

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

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**Title: Changes Related to LCO 3.7.2, Main Steam Isolation Valves (MSIVs)**

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

**TSTF Number and Title:**

TSTF-479-A, Rev 0, Changes to Reflect Revision of 10 CFR 50.55a  
TSTF-491-A, Rev 2, Removal of Main Steam and Main Feedwater Valve Isolation Times From Technical Specifications  
TSTF-504-T, Rev 0, Revised the MSIV and MFIV Specifications to Provide Actions for Actuator Trains

**STS NUREGs Affected:**

TSTF-479-A, Rev 0: NUREGs 1430, 1431, 1432, 1433, and 1434  
TSTF-491-A, Rev 2: NUREGs 1430, 1431, and 1432  
TSTF-504-T, Rev 0: NUREGs 1431 and 1432

**NRC Approval Date:**

TSTF-479-A, Rev 0: 06-Dec-05  
TSTF-491-A, Rev 2: 05-Oct-06  
TSTF-504-T, Rev 0: Approved for Use by TSTF 14-Sep-07

**TSTF Classification:**

TSTF-479-A, Rev 0: Technical Change  
TSTF-491-A, Rev 2: Technical Change  
TSTF-504-T, Rev 0: Technical Change

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

**RCOL Std. Dep. Number and Title:**

There are no Vogtle departures applicable to Specification 3.7.2.

**RCOL COL Item Number and Title:**

There are no Vogtle COL items applicable to Specification 3.7.2.

**RCOL PTS Change Number and Title:**

VEGP LAR DOC A094: TS 3.7.2 title and description revisions  
VEGP LAR DOC A095: TS 3.7.2 Conditions and Required Action revisions  
VEGP LAR DOC M11: Containment valve isolation revisions to TS 3.7.2  
VEGP LAR DOC M15: Applicability revision to TS 3.7.2  
VEGP LAR DOC L20: TS 3.7.2 Condition D revision  
VEGP LAR DOC D09: Closure time removal

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

This section discusses changes: (1) that were applicable to previous designs, but are not to the current design; (2) that are already incorporated in the GTS; and (3) that are superseded by another change.

TSTF-479-A, Rev.0 has been applied to AP1000 GTS 3.7.2, Rev 19 by Westinghouse. TSTF-479-A will not be discussed further as a part of this GTST.

TSTF-504-T, Rev. 0 revises WOG Specification 3.7.2 based on license amendments granted for Wolf Creek, Callaway, and Palo Verde regarding dual actuator trains for isolation valves. A specific need should be identified for the AP1000 design and a separate AP1000-specific TSTF issued to implement a similar change. Therefore, the TSTF-504-T changes are not applicable and are not incorporated in the AP1000 Technical Specifications. TSTF-504-T will not be discussed further as a part of this GTST.

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**IV. Additional Changes Proposed as Part of this GTST (modifications proposed by NRC staff and/or clear editorial changes or deviations identified by preparer of GTST)**

Minor corrections were made to correct grammatical errors in the bases.

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

Section 3.7.2 Main Steam Line Flow Path Isolation Valves (MSIVs)

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

The LCO title and Specification statement are revised to indicate flow path isolation. This provides clarification of LCO coverage. (DOC A094)

The Applicability statement is revised to remove the exception statement. (DOC M11 and DOC M15)

GTS 3.7.2 Conditions A, B, C and D and the associated Required Actions are revised by editorial corrections. (DOC A095)

GTS 3.7.2 Conditions D Note is revised. The term "MSIV" is changed to "main steam line flow path." (DOC L20)

STS 3.7.2 Condition E and Required Actions E.1 and E.2 are added to provide consistency with GTS 3.6.3. (DOC M11)

GTS 3.7.2 Condition E is relabeled as STS 3.7.2 Condition F and Required Action F.3 is added. This provides consistency with GTS 3.6.3 and provisions to exit the LCO. (DOC M11 and DOC M15)

The specific closure times associated with SR 3.7.2.1 and SR 3.7.2.2 are replaced with the phrase "within limits." The affected valve isolation times are important to the safety analyses because they are part of the associated overall ESF Response Time assumed in the safety analyses. However, the individual component actuation times that make up the total ESF Response Time are not modeled in the associated safety analysis. Only the overall or total Response Time is considered in the safety analysis. The NRC has already determined (per Generic Letter 93-08) that the ESF Response Times (which include, by technical specification definition, the associated equipment actuation times) do not need to be in the technical specifications. (TSTF-491-A and DOC D09)

The bases "Surveillance Requirements" discussion is modified to support the SR 3.7.2.1 and SR 3.7.2.2 changes and to reference closure time tracking in a Technical Requirements manual. (TSTF-491-A and DOC D09)

New SR 3.7.2.3 and SR 3.7.2.4 are added. This provides consistency with GTS 3.6.3. (DOC M11)

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## **VI. Traveler Information**

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

The proposed change removes the specific isolation time for the isolation valves from the associated AP1000 GTS Surveillance Requirements (SRs). The isolation times in the AP1000 GTS SRs are replaced with the requirement to verify the valve isolation time is within limits. The specific valve isolation time required to meet the AP1000 STS surveillances would be located outside of the technical specifications in a document subject to control by the 10 CFR 50.59 process.

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

In accordance with the Improved Standard Technical Specification (ISTS) definition of Engineered Safety Feature (ESF) Response Time, the affected valve isolation times are part of the ESF Response Time. The ISTS does not specify the specific ESF Response Time acceptance criteria in the technical specifications or Bases. The ISTS only requires the ESF response time to be verified within the limit. The proposed change would make the requirements pertaining to ESF Response Times consistent within the ISTS.

Similar to the current allowance for the ESF and Reactor Trip System (RTS) Response Times to be located outside the technical specifications, the proposed change will allow the affected valve isolation times to be revised in accordance with 10 CFR 50.59 instead of a license amendment request. See references 4-9.

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

VEGP LAR DOC A094 revises GTS 3.7.2, "Main Steam Isolation Valves (MSIVs)," to STS 3.7.2, "Main Steam Line Flow Path Isolation Valves." The LCO statement is revised to state "Each of the following main steam line flow path isolation valves shall be OPERABLE:

- a. Main steam isolation valves (MSIVs);
- b. MSIV bypass valves;
- c. Main steam line drain valves;
- d. Turbine stop valves or turbine control valves;
- e. Turbine bypass valves; and
- f. Moisture separator reheater 2nd stage steam isolation valves."

In addition, GTS 3.7.2 Required Action D.1 is revised from "steam flow path" to "main steam line flow path." Also, GTS SR 3.7.2.2 is revised to add "required."

VEGP LAR DOC A095 provides editorial corrections to GTS 3.7.2 Conditions A, B, C, and D and the associated Required Actions.

VEGP LAR DOC M11 revises LCO 3.7.2 to include the MSIV bypass valves and main steam line drain valves as part of the LCO requirements, specifically: "b. MSIV bypass valves;" and "c. Main steam line drain valves." The Applicability is revised to "MODES 1, 2, 3, and 4." STS 3.7.2 Condition E is added stating "One or more MSIV bypass or main steam line drain valves inoperable." Required Actions E.1 and E.2 and associated Completion Times are moved from GTS 3.6.3 current Required Actions C.1 and C.2. GTS 3.7.2 Condition E and associated Required Actions are relabeled as Action F and revised to include reference to STS 3.7.2

Condition E. STS 3.7.2 Required Action F.3 as it pertains to MSIVs only is added, stating to “Be in MODE 5” in 36 hours. A new SR 3.7.2.3 is added. A new SR 3.7.2.4 is added.

VEGP LAR DOC M15 revises the Applicability to be MODES 1, 2, 3, and 4, with no exceptions. STS 3.7.2 Required Action F.3 is added to be in MODE 5 within 36 hours to provide an exit from the Specification requirement.

GTS 3.7.2 Condition D is modified by a Note that states “Separate Condition entry is allowed for each MSIV.” VEGP LAR DOC L20 revises the term “MSIV” to “main steam line flow path.”

VEGP LAR DOC D09 provides the same change implemented by TSTF 491-A described above.

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 11 and the Southern Nuclear Operating Company RAI Response in Reference 12.

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

VEGP LAR DOC A094 provides clarity for the LCO requirements.

VEGP LAR DOC A095 is consistent with the TS Writers Guide (Reference 10).

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

VEGP LAR DOC M15 removes the exception statement from the LCO Applicability. When the unit is in MODE 2, 3, or 4, GTS 3.7.2 does not apply to the valves whose flow path is isolated. Thus, when a main steam flow path isolation valve (e.g., a turbine stop valve) is inoperable in MODE 2, 3, or 4, once the affected steam flow path is isolated as required by Required Action D.1, GTS 3.7.2 would not apply and the periodic verification of Required Action D.2 would not be required. This change will ensure that the periodic verification of Required Action D.2 is performed as long as a valve in the affected flow path remains inoperable.

VEGP LAR DOC L20 notes that Condition D applies to all valves required by the LCO, not just the MSIVs. The manner in which the Note is written does not allow Required Actions D.1 and D.2 to be taken for each affected flow path associated with any valves other than the MSIVs.

VEGP LAR DOC D09 implements the same changes as TSTF-491-A.

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

Dashes were added to time descriptors such as “the 72-hour completion time is acceptable...” in the Actions section of the bases.

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

These changes are to correct grammatical errors in the bases.

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## VII. GTST Safety Evaluation

### Technical Analysis:

VEGP LAR DOC A094 revises GTS 3.7.2, "Main Steam Isolation Valves (MSIVs)," to STS 3.7.2, "Main Steam Line Flow Path Isolation Valves." The STS 3.7.2 LCO statement is revised to state "Each of the following main steam line flow path isolation valves shall be OPERABLE:

- a. Main steam isolation valves (MSIVs);
- b. MSIV bypass valves;
- c. Main steam line drain valves;
- d. Turbine stop valves or turbine control valves;
- e. Turbine bypass valves; and
- f. Moisture separator reheater 2nd stage steam isolation valves."

The GTS title does not match what the LCO statement actually specifies. The GTS 3.7.2 applies to more than just the MSIVs. It also includes the turbine stop valves, turbine bypass valves, and moisture separator 2nd stage steam isolation valves. Therefore, the title of GTS 3.7.2 is changed to more clearly identify what the actual LCO statement is covering. Furthermore, for clarity, all the required valves are now listed in the LCO statement. This change is made to provide clarification.

GTS 3.7.2 Required Action D.1 is revised from "steam flow path" to "main steam line flow path." Also, GTS SR 3.7.2.2 is revised to add the word "required," which is consistent with the wording of the LCO.

One MSIV is located in each main steam line outside of the containment. Closing the MSIVs isolates each steam generator from the others and isolates the turbine, steam bypass system and other auxiliary steam supplies from the steam generator. However, alternate downstream isolation valves are available (turbine stop, turbine control, turbine bypass, and moisture separator reheater 2nd stage steam isolation valves). Closing the alternate downstream isolation valves also isolates each steam generator from the others and isolates the turbine, steam bypass system and other auxiliary steam supplies from the steam generator. Therefore, changing the LCO from just focusing on the MSIVs to focusing on the entire steam line flow path provides alternatives to meet the LCO objective to protect the reactor core from damage following a high energy line break (HELB).

By isolating the steam flow from the secondary side of the steam generator the MSIVs and alternate downstream isolation valves prevent over cooling the reactor core following a HELB. By preventing core overcooling the MSIVs and alternate downstream isolation valves protect the reactor core from being damaged.

In addition, VEGP LAR DOC M11 revises LCO 3.7.2 to include the MSIV bypass valves and main steam line drain valves as part of the LCO requirements, specifically: "b. MSIV bypass valves;" and "c. Main steam line drain valves."

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 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. The remaining closed system containment isolation valves that are not covered by GTS 3.7.1, GTS 3.7.2, GTS 3.7.3, GTS 3.7.7, and GTS 3.7.10, are MSIV bypass valves and the main steam line drain valves. The requirements for these containment isolation valves are added to STS 3.7.2 with the other steam line flow path 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 in GTS 3.6.3, or have been revised to include the requirements from GTS 3.6.3. Therefore, the LCO changes to GTS 3.6.3 and GTS 3.7.2 reflect no technical change for these moved valves.

The Applicability of GTS 3.7.2, which is Mode 1, and Modes 2, 3, and 4, except when steam flow is isolated is revised to be consistent with the Applicability of GTS 3.6.3, which is Modes 1, 2, 3, 4. Thus, the proposed Applicability is consistent with GTS 3.6.3 Applicability for the MSIVs, MSIV bypass valves, and main steam line drain valves, which are moved from GTS 3.6.3. Therefore, the Applicability change also reflects no technical change for these moved valves. The impact of this Applicability change to the other valves addressed in GTS 3.7.2 is discussed in association with DOC M15.

For MSIV bypass valves or main steam line drain valves inoperability, the new Required Actions in STS 3.7.2 Action E are identical to those currently required in GTS 3.6.3 Action C. Since GTS 3.6.3 Action C is the Action applicable to the MSIV bypass valves and main steam line drain valves, this Action change reflects no technical change for these moved valves. Additionally, STS 3.7.2 Action E Required Actions include a Note stating "Penetration flow path(s) may be unisolated intermittently under administrative controls" and STS Condition E includes a Note stating "Separate Condition entry is allowed for each penetration flow path." These Notes are included in STS 3.7.2 from GTS 3.6.3 Actions Notes 1 and 2, respectively, and therefore reflect no technical change. GTS 3.6.3 Actions Notes 3 and 4 do not apply to MSIV bypass valves and main steam line drain valves and are not included in STS 3.7.2. There is no impact on safety from moving the Action requirement for MSIV bypass valves and main steam line drain valves out of GTS 3.6.3. Actions for MSIVs that are addressed in GTS 3.7.2 Actions A, C, and D, are compared to GTS 3.6.3 Actions - Specifically GTS 3.6.3 Action C. The more restrictive isolation time for MSIVs is in STS 3.7.2, which may be as long as 22 hours based on the combination of:

- 8 hour allowance of Required Action A.1 to restore;
- 6 hours to be in Mode 2 if restoration not met per Required Action C.1; and
- 8 hours to isolate from when in Mode 2, 3, or 4 per Required Action D.1.

In contrast, GTS 3.6.3 Required Action C.1 allows 72 hours to isolate and does not impose the explicit requirement to be in Mode 2 (in up to 14 hours). However, STS 3.7.2 Required Actions do not include the restrictions of GTS 3.6.3 current Required Action C.1 that require deactivating the MSIV in the closed position. Conversely, GTS 3.6.3 Required Action C.2 periodic verification of "Once per 31 days" is less restrictive than the periodic verification of STS 3.7.2 Required Action D.2 of "Once per 7 days." More frequent verification in STS 3.7.2 adequately compensates for not imposing a requirement to deactivate the MSIV in the closed position. Additionally, STS 3.7.2 Action D does not contain the flexibility found in GTS 3.6.3 Required Action C.2 Notes allowing administrative means to verify flow path isolation. The flexibility of GTS 3.6.3 Actions Note 1 ("Penetration flow path(s) may be unisolated intermittently under administrative controls") is not applied for MSIVs in STS 3.7.2 Actions and the flexibility of GTS

3.6.3 Actions Note 2 ("Separate Condition entry is allowed for each penetration flow path") is only allowed in STS 3.7.2 for Modes 2, 3, and 4; therefore STS 3.7.2 imposes more restrictive Actions.

The overall impact on safety from moving the Action requirement for MSIVs out of GTS 3.6.3 is minimal. The more restrictive Actions of STS 3.7.2 to affect isolation result in achieving the appropriate compensatory measure and protection of public health and safety sooner and the more frequent verification adequately compensates for not requiring deenergization of the MSIVs. In the event that the flow path associated with MSIVs, MSIV bypass valves, or main steam line drain 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, STS 3.7.2 Required Action F.3 is added requiring the reactor to be in Mode 5 within 36 hours, which is consistent with GTS 3.6.3 Required Action D.2. This addition, in combination with STS 3.7.2 Required Action F.1 to be in Mode 3 within 6 hours provides consistent actions for the valves moved from GTS 3.6.3 into STS 3.7.2.

Two new SRs are added to STS 3.7.2: SR 3.7.2.3 and SR 3.7.2.4. SR 3.7.2.3 requires verification that the isolation time of each MSIV bypass valve and main steam line drain valve is within limits at a Frequency of in accordance with the Inservice Testing Program and SR 3.7.2.4 requires verification that each MSIV bypass valve and main steam line drain valve actuates to the isolation position on an actual or simulated actuation signal at a Frequency of 24 months. These SRs are consistent with GTS 3.6.3 SR 3.6.3.4 and SR 3.6.3.5. GTS 3.6.3 SRs 3.6.3.1, 3.6.3.2, and 3.6.3.3 are not applicable to MSIVs, MSIV bypass valves, or main steam line drain valves.

TSTF-491-A and VEGP LAR DOC D09 relocate the required closure times for the MSIVs and alternate downstream isolation valves to the Licensee Controlled Document (LCD) that is referenced in the bases. Changes to LCDs are subject to the 10 CFR 50.59 process. The 10 CFR 50.59 (reference 5) criteria provide adequate assurance that prior staff review and approval will be requested by the licensee for changes to the Bases or LCD requirements with the potential to affect the safe operation of the plant. Furthermore, the MSIVs and alternate downstream isolation valves are subject to periodic testing and acceptance criteria in accordance with the Inservice Testing (IST) Program. Compliance with the IST Program is required by Section 5.5.3 of the AP1000 GTS and 10 CFR 50.55. The IST Program includes specific reference value baseline operating times for valves that are not subject to arbitrary changes.

10 CFR 50.36 requires the inclusion of the periodic testing of the MSIVs and alternate downstream isolation valves in the Surveillance Requirements not the actual closure time of the valves. TSTF-491-A change maintains the periodic testing requirements for MSIVs in accordance with 10 CFR 50.36 (reference 4).

Based on the requirements of 10 CFR 50.36, 10 CFR 50.59 and IST Program, the staff concludes that relocating the MSIV and alternate downstream isolation valves closure times to the LCD as referenced in the Bases is acceptable.

VEGP LAR DOC M15 revises the Applicability to be MODES 1, 2, 3, and 4, with no exceptions. STS 3.7.2 Required Action F.3 is added to be in MODE 5 within 36 hours. When the unit is in Mode 2, 3, or 4, GTS 3.7.2 currently does not apply to the valves whose flow path is isolated. Thus, when a main steam flow path isolation valve (e.g., a turbine stop valve) is inoperable in Mode 2, 3, or 4, once the affected steam flow path is isolated as required by GTS 3.7.2 Required Action D.1, and LCO 3.7.2 would not apply and the periodic verification of GTS 3.7.2 Required Action D.2 would not be required.

Similar to the Applicability of current GTS 3.6.3, the GTS 3.7.2 Applicability is changed to not provide an exception once the affected flow path is isolated. The main steam flow path isolation valves will remain required to be Operable in Modes 2, 3, and 4, even when the affected flow path is isolated. This change will ensure that the periodic verification of GTS 3.7.2 Required Action D.2 is performed as long as a valve in the affected flow path remains inoperable. This change is acceptable since it ensures the flow path is periodically verified to be in the post accident state (i.e., isolated) anytime when in Mode 2, 3, and 4 with an associated isolation valve inoperable.

In addition, due to the Applicability change, STS 3.7.2 Required Action F.3 is added to be in Mode 5. This ensures that when conditions warrant, the Applicability of the LCO is exited. The Applicability change and addition of new Required Action F.3 for the MSIVs is discussed in association with DOC M11.

Condition D is modified by a Note that states "Separate Condition entry is allowed for each MSIV." VEGP LAR DOC L20 revises the term "MSIV" to "main steam line flow path." GTS 3.7.2 requires various main steam line flow path isolation valves to be Operable. Included in these valves are not only the MSIVs, but also the turbine stop valves, turbine control valves, turbine bypass valves, and moisture separator reheater 2nd stage steam isolation valves. GTS 3.7.2 Action D provides the actions to be taken when these valves are inoperable in MODE 2, 3, or 4. Required Action D.1 requires the associated flow path to be isolated and Required Action D.2 requires a periodic verification that the flow path remains in this condition. The GTS 3.7.2 Note to Condition D only states that inoperable MSIVs have a separate Condition entry allowance.

However, since the Condition applies to all valves required by the LCO, not just the MSIVs, the manner in which the Note is written does not allow GTS 3.7.2 Required Actions D.1 and D.2 to be taken for each affected flow path associated with any valves other than the MSIVs. For example, if a turbine stop valve is inoperable and GTS 3.7.2 Required Action D.1 initially complied with (i.e., the affected flow path is isolated), if a second valve in another flow path (e.g., a turbine bypass valve) becomes inoperable, there is no allowed time to perform GTS 3.7.2 Required Action D.1 on this new affected flow path; the Required Action is immediately not met and GTS 3.7.2 Condition E must be entered.

The Note inserted by DOC L20 will allow a separate Condition entry for each main steam line flow path. GTS 3.7.2 Required Action D.1 adequately compensates for the inoperability of each valve, since it requires the affected flow path to be isolated. This places the valve in the assumed post accident position. GTS 3.7.2 Required Action D.2 requires a periodic verification that the flow path remains isolated. Once isolated, the appropriate compensatory action is in place. Subsequent flow paths with inoperable valves are justified to be allowed appropriate Completion Times to isolate the affected flow path prior to requiring a unit shutdown in accordance with GTS 3.7.2 Action E. Providing this allowance minimizes the plant risk associated with imposing an unnecessary shutdown.

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

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

TSTF-491-A: Federal Register, Volume 71, No. 193, Thursday, October 5, 2006, Notices

VEGP LAR SER (Reference 3)

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**VIII. Review Information**

**Evaluator Comments:**

None

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**Review Information:**

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on Monday, May 19, 2014.

**NRC Final Approval Date:**

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

None

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**X. References Used in GTST**

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

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

- ML13277A616 Letter - Correction To The Attachment (Replacement Pages) - Vogtle Electric Generating Plant Units 3 and 4-Issuance of Amendment Re: Technical Specifications Upgrade (LAR 12-002) (TAC No. RP9402)
  - ML13277A637 Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13) (corrected)
4. 10 CFR 50.36, "Technical Specifications."
  5. 10 CFR 50.59, "Changes , Tests, and Experiments."
  6. NRC SER for Beaver Valley Power Station (BVPS) Unit 2 Amendment # 137 issued 6/25/03 (TAC NO. MB5686).
  7. NRC SER for BVPS License Amendment numbers 210 (Unit 1) and 88 (Unit 2) issued 1/20/98 (TAC NOS. M99671 and M99672).
  8. Generic Letter 93-08, "Relocation of Technical Specification Tables of Instrument Response Time Limits," dated 12/29/93.
  9. Generic Letter 91-08, "Removal of Component Lists From Technical Specifications," dated 5/6/91.

10. TSTF-GG-05-01, "Writer's Guide for Plant-Specific Improved Technical Specifications," June 2005.
  11. 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).
  12. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Response to Request for Additional Information Letter No. 01 Related to License Amendment Request LAR-12-002, ND-12-2015, October 04, 2012 (ML12286A363 and ML12286A360)
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**XI. MARKUP of the Applicable GTS Section for Preparation of the STS NUREG**

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

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

**Main Steam Line Flow Path Isolation Valves ~~MSIVs~~**  
3.7.2

## 3.7 PLANT SYSTEMS

3.7.2 Main Steam **Line Flow Path** Isolation Valves ~~(MSIVs)~~

LCO 3.7.2      **Each of the following** ~~The minimum combination of valves required for main steam line flow path isolation valves~~ shall be OPERABLE;-

- a. **Main steam isolation valves (MSIVs);**
- b. **MSIV bypass valves;**
- c. **Main steam line drain valves;**
- d. **Turbine stop valves or turbine control valves;**
- e. **Turbine bypass valves; and**
- f. **Moisture separator reheater 2nd stage steam isolation valves.**

APPLICABILITY:      **MODES 1, 2, 3, and 4.**  
~~MODES 2, 3, and 4 except when steam flow is isolated.~~

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One MSIV inoperable in MODE 1.	A.1 Restore valve to OPERABLE status.	8 hours
B. One or more of the turbine stop valves and <del>its</del> associated turbine control valves, turbine bypass valves, or moisture separator reheater 2nd stage steam isolation valves inoperable in MODE 1.	B.1 Restore valves to OPERABLE status.	72 hours

**Main Steam Line Flow Path Isolation Valves MSIVs**  
3.7.2

## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Two MSIVs inoperable in MODE 1.</p> <p><u>OR</u></p> <p>One MSIV inoperable and one or more of the turbine stop valves and <del>its</del> associated turbine control valves, <del>all</del> turbine bypass valves, or moisture separator reheater 2nd stage steam isolation valves inoperable in MODE 1.</p> <p><u>OR</u></p> <p>Required Action and associated Completion Time of Condition A or B not met.</p>	<p>C.1 Be in MODE 2.</p>	<p>6 hours</p>



**Main Steam Line Flow Path Isolation Valves MSIVs**  
3.7.2

## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<b>E. (continued)</b>	<p><b>E.2</b> -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. Isolation devices in high radiation areas may be verified by use of administrative means.</li> <li>2. Isolation devices that are locked, sealed, or otherwise secured may be verified by administrative means.</li> </ol> <p>-----</p> <p>Verify the affected penetration flow path is isolated.</p>	Once per 31 days
<p><b>FE.</b> Required Action and associated Completion Time of Condition D <b>or E</b> not met.</p>	<p><b>FE.1</b> Be in MODE 3.</p> <p><u>AND</u></p> <p><b>FE.2</b> Be in MODE 4 with the Reactor Coolant System (RCS) cooling provided by the Normal Residual Heat Removal System (RNS).</p> <p><u>AND</u></p> <p><b>F.3</b> Be in MODE 5.</p>	<p>6 hours</p> <p>24 hours</p> <p>36 hours</p>

**Main Steam Line Flow Path Isolation Valves MSIVs**  
3.7.2

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.7.2.1</p> <p style="text-align: center;">-----NOTE-----</p> <p>Only required to be performed prior to entry into MODE 2.</p> <p style="text-align: center;">-----</p> <p>Verify MSIV closure time <del>≤ 5 seconds</del> <b>is within limits</b> on an actual or simulated actuation signal.</p>	<p>In accordance with the Inservice Testing Program</p>
<p>SR 3.7.2.2</p> <p style="text-align: center;">-----NOTE-----</p> <p>Only required to be performed prior to entry into MODE 2.</p> <p style="text-align: center;">-----</p> <p>Verify <b>required</b> turbine stop, turbine control, turbine bypass, and moisture separator reheater 2nd stage steam isolation valves' closure time <del>≤ 5 seconds</del> <b>is within limits</b> on an actual or simulated actuation signal.</p>	<p>In accordance with the Inservice Testing Program</p>
<p><b>SR 3.7.2.3</b></p> <p><b>Verify the isolation time of each MSIV bypass valve and main steam line drain isolation valve is within limits.</b></p>	<p><b>In accordance with the Inservice Testing Program</b></p>
<p><b>SR 3.7.2.4</b></p> <p><b>Verify each MSIV bypass valve and main steam line drain isolation valve actuates to the isolation position on an actual or simulated actuation signal.</b></p>	<p><b>24 months</b></p>

**Main Steam Line Flow Path Isolation Valves ~~MSIVs~~**

B 3.7.2

## B 3.7 PLANT SYSTEMS

B 3.7.2 Main Steam **Line Flow Path** Isolation Valves ~~(MSIVs)~~**BASES**

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**BACKGROUND**

Each main steam line has one safety related MSIV to isolate steam flow from the secondary side of the steam generators following a high energy line break. MSIV closure terminates flow from the unaffected (intact) steam generator.

One MSIV is located in each main steam line outside containment. The MSIVs are downstream from the main steam safety valves (MSSVs). Downstream from the MSIVs, main steam enters the high pressure turbine through four stop valves and four governing control valves. Closing the MSIVs isolates each steam generator from the other and isolates the turbine bypass system, and other steam supplies from the steam generator.

The MSIVs, turbine stop and control valves, turbine bypass valves, and moisture separator reheater 2nd stage steam isolation valves close on a main steam isolation signal generated by either low steam line pressure, high containment pressure, Low Tcold, or high negative steam pressure rate. The MSIVs fail closed on loss of control air or actuation signal from either of two 1E power divisions.

Each MSIV has an MSIV bypass valve. Although these bypass valves are normally closed, they receive the same emergency closure signal as do their associated MSIVs. The MSIVs may also be actuated manually.

A description of the MSIVs is found in the Section 10.3 (Ref. 1). Descriptions for the turbine bypass valves, and moisture separator reheater 2nd stage steam isolation valves are found in the Section 10.4 (Ref. 6).

**Main Steam Line Flow Path Isolation Valves MSIVs**

B 3.7.2

**BASES****APPLICABLE  
SAFETY  
ANALYSES**

The design basis of the MSIVs is established by the containment analysis for the large steam line break (SLB) inside containment, discussed in the Section 6.2 (Ref. 2). It is also affected by the accident analysis of the SLB events presented in the Section 15.1 (Ref. 3). The design precludes the blowdown of more than one steam generator, assuming a single active component failure (e.g., the failure of one MSIV to close on demand).

Design basis events of concern for containment analysis are SLB inside containment with the failure of the associated MSIV to close, or a main feedline break with the associated failure of a feedline isolation or control valve to close. At lower powers, the steam generator inventory and temperature are at their maximum, maximizing the analyzed mass and energy release to the containment. Due to reverse flow and failure of the MSIV to close, the additional mass and energy in the steam headers, downstream from the other MSIV, contribute to the total release. With the most reactive rod cluster control assembly assumed stuck in the fully withdrawn position, there is an increased possibility that the core will become critical and return to power. The core is ultimately shut down by the boric acid injection delivered by the Core Makeup Tanks (CMTs).

The accident analysis compares several different SLB events against different acceptance criteria. The large SLB outside containment upstream of the MSIV is limiting for offsite dose, although a break in this short section of main steam header has a very low probability. The large SLB inside containment at hot zero power is the limiting case for a post trip return to power. The analysis includes consideration of scenarios with offsite power available, and with a loss of offsite power. With offsite power available, the reactor coolant pumps continue to circulate coolant for a longer period through the steam generators, maximizing the Reactor Coolant System cooldown. The reactor protection system includes a safety related signal that initiates the coastdown of the reactor coolant pumps early in the large SLB transient. Therefore, there is very little difference in the predicted departure from nucleate boiling ratio between cases with and without offsite power. Significant single failures considered include failure of an MSIV to close.

The non-safety related turbine stop or control valves, in combination with the turbine bypass, and moisture separator reheater 2nd stage steam isolation valves, are assumed as a backup to isolate the steam flow path given a single failure of an MSIV. The safety analyses do not differentiate between the availability of the turbine stop valve or its series

**Main Steam Line Flow Path Isolation Valves MSIVs**

B 3.7.2

**BASES****APPLICABLE SAFETY ANALYSES (continued)**

control valve. Either the turbine stop valves or ~~its~~ associated turbine control valve are required by this LCO to be OPERABLE. These valves, along with the turbine bypass, and moisture separator reheater 2nd stage steam isolation valves are considered as alternate downstream valves.

The MSIVs serve a safety related function and remain open during power operation. These valves operate under the following situations:

- a. High energy line break inside containment. In order to maximize the mass and energy release into containment, the analysis assumes that the MSIV in the affected steam generator remains open. For this accident scenario, steam is discharged into containment from both steam generators until the unaffected loop MSIV closes. After MSIV closure, steam is discharged into containment only from the affected steam generator and from the residual steam in the main steam header downstream of the closed MSIV in the unaffected loop. Closure of the MSIV isolates the break from the unaffected steam generator.
- b. A break outside of containment, and upstream or downstream from the MSIVs, is not a containment pressurization concern. The uncontrolled blowdown of more than one steam generator must be prevented to limit the potential for uncontrolled Reactor Coolant System (RCS) cooldown and positive reactivity addition. Closure of the MSIVs or alternate downstream valves isolates the break, and limits the blowdown to a single steam generator.
- c. Following a steam generator tube rupture, closure of the MSIVs isolates the ruptured steam generator to minimize radiological releases.
- d. The MSIVs are also utilized during other events such as a feedwater line break; however, these events are less limiting so far as MSIV OPERABILITY is concerned.

**In addition, the MSIV bypass valves and main steam line drain valves 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 MSIV bypass valves and main steam line drain isolation valves.**

**Main Steam Line Flow Path Isolation Valves MSIVs**

B 3.7.2

## BASES

## APPLICABLE SAFETY ANALYSES (continued)

~~The MSIVs and the alternate downstream valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).~~

Following an SLB and main steam isolation signal, the analyses assume continued steam loss through the **main** steam line ~~condensate~~-drain lines, turbine gland seal system, and the main steam to auxiliary steam header which supplies the auxiliary steam line to the deaerator. Since these valves are not assumed for steam isolation **to mitigate an SLB**, they do not satisfy the 10 CFR 50.36(c)(2)(ii) criteria; **however, main steam line drain isolation valves satisfy the 10 CFR 50.36(c)(2)(ii) criteria for containment isolation as discussed above.**

**The MSIVs, the alternate downstream valves, the MSIV bypass valves, and the main steam line drain valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).**

## LCO

This LCO requires **the minimum combination of valves for isolation of each main steam line flow path to be OPERABLE. This requires that one MSIV in each of the two main steam line flow paths be OPERABLE and requires MSIV bypass valves and main steam line drain valves to** ~~that one MSIV in each of the two steam lines~~ be OPERABLE. The MSIVs are considered OPERABLE when their isolation times are within limits, and they close on an isolation actuation signal.

This LCO **also** requires ~~that~~ four turbine stop valves or **the their** associated turbine control valves, six turbine bypass valves, and two moisture separator reheater 2nd stage steam isolation valves be OPERABLE. A valve is considered OPERABLE when its isolation time is within the safety analysis isolation time limit of 5 seconds and it closes on an MSIV actuation signal. ~~The turbine bypass valves are alternatively considered OPERABLE when closed and administratively maintained closed with automatic actuation blocked as appropriate.~~

This LCO provides assurance that the MSIVs will perform their design safety function to mitigate the consequences of accidents that could result in offsite exposures comparable to the 10 CFR 50.34 limits or the NRC staff approved licensing basis.

**Main Steam Line Flow Path Isolation Valves MSIVs**

B 3.7.2

**BASES****LCO (continued)**

This LCO provides assurance that the design and performance of the alternate downstream valves are compatible with the accident conditions for which they are called upon to function (Ref. 5).

**APPLICABILITY**

The MSIVs, **MSIV bypass valves, main steam line drain valves,** turbine stop or associated turbine control valves, turbine bypass valves, and moisture separator reheater 2nd stage steam isolation valves must be OPERABLE in MODE 1 and MODES 2, 3, and 4, ~~except when steam flow is isolated~~ when there is significant mass and energy in the RCS and steam generators **and where a DBA could cause a release of radioactive material to containment.** ~~Therefore, these valves must be OPERABLE or closed. When these valves are closed, they are already performing their required function.~~

In MODE 5 or 6, the steam generators do not contain much energy because their temperature is below the boiling point of water; therefore, the MSIVs and alternate downstream valves are not required for isolation of potential high energy secondary system pipe breaks in these MODES.

**ACTIONS****A.1**

With one MSIV inoperable in MODE 1, action must be taken to restore OPERABLE status within 8 hours. Some repairs to the valves can be made with the plant hot. 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 these valves. With a single MSIV inoperable, the safety function, isolation of the **main steam line** flow path, is provided by the OPERABLE alternate downstream valves, but cannot accommodate a single failure. The assumptions and criteria of the accident analyses are preserved by the ability to automatically isolate the steam flow path.

The 8-hour Completion Time is greater than that normally allowed for containment isolation valves because the MSIVs are valves that isolate a closed system penetrating containment. These valves differ from other containment isolation valves in that the closed system provides a positive means for containment isolation.

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**Main Steam Line Flow Path Isolation Valves MSIVs**

B 3.7.2

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**BASES**

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**ACTIONS (continued)****B.1**

With any number of the turbine stop valves and the associated turbine control valves, turbine bypass valves, or moisture separator reheater 2nd stage steam isolation valves inoperable in MODE 1, action must be taken to restore **the inoperable valve(s) to OPERABLE** status within 72 hours. Some repairs to the valves can be made with the plant hot. The 72-hour Completion Time is reasonable considering the low probability of an accident occurring during this time period that would require a closure of these valves. With the backup isolation valves inoperable, the safety function, isolation of the **main steam line** flow path, is provided by the remaining OPERABLE valves, but cannot accommodate a single failure. The assumptions and criteria of the accident analyses are preserved by the ability to automatically isolate the steam flow path.

**C.1**

With two MSIVs inoperable in MODE 1 or one MSIV and an alternate downstream valve inoperable or if the valves cannot be restored to OPERABLE status in accordance with Required Action A.1 or B.1, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in MODE 2 within 6 hours and Condition D would be entered. The Completion Time is reasonable, based on operating experience, to reach MODE 2 in an orderly manner and without challenging unit systems.

**D.1 and D.2**

Condition D is modified by a Note indicating that a separate Condition entry is allowed for each **main steam line flow path MSIV**.

**With one or two MSIVs inoperable or any number of turbine stop valves and the associated turbine control valves, turbine bypass, or moisture separator reheater 2nd stage steam isolation valves inoperable in MODE 2, 3, or 4, the inoperable valve(s) may either be restored to OPERABLE status or the affected main steam line flow path isolated. When isolated, the main steam line flow path is in the condition** ~~Since the MSIVs are required to be OPERABLE in MODES 2, 3, and 4, the inoperable MSIVs may either be restored to OPERABLE status or closed. When closed, the MSIVs are already in the position~~ required by the assumptions in the safety analysis.

**Main Steam Line Flow Path Isolation Valves MSIVs**

B 3.7.2

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**BASES**

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**ACTIONS (continued)**

The 8-hour Completion Time is consistent with that allowed in Condition A, and conservative considering the reduced energy in the steam generators in MODES 2, 3, and 4.

For inoperable **main steam line flow path isolation valves MSIVs** that cannot be restored to OPERABLE status within the specified Completion Time but **whose affected flow paths are isolated, these isolated flow paths must be verified to be continually isolated** ~~were closed, these inoperable valves must be verified to be continually closed~~ on a periodic basis. This is necessary to ensure that the assumptions in the safety analyses remain valid. The 7-day Completion Time is based on engineering judgment, and is considered reasonable in view of MSIV status indications available in the control room and other administrative controls which ensure that these valves will continue to be closed.

**E.1 and E.2**

**With one or more MSIV bypass or main steam line drain valves inoperable, the inoperable valve must be restored to OPERABLE status or the affected penetration must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and deactivated automatic valve, a closed manual valve, and a blind flange. A check valve may not be used to isolate the affected penetration flow path. Required Action E.1 must be completed within the 72-hour Completion Time. The specified time period is reasonable considering the relative stability of the closed system (hence, reliability) to act as a penetration isolation boundary and the relative importance of maintaining containment integrity during MODES 1, 2, 3, and 4. In the event that the affected penetration is isolated in accordance with Required Action E.1, the affected penetration must be verified to be isolated on a periodic basis. This periodic verification is necessary to assure leak tightness of containment and that containment penetrations requiring isolation following an accident are isolated. The Completion Time of once per 31 days for verifying that each affected penetration flow path is isolated is appropriate because the valves are operated under administrative controls and the probability of their misalignment is low.**

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**Main Steam Line Flow Path Isolation Valves ~~MSIVs~~**

B 3.7.2

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BASES

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## ACTIONS (continued)

Condition E is modified by a Note indicating that separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable containment isolation valve. Complying with the Required Actions may allow for continued operation, and subsequent inoperable containment isolation valves are governed by subsequent Condition entry and application of associated Required Actions.

The Required Actions are modified by a Note allowing containment penetration flow paths to be unisolated intermittently under administrative control. 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 penetration can be rapidly isolated when a need for containment isolation is indicated.

Required Action E.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.

~~FE.1, F.2, and FE.3~~2

If the **main steam line flow path isolation valves ~~MSIVs~~** cannot be restored to OPERABLE status or **affected flow paths isolated ~~closed~~** within the associated Completion Times of Condition D or E, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours, ~~and~~ in MODE 4 with normal residual heat removal system in service within 24 hours, **and in MODE 5 within 36 hours**. The allowed

**Main Steam Line Flow Path Isolation Valves MSIVs**

B 3.7.2

## BASES

## ACTIONS (continued)

Completion Times are reasonable, based on operating experience, to reach the required unit conditions from MODE 2 conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE  
REQUIREMENTSSR 3.7.2.1

This SR verifies that ~~MSIV~~the closure time of each MSIV is ~~≤ 5.0 seconds~~, on an actual or simulated actuation signal. ~~The MSIV isolation time~~ is **within the limit given in Reference 7 and is within that assumed in the accident and containment analyses. This SR also verifies the valve closure time is in accordance with the Inservice Testing Program.** This ~~Surveillance~~SR is normally performed upon returning the unit to operation following a refueling outage. The MSIVs should not be tested at power, since even a part stroke exercise increases the risk of a valve closure when the unit is generating power. As the MSIVs are not tested at power, they are exempt from the ASME OM Code (Ref. ~~78~~) requirements during operation in MODE 1 or 2.

The Frequency is in accordance with the Inservice Testing Program.

This test is conducted in MODE 3 with the unit at operating temperature and pressure. This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.

SR 3.7.2.2

This SR verifies that the turbine stop, turbine control, turbine bypass, and moisture separator reheater 2nd stage steam isolation valves' closure time is ~~≤ 5.0 seconds~~, **within the limit given in Reference 7** on an actual or simulated actuation signal. These alternate downstream isolation valves must meet the MSIV isolation time assumed in the accident and containment analyses. **This SR also verifies the valve closure time is in accordance with the Inservice Testing Program.** This ~~Surveillance~~SR is normally performed upon returning the unit to operation following a refueling outage. The alternate downstream valves should not be tested at power, since even a part stroke exercise increases the risk of a valve closure when the unit is generating power. As the alternate downstream valves are not tested at power, they are exempt from the ASME OM Code (Ref. ~~78~~) requirements during operation in MODE 1 or 2.

**Main Steam Line Flow Path Isolation Valves MSIVs**

B 3.7.2

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**BASES**

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**SURVEILLANCE REQUIREMENTS (continued)**

The Frequency is in accordance with the Inservice Testing Program.

This test is conducted in MODE 3 with the unit at operating temperature and pressure. This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.

**SR 3.7.2.3**

**Verifying that the isolation time of each MSIV bypass and steam line drain 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 Section 6.2.3 (Ref. 9) and Frequency of this SR is in accordance with the Inservice Testing Program.**

**SR 3.7.2.4**

**This SR ensures that each MSIV bypass and steam line drain valve will actuate to its 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 24 month Frequency 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.**

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**REFERENCES**

1. Section 10.3, "Main Steam System."
2. Section 6.2.1, "Containment Functional Design."
3. Section 15.1, "Increase in Heat Removal by Secondary System."
4. Not used.
5. NUREG-138, Issue 1, "Staff Discussion of Fifteen Technical Issues Listed in Attachment to November 3, 1976 Memorandum from Director NRR to NRR Staff."

**Main Steam Line Flow Path Isolation Valves ~~MSIVs~~**

B 3.7.2

**BASES**

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REFERENCES (continued)

6. Section 10.4, "Other Features of Steam and Power Conversion Systems."
  7. **[Technical Requirements Manual.]**
  - ~~78.~~ ASME OM Code, "Code for Operation and Maintenance of Nuclear Power Plants."
  9. **Section 6.2, "Containment Systems."**
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**XII. Applicable STS Subsection After Incorporation of this GTST's Modifications**

The entire subsection of the Specifications and the Bases associated with this GTST, following incorporation of the modifications, is presented next.

Main Steam Line Flow Path Isolation Valves  
3.7.2

## 3.7 PLANT SYSTEMS

## 3.7.2 Main Steam Line Flow Path Isolation Valves

- LCO 3.7.2            Each of the following main steam line flow path isolation valves shall be OPERABLE;
- a.    Main steam isolation valves (MSIVs);
  - b.    MSIV bypass valves;
  - c.    Main steam line drain valves;
  - d.    Turbine stop valves or turbine control valves;
  - e.    Turbine bypass valves; and
  - f.    Moisture separator reheater 2nd stage steam isolation valves.

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

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One MSIV inoperable in MODE 1.	A.1    Restore valve to OPERABLE status.	8 hours
B. One or more of the turbine stop valves and associated turbine control valves, turbine bypass valves, or moisture separator reheater 2nd stage steam isolation valves inoperable in MODE 1.	B.1    Restore valves to OPERABLE status.	72 hours

Main Steam Line Flow Path Isolation Valves  
3.7.2

## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Two MSIVs inoperable in MODE 1.</p> <p><u>OR</u></p> <p>One MSIV inoperable and one or more of the turbine stop valves and associated turbine control valves, turbine bypass valves, or moisture separator reheater 2nd stage steam isolation valves inoperable in MODE 1.</p> <p><u>OR</u></p> <p>Required Action and associated Completion Time of Condition A or B not met.</p>	<p>C.1 Be in MODE 2.</p>	<p>6 hours</p>



Main Steam Line Flow Path Isolation Valves  
3.7.2

## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. (continued)	<p>E.2 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. Isolation devices in high radiation areas may be verified by use of administrative means.</li> <li>2. Isolation devices that are locked, sealed, or otherwise secured may be verified by administrative means.</li> </ol> <p>-----</p> <p>Verify the affected penetration flow path is isolated.</p>	Once per 31 days
F. Required Action and associated Completion Time of Condition D or E not met.	<p>F.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>F.2 Be in MODE 4 with the Reactor Coolant System (RCS) cooling provided by the Normal Residual Heat Removal System (RNS).</p> <p><u>AND</u></p> <p>F.3 Be in MODE 5.</p>	<p>6 hours</p> <p>24 hours</p> <p>36 hours</p>

Main Steam Line Flow Path Isolation Valves  
3.7.2

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	<p>-----NOTE----- Only required to be performed prior to entry into MODE 2. -----</p> <p>Verify MSIV closure time is within limits on an actual or simulated actuation signal.</p>	In accordance with the Inservice Testing Program
SR 3.7.2.2	<p>-----NOTE----- Only required to be performed prior to entry into MODE 2. -----</p> <p>Verify required turbine stop, turbine control, turbine bypass, and moisture separator reheater 2nd stage steam isolation valves' closure time is within limits on an actual or simulated actuation signal.</p>	In accordance with the Inservice Testing Program
SR 3.7.2.3	Verify the isolation time of each MSIV bypass valve and main steam line drain isolation valve is within limits.	In accordance with the Inservice Testing Program
SR 3.7.2.4	Verify each MSIV bypass valve and main steam line drain isolation valve actuates to the isolation position on an actual or simulated actuation signal.	24 months

## B 3.7 PLANT SYSTEMS

### B 3.7.2 Main Steam Line Flow Path Isolation Valves

#### BASES

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**BACKGROUND** Each main steam line has one safety related MSIV to isolate steam flow from the secondary side of the steam generators following a high energy line break. MSIV closure terminates flow from the unaffected (intact) steam generator.

One MSIV is located in each main steam line outside containment. The MSIVs are downstream from the main steam safety valves (MSSVs). Downstream from the MSIVs, main steam enters the high pressure turbine through four stop valves and four governing control valves. Closing the MSIVs isolates each steam generator from the other and isolates the turbine bypass system, and other steam supplies from the steam generator.

The MSIVs, turbine stop and control valves, turbine bypass valves, and moisture separator reheater 2nd stage steam isolation valves close on a main steam isolation signal generated by either low steam line pressure, high containment pressure, Low Tcold, or high negative steam pressure rate. The MSIVs fail closed on loss of control air or actuation signal from either of two 1E power divisions.

Each MSIV has an MSIV bypass valve. Although these bypass valves are normally closed, they receive the same emergency closure signal as do their associated MSIVs. The MSIVs may also be actuated manually.

A description of the MSIVs is found in the Section 10.3 (Ref. 1). Descriptions for the turbine bypass valves, and moisture separator reheater 2nd stage steam isolation valves are found in the Section 10.4 (Ref. 6).

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**BASES**

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**APPLICABLE  
SAFETY  
ANALYSES**

The design basis of the MSIVs is established by the containment analysis for the large steam line break (SLB) inside containment, discussed in the Section 6.2 (Ref. 2). It is also affected by the accident analysis of the SLB events presented in the Section 15.1 (Ref. 3). The design precludes the blowdown of more than one steam generator, assuming a single active component failure (e.g., the failure of one MSIV to close on demand).

Design basis events of concern for containment analysis are SLB inside containment with the failure of the associated MSIV to close, or a main feedline break with the associated failure of a feedline isolation or control valve to close. At lower powers, the steam generator inventory and temperature are at their maximum, maximizing the analyzed mass and energy release to the containment. Due to reverse flow and failure of the MSIV to close, the additional mass and energy in the steam headers, downstream from the other MSIV, contribute to the total release. With the most reactive rod cluster control assembly assumed stuck in the fully withdrawn position, there is an increased possibility that the core will become critical and return to power. The core is ultimately shut down by the boric acid injection delivered by the Core Makeup Tanks (CMTs).

The accident analysis compares several different SLB events against different acceptance criteria. The large SLB outside containment upstream of the MSIV is limiting for offsite dose, although a break in this short section of main steam header has a very low probability. The large SLB inside containment at hot zero power is the limiting case for a post trip return to power. The analysis includes consideration of scenarios with offsite power available, and with a loss of offsite power. With offsite power available, the reactor coolant pumps continue to circulate coolant for a longer period through the steam generators, maximizing the Reactor Coolant System cooldown. The reactor protection system includes a safety related signal that initiates the coastdown of the reactor coolant pumps early in the large SLB transient. Therefore, there is very little difference in the predicted departure from nucleate boiling ratio between cases with and without offsite power. Significant single failures considered include failure of an MSIV to close.

The non-safety related turbine stop or control valves, in combination with the turbine bypass, and moisture separator reheater 2nd stage steam isolation valves, are assumed as a backup to isolate the steam flow path given a single failure of an MSIV. The safety analyses do not differentiate between the availability of the turbine stop valve or its series

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**BASES**

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**APPLICABLE SAFETY ANALYSES (continued)**

control valve. Either the turbine stop valves or associated turbine control valve are required by this LCO to be OPERABLE. These valves, along with the turbine bypass, and moisture separator reheater 2nd stage steam isolation valves are considered as alternate downstream valves.

The MSIVs serve a safety related function and remain open during power operation. These valves operate under the following situations:

- a. High energy line break inside containment. In order to maximize the mass and energy release into containment, the analysis assumes that the MSIV in the affected steam generator remains open. For this accident scenario, steam is discharged into containment from both steam generators until the unaffected loop MSIV closes. After MSIV closure, steam is discharged into containment only from the affected steam generator and from the residual steam in the main steam header downstream of the closed MSIV in the unaffected loop. Closure of the MSIV isolates the break from the unaffected steam generator.
- b. A break outside of containment, and upstream or downstream from the MSIVs, is not a containment pressurization concern. The uncontrolled blowdown of more than one steam generator must be prevented to limit the potential for uncontrolled Reactor Coolant System (RCS) cooldown and positive reactivity addition. Closure of the MSIVs or alternate downstream valves isolates the break, and limits the blowdown to a single steam generator.
- c. Following a steam generator tube rupture, closure of the MSIVs isolates the ruptured steam generator to minimize radiological releases.
- d. The MSIVs are also utilized during other events such as a feedwater line break; however, these events are less limiting so far as MSIV OPERABILITY is concerned.

In addition, the MSIV bypass valves and main steam line drain valves 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 MSIV bypass valves and main steam line drain isolation valves.

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**BASES**

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**APPLICABLE SAFETY ANALYSES (continued)**

Following an SLB and main steam isolation signal, the analyses assume continued steam loss through the main steam line drain lines, turbine gland seal system, and the main steam to auxiliary steam header which supplies the auxiliary steam line to the deaerator. Since these valves are not assumed for steam isolation to mitigate an SLB, they do not satisfy the 10 CFR 50.36(c)(2)(ii) criteria; however, main steam line drain isolation valves satisfy the 10 CFR 50.36(c)(2)(ii) criteria for containment isolation as discussed above.

The MSIVs, the alternate downstream valves, the MSIV bypass valves, and the main steam line drain valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

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**LCO**

This LCO requires the minimum combination of valves for isolation of each main steam line flow path to be OPERABLE. This requires that one MSIV in each of the two main steam line flow paths be OPERABLE and requires MSIV bypass valves and main steam line drain valves to be OPERABLE. The MSIVs are considered OPERABLE when their isolation times are within limits, and they close on an isolation actuation signal.

This LCO also requires four turbine stop valves or the associated turbine control valves, six turbine bypass valves, and two moisture separator reheater 2nd stage steam isolation valves be OPERABLE. A valve is considered OPERABLE when its isolation time is within the safety analysis isolation time limit of 5 seconds and it closes on an MSIV actuation signal.

This LCO provides assurance that the MSIVs will perform their design safety function to mitigate the consequences of accidents that could result in offsite exposures comparable to the 10 CFR 50.34 limits or the NRC staff approved licensing basis.

This LCO provides assurance that the design and performance of the alternate downstream valves are compatible with the accident conditions for which they are called upon to function (Ref. 5).

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**BASES**

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**APPLICABILITY** The MSIVs, MSIV bypass valves, main steam line drain valves, turbine stop or associated turbine control valves, turbine bypass valves, and moisture separator reheater 2nd stage steam isolation valves must be OPERABLE in MODE 1 and MODES 2, 3, and 4, when there is significant mass and energy in the RCS and steam generators and where a DBA could cause a release of radioactive material to containment. In MODE 5 or 6, the steam generators do not contain much energy because their temperature is below the boiling point of water; therefore, the MSIVs and alternate downstream valves are not required for isolation of potential high energy secondary system pipe breaks in these MODES.

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**ACTIONS**A.1

With one MSIV inoperable in MODE 1, action must be taken to restore OPERABLE status within 8 hours. Some repairs to the valves can be made with the plant hot. 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 these valves. With a single MSIV inoperable, the safety function, isolation of the main steam line flow path, is provided by the OPERABLE alternate downstream valves, but cannot accommodate a single failure. The assumptions and criteria of the accident analyses are preserved by the ability to automatically isolate the steam flow path.

The 8-hour Completion Time is greater than that normally allowed for containment isolation valves because the MSIVs are valves that isolate a closed system penetrating containment. These valves differ from other containment isolation valves in that the closed system provides a positive means for containment isolation.

B.1

With any number of the turbine stop valves and the associated turbine control valves, turbine bypass valves, or moisture separator reheater 2nd stage steam isolation valves inoperable in MODE 1, action must be taken to restore the inoperable valve(s) to OPERABLE status within 72 hours. Some repairs to the valves can be made with the plant hot. The 72-hour Completion Time is reasonable considering the low probability of an accident occurring during this time period that would require a closure of these valves. With the backup isolation valves inoperable, the safety function, isolation of the main steam line flow path, is provided by the remaining OPERABLE valves, but cannot accommodate a single failure. The assumptions and criteria of the accident analyses are preserved by the ability to automatically isolate the steam flow path.

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**BASES**

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**ACTIONS (continued)**C.1

With two MSIVs inoperable in MODE 1 or one MSIV and an alternate downstream valve inoperable or if the valves cannot be restored to OPERABLE status in accordance with Required Action A.1 or B.1, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in MODE 2 within 6 hours and Condition D would be entered. The Completion Time is reasonable, based on operating experience, to reach MODE 2 in an orderly manner and without challenging unit systems.

D.1 and D.2

Condition D is modified by a Note indicating that a separate Condition entry is allowed for each main steam line flow path .

With one or two MSIVs inoperable or any number of turbine stop valves and the associated turbine control valves, turbine bypass, or moisture separator reheater 2nd stage steam isolation valves inoperable in MODE 2, 3, or 4, the inoperable valve(s) may either be restored to OPERABLE status or the affected main steam line flow path isolated. When isolated, the main steam line flow path is in the condition required by the assumptions in the safety analysis.

The 8-hour Completion Time is consistent with that allowed in Condition A, and conservative considering the reduced energy in the steam generators in MODES 2, 3, and 4.

For inoperable main steam line flow path isolation valves that cannot be restored to OPERABLE status within the specified Completion Time but whose affected flow paths are isolated, these isolated flow paths must be verified to be continually isolated on a periodic basis. This is necessary to ensure that the assumptions in the safety analyses remain valid. The 7-day Completion Time is based on engineering judgment, and is considered reasonable in view of MSIV status indications available in the control room and other administrative controls which ensure that these valves will continue to be closed.

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**BASES**

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**ACTIONS (continued)**E.1 and E.2

With one or more MSIV bypass or main steam line drain valves inoperable, the inoperable valve must be restored to OPERABLE status or the affected penetration must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and deactivated automatic valve, a closed manual valve, and a blind flange. A check valve may not be used to isolate the affected penetration flow path. Required Action E.1 must be completed within the 72-hour Completion Time. The specified time period is reasonable considering the relative stability of the closed system (hence, reliability) to act as a penetration isolation boundary and the relative importance of maintaining containment integrity during MODES 1, 2, 3, and 4. In the event that the affected penetration is isolated in accordance with Required Action E.1, the affected penetration must be verified to be isolated on a periodic basis. This periodic verification is necessary to assure leak tightness of containment and that containment penetrations requiring isolation following an accident are isolated. The Completion Time of once per 31 days for verifying that each affected penetration flow path is isolated is appropriate because the valves are operated under administrative controls and the probability of their misalignment is low.

Condition E is modified by a Note indicating that separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable containment isolation valve. Complying with the Required Actions may allow for continued operation, and subsequent inoperable containment isolation valves are governed by subsequent Condition entry and application of associated Required Actions.

The Required Actions are modified by a Note allowing containment penetration flow paths to be unisolated intermittently under administrative control. 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 penetration can be rapidly isolated when a need for containment isolation is indicated.

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**BASES**

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**ACTIONS (continued)**

Required Action E.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.

**F.1, F.2, and F.3**

If the main steam line flow path isolation valves cannot be restored to OPERABLE status or affected flow paths isolated within the associated Completion Times of Condition D or E, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours, in MODE 4 with normal residual heat removal system in service 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 from MODE 2 conditions in an orderly manner and without challenging plant systems.

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**SURVEILLANCE  
REQUIREMENTS****SR 3.7.2.1**

This SR verifies that the closure time of each MSIV on an actual or simulated actuation signal is within the limit given in Reference 7 and is within that assumed in the accident and containment analyses. This SR also verifies the valve closure time is in accordance with the Inservice Testing Program. This SR is normally performed upon returning the unit to operation following a refueling outage. The MSIVs should not be tested at power, since even a part stroke exercise increases the risk of a valve closure when the unit is generating power. As the MSIVs are not tested at power, they are exempt from the ASME OM Code (Ref. 8) requirements during operation in MODE 1 or 2.

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**BASES**

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**SURVEILLANCE REQUIREMENTS (continued)**

The Frequency is in accordance with the Inservice Testing Program.

This test is conducted in MODE 3 with the unit at operating temperature and pressure. This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.

**SR 3.7.2.2**

This SR verifies that the turbine stop, turbine control, turbine bypass, and moisture separator reheater 2nd stage steam isolation valves' closure time is within the limit given in Reference 7 on an actual or simulated actuation signal. These alternate downstream isolation valves must meet the MSIV isolation time assumed in the accident and containment analyses. This SR also verifies the valve closure time is in accordance with the Inservice Testing Program. This SR is normally performed upon returning the unit to operation following a refueling outage. The alternate downstream valves should not be tested at power, since even a part stroke exercise increases the risk of a valve closure when the unit is generating power. As the alternate downstream valves are not tested at power, they are exempt from the ASME OM Code (Ref. 8) requirements during operation in MODE 1 or 2.

The Frequency is in accordance with the Inservice Testing Program.

This test is conducted in MODE 3 with the unit at operating temperature and pressure. This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.

**SR 3.7.2.3**

Verifying that the isolation time of each MSIV bypass and steam line drain 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 Section 6.2.3 (Ref. 9) and Frequency of this SR is in accordance with the Inservice Testing Program.

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**BASES**

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**SURVEILLANCE REQUIREMENTS (continued)**SR 3.7.2.4

This SR ensures that each MSIV bypass and steam line drain valve will actuate to its 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 24 month Frequency 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.

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**REFERENCES**

1. Section 10.3, "Main Steam System."
  2. Section 6.2.1, "Containment Functional Design."
  3. Section 15.1, "Increase in Heat Removal by Secondary System."
  4. Not used.
  5. NUREG-138, Issue 1, "Staff Discussion of Fifteen Technical Issues Listed in Attachment to November 3, 1976 Memorandum from Director NRR to NRR Staff."
  6. Section 10.4, "Other Features of Steam and Power Conversion Systems."
  7. [Technical Requirements Manual.]
  8. ASME OM Code, "Code for Operation and Maintenance of Nuclear Power Plants."
  9. Section 6.2, "Containment Systems."
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