SOUTHERN CALIFORNIA
EDISON
An *EDISON INTERNATIONAL*SM Company

R. W. Krieger
Vice President
Nuclear Generation

May 3, 2000

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: **Docket Nos. 50-361 and 50-362**
Proposed Technical Specification Change Number NPF-10/15-516
Reduce the Minimum Boltup Temperature for Reactor Vessel Head Bolts When They Are Tensioned
San Onofre Nuclear Generating Station Units 2 and 3

Gentlemen:

Enclosed are Amendment Application Number 199 to Facility Operating License NPF-10, and Amendment Application Number 184 to Facility Operating License NPF-15, for the San Onofre Nuclear Generating Station, Units 2 and 3, respectively. The Amendment Applications consist of Proposed Technical Specification Change Number (PCN)-516.

PCN-516 is a request to revise Technical Specification (TS) 3.4.3, "RCS Pressure and Temperature (P/T) Limits". Specifically, the Proposed Change would reduce the minimum boltup temperature from 86^0 F to 65^0 F. The following changes are proposed for Technical Specification 3.4.3:

1. The maximum heatup limit is applicable with RCS cold leg temperature greater than 65°F, rather than 86°F.

2. The minimum temperature to tension the reactor vessel head bolts is reduced from 86°F to 65°F.

The new value for minimum boltup temperature will result in a reduction of burden for San Onofre Nuclear Generating Station Units 2 and 3. The critical path schedule for the refueling outages can be reduced with a lower value of minimum boltup temperature by approximately 8 hours, primarily due to the additional cooling that can be accomplished. In order to maintain the current minimum boltup temperature of 86°F,

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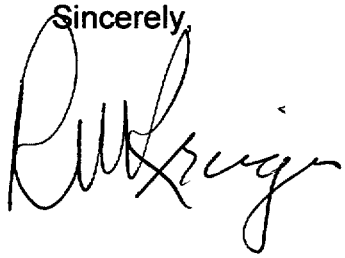
A012

the shutdown cooling flow must be bypassed around the shutdown cooling heat exchangers during initial cooldown. The proposed 65°F limit will permit continued cooling, yielding a greater time to boil and an increased margin of safety in the event of a loss of shutdown cooling. Additionally, the transfer from one train of shutdown cooling to the other will not result in an intermittent non-compliance with the LCO, and therefore not distract the Control Room staff from other outage functions.

Southern California Edison requests these amendments be issued effective as of the date of issuance, to be implemented within 30 days from the date of issuance. An issuance date prior to 10/01/00 would ensure implementation of this change before SONGS Unit 2 Cycle 11 outage.

If you have any questions regarding these amendment applications, please contact me or Mr. Jack L. Rainsberry (949) 368-7420.

Sincerely,



Enclosure

cc:

E. W. Merschoff, Regional Administrator, NRC Region IV
J. A. Sloan, NRC Senior Resident Inspector, San Onofre Units 2 and 3
L. Raghavan, NRC Project Manager, San Onofre Units 2 and 3
S. Y. Hsu, Department of Health Services, Radiologic Health Branch

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Application of SOUTHERN, CALIFORNIA EDISON COMPANY, ET AL. for a class 103 License to Acquire, Possess, and Use a Utilization Facility as Part of Unit No. 3 of the San Onofre Nuclear Generating Station	Docket No. 50-362 Amendment Application No. 184

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. pursuant to 10CFR50.90, hereby submit Amendment Application No. 184. This amendment application consists of Proposed Change No. PCN-516 to Facility Operating License NPF-15. PCN-516 is a request to revise Technical Specification (TS) 3.4.3, "RCS Pressure and Temperature (P/T) Limits". Specifically, the Proposed Change would reduce the minimum boltup temperature from 86° F to 65° F.

Subscribed on this 3rd day of May, 2000.

Respectfully Submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

By: _____
Russ W. Krieger
Vice President
Nuclear Generation

State of California
County of San Diego

On May 3, 2000 before me, Frances M. Thurber

personally appeared Russ W. Krieger, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature Frances M. Thurber

FRANCES M. THURBER
Commission # 1139788
Notary Public — California
San Diego County
My Comm. Expires Mar 28, 2001

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. 199

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. pursuant to 10CFR50.90, hereby submit Amendment Application No. 199. This amendment application consists of Proposed Change No. PCN-516 to Facility Operating License NPF-10. PCN-516 is a request to revise Technical Specification (TS) 3.4.3, "RCS Pressure and Temperature (P/T) Limits". Specifically, the Proposed Change would reduce the minimum boltup temperature from 86^0 F to 65^0 F.

Subscribed on this 3rd day of May, 2000.

Respectfully Submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

By: _____
Russ W. Krieger
Vice President
Nuclear Generation

State of California
County of San Diego

On May 3, 2000 before me, Frances M. Thurber,

personally appeared Russ W. Krieger, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

FRANCES M. THURBER
Commission # 1150096
Notary Public — California
San Diego County
My Comm. Expires Mar 28, 2001

ENCLOSURE

AMENDMENT APPLICATIONS 199 AND 184

(PCN-516)

DESCRIPTION AND SAFETY ANALYSIS OF PROPOSED CHANGES NPF-10-516 and NPF-15-516

The purpose of this request is to revise San Onofre Nuclear Generating Station Units 2 and 3 Technical Specifications (TSs), Section 3.4.3, "RCS Pressure and Temperature (P/T) Limits". The proposed change is to lower the Minimum Boltup Temperature (MBT) from 86°F to 65°F for the Reactor Coolant System (RCS) during the period of time when the reactor vessel head bolts are in tension.

Existing Technical Specifications

Unit 2: See Attachment "A"

Unit 3: See Attachment "B"

Proposed Technical Specifications

Unit 2: See Attachment "C" (Redline and Strikeout)

Unit 3: See Attachment "D" (Redline and Strikeout)

Proposed Technical Specifications

Unit 2: See Attachment "E"

Unit 3: See Attachment "F"

Proposed Bases (for Information only):

Unit 2: See Attachment "G"

Unit 3: See Attachment "H"

CALCULATION M-DSC-373, "Reactor Pressure Vessel Minimum Boltup Temperature"

See Attachment "I"

DESCRIPTION

This proposed change is a request to revise Technical Specification 3.4.3, "RCS Pressure and Temperature (P/T) Limits". The proposed change is to reduce MBT from 86°F to 65°F. The following changes are proposed for Technical Specification 3.4.3:

1) The maximum heatup limit is applicable with RCS cold leg temperature greater than 65°F, rather than 86°F.

2) The minimum temperature to tension the reactor vessel head bolts is reduced from 86°F to 65°F.

BACKGROUND:

During refueling operations, administrative control of RCS temperature is maintained by station procedures and the current limit is 90 °F. Prior to the approval of PCN 278 and PCN 292, the station procedures maintained the Unit 2 RCS temperature limit at 65°F and the Unit 3 temperature limit at 90°F. SCE determined that maintaining two different values was a burden on the Operations staff and elected to use a common value for both units in 1988. The MBT value of 86 °F was explicitly called out in the Unit 2 Technical Specification and was added as a text box to Figures 3.4.3-2 and 3.4.3-3 via PCN-278, which was approved by the NRC on April 11, 1989. The MBT value of 86°F was added to the Unit 3 Technical Specifications via PCN 292 and was approved by the NRC on December 14, 1989. All corresponding figures were revised to reflect the MBT of 86 degrees.

DISCUSSION:

Technical Specification 3.4.3 governs the Pressure and Temperature limits for operation of the reactor vessel. Pressure-Temperature curves are provided in Technical Specification 3.4.3 as Figures 3.4.3-1 through 3.4.3-5. The proposed MBT was determined from the RT_{NDT} of the limiting reactor vessel flange material; specifically, base material and welds for the reactor pressure vessel flange, and closure head flange. In applying the recommendation of Article G-2222(c) of American Society of Mechanical Engineers (ASME) Appendix G to Section III of the Boiler and Pressure Vessel Code, a MBT of 59°F was established. In particular, subsection (c) of Article G-2222 reads: "It is recommended that when the flange and adjacent shell region are stressed by the full intended bolt preload and by pressure not exceeding 20% of the preoperational system hydrostatic test pressure, minimum metal temperature in the stressed region should be at least the initial RT_{NDT} temperature for the material in the stressed regions plus any effects of irradiation at the stressed regions." This minimum temperature limit includes a maximum temperature uncertainty of +19°F based on the Total Loop Uncertainty (TLU) calculation for the RCS cold leg temperature indicators. Further analysis, based on fracture mechanics, was performed to verify that adequate safety margins exist at the 59°F MBT (see Attachment I). The proposed MBT is 65°F, which provides 6°F of margin in the event that future revisions of the temperature measurement uncertainty calculations are revised upwards.

LCO Conditions "a" and "d", a footnote at page 3.4-5 and Figures 3.4.3-1 through 3.4.3-5 will be revised to reflect this new value. The Pressure-Temperature curves on Figures 3.4.3-1 through 3.4.3-5 will be extended from 86°F to 65°F. During operation at temperatures between 86°F and 65°F, the pressure limit change is negligible. Additionally, the TS bases will be updated to reflect the basis for the MBT of 65°F.

The new value for MBT will result in a reduction of burden for San Onofre. The critical path schedule for the refueling outages can be reduced with a lower value of MBT, primarily due to the additional cooling that can be accomplished. In order to maintain the current MBT of 86°F, the shutdown cooling flow must be bypassed around the shutdown cooling heat exchangers during initial cooldown. The proposed 65°F limit will permit continued cooling, yielding a greater time to boil and an increased margin of safety in the event of a loss of shutdown cooling. Additionally, the transfer from one train of shutdown cooling to the other will not result in an intermittent non-compliance with the LCO, and therefore not distract the Control Room staff from other outage functions.

NO SIGNIFICANT HAZARDS CONSIDERATION:

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10CFR50.92. A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with a proposed amendment would not: (1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) Involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

(1) Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

This proposed change is a request to revise Technical Specification 3.4.3, "Pressure Temperature Limits". The proposed change reduces the Minimum Boltup Temperature (MBT) from 86°F to 65°F. During operations below 86°F, the plant is in a shutdown mode, open to the atmosphere, and depressurized. This proposed change does not affect the shape of the Pressure Temperature Limits when Reactor Coolant System (RCS) temperature is above 86°F. Therefore, the probability or consequences of an accident previously evaluated will not be increased by operating the facility in accordance with this proposed change.

(2) Will operation of the facility in accordance with this proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

This proposed change does not change the design or configuration of the plant.

Therefore, this proposed change will not create the possibility of a new or different kind of accident from any accident that has been previously evaluated.

(3) Will operation of the facility in accordance with this proposed change involve a significant reduction in a margin of safety?

Response: No.

This proposed change involves reducing the MBT from 86°F to 65°F. This proposed change meets the American Society of Mechanical Engineers (ASME) Code requirements for establishing the minimum temperature in the reactor pressure vessel flange region when the pressure does not exceed 20% of the pre-operational hydrostatic test pressure. All margins of safety established by the ASME Code requirements are maintained. The operation of the facility in accordance with this proposed change will not involve a significant reduction in a margin of safety.

ENVIRONMENTAL CONSIDERATION:

Southern California Edison (SCE) has determined that the proposed amendment involves no changes in the amount or type of effluent that may be released offsite, and results in no increase in individual or cumulative occupational radiation exposure. As described above, the proposed Technical Specification (TS) amendment involves no significant hazards consideration and, as such, meets the eligibility criteria for categorical exclusion set forth in 10CFR51.22(c)(9).

Attachment A

(Existing Pages)

SONGS Unit 2

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 86°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 86°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 86°F.

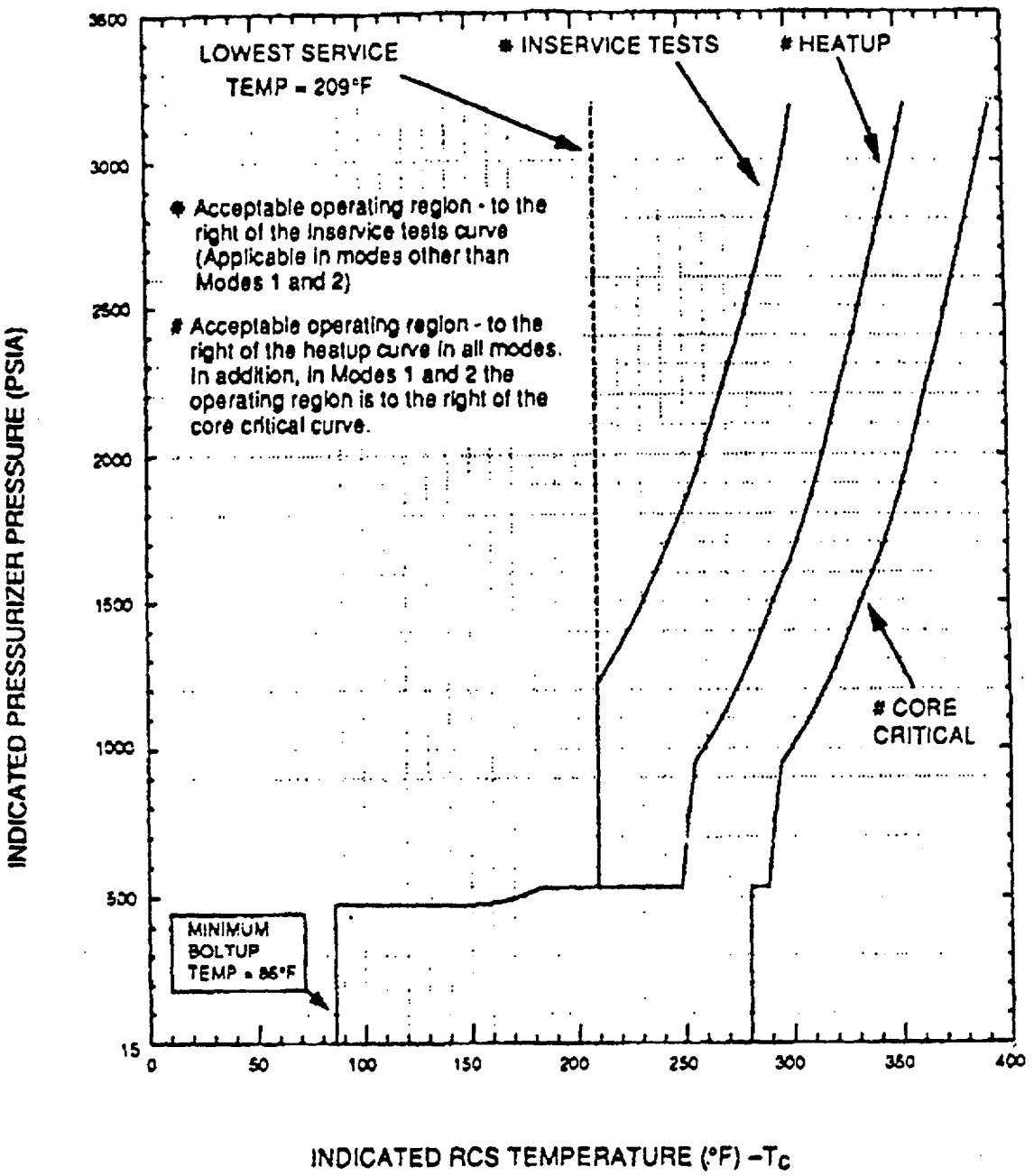


Figure 3.4.3-1

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

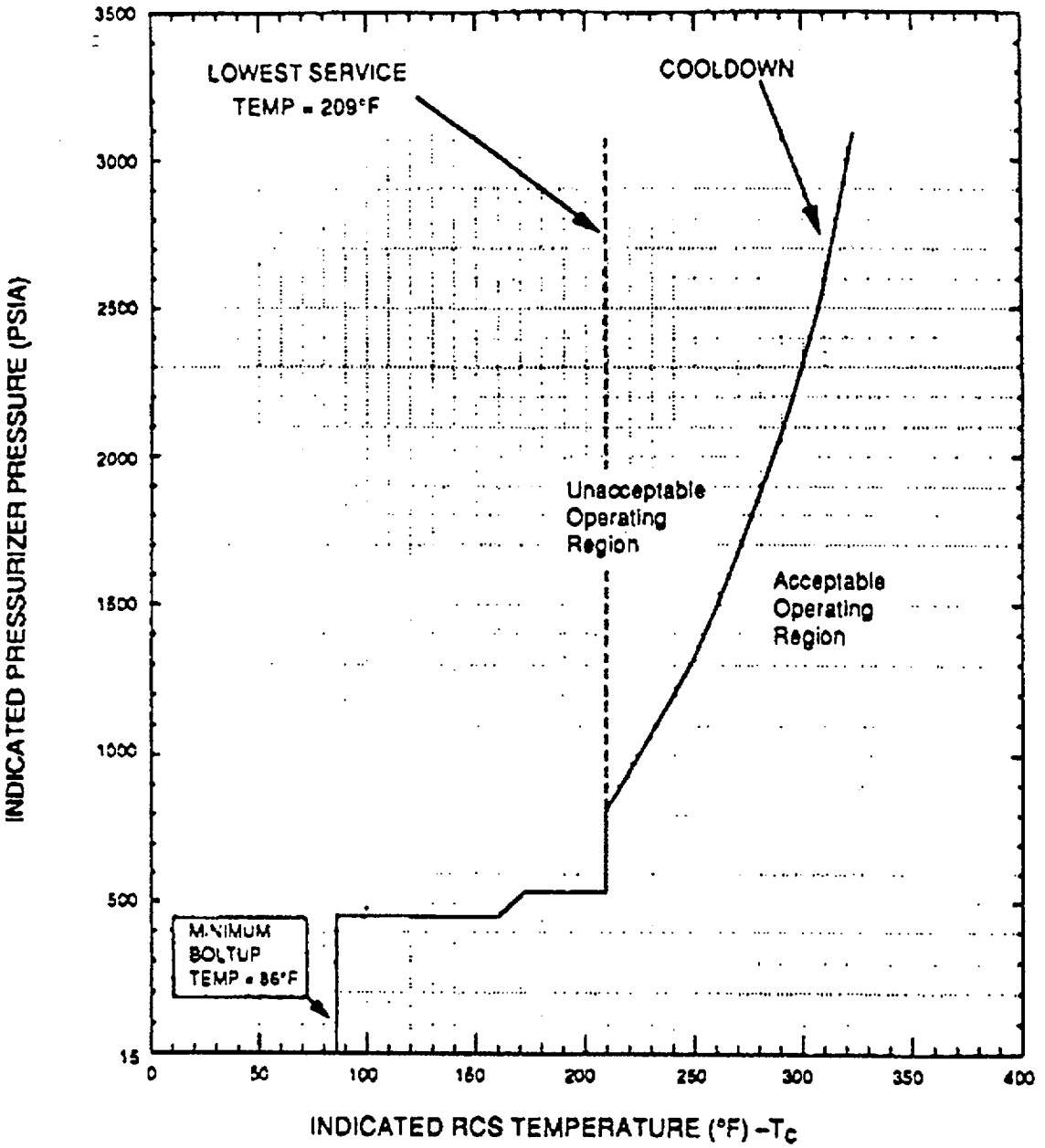
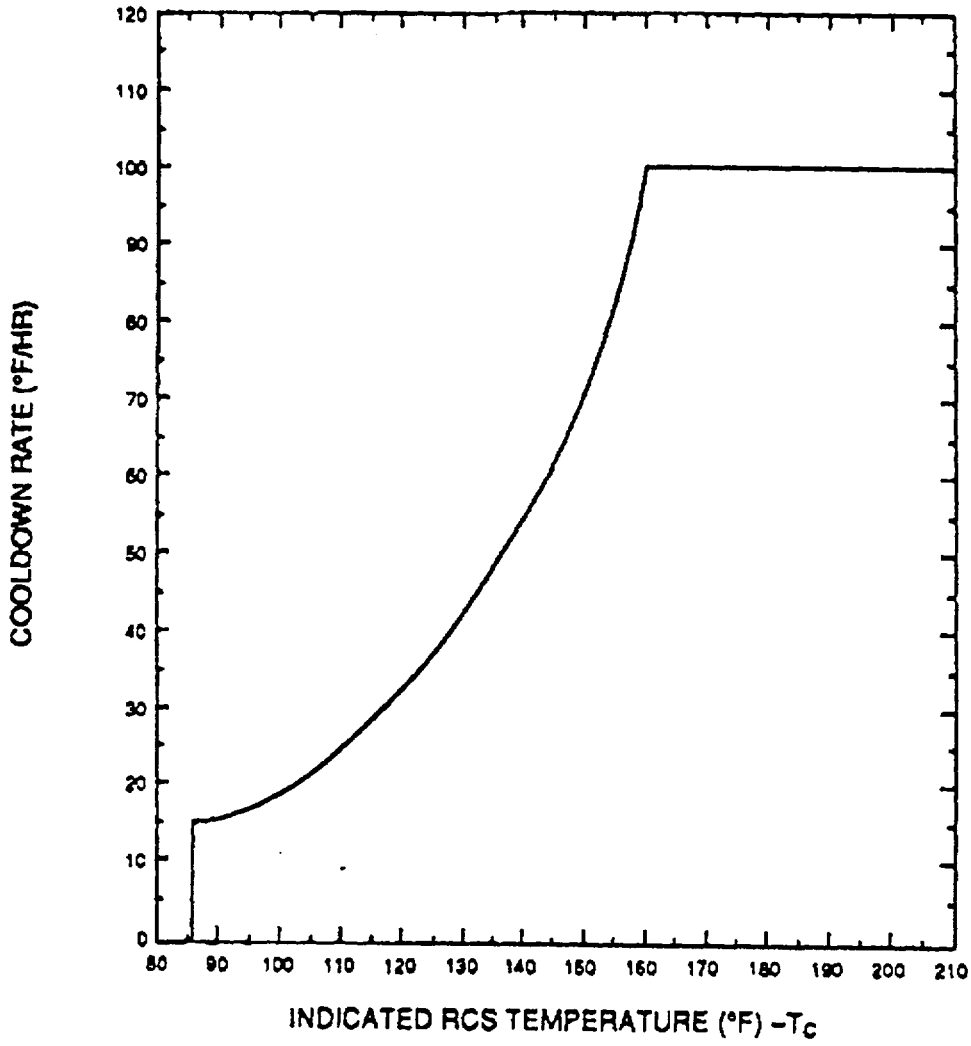


FIGURE 3.4.3-2

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

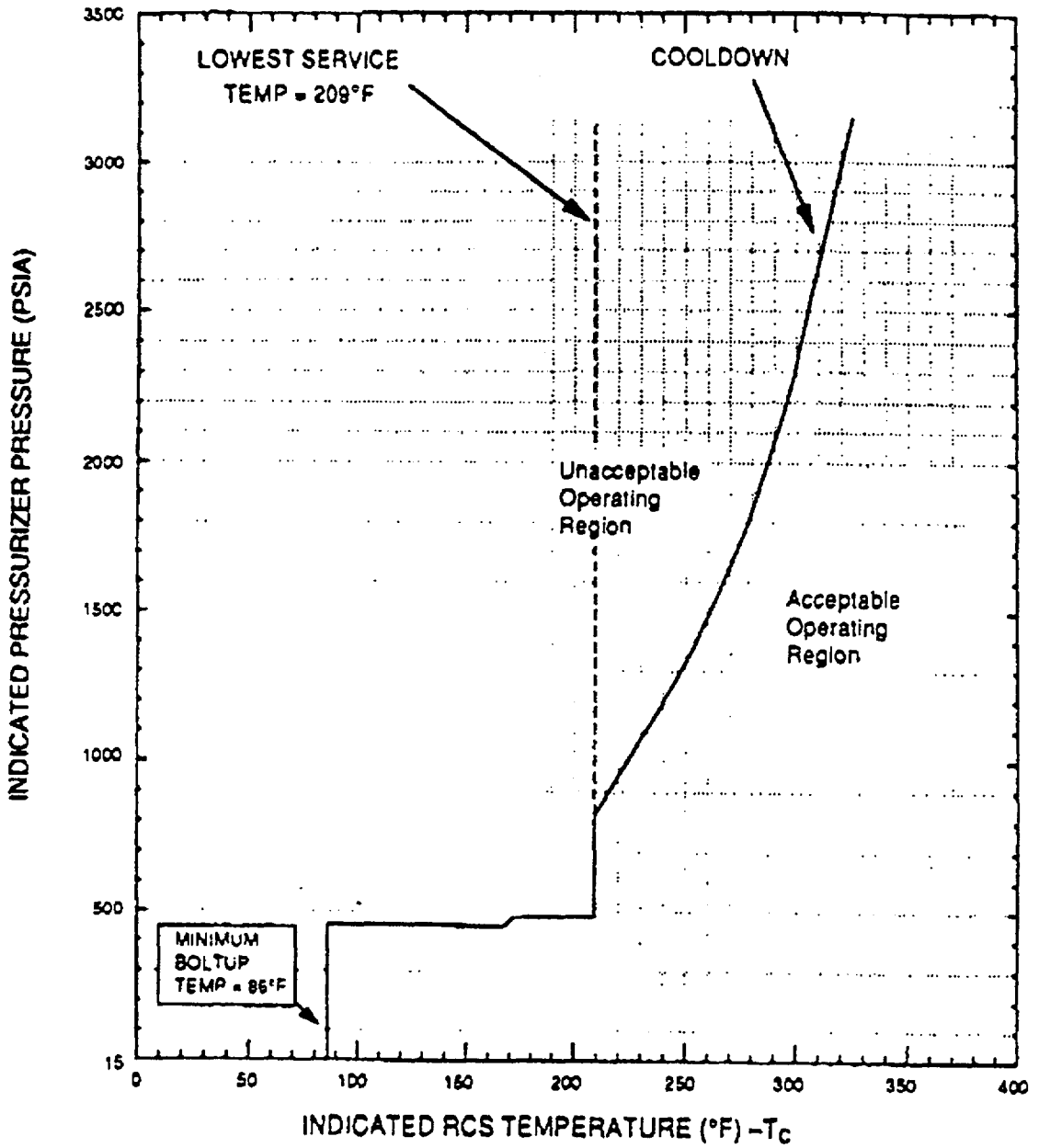
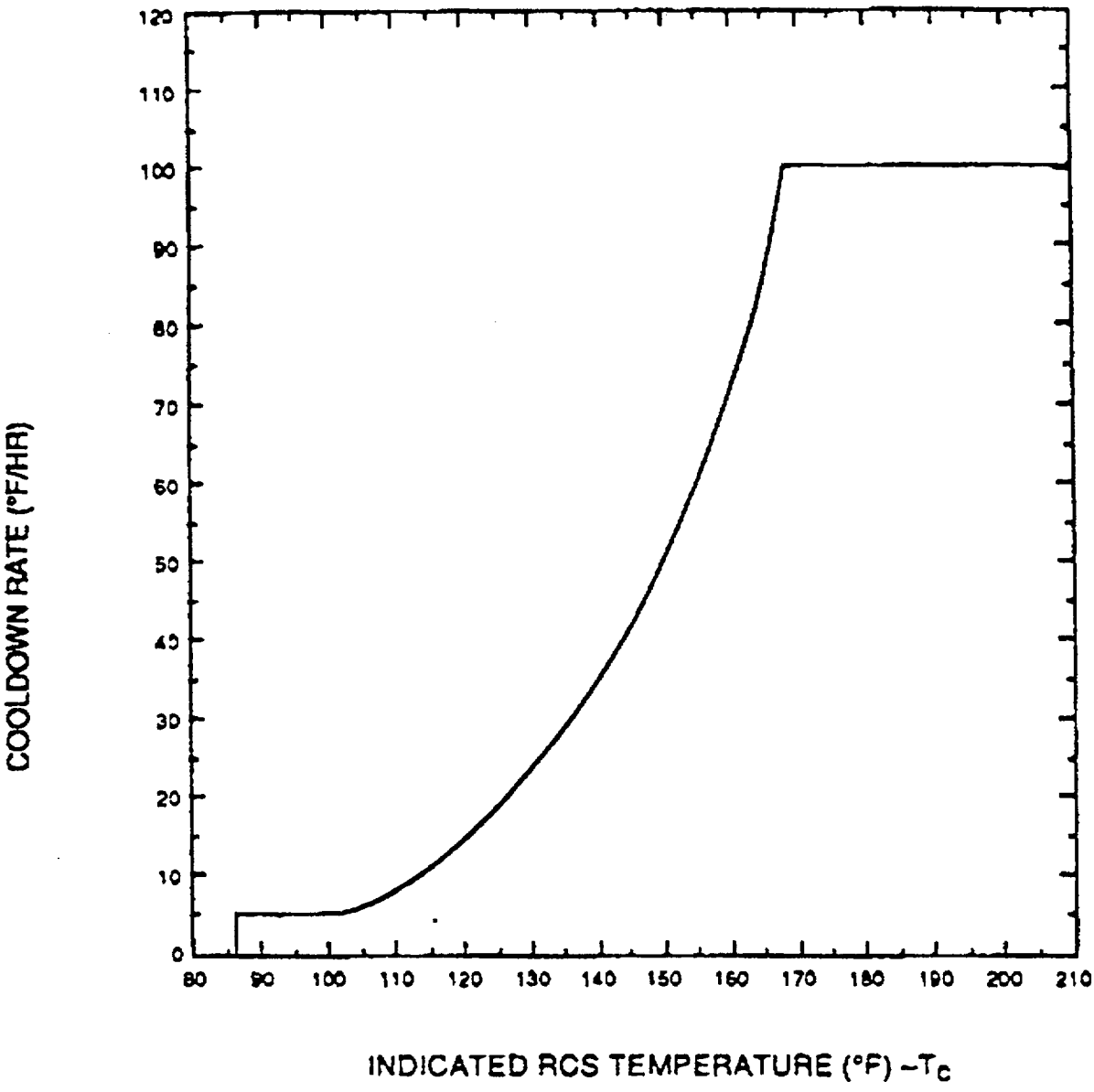


FIGURE 3.4.3-4

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

Attachment B

(Existing Pages)

SONGS Unit 3

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 86°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 147°F. A maximum cooldown of 100°F in any 1-hour period with RCS cold leg temperature greater than 147°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 86°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 86°F.

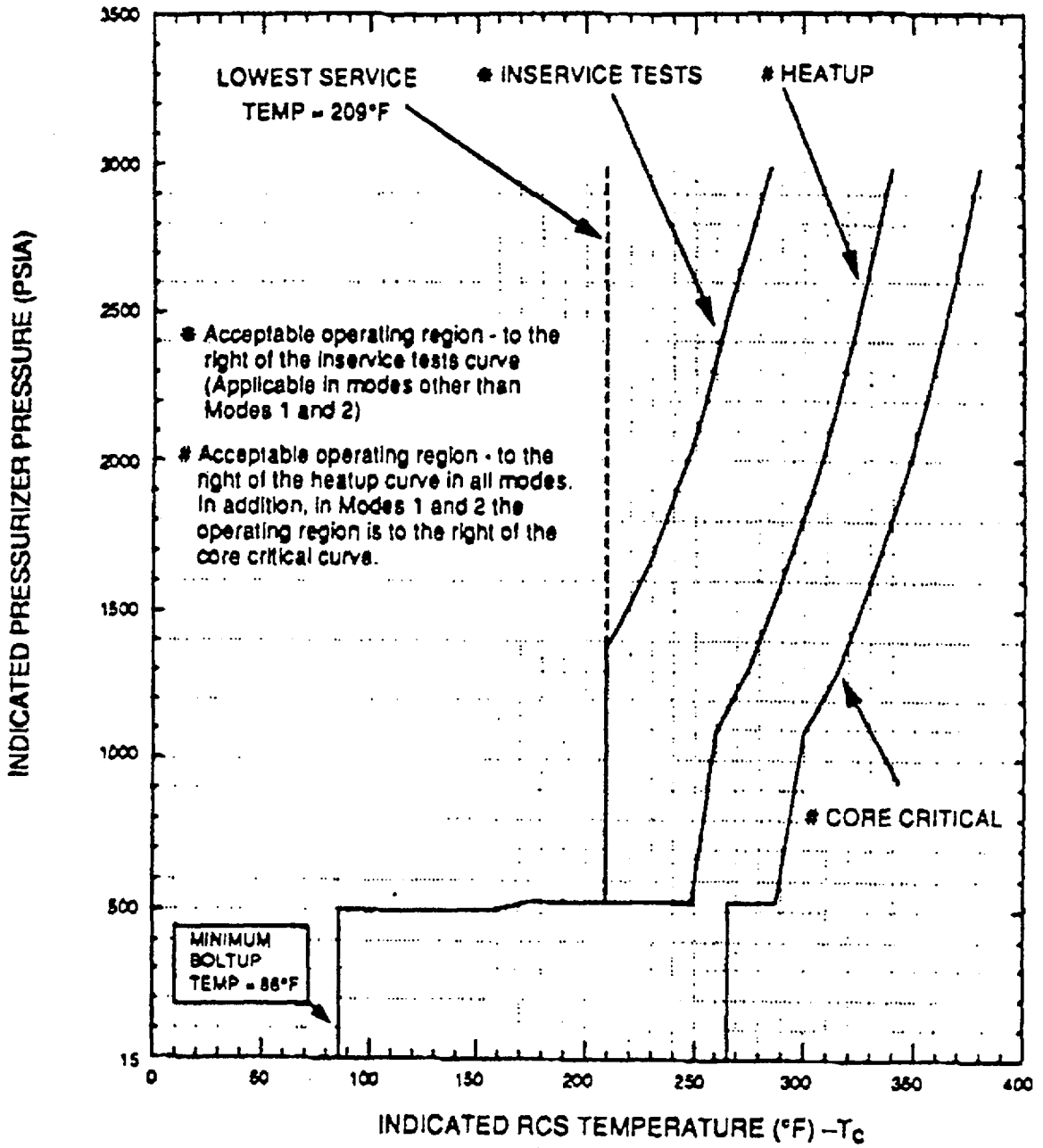


FIGURE 3.4.3-1

SONGS 3 HEATUP RCS PRESSURE/TEMPERATURE
LIMITATIONS UNTIL 20 EFPY
Normal Operation

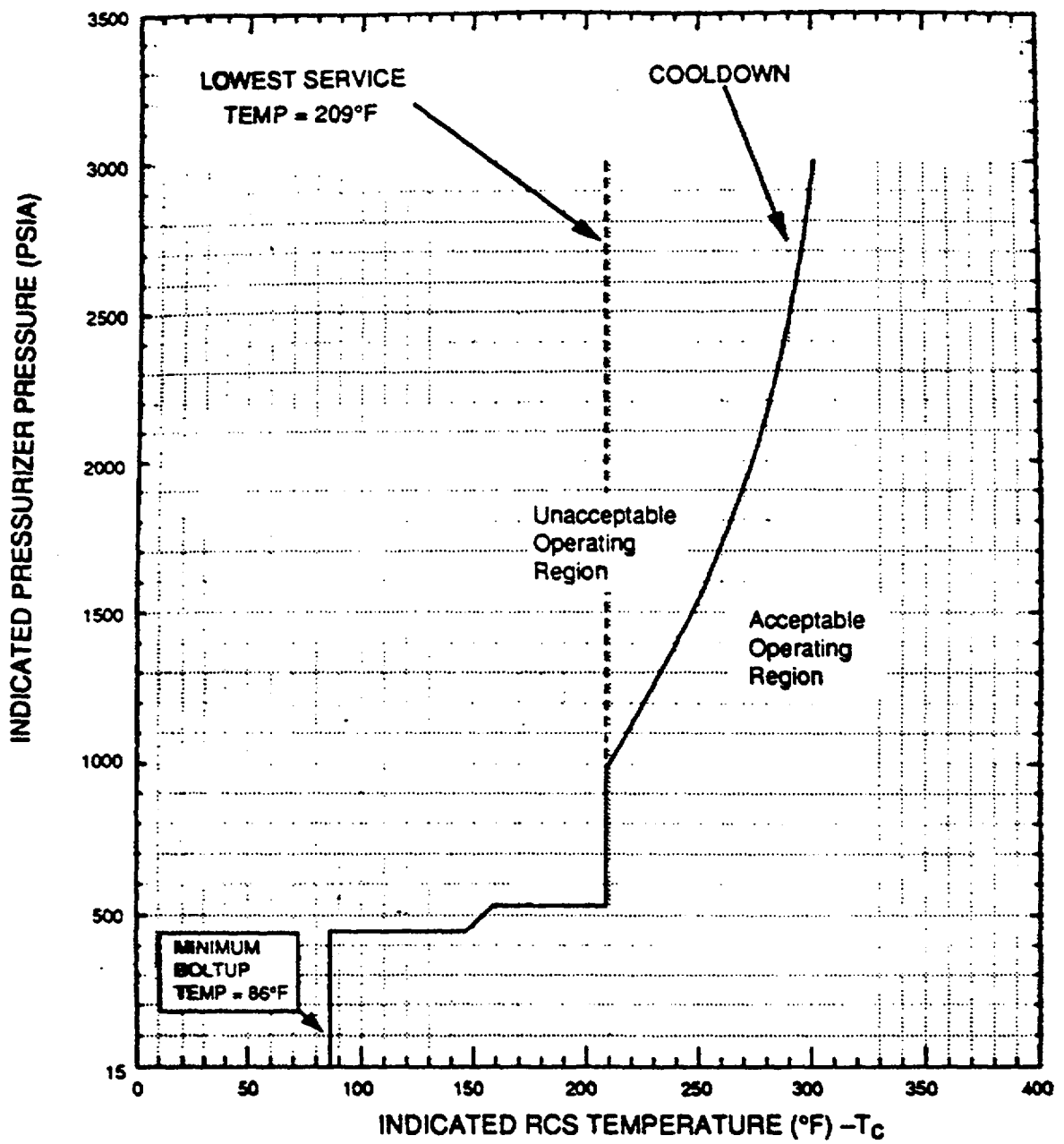
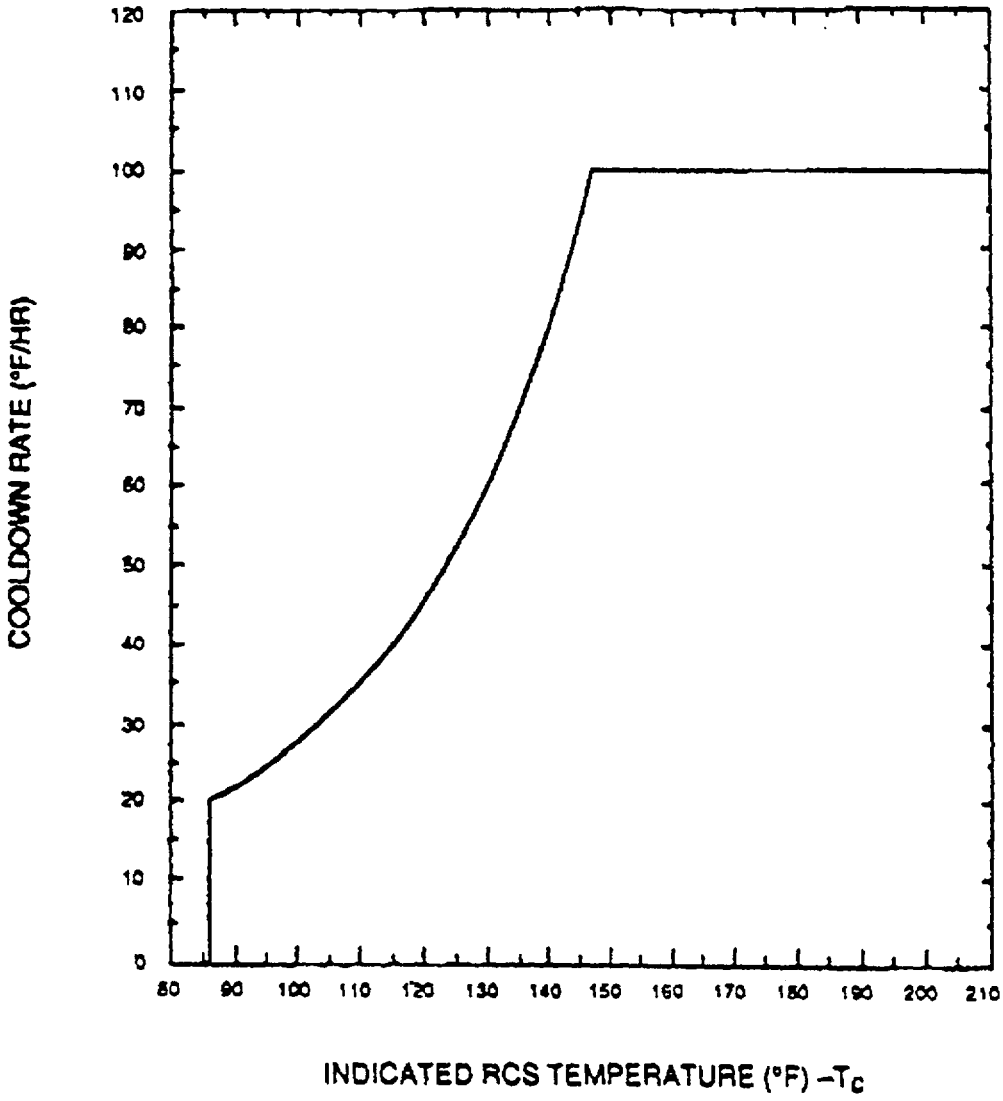


FIGURE 3.4.3-2

SONGS 3 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 147°F

FIGURE 3.4.3-3

SONGS 3 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Normal Operation

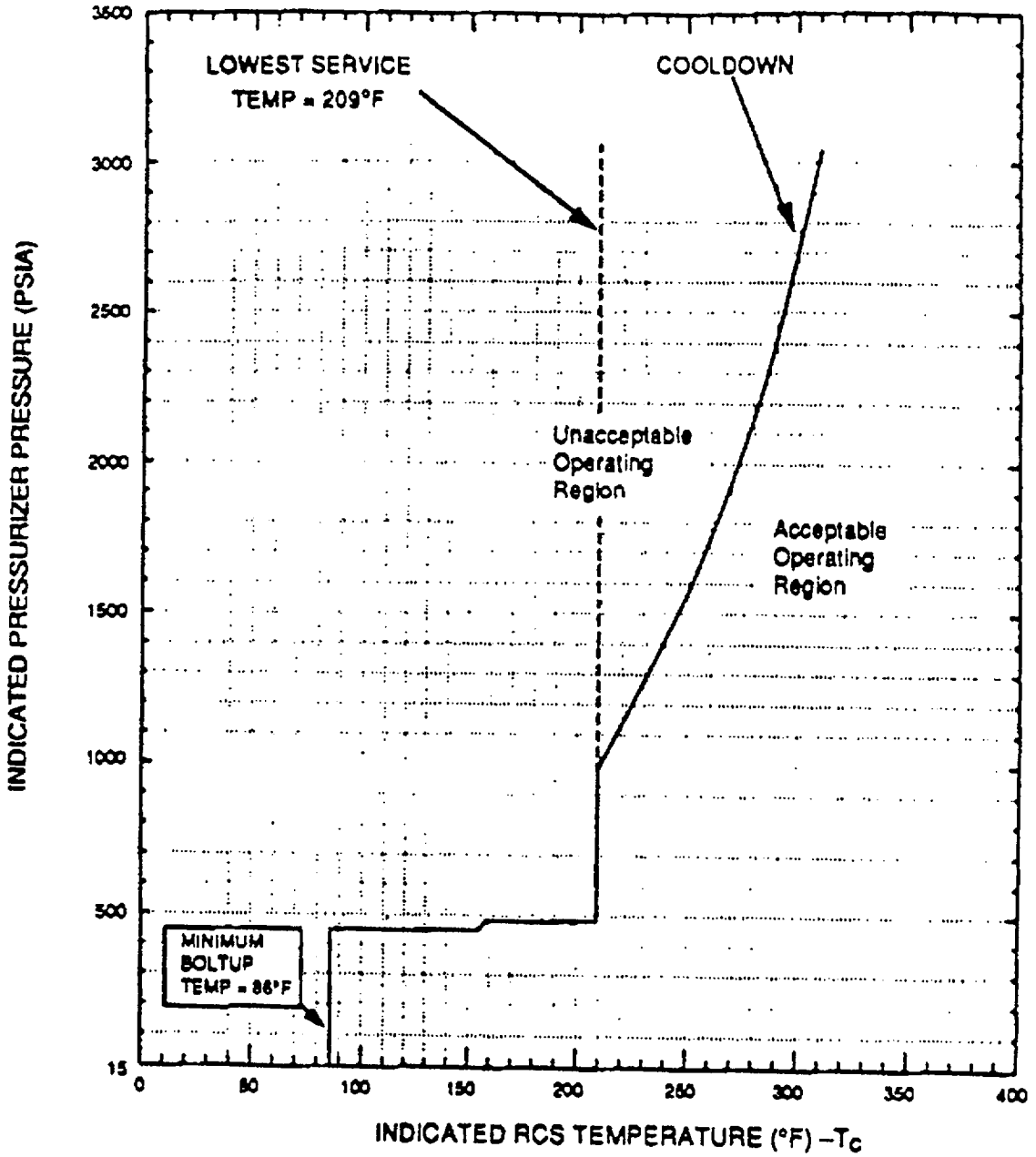
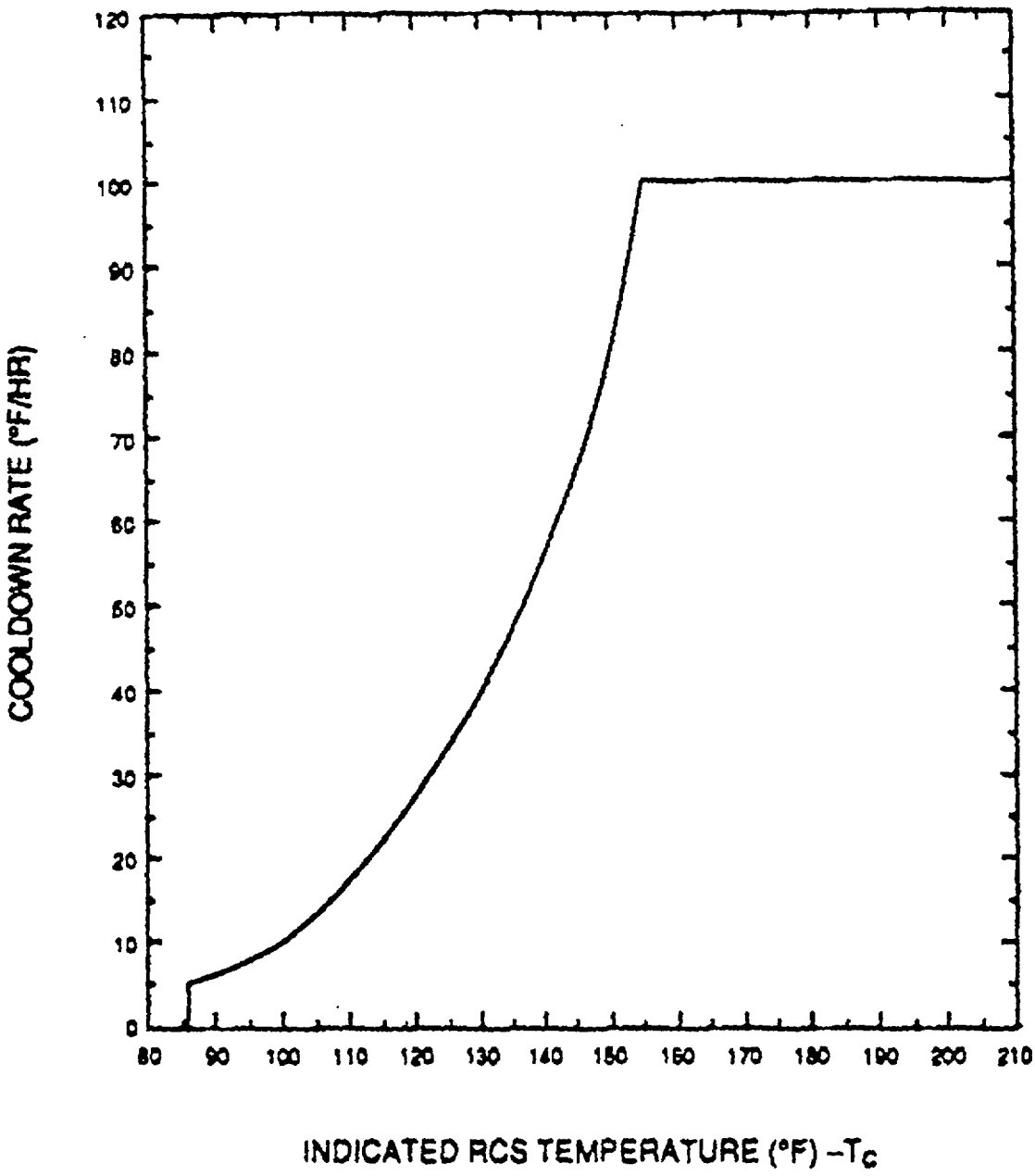


FIGURE 3.4.3-4

SONGS 3 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 155°F

FIGURE 3.4.3-5

SONGS 3 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Remote Shutdown Operation

Attachment C

(Proposed Pages)

(Redline and Strikeout)

SONGS Unit 2

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 ~~86~~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 ~~86~~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 ~~86~~65°F.

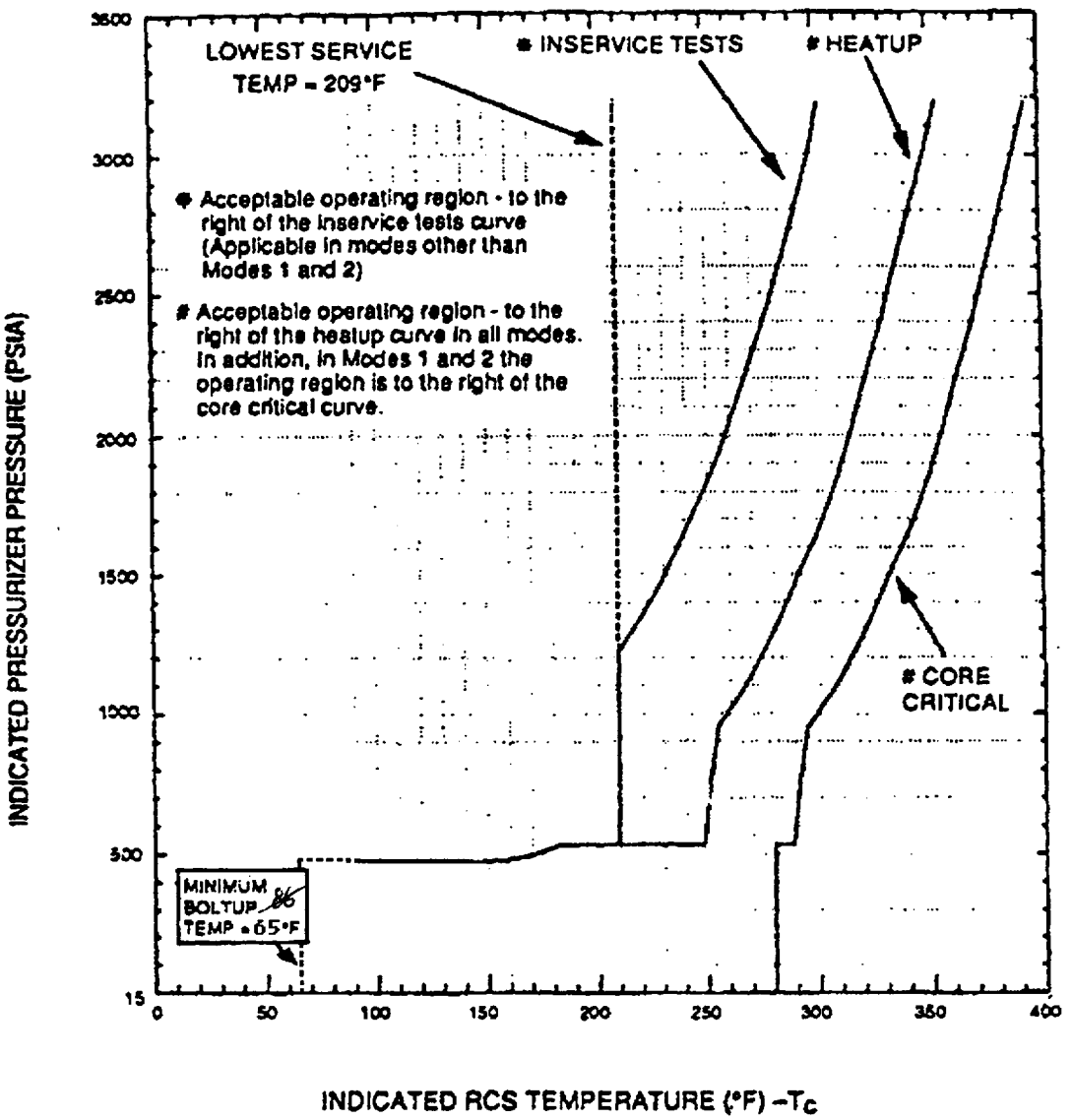


Figure 3.4.3-1

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

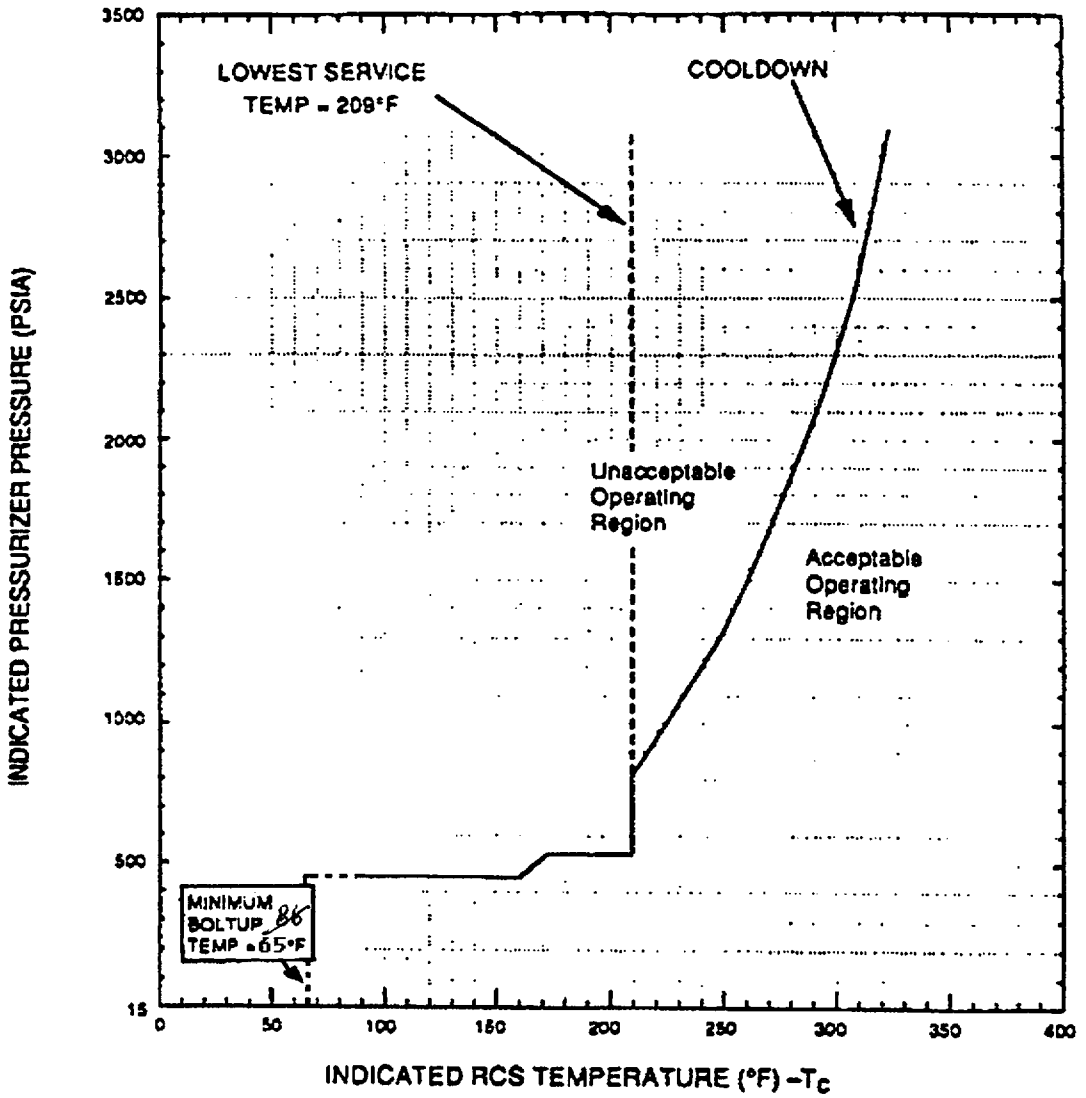
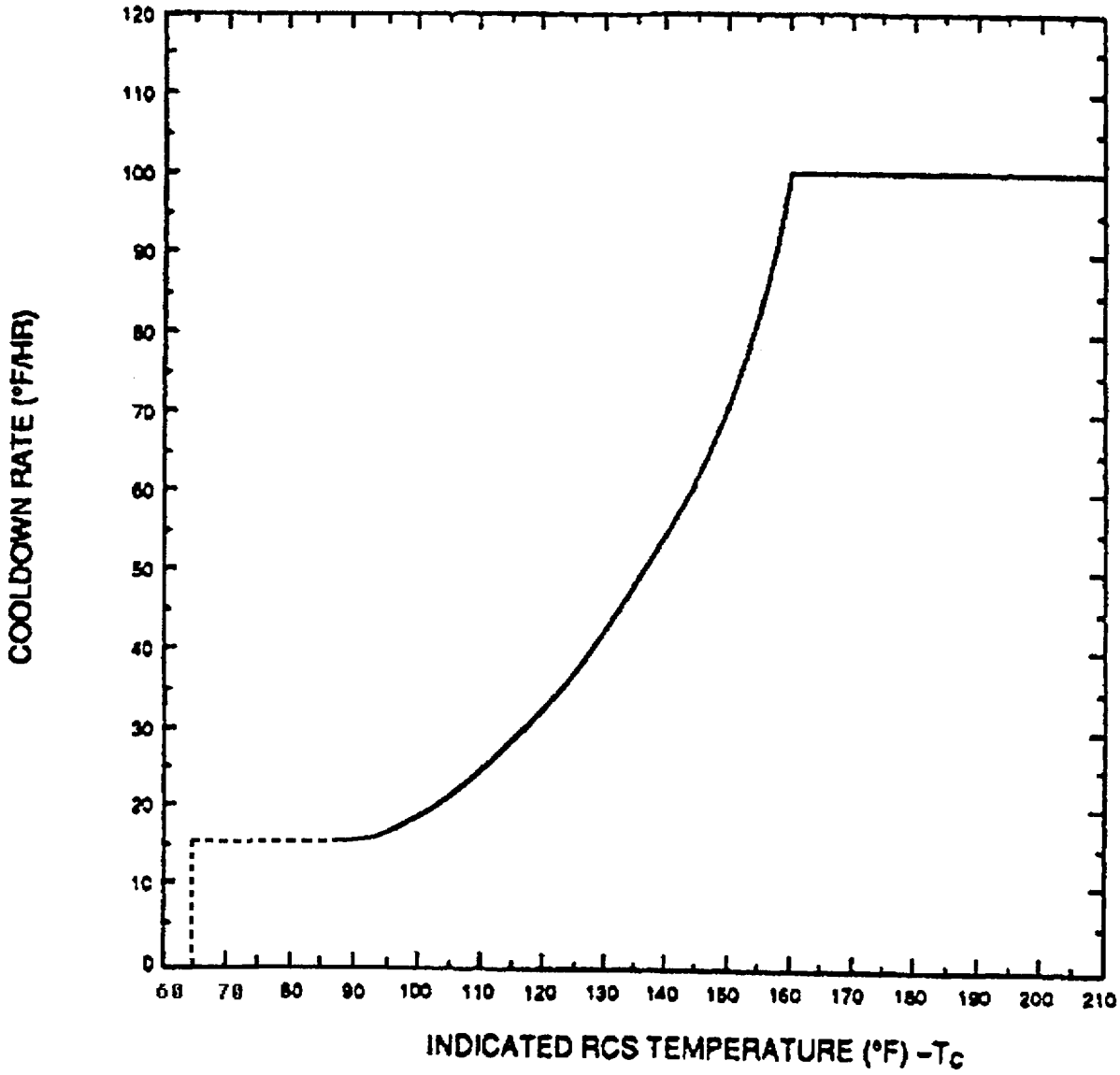


FIGURE 3.4.3-2

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

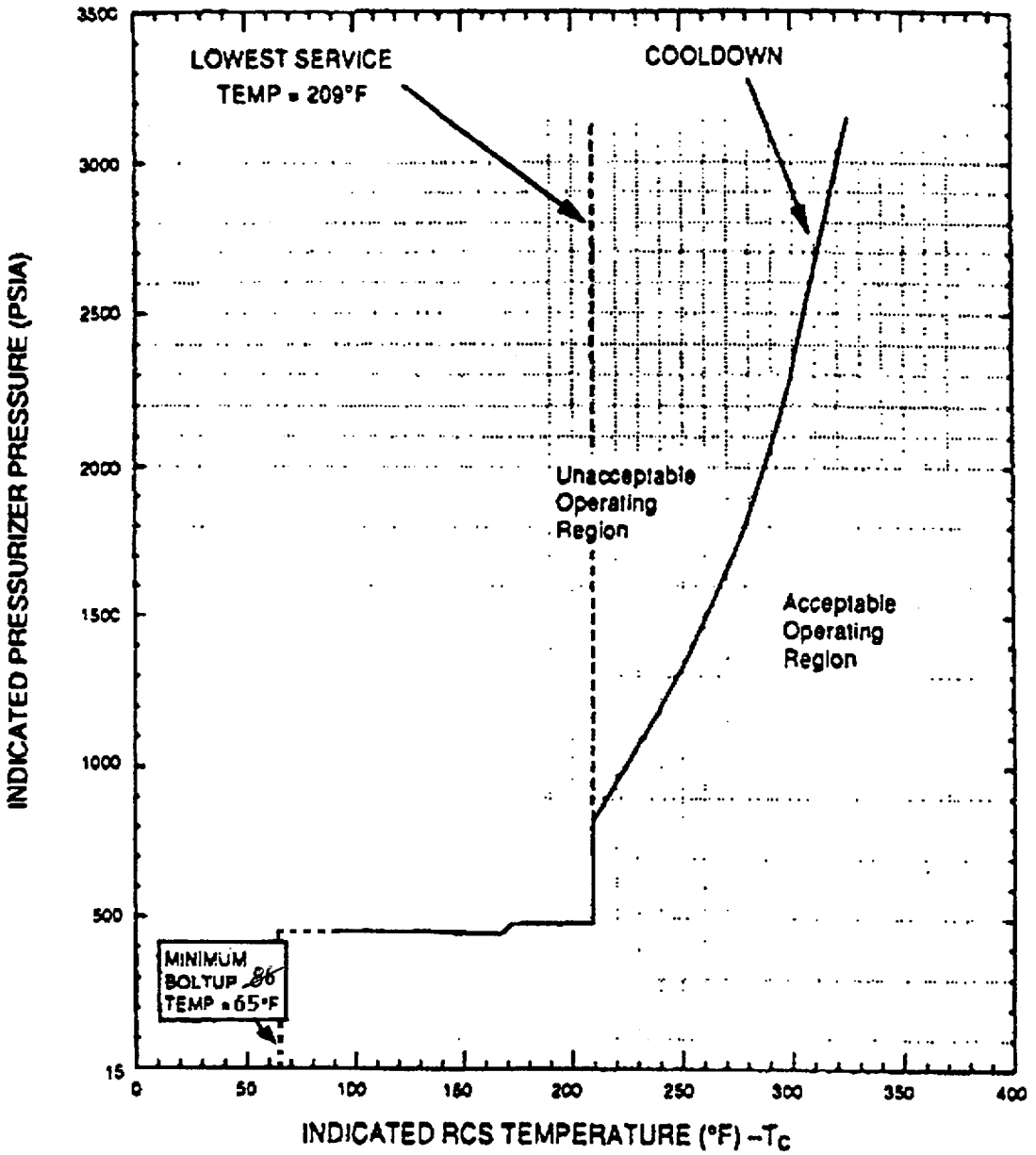
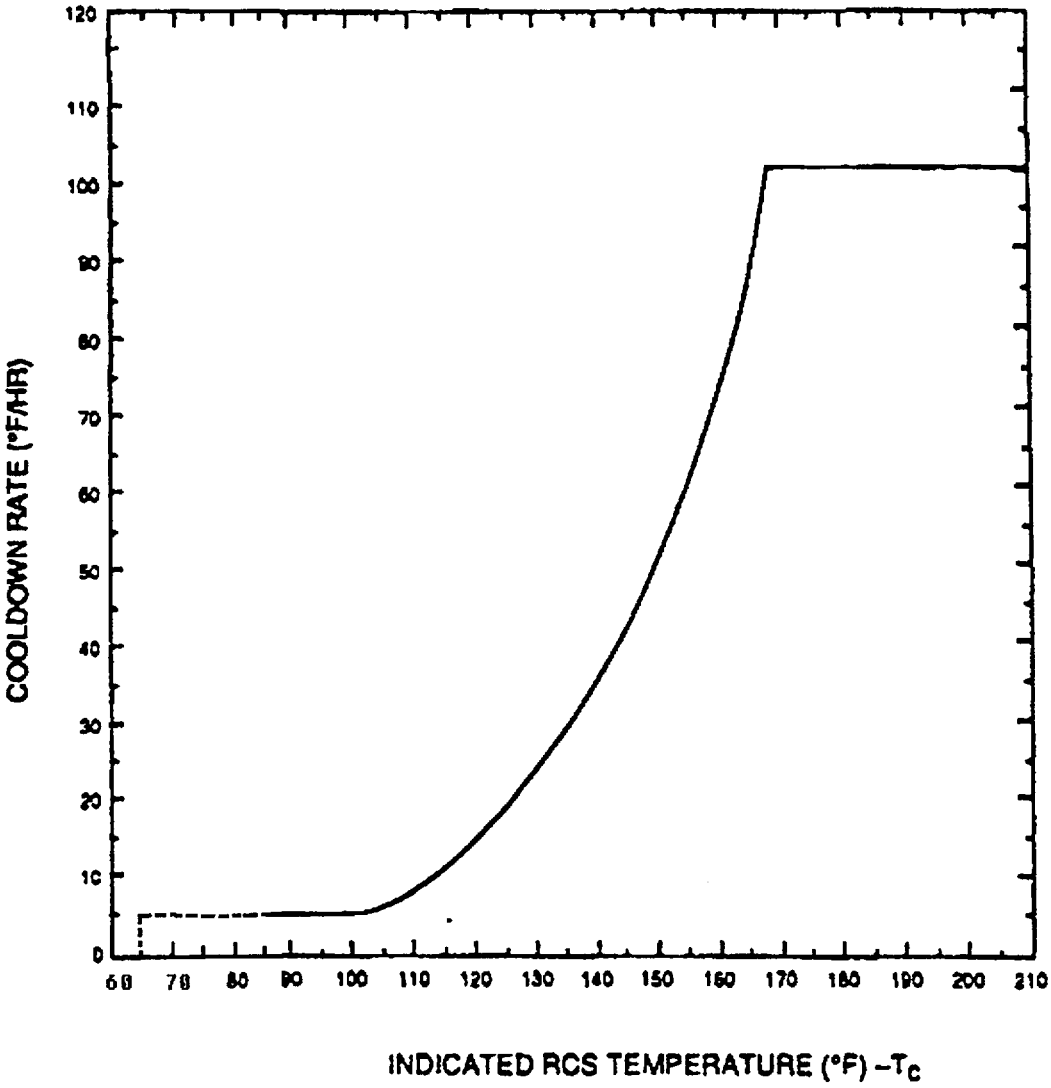


FIGURE 3.4.3-4

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

Attachment D

(Proposed Pages)

(Redline and Strikeout)

SONGS Unit 3

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 ~~86~~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 147°F. A maximum cooldown of 100°F in any 1-hour period with RCS cold leg temperature greater than 147°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 ~~86~~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 ~~86~~65°F.

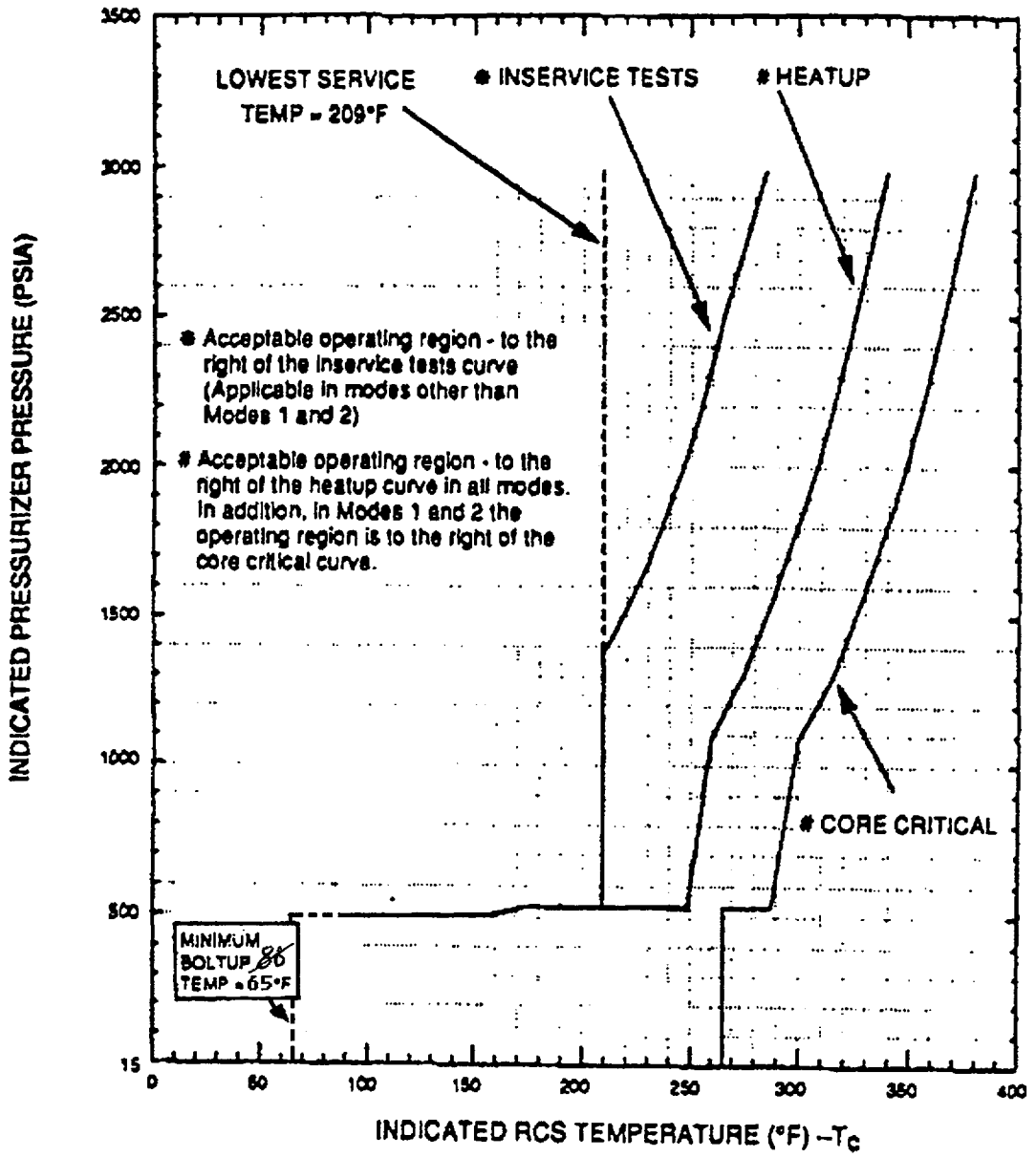


FIGURE 3.4.3-1

SONGS 3 HEATUP RCS PRESSURE/TEMPERATURE
LIMITATIONS UNTIL 20 EFPY
Normal Operation

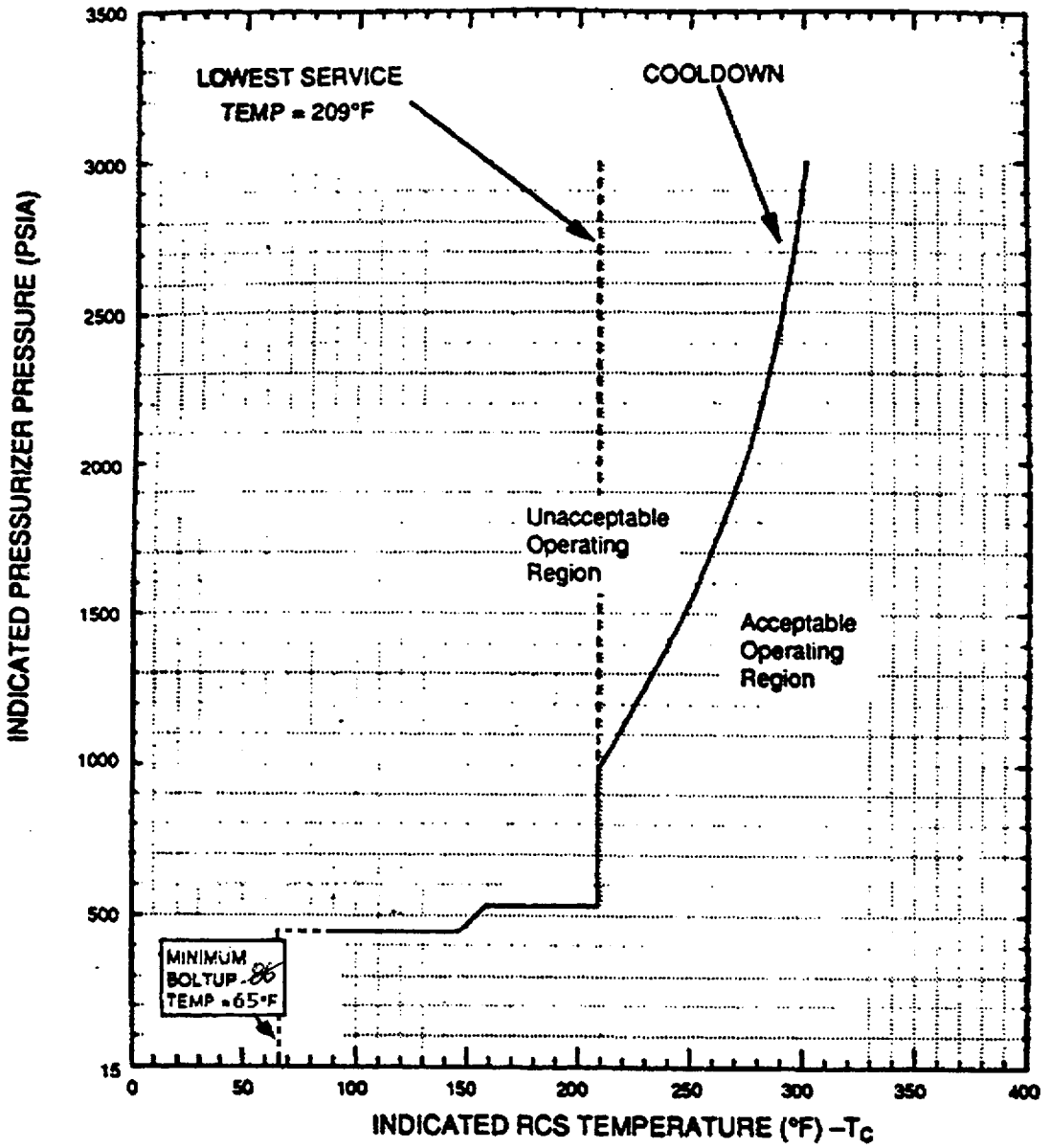
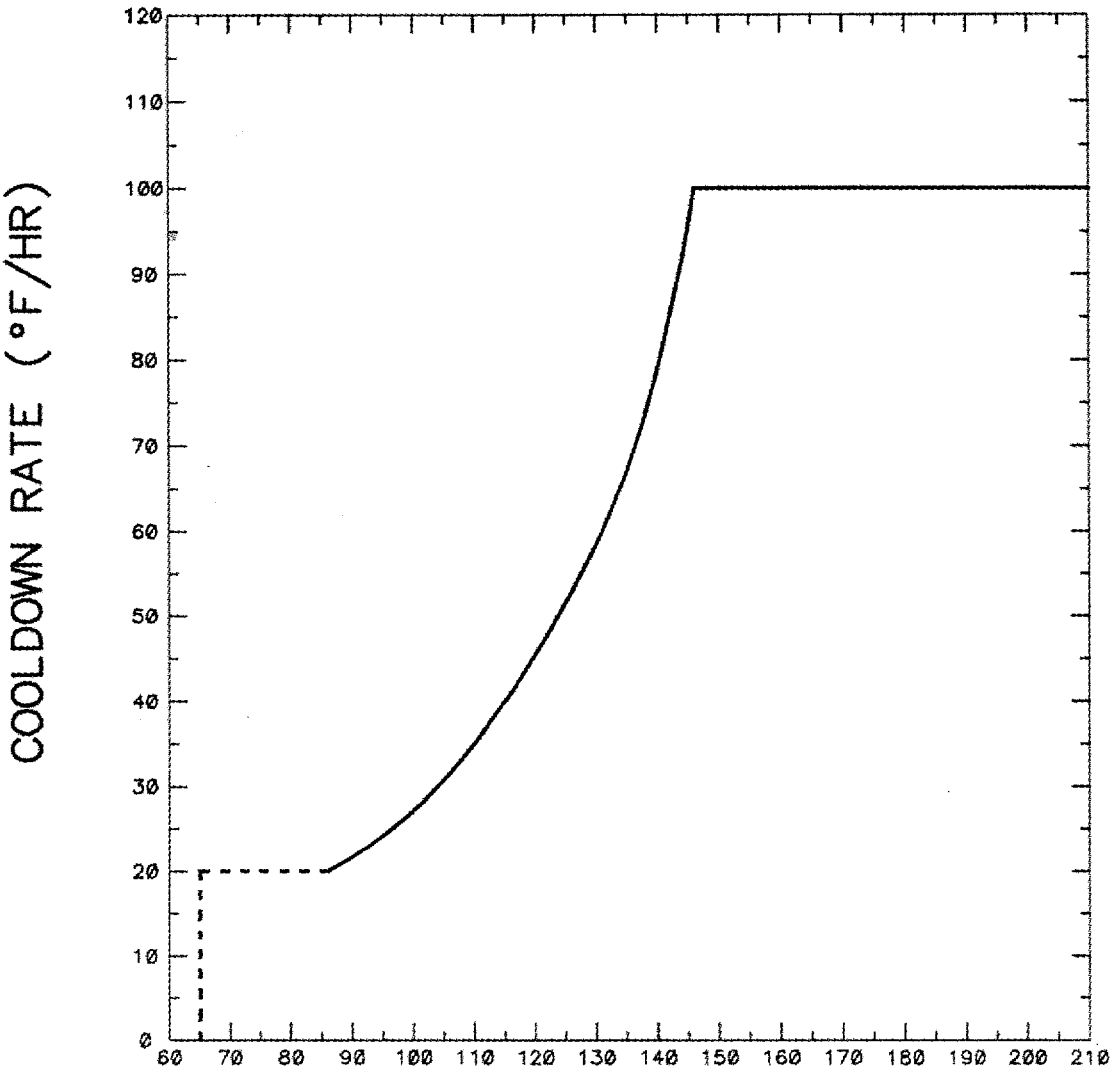


FIGURE 3.4.3-2

SONGS 3 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 147°F

FIGURE 3.4.3-3

SONGS 3 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Normal Operation

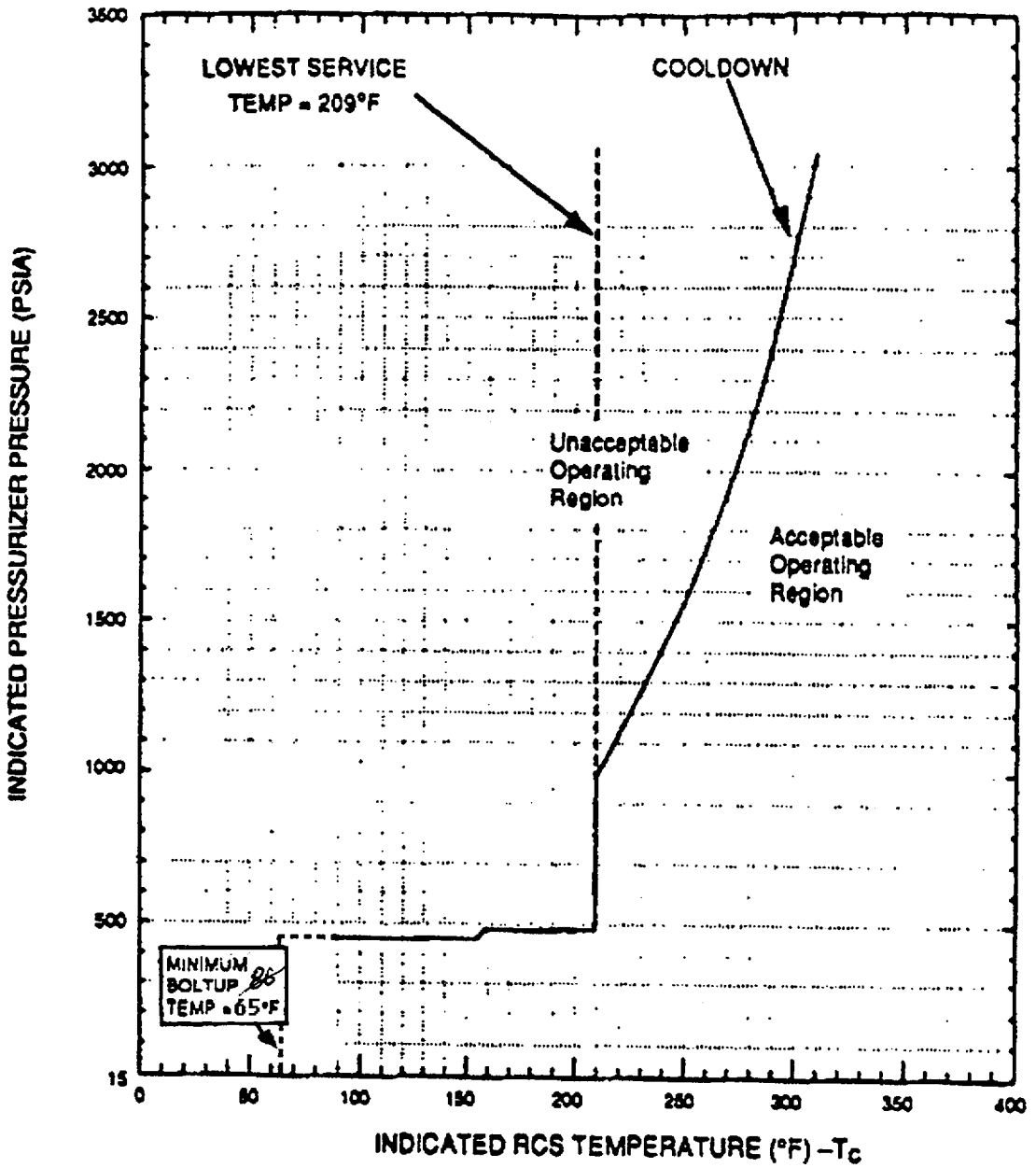
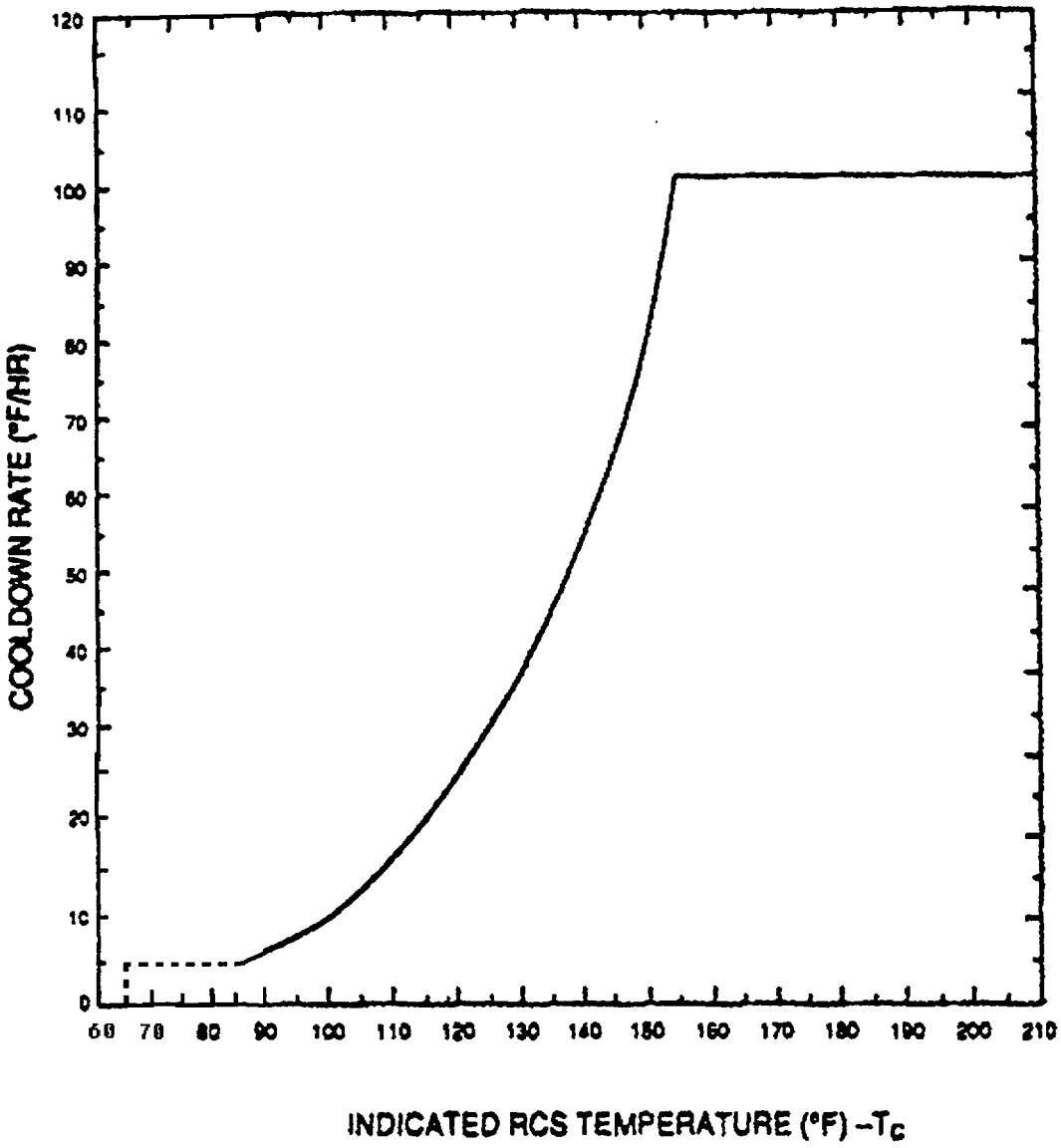


FIGURE 3.4.3-4

SONGS 3 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 155°F

FIGURE 3.4.3-5

SONGS 3 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Remote Shutdown Operation

Attachment E

(Proposed Pages)

SONGS Unit 2

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.

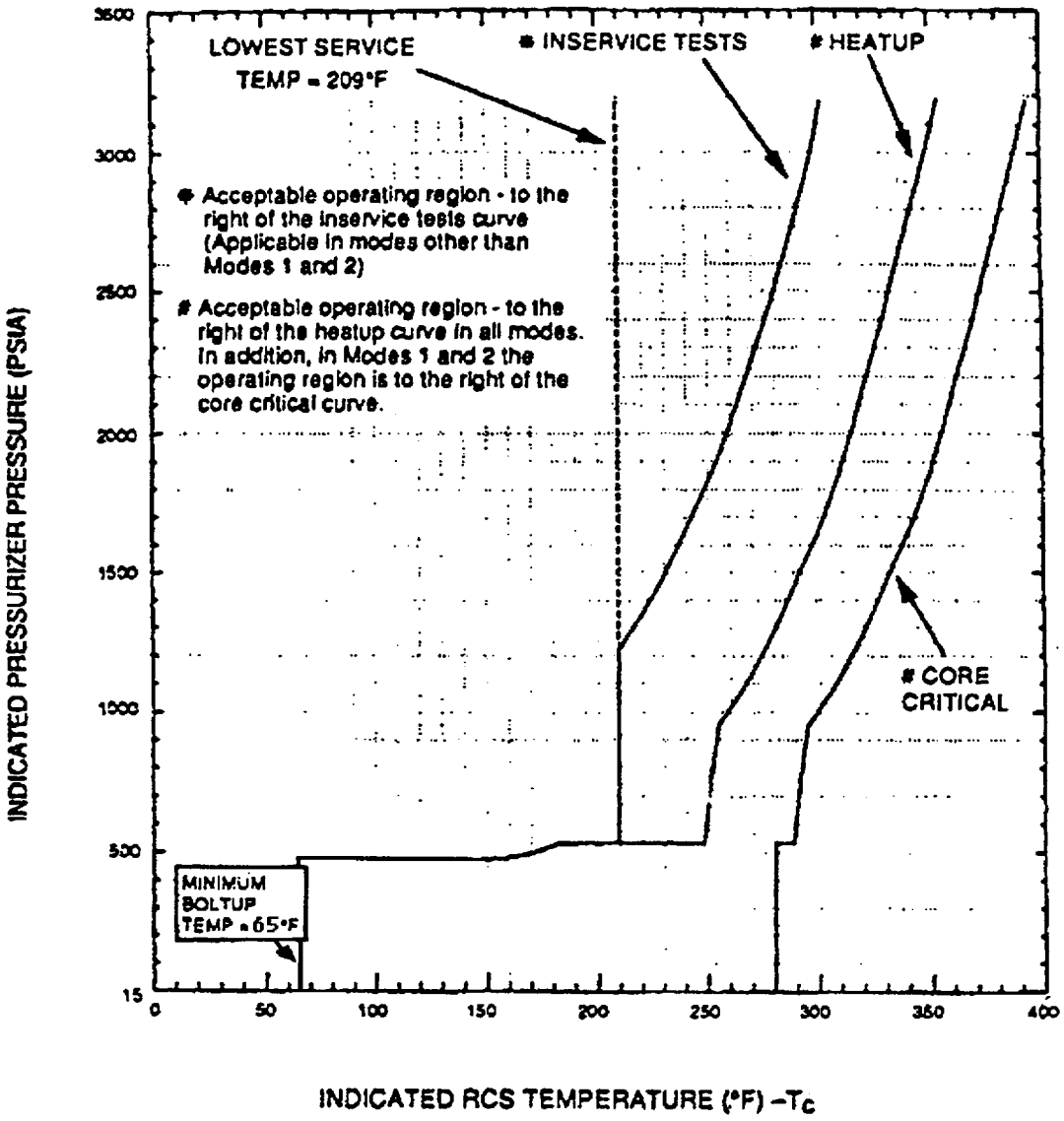


Figure 3.4.3-1

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

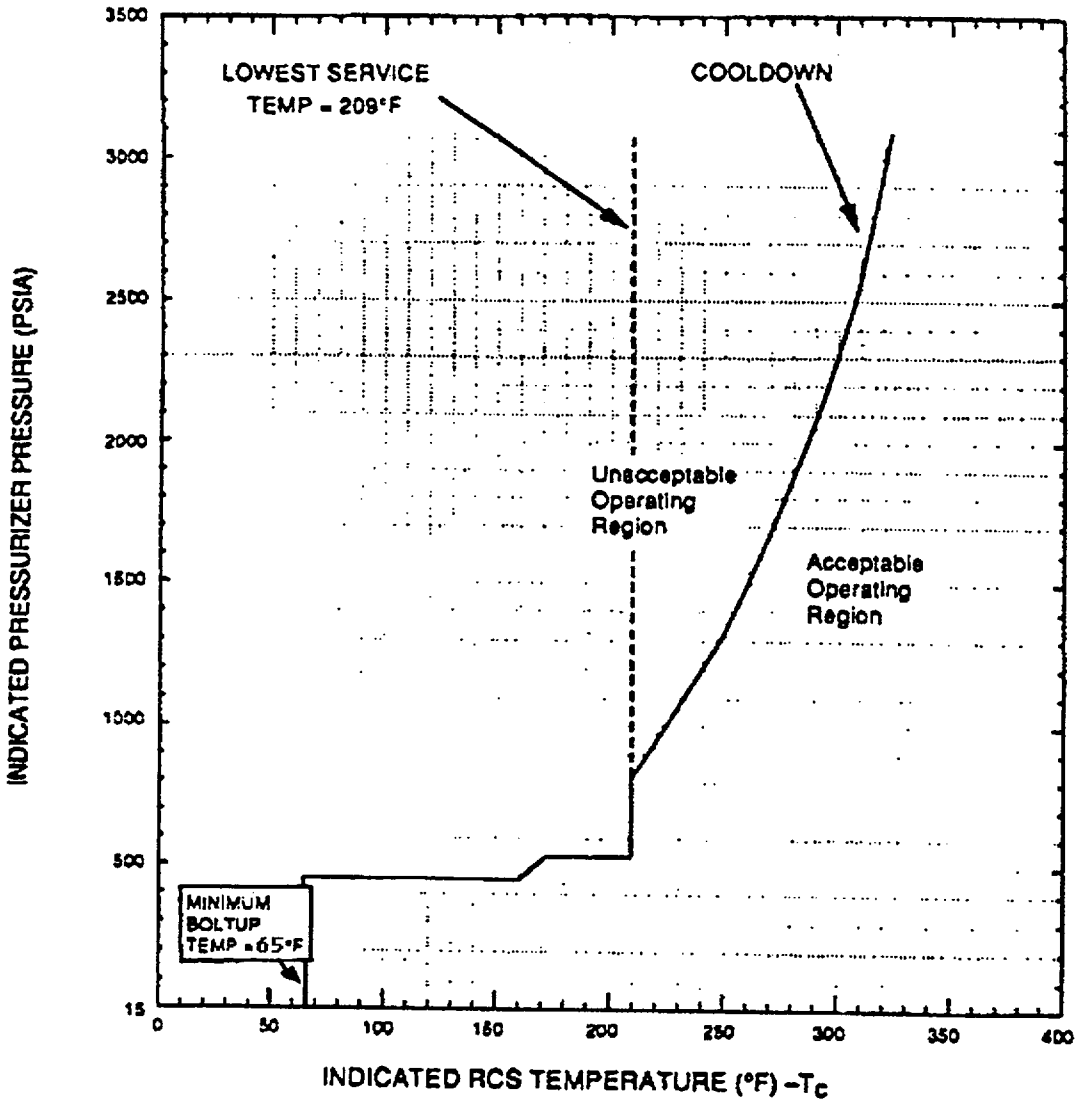
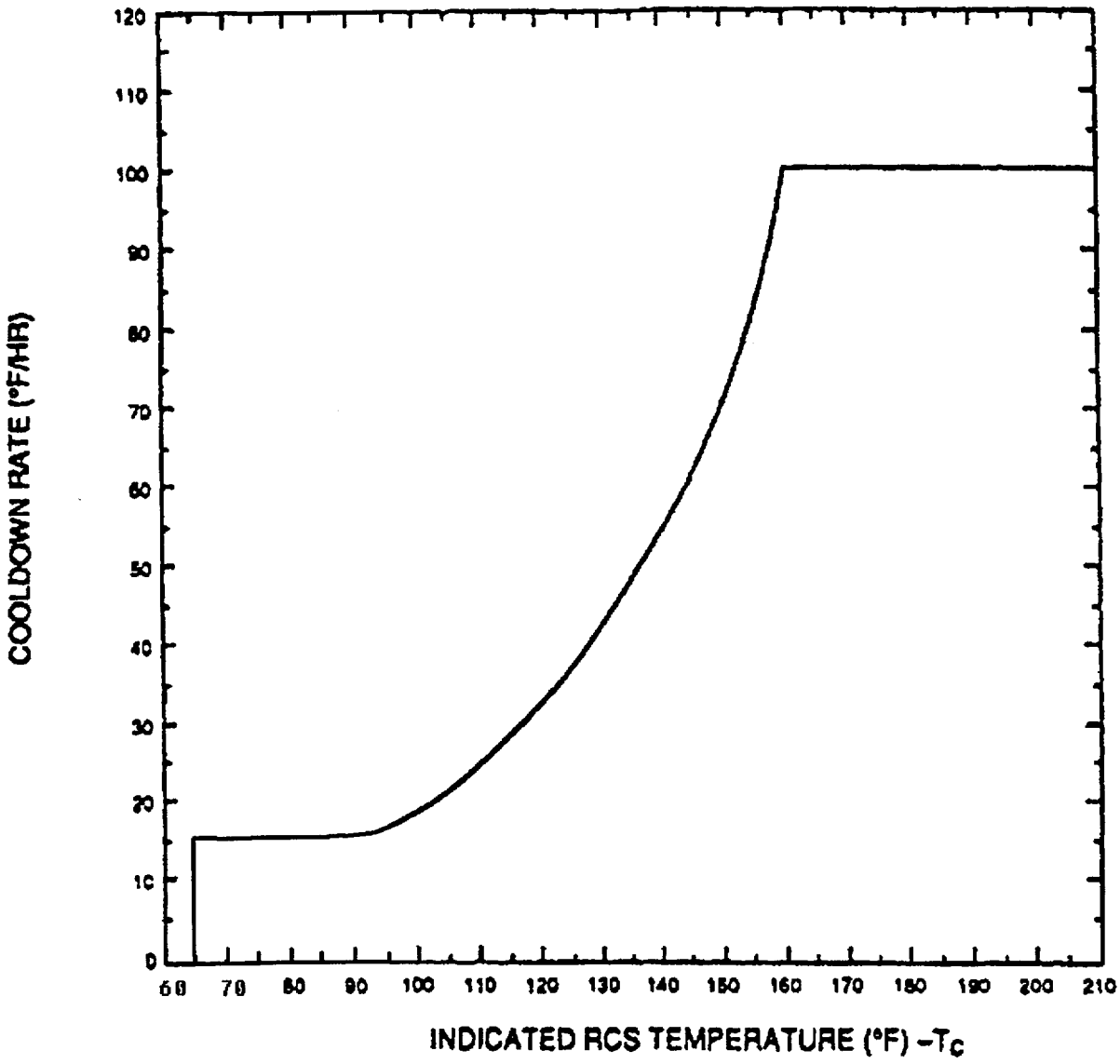


FIGURE 3.4.3-2

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

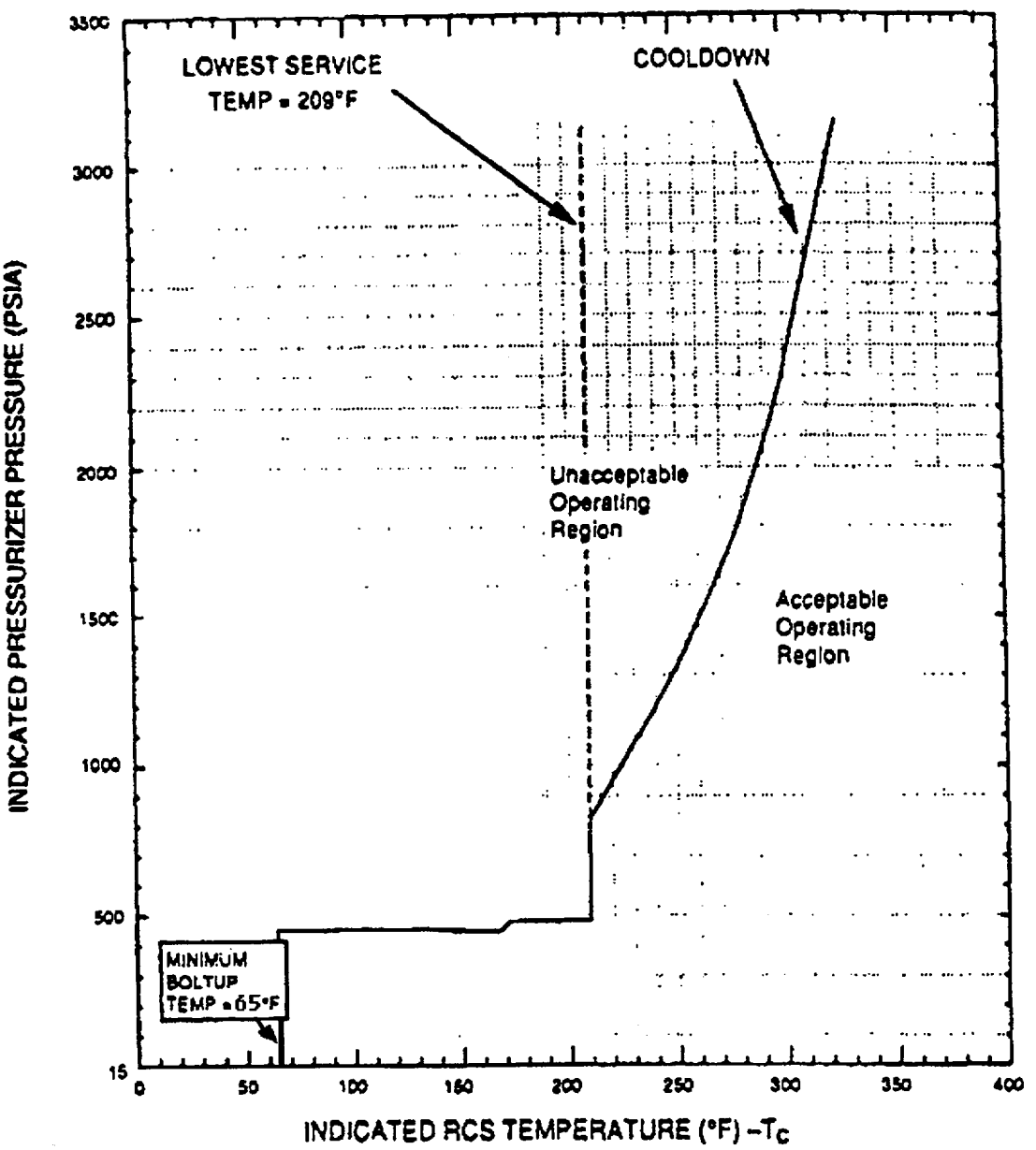
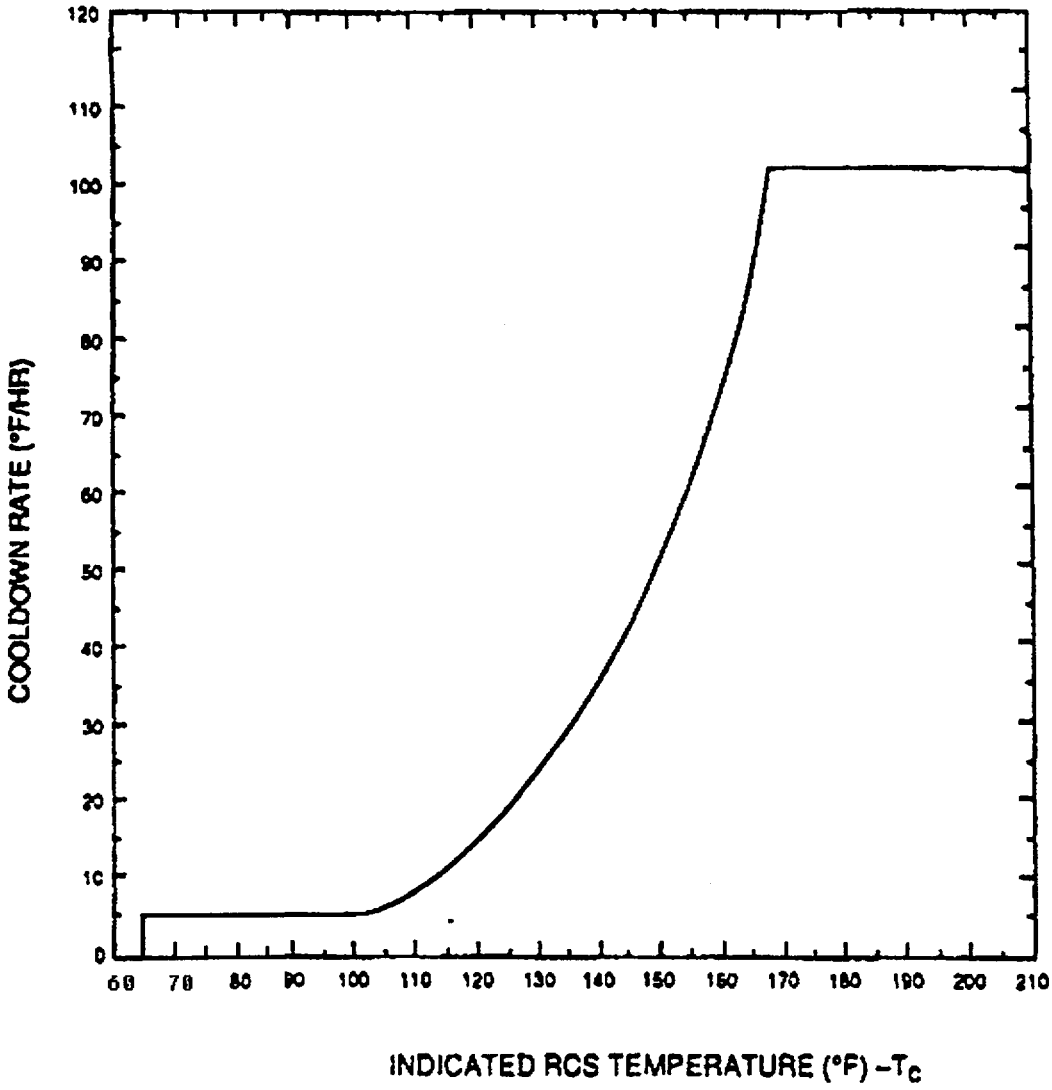


FIGURE 3.4.3-4

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

Attachment F

(Proposed Pages)

SONGS Unit 3

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 147°F. A maximum cooldown of 100°F in any 1-hour period with RCS cold leg temperature greater than 147°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.

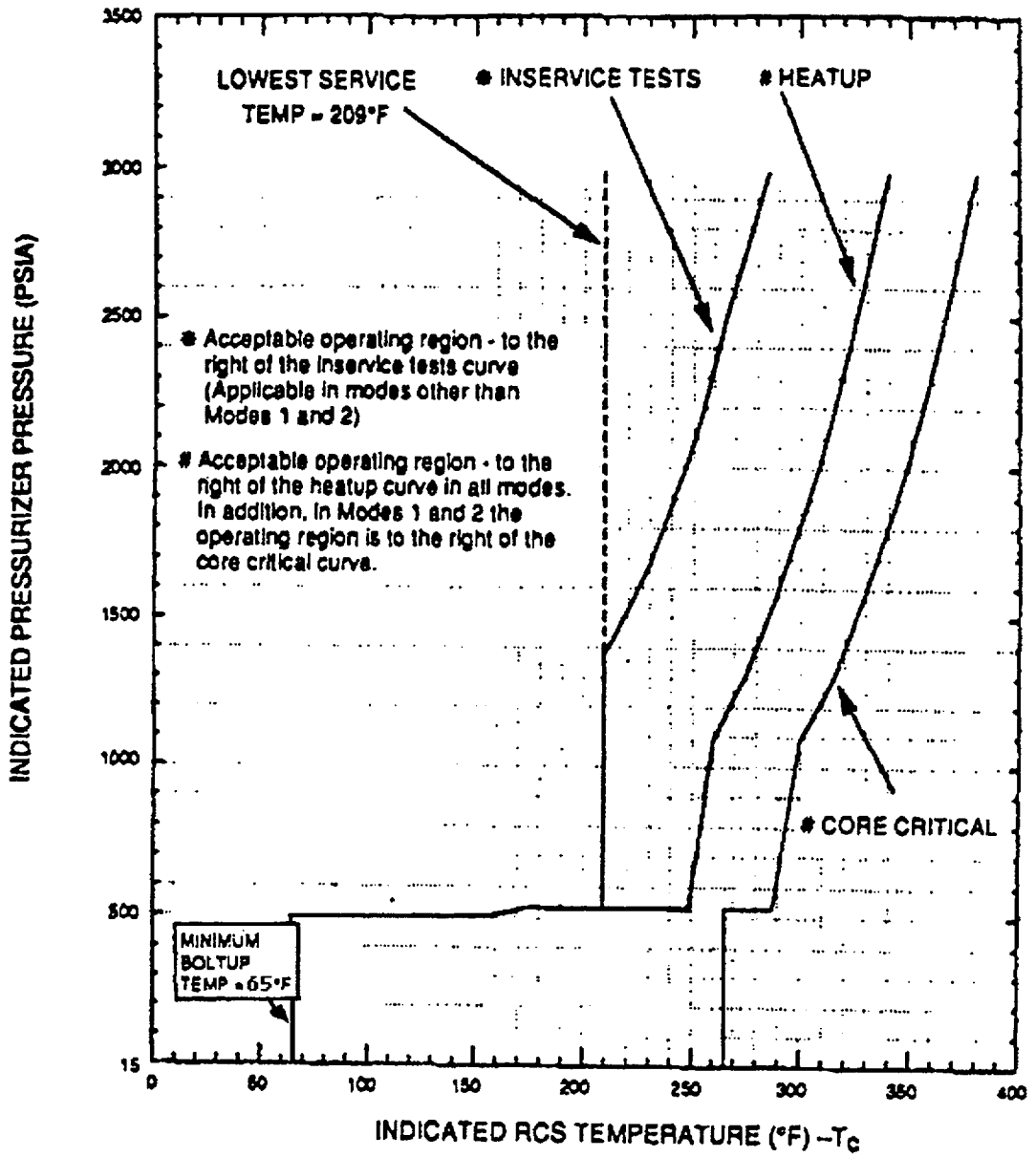


FIGURE 3.4.3-1

SONGS 3 HEATUP RCS PRESSURE/TEMPERATURE
LIMITATIONS UNTIL 20 EFPY
Normal Operation

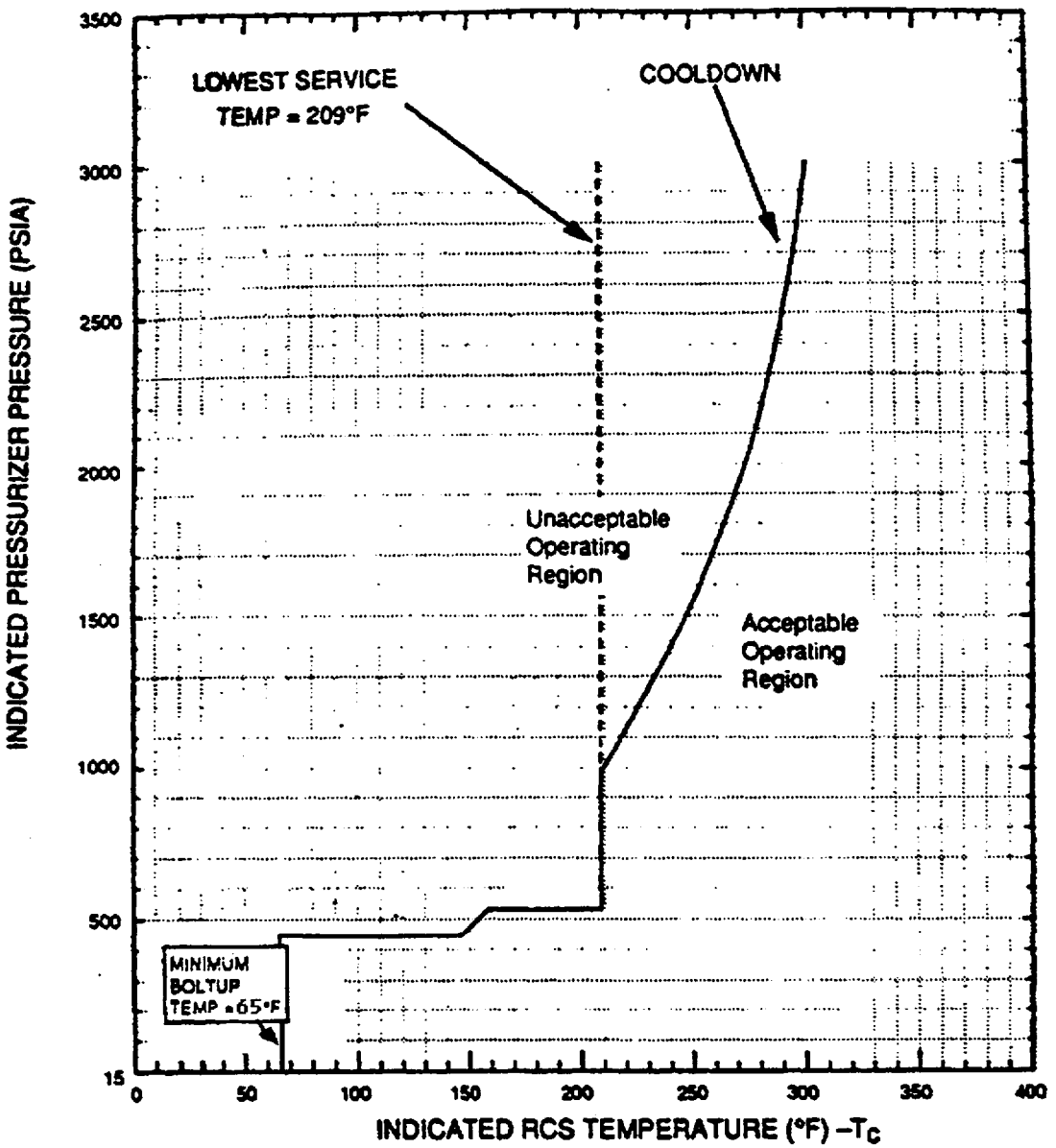
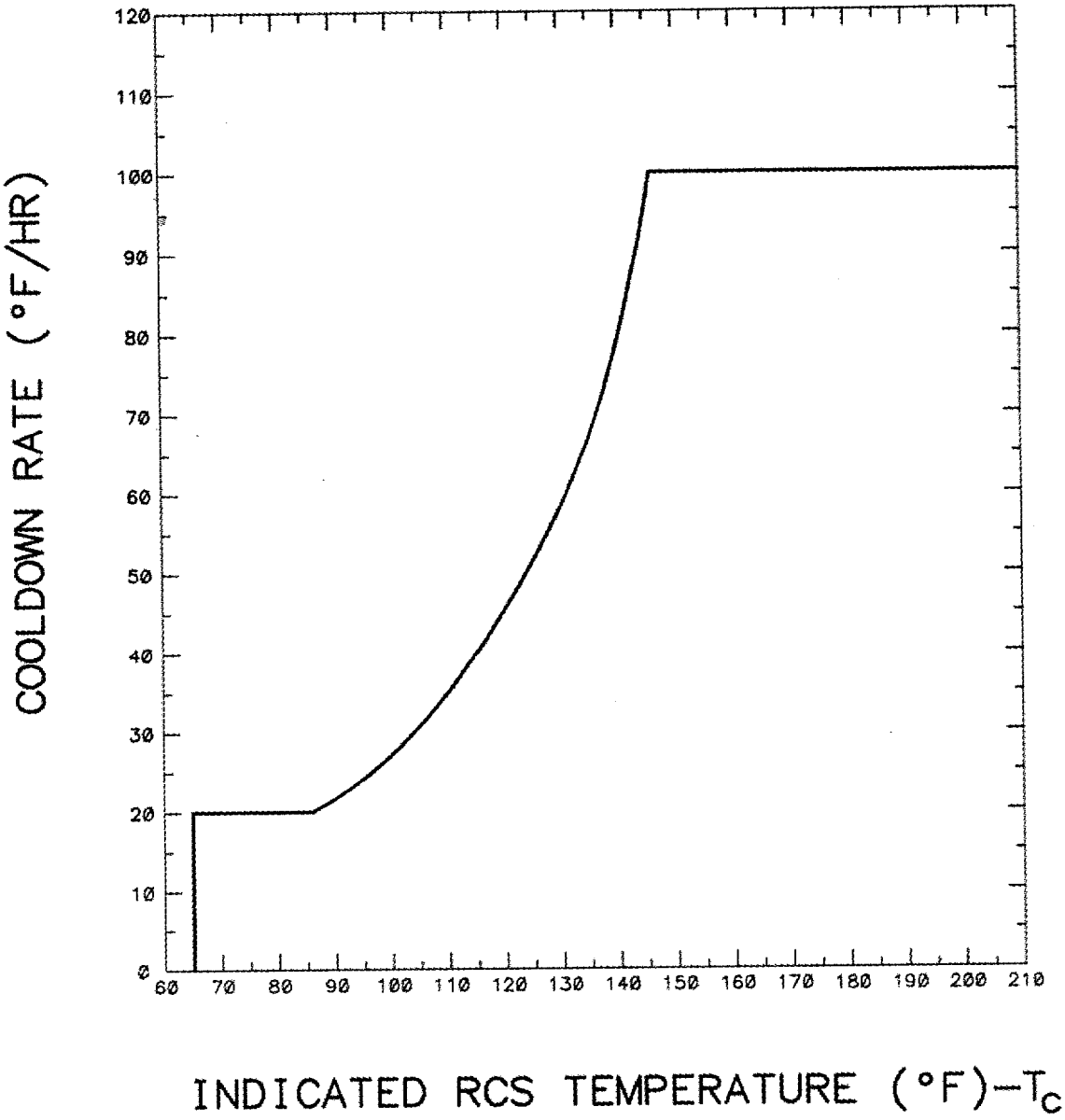


FIGURE 3.4.3-2

SONGS 3 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 147°F

FIGURE 3.4.3-3

SONGS 3 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Normal Operation

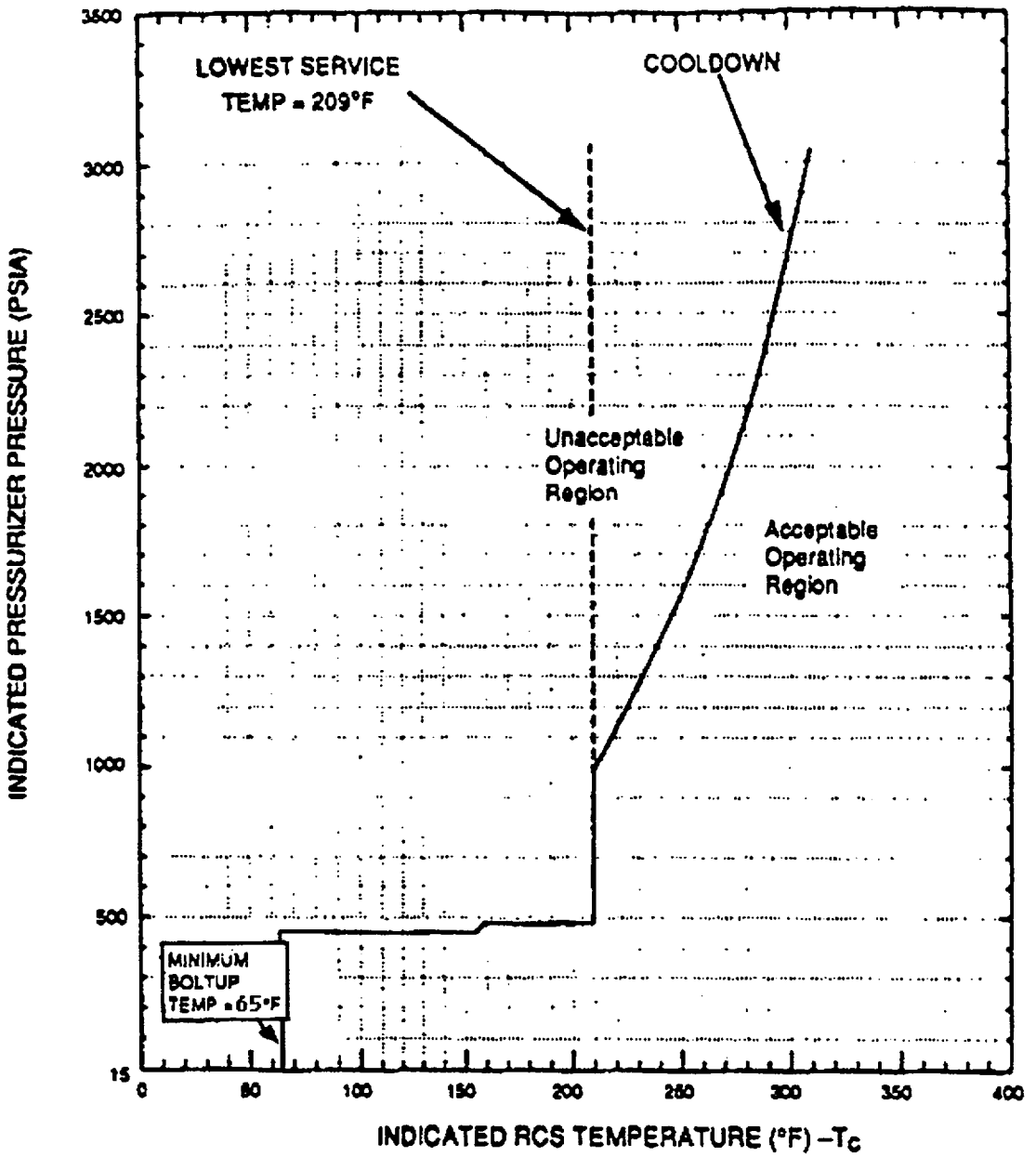
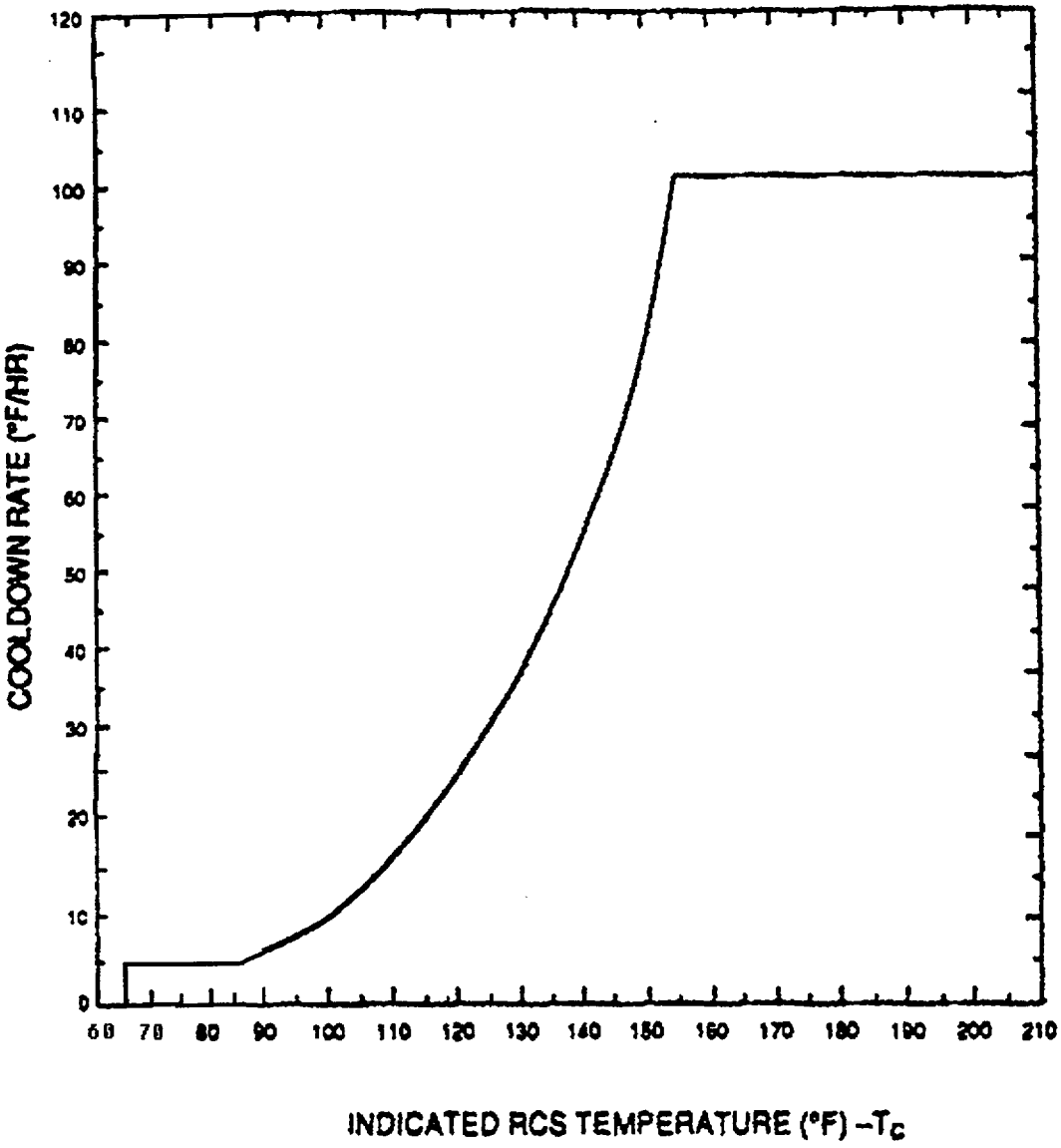


FIGURE 3.4.3-4

SONGS 3 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 155°F

FIGURE 3.4.3-5

SONGS 3 RCS PRESSURE/TEMPERATURE LIMITS
MAXIMUM ALLOWABLE COOLDOWN RATES (UNTIL 20 EFPY)
Remote Shutdown Operation

Attachment G

(Proposed Bases Pages)

SONGS 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.

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, Appendix G (Ref. 3).

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 minimum boltup temperature in the flange region should also consider any effects of irradiation at the stressed regions. However, given that the vessel flange is over eight feet above the core and is shielded by the vessel

(continued)

BASES

BACKGROUND (continued)

internals, it will receive a much lower neutron fluence than that in the reactor vessel beltline. It is unlikely that there will be sufficient irradiation exposure to cause any significant effect on the flange region materials. Therefore, the minimum boltup temperature need only consider the highest RT_{NDT} of the flange region materials. The highest RT_{NDT} of the flange region materials was confirmed by the NSSS vendor to be 40°F (SO23-901-C251 and SO23-901-C252). The current TLU value for RCS T_{COLD} is ±19°F (J-BBB-003). The LCO value of 65°F includes 6°F of margin in addition to the TLU value.

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.

(continued)

BASES

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 methodology for determining 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:

(continued)

BASES

LCO (continued)

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

c. The existences, sizes, and orientations of flaws in the vessel material.

APPLICABILITY

The RCS P/T limits Specification provides a definition of acceptable operation for prevention of nonductile failure in accordance with 10 CFR 50, Appendix G (Ref. 2). Although the P/T limits were developed to provide guidance for operation during heatup or cooldown (MODES 3, 4, and 5) or ISLH testing, their Applicability is at all times in keeping with the concern for nonductile failure. The limits do not apply to the pressurizer.

During MODES 1 and 2, other Technical Specifications provide limits for operation that can be more restrictive than or can supplement these P/T limits. LCO 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits"; LCO 3.4.2, "RCS Minimum Temperature for Criticality"; and Safety Limit 2.1, "Safety Limits," also provide operational restrictions for pressure and temperature and maximum pressure. Furthermore, MODES 1 and 2 are above the temperature range of concern for nonductile failure, and stress analyses have been performed for normal maneuvering profiles, such as power ascension or descent.

The actions of this LCO consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures.

(continued)

BASES

ACTIONS

A.1 and A.2

The actions of this LCO in MODE 1, 2, 3, or 4 consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures. Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

The 30 minute Completion Time reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in this time in a controlled manner.

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify the RCPB integrity remains acceptable for continued operation. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components.

ASME Code, Section XI, Appendix E (Ref. 6), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The 72 hour Completion Time is reasonable to accomplish the evaluation. The evaluation for a mild violation is possible within this time, but more severe violations may require special, event specific stress analyses or inspections. A favorable evaluation must be completed before continuing to operate.

Condition A is modified by a Note requiring Required Action A.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action A.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

If a Required Action and associated Completion Time of Condition A are not met, the plant must be placed in a lower MODE because:

a. The RCS remained in an unacceptable P/T region for an extended period of increased stress; or

b. A sufficiently severe event caused entry into an unacceptable region.

Either possibility indicates a need for more careful examination of the event, best accomplished with the RCS at reduced pressure and temperature. With reduced pressure and temperature conditions, the possibility of propagation of undetected flaws is decreased.

Pressure and temperature are reduced by placing the plant in MODE 3 within 6 hours and in MODE 5 with RCS pressure < 500 psia within 36 hours.

The Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

The actions of this LCO, anytime other than in MODE 1, 2, 3, or 4, consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures. Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

The Completion Time of "immediately" reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in a short period of time in a controlled manner.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify that the RCPB integrity remains acceptable and must be completed before continuing operation. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components.

ASME Code, Section XI, Appendix E (Ref. 6), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The Completion Time of "prior to entering MODE 4" forces the evaluation prior to entering a MODE where temperature and pressure can be significantly increased. The evaluation for a mild violation is possible within several days, but more severe violations may require special, event specific stress analyses or inspections.

Condition C is modified by a Note requiring Required Action C.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action C.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

SURVEILLANCE REQUIREMENTS

SR 3.4.3.1

Verification that operation is within the Pressure /Temperature limits is required every 30 minutes when RCS pressure and temperature conditions are undergoing planned changes. This Frequency is considered reasonable in view of the control room indication available to monitor RCS status. Also, since temperature rate of change limits are specified in hourly increments, 30 minutes permits assessment and correction for minor deviations within a reasonable time.

Surveillance for heatup, cooldown, or ISLH testing may be discontinued when the definition given in the relevant plant procedure for ending the activity is satisfied.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.3.1

This SR is modified by a Note that requires this SR be performed only during RCS system heatup, cooldown, and ISLH testing. No SR is given for criticality operations because LCO 3.4.2 contains a more restrictive requirement.

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 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.
2. 10 CFR 50, Appendix G.
3. ASME, Boiler and Pressure Vessel Code, Section III, 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.

Attachment H

(Proposed Bases Pages)

SONGS Unit 3

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.

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, Appendix G (Ref. 3).

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 minimum boltup temperature in the flange region should also consider any effects of irradiation at the stressed regions. However, given that the vessel flange is over eight feet above the core and is shielded by the vessel

(continued)

BASES

BACKGROUND (continued)

internals, it will receive a much lower neutron fluence than that in the reactor vessel beltline. It is unlikely that there will be sufficient irradiation exposure to cause any significant effect on the flange region materials. Therefore, the minimum boltup temperature need only consider the highest RT_{NDT} of the flange region materials. The highest RT_{NDT} of the flange region materials was confirmed by the NSSS vendor to be 40°F (S023-901-C251 and C252). The current TLU value for RCS T_{COLD} is ±19°F (J-BBB-003). The LCO value of 65°F includes 6°F of margin in addition to the TLU value.

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.

(continued)

BASES

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 methodology for determining 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:

(continued)

BASES

LCO (continued)

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

c. The existences, sizes, and orientations of flaws in the vessel material.

APPLICABILITY

The RCS P/T limits Specification provides a definition of acceptable operation for prevention of nonductile failure in accordance with 10 CFR 50, Appendix G (Ref. 2). Although the P/T limits were developed to provide guidance for operation during heatup or cooldown (MODES 3, 4, and 5) or ISLH testing, their Applicability is at all times in keeping with the concern for nonductile failure. The limits do not apply to the pressurizer.

During MODES 1 and 2, other Technical Specifications provide limits for operation that can be more restrictive than or can supplement these P/T limits. LCO 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits"; LCO 3.4.2, "RCS Minimum Temperature for Criticality"; and Safety Limit 2.1, "Safety Limits," also provide operational restrictions for pressure and temperature and maximum pressure. Furthermore, MODES 1 and 2 are above the temperature range of concern for nonductile failure, and stress analyses have been performed for normal maneuvering profiles, such as power ascension or descent.

The actions of this LCO consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures.

(continued)

BASES

ACTIONS

A.1 and A.2

The actions of this LCO in MODE 1, 2, 3, or 4 consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures. Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

The 30 minute Completion Time reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in this time in a controlled manner.

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify the RCPB integrity remains acceptable for continued operation. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components.

ASME Code, Section XI, Appendix E (Ref. 6), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The 72 hour Completion Time is reasonable to accomplish the evaluation. The evaluation for a mild violation is possible within this time, but more severe violations may require special, event specific stress analyses or inspections. A favorable evaluation must be completed before continuing to operate.

Condition A is modified by a Note requiring Required Action A.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action A.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

If a Required Action and associated Completion Time of Condition A are not met, the plant must be placed in a lower MODE because:

a. The RCS remained in an unacceptable P/T region for an extended period of increased stress; or

b. A sufficiently severe event caused entry into an unacceptable region.

Either possibility indicates a need for more careful examination of the event, best accomplished with the RCS at reduced pressure and temperature. With reduced pressure and temperature conditions, the possibility of propagation of undetected flaws is decreased.

Pressure and temperature are reduced by placing the plant in MODE 3 within 6 hours and in MODE 5 with RCS pressure < 500 psia within 36 hours.

The Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

The actions of this LCO, anytime other than in MODE 1, 2, 3, or 4, consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures. Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

The Completion Time of "immediately" reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in a short period of time in a controlled manner.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify that the RCPB integrity remains acceptable and must be completed before continuing operation. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components.

ASME Code, Section XI, Appendix E (Ref. 6), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The Completion Time of "prior to entering MODE 4" forces the evaluation prior to entering a MODE where temperature and pressure can be significantly increased. The evaluation for a mild violation is possible within several days, but more severe violations may require special, event specific stress analyses or inspections.

Condition C is modified by a Note requiring Required Action C.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action C.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

SURVEILLANCE REQUIREMENTS

SR 3.4.3.1

Verification that operation is within the Pressure /Temperature limits is required every 30 minutes when RCS pressure and temperature conditions are undergoing planned changes. This Frequency is considered reasonable in view of the control room indication available to monitor RCS status. Also, since temperature rate of change limits are specified in hourly increments, 30 minutes permits assessment and correction for minor deviations within a reasonable time.

Surveillance for heatup, cooldown, or ISLH testing may be discontinued when the definition given in the relevant plant procedure for ending the activity is satisfied.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

This SR is modified by a Note that requires this SR be performed only during RCS system heatup, cooldown, and ISLH testing. No SR is given for criticality operations because LCO 3.4.2 contains a more restrictive requirement.

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 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.
2. 10 CFR 50, Appendix G.
3. ASME, Boiler and Pressure Vessel Code, Section III, 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.