Industry/TSTF Standard Technical Specification Change Traveler

Relocation of LTOP EnableTemperature and PORV Lift Setting to the PTLR

Classification: 1) Technical Change

Priority: 2)Medium

NUREGs Affected: ☐ 1430 ☐ 1431 ☑ 1432 ☐ 1433 ☐ 1434

Description:
NUREG 1432 references the specific LTOP enable temperature and PORV lift setting in the specifications. This change moves these values to the PTLR.

Justification:
Background

Topical Report CE NPSD-683 Revision 6, "Development of a RCS Pressure and Temperature Limits Report for Removal of P-T Limits and LTOP Requirements from the Technical Specifications," supports relocation of the LTOP enable temperature and PORV lift setting in the LTOP range to the PTLR. The PTLR is described in Generic Letter 96-03 and contains detailed information regarding pressure and temperature limits.

Need for Change

Currently 10 CFR 50, Appendix G imposes special fracture toughness requirements on the ferritic components of the RCPB. These fracture toughness requirements result in pressure restrictions which vary with RCS temperature. Determination of these restrictions requires that specific loading conditions be evaluated and the resulting P-T limits not be exceeded.

NRC Generic Letter 96-03, "Relocation Of The Pressure Temperature Limit Curves And Low Temperature Overpressure Protection System Limits," dated January 31, 1996, allows licensees to relocate the pressure temperature (P/T) limit curves from their plant technical specifications (TS) to a pressure temperature limits report (PTLR) or a similar document. The low temperature overpressure protection (LTOP) system limits were also allowed to be relocated to the same document The methodology used to determine the P/T and LTOP system limit parameters must comply with the specific requirements of Appendices G and H to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR), be documented in an NRC approved topical report or in a plant-specific submittal, and be incorporated by reference into the TS. Subsequent changes in the methodology must be approved by a license amendment; 10 CFR 50.59 does not apply.

Topical Report CE NPSD-683 Revision 6, "Development of a RCS Pressure and Temperature Limits Report for Removal of P-T Limits and LTOP Requirements from the Technical Specifications," provides the approved methodology which may be referenced in moving items to the PTLR.

NUREG-1432, Revision 1, is written assuming that the pressure / temperature limits are located in a PTLR. However, other changes are required to NUREG-1432 to support use of the Topical Report.

Proposed Change

The following changes are proposed to NUREG-1432:

1. Revise the PTLR definition to not state which Specifications contain limits specified in the PTLR. This information is located in Administrative Control 5.5.6, PTLR, and should not be repeated in Section 1.1.

2. Eliminate the value of the LTOP enable temperature and LTOP PORV lift setpoint and substitute a reference to the PTLR in LCO 3.4.6, LCO 3.4.7, LCO 3.4.10, Required Action 3.4.10.B.2, LCO 3.4.12, Applicability 3.4.12, and Surveillance 3.4.12.6.

3. Revise 5.6.6 to allow referencing of NRC approved Topical Reports without reference to version and approval date consistent with the wording approved for the Core Operating Limits Report in TSTF-363.

To maintain consistency between the ITS NUREGs, a separate generic change will be provided to make the changes the PTLR definition and to the PTLR Administrative Control (Changes 1 and 3, above).

Justification

Topical Report CE NPSD-683 Revision 6, "Development of a RCS Pressure and Temperature Limits Report for Removal of P-T Limits and LTOP Requirements from the Technical Specifications," provides a methodology for licensees to relocate the Pressure-Temperature (P-T) limit curves, low temperature overpressure protection (LTOP) setpoint values and curves currently contained in the Technical Specifications (TSs) to a licensee-controlled document. The approach is based upon the guidance contained in Nuclear Regulatory Commission (NRC) Generic Letter (GL) 96-03.

As part of the relocation, additional considerations were the Reactor Vessel (RV) surveillance program, including the capsule withdrawal schedule, and the calculation of Adjusted Reference Temperature (ART), including the determination of the neutron fluence and analysis of post-irradiation surveillance capsule measurements.

To support relocation of the detailed information for affected Limiting Conditions for Operation (LCOs), a licensee-controlled document described in NUREG-1432, Specification 5.6.6, Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR), must be developed by the licensee. This document must be consistent with the recommendations of GL 96-03 and contain the detailed information needed to support the pertinent LCOs, which would remain in the TS. Per GL 96-03, methodology descriptions for developing RCS P-T limits, establishing LTOP setpoints, calculating the ART, developing a RV Surveillance Program, and calculating neutron fluence to support the PTLR are provided in the Topical Report.

Determination of No Significant Hazards Considerations

A change to NUREG-1432 is proposed to relocate the LTOP enable temperature and LTOP PORV lift setting pressure to the PTLR.

In accordance with the criteria set forth in 10 CFR 50.92, the Industry has evaluated these proposed Improved Technical Specification changes and determined they do not represent a significant hazards consideration. The following is provided in support of this conclusion.

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

A change to NUREG-1432 is proposed to relocate the LTOP enable temperature and LTOP PORV lift setting pressure to the PTLR. The plant is still required to meet the limits provided in the PTLR. Therefore, there is no change to the initiators of any accident previously evaluated. Consequently, the probability of an accident previously evaluated is not significantly increased. The plant is still required to meet the limits provided in the PTLR. Therefore, there is no change in the ability of the plant to mitigate an accident previously evaluated. Therefore, the consequences of an accident previously evaluated are not significantly increased by this change. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

A change to NUREG-1432 is proposed to relocate the LTOP enable temperature and LTOP PORV lift setting pressure to the PTLR. The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

A change to NUREG-1432 is proposed to relocate the LTOP enable temperature and LTOP PORV lift setting pressure to the PTLR. Relocating these value to the PTLR eliminates NRC prior review and approval of changes to these values. Elimination of this NRC review of any future change to these limits does not result in a significant reduction in the margin of safety because only NRC approved methodologies are allowed to be used to determine the limits. Therefore, this change does not involve a significant reduction in a margin of safety.

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Revision History

OG Revision 0 Revision Status: Closed

Revision Proposed by: CEOG

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 17-Mar-99

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 30-Jun-99

OG Revision 0 Revision Status: Closed

TSTF Review Information

TSTF Received Date: 20-Jul-99 Date Distributed for Review

OG Review Completed: ☐ BWOG ☐ WOG ☐ CEOG ☐ BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Superceeded Date: 05-Dec-00

OG Revision 1 Revision Status: Active Next Action: NRC

Revision Proposed by: CEOG

Revision Description:
Revised to reflect Revision 6 of the Topical Report. Technical Specification changes included:

1. Relocating the PORV lift setting to the PTLR
2. Revising the PTLR Definition in Section 1.0 to eliminate the list of specifications affected by the PTLR. This information is located in Admin Control 5.6.6, PTLR.
3. Revise 5.6.6, PTLR, to provide the same directions for specifing the NRC approval documents as in the COLR. This change eliminates the need to specify the revision and date of NRC Topical Reports.

Owners Group Review Information

Date Originated by OG: 05-Dec-00

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 05-Dec-00

TSTF Review Information

TSTF Received Date: 12-Feb-01 Date Distributed for Review 06-Apr-01

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:

The TSTF noted that the specific change to the definition of PTLR is applicable to all five of the NUREGS. Also, the wording in the Section 5.0 is not consistent with TSTF-363 and is also generic. Revise the Section 5.0 wording to be consistent with TSTF-363 prior to submittal. A separate Traveler will be created adopting the generic portions of the Traveler for the other ITS NUREGs.
CEOG directed that a reference to the Topical Report be included in the Traveler.

TSTF Resolution: Approved Date: 02-May-01

NRC Review Information

NRC Received Date: 24-May-01

NRC Comments:

(No Comments)

Final Resolution: NRC Action Pending Final Resolution Date:

Incorporation Into the NUREGs

File to BBS/LAN Date: TSTF Informed Date: TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

1.0	Definitions - PTLR
LCO 3.4.6	RCS Loops - MODE 4
LCO 3.4.6 Bases	RCS Loops - MODE 4
LCO 3.4.7	RCS Loops - MODE 5, Loops Filled
LCO 3.4.7 Bases	RCS Loops - MODE 5, Loops Filled
LCO 3.4.10	Pressurizer Safety Valves
LCO 3.4.10 Bases	Pressurizer Safety Valves
Action 3.4.10.B	Pressurizer Safety Valves
Action 3.4.10.B Bases	Pressurizer Safety Valves
S/A 3.4.12 Bases	LTOP System
LCO 3.4.12	LTOP System
LCO 3.4.12 Bases	LTOP System
Appl. 3.4.12	LTOP System
Appl. 3.4.12 Bases	LTOP System
SR 3.4.12.6	LTOP System
SR 3.4.12.6 Bases	LTOP System
LCO 3.5.3 Bases	ECCS - Shutdown
5.6.6	Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)

INSERT 1

less than or equal to the LTOP enable temperature specified in the PTLR

INSERT 2

greater than the LTOP enable temperature specified in the PTLR

INSERT 3

[Identify the Topical Report(s) by number and title or identify the NRC Safety Evaluation for a plant specific methodology by NRC letter and date. The PTLR will contain the complete identification for each of the TS referenced Topical Reports used to prepare the PTLR (i.e., report number, title, revision, date, and any supplements)

1. CE NPSD-683-A, "Removal of RCS P-T Limits & LTOP Requirements]

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1.1 Definitions

PHYSICS TESTS (continued)

a. Described in Chapter [14, Initial Test Program] of the FSAR,

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 limits, including heatup and cooldown rates, for the current reactor vessel fluence period. These pressure and temperature limits shall be determined for each fluence period in accordance with Specification 5.6.6. ~~Plant operation within these operating limits is addressed in LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," and LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System."~~

RATED THERMAL POWER (RTP)

RTP shall be a total reactor core heat transfer rate to the reactor coolant of [3410] MWt.

REACTOR PROTECTION 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:

a. All full length CEAs (shutdown and regulating) are fully inserted except for the single CEA of highest reactivity worth, which is assumed to be fully withdrawn. However, with all CEAs verified fully inserted by two independent means, it is not necessary to account for a stuck CEA in the SDM calculation. With any CEAs not capable of being fully inserted, the reactivity worth of

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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 one loop or train shall be in operation.

- NOTES -

1. All reactor coolant pumps (RCPs) and SDC pumps may be not in operation for ≤ 1 hour per 8 hours 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.

Insert 1

2. No RCP shall be started with any RCS cold leg temperature ≤ [285]°F unless:

   a. Pressurizer water level is < [60]% or

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

APPLICABILITY:

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required loop inoperable.	A.1 Initiate action to restore a non-operating loop or train to OPERABLE status. AND	Immediately

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops - MODE 5, Loops Filled

LCO 3.4.7 One shutdown cooling (SDC) train shall be OPERABLE and in operation and either:

a. The non-operating SDC train shall be OPERABLE or

b. The secondary side water level of each steam generator (SG) shall be ≥ [25%].

- NOTES -

1. The SDC pump of the train in operation may be not in operation 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 ≥ 10°F below saturation temperature.

2. One SDC train may be inoperable for up to 2 hours for surveillance testing provided that the other SDC train is OPERABLE and in operation.

3. No reactor coolant pump (RCP) shall be started with any RCS cold leg temperature ≤ [285]°F unless:

   Insert 1

   a. The pressurizer water level is < [60]% or

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

4. Both SDC trains may be not in operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

APPLICABILITY: MODE 5 with RCS loops filled.

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Safety Valves

LCO 3.4.10 [Two] pressurizer safety valves shall be OPERABLE with lift settings ≥ [2475] psia and ≤ [2525] psia.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 with all RCS cold leg temperatures > ~~[285]~~ °F (Insert 2)

- NOTE -

The lift settings are not required to be within LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for [36] hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One pressurizer safety valve inoperable.	A.1	Restore valve to OPERABLE status.	15 minutes
B. Required Action and associated Completion Time not met. OR Two [or more] pressurizer safety valves inoperable.	B.1 AND B.2	Be in MODE 3. Be in MODE 4 with any RCS cold leg temperature ≤ ~~[285]~~ °F (Insert 1)	6 hours [24] hours

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.12 An LTOP System shall be OPERABLE with a maximum of one high pressure safety injection (HPSI) pump and one charging pump capable of injecting into the RCS and the safety injection tanks (SITs) isolated, and either:

- NOTES -

1. [Two charging pumps] may be made capable of injecting for ≤ 1 hour for pump swap operations.

2. SIT may be unisolated when SIT pressure is less than the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR.

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a. Two OPERABLE power operated relief valves (PORVs) with lift settings ≤ ~~[450] psig~~ Within the limits specified in the PTLR or

b. The RCS depressurized and an RCS vent of ≥ [1.3] square inches.

Insert 1

APPLICABILITY: MODE 4 when any RCS cold leg temperature is ≤ ~~[285]~~ °F,
MODE 5,
MODE 6 when the reactor vessel head is on.

ACTIONS

- NOTE -

SIT isolation 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 the PTLR.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Two or more HPSI pumps capable of injecting into the RCS.	A.1 Initiate action to verify a maximum of one HPSI pump capable of injecting into the RCS.	Immediately

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.12.5	Verify PORV block valve is open for each required PORV.	72 hours
SR 3.4.12.6	---------- **- NOTE -** Not required to be performed until [12] hours after decreasing RCS cold leg temperature to ≤ [285] °F. ---------- Insert 1	
	Perform CHANNEL FUNCTIONAL TEST on each required PORV, excluding actuation.	31 days
SR 3.4.12.7	Perform CHANNEL CALIBRATION on each required PORV actuation channel.	[18] months

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5.6 Reporting Requirements

5.6.5 Core Operating Limits Report (continued)

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

[Identify the Topical Report(s) by number and title or identify the staff Safety Evaluation Report for a plant specific methodology by NRC letter and date. The COLR will contain the complete identification for each of the TS referenced topical reports used to prepare the COLR (i.e., report number, title, revision, date, and any supplements).]

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 midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.6.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

a. RCS pressure and temperature limits for heat up, cooldown, low temperature operation, criticality, and hydrostatic testing as well as heatup and cooldown rates shall be established and documented in the PTLR for the following:

[The individual specifications that address RCS pressure and temperature limits must be referenced here.]

b. The analytical methods used to determine the RCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

Insert 3

[~~Identify~~ the NRC staff ~~approval~~ document ~~by date.~~]

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

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LCO (continued)

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.

Insert 1

Note 2 requires that either of the following two conditions be satisfied before an RCP may be started with any RCS cold leg temperature ≤ ~~285°F~~.

a. Pressurizer water level is < [60]% or

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

Satisfying either of the above conditions 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.

Similarly, for the SDC System, an OPERABLE SDC train is composed of the OPERABLE SDC pump(s) capable of providing forced flow to the SDC heat exchanger(s). RCPs and SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required.

APPLICABILITY

In MODE 4, this LCO applies because it is possible to remove core decay heat and to provide proper boron mixing with either the RCS loops and SGs or the SDC System.

Operation in other MODES is covered by:

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BASES

LCO (continued)

reactor coolant under these conditions. The second SDC train is normally maintained OPERABLE as a backup to the operating SDC train to provide redundant paths for decay heat removal. However, if the standby SDC train is not OPERABLE, a sufficient alternate method to provide redundant paths for decay heat removal is two SGs with their secondary side water levels ≥ [25%]. Should the operating SDC train fail, the SGs could be used to remove the decay heat via natural circulation.

Note 1 permits all SDC pumps to not be in operation ≤ 1 hour per 8 hour period. The circumstances for stopping both SDC trains are to be limited to situations where pressure and temperature increases can be maintained well within the allowable pressure (pressure and temperature and low temperature overpressure protection) and 10°F subcooling limits, or an alternate heat removal path through the SG(s) is in operation.

This LCO is modified by a Note that prohibits boron dilution with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained when SDC 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 would form and possibly cause a natural circulation flow obstruction. In this MODE, the SG(s) can be used as the backup for SDC heat removal. To ensure their availability, the RCS loop flow path is to be maintained with subcooled liquid.

In MODE 5, it is sometimes necessary to stop all RCP or SDC forced circulation. This is permitted to change operation from one SDC train to the other, perform surveillance or startup testing, perform the transition to and from the SDC, or to avoid operation below the RCP minimum net positive suction head limit. The time period is acceptable because natural circulation is acceptable for decay heat removal, the reactor coolant temperature can be maintained subcooled, and boron stratification affecting reactivity control is not expected.

Note 2 allows one SDC train to be inoperable for a period of up to 2 hours provided that the other SDC train is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable train during the only time when such testing is safe and possible.

Note 3 requires that either of the following two conditions be satisfied before an RCP may be started with any RCS cold leg temperature

Insert 1 → ≤ [285]°F:

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APPLICABLE SAFETY ANALYSES (continued)

feedwater, or main feedwater line break accident. The startup accident establishes the minimum safety valve capacity. The startup accident is assumed to occur at < 15% power. Single failure of a safety valve is neither assumed in the accident analysis nor required to be addressed by the ASME Code. Compliance with this specification is required to ensure that the accident analysis and design basis calculations remain valid.

The pressurizer safety valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The [two] pressurizer safety valves are set to open at the RCS design pressure (2500 psia) and within the ASME specified tolerance to avoid exceeding the maximum RCS design pressure SL, to maintain accident analysis assumptions, and to comply with ASME Code requirements. The upper and lower pressure tolerance limits are based on the ± 1% tolerance requirements (Ref. 1) for lifting pressures above 1000 psig. The limit protected by this specification is the reactor coolant pressure boundary (RCPB) SL of 110% of design pressure. Inoperability of one or both valves could result in exceeding the SL if a transient were to occur. The consequences of exceeding the ASME pressure limit could include damage to one or more RCS components, increased leakage, or additional stress analysis being required prior to resumption of reactor operation.

APPLICABILITY

In MODES 1, 2, and 3, and portions of MODE 4 above the LTOP temperature, OPERABILITY of [two] valves is required because the combined capacity is required to keep reactor coolant pressure below 110% of its design value during certain accidents. MODE 3 and portions of MODE 4 are conservatively included, although the listed accidents may not require both safety valves for protection.

Insert 1

The LCO is not applicable in MODE 4 when any RCS cold leg temperatures are ≤ ~~[285°F]~~ and MODE 5 because LTOP protection is provided. Overpressure protection is not required in MODE 6 with the reactor vessel head detensioned.

The Note allows entry into MODES 3 and 4 with the lift settings outside the LCO limits. This permits testing and examination of the safety valves at high pressure and temperature near their normal operating range, but only after the valves have had a preliminary cold setting. The cold setting gives assurance that the valves are OPERABLE near their design condition. Only one valve at a time will be removed from service for testing. The [36] hour exception is based on 18 hour outage time for

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BASES

APPLICABILITY (continued)

each of the two valves. The 18 hour period is derived from operating experience that hot testing can be performed within this timeframe.

ACTIONS

A.1

With one pressurizer safety valve inoperable, restoration must take place within 15 minutes. The Completion Time of 15 minutes reflects the importance of maintaining the RCS overpressure protection system. An inoperable safety valve coincident with an RCS overpressure event could challenge the integrity of the RCPB.

B.1 and B.2

Insert 1

If the Required Action cannot be met within the required Completion Time or if two or more pressurizer safety valves are inoperable, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 with any RCS cold leg temperature ≤ [285]°F within [24] hours. The 6 hours allowed is reasonable, based on operating experience, to reach MODE 3 from full power without challenging plant systems. Similarly, the [24] hours allowed is reasonable, based on operating experience, to reach MODE 4 without challenging plant systems. With any RCS cold leg temperature ≤ [285]°F, overpressure protection is provided by LTOP. The change from MODE 1, 2, or 3 to MODE 4 reduces the RCS energy (core power and pressure), lowers the potential for large pressurizer insurges, and thereby removes the need for overpressure protection by [two] pressurizer safety valves.

Insert 1

SURVEILLANCE REQUIREMENTS

SR 3.4.10.1

SRs are specified in the Inservice Testing Program. Pressurizer safety valves are to be tested in accordance with the requirements of Section XI of the ASME Code (Ref. 1), which provides the activities and the Frequency necessary to satisfy the SRs. No additional requirements are specified.

The pressurizer safety valve setpoint is ± [3]% for OPERABILITY; however, the valves are reset to ± 1% during the Surveillance to allow for drift.

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BASES

BACKGROUND (continued)

opening an RCS vent valve. The vent path(s) must be above the level of reactor coolant, so as not to drain the RCS when open.

APPLICABLE SAFETY ANALYSES

Insert 2

Safety analyses (Ref. 3) demonstrate that the reactor vessel is adequately protected against exceeding the Reference 1 P/T limits during shutdown. In MODES 1, 2, and 3, and in MODE 4 with any RCS cold leg temperature ~~exceeding [285] °F~~, the pressurizer safety valves prevent RCS pressure from exceeding the Reference 1 limits. At ~~about [285] °F~~ and below, overpressure prevention falls to the OPERABLE PORVs [or to a depressurized RCS and a sufficient sized RCS vent]. Each of these means has a limited overpressure relief capability.

the LTOP enable temperature specified in the PTLR

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 PORV 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

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

BASES

APPLICABLE SAFETY ANALYSES (continued)

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. Rendering all but one HPSI pump, and all but one charging pump incapable of injection and

b. Deactivating the SIT discharge isolation valves in their closed positions.

The Reference 3 analyses demonstrate that either one PORV or the RCS vent can maintain RCS pressure below limits when only one HPSI pump and one charging pump are actuated. Thus, the LCO allows only one HPSI pump and one charging pump OPERABLE during the LTOP MODES. Since neither the PORV nor the RCS vent can handle the pressure transient produced from accumulator injection, when RCS temperature is low, the LCO also requires the SITs isolation when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in the PTLR.

The isolated SITs must have their discharge valves closed and the valve power supply breakers fixed in their open positions. The analyses show the effect of SIT discharge is over a narrower RCS temperature range ([175]°F and below) than that of the LCO ([285]°F and below).

Insert 1

Fracture mechanics analyses established the temperature of LTOP Applicability at [285]°F and below. Above this temperature, the pressurizer safety valves provide the reactor vessel pressure protection. The vessel materials were assumed to have a neutron irradiation accumulation equal to 21 effective full power years of operation.

The consequences of a small break loss of coolant accident (LOCA) in LTOP MODE 4 conform to 10 CFR 50.46 and 10 CFR 50, Appendix K (Refs. 4 and 5), requirements by having a maximum of one HPSI pump and one charging pump OPERABLE and SI actuation enabled for these pumps.

PORV Performance

The fracture mechanics analyses show that the vessel is protected when the PORVs are set to open at or below the limits specified in the PTLR ≤ [450] psig. The setpoint is derived by modeling the performance of the LTOP System, assuming the limiting allowed LTOP transient of one HPSI pump and one charging

BASES

LCO (continued)

or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in the PTLR).

The LCO is modified by two Notes. Note 1 allows [two charging pumps] to be made capable of injecting for ≤ 1 hour during pump swap operations. One hour provides sufficient time to safely complete the actual transfer and to complete the administrative controls and surveillance requirements associated with the swap. The intent is to minimize the actual time that more than [one] makeup pump is physically capable of injection. Note 2 states that SIT isolation is 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 curves provided in the PTLR. This Note permits the SIT discharge valve surveillance performed only under these pressure and temperature conditions.

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

a. Two OPERABLE PORVs or

b. The depressurized RCS and an RCS vent.

within the limits specified in the PTLR

A PORV is OPERABLE for LTOP when its block valve is open, its lift setpoint is set ~~at [450] psig or less~~ and testing has proven its ability to open at that setpoint, and motive power is available to the two valves and their control circuits.

An RCS vent is OPERABLE when open with an area ≥ [1.3] square inches.

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

APPLICABILITY

Insert 1

This LCO is applicable in MODE 4 when the temperature of any RCS cold leg is ~~≤ [285] °F~~, 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 ~~[285] °F~~ the LTOP enable temperature and below. 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

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BASES

APPLICABILITY (continued)

the LTOP enable temperature specified in the PTLR

the pressurizer safety valves that provide overpressure protection during MODES 1, 2, and 3, and MODE 4 above [285]°F.

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 and B.1

With two or more 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.

C.1, D.1, and D.2

An unisolated SIT requires isolation within 1 hour. This is only required when the SIT pressure is greater than or equal to the maximum RCS pressure for the existing cold leg temperature allowed in the PTLR.

If isolation is needed and cannot be accomplished within 1 hour, Required Action D.1 and Required Action D.2 provide two options, either of which must be performed within 12 hours. By increasing the RCS temperature to > [175]°F, a SIT pressure of [600] psig cannot exceed the LTOP limits if the tanks are fully injected. Depressurizing the SIT below the LTOP limit stated in the PTLR also protects against such an event.

The Completion Times are based on operating experience that these activities can be accomplished in these time periods and on engineering evaluations indicating that an event requiring LTOP is not likely in the allowed times.

E.1

In MODE 4 when any RCS cold leg temperature is ≤ [285]°F, with one PORV inoperable, two PORVs must be restored to OPERABLE status within a Completion Time of 7 days. Two valves are required to meet the LCO requirement and to provide low temperature overpressure mitigation while withstanding a single failure of an active component.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

leakage or does not close (sticks open) after relieving an overpressure event.

The 72 hour Frequency considers operating experience with accidental movement of valves having remote control and position indication capabilities available where easily monitored. These considerations include the administrative controls over main control room access and equipment control.

SR 3.4.12.6

Performance of a CHANNEL FUNCTIONAL TEST is required every 31 days to verify and, as necessary, adjust the PORV open setpoints. The CHANNEL FUNCTIONAL TEST will verify on a monthly basis that the PORV lift setpoints are within the LCO limit. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. PORV actuation could depressurize the RCS and is not required. The 31 day Frequency considers experience with equipment reliability.

Insert 1

A Note has been added indicating this SR is required to be performed [12] hours after decreasing RCS cold leg temperature to ≤ [285] °F. The test cannot be performed until the RCS is in the LTOP MODES when the PORV lift setpoint can be reduced to the LTOP setting. The test must be performed within 12 hours after entering the LTOP MODES.

SR 3.4.12.7

Performance of a CHANNEL CALIBRATION on each required PORV actuation channel is required every [18] months to adjust the whole channel so that it responds and the valve opens within the required LTOP range and with accuracy to known input.

The [18] month Frequency considers operating experience with equipment reliability and matches the typical refueling outage schedule.

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BASES

LCO (continued)

With RCS pressure < 1700 psia, one HPSI pump is acceptable without single failure consideration, based on the stable reactivity condition of the reactor and the limited core cooling requirements. The low pressure safety injection (LPSI) pumps may therefore be released from the ECCS train for use in shutdown cooling (SDC). In MODE 4 with RCS cold leg temperature ≤ 285°F, a maximum of one HPSI pump is allowed to be OPERABLE in accordance with LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System."

Insert 1

APPLICABILITY

In MODES 1, 2, and 3 with RCS pressure ≥ 1700 psia, the OPERABILITY requirements for ECCS are covered by LCO 3.5.2.

In MODE 3 with RCS pressure < 1700 psia and in MODE 4, one OPERABLE ECCS train is acceptable without single failure consideration, based on the stable reactivity condition of the reactor and the limited core cooling requirements.

In MODES 5 and 6, unit conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level," and LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level."

ACTIONS

A.1

With no HPSI pump OPERABLE, the unit is not prepared to respond to a loss of coolant accident. The 1 hour Completion Time to restore at least one HPSI train to OPERABLE status ensures that prompt action is taken to restore the required cooling capacity or to initiate actions to place the unit in MODE 5, where an ECCS train is not required.

B.1

When the Required Action cannot be completed within the required Completion Time, a controlled shutdown should be initiated. Twenty-four hours is reasonable, based on operating experience, to reach MODE 5 in an orderly manner and without challenging plant systems.