

**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

**STS NUREGs Affected:**

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

**NRC Approval Date:**

TSTF-359-A, Rev 9: 12-May-03

**TSTF Classification:**

TSTF-359-A, Rev 9: 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 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 changes: (1) that were applicable to previous designs, but are not to the current design; (2) that are already incorporated in the GTS; and (3) that are superseded by another change.

None

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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)**

None

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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:**

GTS 3.4.10 Action A Note is revised to state that "LCO 3.0.4.c is applicable." Points a, b, and c are added to LCO 3.0.4 and associated bases discussion regarding when entry into a higher MODE is permissible. The clarified statement of LCO 3.0.4 eliminates the need for many LCO 3.0.4 exceptions in many LCOs. Therefore, references to LCO 3.0.4 in other LCO Action Notes are eliminated or revised. (TSTF-359-A)

Bases 3.4.10 Action A Note discussion is revised to support the above change. (TSTF-359-A)

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 the current Required Action B.1 is not completed within 4 hours. Current 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 current Required Action B.1. (DOC L16)

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## **VI. Traveler Information**

### **Description of TSTF changes:**

AP1000 GTS LCO 3.0.4 is revised to allow entry into a MODE or other specified condition in the Applicability while relying on the associated ACTIONS, provided that there is a risk assessment performed which justifies the use of LCO 3.0.4, the ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time, or an NRC approved allowance is provided in the Specification to be entered. The current AP1000 GTS LCO 3.0.4 allows entry into a MODE or a specified condition in the Applicability, while relying on the associated ACTIONS, only if the ACTIONS permit continued operation in the MODE or other specified condition in the Applicability for a unlimited period of time, or if an NRC approved allowance is provided in the Specification to be entered. SR 3.0.4 is revised to reflect the concepts of the change to LCO 3.0.4. The applicability of LCO 3.0.4 and SR 3.0.4 is expanded to include transition into all MODES or other specified conditions in the Applicability, except when required to comply with ACTIONS or that are part of a shutdown of the unit. As a result, many LCO exceptions to LCO 3.0.4 can be eliminated or revised.

### **Rationale for TSTF changes:**

TSTF-359-A reflects the allowances of LCO 3.0.4, which are based on NRC Generic Letter 87-09. GL 87-09 indicates that with respect to unnecessary restrictions on MODE changes, "Specification LCO 3.0.4 unduly restricts facility operation when conformance with Action Requirements provides an acceptable level of safety for continued operation. For an LCO that has Action Requirements permitting continued operation for an unlimited period of time, entry into an operation MODE or other specified condition of operation should be permitted in accordance with the Action Requirements." This is still overly restrictive. For example, the startup of a unit could be delayed due to the current restrictions of LCO 3.0.4. A single maintenance activity that is almost complete could cause significant delays and changes in a previously well thought out plan for returning the unit to service. In such situations, allowing the unit to enter the MODE or other specified condition in the Applicability would allow the work to be completed while reducing the likelihood of human error caused by expediting the completion of required Surveillances and maintenance activities. Therefore, application of TSTF-359-A to the AP1000 GTS provides necessary standardization and consistency to the use and application of LCO 3.0.4.

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

VEGP LAR 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  $\leq 60 \mu\text{Ci/gm}$ ."

VEGP LAR 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:**

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

VEGP LAR DOC L16 deletes Required Action B.1 because it does not specify a default condition to enter in the event the current Required Action B.1 is not completed within 4 hours. Current 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 current Required Action B.1. Therefore, deleting the current 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:**

Not Applicable

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

Not Applicable

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## VII. GTST Safety Evaluation

### Technical Analysis:

TSTF-359-A allows entry into a higher mode of operation, or other specified condition in the TS applicability, while relying on the TS conditions, and associated required actions and completion times, provided a risk assessment is performed to confirm the acceptability of that action. Technical specifications have taken advantage of risk technology as experience and capability have increased. The proposal revises STS LCO 3.0.4 and SR 3.0.4, and their application to the TS. New paragraphs (a), (b), and (c) are proposed for LCO 3.0.4.

The proposed LCO 3.0.4(a) retains the current allowance, permitting the mode change when the TS required actions allow indefinite operation.

The addition of LCO 3.0.4(b), which allows entry into a MODE or other specified condition in the Applicability while relying on ACTIONS based on a risk assessment, is reasonable based on many factors. The licensee, and particularly the licensee management, is always responsible for maintaining overall plant configuration and safety. Developments in the Maintenance Rule and other Industry/NRC initiatives (including the configuration risk management programs) enhance the tools available to licensees to assess the risk associated with various plant configurations. This change is a logical step of requiring licensees to assess the application of LCO 3.0.4 allowances in light of the newly available tools and information.

The risk assessment may consider a variety of factors, but will focus on managing plant risk. Consideration would be given to the probability of completing restoration such that the requirements of the LCO would be met prior to the ACTIONS requiring that the Applicability be exited. The assessment may also establish appropriate compensatory measures to enhance safe and effective operations until restoration of compliance with the LCO. The proposed change would provide the flexibility of not restricting which MODES can be entered while relying on the ACTIONS, as do the current LCO 3.0.4 exceptions, but would add the requirement to assess the risks prior to making the MODE change when using LCO 3.0.4(b).

When an LCO is not met, the licensee must restore compliance with the LCO consistent with the requirements of the TS. This restoration may include corrective maintenance. 10CFR50.65 requires that licensees assess the effect equipment maintenance will have on the plant's capability to perform safety functions before beginning any maintenance activity on structures, systems, or components within the scope of the maintenance rule. Plant procedures must be in place to implement 10 CFR 50.65(a)(4) to address the situation where entering a mode or other specified condition in the applicability is contemplated with plant equipment inoperable. Such plant procedures typically follow the guidance in NUMARC 93-01, Section 11, as revised in February 2000 and endorsed by NRC RG 1.182.

The LCO 3.0.4(b) allowance does not apply to values and parameters of the TSs that have their own respective LCOs (e.g., Reactor Coolant System Specific Activity), but instead those values and parameters are addressed by LCO 3.0.4(c). The LCO 3.0.4(c) allowances apply to parameters and values which have been previously approved by the NRC in a plant's specific TS. The licensee will provide in their TS Bases a discussion and list of each NRC-approved, LCO 3.0.4(c)-specific value and parameter allowance. The risk assessments performed to justify the use of LCO 3.0.4(b) usually only consider systems and components. For this reason, LCO 3.0.4(c) is typically applied to Specifications which describe values and parameters (e.g., [Containment Air Temperature, Containment Pressure, Moderator Temperature Coefficient]), and may be applied to other Specifications based on NRC plant-specific approval. The TS



values and parameters, for which mode transition allowances apply, will have a note that states LCO 3.0.4(c) is applicable.

Accident analyses presented in the UFSAR do not address the effects of the plant being in ACTIONS. The accident analyses assume that the necessary equipment is available and then, in most cases, assumes the single most limiting active failure occurs. It is this assumption that leads to limiting the length of Completion Times in order to minimize the length of time that the plant is not within the initial conditions of the accident analysis. This change does not affect the Completion Times. Therefore, this proposal would not affect the accident analyses and is therefore acceptable.

VEGP LAR 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, Required Action B.1 currently 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, Required Action B.2 currently 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 the current Required Action B.1 is not completed within 4 hours. Current 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 the current Required Action B.1. Therefore, deleting the current 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 the current Required Action B.2. This provides assurance that requirements of the safety analyses are preserved.

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.

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

TSTF-359-A: Federal Register /Vol. 68, No. 65 / Friday, April 4, 2003 /Notices  
VEGP LAR SER (Reference 3)

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**VIII. Review Information**

**Evaluator Comments:**

None

Randy Belles  
Oak Ridge National Laboratory  
865-574-0388  
bellesrj@ornl.gov

**Review Information:**

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on Friday, May 16, 2014.

**NRC Final Approval Date:**

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**NRC Contact:**

Hien Le  
United States Nuclear Regulatory Commission (US NRC)  
301-415-1511  
Hien.Le@nrc.gov

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

The database does not yet recognize non-breaking hyphens or spaces. For Rev. 0 of this GTST, it was necessary to manually insert (1) non-breaking hyphens as necessary to interlock designations such as P-10 to avoid breaking across the end of a line; and (2) non-breaking spaces as necessary to (a) keep symbols such as “≥” with the subsequent value; and (b) avoid stranding a number value on a subsequent line, such as MODE 5.

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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:

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|-------------|---|
| 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)
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**XI. MARKUP of the Applicable GTS Section 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 3.0.4c is <del>not</del> 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} &lt; 500^\circ\text{F}</math>.</b></p> <p><del>AND</del></p> <p><del>B.2 Be in MODE 3 with <math>T_{avg} &lt; 500^\circ\text{F}</math>.</del></p>	<p><b>46</b> hours</p> <p><del>6</del> 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 $\mu\text{Ci/gm}$ .	C.1 Be in MODE 3 with $T_{\text{avg}} < 500^{\circ}\text{F}$ .	6 hours

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.10.1 Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity $\leq 280 \mu\text{Ci/gm}$ .	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 $\leq 1.0 \mu\text{Ci/gm}$ .	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



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**B 3.4 REACTOR COOLANT SYSTEM (RCS)****B 3.4.10 RCS Specific Activity****BASES**

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**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 Chapter 15).

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**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

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**BASES**

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**APPLICABLE SAFETY ANALYSES (continued)**

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 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 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.

## BASES

## 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 **permits the use of the provisions of LCO 3.0.4.c to the Required Action of Condition A** ~~excludes the MODE change restriction of LCO 3.0.4.~~ This **allowance permits entry into the applicable MODE(S) while relying on the ACTIONS** ~~exception allows entry into the applicable MODE(S) while relying on the ACTIONS even though the ACTIONS may eventually require plant shutdown.~~ This **allowance** ~~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  $< 500^\circ\text{F}$  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  $< 500^\circ\text{F}$  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.

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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.

**BASES**

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- REFERENCES
1. Section 15.1.5, "Steam System Piping Failure."
  2. 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°F.

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. DOSE EQUIVALENT I-131 > 1.0 $\mu$ Ci/gm.	<p>-----NOTE----- LCO 3.0.4c is applicable. -----</p> <p>A.1    Verify DOSE EQUIVALENT I-131 <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>
B. DOSE EQUIVALENT XE-133 > 280 $\mu$ Ci/gm.	B.1    Be in MODE 3 with $T_{avg}$ < 500°F.	6 hours
C. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>  DOSE EQUIVALENT I-131 > 60 $\mu$ Ci/gm.	C.1    Be in MODE 3 with $T_{avg}$ < 500°F.	6 hours

## SURVEILLANCE REQUIREMENTS

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



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## B 3.4 REACTOR COOLANT SYSTEM (RCS)

### B 3.4.10 RCS Specific Activity

#### BASES

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**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 Chapter 15).

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**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

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**BASES**

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**APPLICABLE SAFETY ANALYSES (continued)**

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 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 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 permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S) while relying on the ACTIONS. This allowance 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 power conditions in an orderly manner and without challenging plant systems.

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**BASES**

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