Advanced Passive 1000 (AP1000)
Generic Technical Specification Traveler (GTST)

Title: Changes Related to LCO 3.4.3, RCS Pressure and Temperature (P/T) Limits

I. Technical Specifications Task Force (TSTF) Travelers, Approved Since Revision 2 of STS NUREG-1431, and Used to Develop this GTST

TSTF Number and Title:

TSTF-425-A, Rev 3, Relocate Surveillance Frequencies to Licensee Control – RITSTF Initiative 5b
TSTF-499-T, Rev 0, Revise TS 3.4.3 Bases to Exclude the Pressurizer Surge Line from the P/T Limits

STS NUREGs Affected:

TSTF-425-A, Rev 3: NUREGs 1430, 1431, 1432, 1433, and 1434
TSTF-499-T, Rev 0: NUREG 1431

NRC Approval Date:

TSTF-425-A, Rev. 3: 06-Jul-09
TSTF-499-T, Rev 0: 29-Nov-06 (Approved for Use)

TSTF Classification:

TSTF-425-A, Rev 3: Technical Change
TSTF-499-T, Rev 0: Bases Only Change

II. Reference Combined License (RCOL) Standard Departures (Std. Dep.), RCOL COL Items, and RCOL Plant-Specific Technical Specifications (PTS) Changes Used to Develop this GTST

RCOL Std. Dep. Number and Title:

There are no Vogtle departures applicable to Specification 3.4.3.

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to Specification 3.4.3.

RCOL PTS Change Number and Title:

VEGP LAR DOC A040:	Modify SR 3.4.3.1 Note by inserting “RCS” before the word “inservice.”
VEGP LAR DOC M05:	Modify TS 3.4.3 Required Action B.2.

III. Comments on Relations Among TSTFs, RCOL Std. Dep., RCOL COL Items, and RCOL PTS Changes

This section discusses the considered changes that are: (1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

DOC M06 was initially applied to this GTS. The VEGP TSU LAR was modified in response to NRC staff RAIs in Reference 8 and the Southern Nuclear Operating Company RAI Response in Reference 9. DOC M06 was subsequently withdrawn.

TSTF-425-A deferred for future consideration.

IV. Additional Changes Proposed as Part of this GTST (modifications proposed by NRC staff and/or clear editorial changes or deviations identified by preparer of GTST)

Editorial Correction:
In the last sentence of the third paragraph in the bases "Actions" B.1 and B.2 section; changed the phrase "…operate pressure and temperature conditions." to "…operating pressure and temperature conditions."

Other minor corrections were made to correct grammatical errors in the bases.

NRC Staff recommends revising the fourth paragraph, last sentence of the "Background" section of the Bases to correct grammar as follows; ". . . The limits do not apply to the pressurizer and the pressurizer surge line, which have different design characteristics and operating functions."

NRC Staff recommends revising the first paragraph, last sentence of the STS 3.4.3 "Applicability" section of Bases to correct grammar; "The limits do not apply to the pressurizer and the pressurizer surge line."

APOG Recommended Changes to Improve the Bases

Revise the tenth paragraph of the STS 3.4.3 "Background" section of the Bases to provide improved clarity, consistency, and operator usability to state; "The criticality limit curve includes the requirement **to** be ≥ 40°F above the heatup curve or the cooldown curve, and not less than the minimum permissible temperature for RCS ISLH testing per Reference 1."

Revise element "a" of the STS 3.4.3 "LCO" section of the Bases to eliminate "and criticality." This provides consistency with the "Background" next-to-last paragraph and the SR 3.4.3.1 Bases discussion (and NUREG-1431). This Specification does not provide the criticality temperature limits.

Delete the first paragraph of the STS 3.4.3 "Actions" section of Bases. The paragraph is inconsistent with NUREG-1431 and standard TS Bases content. EOP actions are not appropriate to be referenced from TS Bases.

Delete the last sentence of the first paragraph in the "Actions" section of the Bases under the heading "A.1 and A.2." This sentence is not standard content in NUREG-1431 or other standard TS, and gives no guidance concerning "proper direction" of restoration and is not helpful to the operator.

V. Applicability

Affected Generic Technical Specifications and Bases:

Section 3.4.3, RCS Pressure and Temperature (P/T) Limits

Changes to the Generic Technical Specifications and Bases:

Required Action B.2 is revised from "Be in MODE 4 with RCS pressure < 500 psig," to "Be in MODE 5." The associated Completion Time for Required Action B.2 is also revised from 24 hours to 36 hours. This provides clarity for transition between Action B and Action C. (DOC M05)

The Note that modifies SR 3.4.3.1 is revised by inserting "RCS" before the word "inservice." This is consistent with NUREG-1431. (DOC A040)

The Bases are modified to reflect the above changes. (DOC A040, and M05)

Bases 3.4.3 "Background," "LCO," and "Applicability" sections are updated to note that the pressurizer surge line is excluded from the PTLR P/T limits required by Specification 3.4.3. The pressurizer is already excluded from the PTLR P/T limits. This correction clears up any possible ambiguity related to the pressurizer surge line. (TSTF-499-T)

The tenth paragraph of the STS 3.4.3 "Background" section of the Bases is revised to improve clarity, consistency, and operator usability. (APOG Comment)

The last sentence of the fourth paragraph in the "Background" section of the Bases is revised to improve clarity, consistency, and operator usability. (NRC Staff Comment)

Element "a" of the STS 3.4.3 "LCO" section of the Bases is revised to eliminate "and criticality." (APOG Comment)

The last sentence of the first paragraph in the STS 3.4.3 "Applicability" section of the Bases is revised to improve clarity, consistency, and operator usability. (NRC Staff Comment)

The first paragraph of the STS 3.4.3 "Actions" section of the Bases is deleted. (APOG Comment)

The last sentence of the first paragraph in the "Actions" section of the Bases under the heading "A.1 and A.2" (i.e. "Restoration is in the proper direction to reduce RCPB stress") is deleted. (APOG Comment)

Bases 3.4.3 Actions B.1 and B.2 text is revised. (Editorial Change)

Other minor grammatical corrections are made to Action B and Action C Bases text.

VI. Traveler Information

Description of TSTF changes:

The GTS Bases 3.4.3 “Background,” “LCO,” and “Applicability” sections contain statements that the Reactor Coolant System (RCS) P/T limits in the Specification do not apply to the pressurizer. The proposed change adds the pressurizer surge line to each of these exclusionary statements.

Rationale for TSTF changes:

Plants that have adopted the STS for Westinghouse Owners Group (WOG) Plants, NUREG-1431, which is the basis for the AP1000 GTS, relocated the pressurizer temperature limits to a licensee controlled document such as a Technical Requirements Manual (TRM). Those limits were originally found in Specification 3.4.9.2 in plant Technical Specifications based on NUREG-0452. Absent an exclusionary statement in both the Bases for WOG STS 3.4.3 for the RCS P/T limits and in the plant TRM (or equivalent) for the pressurizer temperature limits, a question can be raised as to whether either document applies to the pressurizer surge line. To eliminate confusion, both documents should be revised to state that the RCS P/T limits do not apply to the pressurizer surge line. The AP1000 GTS 3.4.3 has the same point of confusion as the WOG STS.

Description of changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:

DOC M05 revises Required Action B.2 from “Be in MODE 4 with RCS pressure < 500 psig,” to “Be in MODE 5.” The associated Completion Time is revised to allow for the additional Mode change.

DOC A040 revises the Note that modifies SR 3.4.3.1 by inserting “RCS” before the word “inservice.”

A more detailed description of each DOC can be found in Reference 2, VEGP TSU LAR Enclosure 1, and the NRC staff safety evaluation can be found in Reference 3, VEGP LAR SER. The VEGP TSU LAR was modified in response to NRC staff RAIs in Reference 5 and the Southern Nuclear Operating Company RAI Response in Reference 6.

Rationale for changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:

As written, the GTS Required Action B.2 allows the unit to remain in MODE 4 with RCS pressure < 500 psig. Condition C states that “Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4,” and is modified by a Note, which states that “Required Action C.2 shall be completed whenever this Condition is entered.” Modification per DOC M05 provides clarity for transition between Action B and Action C.

Inserting “RCS” before the word “inservice” per DOC A040 is consistent with NUREG-1431.

Description of additional changes proposed by NRC staff/preparer of GTST:

In the last sentence of the third paragraph in the bases Actions B.1 and B.2 section; change the phrase "…operate pressure and temperature conditions." to "…operating pressure and temperature conditions." Also, in the bases for Actions, the phrase "a Note requiring Required Action A.2 be completed whenever the Condition is entered" is changed to "a Note requiring that Required Action A.2 be completed whenever the Condition is entered."

Revise the tenth paragraph of the STS 3.4.3 "Background" section of the Bases to state; "The criticality limit curve includes the requirement **to** be ≥ 40°F above the heatup curve or the cooldown curve, and not less than the minimum permissible temperature for RCS ISLH testing per Reference 1." (APOG Comment)

In addition, revise the fourth paragraph, last sentence of the "Background" section of the Bases as follows; ". . . The limits do not apply to the pressurizer and the pressurizer surge line, which have different design characteristics and operating functions." (NRC Staff Comment)

Revise element "a" of the STS 3.4.3 "LCO" section of the Bases to eliminate "and criticality." (APOG Comment)

Delete the first paragraph of the STS 3.4.3 "Actions" section of Bases. (APOG Comment)

In addition, revise the first paragraph, last sentence of the STS 3.4.3 "Applicability" section of Bases to state; "The limits do not apply to the pressurizer and the pressurizer surge line." (NRC Staff Comment)

Delete the last sentence of the first paragraph in the "Actions" section of the Bases under the heading "A.1 and A.2." (APOG Comment)

Rationale for additional changes proposed by NRC staff/preparer of GTST:

These changes are to correct editorial and grammatical errors in the bases.

The non-technical editorial revision to the tenth paragraph of the STS 3.4.3 "Background" section of the Bases provides improved clarity, consistency, and operator usability.

The non-technical editorial revision to the fourth paragraph, last sentence of the "Background" section of the Bases corrects grammar.

The revision of element "a" of the STS 3.4.3 "LCO" section of the Bases provides consistency with the next-to-last paragraph of the "Background" section of the Bases and the SR 3.4.3.1 Bases discussion (and NUREG-1431). This Specification does not provide the criticality temperature limits.

The deletion of the first paragraph of the STS 3.4.3 "Actions" section of Bases is necessary because it is inconsistent with NUREG-1431 and standard TS Bases content. EOP actions are not appropriate to be referenced from TS Bases.

The non-technical editorial revision to the first paragraph, last sentence of the STS 3.4.3 "Applicability" section of Bases corrects grammar.

The last sentence of the first paragraph in the “Actions” section of the Bases under the heading “A.1 and A.2” is not standard content in NUREG-1431 or other standard TS, and gives no guidance concerning “proper direction” of restoration and is not helpful to the operator.

VII. GTST Safety Evaluation

Technical Analysis:

DOC M05 revises Required Action B.2 from “Be in MODE 4 with RCS pressure < 500 psig,” to ‘Be in MODE 5.” As written, the GTS Required Action B.2 allows the unit to remain in MODE 4 with RCS pressure < 500 psig. Condition C has no Required Actions if LCO is not met in MODES 1, 2, 3, or, 4. Because Condition B is applicable in MODE 4, it should require the unit to exit MODE 4. The change ensures a proper progression between Condition B and Condition C, which is applicable if the requirements of the LCO are not met any time in other than MODE 1, 2, 3, or 4. In addition to changing the Required Action B.2 end state, this change revises the associated Completion Time to be consistent with NUREG-1431 and with other Completion Times in the GTS that are associated with placing the unit in Mode 5. This change in Completion Time is necessary to ensure a safe and orderly shutdown to Mode 5.

The GTS Bases 3.4.3 “Background,” “LCO,” and “Applicability” sections contain statements that the Reactor Coolant System (RCS) P/T limits in the Specification do not apply to the pressurizer. TSTF-499-T adds the pressurizer surge line to each of these exclusionary statements. RCS heatup and cooldown transient rate limits and pressurizer heatup and cooldown rates are contained in plant procedures written to comply with WOG STS 3.4.3 or a plant's technical requirements manual (TRM)-equivalent for the pressurizer. This ensures that operation is within the conditions analyzed for nonductile fracture in carbon steel vessels, such as the reactor vessel.

AP1000 DCD, Revision 19, Section 5.4.5.1 notes that “the pressurizer surge nozzle and surge line are designed to withstand the thermal stresses resulting from volume surges occurring during operation. The evaluation of design transients for the pressurizer addresses the potential for thermal stratification at the surge nozzle.” As listed in AP1000 DCD, Revision 19, Section 5.2, Table 5.2-1, the pressurizer connecting pipe components are constructed of stainless steel. This is consistent with the parameters discussed in WCAP-14717-P, Revision 1, Supplement 1, where it is noted that the pressurizer surge line, which is made of stainless steel, is not subject to non-ductile fracture as carbon steel vessels are. The requirements of Section III, Appendix G of the ASME Code only apply to ferritic components.

The heatup and cooldown rates are reflected in the transients included in the original stress and fatigue evaluations of the pressurizer surge line. These original stress and fatigue evaluations for the pressurizer surge line were revised for the current fleet of Westinghouse reactors in response to NRC Bulletin 88-11. The pressurizer surge line evaluation described in WCAP-12893 addresses the impact of pressurizer surge line stratification in the stress and fatigue analyses of transients for normal and upset conditions for two such plants; Callaway and Wolf Creek. These transient characteristics envelope those observed in plant monitoring data. As such, the pressurizer surge line stratification transient rates are much more severe than the plant heatup and cooldown transients previously defined in the piping design specification. Since the AP1000 pressurizer surge line has been analyzed for the more detailed and severe transients per AP1000 DCD, Revision 19, Section 5.4.5.1, the AP1000 RCS heatup and cooldown rate limits are demonstrated to not be applicable to the pressurizer surge line. Therefore, the heatup and cooldown rate limits of AP1000 GTS 3.4.3 or from the TRM (or equivalent) on the pressurizer are not applicable to the pressurizer surge line in AP1000 plants and the change specified by TSTF-499-T, Revision 0 is applicable to AP1000 GTS 3.4.3.

The revision of element “a” of the STS 3.4.3 “LCO” section of the Bases provides consistency with the next-to-last paragraph of the “Background” section of the Bases and the SR 3.4.3.1

Bases discussion (and NUREG-1431). This Specification does not provide the criticality temperature limits. Based on the preceding evaluation, the proposed change to the “LCO” section of the GTS 3.4.3 Bases is acceptable.

The deletion of the first paragraph of the STS 3.4.3 “Actions” section of Bases is necessary because it is inconsistent with NUREG-1431 and standard TS Bases content. EOP actions are not appropriate to be referenced from TS Bases. Based on the preceding evaluation, the proposed change to the “Actions” section of the GTS 3.4.3 Bases is acceptable.

The deletion of the last sentence of the first paragraph in the “Actions” section of the Bases under the heading “A.1 and A.2” is necessary because (1) it is not standard content in NUREG-1431 or other standard TS, (2) the sentence gives no guidance concerning “proper direction” of restoration, and (3) is not helpful to the operator. Based on the preceding evaluation, the proposed change to the “Actions” section of the GTS 3.4.3 Bases is acceptable.

The remaining changes are editorial, clarifying, grammatical, or otherwise considered administrative. These changes do not affect the technical content, but improve the readability, implementation, and understanding of the requirements, and are therefore acceptable.

Having found that this GTST’s proposed changes to the GTS and Bases are acceptable, the NRC staff concludes that AP1000 STS Subsection 3.4.3 is an acceptable model Specification for the AP1000 standard reactor design.

References to Previous NRC Safety Evaluation Reports (SERs):

None

VIII. Review Information

Evaluator Comments:

The Technical Analysis (GTST Section VII) is revised to include positive statements of acceptability for each discussion point.

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Review Information:

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on 5/16/2014.

APOG Comments (Ref. 10) and Resolutions:

1. (Internal # 6) The GTST sections often repeat VEGP LAR DOCs, which reference "existing" and "current" requirements. The inclusion in the GTST of references to "existing" and "current," are not always valid in the context of the GTS. Each occurrence of "existing" and "current" should be revised to be clear and specific to GTS, MTS, or VEGP COL TS (or other), as appropriate. Noted ambiguities are corrected in the GTST body.

2. (Internal # 7) Section VII, GTST Safety Evaluation, inconsistently completes the subsection "References to Previous NRC Safety Evaluation Reports (SERs)" by citing the associated SE for VEGP 3&4 COL Amendment 13. It is not clear whether there is a substantive intended difference when omitting the SE citation. This is resolved by removing the SE citation in Section VII of the GTST and ensuring that appropriate references to the consistent citation of this reference in Section X of the GTST are made.

3. (Internal #13) Many GTSTs evaluated TSTF-425 with the following note: Risk-informed TS changes will be considered at a later time for application to the AP1000 STS.

   The NRC approval of TSTF-425, and model safety evaluation provided in the CLIIP for TSTF-425, are generically applicable to any design's Technical Specifications. As such, the replacement of certain Frequencies with a Surveillance Frequency Control Program should be included in the GTST for AP1000 STS NUREG.

   However, implementation in the AP1000 STS should not reflect optional (i.e., bracketed) material showing retention of fixed Surveillance Frequencies where relocation to a Surveillance Frequency Control Program is acceptable. Since each represented AP1000 Utility is committed to maintaining standardization, there is no rationale for an AP1000 STS that includes bracketed options.

   Consistent with TSTF-425 criteria, replace applicable Surveillance Frequencies with "In accordance with the Surveillance Frequency control Program" and add that Program as new AP1000 STS Specification 5.5.15.

NRC Staff disagreed with implementing TSTF-425 in the initial version of the STS. Although the APOG thinks the analysis supporting this traveler is general enough to be applicable to AP1000, staff thinks an AP1000-specific proposal from APOG is needed to identify any GTS SRs that should be excluded. Also, with the adoption of a Surveillance Frequency Control Program (SFCP) in the AP1000 STS, bracketed Frequencies, which provide a choice between the GTS Frequency and the SFCP Frequency, are needed because the NRC will use the AP1000 STS as a reference, and to be consistent with NUREG-1431, Rev. 4. APOG was requested to consider proposing an AP1000 version of TSTF-425 for a subsequent revision of the STS.

4. (Internal # 230) APOG recommends adding a new second sentence to the first paragraph in GTST Section V that identifies the changes made as a result of DOC M05. The new second sentence provides discussion of the change to the Completion Time of Required Action B.2 by stating "The Completion Time for Required Action B.2 is also revised from 24 hours to 36 hours." This is resolved by making the recommended change with additional editorial adjustments to the (new) second and third sentences as follows:

   The associated Completion Time for Required Action B.2 is also revised from 24 hours to 36 hours. This provides clarity for transition between ~~Required~~ Action B and ~~required~~ Action C. (DOC M05)

5. (Internal # 231) APOG recommends additional discussion in GTST Section VII, Technical Analysis, that identifies the changes made as a result of DOC M05. The additional discussion addresses the change to the Completion Time of Required Action B.2 by stating "In addition to the change to the Required Action B.2 end state, this change revises the Completion Time to be consistent with NUREG-1431 and with other Completion Times in the GTS that are associated with placing the unit in Mode 5. This change in Completion Time is necessary to ensure a safe and orderly shutdown to Mode 5." This is resolved by making the recommended change with additional NRC Staff editorial adjustments to the discussion in the Technical Analysis:

   In addition to ~~the~~ ~~change to~~ changing the Required Action B.2 end state, this change revises the associated Completion Time to be consistent with NUREG-1431 and with other Completion Times in the GTS that are associated with placing the unit in Mode 5. This change in Completion Time is necessary to ensure a safe and orderly shutdown to Mode 5.

   In addition, "**no**" is added the third sentence of the Technical Analysis paragraph on this topic to correct a logic error in the statement.

   Additionally, the Description of changes in RCOL Std. Dep., RCOL COL Items, and RCOL PTS changes in Section VI was revised to include a second sentence in the first paragraph that acknowledges this DOC M05 change. The sentence states: "The associated Completion Time is revised to allow for the additional Mode change."

6. (Internal # 232 and 233) APOG recommends revising the tenth paragraph of the STS 3.4.3 "Background" section of the Bases to provide improved clarity, consistency, and operator usability. This is resolved by making the recommended changes:

   The criticality limit curve includes the ~~Reference 1~~ requirement ~~that it~~**to** be ≥ 40°F above the heatup curve or the cooldown curve, and not less than the minimum permissible temperature for **RCS** ISLH ~~Testing~~ **testing per Reference 1**.

In addition, NRC Staff recommends revising the fourth paragraph, last sentence to correct grammar:

> **. . .** The limits do not apply to the pressurizer ~~**or to**~~ **and the pressurizer surge line**, which ~~has~~**have** different design characteristics and operating functions.

7. (Internal # 234) APOG recommends revising element "a" of the STS 3.4.3 "LCO" section of the Bases to eliminate "and criticality." This provides consistency with the "Background" next-to-last paragraph and the SR 3.4.3.1 Bases discussion (and NUREG-1431). This Specification does not provide the criticality temperature limits. This is resolved by making the recommended change.

8. (Internal # 235) APOG recommends deleting the first paragraph of the STS 3.4.3 "Actions" section of Bases. The paragraph is inconsistent with NUREG-1431 and standard TS Bases content. EOP actions are not appropriate to be referenced from TS Bases. This is resolved by making the recommended change.

   In addition, NRC Staff recommends revising the first paragraph, last sentence of the STS 3.4.3 "Applicability" section of Bases. to correct grammar:

   > The limits do not apply to the pressurizer ~~**or**~~ **and the pressurizer surge line**.

9. (Internal #236) APOG recommends deleting the last sentence of the first paragraph in the "Actions" section of the Bases under the heading "A.1 and A.2" (i.e. "Restoration is in the proper direction to reduce RCPB stress"). This sentence is not standard content in NUREG-1431 or other standard TS, and gives no guidance concerning "proper direction" of restoration and is not helpful to the operator. This is resolved by making the recommended change.

10. (Internal # 535) In Actions tables, Notes in the Condition column do not always span the available space. See LCO 3.4.3 Condition A Note. Identify all instances of this kind of format (data entry) error and correct them. This is resolved by making corrections to Condition A and Condition C Notes.

NRC Final Approval Date: 12/7/2015

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IX. Evaluator Comments for Consideration in Finalizing Technical Specifications and Bases

None

X. References Used in GTST

1. AP1000 DCD, Revision 19, Section 16, “Technical Specifications,” June 2011 (ML11171A500).

2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Technical Specifications Upgrade License Amendment Request, February 24, 2011 (ML12065A057).

3. NRC Safety Evaluation (SE) for Amendment No. 13 to Combined License (COL) No. NPF-91 for Vogtle Electric Generating Plant (VEGP) Unit 3, and Amendment No. 13 to COL No. NPF-92 for VEGP Unit 4, September 9, 2013, ADAMS Package Accession No. ML13238A337, which contains:

ML13238A355	Cover Letter - Issuance of License Amendment No. 13 for Vogtle Units 3 and 4 (LAR 12-002).
ML13238A359	Enclosure 1 - Amendment No. 13 to COL No. NPF-91
ML13239A256	Enclosure 2 - Amendment No. 13 to COL No. NPF-92
ML13239A284	Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13)
ML13239A287	Enclosure 4 - Safety Evaluation (SE), and Attachment 1 - Acronyms
ML13239A288	SE Attachment 2 - Table A - Administrative Changes
ML13239A319	SE Attachment 3 - Table M - More Restrictive Changes
ML13239A333	SE Attachment 4 - Table R - Relocated Specifications
ML13239A331	SE Attachment 5 - Table D - Detail Removed Changes
ML13239A316	SE Attachment 6 - Table L - Less Restrictive Changes

   The following documents were subsequently issued to correct an administrative error in Enclosure 3:

ML13277A616	Letter - Correction To The Attachment (Replacement Pages) - Vogtle Electric Generating Plant Units 3 and 4-Issuance of Amendment Re: Technical Specifications Upgrade (LAR 12-002) (TAC No. RP9402)
ML13277A637	Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13) (corrected)

4. WCAP-14717 Revision 1, Supplement 1, “Westinghouse Owners Group Evaluation of the Effects of Insurge/Outsurge Out-of-Limit Transients on the Integrity of the Pressurizer,” November 1999.

5. NRC Bulletin 88-11, “Pressurizer Surge Line Thermal Stratification,” dated December 20, 1988.

6. WCAP-12893, “Structural Evaluation of the Wolf Creek and Callaway Pressurizer Surge Lines, Considering the Effects of Thermal Stratification,” March 1991 (and Supplement 1, December 1995).

7. TSTF-GG-05-01, “Writer's Guide for Plant-Specific Improved Technical Specifications,” June 2005.

8. RAI Letter No. 01 Related to License Amendment Request (LAR) 12-002 for the Vogtle Electric Generating Plant Units 3 and 4 Combined Licenses, September 7, 2012 (ML12251A355).

9. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Response to Request for Additional Information Letter No. 01 Related to License Amendment Request LAR-12-002, ND-12-2015, October 04, 2012 (ML12286A363 and ML12286A360)

10. APOG-2014-008, APOG (AP1000 Utilities) Comments on AP1000 Standardized Technical Specifications (STS) Generic Technical Specification Travelers (GTSTs), Docket ID NRC-2014-0147, September 22, 2014 (ML14265A493).

XI. MARKUP of the Applicable GTS Subsection for Preparation of the STS NUREG

The entire section of the Specifications and the Bases associated with this GTST is presented next.

Changes to the Specifications and Bases are denoted as follows: Deleted portions are marked in strikethrough red font, and inserted portions in bold blue font.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameters to within limits. AND A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE **5**~~4 with RCS pressure < 500 psig~~.	6 hours **36**~~24~~ hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ----------NOTE---------- Required Action C.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1 Initiate action to restore parameter(s) to within limit. AND C.2 Determine RCS is acceptable for continued operation.	Immediately Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	----------NOTE---------- Only required to be performed during RCS heatup and cooldown operations and **RCS** inservice leak and hydrostatic testing. ---------- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates are within limits specified in the PTLR.	30 minutes

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.

The PTLR contains P/T limit curves for heatup, cooldown, **RCS** inservice leak and hydrostatic (ISLH) testing, and data for the maximum rate of change of reactor coolant temperature.

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 **and the pressurizer surge line**, which ~~has~~**have** different design characteristics and operating functions.

10 CFR 50, Appendix G (Ref. 1) requires the establishment of P/T limits for specific material fracture toughness requirements of the RCPB materials. An adequate margin to brittle failure must be provided during normal operation, anticipated operational occurrences, and system hydrostatic tests. Reference 1 mandates the use of the ASME Code, Section III, Appendix G (Ref. 2).

The neutron embrittlement effect on the material toughness is reflected by increasing the nil ductility reference temperature (RT_{NDT}) as exposure to neutron fluence increases.

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 E 185 (Ref. 3) and Appendix H of 10 CFR 50 (Ref. 4). The operating P/T limit curves will be

BASES

BACKGROUND (continued)

adjusted, as necessary, based on the evaluation findings and the recommendations of Regulatory Guide 1.99 (Ref. 5).

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 P/T span of the 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 curve includes the ~~Reference 1~~ requirement **to** ~~that it~~ be ≥ 40°F above the heatup curve or the cooldown curve, and not less than the minimum permissible temperature for **RCS** ISLH **testing per Reference 1** ~~Testing~~. However, the criticality curve 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. ASME Code, Section XI, Appendix E (Ref. 6) provides a recommended methodology for evaluating an operating event that causes an excursion outside the limits.

APPLICABLE SAFETY ANALYSES

The P/T limits are not derived from Design Basis Accident (DBA) analyses. They are prescribed during normal operation to avoid encountering pressure, temperature, and temperature rate of change conditions that might cause undetected flaws to propagate and cause nonductile failure of the RCPB, an unanalyzed condition. Reference 7 establishes the methodology for determining the P/T limits. Although the P/T limits are not derived from any DBA, the P/T limits are acceptance limits since they preclude operation in an unanalyzed condition.

BASES

APPLICABLE SAFETY ANALYSES (continued)

RCS P/T limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The two elements of this LCO are:

a. The limit curves for heatup, cooldown, **and RCS** ISLH testing ~~and criticality~~; and

b. Limits on the rate of change of temperature**.**

The element a ~~The LCO~~ limits**, above,** apply to all components of the RCS, except the pressurizer **and the pressurizer surge line**. These limits define allowable operating regions and permit a large number of operating cycles while providing a wide margin to nonductile failure.

The **element b** limits**, above,** 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 **RCS** 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 follow:

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 LCO provides a definition of acceptable operation for prevention of nonductile (brittle) failure in accordance with 10 CFR 50, Appendix G (Ref. 1). Although the P/T limits were developed to provide guidance for operation during heatup or cooldown (MODES 3, 4, and 5) or **RCS** ISLH testing, they are applicable at all times in keeping with the

BASES

APPLICABILITY (continued)

concern for nonductile failure. The limits do not apply to the pressurizer **and the pressurizer surge line**.

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.

ACTIONS

~~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.~~

A.1 and A.2

Operation outside the P/T limits must be restored to within the limits. The RCPB must be returned to a condition that has been verified by stress analyses. ~~Restoration is in the proper direction to reduce RCPB stress.~~

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 within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify 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.

BASES

ACTIONS (continued)

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 **that** Required Action A.2 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 per Required Action A.1 alone is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

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 either the RCS remained in an unacceptable P/T region for an extended period of increased stress, or 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. In reduced pressure and temperature conditions, the possibility of propagation with undetected flaws is decreased.

If the required restoration activity cannot be accomplished in 30 minutes, Required Action B.1 and Required Action B.2 must be implemented to reduce pressure and temperature.

If the required evaluation for continued operation cannot be accomplished within 72 hours or the results are indeterminate or unfavorable, action must proceed to reduce pressure and temperature as specified in Required Action B.1 and Required Action B.2. A favorable evaluation must be completed and documented before returning to ~~operate~~**operating** pressure and temperature conditions.

Pressure and temperature are reduced by bringing the plant to MODE 3 within 6 hours and to MODE ~~4~~**5** within ~~24~~**36** hours~~, with RCS pressure < 500 psig~~.

BASES

ACTIONS (continued)

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

C.1 and C.2

Actions must be initiated immediately to correct operation outside of the P/T limits at times other than when in MODE 1, 2, 3, or 4, so that the RCPB is returned to a condition that has been verified by stress analysis.

The immediate Completion Time reflects the urgency of initiating action to restore 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 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 prior to entry into MODE 4. Several methods may be used, including comparison with pre-analyzed transients in the stress 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.

Condition C is modified by a Note requiring **that** 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 PTLR limits is required every 30 minutes when RCS P/T 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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

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

REFERENCES

1. 10 CFR 50, Appendix G, "Fracture Toughness Requirements."
2. ASME Boiler and Pressure Vessel Code, Section III, Appendix G, "Protection Against Non-Ductile Failure."
3. ASTM E 185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," July 1982.
4. 10 CFR 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements."
5. Regulatory Guide 1.99, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.
6. ASME Boiler and Pressure Vessel Code, Section XI, Appendix E, "Evaluation of Unanticipated Operating Events."
7. WCAP-14040-A, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves," January 1996.

XII. Applicable STS Subsection After Incorporation of this GTST's Modifications

The entire subsection of the Specifications and the Bases associated with this GTST, following incorporation of the modifications, is presented next.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameters to within limits. AND A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ----------NOTE---------- Required Action C.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1 Initiate action to restore parameter(s) to within limit. AND C.2 Determine RCS is acceptable for continued operation.	Immediately Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	----------NOTE---------- Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. ---------- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates are within limits specified in the PTLR.	30 minutes

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.

The PTLR contains P/T limit curves for heatup, cooldown, RCS inservice leak and hydrostatic (ISLH) testing, and data for the maximum rate of change of reactor coolant temperature.

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 and the pressurizer surge line, which have different design characteristics and operating functions.

10 CFR 50, Appendix G (Ref. 1) requires the establishment of P/T limits for specific material fracture toughness requirements of the RCPB materials. An adequate margin to brittle failure must be provided during normal operation, anticipated operational occurrences, and system hydrostatic tests. Reference 1 mandates the use of the ASME Code, Section III, Appendix G (Ref. 2).

The neutron embrittlement effect on the material toughness is reflected by increasing the nil ductility reference temperature (RT_{NDT}) as exposure to neutron fluence increases.

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 E 185 (Ref. 3) and Appendix H of 10 CFR 50 (Ref. 4). The operating P/T limit curves will be

BASES

BACKGROUND (continued)

adjusted, as necessary, based on the evaluation findings and the recommendations of Regulatory Guide 1.99 (Ref. 5).

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 P/T span of the 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 curve includes the requirement to be ≥ 40°F above the heatup curve or the cooldown curve, and not less than the minimum permissible temperature for RCS ISLH testing per Reference 1. However, the criticality curve 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. ASME Code, Section XI, Appendix E (Ref. 6) provides a recommended methodology for evaluating an operating event that causes an excursion outside the limits.

APPLICABLE SAFETY ANALYSES

The P/T limits are not derived from Design Basis Accident (DBA) analyses. They are prescribed during normal operation to avoid encountering pressure, temperature, and temperature rate of change conditions that might cause undetected flaws to propagate and cause nonductile failure of the RCPB, an unanalyzed condition. Reference 7 establishes the methodology for determining the P/T limits. Although the P/T limits are not derived from any DBA, the P/T limits are acceptance limits since they preclude operation in an unanalyzed condition.

BASES

APPLICABLE SAFETY ANALYSES (continued)

RCS P/T limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The two elements of this LCO are:

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

b. Limits on the rate of change of temperature.

The element a limits, above, apply to all components of the RCS, except the pressurizer and the pressurizer surge line. These limits define allowable operating regions and permit a large number of operating cycles while providing a wide margin to nonductile failure.

The element b limits, above, 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 RCS 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 follow:

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 LCO provides a definition of acceptable operation for prevention of nonductile (brittle) failure in accordance with 10 CFR 50, Appendix G (Ref. 1). Although the P/T limits were developed to provide guidance for operation during heatup or cooldown (MODES 3, 4, and 5) or RCS ISLH testing, they are applicable at all times in keeping with the

BASES

APPLICABILITY (continued)

concern for nonductile failure. The limits do not apply to the pressurizer and the pressurizer surge line.

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.

ACTIONS

A.1 and A.2

Operation outside the P/T limits must be restored to within the limits. The RCPB must be 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 within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify 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 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.

BASES

ACTIONS (continued)

Condition A is modified by a Note requiring that Required Action A.2 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 per Required Action A.1 alone is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

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 either the RCS remained in an unacceptable P/T region for an extended period of increased stress, or 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. In reduced pressure and temperature conditions, the possibility of propagation with undetected flaws is decreased.

If the required restoration activity cannot be accomplished in 30 minutes, Required Action B.1 and Required Action B.2 must be implemented to reduce pressure and temperature.

If the required evaluation for continued operation cannot be accomplished within 72 hours or the results are indeterminate or unfavorable, action must proceed to reduce pressure and temperature as specified in Required Action B.1 and Required Action B.2. A favorable evaluation must be completed and documented before returning to operating pressure and temperature conditions.

Pressure and temperature are reduced by bringing the plant to MODE 3 within 6 hours and to MODE 5 within 36 hours.

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

BASES

ACTIONS (continued)

C.1 and C.2

Actions must be initiated immediately to correct operation outside of the P/T limits at times other than when in MODE 1, 2, 3, or 4, so that the RCPB is returned to a condition that has been verified by stress analysis.

The immediate Completion Time reflects the urgency of initiating action to restore 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 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 prior to entry into MODE 4. Several methods may be used, including comparison with pre-analyzed transients in the stress 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.

Condition C is modified by a Note requiring that Required Action C.2 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 PTLR limits is required every 30 minutes when RCS P/T 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 RCS ISLH testing may be discontinued when the definition given in the relevant plant procedure for ending the activity is satisfied.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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

REFERENCES

1. 10 CFR 50, Appendix G, “Fracture Toughness Requirements.”
2. ASME Boiler and Pressure Vessel Code, Section III, Appendix G, “Protection Against Non-Ductile Failure.”
3. ASTM E 185-82, “Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels,” July 1982.
4. 10 CFR 50, Appendix H, “Reactor Vessel Material Surveillance Program Requirements.”
5. Regulatory Guide 1.99, “Radiation Embrittlement of Reactor Vessel Materials,” May 1988.
6. ASME Boiler and Pressure Vessel Code, Section XI, Appendix E, “Evaluation of Unanticipated Operating Events.”
7. WCAP-14040-A, “Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves,” January 1996.