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

Title: Changes Related to LCO 3.7.10, Steam Generator (SG) Isolation Valves

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

TSTF Number and Title:

TSTF-359-A, Rev 9, Increase Flexibility in MODE Restraints
TSTF-425-A, Rev 3, Relocate Surveillance Frequencies to Licensee Control – RITSTF Initiative 5b

STS NUREGs Affected:

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

NRC Approval Date:

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

TSTF Classification:

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

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 3.7.10.

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to Specification 3.7.10.

RCOL PTS Change Number and Title:

VEGP LAR DOC A003:	References to various Chapters and Sections of the Final Safety Analysis Report (FSAR) are revised to include FSAR.
VEGP LAR DOC A027	SR Clarification and Consistency with TS Writers Guide
VEGP LAR DOC A106:	Use of Acronym SG
VEGP LAR DOC A107:	TS 3.7.10 Required Action D.2 is deleted
VEGP LAR DOC M04:	TS 3.7.10 addition of Required Action A.2
VEGP LAR DOC M11:	Containment valve isolation revisions to TS 3.7.10
VEGP LAR DOC D12:	Remove valve numbers from SR 3.7.10.1
VEGP LAR DOC L01:	TS Definition for Actuation Device Test is deleted

III. Comments on Relations Among TSTFs, RCOL Std. Dep., RCOL COL Items, and RCOL PTS Changes

This section discusses the considered changes that are: (1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

The justification for TSTF-359 is based on vendor-specific evaluations. For Westinghouse plants, that evaluation is in MUHP-3015, "Qualitative Risk Assessment Supporting Increased Flexibility in Mode Restraints," January 2002. This report evaluated "the key plant changes that occur during the Mode changes so it is possible to identify the initiating events that can occur and systems available for event detection, actuation, and mitigation." It also considered initiating events and equipment available to mitigate those events. Based on that evaluation, Notes were proposed for several systems to prohibit the use of LCO 3.0.4.b. These Notes were applied to LTOP, ECCS-Shutdown, AFW, and AC Sources - Operating. TSTF-359-A also removed existing Notes from the ISTS and revised SR 3.0.4. There is no technical basis for concluding that the analysis performed in support of TSTF-359-A and the high-risk configurations addressed by the Notes are applicable to AP1000 plants. TSTF-359-A is not implemented by this GTST and is deferred for future consideration.

TSTF-425-A deferred for future consideration.

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)

For consistency with other APOG comments, revise the first paragraph, second, third, and fourth paragraphs of the "Background" section of the Bases to state (NRC Staff Comment):

The steam generator **(SG)** isolation valves consist of the

- power operated relief valve**s (PORVs) (SGS-PLV233A & B),**
- **PORV**~~(PORV)~~ block valves (SGS-PL-V027A & B), ~~PORVs (SGS-PLV233A & B),~~ and
- blowdown isolation valves (SGS-PL-V074A & B and SGS-PL-V075A & B).

The PORV flow paths must be isolated following a Steam Generator Tube Rupture (SGTR) **event** to minimize radiological releases. The blowdown flow path must be isolated following Loss of Feedwater and Feedwater Line Break **(FLB)** events to retain the ~~steam generator~~**SG** water inventory for Reactor Coolant System (RCS) heat removal.

A PORV is installed in a 6 inch branch line off of the main steam line piping from each ~~steam generator~~**SG**, to provide for controlled removal of reactor decay heat during normal ~~reactor~~**RCS** cooldown when the main steam isolation valves **(MSIVs)** are closed or the turbine bypass system is not available. A normally-open block valve is provided in each PORV line to provide backup isolation capability. Both the PORV and the block valve receive a Protection and Safety Monitoring System (PMS) isolation signal on ~~low~~ steam line pressure **below the Steam Line Pressure - Low setpoint (Table 3.3.8-1 Function 24) in the associated SG**. The **SG PORV** block **valves are**~~valve is~~ also ~~a~~ containment isolation ~~valve~~**valves**.

The blowdown line from each ~~steam generator~~**SG** is provided with two **in-**series isolation valves, both located outside, but close to, containment. The **two** blowdown valves **for each SG** receive a PMS isolation signal on ~~low~~ SG **water** level **below the SG Narrow Range Water Level - Low setpoint (Table 3.3.8-1 Function 20) in the associated SG. In addition, all four blowdown valves receive a PMS isolation signal** ~~and~~ on **a** Passive Residual Heat Removal (PRHR) actuation **signal**. The first blowdown isolation valve outside of containment **for each SG** is also a containment isolation valve**; these CIVs (SGS PL-V074A & B) also receive a PMS isolation signal on a containment isolation actuation signal**.

The ~~steam generator~~**SG** PORVs and the **SG** blowdown isolation valves fail closed on loss of control or actuation power. The ~~steam generator~~**SG** PORV block valves fail as-is on loss of control or actuation power. The ~~steam generator~~**SG** isolation valves may also be actuated manually.

For consistency with other APOG comments, revise the first paragraph, second, third, and fourth paragraphs of the "ASA" section of the Bases to state (NRC Staff Comment):

The PORV flow paths must be isolated following an SGTR to minimize radiological releases from the ruptured ~~steam generator~~**SG** into the atmosphere. The PORV flow path is assumed to open due to high secondary side pressure,

during the SGTR. Dose analyses take credit for subsequent isolation of the PORV flow path by the PORV ~~and/~~or ~~the~~ block valve**, both of** which receive a ~~close~~**PMS isolation** signal **to close** on ~~low~~ steam line pressure **below the Steam Line Pressure - Low setpoint**.

The blowdown flow path on each SG must be isolated following Loss of Feedwater and ~~Feedwater Line Break~~**FLB** events to retain ~~the steam generator~~**SG** water inventory for use in ~~Reactor Coolant System (RCS)~~**RCS** heat removal via the SGs. RCS heat removal for these events is, primarily, provided by the ~~Passive Residual Heat Removal Heat Exchanger~~ **PRHR heat exchanger** (~~PRHR~~ HX); however, ~~the~~ SG heat removal is **also** assumed. The SG blowdown isolation valves receive ~~an~~**a PMS** isolation signal on ~~low~~ SG level **below the SG Narrow Range Water Level - Low setpoint** ~~or~~**and on** PRHR actuation. ~~These~~**The** Loss of Feedwater **and FLB event analyses** ~~events~~ take credit for ~~steam generator~~**SG** heat removal using the water inventory retained after blowdown isolation. If the blowdown line were not isolated, much of the inventory would drain from the SG rather than cool the RCS.

In addition, the PORV block valves and ~~steam generator~~**SG blowdown valves (closest to each containment penetration) are containment isolation valves and support the assumptions related to minimizing the loss of inventory and establishing the containment boundary during major accidents. Therefore, the safety analysis of any event requiring isolation of containment is applicable to the PORV block valves and** ~~steam generator~~**SG blowdown valves.**

The ~~steam generator~~**SG** isolation valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

For consistency with other APOG comments, revise the first, second, and third paragraphs of the “LCO” section of the Bases to state (NRC Staff Comment):

This LCO requires ~~that~~ the ~~steam generator~~**SG PORV, SG PORV block valve, and ~~steam generator~~SG blowdown** isolation valves ~~consisting of the PORV, PORV block valve, and blowdown isolation valves~~ on each ~~steam generator~~**SG** to be OPERABLE. These isolation valves are considered OPERABLE when the valves are capable of closing on a PMS ~~actuation~~**isolation** signal.

This LCO provides assurance that ~~the steam generator~~**each SG** PORV and **SG** PORV block valve will perform ~~their~~**its** design safety function to mitigate the consequences of an SGTR **event** that could result in offsite exposures.

Additionally, this LCO provides assurance that ~~the steam generator~~**each SG** blowdown isolation ~~valves~~**valve** will perform ~~their~~**its** design safety function to mitigate the consequences of Loss of Feedwater and ~~Feedwater Line Break~~ **FLB** events by retaining ~~the steam generator~~**SG** water inventory for ~~Reactor Coolant System (RCS)~~**RCS** heat removal.

Revise the second paragraph of the “Applicability” section of the Bases to state (NRC Staff Comment):

In MODE 4 with the RCS cooling being provided by the RNS and in MODES 5 and 6, the ~~steam generators~~**SGs** are not needed for RCS cooling and the potential for an SGTR**,** or Loss of Feedwater and ~~Feedwater Line Break~~**FLB**

events is minimized due to the reduced mass and energy in the RCS and ~~steam generators~~**SGs**.

In the “Actions” section of the Bases, insert a blank line under heading “D.1.” (NRC Staff Comment)

Throughout the remainder of the GTS 3.7.10 Bases, replace “steam generator” with “SG” everywhere it occurs. Replace “feedwater line break” with “FLB” everywhere it occurs. (NRC Staff Comment)

The acronym “AOT” is replaced with “Completion Time” in the Bases discussion for Action C.1 and Action D.1. AOT is not a preferred STS acronym.

Additional editorial changes are applied to the Bases to correct grammar.

APOG Recommended Changes to Improve the Bases

Revise the first paragraph of the “LCO” section of the Bases to state:

. . . These isolation valves are considered OPERABLE when the valves are capable of closing on a PMS ~~actuation~~**isolation** signal.

This non-technical change provides consistency with the TS requirement being discussed in the TS Bases.

Revise the first paragraph of the “Applicability” section of the Bases to state:

The steam generator PORV, PORV block valve, and steam generator blowdown isolation valves must be OPERABLE in MODES 1, 2, ~~and~~ 3, and 4**,** where a DBA . . .

This non-technical change provides improved clarity, consistency, and operator usability.

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 3.7.10, Steam Generator (SG) Isolation Valves

Changes to the Generic Technical Specifications and Bases:

The GTS 3.7.10 LCO header is revised from “Steam Generator” to “SG.” This is an appropriate use of the acronym. (DOC A106)

The GTS 3.7.10 LCO Specification statement is revised to list specific flow path isolation valves to provide clarity. (DOC A106)

The GTS 3.7.10 Applicability statement is revised to remove the exception statement for consistency with GTS 3.6.3. The GTS 3.7.10 Applicability is further revised to add a Note stating: “PORV OPERABILITY is not required in MODE 4 with Reactor Coolant System (RCS) being cooled by the Normal Residual Heat Removal System (RNS).” (DOC M11)

The GTS 3.7.10 Action Note 1 is revised to provide appropriate use of SG acronym. (DOC A106)

The GTS 3.7.10 Condition A, B, C, and D statements are revised to provide appropriate use of SG acronym. (DOC A106)

STS 3.7.10 Required Action A.2 Note and statement are added to provide consistency with GTS 3.6.3. (DOC M04 and DOC M11)

GTS 3.7.10 Required Action B.2 is revised to provide clarity. (DOC A106)

GTS 3.7.10 Required Action D.2 is deleted because it is redundant. (DOC A107)

STS 3.7.10 Required Action E.3 Note and statement are added. This provides consistency with GTS 3.6.3 and provides an LCO exit provision. (DOC M11 and DOC L01)

The GTS SR 3.7.10.1 description is revised. Specific valve numbers are removed and the action statement is revised to conform to the TS Writer's Guide (Reference 4). (DOC A027 and DOC D12)

STS SR 3.7.10.2 and SR 3.7.10.3 are added. This provides consistency with GTS 3.6.3. (DOC M11)

The first, second, third, and fourth paragraphs of the “Background” section of the Bases are revised for consistency with other APOG comments. (NRC Staff Comment)

The first, second, third, and fourth paragraphs of the “ASA” section of the Bases are revised for consistency with other APOG comments. (NRC Staff Comment)

The first, second, and third paragraphs of the “LCO” section of the Bases are revised for consistency with the TS requirement being discussed in the TS Bases and other APOG comments. (APOG Comment and NRC Staff Comment)

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

The “Actions” section of the Bases is revised to add a blank line under heading “D.1.” (NRC Staff Comment)

The acronym “AOT” is replaced with “Completion Time” in the Bases discussion for Action C.1 and Action D.1. (NRC Staff Comment)

The phrase “steam generator” is replaced by the acronym “SG” throughout the Bases. (NRC Staff Comment)

The phrase “feedwater line break” is replaced by the acronym “FLB” throughout the Bases. (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:

DOC A027 revises GTS SR 3.7.10.1 from "... is OPERABLE by stroking the valve" to "... strokes."

DOC A106 revises the GTS Title in Header to use the acronym "SG" in place of "Steam Generator." The GTS 3.7.10 LCO statement is revised from "The steam generator isolation valves shall be OPERABLE" to "Each SG power operated relief valve (PORV), PORV block valve, and SG blowdown isolation valve shall be OPERABLE." GTS 3.7.10 Actions Note 1 is revised to use the acronym "SG" in place of "Steam Generator." GTS 3.7.10 Conditions A, B, C, and D are revised to delete the acronym "SG" from the SG isolation valve or valves phrase and include the acronym "SG" before the flow path name. GTS 3.7.10 Required Action B.2 is revised from "Verify that the affected SG blowdown flow path is isolated" to "Verify the affected flow path is isolated."

DOC A107 deletes GTS 3.7.10 Required Action D.2.

DOC M04 revises GTS 3.7.10 Action A as it relates to the SG PORVs to add STS 3.7.10 Required Action A.2 to "verify the affected flow path is isolated" once per 31 days.

DOC M11 revises the GTS 3.7.10 Applicability from "MODES 1, 2, 3, and 4 with the Reactor Coolant System (RCS) not being cooled by the Normal Residual Heat Removal System (RNS)," to STS 3.7.10 Applicability, "MODES 1, 2, 3, and 4." A clarifying Note is added to replace the MODE 4 exception. STS Required Action E.3 is added to "Be in MODE 5" in 36 hours. STS SR 3.7.10.2 and SR 3.7.10.3 are added.

DOC D12 notes that GTS SR 3.7.10.1 includes the valve numbers for the PORVs, PORV block valves, and blowdown isolation valves. The specific valve numbers are deleted from the STS SR.

DOC L01 revises STS SR 3.7.10.3 inserted by DOC M11.

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 A027 provides clarity and is consistent with the TS Writer's Guide (Reference 4).

DOC A106 provides clarity and consistent use of the acronym “SG.”

DOC A107 provides clarity by deleting a redundant Required Action.

DOC M04 provides consistency with GTS 3.6.3 Required Action A.2 and Completion Time. DOC M04 is related to M11.

DOC M11 provides closed system containment isolation valve requirements that are either consistent with or more restrictive than those in GTS 3.6.3.

DOC D12 notes that valves identified by name and valve number are not typically included in STS.

GTS SR 3.3.2.7 (“Perform ACTUATION DEVICE TEST”) and SR 3.3.2.8 (“Perform ACTUATION DEVICE TEST for squib valves”) are deleted from GTS 3.3.2 and Table 3.3.2-1, Function 26.a, ESF Actuation Subsystem per DOC L01. The equivalent requirement (using phrasing generally consistent with NUREG-1431) must be included in individual Specifications for the actuated devices with the same 24 month Frequency as the deleted SRs. Therefore, device-specific SRs such as STS SR 3.7.10.3 must be added with consistent requirements.

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

Revise the first paragraph, second, third, and fourth paragraphs of the “Background” section of the Bases to state (NRC Staff Comment):

> The steam generator **(SG)** isolation valves consist of the
>
> - power operated relief valve**s (PORVs) (SGS-PLV233A & B),**
> - **PORV**~~(PORV)~~ block valves (SGS-PL-V027A & B), ~~PORVs (SGS-PLV233A & B),~~ and
> - blowdown isolation valves (SGS-PL-V074A & B and SGS-PL-V075A & B).
>
> The PORV flow paths must be isolated following a Steam Generator Tube Rupture (SGTR) **event** to minimize radiological releases. The blowdown flow path must be isolated following Loss of Feedwater and Feedwater Line Break **(FLB)** events to retain the ~~steam generator~~**SG** water inventory for Reactor Coolant System (RCS) heat removal.
>
> A PORV is installed in a 6 inch branch line off of the main steam line piping from each ~~steam generator~~**SG**, to provide for controlled removal of reactor decay heat during normal ~~reactor~~**RCS** cooldown when the main steam isolation valves **(MSIVs)** are closed or the turbine bypass system is not available. A normally-open block valve is provided in each PORV line to provide backup isolation capability. Both the PORV and the block valve receive a Protection and Safety Monitoring System (PMS) isolation signal on ~~low~~ steam line pressure **below the Steam Line Pressure - Low setpoint (Table 3.3.8-1 Function 24) in the**

associated SG. The **SG PORV** block **valves are**~~valve is~~ also ~~a~~ containment isolation ~~valve~~**valves**.

The blowdown line from each ~~steam generator~~**SG** is provided with two **in-**series isolation valves, both located outside, but close to, containment. The **two** blowdown valves **for each SG** receive a PMS isolation signal on ~~low~~ SG **water** level **below the SG Narrow Range Water Level - Low setpoint (Table 3.3.8-1 Function 20) in the associated SG. In addition, all four blowdown valves receive a PMS isolation signal** ~~and~~ on **a** Passive Residual Heat Removal (PRHR) actuation **signal**. The first blowdown isolation valve outside of containment **for each SG** is also a containment isolation valve**; these CIVs (SGS PL-V074A & B) also receive a PMS isolation signal on a containment isolation actuation signal**.

The ~~steam generator~~**SG** PORVs and the **SG** blowdown isolation valves fail closed on loss of control or actuation power. The ~~steam generator~~**SG** PORV block valves fail as-is on loss of control or actuation power. The ~~steam generator~~**SG** isolation valves may also be actuated manually.

Revise the first paragraph, second, third, and fourth paragraphs of the “ASA” section of the Bases to state (NRC Staff Comment):

The PORV flow paths must be isolated following an SGTR to minimize radiological releases from the ruptured ~~steam generator~~**SG** into the atmosphere. The PORV flow path is assumed to open due to high secondary side pressure, during the SGTR. Dose analyses take credit for subsequent isolation of the PORV flow path by the PORV ~~and/~~or ~~the~~ block valve**, both of** which receive a ~~close~~**PMS isolation** signal **to close** on ~~low~~ steam line pressure **below the Steam Line Pressure - Low setpoint**.

The blowdown flow path on each SG must be isolated following Loss of Feedwater and ~~Feedwater Line Break~~**FLB** events to retain ~~the steam generator~~**SG** water inventory for use in ~~Reactor Coolant System (RCS)~~**RCS** heat removal via the SGs. RCS heat removal for these events is, primarily, provided by the ~~Passive Residual Heat Removal Heat Exchanger~~ **PRHR heat exchanger** (~~PRHR~~ HX); however, ~~the~~ SG heat removal is **also** assumed. The SG blowdown isolation valves receive ~~an~~**a PMS** isolation signal on ~~low~~ SG level **below the SG Narrow Range Water Level - Low setpoint** ~~or~~**and on** PRHR actuation. ~~These~~**The** Loss of Feedwater **and FLB event analyses** ~~events~~ take credit for ~~steam generator~~**SG** heat removal using the water inventory retained after blowdown isolation. If the blowdown line were not isolated, much of the inventory would drain from the SG rather than cool the RCS.

In addition, the PORV block valves and ~~steam generator~~**SG blowdown valves (closest to each containment penetration) are containment isolation valves and support the assumptions related to minimizing the loss of inventory and establishing the containment boundary during major accidents. Therefore, the safety analysis of any event requiring isolation of containment is applicable to the PORV block valves and** ~~steam generator~~**SG blowdown valves.**

The ~~steam generator~~**SG** isolation valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

Revise the first, second,and third paragraphs of the “LCO” section of the Bases to state (APOG Comment and NRC Staff Comment):

> This LCO requires ~~that~~ the ~~steam generator~~**SG PORV, SG PORV block valve, and ~~steam generator~~SG blowdown** isolation valves ~~consisting of the PORV, PORV block valve, and blowdown isolation valves~~ on each ~~steam generator~~**SG** to be OPERABLE. These isolation valves are considered OPERABLE when the valves are capable of closing on a PMS ~~actuation~~**isolation** signal.
>
> This LCO provides assurance that ~~the steam generator~~**each SG** PORV and **SG** PORV block valve will perform ~~their~~**its** design safety function to mitigate the consequences of an SGTR **event** that could result in offsite exposures.
>
> Additionally, this LCO provides assurance that ~~the steam generator~~**each SG** blowdown isolation ~~valves~~**valve** will perform ~~their~~**its** design safety function to mitigate the consequences of Loss of Feedwater and ~~Feedwater Line Break~~ **FLB** events by retaining ~~the steam generator~~**SG** water inventory for ~~Reactor Coolant System (RCS)~~**RCS** heat removal.

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

> The ~~steam generator~~**SG PORVs, PORV block valves, and ~~steam generator~~ blowdown** isolation valves must be OPERABLE in MODES 1, 2, ~~and~~ 3, and ~~in MODE 4~~**4, where a DBA could cause a release of radioactive material to containment. The Applicability is modified by a Note indicating that PORV OPERABILITY is not required in MODE 4** with the RCS cooling ~~not~~ being provided by the Normal Residual Heat Removal System (RNS).
>
> In MODE 4 with the RCS cooling being provided by the RNS and in MODES 5 and 6, the ~~steam generators~~**SGs** are not needed for RCS cooling and the potential for an SGTR**,** or Loss of Feedwater and ~~Feedwater Line Break~~**FLB** events is minimized due to the reduced mass and energy in the RCS and ~~steam generators~~**SGs**.

In the “Actions” section of the Bases, insert a blank line under heading “D.1.” (NRC Staff Comment)

The acronym “AOT” is replaced with “Completion Time” in the Bases discussion for Action C.1 and Action D.1. (NRC Staff Comment)

Throughout the remainder of the GTS 3.7.10 Bases, replace “steam generator” with “SG” everywhere it occurs. (NRC Staff Comment)

Throughout the remainder of the GTS 3.7.10 Bases, replace “feedwater line break” with “FLB” everywhere it occurs. (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)

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

The non-technical changes to the first, second, third, and fourth paragraphs of the “Background” section of the Bases provide consistency with other APOG comments.

The non-technical changes to the first, second, third, and fourth paragraphs of the “ASA” section of the Bases provide consistency with other APOG comments.

The non-technical changes to the first, second, and third paragraphs of the “LCO” section of the Bases are revised for consistency with the TS requirement being discussed in the TS Bases and other APOG comments.

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

The “Actions” section of the Bases is revised to add a blank line under heading “D.1” in accordance with the TS Writer's Guide.

The acronym “AOT” is replaced in the Bases discussion for Action C.1 and Action D.1 because AOT is not a preferred STS acronym.

The phrase “steam generator” is replaced by the acronym “SG” throughout the Bases for consistency. The phrase “feedwater line break” is replaced by the acronym “FLB” throughout the Bases for consistency.

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 GTS 3.7.10 LCO statement uses the term “steam generator isolation valves.” The intended valves as presented in the bases for GTS 3.7.10 as well as GTS SR 3.7.10.1 are not the only valves that could be considered steam generator (SG) isolation valves. For example, feedwater valves to the SG are also used to “isolate” the SG. GTS SR 3.7.10.1 defines the SG isolation valves as the SG PORVS, the SG PORV block valves, and the SG blowdown isolation valves. Therefore, for clarity, and to preclude any misunderstanding, DOC A106 revises the GTS 3.7.10 LCO statement to indicate that each SG PORV, SG PORV block valve, and SG blowdown isolation valve is required to be operable.

Consistent with this change, GTS 3.7.10 Conditions A, B, C, and D are revised to present the two flow paths (PORV and blowdown) as “SG” flow paths, and acronym “SG” has been deleted from the isolation valve phrase. This is an editorial clarification and provides consistent phrasing, which ensures the Conditions are consistent with the STS 3.7.10 LCO statement. The acronym “SG” is used in various locations in lieu of steam generator since it has been defined in the LCO title. In addition, GTS 3.7.10 Required Action B.2 is revised to be consistent with the terminology used in GTS 3.7.10 Required Action B.1 (which Required Action B.2 is verifying periodically). Convention also uses defined acronyms in the header; therefore “Steam Generator” is replaced with “SG” in the header.

DOC A107 deletes GTS 3.7.10 Required Action D.2. Required Action D.2 is redundant to GTS 3.7.10 Required Action and B.2. Under circumstances where GTS 3.7.10 Condition D applies, GTS 3.7.10 Condition B continues to apply and the respective Required Actions continue to be required. Since GTS 3.7.10 Required Action B.2 requires the affected flow path to be isolated, there is no need to repeat this Required Action in GTS 3.7.10 Required Action D.2. Therefore, the GTS 3.7.10 Required Action D.2 can be deleted with no resultant technical change. This change establishes Actions consistent with the presentation in NUREG-1431 for similar conditions.

DOC M04 revises GTS 3.7.10 Action A as it relates to the SG PORVs to add STS Required Action A.2 to “verify the affected flow path is isolated” once per 31 days. GTS 3.7.10 Action A provides the requirements when one or more PORV flow paths have one isolation valve inoperable. GTS 3.7.10 Required Action A.1 requires isolation of the flow path by use of at least one closed and deactivated automatic valve within 72 hours. Operation with an inoperable isolation valve can then continue indefinitely with no further requirements. STS Required Action A.2 ensures that the flow path that was isolated to comply with GTS 3.7.10 Required Action A.1 is periodically verified to remain isolated. STS 3.7.10 Required Action ensures the closure required by GTS 3.7.10 Required Action A.1 continues to be met when a PORV is inoperable and is consistent with other similar applications. The STS Required Action is also consistent with the similar Required Action for an isolated blowdown flow path (GTS 3.7.10 Required Action B.2). The STS 3.7.10 Required Action A.2 Completion Time is acceptable since it is consistent with the current time for inoperable containment isolation valves in GTS 3.6.3 as discussed under DOC M11.

DOC M11 revises the GTS 3.7.10 Applicability from “MODES 1, 2, 3, and 4 with the Reactor Coolant System (RCS) not being cooled by the Normal Residual Heat Removal System (RNS),” to STS 3.7.10 Applicability, “MODES 1, 2, 3, and 4.”

GTS 3.6.3 provides the requirement for the containment isolation valve function. Some of the valves that are containment isolation valves are also required to be operable to meet other safety related functions and these requirements are provided in separate LCOs. Thus, for certain containment isolation valves on closed systems, the same valve has two separate TS that cover its requirements. GTS 3.7.1 provides requirements for MSSVs, GTS 3.7.2 provides requirements for the MSIVs, GTS 3.7.3 provides requirements for the MFIVs, GTS 3.7.7 provides requirements for the startup feedwater isolation valves, and GTS 3.7.10 provides requirements for the SG power operated relief valve (PORV) block valves and SG blowdown isolation valves.

In lieu of including these valves in both GTS 3.6.3 and their individual Specification, GTS 3.6.3 is revised to exclude all closed system containment isolation valves. All of the moved containment isolation valves are associated with a closed system and they are the only closed system containment isolation valves. The individual Specifications where these valves are moved to include the same or more restrictive requirements as currently in GTS 3.6.3, or have been revised to include the requirements from GTS 3.6.3.

For the SG PORV, SG PORV block valves, and SG blowdown isolation valves the STS 3.7.10 Applicability is consistent with the GTS 3.6.3 Applicability for the SG PORV block valves and SG blowdown isolation valves. The STS Applicability Note limits the PORV Applicability to Mode 4 with RCS not being cooled by RNS, which results in no change to the PORV Applicability. However, the Applicability Note is a positive statement of plant condition and provides better clarity as to when MODE 4 applies.

In conjunction with DOC M04, DOC M11 adds STS Required Action A.2

GTS 3.7.10, Required Action A.1 is more restrictive than the corresponding GTS 3.6.3 Required Action C.1 in that the GTS 3.7.10 action does not provide for the flow path to be isolated by a closed manual valve or blind flange. STS 3.7.10 Required Action A.2 (and associated Notes) is added requiring that the affected SG PORV flow path be verified to be isolated once per 31 days. This added Required Action (and associated Notes) is consistent with GTS 3.6.3 Required Action C.2 for the SG PORV block valves and SG blowdown isolation valves, and is a more restrictive action for the PORV.

Additionally, GTS 3.6.3 Actions Note 1 (“Penetration flow path(s) may be unisolated intermittently under administrative controls”) and Actions Note 2 (“Separate Condition entry is allowed for each penetration flow path”) are consistent with GTS 3.7.10 Actions Notes 1 and 2; therefore GTS 3.7.10 imposes consistent or more restrictive Actions than GTS 3.6.3. GTS 3.6.3 Actions Notes 3 and 4 do not apply to the SG PORV block valves and SG blowdown isolation valves and are not included in STS 3.7.10.

The overall impact on safety from moving the Action requirement for the PORV block valves and SG blowdown isolation valves out of GTS 3.6.3 is minimal. The Actions of STS 3.7.10 for isolation and verification are consistent with or more restrictive than the Actions in GTS 3.6.3.

DOC M11 adds STS Required Action E.3 to “Be in MODE 5” in 36 hours. In the event that the flow path associated with the PORV block valves or SG blowdown isolation valves is not isolated, the default actions of GTS 3.6.3 Action D require being in Mode 3 within 6 hours and being in Mode 5 within 36 hours. To assure these requirements are maintained, a STS 3.7.10 Required Action E.3 is added requiring the plant to be in Mode 5 within 36 hours, which is consistent with GTS 3.6.3 Required Action D.2. The Note associated with STS 3.7.10 Required Action E.3 excluding application to inoperable PORVs is consistent with GTS 3.7.10 actions. These actions provide consistent or more restrictive actions for the SG PORV, PORV block valves and SG blowdown isolation valves as moved from GTS 3.6.3 into STS 3.7.10.

For the SG PORV block valves and SG blowdown isolation valves DOC M11 adds STS SR 3.7.10.2 and SR 3.7.10.3. STS SR 3.7.10.2 requires verification that the isolation time of each SG PORV, SG PORV block valve, and SG blowdown isolation valve is within limits at a Frequency in accordance with the Inservice Testing Program and new SR 3.7.10.3 requires verification that each SG PORV block valve and SG blowdown isolation valve actuates on an actual or simulated actuation signal at a Frequency of 24 months. These STS SRs are consistent with GTS SR 3.6.3.4 and GTS SR 3.6.3.5. GTS TS 3.6.3 SRs 3.6.3.1, 3.6.3.2, and 3.6.3.3 are not applicable to the SG PORV block valves and SG blowdown isolation valves. Therefore, the STS 3.7.10 LCO requirement, Actions, and SRs, as they relate to the SG isolation valves, are either consistent with or more restrictive than those in GTS 3.6.3.

DOC D12 notes that GTS SR 3.7.10.1 includes the valve numbers for the SG PORVs, SG PORV block valves, and blowdown isolation valves. The specific valve numbers have been deleted from the STS SR. The removal of the valve numbers for the required valves from the SR is acceptable because this type of information is not necessary to be included in the STS to provide adequate protection of public health and safety. The STS retain the necessary requirements to ensure the required valves are identified, both in the LCO statement and SR 3.7.10.1 (i.e., the SG PORVs, SG PORV block valves, and SG blowdown isolation valves). The valve numbers are stated in the bases.

DOC L01 deletes the Actuation Device Test and revises the surveillance description of STS SR 3.7.10.3 to state: “Verify each SG PORV, SG PORV block valve, and SG blowdown isolation valve actuates to the isolation position on an actual or simulated actuation signal.” In accordance with the defined term, an actuation device test is a test of the actuated equipment. And as discussed in the TS Bases, performance of an actuation device test demonstrates that the actuated device responds to a simulated actuation signal. As such, Surveillances associated with the testing of the actuated equipment should be addressed in the actuated equipment Specifications, where failures of the surveillance would lead to entering the Actions for the inoperable actuated equipment.

Currently, the only Surveillances that utilize this defined term are in GTS 3.3.2, “Engineered Safety Feature Actuation System (ESFAS) Instrumentation;” as GTS SRs 3.3.2.7, 3.3.2.8, and 3.3.2.9. GTS SRs 3.3.2.7 and 3.3.2.8 provide the actuation device test for Engineered Safety Features (ESF) that are actuated by Table 3.3.2-1, Function 26. As such, failures of GTS SRs 3.3.2.7 and 3.3.2.8 (i.e., failures in the actuated equipment) would inappropriately result in applying the Actions of GTS 3.3.2 for Function 26. This is inconsistent with the intent of applying Actions specific to the equipment inoperability. Therefore GTS SRs 3.3.2.7 and 3.3.2.8 are deleted from GTS 3.3.2 and Table 3.3.2-1, Function 26, ESF Actuation. In conjunction with this deletion, each Specification for ESF actuated equipment is provided with Surveillance(s) that appropriately address the testing of the actuated devices consistent with these SRs and the definition being removed. In certain actuated device Specifications, there is currently an appropriate actuated device test and no new SR is added. Where an actuated device test is not specified in the GTS actuated equipment Specification, a new SR is added.

The effect of moving the requirement for the actuated device test from GTS 3.3.2 to the individual equipment Specifications is for less restrictive actions when the device is inoperable. As an SR associated with GTS 3.3.2, Table 3.3.2-1, Function 26 for Modes 1, 2, 3, and 4, would impose a 6 hour restoration (Action D) prior to a required plant shutdown (Action O). GTS 3.7.10 with SRs added to address actuation device testing has a 7-day restoration allowance. These less restrictive actions are currently approved in STS as appropriate for the inoperable devices. The more restrictive actions imposed by GTS 3.3.2 are therefore excessively restrictive. The change maintains the same level of safety provided by the existing separate GTS Actions for inoperability of the specific actuated devices.

The remaining changes are editorial, clarifying, grammatical, or otherwise considered administrative. These changes do not affect the technical content, but improve the readability, implementation, and understanding of the requirements, and are therefore acceptable.

Having found that this GTST's proposed changes to the GTS and Bases are acceptable, the NRC staff concludes that AP1000 STS Subsection 3.7.10 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 5/19/2014.

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 # 11) The GTST incorporates TSTF-359-A, Rev. 9. The justification for TSTF-359 was based on vendor-specific evaluations. For Westinghouse plants, that evaluation was in MUHP-3015, “Qualitative Risk Assessment Supporting Increased Flexibility in Mode Restraints,” January 2002. This report evaluated “the key plant changes that occur during the Mode changes so it is possible to identify the initiating events that can occur and systems available for event detection, actuation, and mitigation.” It also considered initiating events and equipment available to mitigate those events. Based on that evaluation, Notes were proposed for several systems to prohibit the use of LCO 3.0.4.b. These Notes were applied to LTOP, ECCS-Shutdown, AFW, and AC Sources - Operating. TSTF-359-A also removed existing Notes from the ISTS and revised SR 3.0.4. There is no technical basis for concluding that the analysis performed in support of TSTF-359-A and the high-risk configurations addressed by the Notes are applicable to AP1000 plants. Remove TSTF-359-A from the GTST. Include TSTF-359-A in the reference disposition tables, as “TSTF deferred for future consideration”

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

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

   The NRC approval of TSTF-425, and model safety evaluation provided in the 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.

6. (Internal # 434) In GTST for Subsection 3.7.10, Section VII, under the heading “GTST Safety Evaluation,” technical analysis for DOC A107 is not correct. The fifth sentence states “Once the flow path is isolated as required by GTS 3.7.10 Required Action B.2, Condition D would no longer apply and can be exited.” This is not correct. Condition D can only be exited when there is no longer a flow path with two SG blowdown valves inoperable. Performing either Required Action B.1 or B.2 has no impact on exiting Condition D. If Condition D exists (i.e., a flow path with two SG blowdown valves are inoperable), it must remain entered even when Required Action B.1 or B.2 are performed. The justification for deleting Required Action D.2 is that it is redundant to Required Action B.2 - when Required Action D.2 is required, Required Action B.2 will also be required. Delete the fifth sentence of the DOC A107 discussion. This is resolved by making the recommended change.

7. (Internal # 435) In GTST for Subsection 3.7.10, Section VI, under the heading “Rationale for changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes,” the Fourth paragraph states that DOC M04 provides consistency with GTS 3.6.3 Required Action B.2 and Completion Time. There is no GTS 3.6.3 Required Action B.2. This should be Required Action A.2. Change “B.2” to “A.2.” This is resolved by making the recommended change.

8. (Internal # 436 and 437) The markup of SR 3.7.10.1 results in the following wording: “Verify each SG PORV, PORV block valve, PORV, and SG blowdown isolation valve strokes

closed." The components listed should be only SG PORV, PORV block valve, and SG blowdown isolation valve. Delete the occurrence of "PORV," that is just prior to "and SG blowdown isolation valve." This is resolved by making the recommended change.

9. (Internal # 438) In the "LCO" section of the Bases, revise the first paragraph as follows:

> . . . These isolation valves are considered OPERABLE when the valves are capable of closing on a PMS ~~actuation~~**isolation** signal.

This non-technical change provides consistency with the TS requirement being discussed in the TS Bases. This is resolved by making the recommended change with additional edits. The NRC staff recommends editing the first, second,and third paragraphs of the "LCO" section of the Bases as follows:

> This LCO requires ~~that~~ the ~~steam generator~~**SG PORV, SG PORV block valve, and ~~steam generator~~SG blowdown** isolation valves ~~consisting of the PORV, PORV block valve, and blowdown isolation valves~~ on each ~~steam generator~~**SG** to be OPERABLE. These isolation valves are considered OPERABLE when the valves are capable of closing on a PMS ~~actuation~~**isolation** signal.
>
> This LCO provides assurance that ~~the steam generator~~**each SG** PORV and **SG** PORV block valve will perform ~~their~~**its** design safety function to mitigate the consequences of an SGTR **event** that could result in offsite exposures.
>
> Additionally, this LCO provides assurance that ~~the steam generator~~**each SG** blowdown isolation ~~valves~~**valve** will perform ~~their~~**its** design safety function to mitigate the consequences of Loss of Feedwater and ~~Feedwater Line Break~~ **FLB** events by retaining ~~the steam generator~~**SG** water inventory for ~~Reactor Coolant System (RCS)~~**RCS** heat removal.

In addition, throughout the remainder of the GTS 3.7.10 Bases, replace "steam generator" with "SG" everywhere it occurs. Replace "feedwater line break" with "FLB" everywhere it occurs

In the "Actions" section of the Bases, insert a blank line under heading "D.1."

In the "Background" section of the Bases, revise the first paragraph, second, third, and fourth paragraphs as follows:

> The steam generator **(SG)** isolation valves consist of the
>
> - power operated relief valve**s (PORVs) (SGS-PLV233A & B),**
> - **PORV**~~(PORV)~~ block valves (SGS-PL-V027A & B), ~~PORVs (SGS-PLV233A & B),~~ and
> - blowdown isolation valves (SGS-PL-V074A & B and SGS-PL-V075A & B).
>
> The PORV flow paths must be isolated following a Steam Generator Tube Rupture (SGTR) **event** to minimize radiological releases. The blowdown flow path must be isolated following Loss of Feedwater and Feedwater Line Break **(FLB)** events to retain the ~~steam generator~~**SG** water inventory for Reactor Coolant System (RCS) heat removal.

A PORV is installed in a 6 inch branch line off of the main steam line piping from each ~~steam generator~~**SG**, to provide for controlled removal of reactor decay heat during normal ~~reactor~~**RCS** cooldown when the main steam isolation valves **(MSIVs)** are closed or the turbine bypass system is not available. A normally-open block valve is provided in each PORV line to provide backup isolation capability. Both the PORV and the block valve receive a Protection and Safety Monitoring System (PMS) isolation signal on ~~low~~ steam line pressure **below the Steam Line Pressure - Low setpoint (Table 3.3.8-1 Function 24) in the associated SG**. The **SG PORV** block **valves are**~~valve is~~ also ~~a~~ containment isolation ~~valve~~**valves**.

The blowdown line from each ~~steam generator~~**SG** is provided with two **in-**series isolation valves, both located outside, but close to, containment. The **two** blowdown valves **for each SG** receive a PMS isolation signal on ~~low~~ SG **water** level **below the SG Narrow Range Water Level - Low setpoint (Table 3.3.8-1 Function 20) in the associated SG. In addition, all four blowdown valves receive a PMS isolation signal** ~~and~~ on **a** Passive Residual Heat Removal (PRHR) actuation **signal**. The first blowdown isolation valve outside of containment **for each SG** is also a containment isolation valve**; these CIVs (SGS PL-V074A & B) also receive a PMS isolation signal on a containment isolation actuation signal**.

The ~~steam generator~~**SG** PORVs and the **SG** blowdown isolation valves fail closed on loss of control or actuation power. The ~~steam generator~~**SG** PORV block valves fail as-is on loss of control or actuation power. The ~~steam generator~~**SG** isolation valves may also be actuated manually.

In the “ASA” section of the Bases, revise the first paragraph, second, third, and fourth paragraphs as follows:

The PORV flow paths must be isolated following an SGTR to minimize radiological releases from the ruptured ~~steam generator~~**SG** into the atmosphere. The PORV flow path is assumed to open due to high secondary side pressure, during the SGTR. Dose analyses take credit for subsequent isolation of the PORV flow path by the PORV ~~and/~~or ~~the~~ block valve**, both of** which receive a ~~close~~**PMS isolation** signal **to close** on ~~low~~ steam line pressure **below the Steam Line Pressure - Low setpoint**.

The blowdown flow path on each SG must be isolated following Loss of Feedwater and ~~Feedwater Line Break~~**FLB** events to retain ~~the steam generator~~**SG** water inventory for use in ~~Reactor Coolant System (RCS)~~**RCS** heat removal via the SGs. RCS heat removal for these events is, primarily, provided by the ~~Passive Residual Heat Removal Heat Exchanger~~ **PRHR heat exchanger** (~~PRHR~~ HX); however, ~~the~~ SG heat removal is **also** assumed. The SG blowdown isolation valves receive ~~an~~**a PMS** isolation signal on ~~low~~ SG level **below the SG Narrow Range Water Level - Low setpoint** ~~or~~**and on** PRHR actuation. ~~These~~**The** Loss of Feedwater **and FLB event analyses** ~~events~~ take credit for ~~steam generator~~**SG** heat removal using the water inventory retained after blowdown isolation. If the blowdown line were not isolated, much of the inventory would drain from the SG rather than cool the RCS.

In addition, the PORV block valves and ~~steam generator~~**SG blowdown valves (closest to each containment penetration) are containment**

isolation valves and support the assumptions related to minimizing the loss of inventory and establishing the containment boundary during major accidents. Therefore, the safety analysis of any event requiring isolation of containment is applicable to the PORV block valves and ~~steam generator~~SG blowdown valves.

The ~~steam generator~~**SG** isolation valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

10. (Internal # 439) In the "Applicability" section of the Bases, revise the first paragraph as follows:

    The steam generator PORV, PORV block valve, and steam generator blowdown isolation valves must be OPERABLE in MODES 1, 2, ~~and~~ 3, and 4**,** where a DBA . . .

    This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change with additional edits. The NRC staff recommends editing the first and second paragraphs of the "Applicability" section of the Bases as follows:

    The ~~steam generator~~**SG PORVs, PORV block valves, and ~~steam generator~~ blowdown** isolation valves must be OPERABLE in MODES 1, 2, ~~and~~ 3, and ~~in MODE 4~~**4, where a DBA could cause a release of radioactive material to containment. The Applicability is modified by a Note indicating that PORV OPERABILITY is not required in MODE 4** with the RCS cooling ~~not~~ being provided by the Normal Residual Heat Removal System (RNS).

    In MODE 4 with the RCS cooling being provided by the RNS and in MODES 5 and 6, the ~~steam generators~~**SGs** are not needed for RCS cooling and the potential for an SGTR**,** or Loss of Feedwater and ~~Feedwater Line Break~~**FLB** events is minimized due to the reduced mass and energy in the RCS and ~~steam generators~~**SGs**.

NRC Final Approval Date: 12/8/2015

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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.

3.7 PLANT SYSTEMS

3.7.10 Steam Generator (SG) Isolation Valves

LCO 3.7.10 **Each SG power operated relief valve (PORV), PORV block valve, and SG blowdown** ~~The steam generator~~ isolation valve~~s~~ shall be OPERABLE.

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

ACTIONS

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

1. **SG** ~~Steam generator~~ blowdown flow path(s) may be unisolated intermittently under administrative controls.

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more **SG** PORV flow paths with one ~~SG~~ isolation valve inoperable.	A.1 Isolate the flow path by use of at least one closed and deactivated automatic valve. **AND**	72 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	**A.2** **----------NOTES----------** **1. Isolation devices in high radiation areas may be verified by use of administrative means.** **2. Isolation devices that are locked, sealed, or otherwise secured may be verified by administrative means.** **----------** **Verify the affected flow path is isolated.**	**Once per 31 days**
B. One or more **SG** blowdown flow paths with one ~~SG~~ isolation valve inoperable.	B.1 Isolate the flow path by one closed valve. AND B.2 Verify ~~that~~ the affected ~~SG blowdown~~ flow path is isolated.	72 hours Once per 7 days
C. One or more **SG** PORV flow paths with two ~~SG~~ isolation valves inoperable.	C.1 Isolate the affected flow path by use of at least one closed and deactivated automatic valve.	8 hours
D. One or more **SG** blowdown flow paths with two ~~SG~~ isolation valves inoperable.	D.1 Isolate the flow path by one closed valve. ~~AND~~	8 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. (continued)	~~D.2 Verify that the affected SG blowdown flow path is isolated.~~	~~Once per 7 days~~
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 4 with the RCS cooling provided by the RNS. **AND** **E.3 ----------NOTE---------- Not applicable for inoperable PORV(s). ---------- Be in MODE 5.**	6 hours 24 hours **36 hours**

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.10.1	Verify each ~~steam generator isolation valve (~~**SG PORV,** PORV block valve~~s (SGS-PL-V027A & B), PORVs (SGS-PL-V233A & B)~~, and **SG** blowdown isolation valve~~s (SGS-PL-V074A & B and SGS-PL-V075A & B))~~ **strokes** ~~is OPERABLE by stroking the valve~~ closed.	In accordance with the Inservice Testing Program

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.10.2	**Verify the isolation time of each PORV block valve and SG blowdown isolation valve is within limits.**	**In accordance with the Inservice Testing Program**
SR 3.7.10.3	**Verify each SG PORV, PORV block valve, and SG blowdown isolation valve actuates to the isolation position on an actual or simulated actuation signal.**	**24 months**

B 3.7 PLANT SYSTEMS

B 3.7.10 Steam Generator (SG) Isolation Valves

BASES

BACKGROUND

The steam generator **(SG)** isolation valves consist of the

- power operated relief valve**s (PORVs) (SGS-PLV233A & B),**
- ~~(~~PORV~~)~~ block valves (SGS-PL-V027A & B), ~~PORVs (SGS-PL-V233A & B),~~ and
- blowdown isolation valves (SGS-PL-V074A & B and SGS-PL-V075A & B).

The PORV flow paths must be isolated following a Steam Generator Tube Rupture (SGTR) **event** to minimize radiological releases. The blowdown flow path must be isolated following Loss of Feedwater and Feedwater Line Break **(FLB)** events to retain the **SG** ~~steam generator~~ water inventory for Reactor Coolant System (RCS) heat removal.

A PORV is installed in a 6 inch branch line off of the main steam line piping from each **SG** ~~steam generator~~, to provide for controlled removal of reactor decay heat during normal **RCS** ~~reactor~~ cooldown when the main steam isolation valves **(MSIVs)** are closed or the turbine bypass system is not available. A normally-open block valve is provided in each PORV line to provide backup isolation capability. Both the PORV and the block valve receive a Protection and Safety Monitoring System (PMS) isolation signal on ~~low~~ steam line pressure **below the Steam Line Pressure – Low setpoint (Table 3.3.8-1 Function 24) in the associated SG**. The **SG PORV** block **valves are** ~~valve is~~ also ~~a~~ containment isolation valve**s**.

The blowdown line from each **SG** ~~steam generator~~ is provided with two **in-**series isolation valves, both located outside, but close to, containment. The **two** blowdown valves **for each SG** receive a PMS isolation signal on ~~low~~ SG **water** level **below the SG Narrow Range Water Level – Low setpoint (Table 3.3.8-1 Function 20) in the associated SG. In addition, all four blowdown valves receive a PMS isolation signal** ~~and~~ on **a** Passive Residual Heat Removal (PRHR) actuation **signal**. The first blowdown isolation valve outside of containment **for each SG** is also a containment isolation valve**; these CIVs (SGS PL-V074A & B) also receive a PMS isolation signal on a containment isolation actuation signal**.

BASES

BACKGROUND (continued)

The **SG** ~~steam generator~~ PORVs and the **SG** blowdown isolation valves fail closed on loss of control or actuation power. The **SG** ~~steam generator~~ PORV block valves fail as-is on loss of control or actuation power. The **SG** ~~steam generator~~ isolation valves may also be actuated manually.

Descriptions of the PORVs and SG blowdown isolation are found in **FSAR** Section 10.3.2.2.3 and **FSAR** Section 10.4.8 (Refs. 1 & 2).

APPLICABLE SAFETY ANALYSES

The PORV flow paths must be isolated following an SGTR to minimize radiological releases from the ruptured **SG** ~~steam generator~~ into the atmosphere. The PORV flow path is assumed to open due to high secondary side pressure, during the SGTR. Dose analyses take credit for subsequent isolation of the PORV flow path by the PORV ~~and/~~or ~~the~~ block valve**, both of** which receive a **PMS isolation** ~~close~~ signal **to close** on ~~low~~ steam line pressure **below the Steam Line Pressure – Low setpoint**.

The blowdown flow path on each SG must be isolated following Loss of Feedwater and **FLB** ~~Feedwater Line Break~~ events to retain ~~the~~ **SG** ~~steam generator~~ water inventory for use in **RCS** ~~Reactor Coolant System (RCS)~~ heat removal via the SGs. RCS heat removal for these events is, primarily, provided by the **PRHR heat exchanger** ~~Passive Residual Heat Removal Heat Exchanger~~ (~~PRHR~~ HX); however, ~~the~~ SG heat removal is **also** assumed. The SG blowdown isolation valves receive **a PMS** ~~an~~ isolation signal on ~~low~~ SG level **below the SG Narrow Range Water Level – Low setpoint and on** ~~or~~ PRHR actuation. The~~se~~ **loss of feedwater and FLB event analyses** ~~events~~ take credit for **SG** ~~steam generator~~ heat removal using the water inventory retained after blowdown isolation. If the blowdown line were not isolated, much of the inventory would drain from the SG rather than cool the RCS.

In addition, the PORV block valves and SG blowdown valves (closest to each containment penetration) are containment isolation valves and support the assumptions related to minimizing the loss of inventory and establishing the containment boundary during major accidents. Therefore, the safety analysis of any event requiring isolation of containment is applicable to the PORV block valves and SG blowdown valves.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The **SG** ~~steam generator~~ isolation valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO requires ~~that~~ the **SG** ~~steam generator~~ **PORV, SG PORV block valve, and SG blowdown** isolation valves ~~consisting of the PORV, PORV block valve, and blowdown isolation valves~~ on each **SG** ~~steam generator~~ to be OPERABLE. These isolation valves are considered OPERABLE when the valves are capable of closing on a PMS **isolation** ~~actuation~~ signal.

This LCO provides assurance that **each** ~~the~~ **SG** PORV and **SG** PORV block valve will perform **its** ~~their~~ design safety function to mitigate the consequences of an SGTR **event** that could result in offsite exposures.

Additionally, this LCO provides assurance that **each** ~~the~~ **SG** ~~steam generator~~ blowdown isolation valve~~s~~ will perform **its** ~~their~~ design safety function to mitigate the consequences of Loss of Feedwater and **FLB** ~~Feedwater Line Break~~ events by retaining ~~the~~ **SG** ~~steam generator~~ water inventory for ~~Reactor Coolant System (~~RCS~~)~~ heat removal.

APPLICABILITY

The ~~steam generator~~ **SG PORVs, PORV block valves, and blowdown** isolation valves must be OPERABLE in MODES 1, 2, ~~and~~ 3, and ~~in MODE~~ 4**, where a DBA could cause a release of radioactive material to containment. The Applicability is modified by a Note indicating that PORV OPERABILITY is not required in MODE 4** with the RCS cooling ~~not~~ being provided by the Normal Residual Heat Removal System (RNS).

In MODE 4 with the RCS cooling being provided by the RNS and in MODES 5 and 6, the **SGs** ~~steam generators~~ are not needed for RCS cooling and the potential for ~~an~~ SGTR**,** or Loss of Feedwater and **FLB** ~~Feedwater Line Break~~ events is minimized due to the reduced mass and energy in the RCS and **SGs** ~~steam generators~~.

ACTIONS

The ACTIONS are modified by a Note allowing the **SG** blowdown ~~isolation~~ flow paths to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with

BASES

ACTIONS (continued)

the control room. In this way, the flow path can be rapidly isolated when a need for blowdown isolation is indicated.

The second Note allows separate Condition entry for each **SG** ~~steam generator~~ **PORV and blowdown** ~~isolation~~ flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable **SG PORV and blowdown** flow path.

A.1 **and A.2**

With one valve in one or more **SG** PORV flow paths **(i.e., a SG PORV or SG PORV block valve)** inoperable, action must be taken to isolate the flow path with a closed and deactivated valve. The valve must be deactivated to assure that the flow path will not be opened by a high pressure signal during the course of an SGTR event. This action places the flow path in a condition which assures the safety function is performed. A Completion Time of 72 hours is based on the availability of one OPERABLE PORV flow path isolation valve which is fully capable of performing the required isolation function.

To ensure the PORV flow path remains isolated, periodic verification is required. This is necessary to ensure that the assumptions in the safety analysis remain valid. This Required Action does not require any testing or valve manipulation. Rather, it involves verification that the valve is in the correct position and deactivated. The 31 day Completion Time is reasonable, considering the fact that the valves are operated under administrative controls and the probability of their misalignment is low.

Required Action A.2 is modified by two Notes. Note 1 applies to valves and blind flanges located in high radiation areas, and allows these devices to be verified closed by use of administrative controls. Allowing verification by administrative controls is considered acceptable, since access to these areas is typically restricted. Note 2 applies to isolation devices that are locked, sealed, or otherwise secured in position and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since the function of locking, sealing, or securing components is to ensure that these devices are not inadvertently repositioned.

BASES

ACTIONS (continued)

Therefore, the probability of misalignment of these valves, once they have been verified to be in the proper position, is small.

B.1 and B.2

With one valve in one or more blowdown flow paths inoperable, action must be taken to isolate the flow path with a closed valve. This action places the flow path in a condition which assures the safety function is performed. A Completion Time of 72 hours to isolate the flow path is based on the availability of one OPERABLE blowdown flow path isolation valve which is fully capable of performing the required isolation function.

Since the blowdown isolation valve is not deactivated, periodic verification is required to assure that the flow path remains isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of status indications available in the control room, and other administrative controls, to ensure that the valve remains in the closed position.

C.1

With both valves in one or more **SG** PORV flow paths inoperable, action must be taken to isolate the flow path with a closed and deactivated valve. The valve must be deactivated to assure that the flow path will not be opened by a high pressure signal during the course of an SGTR event. This action places the flow path in a condition which assures the safety function is performed. The 8 hour Completion Time is reasonable, considering the low probability of an accident occurring during this time period that would require a closure of the SG **PORV flow path** isolation valves. The incremental conditional core damage probability with this **Completion Time** ~~AOT~~ is more than an order of magnitude less than the value indicated to have a small impact on plant risk in Reference 3.

In the event the affected flow path is isolated in accordance with Required Action C.1, the affected penetration must be verified to be isolated on a periodic basis per Required Action A.2, which remains in effect.

ACTIONS (continued)

D.1 ~~and D.2~~

With two valves in one or more **SG** ~~steam generator~~ blowdown flow paths inoperable, action must be taken to isolate the flow path with a closed valve. This action places the flow path in a condition which assures the safety function is performed. The 8-hour Completion Time is reasonable, considering the low probability of an accident occurring during this time period that would require a closure of the SG **blowdown flow path** isolation valves. The incremental conditional core damage probability with this **Completion Time** ~~AOT~~ is more than an order of magnitude less than the value indicated to have a small impact on plant risk in Reference 3.

In the event the affected flow path is isolated in accordance with Required Action D.1, the affected penetration must be verified to be isolated on a periodic basis per Required Action B.2, which remains in effect.

~~Since the blowdown isolation valve is not deactivated, periodic verification is required to assure that the flow path remains isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of status indications available in the control room, and other administrative controls, to ensure that the valve remains in the closed position.~~

E.1**, E.2,** and E.3~~2~~

If the SG **PORV flow path or blowdown flow path** isolation valves cannot be restored to OPERABLE status or are not closed within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed at least in MODE 3 within 6 hours, ~~and~~ in MODE 4 with the RCS cooling provided by the RNS within 24 hours**, and in MODE 5 within 36 hours**. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions in an orderly manner and without challenging unit systems. **Required Action E.3 to be in MODE 5 is modified by a Note stating that it is not applicable to inoperable PORV(s). PORV Applicability is exited on completion of Required Action E.2.**

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

The function of the SG **PORV** isolation valves (PORV block valves (SGS-PL-V027A & B), **and** PORVs (SGS-PL-V233A & B)**)** and blowdown isolation valves (SGS-PL-V074A & B and SGS-PL-V075A & B)~~)~~ is to isolate the **SGs** ~~steam generator~~ in the event of SGTR, Loss of Feedwater or **FLB**~~Feedwater Line Break~~. Stroking the valves closed demonstrates their capability to perform the isolation function. The Frequency for this SR is in accordance with the Inservice Testing Program.

SR 3.7.10.2

Verifying that the isolation time of each SG PORV block valve and SG blowdown isolation valve is within limits is required to demonstrate OPERABILITY. The isolation time test ensures that the valve will isolate in a time period less than or equal to that assumed in the safety analysis. The isolation times are specified in FSAR Section 6.2.3 (Ref. 4) and Frequency of this SR is in accordance with the Inservice Testing Program.

SR 3.7.10.3

This Surveillance verifies that each SG PORV, SG PORV block valve, and SG blowdown isolation valve actuates to the isolation position on an actual or simulated actuation signal. The ACTUATION LOGIC TEST overlaps this Surveillance to provide complete testing of the assumed safety function.

The Frequency of 24 months is based on the need to perform this Surveillance during periods in which the plant is shutdown for refueling to prevent any upsets of plant operation.

REFERENCES

1. **FSAR** Section 10.3.2.2.3, “Power-Operated Atmospheric Relief Valves.”

2. **FSAR** Section 10.4.8, “Steam Generator Blowdown System.”

3. Regulatory Guide 1.177, ~~8/98,~~ “An Approach for Plant-Specific, Risk Informed Decisionmaking: Technical Specifications~~,~~.” **August 1998.**

4. **FSAR Section 6.2.3, “Containment Isolation System.”**

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.

3.7 PLANT SYSTEMS

3.7.10 Steam Generator (SG) Isolation Valves

LCO 3.7.10 Each SG power operated relief valve (PORV), PORV block valve, and SG blowdown isolation valve shall be OPERABLE.

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

ACTIONS

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

1. SG blowdown flow path(s) may be unisolated intermittently under administrative controls.

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more SG PORV flow paths with one isolation valve inoperable.	A.1 Isolate the flow path by use of at least one closed and deactivated automatic valve. AND	72 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 ----------NOTES---------- 1. Isolation devices in high radiation areas may be verified by use of administrative means. 2. Isolation devices that are locked, sealed, or otherwise secured may be verified by administrative means. ---------- Verify the affected flow path is isolated.	Once per 31 days
B. One or more SG blowdown flow paths with one isolation valve inoperable.	B.1 Isolate the flow path by one closed valve. AND B.2 Verify the affected flow path is isolated.	72 hours Once per 7 days
C. One or more SG PORV flow paths with two isolation valves inoperable.	C.1 Isolate the affected flow path by use of at least one closed and deactivated automatic valve.	8 hours
D. One or more SG blowdown flow paths with two isolation valves inoperable.	D.1 Isolate the flow path by one closed valve.	8 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3. AND	6 hours
	E.2 Be in MODE 4 with the RCS cooling provided by the RNS. AND	24 hours
	E.3 ----------NOTE---------- Not applicable for inoperable PORV(s). ---------- Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.10.1	Verify each SG PORV, PORV block valve, and SG blowdown isolation valve strokes closed.	In accordance with the Inservice Testing Program
SR 3.7.10.2	Verify the isolation time of each PORV block valve and SG blowdown isolation valve is within limits.	In accordance with the Inservice Testing Program
SR 3.7.10.3	Verify each SG PORV, PORV block valve, and SG blowdown isolation valve actuates to the isolation position on an actual or simulated actuation signal.	24 months

B 3.7 PLANT SYSTEMS

B 3.7.10 Steam Generator (SG) Isolation Valves

BASES

BACKGROUND

The steam generator (SG) isolation valves consist of the

- power operated relief valves (PORVs) (SGS-PLV233A & B),
- PORV block valves (SGS-PL-V027A & B), and
- blowdown isolation valves (SGS-PL-V074A & B and SGS-PL-V075A & B).

The PORV flow paths must be isolated following a Steam Generator Tube Rupture (SGTR) event to minimize radiological releases. The blowdown flow path must be isolated following Loss of Feedwater and Feedwater Line Break (FLB) events to retain the SG water inventory for Reactor Coolant System (RCS) heat removal.

A PORV is installed in a 6 inch branch line off of the main steam line piping from each SG, to provide for controlled removal of reactor decay heat during normal RCS cooldown when the main steam isolation valves (MSIVs) are closed or the turbine bypass system is not available. A normally-open block valve is provided in each PORV line to provide backup isolation capability. Both the PORV and the block valve receive a Protection and Safety Monitoring System (PMS) isolation signal on steam line pressure below the Steam Line Pressure – Low setpoint (Table 3.3.8-1 Function 24) in the associated SG. The SG PORV block valves are also containment isolation valves.

The blowdown line from each SG is provided with two in-series isolation valves, both located outside, but close to, containment. The two blowdown valves for each SG receive a PMS isolation signal on SG water level below the SG Narrow Range Water Level – Low setpoint (Table 3.3.8-1 Function 20) in the associated SG. In addition, all four blowdown valves receive a PMS isolation signal on a Passive Residual Heat Removal (PRHR) actuation signal. The first blowdown isolation valve outside of containment for each SG is also a containment isolation valve; these CIVs (SGS PL-V074A & B) also receive a PMS isolation signal on a containment isolation actuation signal.

The SG PORVs and the SG blowdown isolation valves fail closed on loss of control or actuation power. The SG PORV block valves fail as-is on loss of control or actuation power. The SG isolation valves may also be actuated manually.

BASES

BACKGROUND (continued)

Descriptions of the PORVs and SG blowdown isolation are found in FSAR Section 10.3.2.2.3 and FSAR Section 10.4.8 (Refs. 1 & 2).

APPLICABLE SAFETY ANALYSES

The PORV flow paths must be isolated following an SGTR to minimize radiological releases from the ruptured SG into the atmosphere. The PORV flow path is assumed to open due to high secondary side pressure, during the SGTR. Dose analyses take credit for subsequent isolation of the PORV flow path by the PORV or block valve, both of which receive a PMS isolation signal to close on steam line pressure below the Steam Line Pressure – Low setpoint.

The blowdown flow path on each SG must be isolated following Loss of Feedwater and FLB events to retain SG water inventory for use in RCS heat removal via the SGs. RCS heat removal for these events is, primarily, provided by the PRHR heat exchanger (HX); however, SG heat removal is also assumed. The SG blowdown isolation valves receive a PMS isolation signal on SG level below the SG Narrow Range Water Level – Low setpoint and on PRHR actuation. The loss of feedwater and FLB event analyses take credit for SG heat removal using the water inventory retained after blowdown isolation. If the blowdown line were not isolated, much of the inventory would drain from the SG rather than cool the RCS.

In addition, the PORV block valves and SG blowdown valves (closest to each containment penetration) are containment isolation valves and support the assumptions related to minimizing the loss of inventory and establishing the containment boundary during major accidents. Therefore, the safety analysis of any event requiring isolation of containment is applicable to the PORV block valves and SG blowdown valves.

The SG isolation valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO requires the SG PORV, SG PORV block valve, and SG blowdown isolation valves on each SG to be OPERABLE. These isolation valves are considered OPERABLE when the valves are capable of closing on a PMS isolation signal.

BASES

LCO (continued)

This LCO provides assurance that each SG PORV and SG PORV block valve will perform its design safety function to mitigate the consequences of an SGTR event that could result in offsite exposures.

Additionally, this LCO provides assurance that each SG blowdown isolation valve will perform its design safety function to mitigate the consequences of Loss of Feedwater and FLB events by retaining SG water inventory for RCS heat removal.

APPLICABILITY

The SG PORVs, PORV block valves, and blowdown isolation valves must be OPERABLE in MODES 1, 2, 3, and 4, where a DBA could cause a release of radioactive material to containment. The Applicability is modified by a Note indicating that PORV OPERABILITY is not required in MODE 4 with the RCS cooling being provided by the Normal Residual Heat Removal System (RNS).

In MODE 4 with the RCS cooling being provided by the RNS and in MODES 5 and 6, the SGs are not needed for RCS cooling and the potential for SGTR, or Loss of Feedwater and FLB events is minimized due to the reduced mass and energy in the RCS and SGs.

ACTIONS

The ACTIONS are modified by a Note allowing the SG blowdown flow paths to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. In this way, the flow path can be rapidly isolated when a need for blowdown isolation is indicated.

The second Note allows separate Condition entry for each SG PORV and blowdown flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable SG PORV and blowdown flow path.

BASES

ACTIONS (continued)

A.1 and A.2

With one valve in one or more SG PORV flow paths (i.e., a SG PORV or SG PORV block valve) inoperable, action must be taken to isolate the flow path with a closed and deactivated valve. The valve must be deactivated to assure that the flow path will not be opened by a high pressure signal during the course of an SGTR event. This action places the flow path in a condition which assures the safety function is performed. A Completion Time of 72 hours is based on the availability of one OPERABLE PORV flow path isolation valve which is fully capable of performing the required isolation function.

To ensure the PORV flow path remains isolated, periodic verification is required. This is necessary to ensure that the assumptions in the safety analysis remain valid. This Required Action does not require any testing or valve manipulation. Rather, it involves verification that the valve is in the correct position and deactivated. The 31 day Completion Time is reasonable, considering the fact that the valves are operated under administrative controls and the probability of their misalignment is low.

Required Action A.2 is modified by two Notes. Note 1 applies to valves and blind flanges located in high radiation areas, and allows these devices to be verified closed by use of administrative controls. Allowing verification by administrative controls is considered acceptable, since access to these areas is typically restricted. Note 2 applies to isolation devices that are locked, sealed, or otherwise secured in position and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since the function of locking, sealing, or securing components is to ensure that these devices are not inadvertently repositioned. Therefore, the probability of misalignment of these valves, once they have been verified to be in the proper position, is small.

B.1 and B.2

With one valve in one or more blowdown flow paths inoperable, action must be taken to isolate the flow path with a closed valve. This action places the flow path in a condition which assures the safety function is performed. A Completion Time of 72 hours to isolate the flow path is based on the availability of one OPERABLE blowdown flow path isolation valve which is fully capable of performing the required isolation function.

ACTIONS (continued)

Since the blowdown isolation valve is not deactivated, periodic verification is required to assure that the flow path remains isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of status indications available in the control room, and other administrative controls, to ensure that the valve remains in the closed position.

C.1

With both valves in one or more SG PORV flow paths inoperable, action must be taken to isolate the flow path with a closed and deactivated valve. The valve must be deactivated to assure that the flow path will not be opened by a high pressure signal during the course of an SGTR event. This action places the flow path in a condition which assures the safety function is performed. The 8 hour Completion Time is reasonable, considering the low probability of an accident occurring during this time period that would require a closure of the SG PORV flow path isolation valves. The incremental conditional core damage probability with this Completion Time is more than an order of magnitude less than the value indicated to have a small impact on plant risk in Reference 3.

In the event the affected flow path is isolated in accordance with Required Action C.1, the affected penetration must be verified to be isolated on a periodic basis per Required Action A.2, which remains in effect.

D.1

With two valves in one or more SG blowdown flow paths inoperable, action must be taken to isolate the flow path with a closed valve. This action places the flow path in a condition which assures the safety function is performed. The 8-hour Completion Time is reasonable, considering the low probability of an accident occurring during this time period that would require a closure of the SG blowdown flow path isolation valves. The incremental conditional core damage probability with this Completion Time is more than an order of magnitude less than the value indicated to have a small impact on plant risk in Reference 3.

BASES

ACTIONS (continued)

In the event the affected flow path is isolated in accordance with Required Action D.1, the affected penetration must be verified to be isolated on a periodic basis per Required Action B.2, which remains in effect.

E.1, E.2, and E.3

If the SG PORV flow path or blowdown flow path isolation valves cannot be restored to OPERABLE status or are not closed within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed at least in MODE 3 within 6 hours, in MODE 4 with the RCS cooling provided by the RNS within 24 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions in an orderly manner and without challenging unit systems. Required Action E.3 to be in MODE 5 is modified by a Note stating that it is not applicable to inoperable PORV(s). PORV Applicability is exited on completion of Required Action E.2.

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

The function of the SG PORV isolation valves (PORV block valves (SGS-PL-V027A & B), and PORVs (SGS-PL-V233A & B)) and blowdown isolation valves (SGS-PL-V074A & B and SGS-PL-V075A & B) is to isolate the SGs in the event of SGTR, Loss of Feedwater or FLB. Stroking the valves closed demonstrates their capability to perform the isolation function. The Frequency for this SR is in accordance with the Inservice Testing Program.

SR 3.7.10.2

Verifying that the isolation time of each SG PORV block valve and SG blowdown isolation valve is within limits is required to demonstrate OPERABILITY. The isolation time test ensures that the valve will isolate in a time period less than or equal to that assumed in the safety analysis. The isolation times are specified in FSAR Section 6.2.3 (Ref. 4) and Frequency of this SR is in accordance with the Inservice Testing Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.10.3

This Surveillance verifies that each SG PORV, SG PORV block valve, and SG blowdown isolation valve actuates to the isolation position on an actual or simulated actuation signal. The ACTUATION LOGIC TEST overlaps this Surveillance to provide complete testing of the assumed safety function.

The Frequency of 24 months is based on the need to perform this Surveillance during periods in which the plant is shutdown for refueling to prevent any upsets of plant operation.

REFERENCES

1. FSAR Section 10.3.2.2.3, “Power-Operated Atmospheric Relief Valves.”

2. FSAR Section 10.4.8, “Steam Generator Blowdown System.”

3. Regulatory Guide 1.177, “An Approach for Plant-Specific, Risk Informed Decisionmaking: Technical Specifications,” August 1998.

4. FSAR Section 6.2.3, “Containment Isolation System.”