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

Title: Changes Related to LCO 3.4.7, RCS Operational Leakage

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

TSTF Number and Title:

TSTF-425-A, Rev 3, Relocate Surveillance Frequencies to Licensee Control – RITSTF Initiative 5b
TSTF-449-A, Rev 4, Steam Generator Tube Integrity

STS NUREGs Affected:

TSTF-425-A, Rev 3: NUREGs 1430, 1431, 1432, 1433, and 1434
TSTF-449-A, Rev 4: NUREGs 1430, 1431, and 1432

NRC Approval Date:

TSTF-425-A, Rev. 3: 06-Jul-09
TSTF-449-A, Rev 4: 06-May-05

TSTF Classification:

TSTF-425-A, Rev 3: Technical Change
TSTF-449-A, Rev 4: Technical Change

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

RCOL Std. Dep. Number and Title:

There are no Vogtle departures applicable to Specification 3.4.7.

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to Specification 3.4.7.

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 A064: GTS 3.4.17, "Chemical and Volume Control System (CVS) Makeup Isolation Valves," is combined with STS 3.1.9 and GTS 3.4.18 is renumbered

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(1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.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-425-A deferred for future consideration.

TSTF-449-A has been applied to AP1000 GTS 3.4.7, Rev 19 by Westinghouse. TSTF-449-A is not considered further as a part of this GTST. The Federal Register Notice (FRN) of Availability reference for TSTF-449-A is Volume 70, No. 87, Friday, May 6, 2005.

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)

Revise the second paragraph of the “SRs” section of the Bases, under the heading “SR 3.4.7.1,” by changing “a RCS” to “an RCS” since the “R” is pronounced with a vowel sound. (NRC Staff Comment)

Revise the second paragraph of the “SRs” section of the Bases, under the heading “SR 3.4.7.2,” definition of “steady state” to exactly match AP1000 DCD 5.2.5.3.2. (NRC Staff Comment)

Identify all acronyms at the first occurrence in the Bases discussion.

APOG Recommended Changes to Improve the Bases

Append the following paragraph to the text in the “Background” section of the Bases:

LCO 3.4.15, “RCS Pressure Isolation Valve (PIV) Integrity,” measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leak tight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

This change is consistent with NUREG-1431 LCO 3.4.14. The discussion regarding treatment of leakage through PIVs aids in more fully describing RCS operational leakage.

Change the word “operation” in the first sentence of the “LCO” section of the Bases to “operational” to provide improved clarity, consistency, and operator usability. In addition, change “are” to “is” in the fourth sentence of the “LCO” section of the Bases under the heading “Pressure Boundary LEAKAGE” to provide improved clarity, consistency, and operator usability.

Revise “If leaked through many cracks, the cracks are very small, and...” in the second sentence of the “LCO” section of the Bases under the heading “IRWST LEAKAGE through the PRHR HX” to “If the leakage is through many cracks, and the cracks are very small, then...” to provide improved clarity, consistency, and operator usability.

The GTS 3.4.9 “Applicability” section of the Bases discussion of “RCS inventory monitoring via the pressurizer level changes...” should be deleted because monitoring pressurizer level changes is not part of RCS Leakage Detection Instrumentation. The indirect relation to RCS inventory balance is a discussion item for GTS 3.4.7, “RCS Operational LEAKAGE.” Therefore, the following GTS Bases sentence should be moved to the SR 3.4.7.1 Bases discussion:

RCS inventory monitoring via the pressurizer level changes is valid in MODES 1, 2, 3, and 4 only when RCS conditions are stable, i.e., temperature is constant, pressure is constant, no makeup and no letdown.

Revise the fourth paragraph of the “SRs” section of the Bases, under the heading “SR 3.4.7.1,” definition of “steady state” to match AP1000 DCD 5.2.5.3.2. The current Bases discussion incorrectly defines steady state. There are no RCP seals, and no seal injection or seal return flow in the AP1000 design:

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer **level**, and ~~makeup tank levels, and with no makeup or letdown~~ **reactor coolant drain tank and in-containment refueling water storage tank levels**.

Revise the second paragraph of the "SRs" section of the Bases, under the heading "SR 3.4.7.2," definition of "steady state" to match AP1000 DCD 5.2.5.3.2. The current Bases discussion incorrectly defines steady state. There are no RCP seals, and no seal injection or seal return flow in the AP1000 design:

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer **level**, and **reactor coolant drain tank and in-containment refueling water storage tank levels**, and ~~makeup tank levels, makeup and letdown, and RCP seal injection and return~~ flows.

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)

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

Section 3.4.7, RCS Operational LEAKAGE

Changes to the Generic Technical Specifications and Bases:

A paragraph is added to the end of the “Background” section of the Bases for consistency with NUREG-1431. (APOG Comment)

The first sentence of the “LCO” section of the Bases is revised to improve clarity, consistency, and operator usability. (APOG Comment)

The fourth sentence of the “LCO” section of the Bases is revised to improve clarity, consistency, and operator usability. (APOG Comment)

The second sentence of the “LCO” section of the Bases under the heading “IRWST LEAKAGE through the PRHR HX” is revised to improve clarity, consistency, and operator usability. (APOG Comment)

The fifth paragraph of the SR 3.4.7.1 Bases discussion is revised. (APOG Comment)

The “SRs” section of the Bases under the heading “SR 3.4.7.1 is revised to correct a factual error. (APOG Comment and NRC Staff Edit)

The “SRs” section of the Bases under the heading “SR 3.4.7.2 is revised to correct a factual error. (APOG Comment and NRC Staff Edit)

Reference to LCO 3.4.18 is revised to LCO 3.4.17 in the Bases discussion for SR 3.4.7.2. This is a result of the elimination of LCO 3.4.17 and renumbering of LCO 3.4.18. (DOC A064)

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

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 A064 deletes TS 3.4.17.

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

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

DOC A064 deletes TS 3.4.17 because TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves," provides similar requirements.

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

The following paragraph is appended to the text in the "Background" section of the Bases (APOG Comment):

LCO 3.4.15, "RCS Pressure Isolation Valve (PIV) Integrity," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leak tight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

The word "operation" in the first sentence of the "LCO" section of the Bases is revised to "operational." In addition, "are" is changed to "is" in the fourth sentence of the "LCO" section of the Bases under the heading "Pressure Boundary LEAKAGE." (APOG Comment)

Revise the second sentence of the "LCO" section of the Bases under the heading "IRWST LEAKAGE through the PRHR HX" from "If leaked through many cracks, the cracks are very small, and..." to "If the leakage is through many cracks, and the cracks are very small, then..." (APOG Comment)

The second paragraph of the “SRs” section of the Bases, under the heading “SR 3.4.7.1” is revised by changing “a RCS” to “an RCS” since the “R” is pronounced with a vowel sound. (NRC Staff Comment)

The fourth paragraph of the “SRs” section of the Bases, under the heading “SR 3.4.7.1” is revised to state (APOG Comment):

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer **level**, and ~~makeup tank levels, and with no makeup or letdown~~ **reactor coolant drain tank and in-containment refueling water storage tank levels**.

The fifth paragraph in the “SRs” section of the Bases under the heading “SR 3.4.7.1” is revised by adding the following as the first sentence (APOG Comment and NRC Staff Edit):

RCS inventory monitoring via the pressurizer level changes is valid in MODES 1, 2, 3, and 4 only when RCS conditions are stable, as described above.

The second paragraph of the “SRs” section of the Bases, under the heading “SR 3.4.7.2” is revised to state (APOG Comment and NRC Staff Edit):

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer **level**, and ~~makeup tank levels, makeup and letdown, and RCP seal injection and return flows~~ **reactor coolant drain tank and in-containment refueling water storage tank levels**.

All acronyms are identified at the first occurrence in the Bases discussion.

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 revision to the “Background” section of the Bases is consistent with NUREG-1431 LCO 3.4.14. The discussion regarding treatment of leakage through PIVs aids in more fully describing RCS operational leakage.

The revisions to the “LCO” section of the Bases are non-technical and they provide improved clarity, consistency, and operator usability.

The non-technical change to the second paragraph of the “SRs” section of the Bases provides improved clarity, consistency, and operator usability.

The definition of “steady state” in the “SRs” section of the Bases, under the heading “SR 3.4.7.1” is revised to match AP1000 DCD 5.2.5.3.2. The current Bases discussion incorrectly defines steady state. There are no RCP seals, and no seal injection or seal return flow in the AP1000 design:

A sentence is relocated to the SR 3.4.7.1 Bases discussion because the current location of the sentence in the GTS 3.4.9 “Applicability” section of the Bases is not part of RCS Leakage Detection Instrumentation. The indirect relation to RCS inventory balance is a discussion item that is better suited for GTS 3.4.7, “RCS Operational LEAKAGE.”

The definition of “steady state” in the “SRs” section of the Bases, under the heading “SR 3.4.7.2” is revised to match AP1000 DCD 5.2.5.3.2. The current Bases discussion incorrectly defines steady state. There are no RCP seals, and no seal injection or seal return flow in the AP1000 design:

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

VII. GTST Safety Evaluation**Technical Analysis:**

The definitions of “steady state” in the “SRs” section of the Bases under the headings “SR 3.7.2.1” and “SR 3.7.2.2” are revised to match AP1000 DCD 5.2.5.3.2. The GTS Bases incorrectly defines steady state. There are no RCP seals, and no seal injection or seal return flow in the AP1000 design. The proposed change to the “SRs” section of the GTS 3.4.7 Bases is acceptable because it corrects a factual error related to the reactor design.

The sentence (edited) in the STS 3.4.9 “Applicability” section of the Bases:

RCS inventory monitoring via the pressurizer level changes is valid in
MODES 1, 2, 3, and 4 only when RCS conditions are stable, as described above.

is relocated to the SR 3.4.7.1 Bases discussion because the current location of the sentence in the STS 3.4.9 is not applicable to RCS Leakage Detection Instrumentation. The indirect relation to RCS inventory balance is a discussion item that is better suited for STS 3.4.7, “RCS Operational LEAKAGE.” The proposed change to the “SRs” section of the GTS 3.4.7 Bases is administrative because it does not result in a technical change and is, therefore, acceptable.

The 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 3.4.7 is an acceptable model Specification for the AP1000 standard reactor design.

References to Previous NRC Safety Evaluation Reports (SERs):

None

VIII. Review Information**Evaluator Comments:**

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

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

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

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

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

5. (Internal # 242) In the “Background” section of the Bases append the following paragraph to the text:

LCO 3.4.15, “RCS Pressure Isolation Valve (PIV) Integrity,” measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leak tight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

This change is consistent with NUREG-1431 LCO 3.4.14. The discussion regarding treatment of leakage through PIVs aids in more fully describing RCS operational leakage. This is resolved by making the recommended change.

6. (Internal # 243) APOG recommends changing “operation” in the first sentence of the “LCO” section of the Bases to “operational” to provide improved clarity, consistency, and operator usability. In addition, “are” should be changed to “is” in the fourth sentence of the “LCO” section of the Bases under the heading “Pressure Boundary LEAKAGE” to provide improved clarity, consistency, and operator usability. This is resolved by making the recommended changes.
7. (Internal # 244) APOG recommends changing the second sentence of the “LCO” section of the Bases under the heading “IRWST LEAKAGE through the PRHR HX” from “If leaked through many cracks, the cracks are very small, and...” to “If the leakage is through many cracks, and the cracks are very small, then...” to provide improved clarity, consistency, and operator usability. This is resolved by making the recommended changes.
8. (Internal # 245) In the “SRs” section of the Bases, under the heading “SR 3.4.7.1,” revise the fourth paragraph definition of “steady state” to match AP1000 DCD 5.2.5.3.2. The current Bases discussion incorrectly defines steady state. There are no RCP seals, and no seal injection or seal return flow in the AP1000 design.

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer **level**, and ~~makeup tank levels, and with no makeup or letdown~~ **reactor coolant drain tank and in-containment refueling water storage tank levels.**

This is resolved by making the recommended change with an additional edit. In the “SRs” section of the Bases, under the heading “SR 3.4.7.1,” revise the second paragraph by changing “a RCS” to “an RCS” since the “R” is pronounced with a vowel sound.

9. (Internal # 246) APOG recommends revising the STS 3.4.9 “Applicability” section of the Bases to delete discussion of “RCS inventory monitoring via the pressurizer level changes...” (Internal # 256) because monitoring pressurizer level changes is not part of RCS Leakage Detection Instrumentation. The indirect relation to RCS inventory balance is a discussion item for STS 3.4.7, “RCS Operational LEAKAGE.” Therefore, move the following GTS Bases sentence to the SR 3.4.7.1 Bases discussion:

RCS inventory monitoring via the pressurizer level changes is valid in MODES 1, 2, 3, and 4 only when RCS conditions are stable, i.e., temperature is constant, pressure is constant, no makeup and no letdown.

This is resolved by making the recommended change with a modification:

RCS inventory monitoring via the pressurizer level changes is valid in MODES 1, 2, 3, and 4 only when RCS conditions are stable, as described above.

10. (Internal # 247) In the “SRs” section of the Bases, under the heading “SR 3.4.7.2,” revise the second paragraph definition of “steady state” to match AP1000 DCD 5.2.5.3.2. The current Bases discussion incorrectly defines steady state. There are no RCP seals, and no seal injection or seal return flow in the AP1000 design.

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer **level**, and **reactor coolant drain tank and in-containment refueling water storage tank levels**, and ~~makeup tank levels~~, makeup and letdown, ~~and RCP seal injection and return~~ flows.

This is resolved by making the recommended change with an additional edit to fully match DCD Rev. 19 Section 5.2.5.3.2, second paragraph, third sentence:

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer **level**, and ~~makeup tank levels~~, ~~makeup and letdown~~, and ~~RCP seal injection and return flows~~. **reactor coolant drain tank and in-containment refueling water storage tank levels**.

NRC Final Approval Date: 12/7/2015

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

None

X. References Used in GTST

1. AP1000 DCD, Revision 19, Section 16, "Technical Specifications," June 2011 (ML11171A500).
2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Technical Specifications Upgrade License Amendment Request, February 24, 2011 (ML12065A057).
3. NRC Safety Evaluation (SE) for Amendment No. 13 to Combined License (COL) No. NPF-91 for Vogtle Electric Generating Plant (VEGP) Unit 3, and Amendment No. 13 to COL No. NPF-92 for VEGP Unit 4, September 9, 2013, ADAMS Package Accession No. ML13238A337, which contains:
 - ML13238A355 Cover Letter - Issuance of License Amendment No. 13 for Vogtle Units 3 and 4 (LAR 12-002).
 - ML13238A359 Enclosure 1 - Amendment No. 13 to COL No. NPF-91
 - ML13239A256 Enclosure 2 - Amendment No. 13 to COL No. NPF-92
 - ML13239A284 Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13)
 - ML13239A287 Enclosure 4 - Safety Evaluation (SE), and Attachment 1 - Acronyms
 - ML13239A288 SE Attachment 2 - Table A - Administrative Changes
 - ML13239A319 SE Attachment 3 - Table M - More Restrictive Changes
 - ML13239A333 SE Attachment 4 - Table R - Relocated Specifications
 - ML13239A331 SE Attachment 5 - Table D - Detail Removed Changes
 - ML13239A316 SE Attachment 6 - Table L - Less Restrictive Changes

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

- ML13277A616 Letter - Correction To The Attachment (Replacement Pages) - Vogtle Electric Generating Plant Units 3 and 4-Issuance of Amendment Re: Technical Specifications Upgrade (LAR 12-002) (TAC No. RP9402)
 - ML13277A637 Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13) (corrected)
4. TSTF-GG-05-01, "Writer's Guide for Plant-Specific Improved Technical Specifications," June 2005.
 5. 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).
 6. 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)

7. 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.

RCS Operational LEAKAGE
3.4.7

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Operational LEAKAGE

- LCO 3.4.7 RCS operational LEAKAGE shall be limited to:
- a. No pressure boundary LEAKAGE,
 - b. 0.5 gpm unidentified LEAKAGE,
 - c. 10 gpm identified LEAKAGE from the RCS,
 - d. 150 gallons per day primary to secondary LEAKAGE through any one Steam Generator (SG), and
 - e. 500 gallons per day primary to In-Containment Refueling Water Storage Tank (IRWST) LEAKAGE through the passive residual heat removal heat exchanger (PRHR HX).

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours

RCS Operational LEAKAGE
3.4.7

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
<u>OR</u>	<u>AND</u>	
Pressure boundary LEAKAGE exists.	B.2 Be in MODE 5.	36 hours
<u>OR</u>		
Primary to secondary LEAKAGE not within limit.		

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.7.1 -----NOTES----- 1. Not required to be performed until 12 hours after establishment of steady state operation. 2. Not applicable to primary to secondary LEAKAGE. ----- Verify RCS operational LEAKAGE is within limits by performance of RCS water inventory balance.	72 hours

RCS Operational LEAKAGE
3.4.7

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.7.2	<p>-----NOTE-----</p> <p>Not required to be performed until 12 hours after establishment of steady state operation.</p> <p>-----</p> <p>Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG.</p>	72 hours

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.7 RCS Operational LEAKAGE

BASES

BACKGROUND

Components that contain or transport the coolant to or from the reactor core comprise the RCS. Component joints are made by welding, bolting, rolling, or pressure loading, and valves isolate connecting systems from the RCS.

During plant life, the joint and valve interfaces can produce varying amounts of reactor coolant LEAKAGE, through either normal operational wear or mechanical deterioration. The purpose of the RCS Operational LEAKAGE LCO is to limit system operation in the presence of LEAKAGE from these sources to amounts that do not compromise safety. This LCO specifies the types and amounts of LEAKAGE.

10 CFR 50, Appendix A, GDC 30 (Ref. 1), requires means for detecting and, to the extent practical, identifying the source of reactor coolant LEAKAGE. Regulatory Guide 1.45 (Ref. 2) describes acceptable methods for selecting leakage detection systems.

The safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS LEAKAGE into the containment area is necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE is necessary to provide quantitative information to the operators, allowing them to take corrective action should a leak occur that is detrimental to the safety of the facility and the public.

A limited amount of LEAKAGE inside containment is expected from auxiliary systems that cannot be made 100% leaktight. LEAKAGE from these systems should be detected, located, and isolated from the containment atmosphere, if possible, to not interfere with RCS LEAKAGE detection.

This LCO deals with protection of the reactor coolant pressure boundary (RCPB) from degradation and the core from inadequate cooling, in addition to preventing the accident analyses radiation release assumptions from being exceeded. The consequences of violating this LCO include the possibility of a loss of coolant accident (LOCA).

BASES

BACKGROUND (continued)

LCO 3.4.15, "RCS Pressure Isolation Valve (PIV) Integrity," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leak tight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

APPLICABLE
SAFETY
ANALYSES

Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA. The amount of LEAKAGE can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes a 300 gpd primary to secondary LEAKAGE as the initial condition.

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a steam line break (SLB) accident. To a lesser extent, other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leak contaminates the secondary fluid.

The **FSAR** Chapter 15 (Ref. 3) analyses for the accidents involving secondary side releases assume 150 gpd primary to secondary LEAKAGE in each generator as an initial condition. The design basis radiological consequences resulting from a postulated SLB accident and SGTR are provided in Sections 15.1.5 and 15.6.3 of **FSAR** Chapter 15, respectively.

The RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS operational **al** LEAKAGE shall be limited to:

BASES

LCO (continued)

a. Pressure Boundary LEAKAGE

No pressure boundary LEAKAGE is allowed, being indicative of material deterioration. LEAKAGE of this type is unacceptable as the leak itself could cause further deterioration, resulting in higher LEAKAGE. Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets ~~is are~~ not pressure boundary LEAKAGE.

b. Unidentified LEAKAGE

0.5 gpm of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air F18 particulate radioactivity monitoring and containment sump level monitoring equipment, can detect within a reasonable time period. This leak rate supports leak before break (LBB) criteria. Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS Makeup System. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include pressure boundary LEAKAGE. Violation of this LCO could result in continued degradation of a component or system.

d. Primary to Secondary LEAKAGE through One SG

The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, Steam Generator Program Guidelines (Ref. 4). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator

BASES

LCO (continued)

Program is an effective measure for minimizing the frequency of steam generator tube ruptures.

- e. Primary to In-Containment Refueling Water Storage Tank (IRWST) LEAKAGE through the Passive Residual Heat Removal Heat Exchanger (PRHR HX)

The 500 gpd limit from the PRHR HX is based on the assumption that a single crack leaking this amount would not lead to a PRHR HX tube rupture under the stress condition of an RCS pressure increase event. If ~~the leakage is leaked~~ through many cracks, ~~and~~ the cracks are very small, ~~then and~~ the above assumption is conservative. This is conservative because the thickness of the PRHR HX tubes is approximately 60% greater than the thickness of the SG tubes. Furthermore, a PRHR HX tube rupture would result in an isolable leak and would not lead to a direct release of radioactivity to the atmosphere.

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

ACTIONSA.1

Unidentified LEAKAGE or identified LEAKAGE in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

BASES

ACTIONS (continued)

B.1 and B.2

If any pressure boundary LEAKAGE exists, or primary to secondary LEAKAGE is not within limits, or if unidentified or identified LEAKAGE cannot be reduced to within limits within 4 hours, the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. The reactor must be brought to MODE 3 within 6 hours and to MODE 5 within 36 hours. This action reduces the LEAKAGE and also reduces the factors which tend to degrade the pressure boundary.

The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without ACTIONS challenging plant systems. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

SURVEILLANCE
REQUIREMENTSSR 3.4.7.1

Verifying RCS LEAKAGE within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection.

Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be met with the reactor at steady state operating conditions. The Surveillance is modified by two Notes. Note 1 states that this SR is not required to be performed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer level, and reactor coolant drain tank and in-containment refueling

BASES

SURVEILLANCE REQUIREMENTS (continued)

water storage tank (IRWST) levels ~~makeup tank levels, and with no makeup or letdown.~~

RCS inventory monitoring via pressurizer level changes is valid in MODES 1, 2, 3, and 4 only when RCS conditions are stable, as described above. An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere F18 particulate radioactivity and the containment sump level. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. These LEAKAGE detection systems are specified in LCO 3.4.9, "RCS LEAKAGE Detection Instrumentation."

Note 2 states that this SR is not applicable to primary to secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

The containment atmosphere F18 particulate radioactivity LEAKAGE measurement is valid only for plant power > 20% RTP.

The containment atmosphere F18 particulate radioactivity LEAKAGE measurement during MODE 1 is not valid while containment purge occurs or within 2 hours after the end of containment purge.

The containment sump level change method of detecting leaks during MODES 1, 2, 3, and 4 is not valid while containment purge occurs or within 2 hours after the end of containment purge.

The containment sump level change method of detecting leaks during MODES 1, 2, 3, and 4 is not valid during extremely cold outside ambient conditions when frost is forming in the interior of the containment vessel.

The 72 hour Frequency is a reasonable interval to trend LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.7.2

This SR verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.4.1817, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG.

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer level, and ~~makeup tank levels, makeup and letdown, and RCP seal injection and return flows.~~ reactor coolant drain tank and IRWST levels.

The Surveillance Frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

REFERENCES

1. 10 CFR 50, Appendix A GDC 30.
 2. Regulatory Guide 1.45, May 1973.
 3. FSAR Chapter 15, "Accident ~~Analyses~~-Analysis."
 4. NEI-97-06 – "Steam Generator Program Guidelines."
 5. EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."
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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.

RCS Operational LEAKAGE
3.4.7

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Operational LEAKAGE

- LCO 3.4.7 RCS operational LEAKAGE shall be limited to:
- a. No pressure boundary LEAKAGE,
 - b. 0.5 gpm unidentified LEAKAGE,
 - c. 10 gpm identified LEAKAGE from the RCS,
 - d. 150 gallons per day primary to secondary LEAKAGE through any one Steam Generator (SG), and
 - e. 500 gallons per day primary to In-Containment Refueling Water Storage Tank (IRWST) LEAKAGE through the passive residual heat removal heat exchanger (PRHR HX).

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours

RCS Operational LEAKAGE
3.4.7

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
<u>OR</u>	<u>AND</u>	
Pressure boundary LEAKAGE exists.	B.2 Be in MODE 5.	36 hours
<u>OR</u>		
Primary to secondary LEAKAGE not within limit.		

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.7.1 -----NOTES----- 1. Not required to be performed until 12 hours after establishment of steady state operation. 2. Not applicable to primary to secondary LEAKAGE. ----- Verify RCS operational LEAKAGE is within limits by performance of RCS water inventory balance.	72 hours

RCS Operational LEAKAGE
3.4.7

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.7.2	<p>-----NOTE----- Not required to be performed until 12 hours after establishment of steady state operation. -----</p> <p>Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG.</p>	72 hours

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.7 RCS Operational LEAKAGE

BASES

BACKGROUND	<p>Components that contain or transport the coolant to or from the reactor core comprise the RCS. Component joints are made by welding, bolting, rolling, or pressure loading, and valves isolate connecting systems from the RCS.</p> <p>During plant life, the joint and valve interfaces can produce varying amounts of reactor coolant LEAKAGE, through either normal operational wear or mechanical deterioration. The purpose of the RCS Operational LEAKAGE LCO is to limit system operation in the presence of LEAKAGE from these sources to amounts that do not compromise safety. This LCO specifies the types and amounts of LEAKAGE.</p> <p>10 CFR 50, Appendix A, GDC 30 (Ref. 1), requires means for detecting and, to the extent practical, identifying the source of reactor coolant LEAKAGE. Regulatory Guide 1.45 (Ref. 2) describes acceptable methods for selecting leakage detection systems.</p> <p>The safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS LEAKAGE into the containment area is necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE is necessary to provide quantitative information to the operators, allowing them to take corrective action should a leak occur that is detrimental to the safety of the facility and the public.</p> <p>A limited amount of LEAKAGE inside containment is expected from auxiliary systems that cannot be made 100% leaktight. LEAKAGE from these systems should be detected, located, and isolated from the containment atmosphere, if possible, to not interfere with RCS LEAKAGE detection.</p> <p>This LCO deals with protection of the reactor coolant pressure boundary (RCPB) from degradation and the core from inadequate cooling, in addition to preventing the accident analyses radiation release assumptions from being exceeded. The consequences of violating this LCO include the possibility of a loss of coolant accident (LOCA).</p>
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BASES

BACKGROUND (continued)

LCO 3.4.15, "RCS Pressure Isolation Valve (PIV) Integrity," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leak tight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

APPLICABLE
SAFETY
ANALYSES

Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA. The amount of LEAKAGE can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes a 300 gpd primary to secondary LEAKAGE as the initial condition.

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a steam line break (SLB) accident. To a lesser extent, other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leak contaminates the secondary fluid.

The FSAR Chapter 15 (Ref. 3) analyses for the accidents involving secondary side releases assume 150 gpd primary to secondary LEAKAGE in each generator as an initial condition. The design basis radiological consequences resulting from a postulated SLB accident and SGTR are provided in Sections 15.1.5 and 15.6.3 of FSAR Chapter 15, respectively.

The RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS operational LEAKAGE shall be limited to:

a. Pressure Boundary LEAKAGE

No pressure boundary LEAKAGE is allowed, being indicative of material deterioration. LEAKAGE of this type is unacceptable as the leak itself could cause further deterioration, resulting in higher LEAKAGE. Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.

BASES

LCO (continued)

b. Unidentified LEAKAGE

0.5 gpm of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air F18 particulate radioactivity monitoring and containment sump level monitoring equipment, can detect within a reasonable time period. This leak rate supports leak before break (LBB) criteria. Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS Makeup System. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include pressure boundary LEAKAGE. Violation of this LCO could result in continued degradation of a component or system.

d. Primary to Secondary LEAKAGE through One SG

The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, Steam Generator Program Guidelines (Ref. 4). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures.

BASES

LCO (continued)

- e. Primary to In-Containment Refueling Water Storage Tank (IRWST) LEAKAGE through the Passive Residual Heat Removal Heat Exchanger (PRHR HX)

The 500 gpd limit from the PRHR HX is based on the assumption that a single crack leaking this amount would not lead to a PRHR HX tube rupture under the stress condition of an RCS pressure increase event. If the leakage is through many cracks, and the cracks are very small, then the above assumption is conservative. This is conservative because the thickness of the PRHR HX tubes is approximately 60% greater than the thickness of the SG tubes. Furthermore, a PRHR HX tube rupture would result in an isolable leak and would not lead to a direct release of radioactivity to the atmosphere.

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

ACTIONSA.1

Unidentified LEAKAGE or identified LEAKAGE in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

B.1 and B.2

If any pressure boundary LEAKAGE exists, or primary to secondary LEAKAGE is not within limits, or if unidentified or identified LEAKAGE cannot be reduced to within limits within 4 hours, the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. The reactor must be brought to MODE 3 within 6 hours and to MODE 5

BASES

ACTIONS (continued)

within 36 hours. This action reduces the LEAKAGE and also reduces the factors which tend to degrade the pressure boundary.

The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without ACTIONS challenging plant systems. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

SURVEILLANCE
REQUIREMENTSSR 3.4.7.1

Verifying RCS LEAKAGE within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection.

Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be met with the reactor at steady state operating conditions. The Surveillance is modified by two Notes. Note 1 states that this SR is not required to be performed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer level, and reactor coolant drain tank and in-containment refueling water storage tank (IRWST) levels.

RCS inventory monitoring via pressurizer level changes is valid in MODES 1, 2, 3, and 4 only when RCS conditions are stable, as described above. An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere F18 particulate radioactivity and the containment sump level. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. These LEAKAGE

BASES

SURVEILLANCE REQUIREMENTS (continued)

detection systems are specified in LCO 3.4.9, "RCS LEAKAGE Detection Instrumentation."

Note 2 states that this SR is not applicable to primary to secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

The containment atmosphere F18 particulate radioactivity LEAKAGE measurement is valid only for plant power > 20% RTP.

The containment atmosphere F18 particulate radioactivity LEAKAGE measurement during MODE 1 is not valid while containment purge occurs or within 2 hours after the end of containment purge.

The containment sump level change method of detecting leaks during MODES 1, 2, 3, and 4 is not valid while containment purge occurs or within 2 hours after the end of containment purge.

The containment sump level change method of detecting leaks during MODES 1, 2, 3, and 4 is not valid during extremely cold outside ambient conditions when frost is forming in the interior of the containment vessel.

The 72 hour Frequency is a reasonable interval to trend LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.

SR 3.4.7.2

This SR verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.4.17, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer level, and reactor coolant drain tank and IRWST levels.

The Surveillance Frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

REFERENCES

1. 10 CFR 50, Appendix A GDC 30.
 2. Regulatory Guide 1.45, May 1973.
 3. FSAR Chapter 15, "Accident Analyses."
 4. NEI-97-06 – "Steam Generator Program Guidelines."
 5. EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."
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