SOUTHERN CALIFORNIA
EDISON®
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Dwight E. Nunn
Vice President

August 26, 2003

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: **San Onofre Nuclear Generating Station Unit 2**
Docket No. 50-361
Proposed Change Number NPF-10-540
License Amendment Request, "Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)"

Dear Sir or Madam:

Pursuant to 10CFR50.90, Southern California Edison (SCE) is submitting Enclosure 2 "Proposed Change Number (PCN)–540" to request an amendment to SCE License NPF-10 to change the Technical Specifications for San Onofre Unit 2. The proposed change revises Technical Specifications 1.1 "Definitions," 3.4 "Reactor Coolant System," and 5.7 "Reporting Requirements" to relocate the RCS pressure-temperature curves and limits from the Technical Specifications to a licensee-controlled document identified as the PTLR.

Generic Letter (GL) 96-03: Relocation of the Pressure Temperature Limit Curves and Low Temperature Overpressure Protection System Limits, allows the relocation of Technical Specification RCS Pressure-Temperature Limits to a licensee-controlled document, provided that the parameters for constructing the curves and setpoints are derived using a methodology approved by the NRC. The licensee-controlled PTLR document provides the methodology for constructing the curves and limits which are currently valid until 32 Effective Full Power Years (EFPY). Relocating the RCS Pressure-Temperature Curves and Limits from the Technical Specification to the PTLR is consistent with GL 96-03 and as such a "no significant hazards consideration" is appropriate.

The PTLR and two associated justifications for exemption on the methodology for determining the pressure-temperature curves and limits are included with this amendment request as Enclosures 3, 4, and 5, respectively. SCE requests approval of the exemption requests in accordance with 10 CFR 50.12. SCE requests this amendment to be issued effective as of its date of issuance, to be implemented within 60 days from the date of issuance.

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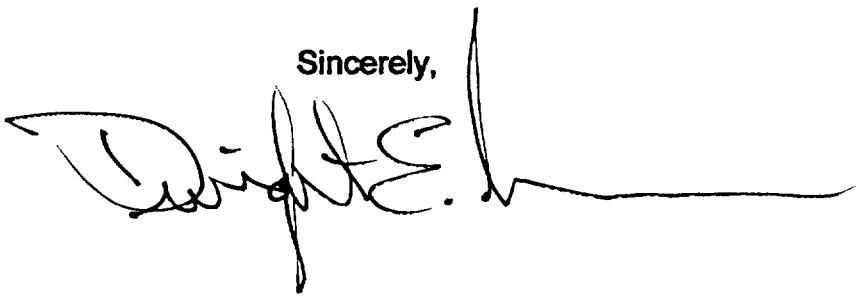
A001

SCE plans to submit a similar amendment request to this one for San Onofre Unit 3 after test results and analyses are available from the Unit 3 Surveillance capsule removed during the recent Unit 3 Cycle 12 refueling outage.

Should you have any questions or require additional information, please contact Mr. Jack Rainsberry at (949) 368-7420.

Sincerely,



Enclosures

1. Notarized affidavit
2. Proposed Change Number (PCN)-540
3. Unit 2 PTLR
4. Justification for Thermal Stress Intensity Factor (K_{IT}) Exemption
5. Justification for ASME Code Case N-640 Exemption

cc: T. P. Gwynn, Acting Regional Administrator, NRC Region IV
B. M. Pham, NRC Project Manager, San Onofre Units 2, and 3
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 and 3
S. Y. Hsu, Department of Health Services, Radiological Health Branch

Enclosure 1

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Application of SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. for a Class 103 License to Acquire, Possess, and Use a Utilization Facility as Part of Unit No. 2 of the San Onofre Nuclear Generating Station	))))))	Docket No. 50-361 Amendment Application No. 222

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. pursuant to 10 CFR 50.90, hereby submit Amendment Application No. 222. This amendment application consists of Proposed Change No. NPF-10-540 to Facility Operating License NPF-10. Proposed Change No. NPF-10-540 is a request to revise the Technical Specification's (TS) Reactor Coolant System (RCS) to relocate the RCS Pressure/Temperature curves, Heatup/Cooldown curves, and Low Temperature Overpressure Protection (LTOP) enable temperatures, from the TS to a licensee-controlled document referred to as the RCS Pressure and Temperature Limits Report (PTLR).

State of California
County of San Diego

Subscribed and sworn to (or affirmed) before me this 26th day of August, 2003, by

Dwight E. Nunn
Vice President

Notary Public

MARIANE SANCHEZ
Commission # 1375470
Notary Public - California
San Diego County
My Comm. Expires Oct 14, 2006

ENCLOSURE 2

PROPOSED CHANGE NUMBER (PCN) – 540
REMOVAL OF REACTOR COOLANT SYSTEM (RCS) PRESSURE AND TEMPERATURE CURVES FROM THE TECHNICAL SPECIFICATIONS TO A PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

SAN ONOFRE UNIT 2

DESCRIPTION AND NO SIGNIFICANT HAZARDS ANALYSIS
FOR PROPOSED CHANGE NPF-10-540
REMOVAL OF REACTOR COOLANT SYSTEM (RCS) PRESSURE AND TEMPERATURE CURVES FROM THE TECHNICAL SPECIFICATIONS TO A PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)
San Onofre Nuclear Generating Station Unit 2

EXISTING TECHNICAL SPECIFICATIONS

See Attachment A

PROPOSED TECHNICAL SPECIFICATIONS
(highlight for additions, strikeout for deletions)

See Attachment B

PROPOSED TECHNICAL SPECIFICATIONS
(with changes)

See Attachment C

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES
(provided for information)

See Attachment D

1.0 Introduction

As one of the improvements to the standard Technical Specifications, the NRC staff agreed with industry that the Reactor Coolant System (RCS) pressure and temperature curves and limits may be relocated outside the Technical Specifications (TS) to a licensee-controlled document, to enable the licensee to maintain these limits efficiently and at a lower cost. Issuance of NRC Generic Letter 96-03, "Relocation of the Pressure Temperature Limits Curves and Low Temperature Overpressure Protection System Limits," allowed the relocation of RCS pressure and temperature limits from the Technical Specifications to a licensee-controlled document, provided that the parameters for constructing the curves and setpoints are derived using NRC approved methodology.
Southern California Edison (SCE) proposes a revision of "Definitions," TS 1.1; "Reactor Coolant System," TS 3.4; and "Reporting Requirements," TS 5.7; to relocate the RCS Pressure and Temperature (P/T) limits, Heatup and Cooldown curves, and Low Pressure Overpressure Protection (LTOP) enable temperatures from the Technical Specifications to a licensee-controlled document referred to as the Pressure and Temperature Limits Report (PTLR). The methodology for constructing the curves and limits including the revised curves and limits, which

are valid until 32 effective full power years (EFPY), is provided in the PTLR. The methodology used is consistent with that currently approved by the NRC.

2.0 Proposed Change

This proposed change will allow SCE to make periodic updates to the RCS P/T curves, Heatup and Cooldown curves, and LTOP enable temperatures more efficiently, without the requirement for a Technical Specification change amendment request to be submitted to the NRC for approval.

The proposed change revises the Technical Specifications by relocating the RCS Pressure and Temperature Limits, Heatup and Cooldown Curves and LTOP enable temperatures from the Technical Specification to the RCS PTLR. This submittal includes request for approval of the RCS PTLR, which describes the methodology for constructing the curves and limits.

The following Technical Specifications are affected by this proposed change. Technical Specifications tables of contents for 3.4.12.1 and 3.4.12.2, 1.1 Definitions, 3.4.3 RCS Pressure and Temperature (P/T) Limits, 3.4.6 RCS Loops – Mode 4, 3.4.7 RCS Loops – Mode 5, Loops Filled, 3.4.12.1 and .2 Low Temperature Overpressure Protection (LTOP) System, 5.7 Reporting Requirements, and supporting TS Bases Changes.

3.0 Background

UFSAR 5.3.2, "Pressure-Temperature Limits," describes the operating conditions and bases for determining these limits.

All components in the RCS are designed to withstand the effects of cyclic loads due to RCS temperature and pressure changes. These cyclic loads could be introduced by normal unit load transients, reactor trips, and startup and shutdown operation.

During plant startup and shutdown, the rates of temperature and pressure changes are limited. The design number of cycles for heatup and cooldown is based upon a rate of 100°Fahrenheit/hour (°F/h) and for cyclic operation.

The maximum allowable RCS pressure at any temperature is based upon the stress limitations for brittle fracture considerations. These limitations are derived by using the rules contained in Section III and XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, including Appendix G, Protection Against Nonductile Failure, and the rules contained in 10 CFR 50, Appendix G, Fracture Toughness Requirements.

Pressure and Temperature Curves and Limits:

The initial heatup and cooldown curves for San Onofre Units 2 and 3 were based in part on the fracture toughness properties of the primary coolant pressure boundary materials and on the expected changes in the toughness of the beltline region materials as a result of neutron irradiation. The initial predicted changes in toughness as a function of irradiation were based on the conservatively developed curves. These initial predictions were similar to, or more conservative than predictions made on the basis of Regulatory Guide 1.99, Revision 1.

Post irradiation surveillance data are used to adjust the plant limit curves consistent with more recent Regulatory Guide 1.99, Revision 2.

During plant life operation surveillance capsules are removed from their location in the reactor vessel for testing at certain intervals of Effective Full Power Years (EFPY). The data obtained are compared with that used to develop the predicted curves and limits shown in the Technical Specifications. If this information indicates anomalies to the existing predictions the curves are redrawn to reflect test data.

Licensee amendments are submitted to the NRC for updating the pressure-temperature curves and limits, following the removal and testing of surveillance capsules, consistent with 10 CFR 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," maintenance of RCS pressure and temperature within these prescribed curves and limits ensures that the integrity of the reactor coolant pressure boundary is maintained.

4.0 Technical Analysis

10 CFR 50.60 requires all light water nuclear power reactors to meet the fracture toughness and material surveillance program for the reactor coolant pressure boundary, as set forth in Appendices G "Fracture Toughness Requirements" and H "Reactor Vessel Material Surveillance Program Requirements" of 10 CFR 50. The purpose of Appendix H is to require a material surveillance program to monitor changes in the fracture toughness properties of ferritic materials (plates and welds) in the reactor vessel beltline region of light water nuclear power reactors resulting from exposure of these materials to neutron irradiation and the thermal environment. Fracture toughness data are obtained from material specimens exposed to neutron radiation in surveillance capsules which are withdrawn periodically from the reactor vessel and used as described in Sections IV and V of Appendix G. The surveillance capsule withdrawal schedule is described in the Updated Final Safety Analysis Report (UFSAR) Table 5.3-12.

A surveillance capsule was removed from Unit 2 during the Cycle 11 refueling outage. Fracture toughness test results of the surveillance capsule, and results of sections IV and V of Appendix G, require changes to the RCS pressure and

temperature (P-T) curves and limits. The RCS P/T curves and limits presently reside in the Technical Specifications. An amendment to the Technical Specifications would be required for any changes made to the pressure and temperature limits. This proposed amendment change of relocating the RCS P/T curves and limits, including the changes, to a licensee-controlled document, is consistent with GL 96-03.

Calculation of the adjusted reference temperature (ART) for the limiting plate and weld in the beltline region was performed using NRC-accepted methodology in accordance with Regulatory Guide 1.99, Revision 2. The adjusted reference temperature values developed are used to derive the P/T curves and limits for San Onofre Unit 2. The adjusted reference temperature includes the exposure of neutron irradiation to the material.

P/T Curves and Limits for Unit 2 were performed consistent with 10 CFR 50 Appendix G and were based upon the principles of Linear Elastic Fracture Mechanics found in the ASME Boiler and Pressure Vessel Code Section XI, Appendix G. ASME Code Case N-640 and an alternate approach to calculate the ASME III Appendix G thermal stress intensity factor (K_{IT}) were used in developing the pressure-temperature curves and limits. Exemptions for the use of ASME Code Case N-640 and the alternate approach to calculate the thermal stress intensity factor (K_{IT}) are utilized in the amendment. Code Case N-640 has been incorporated in the 2001 Edition of the Code. 10 CFR 50.60(b) allows use of alternatives to the requirements described in Appendix G and H of 10 CFR50 when the exemption is granted by the NRC.

Code Case N-640 permits use of K_{IC}, fracture toughness curve shown on ASME XI, Appendix A, Figure A-2200-1, in lieu of the K_{IA}, fracture toughness curve from ASME XI, Appendix G, Figure G-2210-1, as the lower bound for fracture toughness. The exemption request involves only a change of the fracture toughness curve used for development of the P-T curves from K_{IA} to K_{IC}. The other margins involved with the ASME XI, Appendix G, process of determining P-T limit curves remain unchanged. Use of ASME Code Case N-640 was presented in the submittal by Fort Calhoun Station and accepted by the NRC (TAC NO. MB3606).

San Onofre Unit 2 uses a methodology provided by Westinghouse to generate the pressure-temperature curves and limits. This Westinghouse methodology uses an alternate approach to ASME III Appendix G to calculate the thermal stress intensity factor. The methodology compared K_{IT} results obtained from the Westinghouse methodology to those obtained from the ASME Appendix G methodology, using the details of a sample reactor vessel. The Non-Proprietary Version of the Westinghouse methodology "The Technical Methodology Paper Comparing ABB Combustion Engineering Pressure Temperature Curve to ASME Section III, Appendix G" demonstrated that the ABB/CE P/T Curve methodology generates similar results to those generated using the "constant rate" based

ASME approach. The report specifically compared calculations of thermal stress intensity, K_{IT} and P-Allowable using both approaches. The Westinghouse methodology was presented in a submittal by Indian Point 3 Nuclear Power Plant, Docket No. 50-286, "Proposed Exemption from Requirements of 10 CFR 50.60 to Utilize Alternate Methodology to Determine K_{IT}" and was granted by the NRC (TAC NO. M99928).

Pressure and temperature values are adjusted for instrumentation uncertainties, and the effects of RCS static and dynamic pressure heads.

Low Temperature Overpressure Protection (LTOP) enable temperatures are determined using the ASME Code Section XI, Appendix G as a guide. The LTOP system protects the RCS pressure boundary integrity by ensuring that the RCS pressure remains below the applicable P/T limits of 10 CFR 50, Appendix G; particularly at low temperatures when the RCS is water-solid.

The RCS pressure and temperature curves and limits provided in the PTLR submitted with this request are valid until 32 EFPY.

This change does not impact the UFSAR safety analysis and complies with GL 96-03 and 10 CFR 50, Appendices G and H.

10 CFR 50 Appendix H requires a material surveillance program to monitor changes in the fracture toughness properties of ferritic materials (plates and welds) in the reactor vessel beltline region, of light water nuclear power reactors, resulting from exposure of these materials to neutron irradiation and the thermal environment. 10 CFR 50 Appendix G provides the requirements for determining pressure and temperature limits for protecting the reactor coolant system's pressure boundary integrity until end of life (EOL). Removal, testing and analysis of the Unit 2 surveillance capsule in the Cycle 11 refueling outage demonstrated that the current RCS pressure and temperature limits were conservative.

5.0 Regulatory Safety Analysis

5.1 No Significant Hazards Consideration

Southern California Edison (SCE) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

Updating the Reactor Coolant System (RCS) pressure and temperature curves and limits in accordance with 10 CFR 50 Appendices G and H ensures the reactor coolant system's pressure boundary integrity will be protected until End Of Life (EOL) and does not contribute to the probability of or the initiation of accidents. There is no change to the safety analysis.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   These changes are required to maintain the RCS pressure boundary integrity until EOL. Changes to the RCS pressure and temperature curve and limits will not create a new or different kind of accident. There is no change to the safety analysis.

   Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No

   Pressure and temperature curves and limits are provided as limits to plant operation for ensuring RCS pressure boundary integrity is maintained until EOL. No margin of safety is impacted by changes to the RCS pressure and temperature curves and limits. There is no change to the safety analysis.

   Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, SCE concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

10 CFR 50.60 requires all light water nuclear power reactors to meet the fracture toughness and material surveillance program for the reactor coolant pressure boundary, as set forth in Appendices G "Fracture Toughness Requirements" and H "Reactor Vessel Material Surveillance Program Requirements" of 10 CFR 50. Regulatory Guide 1.99, Revision 2 provides guidance in calculating the Adjusted Reference Temperature (ART) for the limiting plate and weld in the beltline region. NRC Generic Letter GL 96-03, "Relocation of the Pressure Temperature Limit Curves and Low Temperature Overpressure Protection System Limits," allows relocating the pressure and temperature curves and limits outside the Technical Specifications to a licensee-controlled document .

The proposed change is in accordance with NRC GL 96-03, Regulatory Guide 1.99, Rev. 2, and 10 CFR 50 Appendices G and H.

In conclusion, based on the considerations discussed above, (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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component, the reactor vessel, located within the restricted area, as defined in 10 CFR 20 or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22 (c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

7.1 Code of Federal Regulations, Title 10, Part 50, Section 50.60, "Acceptance Criteria for Fracture Prevention Measures for Light Water Nuclear Power Reactors for Normal Operation."

7.2 Code of Federal Regulations, Title 10, Part 50, Appendix G, "Fracture Toughness Requirements."

7.3 Code of Federal Regulations, Title 10, Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements."

7.4 U.S. Nuclear Regulatory Commission, "Radiation Embrittlement of Reactor Vessel Materials," Regulatory Guide 1.99, Revision 2.

7.5 ASME Boiler and Pressure Vessel Code, 1995 Edition and addenda through the 1996 Addenda, Section XI, Appendix G, "Fracture Toughness Criteria for Protection Against Failure."

7.6 Cases of ASME Boiler and Pressure Vessel Code, Case N-640, "Alternative Reference Fracture Toughness for Development of P/T Limit Curves," Section XI, Division 1, dated February 26, 1996.

7.7 Westinghouse calculation CN-CI-02-54, SONGS Unit 2 RCS Pressure-Temperature Limits and LTOP Enable Temperatures for 32 EFPY, Revision 1.

7.8 SCE calculation M-0011-071, SONGS Unit 2 Adjusted Referenced Temperature for 20 & 32 EFPY, Revision 0.

7.9 NRC Generic Letter 96-03: Relocation of the Pressure Temperature Limit Curves and Low Temperature Overpressure Protection System Limits.

7.10 San Onofre Nuclear Generating Station Updated Final Safety Analysis Report, Revision 16.

7.11 WCAP-16005-NP, San Onofre Nuclear Generating Station Unit 2 RCS Pressure and Temperature Limits Report, Rev. 00

7.12 Westinghouse Technical paper "Technical Methodology Paper Comparing ABB/Combustion Engineering Pressure Temperature Curve to ASME Section III, Appendix G," 063-PENG-ER-096, Rev. 00, January 22, 1998 prepared for New York Power Authority, Indian Point 3 Nuclear Power Plant.

PCN-540

ATTACHMENT A

EXISTING TECHNICAL SPECIFICATIONS

SAN ONOFRE UNIT 2

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(continued)

1.1 Definitions

OPERABLE – OPERABILITY	A system, subsystem, train, component, or device shall be OPERABLE when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).
PHYSICS TESTS	PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation. These tests are: a. Described in Chapter 14, Initial Test Program of the SONGS Units 2 and 3 UFSAR; b. Authorized under the provisions of 10 CFR 50.59; or c. Otherwise approved by the Nuclear Regulatory Commission.
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of 3438 MWt.
REACTOR PROTECTIVE SYSTEM (RPS) RESPONSE TIME	The RPS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RPS trip setpoint at the channel sensor until electrical power to the CEAs drive mechanism is interrupted. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.
SHUTDOWN MARGIN (SDM)	SDM shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming:

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 With the reactor vessel head bolts tensioned*, the Reactor Coolant System (except the pressurizer) temperature and pressure shall be limited in accordance with the limit lines shown on Figures 3.4.3-1, 3.4.3-2, 3.4.3-3, 3.4.3-4, 3.4.3-5, and Table 3.4.3-1 during heatup, cooldown, and inservice leak and hydrostatic testing with:

a. A maximum heatup of 60°F in any 1-hour period with RCS cold leg temperature greater than or equal to 65°F.

b. A maximum cooldown as specified by Figure 3.4.3-3 in any 1-hour period with RCS cold leg temperature less than or equal to 160°F. A maximum cooldown of 100°F in any 1-hour period with RCS cold leg temperature greater than 160°F.

c. A maximum temperature change of 10°F in any 1-hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves.

d. A minimum temperature of 65°F to tension reactor vessel head bolts.

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.

*With the reactor vessel head bolts detensioned, RCS cold leg temperature may be less than 65°F.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. ---------NOTE--------- Required Action A.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1	Restore parameter(s) to within limits.	30 minutes
	AND		
	A.2	Determine RCS is acceptable for continued operation.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 5 with RCS pressure < 500 psia.	36 hours
C. ---------NOTE--------- Required Action C.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1	Initiate action to restore parameter(s) to within limits.	Immediately
	AND		
	C.2	Determine RCS is acceptable for continued operation.	Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.3.1	----------NOTE---------- Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. ---------- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates within limits specified in Figure 3.4.3-1, Figure 3.4.3-2, Figure 3.4.3-3, Figure 3.4.3-4, Figure 3.4.3-5, and Table 3.4.3-1.	30 minutes
SR 3.4.3.2	The reactor vessel material irradiation surveillance specimens shall be removed and examined, to determine changes in material properties, as required by 10 CFR 50 Appendix H. The results of these examinations shall be used to update Figures 3.4.3-1 through 3.4.3-5. Recalculate the Adjusted Reference Temperature in accordance with Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.	In accordance with requirements of 10CFR 50 Appendix H

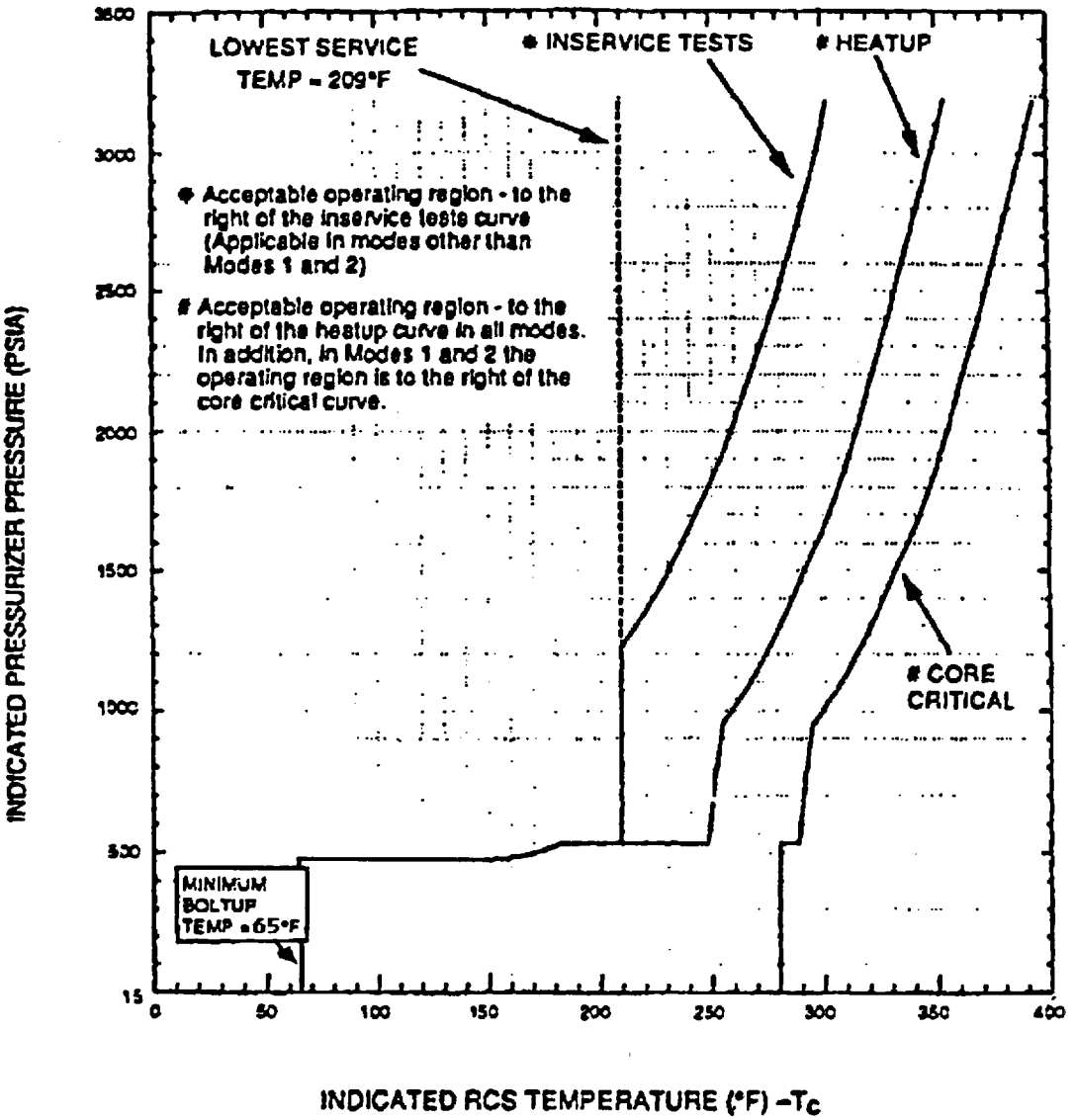


Figure 3.4.3-1

SONGS 2 HEATUP RCS PRESSURE/TEMPERATURE
LIMITATIONS UNTIL 20 EFPY
Normal Operation

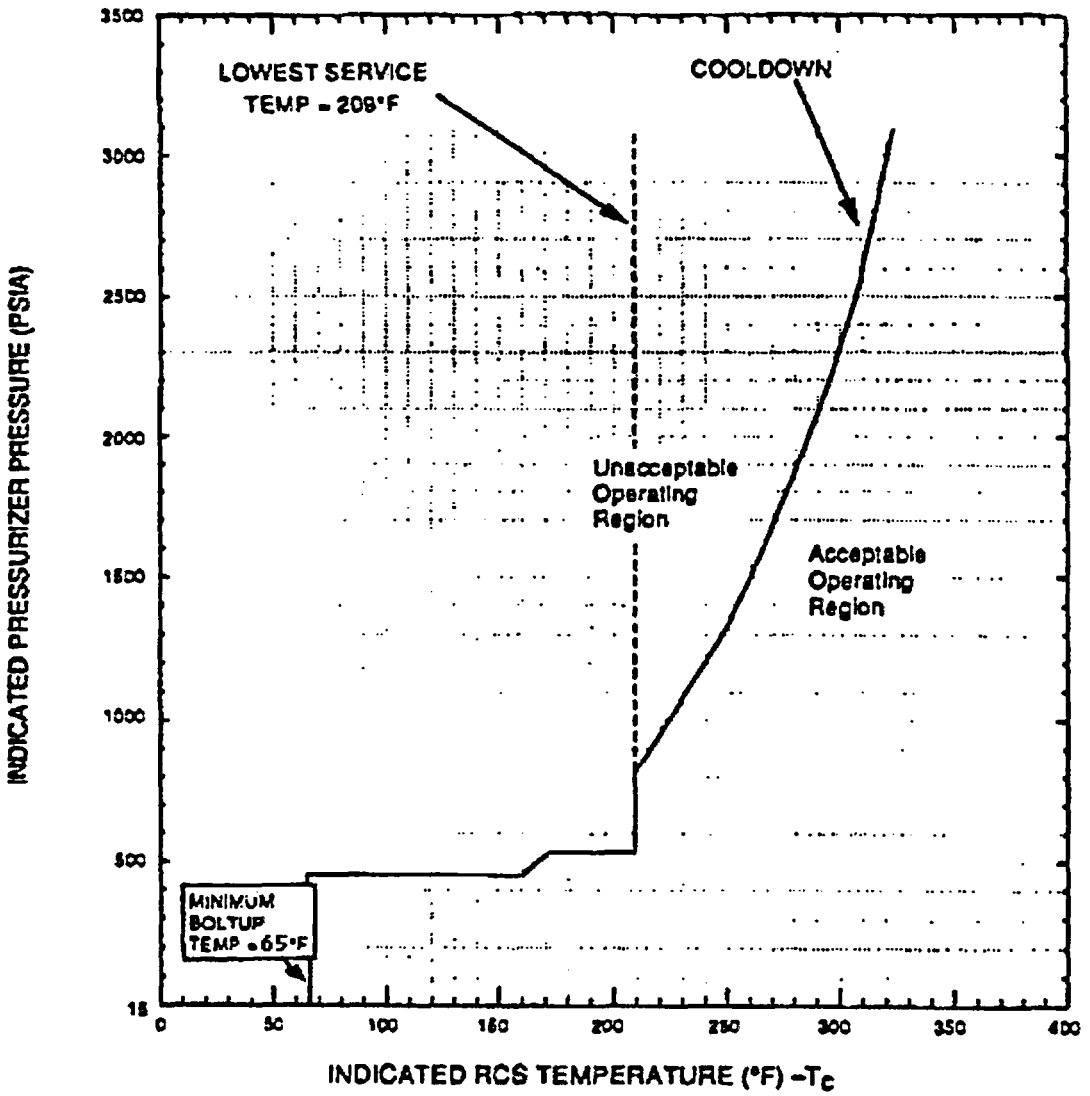
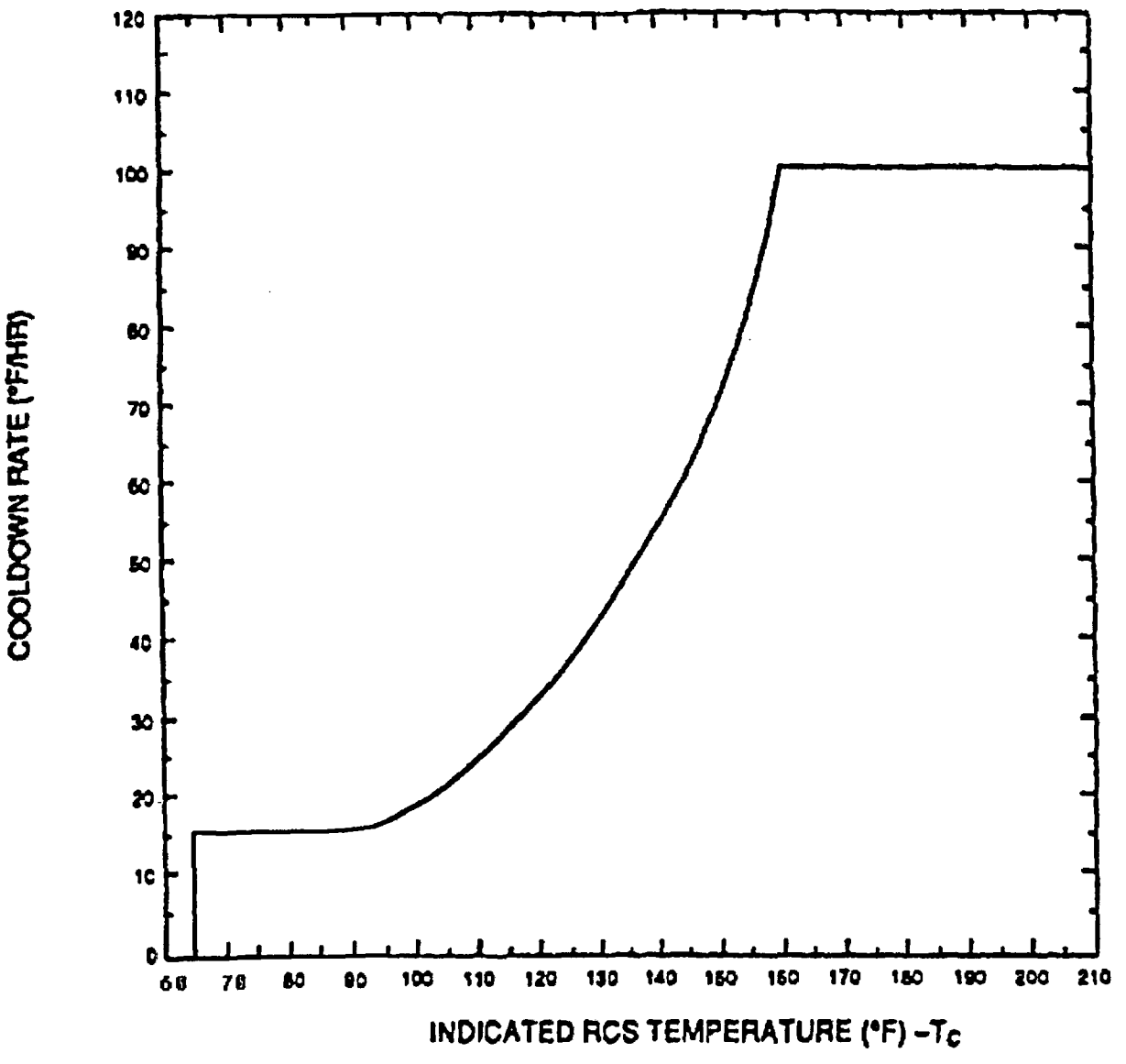


FIGURE 3.4.3-2

SONGS 2 COOLDOWN RCS PRESSURE/TEMPERATURE
LIMITATIONS UNTIL 20 EFPY
Normal Operation



NOTE: A MAXIMUM COOLDOWN RATE OF 100°F/HR IS ALLOWED AT ANY TEMPERATURE ABOVE 160°F

FIGURE 3.4.3-3

SONGS 2 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Normal Operation

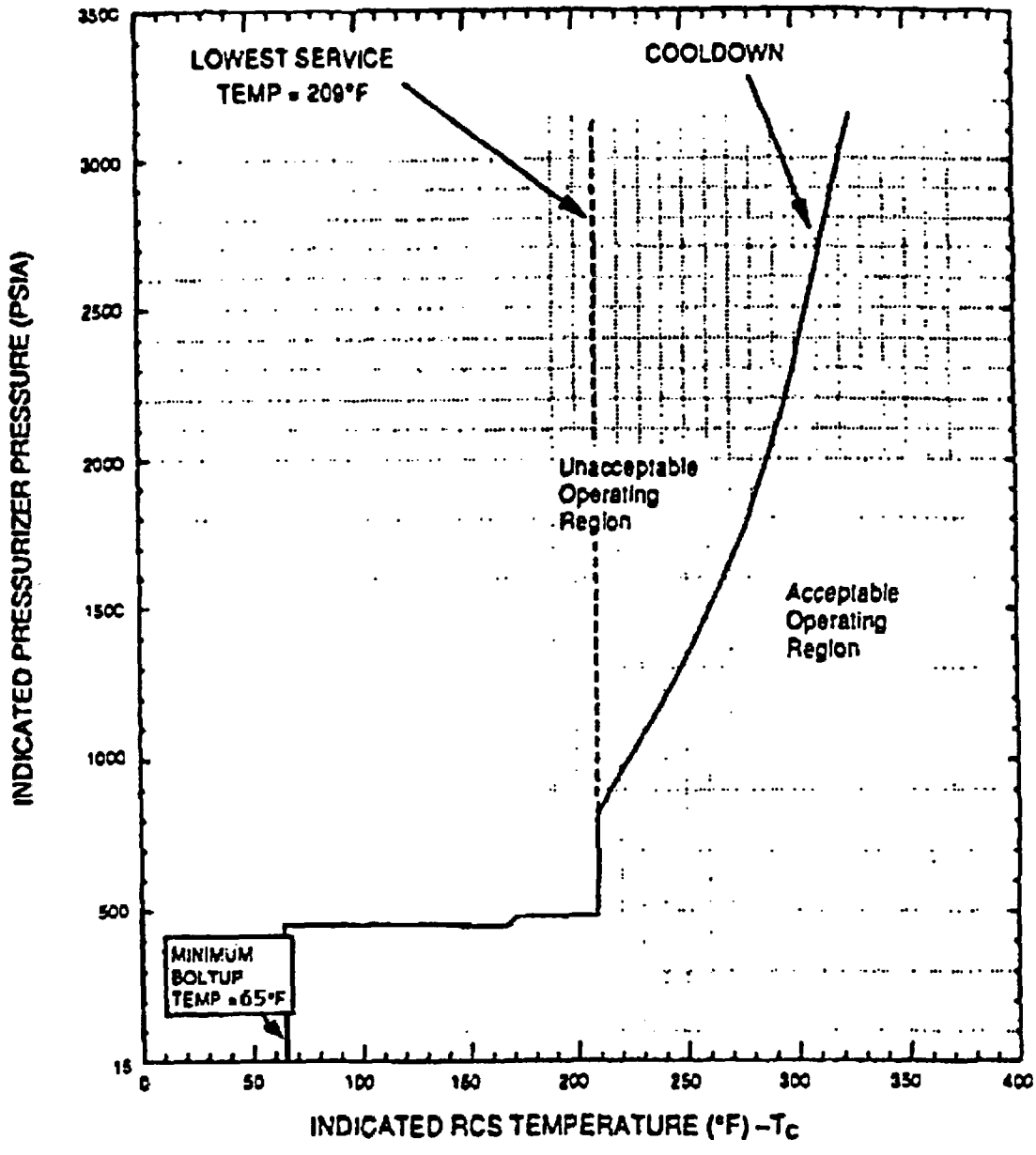
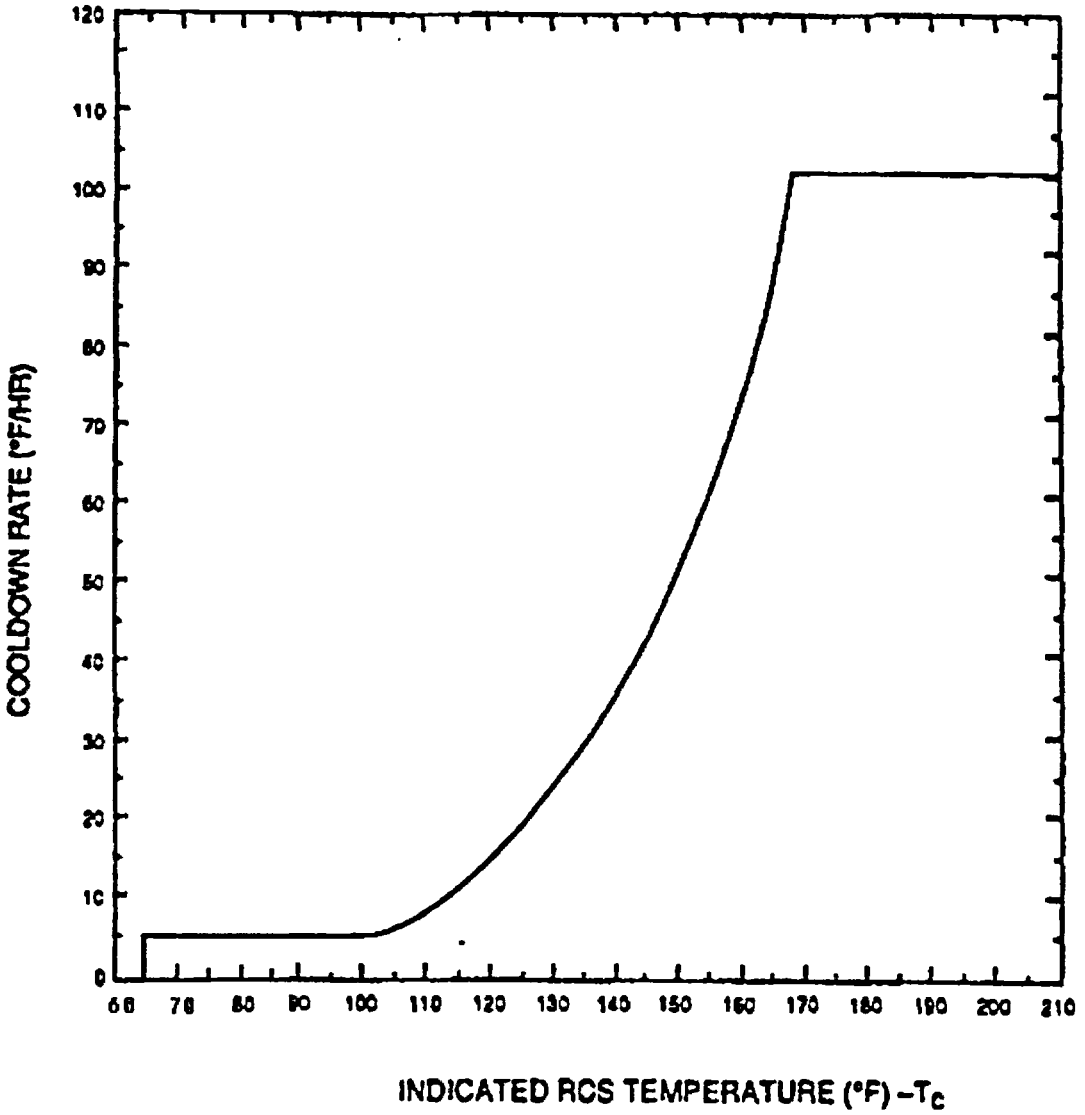


FIGURE 3.4.3-4

SONGS 2 COOLDOWN RCS PRESSURE/TEMPERATURE
LIMITATIONS UNTIL 20 EFPY
Remote Shutdown Operation



NOTE: A MAXIMUM COOLDOWN RATE OF 100°F/HR IS ALLOWED AT ANY TEMPERATURE ABOVE 168°F

FIGURE 3.4.3-5

SONGS 2 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Remote Shutdown Operation

TABLE 3.4.3-1

Low Temperature RCS Overpressure Protection Range

Operating Period, EFPY	Cold Leg Temperature, °F	
	During Heatup	During Cooldown
Until 20 (Normal Operation)	≤ 256	≤ 238
Until 20 (Remote shutdown Operation)	*	≤ 238

* Heatup operations are not normally performed from the Remote Shutdown panels.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops – MODE 4

LCO 3.4.6 Two loops or trains consisting of any combination of RCS loops and shutdown cooling (SDC) trains shall be OPERABLE and at least one loop or train shall be in operation.

---NOTES---

1. All reactor coolant pumps (RCPs) and SDC pumps may be de-energized for ≤ 1 hour per 8 hour period, provided:

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started with any RCS cold leg temperature ≤ 256°F unless:

   a. Pressurizer water volume is < 900 ft^3, or

   b. Secondary side water temperature in each steam generator (SG) is < 100°F above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

----------NOTES (continued)----------

4. No reactor coolant pump (RCP) shall be started with one or more of the RCS cold leg temperatures ≤ 256°F unless:

   a. The pressurizer water volume is < 900 ft^3 or

   b. The secondary side water temperature in each steam generator (SG) is < 100°F above each of the RCS cold leg temperatures.

5. A containment spray pump may be used in place of a low pressure safety injection pump in either or both shutdown cooling trains to provide shutdown cooling flow provided the reactor has been subcritical for a period > 24 hours and the RCS is fully depressurized and vented in accordance with LCO 3.4.12.1.

6. All SDC trains may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

APPLICABILITY: MODE 5 with RCS loops filled.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Less than the required SDC trains/RCS loops OPERABLE. AND Any SG with secondary side water level not within limit.	A.1 Initiate action to restore the required SDC trains/RCS loops to OPERABLE status. OR A.2 Initiate action to restore SG secondary side water levels to within limits.	Immediately Immediately

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12.1 Low Temperature Overpressure Protection (LTOP) System

RCS Temperature ≤ 256°F

LCO 3.4.12.1 No more than two high pressure safety injection pumps shall be OPERABLE, the safety injection tanks shall be isolated or depressurized to less than the limit specified in Figure 3.4.3-2 and at least one of the following overpressure protection systems shall be OPERABLE:

a. The Shutdown Cooling System Relief Valve (PSV9349) with:

1) A lift setting of 406 ± 10 psig,

2) Relief Valve isolation valves 2HV9337, 2HV9339, 2HV9377, and 2HV9378 open,

or,

b. The Reactor Coolant System depressurized with an RCS vent of greater than or equal to 5.6 square inches.

APPLICABILITY: MODE 4 when the temperature of any one RCS cold leg is less than or equal to the enable temperatures specified in Table 3.4.3-1,

MODE 5, and

MODE 6 when the head is on the reactor vessel and the RCS is not vented.

----------NOTE----------
SIT isolation or depressurization to less than the Figure 3.4.3-2 limit is only required when SIT pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in Figure 3.4.3-1 and Figure 3.4.3-2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. With more than two HPSI pumps capable of injecting into the RCS.	A.1 Initiate action to verify a maximum of two HPSI pumps capable of injecting into the RCS.	Immediately
B. SIT pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in Figure 3.4.3-1 and Figure 3.4.3-2.	B.1 Isolate affected SIT.	1 hour
C. Required Action and associated Completion Time of Condition B not met.	C.1 Depressurize affected SIT to less than the maximum RCS pressure for existing cold leg temperature allowed in Figure 3.4.3-1 and Figure 3.4.3-2.	12 hours
D. With one or both SDCS Relief Valve isolation valves in a single SDCS Relief Valve isolation valve pair (valve pair 2HV9337 and 2HV9339 or valve pair 2HV9377 and 2HV9378) closed.	D.1 Open the closed valve(s). OR D.2 Power-lock open the OPERABLE SDCS Relief Valve isolation valve pair.	24 hours 24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. SDCS Relief Valve inoperable. OR Required Action and associated Completion Time of Condition A, C, or D not met. OR LTOP System inoperable for any reason other than Condition A, C, or D.	E.1 Reduce T_{avg} to less than 200°F, depressurize RCS and establish RCS vent of ≥ 5.6 square inches.	8 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.12.1.1	----------NOTE---------- A HPSI pump is secured by verifying that its motor circuit breaker is not racked-in, or its discharge valve is locked closed. The requirement to rack out the HPSI pump breaker is satisfied with the pump breaker racked out to its disconnected or test position. ---------- Verify a maximum of two HPSI pumps are capable of injecting into the RCS.	12 hours
SR 3.4.12.1.2	----------NOTE---------- Required to be performed when complying with the LCO 3.4.12.1 Note. ---------- Verify each SIT is isolated or depressurized less than the limit specified in Figure 3.4.3-2.	12 hours
SR 3.4.12.1.3	Verify RCS vent ≥ 5.6 square inches is open when in use for overpressure protection.	12 hours for unlocked open vent valve(s) AND 31 days for locked, sealed, or otherwise secured open vent valve(s), or open flanged RCS penetrations

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
	----------NOTES---------- 1. Only required to be performed when the SDCS Relief Valve isolation valve pair is inoperable. 2 The power-lock open requirement is satisfied either with the AC breakers open for valve pair 2HV9337 and 2HV9339 or the inverter input and output breakers open for valve pair 2HV9377 and 2HV9378, whichever valve pair is OPERABLE. ----------	
SR 3.4.12.1.4	Verify the OPERABLE SDCS Relief Valve isolation valve pair (valve pair 2HV9337 and 2HV9339, or valve pair 2HV9377 and 2HV9378) is in the power-lock open condition.	12 hours
SR 3.4.12.1.5	Verify that SDCS Relief Valve isolation valves 2HV9337, 2HV9339, 2HV9377, and 2HV9378 are open when the SDCS Relief Valve is used for overpressure protection.	72 hours
SR 3.4.12.1.6	Verify SDCS Relief Valve Setpoint.	In accordance with the Inservice Testing Program

SURVEILLANCE REQUIREMENTS (continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12.2 Low Temperature Overpressure Protection (LTOP) System

RCS Temperature > 256°F

LCO 3.4.12.2 At least one of the following overpressure protection systems shall be OPERABLE:

a. The Shutdown Cooling System Relief Valve (PSV9349) with:

1) A lift setting of 406 ± 10 psig,

2) Relief Valve isolation valves 2HV9337, 2HV9339, 2HV9377, and 2HV9378 open,

or,

b. A minimum of one pressurizer code safety valve with a lift setting of 2500 psia ± 1%.

APPLICABILITY: MODE 4 when the temperature of all RCS cold legs are greater than the enable temperatures specified in Table 3.4.3-1.

----------NOTES----------

1. The lift setting pressure of the pressurizer code safety valve shall correspond to ambient conditions of the valve at nominal operating temperature and pressure.

2. The SDCS Relief Valve lift setting assumes valve temperatures less than or equal to 130°F.

5.7 Reporting Requirements (continued)

5.7.1.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

6.b "Identification of NRC Safety Evaluation Report Limitations and/or Constraints on Reload Analysis Methodology," CEN-635(S), Rev. 00, February 1999

6.c Letter, Stephen Dembek (NRC) to Harold B. Ray (SCE), dated June 2, 1999, "San Onofre Nuclear Generating Station Units 2 and 3 - Evaluation of Reload Analysis Methodology Technology Transfer (TAC Nos. MA4289 and MA4290)"

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal hydraulic limits, Emergency Core Cooling System (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any mid-cycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.7.1.6 Not Used

5.7.1.7 Hazardous Cargo Traffic Report

Hazardous cargo traffic on Interstate 5 (I-5) and the AT&SF railway shall be monitored and the results submitted to the NRC Regional Administrator once every three years.

(continued)

PCN-540

ATTACHMENT B

PROPOSED TECHNICAL SPECIFICATIONS
(Highlight for additions, strikeout for deletions)

SAN ONOFRE UNIT 2

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(continued)

1.1 Definitions

OPERABLE – OPERABILITY	A system, subsystem, train, component, or device shall be OPERABLE when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).
PHYSICS TESTS	PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation. These tests are: a. Described in Chapter 14, Initial Test Program of the SONGS Units 2 and 3 UFSAR; b. Authorized under the provisions of 10 CFR 50.59; or c. Otherwise approved by the Nuclear Regulatory Commission.
PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)	The PTLR is the unit specific document that provides the reactor vessel pressure and temperature (P/T) limits, including heatup and cooldown rates, and LTOP setpoints for the current reactor vessel fluence period. These P/T limits are determined for fluence period of effective full-power years (EFPY) in accordance with the methodology in Appendices G and H to 10CFR50 for determining the P/T and LTOP system limiting parameters. Plant operation within these operating limits are addressed in 3.4.3, RCS Pressure and Temperature (P/T) Limits and 3.4.12, Low Temperature Overpressure Protection (LTOP) System of this Technical Specification.
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of 3438 MWt.

(continued)

1.1 Definitions

REACTOR PROTECTIVE SYSTEM (RPS) RESPONSE TIME	The RPS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RPS trip setpoint at the channel sensor until electrical power to the CEAs drive mechanism is interrupted. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.
SHUTDOWN MARGIN (SDM)	SDM shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming:

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 The combination of RCS pressure, RCS temperature and RCS heatup and cooldown rates shall be maintained within the limits as specified in the RCS PRESSURE-TEMPERATURE LIMITS REPORT (PTLR).

~~With the reactor vessel head bolts tensioned*, the Reactor Coolant System (except the pressurizer) temperature and pressure shall be limited in accordance with the limit lines shown on Figures 3.4.3-1, 3.4.3-2, 3.4.3-3, 3.4.3-4, 3.4.3-5, and Table 3.4.3-1 during heatup, cooldown, and inservice leak and hydrostatic testing with:~~

~~a. A maximum heatup of 60°F in any 1-hour period with RCS cold leg temperature greater than or equal to 65°F.~~

~~b. A maximum cooldown as specified by Figure 3.4.3-3 in any 1-hour period with RCS cold leg temperature less than or equal to 160°F. A maximum cooldown of 100°F in any 1-hour period with RCS cold leg temperature greater than 160°F.~~

~~c. A maximum temperature change of 10°F in any 1-hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves.~~

~~d. A minimum temperature of 65°F to tension reactor vessel head bolts.~~

~~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.~~

~~*With the reactor vessel head bolts detensioned, RCS cold leg temperature may be less than 65°F.~~

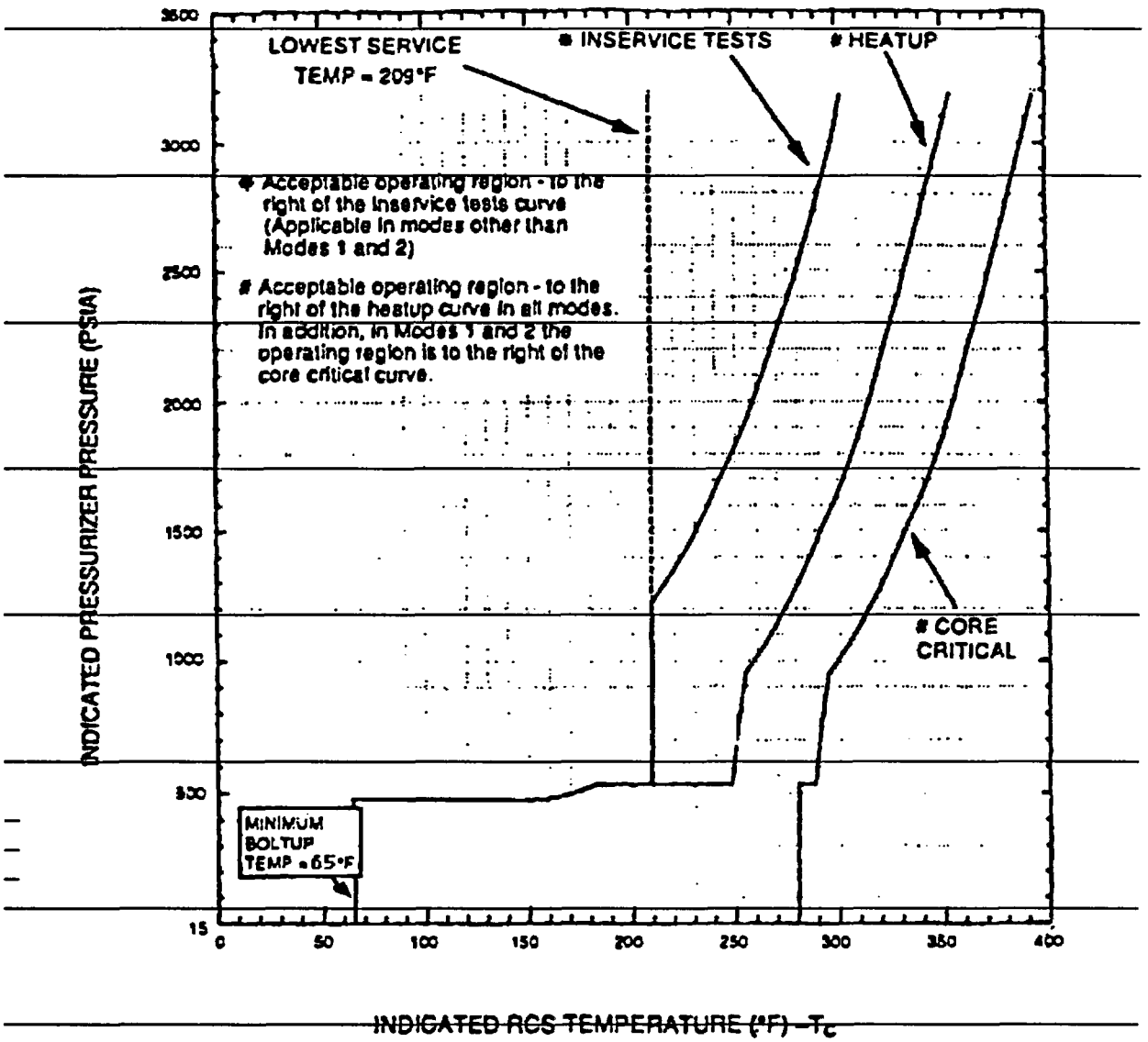
APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. ---------NOTE--------- Required Action A.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1	Restore parameter(s) to within limits.	30 minutes
	AND		
	A.2	Determine RCS is acceptable for continued operation.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 5 with RCS pressure < 500 psia.	36 hours
C. ---------NOTE--------- Required Action C.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1	Initiate action to restore parameter(s) to within limits.	Immediately
	AND		
	C.2	Determine RCS is acceptable for continued operation.	Prior to entering MODE 4

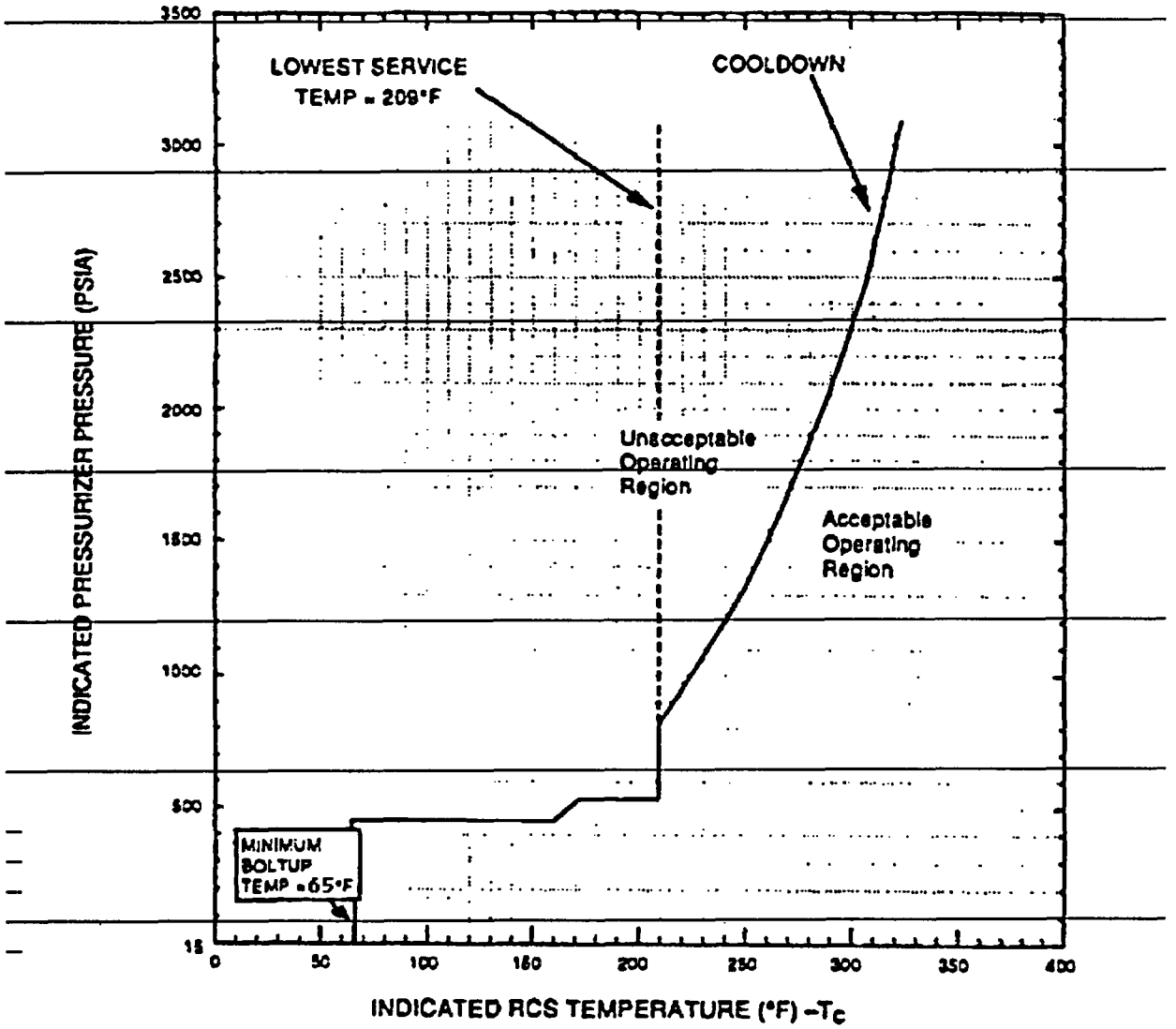
SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	----------NOTE---------- Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. ---------- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates within limits specified in the PTLR~~Figure 3.4.3-1, Figure 3.4.3-2, Figure 3.4.3-3, Figure 3.4.3-4, Figure 3.4.3-5, and Table 3.4.3-1.~~	30 minutes
SR 3.4.3.2	The reactor vessel material irradiation surveillance specimens shall be removed and examined, to determine changes in material properties, as required by 10 CFR 50 Appendix H. The results of these examinations shall be used to update the PTLR~~Figures 3.4.3-1 through 3.4.3-5. Recalculate the Adjusted Reference Temperature in accordance with Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.~~	In accordance with requirements of 10CFR 50 Appendix H



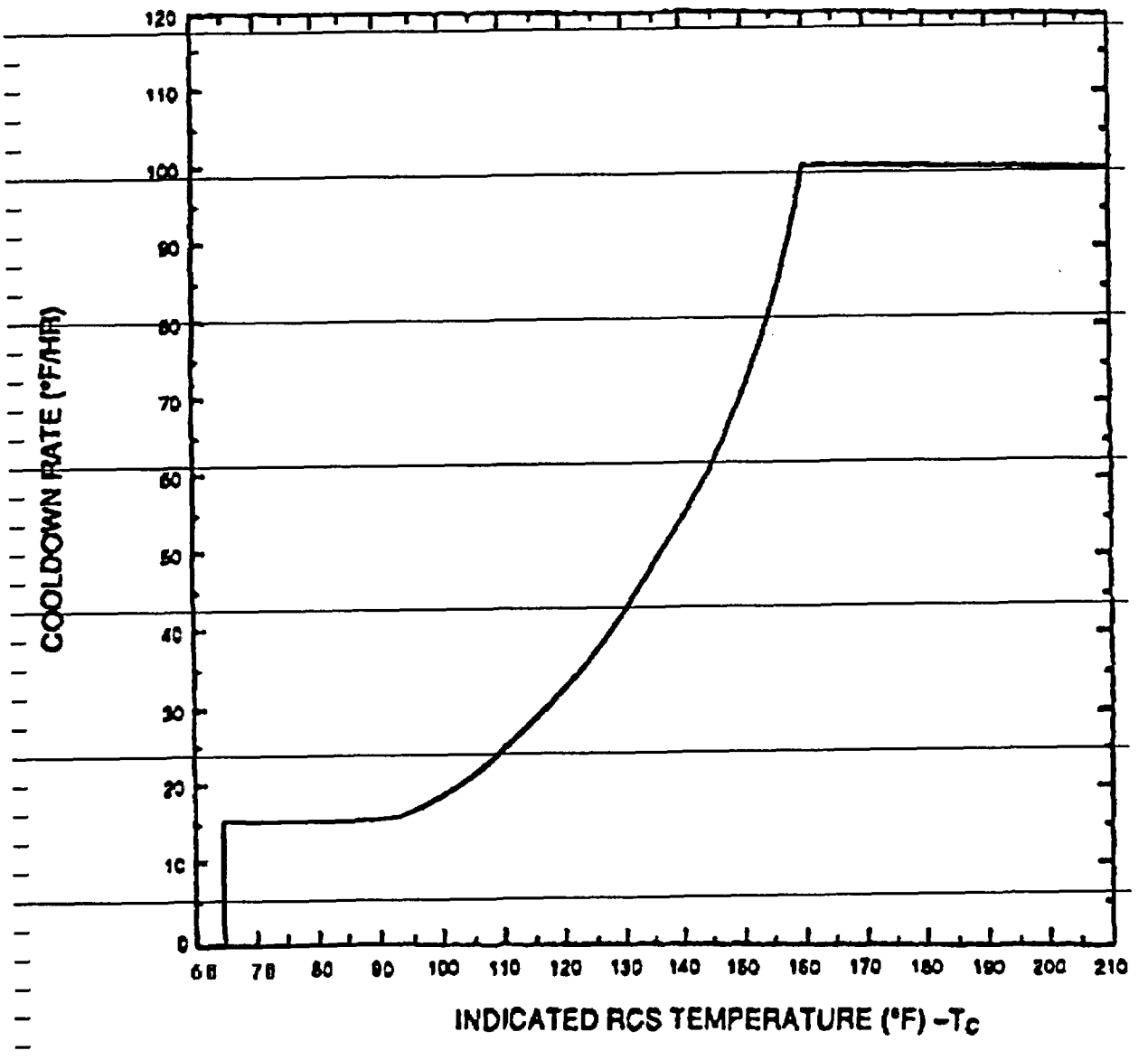
~~Figure 3.4.3-1~~

~~SONGS 2 HEATUP RCS PRESSURE/TEMPERATURE LIMITATIONS UNTIL 20 EFPY Normal Operation~~



~~FIGURE 3.4.3-2~~

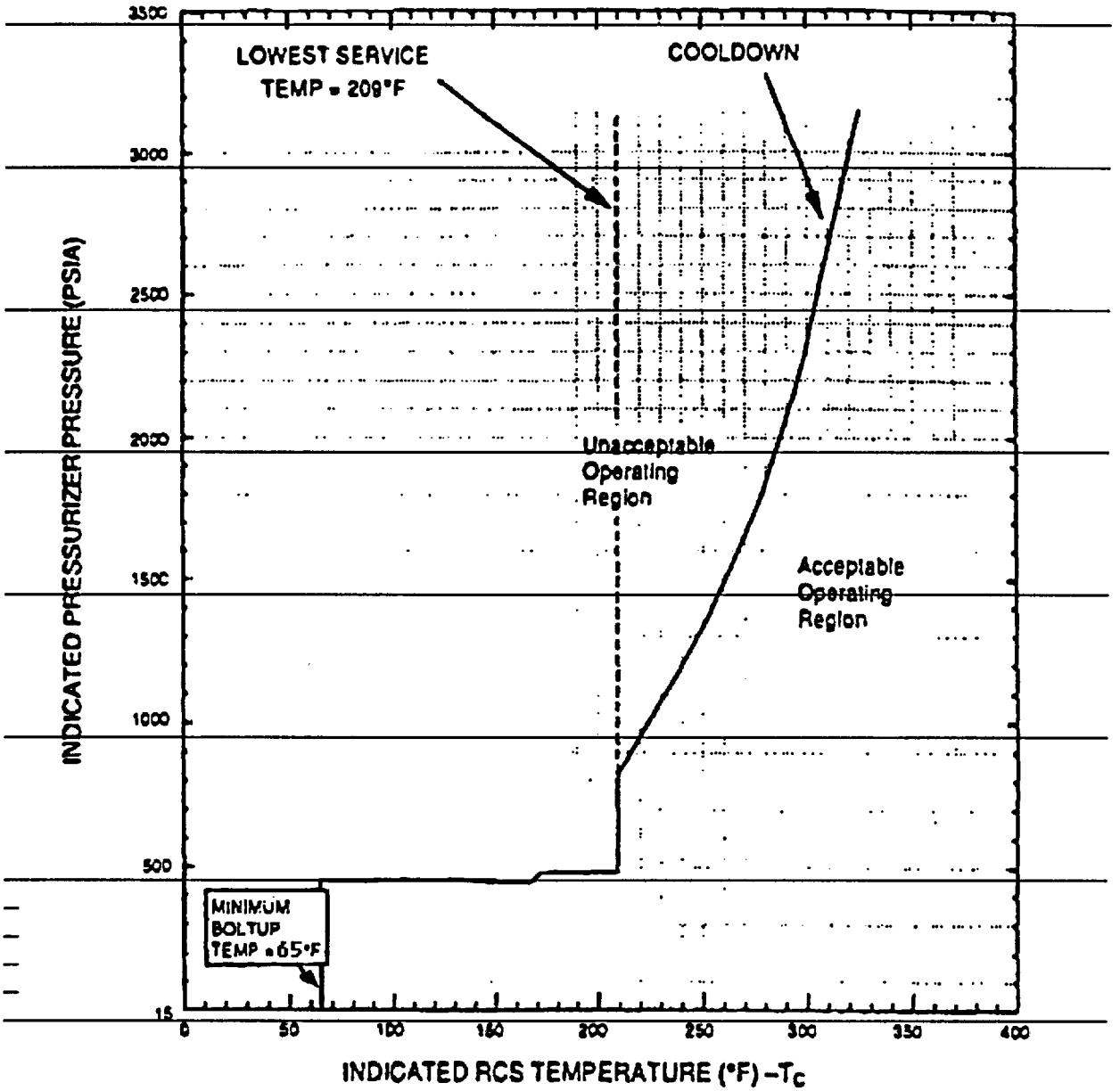
~~SONGS 2 COOLDOWN RCS PRESSURE/TEMPERATURE~~
~~LIMITATIONS UNTIL 20 EFPY~~
~~Normal Operation~~



~~NOTE: A MAXIMUM COOLDOWN RATE OF 100°F/HR IS ALLOWED AT ANY TEMPERATURE ABOVE 160°F~~

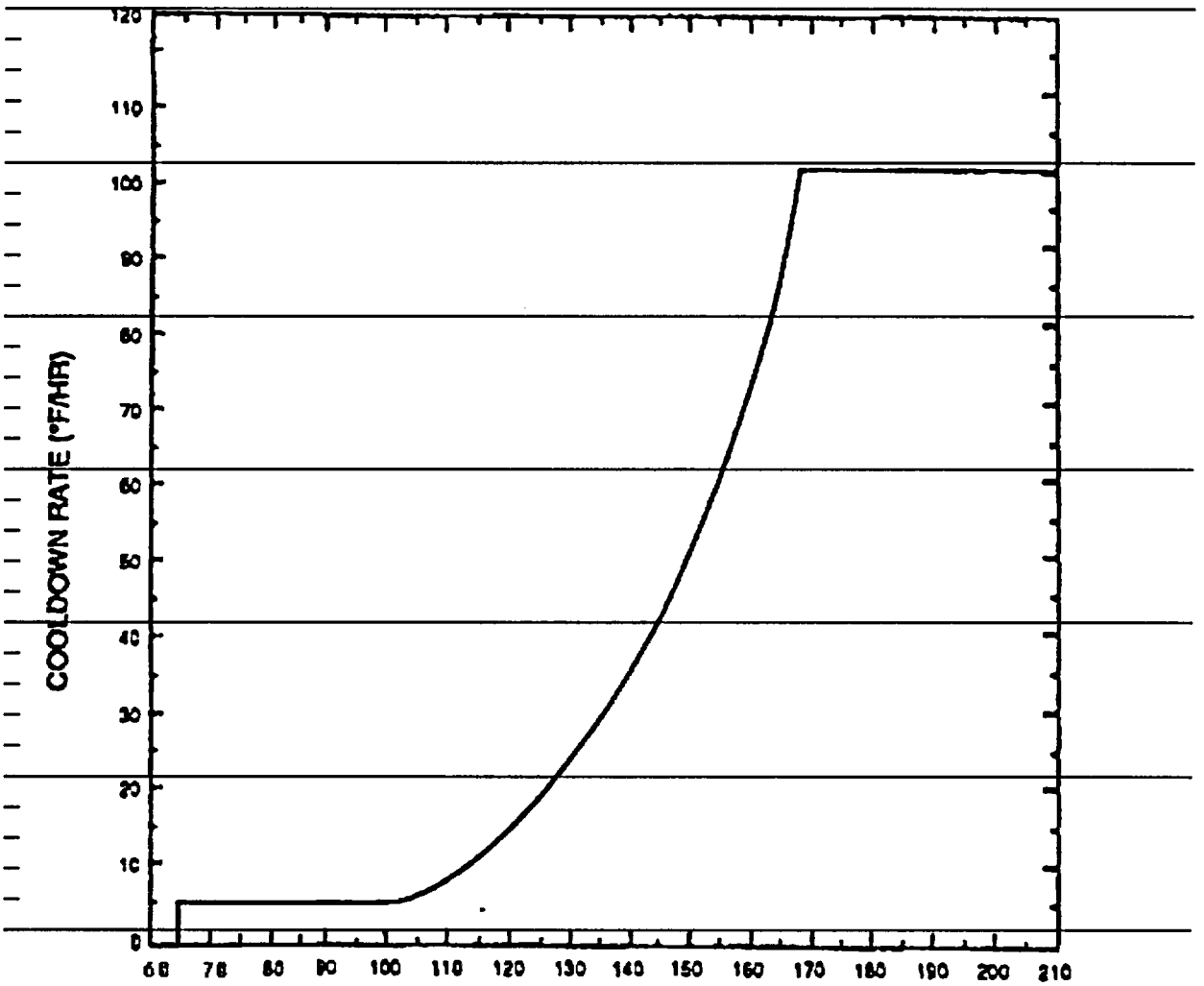
~~FIGURE 3.4.3-3~~

~~SONGS 2 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Normal Operation~~



~~FIGURE 3.4.3-4~~

~~SONGS 2 COOLDOWN RCS PRESSURE/TEMPERATURE~~
~~LIMITATIONS UNTIL 20 EFPY~~
~~Remote Shutdown Operation~~



~~NOTE: A MAXIMUM COOLDOWN RATE OF 100°F/HR IS ALLOWED AT ANY TEMPERATURE ABOVE 168°F~~

~~FIGURE 3.4.3-5~~

~~SONGS 2 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Remote Shutdown Operation~~

~~TABLE 3.4.3-1~~

~~Low Temperature RCS Overpressure Protection Range~~

~~Operating Period, EFPY~~	~~Cold Leg Temperature, °F~~	
	~~During Heatup~~	~~During Cooldown~~
~~Until 20 (Normal Operation)~~	~~≤ 256~~	~~≤ 238~~
~~Until 20 (Remote shutdown Operation)~~	~~*~~	~~≤ 238~~

~~* Heatup operations are not normally performed from the Remote Shutdown panels.~~

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops – MODE 4

LCO 3.4.6 Two loops or trains consisting of any combination of RCS loops and shutdown cooling (SDC) trains shall be OPERABLE and at least one loop or train shall be in operation.

---NOTES---

1. All reactor coolant pumps (RCPs) and SDC pumps may be de-energized for ≤ 1 hour per 8 hour period, provided:

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started with any RCS cold leg temperature ≤ the ~~256°F~~temperature in the PTLR unless:

   a. Pressurizer water volume is < 900 ft^3, or

   b. Secondary side water temperature in each steam generator (SG) is < 100°F above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

----------NOTES (continued)----------

4. No reactor coolant pump (RCP) shall be started with one or more of the RCS cold leg temperatures ≤ the ~~256°F~~temperature in the PTLR unless:

   a. The pressurizer water volume is < 900 ft^3 or

   b. The secondary side water temperature in each steam generator (SG) is < 100°F above each of the RCS cold leg temperatures.

5. A containment spray pump may be used in place of a low pressure safety injection pump in either or both shutdown cooling trains to provide shutdown cooling flow provided the reactor has been subcritical for a period > 24 hours and the RCS is fully depressurized and vented in accordance with LCO 3.4.12.1.

6. All SDC trains may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

APPLICABILITY: MODE 5 with RCS loops filled.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Less than the required SDC trains/RCS loops OPERABLE. AND Any SG with secondary side water level not within limit.	A.1 Initiate action to restore the required SDC trains/RCS loops to OPERABLE status. OR A.2 Initiate action to restore SG secondary side water levels to within limits.	Immediately Immediately

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12.1 Low Temperature Overpressure Protection (LTOP) System

RCS Temperature ≤ ~~256°F~~PTLR Limit

LCO 3.4.12.1 No more than two high pressure safety injection pumps shall be OPERABLE, the safety injection tanks shall be isolated or depressurized to less than the limit specified in the PTLR~~Figure 3.4.3-2~~ and at least one of the following overpressure protection systems shall be OPERABLE:

a. The Shutdown Cooling System Relief Valve (PSV9349) with:

1) A lift setting of 406 ± 10 psig,

2) Relief Valve isolation valves 2HV9337, 2HV9339, 2HV9377, and 2HV9378 open,

or,

b. The Reactor Coolant System depressurized with an RCS vent of greater than or equal to 5.6 square inches.

APPLICABILITY: MODE 4 when the temperature of any one RCS cold leg is less than or equal to the enable temperatures specified in ~~Table 3.4.3-1~~the PTLR,

MODE 5, and

MODE 6 when the head is on the reactor vessel and the RCS is not vented.

----------NOTE----------

SIT isolation or depressurization to less than the ~~Figure 3.4.3-2 limit~~limits in the PTLR is only required when SIT pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the PTLR~~P/T limit curves provided in Figure 3.4.3-1 and Figure 3.4.3-2~~.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. With more than two HPSI pumps capable of injecting into the RCS.	A.1 Initiate action to verify a maximum of two HPSI pumps capable of injecting into the RCS.	Immediately
B. SIT pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in ~~Figure 3.4.3-1 and Figure 3.4.3-2~~the PTLR.	B.1 Isolate affected SIT.	1 hour
C. Required Action and associated Completion Time of Condition B not met.	C.1 Depressurize affected SIT to less than the maximum RCS pressure for existing cold leg temperature allowed in ~~Figure 3.4.3-1 and Figure 3.4.3-2~~the PTLR.	12 hours
D. With one or both SDCS Relief Valve isolation valves in a single SDCS Relief Valve isolation valve pair (valve pair 2HV9337 and 2HV9339 or valve pair 2HV9377 and 2HV9378) closed.	D.1 Open the closed valve(s). OR D.2 Power-lock open the OPERABLE SDCS Relief Valve isolation valve pair.	24 hours 24 hours

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.12.1.1	----------NOTE---------- A HPSI pump is secured by verifying that its motor circuit breaker is not racked-in, or its discharge valve is locked closed. The requirement to rack out the HPSI pump breaker is satisfied with the pump breaker racked out to its disconnected or test position. ---------- Verify a maximum of two HPSI pumps are capable of injecting into the RCS.	12 hours
SR 3.4.12.1.2	----------NOTE---------- Required to be performed when complying with the LCO 3.4.12.1 Note. ---------- Verify each SIT is isolated or depressurized less than the limit specified in ~~Figure 3.4.3-2~~the PTLR.	12 hours
SR 3.4.12.1.3	Verify RCS vent ≥ 5.6 square inches is open when in use for overpressure protection.	12 hours for unlocked open vent valve(s) AND 31 days for locked, sealed, or otherwise secured open vent valve(s), or open flanged RCS penetrations

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12.2 Low Temperature Overpressure Protection (LTOP) System

RCS Temperature > ~~256°F~~PTLR Limit

LCO 3.4.12.2 At least one of the following overpressure protection systems shall be OPERABLE:

a. The Shutdown Cooling System Relief Valve (PSV9349) with:

1) A lift setting of 406 ± 10 psig,

2) Relief Valve isolation valves 2HV9337, 2HV9339, 2HV9377, and 2HV9378 open,

or,

b. A minimum of one pressurizer code safety valve with a lift setting of 2500 psia ± 1%.

APPLICABILITY: MODE 4 when the temperature of all RCS cold legs are greater than the enable temperatures specified in ~~Table 3.4.3-1~~the PTLR.

----------NOTES----------

1. The lift setting pressure of the pressurizer code safety valve shall correspond to ambient conditions of the valve at nominal operating temperature and pressure.

2. The SDCS Relief Valve lift setting assumes valve temperatures less than or equal to 130°F.

5.7 Reporting Requirements (continued)

5.7.1.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

6.b "Identification of NRC Safety Evaluation Report Limitations and/or Constraints on Reload Analysis Methodology," CEN-635(S), Rev. 00, February 1999

6.c Letter, Stephen Dembek (NRC) to Harold B. Ray (SCE), dated June 2, 1999, "San Onofre Nuclear Generating Station Units 2 and 3 - Evaluation of Reload Analysis Methodology Technology Transfer (TAC Nos. MA4289 and MA4290)"

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal hydraulic limits, Emergency Core Cooling System (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any mid-cycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.7.1.6 ~~Not Used~~REACTOR COOLANT SYSTEM (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

a. RCS pressure and temperature limits for heatup, cooldown, LTOP, criticality, and hydrostatic testing as well as heatup and cooldown rates shall be established and documented in the PTLR for Technical Specification 3.4.3 RCS Pressure/Temperature Limits and Technical Specification 3.4.12 Low Temperature Overpressure Protection System.

b. The analytical methods used to determine the RCS pressure and temperature limits as described in the following document have been reviewed and approved by the NRC in accordance with GL 96-03:

1. WCAP-16005-NP, Current Revision, San Onofre Nuclear Generating Station Unit 2 RCS Pressure and Temperature Limits Report - PTLR.

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period of EFPYs and for any revision or supplemental thereto.

5.7.1.7 Hazardous Cargo Traffic Report

Hazardous cargo traffic on Interstate 5 (I-5) and the AT&SF railway shall be monitored and the results submitted to the NRC Regional Administrator once every three years.

(continued)

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ATTACHMENT C

PROPOSED TECHNICAL SPECIFICATIONS
(With changes)

SAN ONOFRE UNIT 2

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(continued)

1.1 Definitions

OPERABLE – OPERABILITY	A system, subsystem, train, component, or device shall be OPERABLE when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).
PHYSICS TESTS	PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation. These tests are: a. Described in Chapter 14, Initial Test Program of the SONGS Units 2 and 3 UFSAR; b. Authorized under the provisions of 10 CFR 50.59; or c. Otherwise approved by the Nuclear Regulatory Commission.
PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)	The PTLR is the unit specific document that provides the reactor vessel pressure and temperature (P/T) limits, including heatup and cooldown rates, and LTOP setpoints for the current reactor vessel fluence period. These P/T limits are determined for fluence period of effective full-power years (EFPY) in accordance with the methodology in Appendices G and H to 10CFR50 for determining the P/T and LTOP system limiting parameters. Plant operation within these operating limits are addressed in 3.4.3, RCS Pressure and Temperature (P/T) Limits and 3.4.12, Low Temperature Overpressure Protection (LTOP) System of this Technical Specification.
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of 3438 MWt.

(continued)

1.1 Definitions

REACTOR PROTECTIVE SYSTEM (RPS) RESPONSE TIME	The RPS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RPS trip setpoint at the channel sensor until electrical power to the CEAs drive mechanism is interrupted. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.
SHUTDOWN MARGIN (SDM)	SDM shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming:

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 The combination of RCS pressure, RCS temperature and RCS heatup and cooldown rates shall be maintained within the limits as specified in the RCS PRESSURE-TEMPERATURE LIMITS REPORT (PTLR).

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. ---------NOTE--------- Required Action A.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1	Restore parameter(s) to within limits.	30 minutes
	AND		
	A.2	Determine RCS is acceptable for continued operation.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 5 with RCS pressure < 500 psia.	36 hours
C. ---------NOTE--------- Required Action C.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1	Initiate action to restore parameter(s) to within limits.	Immediately
	AND		
	C.2	Determine RCS is acceptable for continued operation.	Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	----------NOTE---------- Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. ---------- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates within limits specified in the PTLR.	30 minutes
SR 3.4.3.2	The reactor vessel material irradiation surveillance specimens shall be removed and examined, to determine changes in material properties, as required by 10 CFR 50 Appendix H. The results of these examinations shall be used to update the PTLR.	In accordance with requirements of 10CFR 50 Appendix H

Figure 3.4.3-1
DELETED

FIGURE 3.4.3-2
DELETED

FIGURE 3.4.3-3
DELETED

FIGURE 3.4.3-4
DELETED

FIGURE 3.4.3-5
DELETED

TABLE 3.4.3-1
DELETED

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops – MODE 4

LCO 3.4.6 Two loops or trains consisting of any combination of RCS loops and shutdown cooling (SDC) trains shall be OPERABLE and at least one loop or train shall be in operation.

---NOTES---

1. All reactor coolant pumps (RCPs) and SDC pumps may be de-energized for ≤ 1 hour per 8 hour period, provided:

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started with any RCS cold leg temperature ≤ the temperature in the PTLR unless:

   a. Pressurizer water volume is < 900 ft^3, or

   b. Secondary side water temperature in each steam generator (SG) is < 100°F above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

----------NOTES (continued)----------

4. No reactor coolant pump (RCP) shall be started with one or more of the RCS cold leg temperatures ≤ the temperature in the PTLR unless:

   a. The pressurizer water volume is < 900 ft^3 or

   b. The secondary side water temperature in each steam generator (SG) is < 100°F above each of the RCS cold leg temperatures.

5. A containment spray pump may be used in place of a low pressure safety injection pump in either or both shutdown cooling trains to provide shutdown cooling flow provided the reactor has been subcritical for a period > 24 hours and the RCS is fully depressurized and vented in accordance with LCO 3.4.12.1.

6. All SDC trains may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

APPLICABILITY: MODE 5 with RCS loops filled.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Less than the required SDC trains/RCS loops OPERABLE. AND Any SG with secondary side water level not within limit.	A.1 Initiate action to restore the required SDC trains/RCS loops to OPERABLE status. OR A.2 Initiate action to restore SG secondary side water levels to within limits.	Immediately Immediately

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12.1 Low Temperature Overpressure Protection (LTOP) System

RCS Temperature ≤ PTLR Limit

LCO 3.4.12.1 No more than two high pressure safety injection pumps shall be OPERABLE, the safety injection tanks shall be isolated or depressurized to less than the limit specified in the PTLR and at least one of the following overpressure protection systems shall be OPERABLE:

a. The Shutdown Cooling System Relief Valve (PSV9349) with:

1) A lift setting of 406 ± 10 psig,

2) Relief Valve isolation valves 2HV9337, 2HV9339, 2HV9377, and 2HV9378 open,

or,

b. The Reactor Coolant System depressurized with an RCS vent of greater than or equal to 5.6 square inches.

APPLICABILITY: MODE 4 when the temperature of any one RCS cold leg is less than or equal to the enable temperatures specified in the PTLR,

MODE 5, and

MODE 6 when the head is on the reactor vessel and the RCS is not vented.

----------NOTE----------
SIT isolation or depressurization to less than the limits in the PTLR is only required when SIT pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the PTLR.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. With more than two HPSI pumps capable of injecting into the RCS.	A.1 Initiate action to verify a maximum of two HPSI pumps capable of injecting into the RCS.	Immediately
B. SIT pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	B.1 Isolate affected SIT.	1 hour
C. Required Action and associated Completion Time of Condition B not met.	C.1 Depressurize affected SIT to less than the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	12 hours
D. With one or both SDCS Relief Valve isolation valves in a single SDCS Relief Valve isolation valve pair (valve pair 2HV9337 and 2HV9339 or valve pair 2HV9377 and 2HV9378) closed.	D.1 Open the closed valve(s). OR D.2 Power-lock open the OPERABLE SDCS Relief Valve isolation valve pair.	24 hours 24 hours

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.12.1.1	----------NOTE---------- A HPSI pump is secured by verifying that its motor circuit breaker is not racked-in, or its discharge valve is locked closed. The requirement to rack out the HPSI pump breaker is satisfied with the pump breaker racked out to its disconnected or test position. ---------- Verify a maximum of two HPSI pumps are capable of injecting into the RCS.	12 hours
SR 3.4.12.1.2	----------NOTE---------- Required to be performed when complying with the LCO 3.4.12.1 Note. ---------- Verify each SIT is isolated or depressurized less than the limit specified in the PTLR.	12 hours
SR 3.4.12.1.3	Verify RCS vent ≥ 5.6 square inches is open when in use for overpressure protection.	12 hours for unlocked open vent valve(s) AND 31 days for locked, sealed, or otherwise secured open vent valve(s), or open flanged RCS penetrations

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12.2 Low Temperature Overpressure Protection (LTOP) System

RCS Temperature > PTLR Limit

LCO 3.4.12.2 At least one of the following overpressure protection systems shall be OPERABLE:

a. The Shutdown Cooling System Relief Valve (PSV9349) with:

1) A lift setting of 406 ± 10 psig,

2) Relief Valve isolation valves 2HV9337, 2HV9339, 2HV9377, and 2HV9378 open,

or,

b. A minimum of one pressurizer code safety valve with a lift setting of 2500 psia ± 1%.

APPLICABILITY: MODE 4 when the temperature of all RCS cold legs are greater than the enable temperatures specified in the PTLR.

----------NOTES----------

1. The lift setting pressure of the pressurizer code safety valve shall correspond to ambient conditions of the valve at nominal operating temperature and pressure.

2. The SDCS Relief Valve lift setting assumes valve temperatures less than or equal to 130°F.

5.7 Reporting Requirements (continued)

5.7.1.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

6.b "Identification of NRC Safety Evaluation Report Limitations and/or Constraints on Reload Analysis Methodology," CEN-635(S), Rev. 00, February 1999

6.c Letter, Stephen Dembek (NRC) to Harold B. Ray (SCE), dated June 2, 1999, "San Onofre Nuclear Generating Station Units 2 and 3 - Evaluation of Reload Analysis Methodology Technology Transfer (TAC Nos. MA4289 and MA4290)"

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal hydraulic limits, Emergency Core Cooling System (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any mid-cycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.7.1.6 REACTOR COOLANT SYSTEM (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

a. RCS pressure and temperature limits for heatup, cooldown, LTOP, criticality, and hydrostatic testing as well as heatup and cooldown rates shall be established and documented in the PTLR for Technical Specification 3.4.3 RCS Pressure/Temperature Limits and Technical Specification 3.4.12 Low Temperature Overpressure Protection System.

b. The analytical methods used to determine the RCS pressure and temperature limits as described in the following document have been reviewed and approved by the NRC in accordance with GL 96-03:

1. WCAP-16005-NP, Current Revision, San Onofre Nuclear Generating Station Unit 2 RCS Pressure and Temperature Limits Report - PTLR.

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period of EFPYs and for any revision or supplemental thereto.

5.7.1.7 Hazardous Cargo Traffic Report

Hazardous cargo traffic on Interstate 5 (I-5) and the AT&SF railway shall be monitored and the results submitted to the NRC Regional Administrator once every three years.

(continued)

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ATTACHMENT D

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES
(Provided for information)

SAN ONOFRE UNIT 2

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.3 RCS Pressure and Temperature (P/T) Limits

BASES

BACKGROUND

All components of the RCS are designed to withstand effects of cyclic loads due to system pressure and temperature changes. These loads are introduced by startup (heatup) and shutdown (cooldown) operations, power transients, and reactor trips. This LCO limits the pressure and temperature changes during RCS heatup and cooldown, within the design assumptions and the stress limits for cyclic operation.

Generic Letter 96-03 (Reference 8) allows the Pressure Temperature (P/T) and Low Temperature Overpressure Protection (LTOP) system curves and setpoints to be relocated outside the technical specifications to a licensee-controlled document called the PTLR (Reference 1). Generic Letter 96-03 permits the licensee to maintain these limits efficiently and at a lower cost, provided that the parameters for constructing the curves and setpoints are derived using a methodology approved by the NRC.

The PTLR provides the P/T limits. Each P/T limit curve defines an acceptable region for normal operation. The usual use of the curves is operational guidance during heatup or cooldown maneuvering, when pressure and temperature indications are monitored and compared to the applicable curve to determine that operation is within the allowable region.

The LCO establishes operating limits that provide a margin to brittle failure of the reactor vessel and piping of the reactor coolant pressure boundary (RCPB). The vessel is the component most subject to brittle failure, and the LCO limits apply mainly to the vessel. The limits do not apply to the pressurizer, which has different design characteristics and operating functions.

10 CFR 50, Appendix G (Ref. 2), requires the establishment of P/T limits for material fracture toughness requirements of the RCPB materials. Reference 2 requires an adequate margin to brittle failure during normal operation, anticipated operational occurrences, and system hydrostatic tests. It mandates the use of the ASME Code, Section ~~III~~XI, Appendix G (Ref. 3).

(continued)

BASES (continued)

BACKGROUND (continued)

The actual shift in the RT_{NDT} of the vessel material will be established periodically by removing and evaluating the irradiated reactor vessel material specimens, in accordance with ASTM E185 (Ref. 4) and Appendix H of 10 CFR 50 (Ref. 5). The operating P/T limit curves will be adjusted, as necessary, based on the evaluation findings and the recommendations of Reference 3.

The P/T limit curves are composite curves established by superimposing limits derived from stress analyses of those portions of the reactor vessel and head that are the most restrictive. At any specific pressure, temperature, and temperature rate of change, one location within the reactor vessel will dictate the most restrictive limit. Across the span of the P/T limit curves, different locations are more restrictive, and, thus, the curves are composites of the most restrictive regions.

The heatup curve represents a different set of restrictions than the cooldown curve because the directions of the thermal gradients through the vessel wall are reversed. The thermal gradient reversal alters the location of the tensile stress between the outer and inner walls.

The criticality limit includes the Reference 2 requirement that the limit be no less than 40°F above the heatup curve or the cooldown curve and not less than the minimum permissible temperature for the ISLH testing. However, the criticality limit is not operationally limiting; a more restrictive limit exists in LCO 3.4.2, "RCS Minimum Temperature for Criticality."

The consequence of violating the LCO limits is that the RCS has been operated under conditions that can result in brittle failure of the RCPB, possibly leading to a nonisolable leak or loss of coolant accident. In the event these limits are exceeded, an evaluation must be performed to determine the effect on the structural integrity of the RCPB components. The ASME Code, Section XI, Appendix E (Ref. 6), provides a recommended methodology for evaluating an operating event that causes an excursion outside the limits.

APPLICABLE SAFETY ANALYSES

The P/T limits are not derived from Design Basis Accident (DBA) Analyses. They are prescribed during normal operation to avoid encountering pressure, temperature, and temperature rate of change conditions that might cause undetected flaws to propagate and cause nonductile failure of the RCPB, an unanalyzed condition. Reference 1 establishes the

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

methodology for determining the P/T limits including the P/T limits. Since the P/T limits are not derived from any DBA, there are no acceptance limits related to the P/T limits. Rather, the P/T limits are acceptance limits themselves since they preclude operation in an unanalyzed condition.

The RCS P/T limits satisfy Criterion 2 of the NRC Policy Statement.

LCO

The two elements of this LCO are:

a. The limit curves for heatup, cooldown, and ISLH testing; and

b. Limits on the rate of change of temperature.

The LCO limits apply to all components of the RCS, except the pressurizer.

These limits define allowable operating regions and permit a large number of operating cycles while providing a wide margin to nonductile failure.

The limits for the rate of change of temperature control the thermal gradient through the vessel wall and are used as inputs for calculating the heatup, cooldown, and ISLH testing P/T limit curves. Thus, the LCO for the rate of change of temperature restricts stresses caused by thermal gradients and also ensures the validity of the P/T limit curves.

Violating the LCO limits places the reactor vessel outside of the bounds of the stress analyses and can increase stresses in other RCPB components. The consequences depend on several factors, as follows:

a. The severity of the departure from the allowable operating P/T regime or the severity of the rate of change of temperature;

b. The length of time the limits were violated (longer violations allow the temperature gradient in the thick vessel walls to become more pronounced); and

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.3.2

This SR verifies that the reactor vessel material irradiation surveillance specimens will be removed and examined, to determine changes in material properties, as required by 10 CFR 50 Appendix H. The results of these examinations will be used to update the PTLR. ~~Figures 3.4.3-1 through 3.4.3-5. Also, the Adjusted Reference Temperature will be recalculated in accordance with Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.~~

REFERENCES

1. ~~Deleted.~~WCAP-16005-NP, San Onofre Nuclear Generating Station Unit 2 RCS Pressure and Temperature Limits Report (PTLR).
2. 10 CFR 50, Appendix G.
3. ASME, Boiler and Pressure Vessel Code, Section ~~III~~XI, Appendix G.
4. ASTM E185-73.
5. 10 CFR 50, Appendix H.
6. ASME, Boiler and Pressure Vessel Code, Section XI, Appendix E.
7. UFSAR, Chapter 5.
8. GL 96-03, Relocation of the Pressure Temperature Limit Curves and Low Temperature Overpressure Protection System Limits.

BASES (continued)

LCO (continued)

prohibits boron dilution with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained when forced flow is stopped because an even concentration distribution cannot be ensured. Core outlet temperature is to be maintained at least 10°F below saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction. The response of the RCS without the RCPs or SDC pumps depends on the core decay heat load and the length of time that the pumps are stopped. As decay heat diminishes, the effects on RCS temperature and pressure diminish. Without cooling by forced flow, higher heat loads will cause the reactor coolant temperature and pressure to increase at a rate proportional to the decay heat load. Because pressure can increase, the applicable system pressure limits (pressure and temperature (P/T) limits or low temperature overpressure protection (LTOP) limits) must be observed and forced SDC flow or heat removal via the SGs must be re-established prior to reaching the pressure limit. The circumstances for stopping both RCPs or SDC pumps are to be limited to situations where:

a. Pressure and temperature increases can be maintained well within the allowable pressure (P/T limits and LTOP) and 10°F subcooling limits; or

b. An alternate heat removal path through the SGs is in operation.

Note 2 requires that either of the following two conditions be satisfied before an RCP may be started with any RCS cold leg temperature ≤ temperature in the PTLR~~256°F~~.

a. Pressurizer water volume is < 900 ft^3; or

b. Secondary side water temperature in each SG is < 100°F above each of the RCS cold leg temperatures.

Satisfying the above condition will preclude a large pressure surge in the RCS when the RCP is started.

An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program and has the minimum water level specified in SR 3.4.6.2.

(continued)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.12.1 Low Temperature Overpressure Protection (LTOP) System
RCS Temperature ≤ PTLR Limit~~256°F~~

BASES

BACKGROUND

The LTOP System controls RCS pressure at low temperatures so the integrity of the reactor coolant pressure boundary (RCPB) is not compromised by violating the pressure and temperature (P/T) limits of 10 CFR 50, Appendix G (Ref. 1). The reactor vessel is the limiting RCPB component for demonstrating such protection. LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," provides the allowable combinations for operational pressure and temperature during cooldown, shutdown, and heatup to keep from violating the Reference 1 requirements during the LTOP MODES. Pressure/Temperature limits are provided in the PTLR.

The reactor vessel material is less tough at low temperatures than at normal operating temperatures. As the vessel neutron exposure accumulates, the material toughness decreases and becomes less resistant to pressure stress at low temperatures (Ref. 2). RCS pressure, therefore, is maintained low at low temperatures and is increased only as temperature is increased.

The potential for vessel overpressurization is most acute when the RCS is water solid, occurring only during shutdown; a pressure fluctuation can occur more quickly than an operator can react to relieve the condition. Exceeding the RCS P/T limits by a significant amount could cause brittle cracking of the reactor vessel. LCO 3.4.3 requires administrative control of RCS pressure and temperature during heatup and cooldown to prevent exceeding the P/T limits.

The design basis of the LTOP assumes unrestricted flow from two HPSI pumps and three charging pumps (full charging capacity) without letdown. Because there are three HPSI pumps and three charging pumps, the limitation on the number of HPSI pumps to be maintained OPERABLE during the specified MODES, along with isolating the Safety Injection Tanks, ensures that a mass addition to the RCS that exceeds the design basis assumptions of the LTOP will not occur. This limitation on the number of HPSI pumps that can provide

(continued)

BASES (continued)

BACKGROUND (continued) makeup and injection to the RCS implements the guidance provided in Generic Letter 90-06.

With minimum coolant input capability, the ability to provide core coolant addition is restricted. The LCO does not require the makeup control system deactivated or the safety injection (SI) actuation circuits blocked. Due to the lower pressures in the LTOP MODES and the expected core decay heat levels, the makeup system can provide adequate flow via the makeup control valve and, if needed, until the HPSI pump is actuated by SI.

Shutdown Cooling System Relief Valve Requirements

The Shutdown Cooling System relief valve has adequate relieving capability to protect the RCS from overpressurization when the transient is limited to either (1) the start of an idle RCP with the secondary water temperature of the steam generator less than or equal to 100°F above the RCS cold leg temperatures or (2) inadvertent safety injection actuation with two HPSI pumps injecting into a water-solid RCS with full charging capacity and letdown isolated.

RCS Vent Requirements

Once the RCS is depressurized, a vent exposed to the containment atmosphere will maintain the RCS at containment ambient pressure in an RCS overpressure transient, if the relieving requirements of the transient do not exceed the capabilities of the vent. Thus, the vent path must be capable of relieving the flow resulting from the limiting LTOP mass or heat input transient and maintaining pressure below the P/T limits. The required vent capacity may be provided by one or more vent paths.

The OPERABILITY of an RCS vent opening of greater than 5.6 square inches ensures that the RCS will be protected from pressure transients which could exceed the limits of Appendix G to 10 CFR Part 50 when one or more of the RCS cold legs is less than or equal to that specified in the PTLR ~~Pressure/Temperature Limits~~. The vent path(s) must be above the level of reactor coolant, so as not to drain the RCS when open.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

Safety analyses (Ref. 3) demonstrate that the reactor vessel is adequately protected against exceeding the Reference 1 P/T limits during shutdown. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown with RCS cold leg temperature greater than that specified in the PTLR. ~~Pressure/Temperature Limits.~~ In the event that no safety valves are OPERABLE and for RCS cold leg temperature less than or equal to that specified in the PTLR, ~~Pressure/Temperature Limits~~ the operating shutdown cooling relief valve, connected to the RCS, provides overpressure relief capability and will prevent RCS overpressurization. When the RCS is depressurized, an RCS vent to atmosphere sized 5.6 inches or greater may be used as an alternative to the SDCS Relief Valve.

The actual temperature at which the pressure in the P/T limit curve falls below the pressurizer safety valve setpoint increases as the reactor vessel material toughness decreases due to neutron embrittlement. Each time the P/T limit curves are revised, the LTOP System will be re-evaluated to ensure its functional requirements can still be satisfied using the relief valve method or the depressurized and vented RCS condition.

Reference 3 contains the acceptance limits that satisfy the LTOP requirements. Any change to the RCS must be evaluated against these analyses to determine the impact of the change on the LTOP acceptance limits.

Transients that are capable of overpressurizing the RCS are categorized as either mass or heat input transients, examples of which follow:

Mass Input Type Transients

a. Inadvertent safety injection; or

b. Charging/letdown flow mismatch.

Heat Input Type Transients

a. Inadvertent actuation of pressurizer heaters;

b. Loss of shutdown cooling (SDC); or

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

Heat Input Type Transients (continued)

c. Reactor coolant pump (RCP) startup with temperature asymmetry within the RCS or between the RCS and steam generators.

The following are required during the LTOP MODES to ensure that mass and heat input transients do not occur, which either of the LTOP overpressure protection means cannot handle:

a. No more than two HPSI pumps OPERABLE.

b. Deactivating the SIT discharge isolation valves in their closed positions when SIT pressure equals or exceeds the maximum RCS pressure for existing RCS cold leg temperature allowed by the Pressure/Temperature Limits.

Shutdown Cooling System Relief Valve Performance

One SDCS Relief Valve isolation valve pair is capable of mitigating an LTOP event that is bounded by the limiting SDCS pressure transients. When one or both SDCS Relief Valve isolation valve(s) in one isolation valve pair becomes INOPERABLE, the other OPERABLE SDCS Relief Valve isolation valve pair is placed in a power-lock open condition to preclude a single failure which might cause undesired mechanical motion of one or both of the OPERABLE SDCS Relief Valve isolation valve(s) in a single isolation valve pair and result in loss of system function. This power-lock open condition of the OPERABLE SDCS Relief Valve isolation valve pair is consistent with the guidance provided in Branch Technical Position ICSB 18 (PSB), "Application of the Single Failure Criterion to Manually-Controlled Electrically-Operated Valves."

RCS Vent Performance

The RCS vent size will be re-evaluated for compliance each time the P/T limit curves are revised based on the results of the vessel material surveillance.

The RCS vent is passive and is not subject to active failure.

(continued)

BASES (continued)

LCO (continued)

This LCO is required to ensure that the LTOP System is OPERABLE. The LTOP System is OPERABLE when the minimum coolant input and pressure relief capabilities are OPERABLE. Violation of this LCO could lead to the loss of low temperature overpressure mitigation and violation of the Reference 1 limits as a result of an operational transient.

To limit the coolant input capability, the LCO requires at most two HPSI pumps capable of injecting into the RCS and the SITS isolated or depressurized to less than the Pressure/Temperature Limits. LCO 3.5.3, "ECCS - Shutdown," defines the pump OPERABILITY requirements. LCO 3.3.2, "Engineered Safety Feature Activation System (ESFAS) Instrumentation," defines SI actuation OPERABILITY for the LTOP MODE 4 small break LOCA, as discussed in the previous section.

The elements of the LCO that provide overpressure mitigation through pressure relief are:

a. The Shutdown Cooling System Relief Valve; or

b. The depressurized RCS and an RCS vent.

The SDCS is OPERABLE for LTOP when both trains of isolation valves are open, its lift setpoint is set at 406 ± 10 psig or less and testing has proven its ability to open at that setpoint. An RCS vent is OPERABLE when open with an area ≥ 5.6 square inches.

Each of these methods of overpressure prevention is capable of mitigating the limiting LTOP transient.

APPLICABILITY

This LCO is applicable in MODE 4 when the temperature of any RCS cold leg is ≤ temperature in the PTLR ~~256°F Pressure/Temperature Limits,~~ in MODE 5, and in MODE 6 when the reactor vessel head is on. The pressurizer safety valves provide overpressure protection that meets the Reference 1 P/T limits above the enable temperatures specified in the PTLR~~Pressure/Temperature Limits~~. When the reactor vessel head is off, over- pressurization cannot occur.

(continued)

BASES (continued)

LCO (continued)

LCO 3.4.3 provides the operational P/T limits for all MODES. LCO 3.4.10, "Pressurizer Safety Valves," requires the OPERABILITY of the pressurizer safety valves that provide overpressure protection during MODES 1, 2, and 3, and MODE 4 above the enable temperatures specified in the PTLR~~Pressure/Temperature Limits~~.

APPLICABILITY

Low temperature overpressure prevention is most critical during shutdown when the RCS is water solid, and a mass or heat input transient can cause a very rapid increase in RCS pressure when little or no time allows operator action to mitigate the event.

The Applicability is modified by a Note stating that SIT isolation or depressurization to less than the Pressure/Temperature Limits only required when the SIT pressure is greater than or equal to the RCS pressure for the existing temperature, as allowed by the P/T limit in the PTLR~~curves provided in the Pressure/Temperature Limits~~. This Note permits the SIT discharge valve surveillance performed only under these pressure and temperature conditions.

ACTIONS

A.1

With more than two HPSI pumps capable of injecting into the RCS, overpressurization is possible.

The immediate Completion Time to initiate actions to restore restricted coolant input capability to the RCS reflects the importance of maintaining overpressure protection of the RCS.

B.1

When the SIT pressure is greater than or equal to the maximum RCS pressure for the existing cold leg temperature allowed in the PTLR~~Pressure/Temperature Limits~~, an unisolated SIT requires isolation within 1 hour.

(continued)

BASES (continued)

ACTIONS

B.1 (continued)

By isolating the SIT(s), the RCS is protected against the SIT tanks pressurizing the RCS in excess of the LTOP limits.

The Completion Time is based on operating experience that this activity can be accomplished in this time period and on engineering evaluation indicating that an event requiring LTOP is not likely in the allowed time.

C.1

If the Required Action and associated Completion Time of condition B is not met, the affected SIT(s) must be depressurized to less than the maximum RCS pressure for the existing cold leg temperature allowed in the PTLR~~Pressure/Temperature Limits~~ within 12 hours.

By depressurizing the SIT(s) below the LTOP limit stated in the PTLR~~Pressure/Temperature Limits~~ the RCS is protected against the SIT(s) pressurizing the RCS in excess of the LTOP limits.

The Completion Time is based on operating experience that this activity can be accomplished in this time period and on engineering evaluation indicating that an event requiring LTOP is not likely in the allowed time.

D.1 and D.2

The 24-hour Allowable Outage Time (AOT) for a single channel SDCS Relief Valve isolation valve(s) increases the availability of the LTOP system to mitigate low temperature overpressure transients especially during MODES 5 and 6 when the potential for these transients are highest (RCS temperatures between 80°F and 190°F and the RCS is water-solid). The 24-hour AOT implements the guidance provided in Generic Letter 90-06 (Ref. 6).

E.1

If the SDCS Relief Valve is inoperable, or if a Required Action and the associated Completion Time of Condition A,

(continued)

BASES (continued)

ACTIONS

E.1 (continued)

C, or D are not met, or if the LTOP System is inoperable for any reason other than Condition A, C or D, the RCS must be depressurized and a vent established within 8 hours. The vent must be sized at least 5.6 square inches to ensure the flow capacity is greater than that required for the worst case mass input transient reasonable during the applicable MODES. This action protects the RCPB from a low temperature overpressure event and a possible brittle failure of the reactor vessel.

The Completion Time of 8 hours to depressurize and vent the RCS is based on the time required to place the plant in this condition and the relatively low probability of an overpressure event during this time period due to increased operator awareness of administrative control requirements.

SURVEILLANCE REQUIREMENTS

SR 3.4.12.1.1 and SR 3.4.12.1.2

To minimize the potential for a low temperature overpressure event by limiting the mass input capability, not more than two HPSI pumps are verified OPERABLE. The other pump is secured by verifying that its motor circuit breaker is not racked-in, or its discharge valve is locked closed and power is removed. Additionally, the SIT discharge isolation valves are verified closed and deactivated or SIT(s) are depressurized to less than the values in the PTLR~~Pressure/Temperature Limits limit~~.

The 12 hour interval considers operating practice to regularly assess potential degradation and to verify operation within the safety analysis.

SR 3.4.12.1.3

SR 3.4.12.1.3 requires verifying that the RCS vent is open ≥ 5.6 square inches is proven OPERABLE by verifying its open condition either:

a. Once every 12 hours for a vent valve that is unlocked open; and

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.4.12.1.3 (continued)

b. Once every 31 days for a valve that is locked, sealed, or otherwise secured open and once every 31 days for open flanged RCS penetrations.

The passive vent arrangement must only be open to be OPERABLE. This Surveillance need only be performed if the vent is being used to satisfy the requirements of this LCO. The Frequencies consider operating experience with mispositioning of unlocked and locked vent valves, respectively.

SR 3.4.12.1.4 and SR 3.4.12.1.5

When one or both SDCS Relief Valve isolation valve(s) in one isolation valve pair becomes inoperable, the other OPERABLE SDCS Relief Valve isolation valve pair is verified in a power-lock open condition every 12 hours to preclude a single failure which might cause undesired mechanical motion of one or both of the OPERABLE SDCS Relief Valve isolation valve(s) in a single isolation valve pair and result in loss of system function.

This surveillance requirement, SR 3.4.12.1.4, is modified by two notes. Note 1 requires to perform this SR when the SDCS Relief Valve isolation valve pair is inoperable. Note 2 specifies that the power lock-open requirement is satisfied either with the AC breakers open for valve pair 2HV9337 and 2HV9339 or the regulating transformer output breakers open for valve pair 2HV9377 and 2HV9378, whichever valve pair is OPERABLE.

When both pairs of SDCS Relief Valve isolation valves are OPERABLE and the SDCS Relief Valve is used for overpressure protection, the isolation valves are verified open every 72 hours.

SR 3.4.12.1.6

The SDCS Relief Valve Setpoint is verified periodically in accordance with the Inservice Testing Program.

(continued)

BASES (continued)

REFERENCES

1. 10 CFR 50, Appendix G.
2. Generic Letter 88-11.
3. UFSAR, Section 15.
4. 10 CFR 50.46.
5. 10 CFR 50, Appendix K.
6. Generic Letter 90-06.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.12.2 Low Temperature Overpressure Protection (LTOP) System
RCS Temperature > PTLR Limit~~256°F~~

BASES

BACKGROUND

The LTOP System controls RCS pressure at low temperatures so the integrity of the reactor coolant pressure boundary (RCPB) is not compromised by violating the pressure and temperature (P/T) limits of 10 CFR 50, Appendix G (Ref. 1). The reactor vessel is the limiting RCPB component for demonstrating such protection. LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," provides the allowable combinations for operational pressure and temperature during cooldown, shutdown, and heatup to keep from violating the Reference 1 requirements during the LTOP MODES.

The reactor vessel material is less tough at low temperatures than at normal operating temperatures. As the vessel neutron exposure accumulates, the material toughness decreases and becomes less resistant to pressure stress at low temperatures (Ref. 2). RCS pressure, therefore, is maintained low at low temperatures and is increased only as temperature is increased.

The potential for vessel overpressurization is most acute when the RCS is water solid, occurring only during shutdown; a pressure fluctuation can occur more quickly than an operator can react to relieve the condition. Exceeding the RCS P/T limits by a significant amount could cause brittle cracking of the reactor vessel. LCO 3.4.3 requires administrative control of RCS pressure and temperature during heatup and cooldown to prevent exceeding the P/T limits.

In MODE 4 when the temperature of any RCS cold leg is greater than the enable temperatures specified in the PTLR ~~Pressure/Temperature Limits~~ the LCO does not require the makeup control system deactivated or the safety injection (SI) actuation circuits blocked.

The LTOP System consists of the Shutdown Cooling System Relief Valve with both pairs of SDCS Relief Valve isolation valves open, or a minimum of one pressurizer code safety valve OPERABLE.

(continued)

BASES (continued)

BACKGROUND (continued)

Shutdown Cooling System Relief Valve Requirements

The Shutdown Cooling System relief valve has adequate relieving capability to protect the RCS from overpressurization when the transient is limited to the start of an idle RCP with the secondary water temperature of the steam generator less than or equal to 100°F above the RCS cold leg temperatures.

Pressurizer Code Safety Valve Requirements

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2750 psia. Each safety valve is designed to relieve 4.6×10^5 lbs per hour of saturated steam at the valve setpoint plus 3% accumulation. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown with RCS cold leg temperature greater than that specified in the PTLR. ~~Pressure/Temperature Limits~~

APPLICABLE SAFETY ANALYSES

Safety analyses (Ref. 3) demonstrate that the reactor vessel is adequately protected against exceeding the Reference 1 P/T limits during shutdown. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown with RCS cold leg temperature greater than that specified in the PTLR. ~~Pressure/Temperature Limits~~ In the event that no safety valves are OPERABLE and for RCS cold leg temperature less than or equal to that specified in the PTLR ~~Pressure/Temperature Limits~~, the operating shutdown cooling relief valve, connected to the RCS, provides overpressure relief capability and will prevent RCS overpressurization. When the RCS is depressurized, an RCS vent to atmosphere sized 5.6 inches or greater may be used as an alternative to the SDCS Relief Valve.

The actual temperature at which the pressure in the P/T limit curve falls below the pressurizer safety valve setpoint increases as the reactor vessel material toughness decreases due to neutron embrittlement. Each time the P/T limit curves are revised, the LTOP System will be re-evaluated to ensure its functional requirements can still

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

be satisfied using the relief valve method or the depressurized and vented RCS condition.

Reference 3 contains the acceptance limits that satisfy the LTOP requirements. Any change to the RCS must be evaluated against these analyses to determine the impact of the change on the LTOP acceptance limits.

Shutdown Cooling System Relief Valve Performance

One SDCS Relief Valve isolation valve pair is capable of mitigating an LTOP event that is bounded by the limiting SDCS pressure transients. When one or both SDCS Relief Valve isolation valve(s) in one isolation valve pair becomes INOPERABLE, the other OPERABLE SDCS Relief Valve isolation valve pair is placed in a power-lock open condition to preclude a single failure which might cause undesired mechanical motion of one or both of the OPERABLE SDCS Relief Valve isolation valve(s) in a single isolation valve pair and result in loss of system function. This power-lock open condition of the OPERABLE SDCS Relief Valve isolation valve pair is consistent with the guidance provided in Branch Technical Position ICSB 18 (PSB), "Application of the Single Failure Criterion to Manually-Controlled Electrically-Operated Valves."

LCO

This LCO is required to ensure that the LTOP System is OPERABLE. The LTOP System is OPERABLE when the minimum pressure relief capabilities are OPERABLE. Violation of this LCO could lead to the loss of low temperature overpressure mitigation and violation of the Reference 1 limits as a result of an operational transient.

The elements of the LCO that provide overpressure mitigation through pressure relief are:

a. The Shutdown Cooling System Relief Valve; or

b. A minimum of one pressurizer code safety valve.

The SDCS is OPERABLE for LTOP when both trains of isolation valves are open, its lift setpoint is set at 406 ± 10 psig or less and testing has proven its ability to open at that setpoint. A pressurizer code safety valve is OPERABLE when

(continued)

BASES (continued)

LCO (continued)

its lift setting is 2500 psia ± 1% and testing has proven its ability to open at that setpoint.

Each of these methods of overpressure prevention is capable of mitigating the limiting LTOP transient.

APPLICABILITY

This LCO is applicable in MODE 4 when the temperature of all RCS cold legs are above the enable temperatures specified in the PTLR~~Pressure/Temperature Limits~~. When the temperature of any RCS cold leg is equal to or below the enable temperatures specified in the PTLR~~Pressure/Temperature Limits~~ the Shutdown Cooling System Relief valve is used for overpressure protection or if the RCS is also depressurized, then an RCS vent to atmosphere sized 5.6 inches or greater can be used for overpressure protection. When the reactor vessel head is off, overpressurization cannot occur.

LCO 3.4.3 provides the operational P/T limits for all MODES. LCO 3.4.10, "Pressurizer Safety Valves," requires the OPERABILITY of the pressurizer safety valves that provide overpressure protection during MODES 1, 2, and 3.

Low temperature overpressure prevention is most critical during shutdown when the RCS is water solid, and a mass or heat input transient can cause a very rapid increase in RCS pressure when little or no time allows operator action to mitigate the event.

ACTIONS

A.1

With no pressurizer code safety valves OPERABLE and the SDCS Relief Valve INOPERABLE overpressurization is possible.

The 8 hours Completion Time to be in MODE 5 and vented through a greater than or equal to 5.6 inch vent reflects the importance of maintaining overpressure protection of the RCS.

B.1 and B.2

The 24-hour Allowable Outage Time (AOT) for a single channel SDCS Relief Valve isolation valve(s) increases the

(continued)

BASES (continued)

ACTIONS B.1 and B.2 (continued)

availability of the LTOP system to mitigate low temperature overpressure transients during MODE 4.

The 24-hour AOT implements the guidance provided in Generic Letter 90-06.

SURVEILLANCE REQUIREMENTS

SR 3.4.12.2.1

When the SDCS Relief Valve is being used for overpressure protection, then at least once per 72 hours both pairs of SDCS Relief Valve isolation valves are verified open to preclude a single failure condition that might occur if only one pair of isolation valves are open.

SR 3.4.12.2.2

The SDCS Relief Valve Setpoint is verified periodically in accordance with the Inservice Testing Program.

REFERENCES

1. 10 CFR 50, Appendix G.
2. Generic Letter 88-11.
3. UFSAR, Section 15.
4. 10 CFR 50.46.
5. 10 CFR 50, Appendix K.
6. Generic Letter 90-06.

ENCLOSURE 3

REACTOR COOLANT SYSTEM PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

SAN ONOFRE UNIT 2