

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

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**Title: Changes Related to LCO 3.5.3, Core Makeup Tanks (CMTs) - Shutdown, Reactor Coolant System (RCS) Intact**

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**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-359-A, Rev. 9, Increase Flexibility in MODE Restraints  
TSTF-425, Rev. 3, Relocate Surveillance Frequencies to Licensee Control - RITSTF Initiative 5b  
TSTF-523, Rev. 2, Generic Letter 2008-01, Managing Gas Accumulation

**STS NUREGs Affected:**

TSTF-359-A, Rev. 9: NUREG-1430, 1431, 1432, 1433, 1434  
TSTF-425, Rev. 3: NUREG-1430, 1431, 1432, 1433, 1434  
TSTF-523, Rev. 2: NUREG-1430, 1431, 1432, 1433, 1434

**NRC Approval Date:**

TSTF-359-A, Rev. 9: 12-May-03  
TSTF-425, Rev. 3: 06-Jul-09  
TSTF-523, Rev. 2: 23-Dec-13

**TSTF Classification:**

TSTF-359-A, Rev. 9: Technical Change  
TSTF-425, Rev. 3: Technical Change  
TSTF-523, Rev. 2: Technical Change

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**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:**

None

**RCOL COL Item Number and Title:**

None

**RCOL PTS Change Number and Title:**

VEGP LAR DOC A069: TS 3.5.3 Condition C revision

VEGP LAR DOC A070: TS 3.5.3 Required Action D.1 revision

VEGP LAR DOC A071: TS 3.5.3 revision to Condition associated with water temperature and born concentration

VEGP LAR DOC A072: TS 3.5.3 Condition D entry statement revision

VEGP LAR DOC L01: Added SR for valve actuation

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**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(1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

TSTF-359-A is deferred for future consideration.

TSTF-425 is deferred for future consideration.

TSTF-523, Rev. 2 is not applicable to the GTS. The issues of gas accumulation have been addressed by GTS Rev.19.

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**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)**

Applicability statement is revised to correct the punctuation after "...Removal System (RNS)." from a period to a comma.

In the "Applicable Safety Analyses" section of the Bases, the third sentence is corrected to include the fourth sentence and is revised to indicate the statement relates to reference 1.

**APOG Recommended Changes to Improve the Bases**

Throughout the Bases, references to Sections and Chapters of the FSAR do not include the "FSAR" modifier. Since these Section and Chapter references are to an external document, it is appropriate to include the acronym "FSAR" to modify "Section" and "Chapter" in references to the FSAR throughout the Bases. (DOC A003)

An editorial change is made to the "Actions" section of the Bases, under heading "A.1". The change clarifies and corrects the first use of the acronym "ECCS" by using the full phrase "emergency core cooling system" and deleting "system" after "ECCS".

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**V. Applicability****Affected Generic Technical Specifications and Bases:**

Section 3.5.3, Core Makeup Tanks (CMTs) – Shutdown, Reactor Coolant System (RCS) Intact

**Changes to the Generic Technical Specifications and Bases:**

Applicability statement is revised to correct punctuation. (NRC staff proposed change)

Condition B of TS 3.5.3 is revised from “Required CMT inoperable due to one or more parameters (water temperature, boron concentration) not within limits.” to “Required CMT inoperable due to water temperature or boron concentration not within limits.” (DOC A071)

Required Action B.1 of TS 3.5.3 is revised from “Restore water temperature or boron concentration to within limits.” to “Restore water temperature and boron concentration to within limits.” (DOC A071)

Condition C of TS 3.5.3 is revised by adding the word “Condition” before “...A or B.” (DOC A069)

Condition D and associated Bases of TS 3.5.3 is revised by deleting the second entry statement “LCO not met for reasons other than A, B, or C.” (DOC A072)

Required Action D.1 and associated Bases of TS 3.5.3 is revised from “Initiate action to be in MODE 5 with RCS pressure boundary open and  $\geq$  20% pressurizer level.” to “Initiate action to be in MODE 5 with RCS pressure boundary open.” (DOC A070)

In the “Applicable Safety Analyses” section of the Bases, the third sentence is corrected to include the fourth sentence and is revised to indicate the statement relates to reference 1. (NRC staff proposed change)

In the “Actions” section of the Bases, under heading “A.1” the last sentence is revised by changing “ECCS system” to “emergency core cooling system (ECCS)”. (APOG Comment)

The Bases for SR 3.5.3.1 is revised by updating the reference “SR 3.5.2.7” to “SR 3.5.2.8”. (DOC L01)

The acronym “FSAR” is added to modify “Section” and “Chapter” in references to the FSAR throughout the Bases. (DOC A003) (APOG Comment)

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**VI. Traveler Information****Description of TSTF changes:**

None

**Rationale for TSTF changes:**

None

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

VEGP LAR DOC A069 corrects Condition C of TS 3.5.3 by adding the word "Condition" before "...A or B."

VEGP LAR DOC A070 revises Required Action D.1 and associated Bases of TS 3.5.3 from "Initiate action to be in MODE 5 with RCS pressure boundary open and  $\geq$  20% pressurizer level." to "Initiate action to be in MODE 5 with RCS pressure boundary open."

VEGP LAR DOC A071 revises Condition B entry statement by specifying the parameters not within limits as "water temperature or boron concentration". Required Action B.1 is revised to state that both water temperature and boron concentration need to be restored to within limits.

VEGP LAR DOC A072 revises Condition D and associated Bases by deleting the second entry statement.

VEGP LAR DOC L01 revises Bases for SR 3.5.3.1 by updating the referenced SR from "SR 3.5.2.7" to "SR 3.5.2.8".

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

The VEGP LAR DOC A069 change to Condition C entry statement provides consistency with the writer's guide, TSTF-GG-05-01.

The VEGP LAR DOC A070 change to Required Action D.1 and associated Bases does not change the intent of the Required Action. Once the RCS pressure Boundary is open in MODE 5 the  $\geq$  20% pressurizer level is no longer applicable.

The VEGP LAR DOC A071 change to Condition B entry statement to specify the parameters of water temperature and boron concentration provides clarification. The change to Required Action B.1 to specify both water temperature and boron concentration need to be restored within limits also provides clarification.

VEGP LAR DOC A072 removes the second entry condition of Condition D since it is a duplicate entry condition to Condition C.

The VEGP LAR DOC L01 change to the referenced SRs in the Bases for SR 3.5.3.1 is an editorial change due to the addition of new SR 3.5.2.7 in STS 3.5.2.

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

The Applicability statement is revised by changing the period after "...Removal System (RNS)." to a comma.

In the "Applicable Safety Analyses" section of the Bases, the third sentence is corrected to include the fourth sentence and is revised to indicate the statement relates to reference 1. (NRC staff proposed change)

The phrase "ECCS system" is clarified and corrected to "emergency core cooling system (ECCS)" in the "Actions" section of the Bases, under heading "A.1". (APOG Comment)

The acronym "FSAR" is added to modify "Section" and "Chapter" in references to the FSAR throughout the Bases. (DOC A003) (APOG Comment)

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

The change to the Applicability statement is a correction to the punctuation.

The changes to the "Applicable Safety Analyses" section of the Bases are editorial changes.

The change from "ECCS system" to "emergency core cooling system (ECCS)" is an editorial clarification and the correction is in conformance with TSTF-GG-05-01, section 3.2.2.a. These non-technical changes provide improved clarity, consistency, and operator usability.

Since Bases references to FSAR Sections and Chapters are to an external document, it is appropriate to include the "FSAR" modifier.

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## **VII. GTST Safety Evaluation**

### **Technical Analysis:**

The changes to TS 3.5.3 and associated Bases 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 3.5.3 is an acceptable model Specification for the AP1000 standard reactor design.

### **References to Previous NRC Safety Evaluation Reports (SERs):**

None

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## VIII. Review Information

### Evaluator Comments:

None

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### Review Information:

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on 5/23/2014.

### APOG Comments (Ref. 5) and Resolutions:

1. (Internal #2) Approved TSTF-523 is not dispositioned in the material provided to support the GTSTs. Include TSTF-523 in the reference disposition tables, as "TSTF deferred for future consideration." This is resolved by dispositioning TSTF-523, Rev. 1 as not applicable to the GTS and stating that the concerns of the TSTF have been addressed by GTS Rev.19.
2. (Internal #3) Throughout the Bases, references to Sections and Chapters of the FSAR do not include the "FSAR" modifier. Since these Section and Chapter references are to an external document, it is appropriate (DOC A003) to include the "FSAR" modifier. This is resolved by adding the FSAR modifier to every FSAR reference in the Bases.
3. (Internal #11) Remove TSTF-359-A from the GTST. Include TSTF-359-A in the reference disposition tables, as "TSTF deferred for future consideration". The justification for TSTF-359 was based on vendor-specific evaluations. For Westinghouse plants, that evaluation was in MUHP-3015, "Qualitative Risk Assessment Supporting Increased Flexibility in Mode Restraints," January 2002. This report evaluated "the key plant changes that occur during the mode changes so it is possible to identify the initiating events that can occur and systems available for event detection, actuation, and mitigation." It also considered initiating events and equipment available to mitigate those events. Based on that evaluation, Notes were proposed for several systems to prohibit the use of LCO 3.0.4.b. These Notes were applied to LTOP, ECCS-Shutdown, AFW, and AC Sources - Operating. TSTF-359-A also removed existing Notes from the ISTS and revised SR 3.0.4. There is no technical basis for concluding that the analysis performed in support of TSTF-359-A and the high-risk configurations addressed by the Notes are applicable to AP1000 plants. This is resolved by revising the disposition of TSTF-359-A as "TSTF-359-A is deferred for future consideration".
4. (Internal #13) The NRC approval of TSTF-425, and model safety evaluation provided in the CLIP 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.

5. (Internal #304) APOG recommends making the editorial changes in the “Actions” section of the Bases, under heading “A.1”. These non-technical changes provide improved clarity, consistency, and operator usability. This is resolved by making the suggested changes and adding a comma after “(ECCS)” as follows:

“A Completion Time of 72 hours is consistent with times normally applied to an **emergency core cooling system (ECCS)**, ~~system~~ which is capable of performing its safety function without a single failure.”

**NRC Final Approval Date:** 12/15/2015

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

None

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**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. TSTF-GG-05-01, "Writer's Guide for Plant-Specific Improved Technical Specifications," June 2005 (ML070660229).
  5. 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 (ML 14265A493).

**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.

## 3.5 PASSIVE CORE COOLING SYSTEM (PXS)

## 3.5.3 Core Makeup Tanks (CMTs) – Shutdown, Reactor Coolant System (RCS) Intact

LCO 3.5.3 One CMT shall be OPERABLE.

APPLICABILITY: MODE 4 with the RCS cooling provided by the Normal Residual Heat Removal System (RNS);  
MODE 5 with the RCS pressure boundary intact.

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required CMT inoperable due to one outlet isolation valve inoperable.	A.1 Restore required isolation valve to OPERABLE status.	72 hours
B. Required CMT inoperable due to <del>one of more parameters</del> (water temperature; <del>or</del> boron concentration) not within limits.	B.1 Restore water temperature <del>or</del> and boron concentration to within limits.	72 hours
C. Required CMT inoperable for reasons other than <b>Condition A</b> or B.	C.1 Restore required CMT to OPERABLE status.	8 hours

## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time not met.  OR  LCO not met for reasons other than A, B, or C.	D.1 Initiate action to be in MODE 5 with RCS pressure boundary open and $\geq 20\%$ pressurizer level.	Immediately

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.5.3.1 For the CMT required to be OPERABLE, the SRs of Specification 3.5.2, "Core Makeup Tanks (CMTs) – Operating" are applicable.	In accordance with applicable SRs

## B 3.5 PASSIVE CORE COOLING SYSTEM (PXS)

## B 3.5.3 Core Makeup Tanks (CMTs) – Shutdown, Reactor Coolant System (RCS) Intact

## BASES

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**BACKGROUND** A description of the CMTs is provided in the Bases for LCO 3.5.2, “Core Makeup Tanks – Operating.”

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**APPLICABLE SAFETY ANALYSES** When the plant is shutdown with the Reactor Coolant System (RCS) pressure boundary intact, the CMT and Passive Residual Heat Removal (PRHR) are the preferred methods for mitigation of postulated events such as loss of normal decay heat removal capability (either loss of Startup Feedwater or loss of normal residual heat removal system). The CMT and PRHR are preferred because the RCS pressure boundary can remain intact, thus preserving one of the barriers to fission product release. For these events, the PRHR provides the safety related heat removal path— **A** and the CMT maintains RCS inventory control (**Ref. 1**). These events can also be mitigated by In-containment Refueling Water Storage Tank (IRWST) injection; however, the RCS must be depressurized (vented) in order to facilitate IRWST injection.

Since no loss of coolant accidents (LOCAs) are postulated during MODES 5 and 6, the possibility of a break in the direct vessel injection line is not considered. As a result, only one CMT is required to be available to provide core cooling in response to postulated events. The two parallel CMT outlet isolation valves ensure that injection from one CMT occurs in the event of a single active failure.

CMTs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

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**LCO** This LCO establishes the minimum conditions necessary to ensure that one CMT will be available for RCS inventory control in the event of the loss of normal decay heat removal capability. The two CMT outlet isolation valves must be OPERABLE to ensure that at least one valve will operate, assuming that the other valve is disabled by a single active failure.

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**APPLICABILITY** In MODE 4 without steam generator heat removal and in MODE 5 with the RCS pressure boundary intact, one CMT is required to provide borated water to the RCS in the event the nonsafety related chemical

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**BASES**

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**APPLICABILITY (continued)**

and volume control system makeup pumps are not available to provide RCS inventory control.

The CMT requirements in MODES 1, 2, 3, and 4 are specified in LCO 3.5.2, “Core Makeup Tanks (CMTs) – Operating.”

The CMTs are not required to be OPERABLE while in MODE 5 with the RCS open or in MODE 6 because the RCS is depressurized and borated water can be supplied from the IRWST, if needed.

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**ACTIONS**A.1

With one outlet isolation valve inoperable action must be taken to restore the valve. In this Condition the CMT is capable of performing its safety function, provided a single failure of the remaining parallel isolation valve does not occur. A Completion Time of 72 hours is consistent with times normally applied to an **emergency core cooling system (ECCS), system** which is capable of performing its safety function without a single failure.

B.1

If the water temperature or boron concentration in the CMT is not within limits, it must be returned to within limits within 72 hours. With the temperature above the limit the makeup capability assumed in the safety analysis may not be available. With the boron concentration not within limits, the ability to maintain subcriticality may be degraded.

Because the mechanisms for significantly altering these parameters in the CMT are limited, it is probable that more than the required amount of boron and cooling capacity will be available to meet the conditions assumed in the safety analysis. Therefore, the 72 hour Completion Time is acceptable.

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**BASES**

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**ACTIONS (continued)**C.1

With the required CMT inoperable for reasons other than Condition A or B operation of the CMT may not be available. Action must be taken to restore the inoperable CMT to OPERABLE status within 8 hours. LOCAs are not postulated during the MODEs when this LCO is applicable. The only safety function is to provide LEAKAGE makeup in case normal RCS makeup is unavailable. The 8 hour Completion Time is based on the availability of injection from the IRWST to provide RCS makeup. The ability of the IRWST to provide RCS injection is demonstrated by analysis performed to show that IRWST injection together with ADS venting provides adequate core cooling. Such analysis was performed for the loss of RNS cooling during midloop operations. The analysis was performed in support of the ~~AP1000~~ **probabilistic risk assessment (PRA)** (Ref. 2).

D.1

If the Required Action or associated Completion Time of Conditions A, B, or C are not met ~~or the LCO is not met for reasons other than Conditions A through C,~~ action must be initiated, immediately, to place the plant in a MODE where this LCO does not apply. Action must be initiated, immediately, to place the plant in MODE 5 with RCS pressure boundary open ~~and  $\geq$  20% pressurizer level.~~ In this condition, core cooling and RCS makeup are provided by IRWST injection and sump recirculation. Opening of the ADS valves ensures that IRWST injection can occur.

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**SURVEILLANCE  
REQUIREMENTS**SR 3.5.3.1

The LCO 3.5.2 Surveillance Requirements (SR 3.5.2.1 through 3.5.2.~~78~~) are applicable to the CMT required to be OPERABLE. The Frequencies associated with each specified SR are applicable. Refer to the corresponding Bases for LCO 3.5.2 for a discussion of each SR.

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**REFERENCES**

1. **FSAR** Section 6.3, "Passive Core Cooling System."
  2. ~~AP1000 PRA~~ **FSAR Chapter 19, "Probabilistic Risk Assessment."**
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**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.

## 3.5 PASSIVE CORE COOLING SYSTEM (PXS)

## 3.5.3 Core Makeup Tanks (CMTs) – Shutdown, Reactor Coolant System (RCS) Intact

LCO 3.5.3 One CMT shall be OPERABLE.

APPLICABILITY: MODE 4 with the RCS cooling provided by the Normal Residual Heat Removal System (RNS),  
MODE 5 with the RCS pressure boundary intact.

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required CMT inoperable due to one outlet isolation valve inoperable.	A.1 Restore required isolation valve to OPERABLE status.	72 hours
B. Required CMT inoperable due to water temperature or boron concentration not within limits.	B.1 Restore water temperature and boron concentration to within limits.	72 hours
C. Required CMT inoperable for reasons other than Condition A or B.	C.1 Restore required CMT to OPERABLE status.	8 hours
D. Required Action and associated Completion Time not met.	D.1 Initiate action to be in MODE 5 with RCS pressure boundary open.	Immediately

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.5.3.1 For the CMT required to be OPERABLE, the SRs of Specification 3.5.2, “Core Makeup Tanks (CMTs) – Operating” are applicable.	In accordance with applicable SRs

## B 3.5 PASSIVE CORE COOLING SYSTEM (PXS)

## B 3.5.3 Core Makeup Tanks (CMTs) – Shutdown, Reactor Coolant System (RCS) Intact

## BASES

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BACKGROUND	A description of the CMTs is provided in the Bases for LCO 3.5.2, “Core Makeup Tanks – Operating.”
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APPLICABLE SAFETY ANALYSES	<p>When the plant is shutdown with the Reactor Coolant System (RCS) pressure boundary intact, the CMT and Passive Residual Heat Removal (PRHR) are the preferred methods for mitigation of postulated events such as loss of normal decay heat removal capability (either loss of Startup Feedwater or loss of normal residual heat removal system). The CMT and PRHR are preferred because the RCS pressure boundary can remain intact, thus preserving one of the barriers to fission product release. For these events, the PRHR provides the safety related heat removal path and the CMT maintains RCS inventory control (Ref. 1). These events can also be mitigated by In-containment Refueling Water Storage Tank (IRWST) injection; however, the RCS must be depressurized (vented) in order to facilitate IRWST injection.</p>
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Since no loss of coolant accidents (LOCAs) are postulated during MODES 5 and 6, the possibility of a break in the direct vessel injection line is not considered. As a result, only one CMT is required to be available to provide core cooling in response to postulated events. The two parallel CMT outlet isolation valves ensure that injection from one CMT occurs in the event of a single active failure.

CMTs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

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LCO	<p>This LCO establishes the minimum conditions necessary to ensure that one CMT will be available for RCS inventory control in the event of the loss of normal decay heat removal capability. The two CMT outlet isolation valves must be OPERABLE to ensure that at least one valve will operate, assuming that the other valve is disabled by a single active failure.</p>
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APPLICABILITY	<p>In MODE 4 without steam generator heat removal and in MODE 5 with the RCS pressure boundary intact, one CMT is required to provide borated water to the RCS in the event the nonsafety related chemical</p>
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**BASES**

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**APPLICABILITY (continued)**

and volume control system makeup pumps are not available to provide RCS inventory control.

The CMT requirements in MODES 1, 2, 3, and 4 are specified in LCO 3.5.2, "Core Makeup Tanks (CMTs) – Operating."

The CMTs are not required to be OPERABLE while in MODE 5 with the RCS open or in MODE 6 because the RCS is depressurized and borated water can be supplied from the IRWST, if needed.

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**ACTIONS**A.1

With one outlet isolation valve inoperable action must be taken to restore the valve. In this Condition the CMT is capable of performing its safety function, provided a single failure of the remaining parallel isolation valve does not occur. A Completion Time of 72 hours is consistent with times normally applied to an emergency core cooling system (ECCS), which is capable of performing its safety function without a single failure.

B.1

If the water temperature or boron concentration in the CMT is not within limits, it must be returned to within limits within 72 hours. With the temperature above the limit the makeup capability assumed in the safety analysis may not be available. With the boron concentration not within limits, the ability to maintain subcriticality may be degraded.

Because the mechanisms for significantly altering these parameters in the CMT are limited, it is probable that more than the required amount of boron and cooling capacity will be available to meet the conditions assumed in the safety analysis. Therefore, the 72 hour Completion Time is acceptable.

C.1

With the required CMT inoperable for reasons other than Condition A or B operation of the CMT may not be available. Action must be taken to restore the inoperable CMT to OPERABLE status within 8 hours. LOCAs are not postulated during the MODEs when this LCO is applicable. The only safety function is to provide LEAKAGE makeup in case normal RCS makeup is unavailable. The 8 hour Completion Time is based on the

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**BASES**

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**ACTIONS (continued)**

availability of injection from the IRWST to provide RCS makeup. The ability of the IRWST to provide RCS injection is demonstrated by analysis performed to show that IRWST injection together with ADS venting provides adequate core cooling. Such analysis was performed for the loss of RNS cooling during midloop operations. The analysis was performed in support of the probabilistic risk assessment (PRA) (Ref. 2).

D.1

If the Required Action or associated Completion Time of Conditions A, B, or C are not met action must be initiated, immediately, to place the plant in a MODE where this LCO does not apply. Action must be initiated, immediately, to place the plant in MODE 5 with RCS pressure boundary open. In this condition, core cooling and RCS makeup are provided by IRWST injection and sump recirculation. Opening of the ADS valves ensures that IRWST injection can occur.

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**SURVEILLANCE  
REQUIREMENTS**SR 3.5.3.1

The LCO 3.5.2 Surveillance Requirements (SR 3.5.2.1 through 3.5.2.8) are applicable to the CMT required to be OPERABLE. The Frequencies associated with each specified SR are applicable. Refer to the corresponding Bases for LCO 3.5.2 for a discussion of each SR.

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**REFERENCES**

1. FSAR Section 6.3, "Passive Core Cooling System."
  2. FSAR Chapter 19, "Probabilistic Risk Assessment."
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