

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

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**Title: Changes Related to LCO 3.4.10, RCS Specific Activity**

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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-A, Rev 3, Relocate Surveillance Frequencies to Licensee Control – RITSTF Initiative 5b

**STS NUREGs Affected:**

TSTF-359-A, Rev 9: NUREGs 1430, 1431, 1432, 1433, and 1434  
TSTF-425-A, Rev 3: NUREGs 1430, 1431, 1432, 1433, and 1434

**NRC Approval Date:**

TSTF-359-A, Rev 9: 12-May-03  
TSTF-425-A, Rev. 3: 06-Jul-09

**TSTF Classification:**

TSTF-359-A, Rev 9: Technical Change  
TSTF-425-A, Rev 3: 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:**

There are no Vogtle departures applicable to Specification 3.4.10.

**RCOL COL Item Number and Title:**

There are no Vogtle COL items applicable to Specification 3.4.10.

**RCOL PTS Change Number and Title:**

VEGP LAR DOC A003: References to various Chapters and Sections of the Final Safety Analysis Report (FSAR) are revised to include FSAR.

VEGP LAR DOC A051: Editorial Change in TS 3.4.10 Required Action A.1

VEGP LAR DOC L16: Delete TS 3.4.10 Required Action B.1

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(1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

The justification for TSTF-359 is based on vendor-specific evaluations. For Westinghouse plants, that evaluation is 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. TSTF-359-A is not implemented by this GTST and is deferred for future consideration.

TSTF-425-A deferred for future consideration.

GTS 1.1 includes a definition of Dose Equivalent XE-133, which is proposed to be revised by GTST AP1000-A11-1.1 in the AP1000 STS based on TSTF-490, Rev 0. The changes are not needed. The GTS definition is consistent with the DCD licensing basis and is specific to the AP1000 plants. In a March 14, 2012 memorandum (Accession No. ML12039A201), the NRC Staff effectively withdrew the approval of TSTF-490, Rev. 0. TSTF-490 is not adopted for use in the AP1000 design.

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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)**

Replace the symbol “≤” with the correct symbol “≦” in SR 3.4.10.1.

**APOG Recommended Changes to Improve the Bases**

Throughout the Bases, references to Sections and Chapters of the FSAR do not include the “FSAR” clarifier. Since these Section and Chapter references are to an external document, it is appropriate to include the “FSAR” modifier. (DOC A003)

Revise the second sentence of the second paragraph of the GTS 3.4.10 “Background” section of Bases to replace “0.25 percent” with “0.25%” This non-technical change provides improved clarity, consistency, and operator usability.

Delete the GTS 3.4.10 “ASA” section of Bases first paragraph, second half of statement beginning with “either.” The statement is confusing since both the Steam Generator Tube Rupture (SGTR) and the Steam Line Break (SLB) are fundamentally the same pathways to environment. This “either” distinction is not found in NUREG-1431. Deleting the statement avoids confusion without detracting from TS Bases intent.

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## **V. Applicability**

### **Affected Generic Technical Specifications and Bases:**

Section 3.4.10, RCS Specific Activity

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

The symbol “ $\leq$ ” is replaced with the correct symbol “ $\leq$ ” in SR 3.4.10.1. (NRC Staff Comment)

The second sentence of the second paragraph of the GTS 3.4.10 “Background” section of Bases for GTST for Subsection 3.4.10 is revised to replace “0.25 percent” with “0.25%” (APOG Comment)

The first paragraph, second half of statement beginning with “either” is deleted in the “ASA” section of Bases. (APOG Comment)

Required Action A.1 is revised editorially. This is consistent with TS Writer's Guide (Reference 7). (DOC A051)

Required Action B.1 is deleted. Required Action B.1 does not specify a default condition to enter in the event GTS 3.4.10 Required Action B.1 is not completed within 4 hours. GTS 3.4.10 Required Action B.2 requires placing the plant in Mode 3 with  $T_{avg} < 500^{\circ}\text{F}$  within 6 hours. However, during this required shutdown, the Operator may be distracted by the need to perform the GTS 3.4.10 Required Action B.1. (DOC L16)

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:

Not Applicable

### Rationale for TSTF changes:

Not Applicable

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

DOC A051 revises Required Action A.1 from 'Verify DOSE EQUIVALENT I-131 to be  $\leq 60 \mu\text{Ci/gm}$ ' to "Verify DOSE EQUIVALENT I- 131  $\leq 60 \mu\text{Ci/gm}$ ."

DOC L16 deletes Required Action B.1, "Perform SR 3.4.10.2," within 4 hours.

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 8 and the Southern Nuclear Operating Company RAI Response in Reference 9.

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

DOC A051 is consistent with the TS Writer's Guide (Reference 7).

DOC L16 deletes Required Action B.1 because it does not specify a default condition to enter in the event GTS 3.4.10 Required Action B.1 is not completed within 4 hours. GTS 3.4.10 Required Action B.2 requires placing the plant in Mode 3 with  $T_{\text{avg}} < 500^\circ\text{F}$  within 6 hours. However, during this required shutdown, the Operator may be distracted by the need to perform GTS 3.4.10 Required Action B.1. Therefore, deleting GTS 3.4.10 Required Action B.1 results in reducing Operator burden in the event Condition B is entered.

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

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

The second sentence of the second paragraph of the GTS 3.4.10 "Background" section of the Bases for GTST is revised to replace "0.25 percent" with "0.25%" (APOG Comment)

The symbol " $\underline{\leq}$ " is replaced with the correct symbol " $\leq$ " in SR 3.4.10.1. (NRC Staff Comment)

The first paragraph, second half of statement beginning with "either" is deleted in the GTS 3.4.10 "ASA" section of Bases: (APOG Comment)

The LCO limits on the reactor coolant specific activity are a factor in accident analyses that assume a release of primary coolant to the environment-~~either~~

~~directly as in a Steam Generator Tube Rupture (SGTR) or indirectly by way of LEAKAGE to the secondary coolant system and then to the environment (the Steam Line Break).~~

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

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

The change to the second sentence of the second paragraph of the GTS 3.4.10 “Background” section of Bases is a non-technical change that provides improved clarity, consistency, and operator usability.

The symbol change in SR 3.4.10.1 provides the correct symbol for consistency.

The “ASA” statement is confusing since both the Steam Generator Tube Rupture (SGTR) and the Steam Line Break (SLB) are fundamentally the same pathways to environment. This “either” distinction is not found in NUREG-1431. Deleting the statement avoids confusion without detracting from TS Bases intent.

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## VII. GTST Safety Evaluation

### Technical Analysis:

DOC L16 deletes Required Action B.1. In the event the Dose Equivalent XE-133 concentration is  $> 280 \mu\text{Ci/gm}$ , the TS 3.4.10 Actions require entry into Condition B. Within 4 hours of entering Condition B, GTS 3.4.10 Required Action B.1 requires SR 3.4.10.2 to be performed. SR 3.4.10.2 verifies that the reactor coolant Dose Equivalent I-131 specific activity is  $\leq 1.0 \mu\text{Ci/gm}$ . In addition, upon entry into Condition B, GTS 3.4.10 Required Action B.2 requires that the plant be placed in Mode 3 with  $T_{\text{avg}} < 500^\circ\text{F}$  within 6 hours.

TS 3.4.10 does not specify a default condition to enter in the event GTS 3.4.10 Required Action B.1 is not completed within 4 hours. GTS 3.4.10 Required Action B.2 requires placing the plant in Mode 3 with  $T_{\text{avg}} < 500^\circ\text{F}$  within 6 hours. However, during this required shutdown, the Operator may be distracted by the need to perform GTS 3.4.10 Required Action B.1. Therefore, deleting GTS 3.4.10 Required Action B.1 reduces the Operator burden in the event Condition B is entered.

This change is acceptable because the Actions continue to require that the plant be removed from the Applicability of TS 3.4.10 in the event Condition B is entered. Performing SR 3.4.10.2 within 4 hours of entering Condition B does not result in a more conservative action in the event the Dose Equivalent I-131 is found not within limits, because the plant is already required to be in Mode 3 with  $T_{\text{avg}} < 500^\circ\text{F}$  within 6 hours by GTS 3.4.10 Required Action B.2. This provides assurance that requirements of the safety analyses are preserved.

The first paragraph, second half of statement beginning with "either" is deleted in the GTS 3.4.10 "ASA" section of Bases. The "ASA" statement is confusing since both the Steam Generator Tube Rupture (SGTR) and the Steam Line Break (SLB) fundamentally provide the same pathways to environment. Also, the "either" distinction in the GTS is not found in NUREG-1431. Deleting the statement avoids confusion without detracting from TS Bases intent. The proposed change to the "Actions" section of the Bases is administrative because it does not result in a technical change and is, therefore, 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 3.4.10 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 5/16/2014.

### APOG Comments (Ref. 10) and Resolutions:

1. (Internal #3) Throughout the Bases, references to Sections and Chapters of the FSAR do not include the "FSAR" clarifier. 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 as appropriate.
2. (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.
3. (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.
4. (Internal # 11) The GTST incorporates TSTF-359-A, Rev. 9. 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. Remove TSTF-359-A from the GTST. Include TSTF-359-A in the reference disposition tables, as "TSTF deferred for future consideration"

Note: also reinstate LCO 3.0.4 “not applicable” Notes deleted in various Specifications as a result of incorporating TSTF-359. This is resolved by reversing all changes implemented by the initial application of TSTF-359-A to this GTST.

5. (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 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.

6. (Internal # 24) GTS 1.1 includes a definition of Dose Equivalent XE-133, which is proposed to be revised by GTST AP1000-A11-1.1 in the AP1000 STS based on TSTF-490, Rev 0. The changes are not needed. The GTS definition is consistent with the DCD licensing basis and is specific to the AP1000 plants. In a March 14, 2012 memorandum (Accession No. ML12039A201), the NRC Staff effectively withdrew the approval of TSTF-490, Rev. 0. For consistency with the APOG comments related to GTS 1.1, NRC Staff recommends that the non-adoption of TSTF-490 be noted in Section III of the GTST. This is resolved by making the recommended notation.
7. (Internal # 264) Revise the second sentence of the second paragraph of the GTS 3.4.10 “Background” section of Bases to replace “0.25 percent” with “0.25%” This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change. In addition, NRC Staff recommends replacing “ $\leq$ ” with “ $\leq$ ” in SR 3.4.10.1.
8. (Internal # 265) Delete the GTS 3.4.10 “ASA” section of Bases first paragraph, second half of statement beginning with “either.” The statement is confusing since both the Steam Generator Tube Rupture (SGTR) and the Steam Line Break (SLB) are fundamentally the same pathways to environment. This “either” distinction is not found in NUREG-1431. Deleting the statement avoids confusion without detracting from TS Bases intent. This is resolved by making the recommended change.

**NRC Final Approval Date:** 12/7/2015

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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. 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."
5. NUMARC 93-01, Section 11, Revision 4, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," December 2010 (ML110050227).
6. NRC Regulatory Guide 1.182, "Assessing and Managing Risk before Maintenance Activities at Nuclear Power Plants," May 2000 (ML003699426).
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).
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**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)

3.4.10 RCS Specific Activity

LCO 3.4.10 The specific activity of the reactor coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,  
MODE 3 with RCS average temperature ( $T_{avg}$ )  $\geq$  500°F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. DOSE EQUIVALENT I-131 &gt; 1.0 <math>\mu</math>Ci/gm.</p>	<p>-----NOTE----- LCO 3.0.4 is not applicable. -----</p> <p>A.1 Verify DOSE EQUIVALENT I-131 <del>to be</del> <math>\leq</math> 60 <math>\mu</math>Ci/gm.</p> <p><u>AND</u></p> <p>A.2 Restore DOSE EQUIVALENT I-131 to within limit.</p>	<p>Once per 4 hours</p> <p>48 hours</p>
<p>B. DOSE EQUIVALENT XE-133 &gt; 280 <math>\mu</math>Ci/gm.</p>	<p>B.1 <del>Perform SR 3.4.10.2</del> Be in <b>MODE 3 with <math>T_{avg}</math> &lt; 500°F.</b></p> <p><del>AND</del></p> <p><del>B.2 Be in MODE 3 with <math>T_{avg}</math> &lt; 500°F.</del></p>	<p><b>46</b> hours</p> <p><b>6</b> hours</p>



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>  DOSE EQUIVALENT I-131 > 60 µCi/gm.	C.1 Be in MODE 3 with T <sub>avg</sub> < 500°F.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.10.1 Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity ≤ 280 µCi/gm.	7 days
SR 3.4.10.2 -----NOTE----- Only required to be performed in MODE 1. -----  Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ 1.0 µCi/gm.	14 days  <u>AND</u>  Between 2 to 6 hours after a THERMAL POWER change of ≥ 15% of RTP within a 1 hour period

## B 3.4 REACTOR COOLANT SYSTEM (RCS)

## B 3.4.10 RCS Specific Activity

## BASES

## BACKGROUND

The limits on RCS specific activity ensure that the doses due to postulated accidents are within the doses reported in Chapter 15.

The RCS specific activity LCO limits the allowable concentration of iodines and noble gases in the reactor coolant. The LCO limits are established to be consistent with a fuel defect level of 0.25% ~~percent~~ and to ensure that plant operation remains within the conditions assumed for shielding and Design Basis Accident (DBA) release analyses.

The LCO contains specific activity limits for both DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133. The allowable levels are intended to limit the doses due to postulated accidents to within the values calculated in the radiological consequences analyses (as reported in **FSAR** Chapter 15).

APPLICABLE  
SAFETY  
ANALYSES

The LCO limits on the reactor coolant specific activity are a factor in accident analyses that assume a release of primary coolant to the environment ~~either directly as in a Steam Generator Tube Rupture (SGTR) or indirectly by way of LEAKAGE to the secondary coolant system and then to the environment (the Steam Line Break).~~

The events which incorporate the LCO values for primary coolant specific activity in the radiological consequence analysis include the following:

- Steam generator tube rupture (SGTR)
- Steam line break (SLB)
- Locked RCP rotor
- Rod ejection
- Small line break outside containment
- Loss of coolant accident (LOCA) (early stages)

The limiting event for release of primary coolant activity is the SLB. The SLB dose analysis considers the possibility of a pre-existing iodine spike (in which case the maximum LCO of 60  $\mu\text{Ci/gm}$  DOSE EQUIVALENT I-131 is assumed) as well as the more likely initiation of an iodine spike due to the reactor trip and depressurization. In the latter case, the LCO of 1.0  $\mu\text{Ci/gm}$  DOSE EQUIVALENT I-131 is assumed at the initiation of the accident, but the primary coolant specific activity is assumed to

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**BASES**

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**APPLICABLE SAFETY ANALYSES (continued)**

increase with time due to the elevated iodine appearance rate in the coolant. The reactor coolant noble gas specific activity for both cases is assumed to be the LCO of 280  $\mu\text{Ci/gm}$  DOSE EQUIVALENT XE-133. The safety analysis assumes the specific activity of the secondary coolant at its limit of 0.1  $\mu\text{Ci/gm}$  DOSE EQUIVALENT I-131 from LCO 3.7.4, "Secondary Specific Activity."

The LCO limits ensure that, in either case, the doses reported in **FSAR** Chapter 15 remain bounding.

The RCS specific activity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

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**LCO**

The specific iodine activity is limited to 1.0  $\mu\text{Ci/gm}$  DOSE EQUIVALENT I-131, and the specific noble gas activity is limited to 280  $\mu\text{Ci/gm}$  DOSE EQUIVALENT XE-133. These limits ensure that the doses resulting from a DBA will be within the values reported in Chapter 15. Secondary coolant activities are addressed by LCO 3.7.4, "Secondary Specific Activity."

The SLB and SGTR accident analyses (Refs. 1 and 2) show that the offsite doses are within acceptance limits. Violation of the LCO may result in reactor coolant radioactivity levels that could, in the event of an SLB or SGTR accident, lead to doses that exceed those reported Chapter 15.

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**APPLICABILITY**

In MODES 1 and 2, and in MODE 3 with RCS average temperature  $\geq 500^\circ\text{F}$ , operation within the LCO limits for DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity are necessary to contain the potential consequences of a SGTR to within the calculated site boundary dose values.

For operation in MODE 3 with RCS average temperature  $< 500^\circ\text{F}$  and in MODES 4 and 5, the release of radioactivity in the event of a SGTR is unlikely since the saturation pressure of the reactor coolant is below the lift pressure settings of the main steam safety valves.

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BASES

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## ACTIONS

A.1 and A.2

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to verify that DOSE EQUIVALENT I-131 is  $\leq 60 \mu\text{Ci/gm}$ . The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling is to continue to provide a trend.

The DOSE EQUIVALENT I-131 must be restored to normal within 48 hours. If the concentration cannot be restored to within the LCO limit in 48 hours, it is assumed that the LCO violation is not the result of normal iodine spiking.

A Note to the Required Action of Condition A excludes the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE(S) while relying on the ACTIONS even though the ACTIONS may eventually require plant shutdown. This exception is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient specific activity excursions while the plant remains at, or proceeds to power operation.

B.1 and B.2

With DOSE EQUIVALENT XE-133 in excess of the allowed limit, **the plant must be placed in a MODE or condition in which the LCO requirements are not applicable. This is done by placing the plant in at least MODE 3 with RCS average temperature < 500°F within 6 hours** ~~an analysis must be performed within 4 hours to determine DOSE EQUIVALENT I-131. The allowed Completion Time of 4 hours is required to obtain and analyze a sample.~~

The change to MODE 3 and RCS average temperature < 500°F lowers the saturation pressure of the reactor coolant below the set points of the main steam safety valves, and prevents venting the SG to the environment in a SGTR event. The allowed Completion Time of 6 hours is reasonable, based on operating experience to reach MODE 3 from full power conditions in an orderly manner, without challenging plant systems.

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**BASES**

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**ACTIONS (continued)**C.1

If a Required Action and the associated Completion Time of Condition A is not met or if the DOSE EQUIVALENT I-131 is  $> 60 \mu\text{Ci/gm.}$ , the reactor must be brought to MODE 3 with RCS average temperature  $< 500^\circ\text{F}$  within 6 hours. The Completion Time of 6 hours is reasonable, based on operation experience, to reach MODE 3 below  $500^\circ\text{F}$  from full power conditions in an orderly manner and without challenging plant systems.

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**SURVEILLANCE  
REQUIREMENTS**SR 3.4.10.1

SR 3.4.10.1 requires performing a measure of the noble gas specific activity of the reactor coolant at least once every 7 days. This is a quantitative measure of radionuclides with half lives longer than 15 minutes. This Surveillance provides an indication of any increase in the release of noble gas activity from fuel rods containing cladding defects.

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The 7 day Frequency considers the unlikelihood of a significant increase in fuel defect level during the time.

SR 3.4.10.2

This Surveillance is performed in MODE 1 only to ensure iodine remains within limit during normal operation and following fast power changes when increased releases of iodine from the fuel (iodine spiking) is apt to occur. The 14 day Frequency is adequate to trend changes in the iodine activity level. The Frequency, between 2 and 6 hours after a power change of  $\geq 15\%$  RTP within a 1 hour period, is established because the iodine levels peak during this time following fuel failures; samples at other times would provide inaccurate results.

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**REFERENCES**

1. **FSAR** Section 15.1.5, "Steam System Piping Failure."
  2. **FSAR** Section 15.6.3, "Steam Generator Tube Rupture."
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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.

## 3.4 REACTOR COOLANT SYSTEM (RCS)

## 3.4.10 RCS Specific Activity

LCO 3.4.10 The specific activity of the reactor coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,  
MODE 3 with RCS average temperature ( $T_{avg}$ )  $\geq 500^{\circ}\text{F}$ .

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. DOSE EQUIVALENT I-131 > 1.0 $\mu\text{Ci/gm}$ .	<p>-----NOTE----- LCO 3.0.4 is not applicable. -----</p> <p>A.1 Verify DOSE EQUIVALENT I-131 <math>\leq 60 \mu\text{Ci/gm}</math>.</p> <p><u>AND</u></p> <p>A.2 Restore DOSE EQUIVALENT I-131 to within limit.</p>	<p>Once per 4 hours</p> <p>48 hours</p>
B. DOSE EQUIVALENT XE-133 > 280 $\mu\text{Ci/gm}$ .	B.1 Be in MODE 3 with $T_{avg}$ < 500 $^{\circ}\text{F}$ .	6 hours
C. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>  DOSE EQUIVALENT I-131 > 60 $\mu\text{Ci/gm}$ .	C.1 Be in MODE 3 with $T_{avg}$ < 500 $^{\circ}\text{F}$ .	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.10.1    Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity $\leq$ 280 $\mu$ Ci/gm.	7 days
SR 3.4.10.2    -----NOTE----- Only required to be performed in MODE 1. -----  Verify reactor coolant DOSE EQUIVALENT I-131 specific activity $\leq$ 1.0 $\mu$ Ci/gm.	14 days  <u>AND</u> Between 2 to 6 hours after a THERMAL POWER change of $\geq$ 15% of RTP within a 1 hour period



## B 3.4 REACTOR COOLANT SYSTEM (RCS)

## B 3.4.10 RCS Specific Activity

## BASES

BACKGROUND	<p>The limits on RCS specific activity ensure that the doses due to postulated accidents are within the doses reported in Chapter 15.</p> <p>The RCS specific activity LCO limits the allowable concentration of iodines and noble gases in the reactor coolant. The LCO limits are established to be consistent with a fuel defect level of 0.25% and to ensure that plant operation remains within the conditions assumed for shielding and Design Basis Accident (DBA) release analyses.</p> <p>The LCO contains specific activity limits for both DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133. The allowable levels are intended to limit the doses due to postulated accidents to within the values calculated in the radiological consequences analyses (as reported in FSAR Chapter 15).</p>
APPLICABLE SAFETY ANALYSES	<p>The LCO limits on the reactor coolant specific activity are a factor in accident analyses that assume a release of primary coolant to the environment.</p> <p>The events which incorporate the LCO values for primary coolant specific activity in the radiological consequence analysis include the following:</p> <ul style="list-style-type: none"> <li>Steam generator tube rupture (SGTR)</li> <li>Steam line break (SLB)</li> <li>Locked RCP rotor</li> <li>Rod ejection</li> <li>Small line break outside containment</li> <li>Loss of coolant accident (LOCA) (early stages)</li> </ul> <p>The limiting event for release of primary coolant activity is the SLB. The SLB dose analysis considers the possibility of a pre-existing iodine spike (in which case the maximum LCO of 60 <math>\mu\text{Ci/gm}</math> DOSE EQUIVALENT I-131 is assumed) as well as the more likely initiation of an iodine spike due to the reactor trip and depressurization. In the latter case, the LCO of 1.0 <math>\mu\text{Ci/gm}</math> DOSE EQUIVALENT I-131 is assumed at the initiation of the accident, but the primary coolant specific activity is assumed to increase with time due to the elevated iodine appearance rate in the coolant. The reactor coolant noble gas specific activity for both cases is</p>

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**BASES**

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**APPLICABLE SAFETY ANALYSES (continued)**

assumed to be the LCO of 280  $\mu\text{Ci/gm}$  DOSE EQUIVALENT XE-133. The safety analysis assumes the specific activity of the secondary coolant at its limit of 0.1  $\mu\text{Ci/gm}$  DOSE EQUIVALENT I-131 from LCO 3.7.4, "Secondary Specific Activity."

The LCO limits ensure that, in either case, the doses reported in FSAR Chapter 15 remain bounding.

The RCS specific activity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

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**LCO**

The specific iodine activity is limited to 1.0  $\mu\text{Ci/gm}$  DOSE EQUIVALENT I-131, and the specific noble gas activity is limited to 280  $\mu\text{Ci/gm}$  DOSE EQUIVALENT XE-133. These limits ensure that the doses resulting from a DBA will be within the values reported in Chapter 15. Secondary coolant activities are addressed by LCO 3.7.4, "Secondary Specific Activity."

The SLB and SGTR accident analyses (Refs. 1 and 2) show that the offsite doses are within acceptance limits. Violation of the LCO may result in reactor coolant radioactivity levels that could, in the event of an SLB or SGTR accident, lead to doses that exceed those reported Chapter 15.

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**APPLICABILITY**

In MODES 1 and 2, and in MODE 3 with RCS average temperature  $\geq 500^\circ\text{F}$ , operation within the LCO limits for DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity are necessary to contain the potential consequences of a SGTR to within the calculated site boundary dose values.

For operation in MODE 3 with RCS average temperature  $< 500^\circ\text{F}$  and in MODES 4 and 5, the release of radioactivity in the event of a SGTR is unlikely since the saturation pressure of the reactor coolant is below the lift pressure settings of the main steam safety valves.

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**BASES**

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**ACTIONS**A.1 and A.2

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to verify that DOSE EQUIVALENT I-131 is  $\leq 60 \mu\text{Ci/gm}$ . The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling is to continue to provide a trend.

The DOSE EQUIVALENT I-131 must be restored to normal within 48 hours. If the concentration cannot be restored to within the LCO limit in 48 hours, it is assumed that the LCO violation is not the result of normal iodine spiking.

A Note to the Required Action of Condition A excludes the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE(S) while relying on the ACTIONS even though the ACTIONS may eventually require plant shutdown. This exception is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient specific activity excursions while the plant remains at, or proceeds to power operation.

B.1

With DOSE EQUIVALENT XE-133 in excess of the allowed limit, the plant must be placed in a MODE or condition in which the LCO requirements are not applicable. This is done by placing the plant in at least MODE 3 with RCS average temperature  $< 500^\circ\text{F}$  within 6 hours.

The change to MODE 3 and RCS average temperature  $< 500^\circ\text{F}$  lowers the saturation pressure of the reactor coolant below the set points of the main steam safety valves, and prevents venting the SG to the environment in a SGTR event. The allowed Completion Time of 6 hours is reasonable, based on operating experience to reach MODE 3 from full power conditions in an orderly manner, without challenging plant systems.

C.1

If a Required Action and the associated Completion Time of Condition A is not met or if the DOSE EQUIVALENT I-131 is  $> 60 \mu\text{Ci/gm}$ ., the reactor must be brought to MODE 3 with RCS average temperature  $< 500^\circ\text{F}$  within 6 hours. The Completion Time of 6 hours is reasonable, based on operation experience, to reach MODE 3 below  $500^\circ\text{F}$  from full

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**BASES**

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**ACTIONS (continued)**

power conditions in an orderly manner and without challenging plant systems.

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**SURVEILLANCE  
REQUIREMENTS**SR 3.4.10.1

SR 3.4.10.1 requires performing a measure of the noble gas specific activity of the reactor coolant at least once every 7 days. This is a quantitative measure of radionuclides with half lives longer than 15 minutes. This Surveillance provides an indication of any increase in the release of noble gas activity from fuel rods containing cladding defects.

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The 7 day Frequency considers the unlikelihood of a significant increase in fuel defect level during the time.

SR 3.4.10.2

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  2. FSAR Section 15.6.3, "Steam Generator Tube Rupture."
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