heat rate not being maintained as indicated by any OPERABLE Local Power Density Channel exceeding the linear heat rate limit, verify every 15 minutes that there is no adverse trend in the linear heat rate.

4.2.1.4 At least once per 31 days, the COLSS Margin Alarm shall be verified to actuate at a THERMAL POWER level less than or equal to the core power operating limit based on kw/ft.

3/4.2.2 PLANAR RADIAL PEAKING FACTORS - F_{xy}

LIMITING CONDITION FOR OPERATION

3.2.2 The measured PLANAR RADIAL PEAKING FACTORS (F^m_{xy}) shall be less than or equal to the PLANAR RADIAL PEAKING FACTORS (F^c_{xy}) used in the Core Operating Limit Supervisory System (COLSS) and in the Core Protection Calculators (CPC).

APPLICABILITY: MODE 1 above 20% of RATED THERMAL Power.*

ACTION:

With a F^m_{xy} exceeding a corresponding F^c_{xy}, within 6 hours either:

a. Adjust the CPC and COLSS addressable constants to increase the multiplier applied to PLANAR RADIAL PEAKING FACTORS to a factor greater than or equal to (F^m_{xy}/F^c_{xy}); or

b. Adjust only the CPC addressable constants as in (a). Restrict subsequent operation so that a margin to the COLSS operating limits of at least [(F^m_{xy}/F^c_{xy}) - 1.0] x 100% is maintained; or

c. Adjust the affected PLANAR RADIAL PEAKING FACTORS (F^c_{xy}) used in the COLSS and CPC to a value greater than or equal to the measured PLANAR RADIAL PEAKING FACTORS (F^m_{xy}) or

d. Be in at least HOT STANDBY.

SURVEILLANCE REQUIREMENTS

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 The measured PLANAR RADIAL PEAKING FACTORS (F^m_{xy}) obtained by using the incore detection system, shall be determined to be less than or equal to the PLANAR RADIAL PEAKING FACTORS (F^c_{xy}), used in the COLSS and CPC at the following intervals:

a. After each fuel loading with THERMAL POWER greater than 40% but prior to operation above 70% of RATED THERMAL POWER, and

b. At least once per 31 EFPD.

*See Special Test Exception 3.10.2.

3/4.2.4 DNBR MARGIN

LIMITING CONDITION FOR OPERATION

3.2.4 The DNBR margin shall be maintained by one of following methods:

a. Maintaining COLSS calculated core power less than or equal to COLSS calculated core power operating limit based on DNBR (when COLSS is in service, and either one or both CEACs are operable); or

b. Maintaining COLSS calculated core power less than or equal to COLSS calculated core power operating limit based on DNBR decreased by 13.0% RATED THERMAL POWER (when COLSS is in service and neither CEAC is operable): or

c. Operating within the region of acceptable operation of Figure 3.2-1 using any operable CPC channel (when COLSS is out of service and either one or both CEACs are operable); or

d. Operating within the region of acceptable operation of Figure 3.2-2 using any operable CPC channel (when COLSS is out of service and neither CEAC is operable).

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER.

ACTION:

a. With COLSS in service and the DNBR limit not being maintained as indicated by COLSS calculated core power exceeding the COLSS calculated core power operating limit base on DNBR:

   1. Restore the DNBR to within its limits within 1 hour, or

   2. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

b. With COLSS not in service and the DNBR limit not being maintained as indicated by operation outside the region of acceptable operation of Figure 3.2-1 or 3.2-2 using any operable CPC channel;

   1. Within 15 minutes initiate surveillance requirement 4.2.4.3 and restore the DNBR to within its limits within 4 hours, or

   2. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.2.4.1 The provisions of Specification 4.0.4 are not applicable.

4.2.4.2 The DNBR shall be determined to be within its limits when THERMAL POWER is above 20% of RATED THERMAL POWER by continuously monitoring the core power distribution with the Core Operating Limit Supervisory System (COLSS) or, with the COLSS out of service, by verifying at least once per 2 hours that the DNBR, as indicated on any OPERABLE DNBR channel, is within the limit shown on Figures 3.2-1 or 3.2-2, as applicable.

4.2.4.3 With COLSS not in service and the DNBR margin not being maintained as indicated by operation outside the region of acceptable operation of Figure 3.2-1 or 3.2-2 using any operable CPC channel, verify every 15 minutes that there is no adverse trend in DNBR margin.

4.2.4.4 At least once per 31 days, the COLSS Margin Alarm shall be verified to actuate at a THERMAL POWER level less than or equal to the core power operating limit based on DNBR.

d. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:

1. For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and

2. Of the areas affected within containment at the completion of containment entry when CONTAINMENT INTEGRITY is established.

e. At least once per refueling interval by:

1. Verifying automatic interlock action of the shutdown cooling system with the Reactor Coolant System by ensuring that when simulated RCS pressure is greater than or equal to 376 psia, the interlocks prevent opening the shutdown cooling system isolation valves.

2. A visual inspection of the containment sump and verifying that the subsystem suction inlets are not restricted by debris and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or abnormal corrosion.

f. At least once per refueling interval, during shutdown, by:

1. Verifying that each automatic valve in the flow path actuates to its correct position on SIAS and RAS test signals.

2. Verifying that each of the following pumps start automatically upon receipt of a Safety Injection Actuation Test Signal:

   a. High-Pressure Safety Injection pump.
   b. Low-Pressure Safety Injection pump.
   c. Charging pump.

3. Verifying that on a Recirculation Actuation Test Signal, the containment sump isolation valves open; and that on a RAS test signal coincident with a high-high containment sump test signal, all the recirculation valves to the refueling water tank close.

g. By verifying that each of the following pumps develops the indicated developed head and/or flow rate when tested pursuant to Specification 4.0.5:

1. High-Pressure Safety Injection pumps developed head, at an indicated flow rate of 650 gpm, greater than or equal to 2093 feet for P017, 2132 feet for P018 and 2099 for P019 (see NOTE 1).

SURVEILLANCE REQUIREMENTS (Continued)

2. Low-Pressure Safety Injection pump developed head greater than or equal to 396 feet at miniflow.

3. Charging pump flow rate greater than or equal to 40 gpm.

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying the following flow rates:

1. For High-Pressure Safety Injection pump cold leg injection with a single pump running:

   a. The sum of the injection lines flow rates, excluding the highest flow rate, is greater than or equal to 647 gpm for P017 running, 656 gpm for P018 running and 661 gpm for P019 running, and

   b. The total pump flow rate is greater than or equal to 882 gpm for P017 running, 894 gpm for P018 running and 901 gpm for P019 running.

2. For a single High-Pressure Safety Injection pump hot/cold leg injection.

   a. The sum of the cold leg injection flow rates is greater than or equal to 385 gpm, and

   b. The hot leg injection flow rate is greater than or equal to 385 gpm.

   c. The combined total hot/cold legs injection flow rate is greater than or equal to 896 gpm.

3. For the Low-Pressure Safety Injection pump with a single pump running:

   a. The flow through each injection leg shall be greater than or equal to 3000 gpm when tested individually and corrected to the same pump suction source and leg back pressure conditions. The difference between high and low flow legs shall be less than or equal to 100 gpm.

   b. The total ECCS flow through 2 cold leg injection lines shall be greater than or equal to 4450 gpm when corrected for elevation head.

BASES

3/4.2.1 LINEAR HEAT RATE

The limitation on linear heat rate ensures that in the event of a LOCA, the peak temperature of the fuel cladding will not exceed 2200°F.

Either of the two core power distribution monitoring systems, the Core Operating Limit Supervisory System (COLSS) and the Local Power Density channels in the Core Protection Calculators (CPCs), provide adequate monitoring of the core power distribution and are capable of verifying that the linear heat rate does not exceed its limits. The COLSS performs this function by continuously monitoring the core power distribution and calculating a core power operating limit corresponding to the allowable peak linear heat rate. Reactor operation at or below this calculated power level assures that the limits of 13.9 kw/ft are not exceeded.

The COLSS calculated core power and the COLSS calculated core power operating limits based on linear heat rate are continuously monitored and displayed to the operator. A COLSS alarm is annunciated in the event that the core power exceeds the core power operating limit. This provides adequate margin to the linear heat rate operating limit for normal steady state operation. Normal reactor power transients or equipment failures which do not require a reactor trip may result in this core power operating limit being exceeded. In the event this occurs, COLSS alarms will be annunciated. If the event which causes the COLSS limit to be exceeded results in conditions which approach the core safety limits, a reactor trip will be initiated by the Reactor Protective Instrumentation. The COLSS calculation of the linear heat rate includes appropriate penalty factors which provide, with a 95/95 probability/ confidence level, that the maximum linear heat rate calculated by COLSS is conservative with respect to the actual maximum linear heat rate existing in the core. These penalty factors are determined from the uncertainties associated with planar radial peaking measurement, engineering design factors, axial densification, software algorithm modelling, computer processing, rod bow and core power measurement.

The core power distribution and a corresponding power operating limit based on Linear Heat Rate (LHR) are more accurately determined by the COLSS using the incore detector system. The CPCs determine LHR less accurately with the excore detectors. When COLSS is not available the TS LCOs are more restrictive due to the uncertainty of the CPCs. However, when COLSS becomes inoperable the added margin associated with CPC uncertainty is not immediately required and a 4 hour ACTION is provided for appropriate corrective action.

Parameters required to maintain the operating limit power level based on linear heat rate, margin to DNB and total core power are also monitored by the CPCs assuming minimum core power of 20% RATED THERMAL POWER. The 20% Rated Thermal Power threshold is due to the neutron flux detector system being inaccurate below 20% core power. Core noise level at low power is too large to obtain usable detector readings. Therefore, in the event that the COLSS is not being used, operation within the limits of Figure 3.2-2 can be maintained by utilizing a predetermined local power density margin and a total core power limit in the CPC trip channels. The above listed uncertainty penalty factors plus those associated with startup test acceptance criteria are also included in the CPCs.

3/4.2.1 LINEAR HEAT RATE (Continued)

While operating with the COLSS out of service, the CPC calculated LHR is monitored every 15 minutes to identify any adverse trend in thermal margin. The increased monitoring of LHR during the 4 hour action period ensures that adequate safety margin is maintained for anticipated operational occurrences and no postulated accident results in consequences more severe than those described in Chapter 15 of the UFSAR.

AZIMUTHAL POWER TILT - T_q (Continued)

T_q is the peak fractional tilt amplitude at the core periphery

g is the radial normalizing factor

θ is the azimuthal core location

θ_o is the azimuthal core location of maximum tilt

P_{tilt}/P_{untilt} is the ratio of the power at a core location in the presence of a tilt to the power at that location with no tilt.

3/4.2.4 DNBR MARGIN

The limitation on DNBR as a function of AXIAL SHAPE INDEX represents a conservative envelope of operating conditions consistent with the safety analysis assumptions and which have been analytically demonstrated adequate to maintain an acceptable minimum DNBR throughout all anticipated operational occurrences, of which the loss of flow transient is the most limiting. Operation of the core with a DNBR at or above this limit provides assurance that an acceptable minimum DNBR will be maintained in the event of a loss of flow transient.

Either of the two core power distribution monitoring systems, the Core Operating Limit Supervisory System (COLSS) and the DNBR channels in the Core Protection Calculators (CPCs), provide adequate monitoring of the core power distribution and are capable of verifying that the DNBR does not violate its limits. The COLSS performs this function by continuously monitoring the core power distribution and calculating a core operating limit corresponding to the allowable minimum DNBR. The COLSS calculation of core power operating limit based on the minimum DNBR limit includes appropriate penalty factors which provide, with a 95/95 probability/confidence level, that the core power limit calculated by COLSS (based on the minumum DNBR limit) is conservative with respect to the actual core power limit. These penalty factors are determined from the uncertainties associated with planar radial peaking measurement, engineering design factors, state parameter measurement, software algorithm modelling, computer processing, rod bow and core power measurement.

Parameters required to maintain the margin to DNB and total core power are also monitored by the CPCs. In the event that the COLSS is not being used, the DNBR margin can be maintained by monitoring with any operable CPC channel so that the DNBR remains above the predetermined limit as a function of Axial Shape Index. The above listed uncertainty penalty factors are also included in the CPCs, which assume a minimum of 20% of RATED THERMAL POWER. The 20% RATED THERMAL POWER threshhold is due to the excore neutron flux detector system being less accurate below 20% core power. Core noise level at low power is too large to obtain usable detector readings. The additional uncertainty terms taken into account in the CPCs of transient protection are removed from Figures 3.2-1 and 3.2-2 since the curves are intended to monitor the LCO only during steady state operation.

DNBR Margin (Continued)

The core power distribution and a corresponding power operating limit based on DNBR are more accurately determined by the COLSS using the incore detector system. The CPCs determined DNBR less accurately with the excore detectors. In addition, the COLSS reserves a DNBR overpower margin to ensure that the specified acceptable fuel design limits are not exceeded in the event of an anticipated operational occurrence. Therefore, the COLSS out of service TS LCOs are more restrictive due to the uncertainty of the CPCs and the overpower margin reserved for anticipated operational occurrences. However, when COLSS becomes inoperable the added margin associated with the CPCs is not immediately required and a 4 hour ACTION is provided for appropriate corrective action.

A DNBR penalty factor has been included in the COLSS and CPC DNBR calculation to accommodate the effects of rod bow. The amount of rod bow in each assembly is dependent upon the average burnup experienced by that assembly. Fuel assemblies that incur higher average burnup will experience a greater magnitude of rod bow. Conversely, lower burnup assemblies will experience less rod bow. In design calculations, the penalty for each batch required to compensate for rod bow is determined from a batch's maximum average assembly burnup applied to the batch's maximum integrated planar-radial power peak. A single net penalty for COLSS and CPC is then determined from the penalties associated with each batch, accounting for the offsetting margins due to the lower radial power peaks in the higher burnup batches.

While operating with the COLSS out of service, the CPC calculated DNBR is monitored every 15 minutes to identify any adverse trend in thermal margin. The increased monitoring of DNBR during the 4 hour action period ensures that adequate safety margin is maintained for anticipated operational occurrences and no postulated accident results in consequences more severe than those described in Chapter 15 of the UFSAR.

3/4.2.5 RCS FLOW RATE

This specification is provided to ensure that the actual RCS total flow rate is maintained at or above the minimum value used in the LOCA safety analyses.

3/4.2.6 REACTOR COOLANT COLD LEG TEMPERATURE

This specification is provided to ensure that the actual value of reactor coolant cold leg temperature is maintained within the range of values used in the safety analyses.

2.4.2.7 AXIAL SHAPE INDEX

The Axial Shape Index (ASI) is a measure of the power generated in the lower half of the core less the power generated in the upper half of the core divided by the sum of these powers. This specification is provided to ensure that the core average ASI is maintained within the range of values assumed as an initial condition in the safety analyses. This range is specified as $-0.3 \leq ASI \leq 0.3$.

2.4.2.7 AXIAL SHAPE INDEX (Continued)

The ASI can be determined by utilizing either the Core Operating Limit Supervisory System (COLSS) or any operable Core Protection Calculator (CPC) channel. The real time monitoring capability and accuracy of COLSS allows COLSS to monitor power limit margins closely. Consequently, the ASI limit is broader than it would be with the same core without COLSS. The COLSS continuously calculates the ASI and compares the calculated value to the parameter established for the COLSS ASI alarm limit. In addition, there is an uncertainty associated with the COLSS calculated ASI, therefore the COLSS ASI alarm limit includes this uncertainty. If the LCO is exceeded, COLSS alarms are initiated. The ASI safety setting is selected so that no safety limit will be exceeded as a result of an anticipated operational occurrence, and so that the consequence of a design basis accident will be acceptable.

With COLSS out of service, any operable CPC channel may be used to calculate the ASI (using three axially spaced excore detectors). The axial shape synthesis in the CPC's shows the relative power produced as a function of core height in each third of the core. Due to the uncertainty associated with the CPC estimate, the ASI is restricted to a smaller range than the range calculated using the COLSS.

The 20% rated thermal power threshold is imposed due to the inaccuracy of the neutron flux detector below the threshold. Core noise level is too large to obtain usable detector readings.

3/4.2.8 PRESSURIZER PRESSURE

This specification is provided to ensure that the actual value of pressurizer pressure is maintained within the range of values used in the safety analyses.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. NPF-10

AND AMENDMENT NO. 102 TO FACILITY OPERATING LICENSE NO. NPF-15

SOUTHERN CALIFORNIA EDISON COMPANY

SAN DIEGO GAS AND ELECTRIC COMPANY

THE CITY OF RIVERSIDE, CALIFORNIA

THE CITY OF ANAHEIM, CALIFORNIA

SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3

DOCKET NOS. 50-361 AND 50-362

1.0 INTRODUCTION

By letter dated December 31, 1992, Southern California Edison Company, et al. (SCE or the licensee) submitted a request for changes to the Technical Specifications (TS) for San Onofre Nuclear Generating Station (SONGS), Unit Nos. 2 and 3. The proposed changes would revise TS 3.2.1, "LINEAR HEAT RATE," and TS 3.2.4, "DNBR MARGIN," and the corresponding Bases. These changes (1) add a distinction between the action requirements when the core operating limit supervisory system (COLSS) is in service and the action requirements when the COLSS is out of service (OOS), (2) increase the ACTION time from 1 hour to 4 hours when the COLSS is OOS, (3) add a new surveillance requirement (SR) to require monitoring the departure from nucleate boiling ratio (DNBR) and/or the linear heat rate (LHR) every 15 minutes, when the COLSS is OOS and the corresponding parameter is not being maintained as required, and (4) change the power reduction requirements from "HOT STANDBY" to "less than or equal to 20 percent of Rated Thermal Power" when the DNBR margin and/or the LHR limiting condition for operation (LCO) cannot be met within the allowed ACTION time.

These amendments also include an editorial change to TS 3.2.4.d and revisions to the Bases of the above TS to reflect the changes, and changes to TS 3/4.5.2 to correct errors made in an earlier TS amendment change.

2.0 BACKGROUND

The COLSS is designed to assist the plant operators in implementing TS requirements for monitoring various LCOs. Specifically, the COLSS uses inputs from various plant sensors (core inlet temperature, in-core detector signals, reactor coolant pump speeds and differential pressures, reactor coolant system pressure, etc.) to calculate a core power that corresponds to the LCO on DNBR margin. This power level is the DNBR power operating limit (POL). Concurrently, as a function of the in-core power distribution, COLSS performs a similar calculation to determine the LHR POL. These two POLs, in conjunction with the licensed core power level, are the highest power level at which the core can safely operate. Maintaining the actual core power below these COLSS calculated POLs ensures that no anticipated operational occurrence (AOO) will violate specified acceptable fuel design limits and that no postulated accident will have consequences more severe than those analyzed in Chapter 15 of the Updated Final Safety Analysis Report (UFSAR).

Since COLSS operation is not required for plant safety (i.e., the COLSS does not initiate any direct safety-related function during AOOs or accidents), it is permissible to continue power operation when the COLSS is OOS provided an alternate means of monitoring the specified parameters can be substituted. Under such circumstances, the TS allow the core protection calculators (CPCs) to be used to maintain the parameters within their specified limits. However, because the CPCs cannot perform the required LHR and DNBR calculations as accurately as COLSS, the TS limits based on the CPC's monitoring capability are more restrictive than those based on the COLSS's monitoring capabilities.

When the COLSS becomes unavailable, DNBR TS limits cannot usually be satisfied without a reduction in core power because the DNBR, as determined using CPCs, usually exceeds the COLSS OOS TS limits at full power. Therefore, if the COLSS becomes inoperable for more than 15 minutes, full-power operation cannot be maintained in accordance with the TS. The amount of power reduction depends on the cycle-specific core design and the existing core conditions when the COLSS becomes inoperable.

The existing DNBR and LHR TS ACTION time limits originated from estimated time requirements for returning the COLSS to service and anticipated power reduction requirements. These time limits were established before initial plant operation and without the benefit of practical experience. Currently, reinitializing the plant monitoring system (PMS) computer or transferring from the PMS to the COLSS backup computer system (CBCS) requires approximately 15 minutes. Therefore, a potential situation exists in which a power reduction would be required when the COLSS is lost, because inadequate time is provided by the TS for appropriate corrective action.

In general, a 15-percent power reduction is required when COLSS is lost to restore CPC DNBR margin to within TS limits. According to the TS, this power reduction must be completed within 1 hour following a loss of the COLSS. However, during the last third of the operating cycle, when boron concentration is low, large power reduction rates are difficult to control and could result in a reactor trip. In addition, this power maneuver is required at a time when the most accurate means of monitoring reactor conditions is not available. Consequently, the existing TS may reduce plant reliability by unnecessarily increasing the potential of reactor protection system (RPS) actuation.

In the proposed changes, the licensee will revise operating instructions (OIs) to require a new DNBR margin. These changes will also require that LHR SRs be performed when the COLSS is OOS and TS 3.2.1 or TS 3.2.4 LCOs are not met. The DNBR margin and the LHR will be monitored using an operable CPC channel every 15 minutes. Monitoring will begin within the first 15 minutes of when the COLSS becomes inoperable. If an adverse trend is observed, operator action would be required to restore these parameters conservatively with respect to the initial values. If LHR or DNBR cannot be restored within the COLSS OOS 4-hour action time, a power reduction to less than or equal to 20-percent rated thermal power will be required within 6 hours.

Increasing the amount of time available for restoring LHR and DNBR when the COLSS is not available will potentially reduce the number and rate of power reductions, thereby decreasing the probability of actuating the RPS. This proposed change accordingly increases TS 3.2.1 and TS 3.2.4 action times for restoring LHR and DNBR margin when the COLSS is OOS so as to provide a reasonable opportunity for appropriate corrective actions. The existing safety margins and the proposed changes will not significantly increase the probability of exceeding the initial conditions assumed in the safety analysis.

3.0 EVALUATION

The licensee proposes to change TS 3.2.1 and TS 3.2.4 to (1) separately address the cases when the COLSS is in service and OOS, (2) initiate a new surveillance, within 15 minutes after COLSS is OOS, to monitor DNBR margin and/or LHR every 15 minutes, (3) increase the ACTION time from 1 hour to 4 hours when the COLSS is OOS and either the LHR or DNBR margin is not being maintained within limits as indicated by any OPERABLE CPC channel, and (4) add SRs to verify, every 15 minutes, that no adverse trend in either LHR or DNBR margin exists when the COLSS is OOS and the limits are not maintained. The intent of these changes is to provide reasonable time for appropriate corrective action when the COLSS becomes inoperable while maintaining the safety of the plant.

The proposed changes do not affect the actions and time requirements when the COLSS is in service. However, when the COLSS is OOS, the action time is increased by 3 hours (from 1 hour to 4 hours). The primary consideration in extending the COLSS OOS time limit is the remote possibility of a slow, undetectable transient that degrades the DNBR margin or LHR within the new time limit and that is followed by an anticipated operational occurrence or accident. Plant parameters monitored by the COLSS which could affect DNBR margin and LHR include reactor coolant system (RCS) flow rate as determined from reactor coolant pump shaft speed, axial power distribution, cold leg temperature, reactor core power, RCS pressure, and azimuthal tilt. Of these parameters, CPCs directly incorporate measured values for reactor core power, RCS flow rate as determined from reactor coolant pump shaft speed, RCS pressure, and cold leg temperature into the calculations of DNBR and LHR. Therefore degradation of conditions with respect to these parameters is expected to be evident in the equivalent CPC margins.

Additionally, the licensee has stated that the operating history of San Onofre Units 2 and 3 has shown that the reactor core is stable with respect to azimuthal power tilt within any 4-hour time period. The only credible events affecting azimuthal tilt at San Onofre are an inadvertent drop or misalignment of a control element assembly (CEA). Though these events are remote for any 4-hour period and are beyond the basis of LCO monitoring, a CEA calculator indicating light and alarm (requiring corrective action) will alert the operators if these events occur. Therefore, any degradation of azimuthal tilt during the 4-hour time limit will be quickly and positively identified.

Because of the core design of San Onofre Units 2 and 3, axial xenon oscillations, particularly near the end of a fuel cycle, are normal. Therefore, axial core power fluctuations and axial power shape are strictly controlled. By controlling these parameters, SONGS ensures efficient fuel burnup, maintains the axial power shape within the limits assumed in the safety analysis, and maintains the axial shape index (ASI) within 0.05 ASI units of the equilibrium shape index (ESI). A full xenon oscillation typically takes 26 hours. Therefore, with the proposed requirements of monitoring the CPC calculated LHR and DNBR every 15 minutes, any significant change in ASI will be promptly identified.

Because of CPC uncertainties, the TS LCOs for DNBR margin and LHR are more restrictive when operating with the COLSS OOS. Therefore, with the COLSS OOS, the existing DNBR margin limits can only be satisfied by either reducing power or returning the COLSS to service. By itself, the loss of the COLSS or its return to service does not mean that the actual core power should immediately be changed. Therefore, during normal operation within the COLSS POLs, if there are no indications that the actual DNBR margin or LHR have degraded, the required overpower margin discussed in Chapter 15 of the UFSAR will continue to be maintained. Also, when either TS 3.2.1 or TS 3.2.4 is not satisfied, compensatory actions will provide additional assurance that the actual DNBR margin and LHR do not exceed the safety limits in the UFSAR. The proposed SRs will ensure that DNBR margin and LHR are monitored every 15 minutes and that appropriate action is taken if an adverse trend is noted when COLSS is out of service and the LHR or DNBR TS LCOs are not met. Additionally, core power distribution during all phases of normal operation and AOOs will remain bounded by the initial conditions assumed in Chapter 15 of the UFSAR. The COLSS-calculated POLs and the CPC-based LHR and DNBR operating limits will remain unchanged.

The staff finds the proposed changes to TS 3.2.1 and TS 3.2.4 acceptable for the following reasons:

(1) As explained in the above discussion, the plant operators will continue to adequately maintain the actual core power below the allowed limits with the proposed changes.

(2) The proposed changes do not involve any modifications to the COLSS or CPC software.

(3) The proposed changes are consistent with the improved Standard Technical Specifications for Combustion Engineering plants (NUREG-1432).

The licensee also requests that power reduction requirements be changed from "HOT STANDBY" to "less than or equal to 20% of RATED THERMAL POWER" when the DNBR margin and/or LHR LCOs cannot be met within the allowed ACTION time. This change is considered administrative because these TS currently apply only at rated thermal power greater than 20 percent. This change provides consistency between the action and applicability statements and allows in-core and ex-core neutron detectors to provide meaningful data for COLSS trouble shooting and operability determination without decreasing safety margin. Therefore, the staff finds this change acceptable. This change is also consistent with the STS.

Additionally, in TS 3.2.4.d, the licensee proposes to change from "neither CEACs is" to "neither CEAC is" and to change the Bases for TS 3.2.1 and TS 3.2.4 to document the principal elements of the changes. The change to TS 3.2.4.d is administrative in nature. The changes to the Bases were reviewed and found to be consistent with the above discussed changes. Therefore, the staff finds these changes acceptable.

Also included in the enclosed amendments are changes to TS 3/4.5.2, "ECCS Subsystems - T_{avg} Greater than or Equal to 350°F." During the last update of this TS section (Amendment 98 for Unit 2 and Amendment 87 for Unit 3), some of the pumps values in the TS amendments transmitted by NRC letter dated September 5, 1991, were incorrect. The enclosed changes to TS 3.5.2 correct these typographical errors by reinstating the pump values that were in the TS before the September 5, 1991, letter. The specific editorial changes are as follows:

<u>Unit 2</u>

In TS 4.5.2.g.1, the developed head for pumps P017, P018, and P019 were changed to 2142 feet, 2101 feet, and 2103 feet, respectively.

In TS 4.5.2.g.2, the low-pressure safety injection pump developed head at miniflow was changed to 406.1 feet.

In TS 4.5.2.h.1.a, the sum of the injection flow rates for pumps P018 and P019 were changed to 667 gpm and 672 pgm, respectively.

In TS 4.5.2.h.1.b, the total pump flow rates for pumps P017, P018, and P019 were changed to 900 gpm, 913 gpm, and 918 gpm, respectively.

<u>Unit 3</u>

In TS 4.5.2.h.1.a, the sum of the injection lines flow rate for pump P017 was changed to 647 gpm.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the California State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (58 FR 12269). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: M. Shuaibi

Date: October 27, 1994

A copy of our related Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

Original signed by:

Mel B. Fields, Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No.113 to NPF-10
2. Amendment No.102 to NPF-15
3. Safety Evaluation

cc w/enclosures:
See next page

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