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

Title: Changes Related to LCO 3.4.15, RCS Pressure Isolation Valve 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-479-A, Rev 0, Changes to Reflect Revision of 10 CFR 50.55a

STS NUREGs Affected:

TSTF-425-A, Rev 3: NUREGs 1430, 1431, 1432, 1433, and 1434
TSTF-479-A, Rev 0: NUREGs 1430, 1431, 1432, 1433, and 1434

NRC Approval Date:

TSTF-425-A, Rev. 3: 06-Jul-09
TSTF-479-A, Rev 0: 06-Dec-05

TSTF Classification:

TSTF-425-A, Rev 3: Technical Change
TSTF-479-A, Rev 0: 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 3.4.15.

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to Specification 3.4.15.

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.

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(1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.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-479-A has been applied to AP1000 GTS 3.4.15, Rev 19 by Westinghouse. TSTF-479-A will not be discussed further as a part of this GTST.

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)

Grammatical errors are corrected in several places in the bases.

Revise the next to last sentence of the first paragraph of the "Background" section of the Bases to provide improved clarity, consistency, and operator usability:

> ...The ~~AP1000~~ **RCS** PIVs are listed in **FSAR** Chapter 3, Table 3.9**-**18.

Revise the second sentence of the second paragraph of the "Background" section of the Bases to provide improved clarity, consistency, and operator usability:

> ...The following criteria **were** ~~was~~ used in identifying **RCS** PIVs for inclusion in the specification...

Revise the fifth and sixth paragraphs of the "Background" section of the Bases to provide improved clarity, consistency, and operator usability:

> ...The **RCS** PIVs that are addressed by this specification are listed in **FSAR** Chapter 3, Table 3.9-18.
>
> The CVS ~~pressure isolation valves~~ **PIVs** were not included in this specification based on the defined criteria. The justification for excluding the CVS PIVs is discussed in the following paragraph.

In the "ASA" section of the Bases, revise first paragraph first sentence as indicated:

> ~~Pressure isolation valve~~**RCS PIV** integrity is not considered in any design basis accident analyses.

In the "Applicability" section of the Bases, revise first and second paragraphs, as indicated:

> In MODES 1, 2, and 3**,** and MODE 4~~,~~ with RCS not being cooled by the RNS, this LCO applies when the RCS is pressurized.
>
> In MODE 4~~,~~ with RNS in operation, and **in** MODES 5 and 6, the RCS pressure is reduced and is not sufficient to overpressurize the connected low pressure systems.

In the "Actions" section of the Bases, second paragraph under the heading "A.1"; revise last sentence, as indicated:

> The 8 hour Completion Time allows **a reasonable time to perform** the actions and **appropriately** restricts ~~the~~ **unit** operation with inoperable ~~isolation valves~~**RCS PIVs**.

In the "Actions" section of the Bases, under the heading "A.2"; revise both paragraphs, as indicated:

> If leakage into ~~the~~ **an** accumulator~~s~~ increased to the allowable operational leakage limit **for the accumulator's check valve**, then the **accumulator**

isolation valve could be used to isolate ~~the~~ **its associated** accumulator~~s~~ from the RCS.

The 72 hour Completion Time allows **a reasonable time to perform** the actions and **appropriately** restricts ~~the~~ **unit** operation with inoperable ~~isolation valves~~**RCS PIVs**.

In the "Actions" section of the Bases, under the heading "B.1 and B.2"; revise the first paragraph, as indicated:

If **RCS** PIV integrity cannot be restored, the **connected** system **cannot be** isolated, or the other Required Actions **cannot be** accomplished, the ~~plant~~ **unit** must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This ~~Action~~ **action** may reduce the leakage and reduces the potential for a LOCA outside containment.

APOG Recommended Changes to Improve the Bases

Revise the last sentence of the first paragraph of the "Background" section of the Bases to provide improved clarity, consistency, and operator usability:

The RCS PIV Leakage LCO allows RCS high pressure operation when PIV leakage has been verified **to be within limits**.

Revise the fourth paragraph of the "Background" section of the Bases to provide improved clarity, consistency, and operator usability:

The RNS pressure boundary isolation valves ~~are considered to~~ meet the first criterion for inclusion in this specification. The PXS accumulator check valves were determined to meet the second PIV **criterion** ~~criteria~~ for inclusion in this specification. It is determined that the CVS PIVs do not meet either **criterion** ~~criteria~~ for inclusion in this specification.

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 3.4.15, RCS Pressure Isolation Valve (PIV) Integrity

Changes to the Generic Technical Specifications and Bases:

The last two sentences of the first paragraph in the “Background” section of the Bases are revised. (APOG Comment and NRC Staff Edit)

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

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

The fifth and sixth paragraphs in the “Background” section of the Bases are revised to improve clarity, consistency, and operator usability. (NRC Staff Comment)

The first sentence of the first paragraph in the “ASA” section of the Bases is revised to improve clarity, consistency, and operator usability. (NRC Staff Comment)

The first and second paragraphs in the “Applicability” section of the Bases are revised to improve clarity, consistency, and operator usability. (NRC Staff Comment)

The second paragraph under the heading “A.1” in the “Actions” section of the Bases is revised to improve clarity, consistency, and operator usability. (NRC Staff Comment)

The discussion under the heading “A.2” in the “Actions” section of the Bases is revised to improve clarity, consistency, and operator usability. (NRC Staff Comment)

The first paragraph in the “Actions” section of the Bases, under the heading “B.1 and B.2 is revised to improve clarity, consistency, and operator usability. (NRC Staff Comment)

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:

Not Applicable

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

Not Applicable

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

Grammatical errors are corrected in several places in the bases.

The last two sentences of the first paragraph in the "Background" section of the Bases are revised (APOG Comment and NRC Staff Comment):

> ...The ~~AP1000~~ **RCS** PIVs are listed in **FSAR** Chapter 3, Table 3.9**-**18. The RCS PIV Leakage LCO allows RCS high pressure operation when PIV leakage has been verified **to be within limits**.

The second sentence of the second paragraph in the "Background" section of the Bases is revised (NRC Staff Comment):

> ...The following criteria **were** ~~was~~ used in identifying **RCS** PIVs for inclusion in the specification...

The fourth paragraph of the "Background" section of the Bases is revised (APOG Comment):

> The RNS pressure boundary isolation valves ~~are considered to~~ meet the first criterion for inclusion in this specification. The PXS accumulator check valves were determined to meet the second PIV **criterion** ~~criteria~~ for inclusion in this specification. It is determined that the CVS PIVs do not meet either **criterion** ~~criteria~~ for inclusion in this specification.

The fifth and sixth paragraphs in the "Background" section of the Bases are revised (NRC Staff Comment):

> ...The **RCS** PIVs that are addressed by this specification are listed in **FSAR** Chapter 3, Table 3.9-18.

The CVS ~~pressure isolation valves~~ **PIVs** were not included in this specification based on the defined criteria. The justification for excluding the CVS PIVs is discussed in the following paragraph.

The first paragraph first sentence in the “ASA” section of the Bases is revised (NRC Staff Comment):

~~Pressure isolation valve~~**RCS PIV** integrity is not considered in any design basis accident analyses.

The first and second paragraphs in the “Applicability” section of the Bases are revised (NRC Staff Comment):

In MODES 1, 2, and 3**,** and MODE 4~~,~~ with RCS not being cooled by the RNS, this LCO applies when the RCS is pressurized.

In MODE 4~~,~~ with RNS in operation, and **in** MODES 5 and 6, the RCS pressure is reduced and is not sufficient to overpressurize the connected low pressure systems.

The second paragraph under the heading “A.1” in the “Actions” section of the Bases is revised (NRC Staff Comment):

The 8 hour Completion Time allows **a reasonable time to perform** the actions and **appropriately** restricts ~~the~~ **unit** operation with inoperable ~~isolation valves~~**RCS PIVs**.

The discussion under the heading “A.2” is revised (NRC Staff Comment):

If leakage into ~~the~~ **an** accumulator~~s~~ increased to the allowable operational leakage limit **for the accumulator’s check valve**, then the **accumulator isolation** valve could be used to isolate ~~the~~ **its associated accumulator** ~~accumulators~~ from the RCS.

The 72 hour Completion Time allows **a reasonable time to perform** the actions and **appropriately** restricts ~~the~~ **unit** operation with inoperable ~~isolation valves~~**RCS PIVs**.

In the “Actions” section of the Bases, under the heading “B.1 and B.2”; revise the first paragraph, as indicated (NRC Staff Comment):

If **RCS** PIV integrity cannot be restored, the **connected** system **cannot be** isolated, or the other Required Actions **cannot be** accomplished, the ~~plant~~ **unit** must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This ~~Action~~ **action** may reduce the leakage and reduces the potential for a LOCA outside containment.

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:

Provide correct grammar.

These non-technical changes to the “Background” section of the Bases provide improved clarity, consistency, and operator usability.

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

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

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

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

VII. GTST Safety Evaluation

Technical Analysis:

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

References to Previous NRC Safety Evaluation Reports (SERs):

Not Applicable

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

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

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

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

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

   NRC Staff disagreed with implementing TSTF-425 in the initial version of the STS. Although the APOG thinks the analysis supporting this traveler is general enough to be applicable to AP1000, staff thinks an AP1000-specific proposal from APOG is needed to

identify any GTS SRs that should be excluded. Also, with the adoption of a Surveillance Frequency Control Program (SFCP) in the AP1000 STS, bracketed Frequencies, which provide a choice between the GTS Frequency and the SFCP Frequency, are needed because the NRC will use the AP1000 STS as a reference, and to be consistent with NUREG-1431, Rev. 4. APOG was requested to consider proposing an AP1000 version of TSTF-425 for a subsequent revision of the STS.

4. (Internal # 285) An editorial change is recommended to the "Background" section of the Bases. Revise the last sentence of the first paragraph, as indicated:

> The RCS PIV Leakage LCO allows RCS high pressure operation when PIV leakage has been verified **to be within limits**.

This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change with additional edits:

> ...The ~~AP1000~~ **RCS** PIVs are listed in **FSAR** Chapter 3, Table 3.9**-**18. The RCS PIV Leakage LCO allows RCS high pressure operation when PIV leakage has been verified **to be within limits**.

The second sentence of the second paragraph is revised:

> ...The following criteria **were** ~~was~~ used in identifying **RCS** PIVs for inclusion in the specification...

The fifth and sixth paragraphs are revised:

> ...The **RCS** PIVs that are addressed by this specification are listed in **FSAR** Chapter 3, Table 3.9-18.
>
> The CVS ~~pressure isolation valves~~ **PIVs** were not included in this specification based on the defined criteria. The justification for excluding the CVS PIVs is discussed in the following paragraph.

5. (Internal # 286) An editorial change is recommended to the "Background" section of the Bases. Revise the fourth paragraph, as indicated:

> The RNS pressure boundary isolation valves ~~are considered to~~ meet the first criterion for inclusion in this specification. The PXS accumulator check valves were determined to meet the second PIV **criterion** ~~criteria~~ for inclusion in this specification. It is determined that the CVS PIVs do not meet either **criterion** ~~criteria~~ for inclusion in this specification.

This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change with additional edits:

In the "ASA" section of the Bases, revise first paragraph first sentence as indicated:

> ~~Pressure isolation valve~~**RCS PIV** integrity is not considered in any design basis accident analyses.

In the "Applicability" section of the Bases, revise first and second paragraphs, as indicated:

In MODES 1, 2, and 3**,** and MODE 4~~,~~ with RCS not being cooled by the RNS, this LCO applies when the RCS is pressurized.

In MODE 4~~,~~ with RNS in operation, and **in** MODES 5 and 6, the RCS pressure is reduced and is not sufficient to overpressurize the connected low pressure systems.

In the "Actions" section of the Bases, second paragraph under the heading "A.1"; revise last sentence, as indicated:

The 8 hour Completion Time allows **a reasonable time to perform** the actions and **appropriately** restricts ~~the~~ **unit** operation with inoperable ~~isolation valves~~**RCS PIVs**.

In the "Actions" section of the Bases, under the heading "A.2"; revise both paragraphs, as indicated:

If leakage into ~~the~~ **an** accumulator~~s~~ increased to the allowable operational leakage limit **for the accumulator's check valve**, then the **accumulator isolation** valve could be used to isolate ~~the~~ **its associated accumulator** ~~accumulators~~ from the RCS.

The 72 hour Completion Time allows **a reasonable time to perform** the actions and **appropriately** restricts ~~the~~ **unit** operation with inoperable ~~isolation valves~~**RCS PIVs**.

In the "Actions" section of the Bases, under the heading "B.1 and B.2"; revise the first paragraph, as indicated:

If **RCS** PIV integrity cannot be restored, the **connected** system **cannot be** isolated, or the other Required Actions **cannot be** accomplished, the ~~plant~~ **unit** must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This ~~Action~~ **action** may reduce the leakage and reduces the potential for a LOCA outside containment.

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).

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

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

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

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.15 RCS Pressure Isolation Valve (PIV) Integrity

LCO 3.4.15 Leakage from each RCS PIV shall be within limit.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4~~,~~ with the RCS not being cooled by the Normal Residual Heat Removal System (RNS).

ACTIONS

----------NOTES----------

1. Separate Condition entry is allowed for each flow path.

2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable **RCS** PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Leakage from one or more RCS PIVs not within limit.	----------NOTE---------- Each valve used to satisfy Required Action A.1 and Required Action A.2 must have been verified to meet SR 3.4.15.1 and be in the reactor coolant pressure boundary or the high pressure portion of the system. ---------- A.1 Isolate the high pressure portion of the affected system from the low pressure portion by use of one closed manual, deactivated automatic, or check valve. AND	8 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 Verify a second OPERABLE PIV can meet the leakage limits. This valve is required to be a check valve, or a closed valve, if it isolates a line that penetrates containment.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.15.1	Verify leakage of each RCS PIV is equivalent to ≤ 0.5 gpm per nominal inch valve size up to a maximum of 5 gpm at an RCS pressure ≥ 2215 and ≤ 2255 psig.	24 months

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.15 RCS Pressure Isolation Valve (PIV) Integrity

BASES

BACKGROUND

10 CFR 50.2, 10 CFR 50.55a(c), and GDC 55 of 10 CFR 50, Appendix A (Refs. 1, 2, and 3), define the RCS pressure boundary as all those pressure containing components such as pressure vessels, piping, pumps, and valves which are connected to the reactor coolant system, up to and including the outermost containment isolation valve in system piping which penetrates primary reactor containment, the second of two valves normally closed during normal reactor operation in system piping which does not penetrate primary reactor containment, and the reactor coolant system safety and relief valves. This includes any two normally closed valves in series within the reactor coolant pressure boundary (RCPB), which separate the high pressure RCS from an attached low pressure system. During their lives, these valves can experience varying amounts of reactor coolant leakage through either normal operational wear or mechanical deterioration. The **RCS** ~~AP1000~~ PIVs are listed in **FSAR** Chapter 3, Table 3.9 18. The RCS PIV Leakage LCO allows RCS high pressure operation when PIV leakage has been verified **to be within limits**.

The purpose of this specification is to prevent overpressure failure or degradation of low pressure portions of connecting systems. The following criteria **were** ~~was~~ used in identifying **RCS** PIVs for inclusion in the specification. A valve was included in this specification if its failure may result in:

1. Failure of low pressure portions of connected systems, such as a Loss of Coolant Accident (LOCA) outside of containment, which could place the plant in an unanalyzed condition.

2. Degradation of low pressure portions of connected systems, such as damage to a core cooling system, which could degrade a safety related function that mitigates a DBA.

BASES

BACKGROUND (continued)

Valves considered for inclusion in this specification are used to isolate the RCS from the following connected systems:

a. Passive Core Cooling System (PXS) Accumulators;

b. Normal Residual Heat Removal System (RNS); and

c. Chemical and Volume Control System (CVS).

The RNS pressure boundary isolation valves ~~are considered to~~ meet the first criterion for inclusion in this specification. The PXS accumulator check valves were determined to meet the second PIV **criterion** ~~criteria~~ for inclusion in this specification. It is determined that the CVS PIVs do not meet either **criterion** ~~criteria~~ for inclusion in this specification.

The **RCS** PIVs that are addressed by this specification are listed in **FSAR** Chapter 3, Table 3.9-18.

The CVS **PIVs** ~~pressure isolation valves~~ were not included in this specification based on the defined criteria. The justification for excluding the CVS PIVs is discussed in the following paragraph.

The CVS contains four high pressure/low pressure connections with the RCS. Since the portion of the CVS which is located inside reactor containment is designed to full RCS pressure, the high pressure/low pressure interfaces with the RCS are the lines that penetrate the reactor containment. The CVS lines that penetrate containment include the makeup line, the letdown line to the Liquid Radwaste System, the hydrogen supply line, and the demineralizer resin sluice line used to transfer spent resins from the demineralizers to the Solid Radwaste System. These lines each contain two safety related containment isolation valves which are addressed by the Containment Isolation Specification (LCO 3.6.3). In addition to the containment isolation valves in each of the CVS lines that interface with the RCS, there are additional valves in each line that provide diverse isolation capability. Since more restrictive requirements are imposed by LCO 3.6.3, the CVS isolation valves are not included in this LCO.

Since the purpose of this LCO is to verify that the PIVs have not suffered gross failures, the valve leakage test in conjunction with tests specified in the IST program provide an acceptable method of determining valve integrity. The ability of the valves to transition from open to closed

BASES

BACKGROUND (continued)

provides assurance that the valve can perform its pressure isolation function as required. A small amount leakage through these valves is allowed, provided that the integrity of the valve was demonstrated.

Violation of this LCO could result in continued degradation of a PIV, which could lead to overpressurization of a low pressure system or the failure of a safety related function to mitigate a DBA.

APPLICABLE SAFETY ANALYSES

RCS PIV ~~Pressure isolation valve~~ integrity is not considered in any design basis accident analyses. This specification provides for monitoring the condition of the reactor coolant pressure boundary to detect degradation which could lead to accidents or which could impair a connected system's ability to mitigate DBAs.

RCS PIV integrity satisfies~~,~~ Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS PIV leakage is identified LEAKAGE into closed systems connected to the RCS. Isolation valve leakage is usually small. Leakage that increases significantly suggests that something is operationally wrong and corrective action must be taken.

The LCO PIV leakage limit is 0.5 gpm per inch nominal valve size up to a maximum of 5 gpm per valve. This limit is well within the makeup capability of the CVS makeup pumps. This leak rate will not result in the overpressure of a connected low pressure system. Reference 5 permits leakage testing at a lower pressure differential than between the specified maximum RCS pressure and the normal pressure of the connected system during RCS operation (the maximum pressure differential) in those types of valves in which the higher service pressure will tend to diminish the overall leakage of the valve. In such cases, the observed leakage rate at lower differential pressures can be assumed to be the leakage at the maximum pressure differential. Verification that the valve leakage diminishes with increasing pressure differential is sufficient to verify that the valve characteristics are such that higher service pressure results in a decrease in overall leakage.

APPLICABILITY

In MODES 1, 2, and 3, and MODE 4~~,~~ with RCS not being cooled by the RNS, this LCO applies when the RCS is pressurized.

BASES

APPLICABILITY (continued)

In MODE 4~~,~~ with RNS in operation, and **in** MODES 5 and 6, the RCS pressure is reduced and is not sufficient to overpressurize the connected low pressure systems.

ACTIONS

The ACTIONS are modified by two Notes. Note 1 provides clarification that each flow path allows separate entry into a Condition. This is allowed based upon the functional independence of the flow path. Note 2 requires an evaluation of affected systems if a PIV is inoperable. The pressurization may have affected system OPERABILITY, or isolation of an affected flow path with an alternate valve may have degraded the ability of the interconnected system to perform its safety function.

A.1

With one or more PIVs inoperable, the affected flow path(s) must be isolated. Required Action A.1 is modified by a Note that the valves used for isolation must meet the same integrity requirements as the PIVs and must be within the RCPB or the high pressure portion of the system.

Required Action A.1 requires that the isolation with one valve must be performed within 8 hours. Eight hours provides time to verify IST compliance for the alternate isolation valve and isolate the flow path. The 8 hour Completion Time allows **a reasonable time to perform** the actions and **appropriately** restricts **unit** ~~the~~ operation with inoperable **RCS PIVs**~~isolation valves~~.

A.2

Required Action A.2 specifies verification that a second OPERABLE PIV can meet the leakage limits. This valve is required to be a check valve, or a closed valve, if it isolates a line that penetrates containment. For the accumulator valves, the normally open accumulator isolation valve is a suitable replacement PIV, but can remain open because leakage into the accumulator is continuously monitored. If leakage into **an** ~~the~~ accumulator~~s~~ increased to the allowable operational leakage limit **for the accumulator's check valve**, then the **accumulator isolation** valve could be used to isolate **its associated** ~~the~~ accumulator~~s~~ from the RCS.

The 72 hour Completion Time allows **a reasonable time to perform** the actions and **appropriately** restricts **unit** ~~the~~ operation with inoperable **RCS PIVs**~~isolation valves~~.

BASES

ACTIONS (continued)

B.1 and B.2

If **RCS** PIV integrity cannot be restored, the **connected** system **cannot be** isolated, or the other Required Actions **cannot be** accomplished, the **unit** ~~plant~~ must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This **action** ~~Action~~ may reduce the leakage and reduces the potential for a LOCA outside containment.

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1

Performance of leakage testing on each RCS PIV or isolation valve used to satisfy Required Action A.1 and Required Action A.2 is required to verify that leakage is below the specified limit and to identify each leaking valve. The leakage limit of 0.5 gpm per inch nominal valve size up to a minimum of 5 gpm applies to each valve. Leakage testing requires a stable pressure condition.

For the two PIVs in series, the leakage requirement applies to each valve individually and not to the combined leakage across both valves. If the PIVs are not individually leakage tested, one valve may have failed completely and not be detected if the other valve in series meets the leakage requirement. In this situation, the protection provided by redundant valves would be lost.

Testing shall be performed every 24 months, a typical refueling cycle. The 24 month Frequency is consistent with 10 CFR 50.55a(g) (Ref. 4) as contained in the Inservice Testing Program and is within frequency allowed by the American Society of Mechanical Engineers (ASME) OM Code (Ref. 5).

REFERENCES

1. 10 CFR 50.2.

2. 10 CFR 50.55a(c).

3. 10 CFR 50, Appendix A, Section V, GDC 55.

BASES

REFERENCES (continued)

4. 10 CFR 50.55a(g).

5. ASME OM Code, “Code for Operation and Maintenance of Nuclear Power Plants.”

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)

3.4.15 RCS Pressure Isolation Valve (PIV) Integrity

LCO 3.4.15 Leakage from each RCS PIV shall be within limit.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 with the RCS not being cooled by the Normal Residual Heat Removal System (RNS).

ACTIONS

----------NOTES----------

1. Separate Condition entry is allowed for each flow path.

2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable RCS PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Leakage from one or more RCS PIVs not within limit.	----------NOTE---------- Each valve used to satisfy Required Action A.1 and Required Action A.2 must have been verified to meet SR 3.4.15.1 and be in the reactor coolant pressure boundary or the high pressure portion of the system. ---------- A.1 Isolate the high pressure portion of the affected system from the low pressure portion by use of one closed manual, deactivated automatic, or check valve. AND	8 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 Verify a second OPERABLE PIV can meet the leakage limits. This valve is required to be a check valve, or a closed valve, if it isolates a line that penetrates containment.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.15.1	Verify leakage of each RCS PIV is equivalent to ≤ 0.5 gpm per nominal inch valve size up to a maximum of 5 gpm at an RCS pressure ≥ 2215 and ≤ 2255 psig.	24 months

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.15 RCS Pressure Isolation Valve (PIV) Integrity

BASES

BACKGROUND

10 CFR 50.2, 10 CFR 50.55a(c), and GDC 55 of 10 CFR 50, Appendix A (Refs. 1, 2, and 3), define the RCS pressure boundary as all those pressure containing components such as pressure vessels, piping, pumps, and valves which are connected to the reactor coolant system, up to and including the outermost containment isolation valve in system piping which penetrates primary reactor containment, the second of two valves normally closed during normal reactor operation in system piping which does not penetrate primary reactor containment, and the reactor coolant system safety and relief valves. This includes any two normally closed valves in series within the reactor coolant pressure boundary (RCPB), which separate the high pressure RCS from an attached low pressure system. During their lives, these valves can experience varying amounts of reactor coolant leakage through either normal operational wear or mechanical deterioration. The RCS PIVs are listed in FSAR Chapter 3, Table 3.9 18. The RCS PIV Leakage LCO allows RCS high pressure operation when PIV leakage has been verified to be within limits.

The purpose of this specification is to prevent overpressure failure or degradation of low pressure portions of connecting systems. The following criteria were used in identifying RCS PIVs for inclusion in the specification. A valve was included in this specification if its failure may result in:

1. Failure of low pressure portions of connected systems, such as a Loss of Coolant Accident (LOCA) outside of containment, which could place the plant in an unanalyzed condition.

2. Degradation of low pressure portions of connected systems, such as damage to a core cooling system, which could degrade a safety related function that mitigates a DBA.

BASES

BACKGROUND (continued)

Valves considered for inclusion in this specification are used to isolate the RCS from the following connected systems:

a. Passive Core Cooling System (PXS) Accumulators;

b. Normal Residual Heat Removal System (RNS); and

c. Chemical and Volume Control System (CVS).

The RNS pressure boundary isolation valves meet the first criterion for inclusion in this specification. The PXS accumulator check valves were determined to meet the second PIV criterion for inclusion in this specification. It is determined that the CVS PIVs do not meet either criterion for inclusion in this specification.

The RCS PIVs that are addressed by this specification are listed in FSAR Chapter 3, Table 3.9-18.

The CVS PIVs were not included in this specification based on the defined criteria. The justification for excluding the CVS PIVs is discussed in the following paragraph.

The CVS contains four high pressure/low pressure connections with the RCS. Since the portion of the CVS which is located inside reactor containment is designed to full RCS pressure, the high pressure/low pressure interfaces with the RCS are the lines that penetrate the reactor containment. The CVS lines that penetrate containment include the makeup line, the letdown line to the Liquid Radwaste System, the hydrogen supply line, and the demineralizer resin sluice line used to transfer spent resins from the demineralizers to the Solid Radwaste System. These lines each contain two safety related containment isolation valves which are addressed by the Containment Isolation Specification (LCO 3.6.3). In addition to the containment isolation valves in each of the CVS lines that interface with the RCS, there are additional valves in each line that provide diverse isolation capability. Since more restrictive requirements are imposed by LCO 3.6.3, the CVS isolation valves are not included in this LCO.

Since the purpose of this LCO is to verify that the PIVs have not suffered gross failures, the valve leakage test in conjunction with tests specified in the IST program provide an acceptable method of determining valve integrity. The ability of the valves to transition from open to closed

BASES

BACKGROUND (continued)

provides assurance that the valve can perform its pressure isolation function as required. A small amount leakage through these valves is allowed, provided that the integrity of the valve was demonstrated.

Violation of this LCO could result in continued degradation of a PIV, which could lead to overpressurization of a low pressure system or the failure of a safety related function to mitigate a DBA.

APPLICABLE SAFETY ANALYSES

RCS PIV integrity is not considered in any design basis accident analyses. This specification provides for monitoring the condition of the reactor coolant pressure boundary to detect degradation which could lead to accidents or which could impair a connected system's ability to mitigate DBAs.

RCS PIV integrity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS PIV leakage is identified LEAKAGE into closed systems connected to the RCS. Isolation valve leakage is usually small. Leakage that increases significantly suggests that something is operationally wrong and corrective action must be taken.

The LCO PIV leakage limit is 0.5 gpm per inch nominal valve size up to a maximum of 5 gpm per valve. This limit is well within the makeup capability of the CVS makeup pumps. This leak rate will not result in the overpressure of a connected low pressure system. Reference 5 permits leakage testing at a lower pressure differential than between the specified maximum RCS pressure and the normal pressure of the connected system during RCS operation (the maximum pressure differential) in those types of valves in which the higher service pressure will tend to diminish the overall leakage of the valve. In such cases, the observed leakage rate at lower differential pressures can be assumed to be the leakage at the maximum pressure differential. Verification that the valve leakage diminishes with increasing pressure differential is sufficient to verify that the valve characteristics are such that higher service pressure results in a decrease in overall leakage.

APPLICABILITY

In MODES 1, 2, and 3, and MODE 4 with RCS not being cooled by the RNS, this LCO applies when the RCS is pressurized.

BASES

APPLICABILITY (continued)

In MODE 4 with RNS in operation, and in MODES 5 and 6, the RCS pressure is reduced and is not sufficient to overpressurize the connected low pressure systems.

ACTIONS

The ACTIONS are modified by two Notes. Note 1 provides clarification that each flow path allows separate entry into a Condition. This is allowed based upon the functional independence of the flow path. Note 2 requires an evaluation of affected systems if a PIV is inoperable. The pressurization may have affected system OPERABILITY, or isolation of an affected flow path with an alternate valve may have degraded the ability of the interconnected system to perform its safety function.

A.1

With one or more PIVs inoperable, the affected flow path(s) must be isolated. Required Action A.1 is modified by a Note that the valves used for isolation must meet the same integrity requirements as the PIVs and must be within the RCPB or the high pressure portion of the system.

Required Action A.1 requires that the isolation with one valve must be performed within 8 hours. Eight hours provides time to verify IST compliance for the alternate isolation valve and isolate the flow path. The 8 hour Completion Time allows a reasonable time to perform the actions and appropriately restricts unit operation with inoperable RCS PIVs.

A.2

Required Action A.2 specifies verification that a second OPERABLE PIV can meet the leakage limits. This valve is required to be a check valve, or a closed valve, if it isolates a line that penetrates containment. For the accumulator valves, the normally open accumulator isolation valve is a suitable replacement PIV, but can remain open because leakage into the accumulator is continuously monitored. If leakage into an accumulator increased to the allowable operational leakage limit for the accumulator's check valve, then the accumulator isolation valve could be used to isolate its associated accumulator from the RCS.

The 72 hour Completion Time allows a reasonable time to perform the actions and appropriately restricts unit operation with inoperable RCS PIVs.

BASES

ACTIONS (continued)

B.1 and B.2

If RCS PIV integrity cannot be restored, the connected system cannot be isolated, or the other Required Actions cannot be accomplished, the unit must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This action may reduce the leakage and reduces the potential for a LOCA outside containment.

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1

Performance of leakage testing on each RCS PIV or isolation valve used to satisfy Required Action A.1 and Required Action A.2 is required to verify that leakage is below the specified limit and to identify each leaking valve. The leakage limit of 0.5 gpm per inch nominal valve size up to a minimum of 5 gpm applies to each valve. Leakage testing requires a stable pressure condition.

For the two PIVs in series, the leakage requirement applies to each valve individually and not to the combined leakage across both valves. If the PIVs are not individually leakage tested, one valve may have failed completely and not be detected if the other valve in series meets the leakage requirement. In this situation, the protection provided by redundant valves would be lost.

Testing shall be performed every 24 months, a typical refueling cycle. The 24 month Frequency is consistent with 10 CFR 50.55a(g) (Ref. 4) as contained in the Inservice Testing Program and is within frequency allowed by the American Society of Mechanical Engineers (ASME) OM Code (Ref. 5).

REFERENCES

1. 10 CFR 50.2.
2. 10 CFR 50.55a(c).
3. 10 CFR 50, Appendix A, Section V, GDC 55.
4. 10 CFR 50.55a(g).

BASES

REFERENCES (continued)

5. ASME OM Code, “Code for Operation and Maintenance of Nuclear Power Plants.”