

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

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**Title: Changes related to Section 3.1.9, CVS Demineralized Water Isolation Valves and Makeup Line Isolation Valves**

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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-425, Rev. 3, Relocate Surveillance Frequencies to Licensee Control – RITSTF Initiative 5b

**STS NUREGs Affected:**

NUREG-1430, -1431, -1432, -1433, -1434

**NRC Approval Date:**

18-Mar-09

**TSTF Classification:**

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:**

None

**RCOL COL Item Number and Title:**

None

**RCOL PTS Change Number and Title:**

- VEGP LAR DOC A016: TS 3.1.9 references to “makeup line isolation valve” are changed to “CVS makeup line isolation valve” and editorial corrections are made to Condition B and Required Action B.1
- VEGP LAR DOC A017: TS 3.1.9 Note to Required Action B.1 is moved to the beginning of the Actions Table.
- VEGP LAR DOC A027: TS 3.1.9, SR 3.1.9.1 description is revised to state “... isolation valves stroke closed.”
- VEGP LAR DOC A064: TS 3.1.9 is revised to include SR 3.1.9.2 requiring verification of the closure time of CVS makeup isolation valves.
- VEGP LAR DOC L01: ACTUATION DEVICE TEST is replaced with device-specific surveillances in the individual specifications for the actuation devices with the same 24 month Frequency. New SR 3.1.9.3 is added for verification of CVS demineralized water isolation valve actuation.
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**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(1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

Responses to VEGP LAR 2012-02 RAI Questions 16-3 Issue 1 and 2, and 16-28, Issue 2 did not result in any changes to Section 3.1.9.

TSTF-425 is deferred for future consideration.

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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)**

In the “References” section of the Bases, “Accident Analysis” was changed to “Accident Analyses” in Reference 1.

APOG Recommended Changes to Improve the Specifications and the Bases

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)

Delete “the” from the SR 3.1.9.2 text. The proposed SR 3.1.9.2 is easily understood without using “the.”

Editorial changes are made in the “Background” and “LCO” section of the Bases.

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## **V. Applicability**

### **Affected Generic Technical Specifications and Bases:**

Section 3.1.9, Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves

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

Throughout the Specifications, “makeup line isolation valve(s)” is replaced with “CVS makeup line isolation valve(s).” (DOC A016)

Note from Required Action B.1 is moved to the beginning of the Actions Table.(DOC A017)

Condition B is revised to replace “Condition not met” with “Condition A not met.” (DOC A016)

Required Action B.1 is revised to replace “Isolate the flow path” with “Isolate the affected flow path(s).” (DOC A016)

SR 3.1.9.1 is revised to replace “...isolation valves are OPERABLE by stroking the valve closed” with “...isolation valves stroke closed.” (DOC A027)

New SR 3.1.9.2 and SR 3.1.9.3 are added. (DOC A064 and DOC L01)

The text of SR 3.1.9.2 is revised deleting “the” aligning the text with VEGP LAR text. (APOG Comment)

Editorial changes in the “Background” and “LCO” section of the Bases. (APOG Comment)

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

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**VI. Traveler Information****Description of TSTF changes:**

NA

**Rationale for TSTF changes:**

NA

**Description of changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:****VEGP LAR DOC A016:**

TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves," uses the term "makeup line isolation" in numerous locations. Specifically, LCO 3.1.9, Condition A (two locations), Required Action A.1, Condition B (one location), and SR 3.1.9.1. This term is changed to "CVS makeup line isolation" in all locations.

Condition B, first Condition states "Required Action and associated Completion Time of Condition not met." This Condition is revised to be "Required Action and associated Completion Time of Condition A not met."

Required Action B.1, in part, states to "Isolate the flow path ...." Required Action B.1 is changed to state "Isolate the affected flow path(s)...."

**VEGP LAR DOC A017:**

TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves," includes a Note to Required Action B.1 that states "Flow path(s) may be unisolated intermittently under administrative controls." This Note is moved to the beginning of the Actions Table.

**VEGP LAR DOC A027:**

TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves," SR 3.1.9.1 is revised from "... isolation valves are OPERABLE by stroking the valve closed" to "... isolation valves stroke closed."

**VEGP LAR DOC A064:**

Current TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves," is revised by the inclusion of SR 3.1.9.2, which requires verification that the closure time of each CVS makeup isolation valve is within limits on an actual or simulated actuation signal at a Frequency in accordance with the Inservice Testing Program.

**VEGP LAR DOC L01:**

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ACTUATION DEVICE TEST is replaced with individual specifications for the actuation devices with the same 24 month Frequency. New SR 3.1.9.3 is added to TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves," stating: "Verify each CVS demineralized water isolation valve actuates to the isolation position on an actual or simulated actuation signal."

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

##### VEGP LAR DOC A016:

The change to Condition A, Required Action A.1, Condition B and SR 3.1.9.1 provides clarification that the valves are the CVS valves.

The change to the first Condition of Condition B is applicable since a listing of applicable Conditions is given (STS Writer's Guide) if the Condition is entered for failure of only some of the Required Actions.

The change to Required Action B.1 is also made since the Action could apply to multiple flow paths at the same time. This is clearly identified in the Note to the Required Action, which uses the term "flow path(s)."

##### VEGP LAR DOC A017:

This change is made to provide more consistency with other Notes of this type in other isolation valve TS where this Note is most commonly located at the beginning of the Actions Table. For example, TS 3.6.3, "Containment Isolation Valves," includes this type of Note at the beginning of the Actions Table.

##### VEGP LAR DOC A027:

Satisfactory performance of SRs is directly tied to meeting the LCO in accordance with SR 3.0.1. STS Writer's Guide states that the Surveillance statement should be as brief as possible but should also fully identify those requirements appropriate to ensure compliance with the LCO. Including the phrase "are OPERABLE by" is inconsistent with standard convention within other SRs, and inconsistent with Writer's Guide guidance. As an overarching principle established by SR 3.0.1, restating within an SR "are OPERABLE by" is unnecessary.

##### VEGP LAR DOC A064:

Current TS 3.4.17 requires two CVS makeup line isolation valves to be Operable in Modes 1, 2, 3, and 4. However, current TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves," provides similar requirements for these two valves in Modes 1, 2, 3, 4, and 5. Current TS LCO 3.1.9, in part, requires two CVS makeup line isolation valves to be Operable. Both current TS 3.4.17 Action A and current TS 3.1.9 Action A provide the requirements when one CVS makeup line isolation valve is inoperable, and requires it to be restored to Operable status within 72 hours. If not restored or with two CVS makeup line valves inoperable, Current TS 3.4.17 Action B and current TS 3.1.9 Action B require the flow path to be isolated in 1 hour. Both current TS 3.4.17 Action B and current TS 3.1.9 Action B are modified by a Note allowing the flow path to be unisolated intermittently under administrative controls. Thus, the current TS 3.1.9 LCO statement, Applicability, and Actions are equivalent to or more restrictive than those in current TS 3.4.17 (i.e., TS 3.4.17 LCO, Applicability, and Actions A and B). Current TS 3.4.17 includes two SRs. Current SR 3.4.17.1 is equivalent to current SR 3.1.9.1; both require the CVS makeup

line isolation valves to be stroked closed at a Frequency in accordance with the Inservice Testing Program. Current TS 3.1.9 does not include an SR equivalent to current SR 3.4.17.2, which requires verification of the closure time of each CVS makeup line isolation valve on an actual or simulated actuation signal at a Frequency in accordance with the Inservice Testing Program.

Current TS 3.1.9 is revised to include this SR as new SR 3.1.9.2. The proposed SR does not include the actual closure time limit of 30 seconds. This time is being relocated to the TS Bases as discussed in DOC D04. With the deletion of current TS 3.4.17, current TS 3.4.18 is renumbered as TS 3.4.17.

This change is considered acceptable because the revised TS 3.1.9 includes all the current requirements of TS 3.4.17.

#### VEGP LAR DOC L01:

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. Acceptance of the deletion of actuation device test is presented in the GTST for Section 3.3.2.

The effect of moving the requirement for the actuated device test from current TS 3.3.2 to the individual equipment Specifications is for less restrictive actions when the device is inoperable. As an SR associated with current TS 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). Each of the individual equipment Specifications with SRs added to address actuation device testing (listed in Detailed Description section above) has a 72-hour or 7-day restoration allowance. This is followed in some cases by additional flexibility to isolate associated flowpaths in lieu of plant shutdown. These less restrictive actions are currently approved in current TS as appropriate for the inoperable devices. The current more restrictive actions imposed by TS 3.3.2 are therefore deemed excessively restrictive. The change maintains the same level of safety provided by the existing separate TS Actions for inoperability of the specific actuated devices. For SR 3.1.9.3, the verification that each CVS demineralized water isolation valve actuates to the isolation position in an actual or simulated signal is conducted at 24 months interval.

This less restrictive change results in closer alignment with NUREG-1431 Standard TS presentation of actuated device testing, and associated required actions for inoperabilities of actuated devices. While certain actions for inoperability of actuated devices are made less restrictive by eliminating entry into ESFAS Actuation and Instrumentation inoperability actions, no action is made less restrictive than currently approved for any device inoperability. As such there is no adverse impact to public health and safety.



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

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

The text of SR 3.1.9.2 was revised to state “Verify closure time of each CVS makeup isolation valve is within limits on an actual or simulated actuation signal.” “Verify the closure time” was changed to “Verify closure time.”

Editorial change was made in the “Background” section of the Bases:

The safety related functions provided by the CVS include containment isolation of ~~chemical and volume control system~~ CVS lines penetrating containment, termination.....

Editorial changes were made in the LCO section of the Bases:

The requirement that at least two **CVS** demineralized water isolation valves (CVS-PL-V136A and V136B) and two **CVS** makeup line isolation valves (CVS-PL-V090 and V091) be OPERABLE....

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

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

The proposed SR 3.1.9.2 is easily understood without using “the.” Since the STS Writer's Guide recommendation is to minimize the use of articles in table entries and in tabular instructions unless a passage cannot be clearly understood without the use of articles, deletion of “the’ in this case would be appropriate.

The remaining editorial changes improve clarity and consistency.

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## VII. GTST Safety Evaluation

### Technical Analysis:

#### Clarification of the Requirements:

Adding CVS when mentioning makeup line isolation valve(s), i.e., use of “CVS makeup line isolation valve(s)” replacing “makeup line isolation valve(s)” provides clarity to the specifications and is acceptable.

Replacing “Condition not met” with “Condition A not met” and “Isolate the flow path from demineralized water storage tank” with “isolate the affected flow path(s) from the demineralized water storage tank” provides clarity to the requirements. Specifying Condition A specifies that this Condition is entered only for the failures to complete Required Action A.1. Isolation of the affected flow paths, as defined in Required Action B.1, clarifies that multiple flow paths may be affected and this change makes the ‘Note’ consistent with the Required Action. These changes improve clarity of AP1000 specifications and are acceptable.

Moving the Note in Required Action B.1 to the beginning of the Actions Table is consistent with the convention of the STS and other specifications, where a required action Note applies to all the Actions. This change is therefore acceptable for AP1000 STS.

Removal of “are OPERABLE by” from SR 3.1.9.1 makes the surveillance clearer. This change is therefore acceptable.

#### Addition of SR 3.1.9.2 and SR 3.1.9.3

SR 3.1.9.2 is added to make TS 3.1.9 consistent with TS 3.4.17. Both TS 3.1.9 and TS 3.4.17 deal with CVS makeup isolation valves. These requirements should be consistent to avoid confusion. The requirement to verify the closure time of the CVS makeup isolation valves is consistent with the inservice testing requirements and the testing done for the valves. The requirement does not include the closing time limit of 30 seconds which is included in the Bases. This issue is addressed in a separate change request, which is addressed as part of the GTST for Section 3.4.17. Considering the issues discussed above, the addition of SR 3.1.9.2 is acceptable. In the initial description, “the” was included in SR 3.1.9.2 text, but was removed following APOG comment. SR 3.1.9.2 is clearly understood without the use of “the” and accordingly, the change is acceptable.

SR 3.1.9.3 is added to replace the ACTUATION DEVICE TEST- defined term, which is being deleted. An actuation device test is a test of the actuation of equipment. Previously, actuation device test was included in TS 3.3.2 and is now being moved to individual specifications (see GTST for TS 3.3.2). As part of this change, SR 3.1.9.3 is necessary and is correctly included. As correctly noted in VEGP technical analysis for the change, the SR associated with TS 3.3.2, Table 3.3.2-1, Function 26 would have implied a 6-hour restoration prior to a required plant shutdown where with SR 3.1.9.3 the associated Required Actions will have a completion Time of 72 hours which is followed by a Required Action to isolated affected flow paths within 1 hour before a plant shutdown. In this way, the Required Action is the same as that would for the inoperability of the valves. This is justified since there is no reason to have a different Completion Time for an inoperable valve identified through an SR. The previous requirement can be considered unnecessarily restrictive. This change as implied through inclusion of SR 3.1.9.3 is acceptable for AP1000 STS.

### Remaining Changes

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

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

None

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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 5/20/2014.

### **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" modifier. Since these Section and Chapter references are to an external document, it is appropriate to include the "FSAR" modifier. This is resolved by adding the "FSAR" modifier as appropriate.
2. (Internal #91) 3.1.09, Pg. 17, SR 3.1.9.2 text was revised deleting "the."
3. (Internal #92) 3.1.09, Pg. 26, Editorial change is made in the "Background" section of the Bases. "Chemical and Volume Control System" was abbreviated as "CVS."
4. (Internal #93) 3.1.09, Pg. 27, Editorial changes are made in the LCO section of the Bases. "CVS" was added before "demineralized water isolation valves" and "makeup line isolation valves."
5. (Internal #94) 3.1.09, Pg. 08, "CVS" was added before "demineralized water isolation valve" in the GTST section "Rationale for changes in RCOL Std. Dep., RCOL COL item(s), and RCOL PTS Changes," subsection "VEGP LAR DOC L01," second paragraph, last sentence, for consistency with SR.

**NRC Final Approval Date:** 12/4/2015

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### **NRC Contact:**

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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, Unit 3 and 4, Technical Specifications Upgrade License Amendment Request, February 24, 2011 (ML12065A057).
3. 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).
4. 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).
5. 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)
6. TSTF-GG-05-01, "Writer's Guide for Plant-Specific Improved Technical Specifications," June 2005.

7. APOG-2014-008, APOG (AP1000 Utilities) Comments on AP1000 Standardized Technical Specifications (STS) Generic Technical Specification Travelers (GTSTs), Docket ID NRC-2014-0147, September 22, 2014 (ML14265A493).
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**XI. MARKUP of the Applicable GTS Subsection for Preparation of the STS NUREG**

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

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



3.1 REACTIVITY CONTROL SYSTEMS

3.1.9 Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves

LCO 3.1.9 Two CVS Demineralized Water Isolation Valves and two **CVS** Makeup Line Isolation Valves shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, and 5.

ACTIONS

**NOTE**

**Flow path(s) may be unisolated intermittently under administrative controls.**

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One CVS demineralized water isolation valve inoperable.</p> <p><u>OR</u></p> <p>One <b>CVS</b> makeup line isolation valve inoperable.</p> <p><u>OR</u></p> <p>One CVS demineralized water isolation valve and one <b>CVS</b> makeup line isolation valve inoperable.</p>	<p>A.1 Restore two CVS demineralized water isolation valves and two <b>CVS</b> makeup line isolation valves to OPERABLE status.</p>	<p>72 hours</p>

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. Required Action and associated Completion Time of Condition <b>A</b> not met.</p> <p><u>OR</u></p> <p>Two CVS demineralized water isolation valves inoperable.</p> <p><u>OR</u></p> <p>Two <b>CVS</b> makeup line isolation valves inoperable.</p>	<p><del>B.1 <u>NOTE</u></del></p> <p><del>Flow path(s) may be unisolated intermittently under administrative controls.</del></p> <hr/> <p><b>B.1</b> Isolate the <b>affected</b> flow path(s) from the demineralized water storage tank to the Reactor Coolant System by use of at least one closed manual or one closed and de-activated automatic valve.</p>	<p>1 hour</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.9.1 Verify two CVS demineralized water isolation valves and two <b>CVS</b> makeup line isolation valves <del>are OPERABLE by stroking the valve</del> <b>stroke</b> closed.</p>	<p>In accordance with the Inservice Testing Program</p>
<p><b>SR 3.1.9.2 Verify closure time of each CVS makeup isolation valve is within limits on an actual or simulated actuation signal.</b></p>	<p><b>In accordance with the Inservice Testing Program</b></p>
<p><b>SR 3.1.9.3 Verify each CVS demineralized water isolation valve actuates to the isolation position on an actual or simulated actuation signal.</b></p>	<p><b>24 months</b></p>

## B 3.1 REACTIVITY CONTROL SYSTEMS

## B 3.1.9 Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves

BASES

**BACKGROUND** One of the principle functions of the CVS system is to maintain the reactor coolant chemistry conditions by controlling the concentration of boron in the coolant for plant startups, normal dilution to compensate for fuel depletion, and shutdown boration. In the dilute mode of operation, unborated demineralized water may be supplied directly to the reactor coolant system. **Another of the principle functions of the CVS system is to maintain the reactor coolant inventory by providing water makeup for reactor coolant system (RCS) LEAKAGE, shrinkage of the reactor coolant during cooldowns, and RCS boron concentration changes. In the automatic makeup mode of operation, the pressurizer water level starts and stops CVS makeup to the RCS.**

Although the CVS is not considered a safety related system, certain functions of the system are considered safety related functions. The appropriate components have been classified and designed as safety related. The safety related functions provided by the CVS include containment isolation of ~~chemical and volume control system~~ **CVS** lines penetrating containment, termination of inadvertent boron dilution, and preservation of the Reactor Coolant System (RCS) pressure boundary, including isolation of CVS letdown from the RCS. **Another of the safety related functions provided by the CVS is the termination of RCS makeup to prevent overfilling of the pressurizer during non-LOCA transients or to prevent steam generator overfilling during a steam generator tube rupture. The CVS makeup line isolation valves provide this RCS makeup isolation function.**

**APPLICABLE SAFETY ANALYSES** One of the initial assumptions in the analysis of an inadvertent boron dilution event (Ref. 1) is the assumption that the increase in core reactivity, created by the dilution event, can be detected by the source range instrumentation. The source range instrumentation will then supply a signal to the **CVS** demineralized water isolation valves and the **CVS** makeup line isolation valves in the CVS causing these valves to close and terminate the boron dilution event. Thus the makeup line isolation valves and the demineralized water isolation valves are components which function to mitigate or prevent an AOO.

## BASES

## APPLICABLE SAFETY ANALYSES (continued)

**One of the initial assumptions in the analysis of several non-LOCA events and during a steam generator tube rupture accident is that excessive CVS makeup to the RCS may aggravate the consequences of the accident. The need to isolate the CVS makeup to the RCS is detected by the pressurizer level instruments or the steam generator narrow range level instruments. These instruments will supply a signal to the CVS makeup line isolation valves causing these valves to close and terminate RCS makeup. Thus the CVS makeup isolation valves are components which function to mitigate an accident.**

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

## LCO

The requirement that at least two **CVS** demineralized water isolation valves (**CVS-PL-V136A and V136B**) and two **CVS** makeup line isolation valves (**CVS-PL-V090 and V091**) be OPERABLE assures that there will be redundant means available to terminate or prevent an inadvertent boron dilution event. **In addition, LCO 3.6.3, "Containment Isolation Valves," provides additional requirements for the CVS makeup line isolation valves.**

## APPLICABILITY

The requirement that at least two **CVS** demineralized water isolation valves and two **CVS** makeup line isolation valves be OPERABLE is applicable in MODES 1, 2, 3, 4, and 5 because a boron dilution event is considered possible in these MODES, and the automatic closure of these valves is assumed in the safety analysis. **The pressurizer overflow event or steam generator tube rupture accident is also possible in MODES 1, 2, and 3, and MODE 4 with the Normal Residual Heat Removal System (RNS) suction to the RCS not open and the automatic closure of these valves is assumed in the safety analysis. In the applicable MODES, the need to isolate the CVS makeup to the RCS is detected by the pressurizer level instruments (high 1 setpoint coincident with safeguards actuation or high 2 setpoint) or the steam generator narrow range level instruments (high setpoint coincident with reactor trip (P-4) or high 2 setpoint).**

In MODES 1 and 2, the detection and mitigation of a boron dilution event does not assume the detection of the event by the source range instrumentation. In these MODES, the event would be signaled by an intermediate range trip, a trip on the Power Range Neutron Flux - High

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**BASES**

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**APPLICABILITY (continued)**

(low setpoint nominally at 25% RTP), or Overtemperature delta T. The two demineralized water isolation valves close automatically upon reactor trip.

In MODE 6, a dilution event is precluded by the requirement in LCO 3.9.2 to close, lock and secure at least one valve in each unborated water source flow path.

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**ACTIONS**

**The ACTIONS are modified by a Note allowing the affected flow path(s) 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 main control room. In this way, the flow path(s) can be rapidly isolated when a need for isolation is indicated.**

A.1

If only one of the demineralized water isolation valve and/or the makeup line isolation valve is/are OPERABLE, the redundant valve must be restored to OPERABLE status in 72 hours. The allowed Completion Time assures expeditious action will be taken, and is acceptable because the safety function of automatically isolating the clean water source can be accomplished by the redundant isolation valve(s).

B.1

If the Required Actions and associated Completion Time of Condition A are not met, or if both CVS demineralized water isolation valves or both **CVS** makeup line isolation valves are not OPERABLE (i.e., not able to be closed automatically), then **affected flow paths from** the demineralized water supply flow path to the RCS must be isolated. Isolation can be accomplished by manually isolating the CVS demineralized water isolation valve(s) or by positioning the 3-way blend valve to only take suction from the boric acid tank. Alternatively, the dilution path may be isolated by closing appropriate isolation valve(s) in the flow path(s) from the demineralized water storage tank to the reactor coolant system.  
~~The Action is modified by a Note allowing the flow path 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 main control room. In this~~

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**BASES**

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**ACTIONS (continued)**

~~way, the flow path can be rapidly isolated when a need for isolation is indicated.~~

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**SURVEILLANCE  
REQUIREMENTS****SR 3.1.9.1**

Verification that the CVS demineralized water isolation valves and makeup line isolation valves ~~are OPERABLE, by stroking each valve~~ **stroke** closed, demonstrates that the valves can perform their safety related function. The Frequency is in accordance with the Inservice Testing Program.

**SR 3.1.9.2**

**Verification that the closure time of each RCS makeup isolation valve is less than that assumed in the safety analysis (i.e.,  $\leq 30$  seconds), is performed by measuring the time required for each valve to close 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 is in accordance with the Inservice Testing Program.**

**SR 3.1.9.3**

**This SR verifies that each CVS demineralized water isolation valve actuates to the correct 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.**

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**REFERENCES**

1. **FSAR** Chapter 15, "Accident Analysis."
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**XII. Applicable STS Subsection After Incorporation of this GTST's Modifications**

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

3.1 REACTIVITY CONTROL SYSTEMS

3.1.9 Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves

LCO 3.1.9 Two CVS Demineralized Water Isolation Valves and two CVS Makeup Line Isolation Valves shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, and 5.

ACTIONS

-----NOTE-----  
Flow path(s) may be unisolated intermittently under administrative controls.  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One CVS demineralized water isolation valve inoperable.</p> <p><u>OR</u></p> <p>One CVS makeup line isolation valve inoperable.</p> <p><u>OR</u></p> <p>One CVS demineralized water isolation valve and one CVS makeup line isolation valve inoperable.</p>	<p>A.1 Restore two CVS demineralized water isolation valves and two CVS makeup line isolation valves to OPERABLE status.</p>	<p>72 hours</p>



## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. Required Action and associated Completion Time of Condition A not met.</p> <p><u>OR</u></p> <p>Two CVS demineralized water isolation valves inoperable.</p> <p><u>OR</u></p> <p>Two CVS makeup line isolation valves inoperable.</p>	<p>B.1 Isolate the affected flow path(s) from the demineralized water storage tank to the Reactor Coolant System by use of at least one closed manual or one closed and de-activated automatic valve.</p>	1 hour

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.9.1	Verify two CVS demineralized water isolation valves and two CVS makeup line isolation valves stroke closed.	In accordance with the Inservice Testing Program
SR 3.1.9.2	Verify closure time of each CVS makeup isolation valve is within limits on an actual or simulated actuation signal.	In accordance with the Inservice Testing Program
SR 3.1.9.3	Verify each CVS demineralized water isolation valve actuates to the isolation position on an actual or simulated actuation signal.	24 months

## B 3.1 REACTIVITY CONTROL SYSTEMS

### B 3.1.9 Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves

#### BASES

**BACKGROUND** One of the principle functions of the CVS system is to maintain the reactor coolant chemistry conditions by controlling the concentration of boron in the coolant for plant startups, normal dilution to compensate for fuel depletion, and shutdown boration. In the dilute mode of operation, unborated demineralized water may be supplied directly to the reactor coolant system. Another of the principle functions of the CVS system is to maintain the reactor coolant inventory by providing water makeup for reactor coolant system (RCS) LEAKAGE, shrinkage of the reactor coolant during cooldowns, and RCS boron concentration changes. In the automatic makeup mode of operation, the pressurizer water level starts and stops CVS makeup to the RCS.

Although the CVS is not considered a safety related system, certain functions of the system are considered safety related functions. The appropriate components have been classified and designed as safety related. The safety related functions provided by the CVS include containment isolation of CVS lines penetrating containment, termination of inadvertent boron dilution, and preservation of the Reactor Coolant System (RCS) pressure boundary, including isolation of CVS letdown from the RCS. Another of the safety related functions provided by the CVS is the termination of RCS makeup to prevent overfilling of the pressurizer during non-LOCA transients or to prevent steam generator overfilling during a steam generator tube rupture. The CVS makeup line isolation valves provide this RCS makeup isolation function.

**APPLICABLE SAFETY ANALYSES** One of the initial assumptions in the analysis of an inadvertent boron dilution event (Ref. 1) is the assumption that the increase in core reactivity, created by the dilution event, can be detected by the source range instrumentation. The source range instrumentation will then supply a signal to the CVS demineralized water isolation valves and the CVS makeup line isolation valves in the CVS causing these valves to close and terminate the boron dilution event. Thus the makeup line isolation valves and the demineralized water isolation valves are components which function to mitigate or prevent an AOO.

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**BASES**

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**APPLICABLE SAFETY ANALYSES (continued)**

One of the initial assumptions in the analysis of several non-LOCA events and during a steam generator tube rupture accident is that excessive CVS makeup to the RCS may aggravate the consequences of the accident. The need to isolate the CVS makeup to the RCS is detected by the pressurizer level instruments or the steam generator narrow range level instruments. These instruments will supply a signal to the CVS makeup line isolation valves causing these valves to close and terminate RCS makeup. Thus the CVS makeup isolation valves are components which function to mitigate an accident.

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

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**LCO**

The requirement that at least two CVS demineralized water isolation valves (CVS-PL-V136A and V136B) and two CVS makeup line isolation valves (CVS-PL-V090 and V091) be OPERABLE assures that there will be redundant means available to terminate or prevent an inadvertent boron dilution event. In addition, LCO 3.6.3, "Containment Isolation Valves," provides additional requirements for the CVS makeup line isolation valves.

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**APPLICABILITY**

The requirement that at least two CVS demineralized water isolation valves and two CVS makeup line isolation valves be OPERABLE is applicable in MODES 1, 2, 3, 4, and 5 because a boron dilution event is considered possible in these MODES, and the automatic closure of these valves is assumed in the safety analysis. The pressurizer overflow event or steam generator tube rupture accident is also possible in MODES 1, 2, and 3, and MODE 4 with the Normal Residual Heat Removal System (RNS) suction to the RCS not open and the automatic closure of these valves is assumed in the safety analysis. In the applicable MODES, the need to isolate the CVS makeup to the RCS is detected by the pressurizer level instruments (high 1 setpoint coincident with safeguards actuation or high 2 setpoint) or the steam generator narrow range level instruments (high setpoint coincident with reactor trip (P-4) or high 2 setpoint).

In MODES 1 and 2, the detection and mitigation of a boron dilution event does not assume the detection of the event by the source range instrumentation. In these MODES, the event would be signaled by an intermediate range trip, a trip on the Power Range Neutron Flux - High (low setpoint nominally at 25% RTP), or Overtemperature delta T. The

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**BASES**

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**APPLICABILITY (continued)**

two demineralized water isolation valves close automatically upon reactor trip.

In MODE 6, a dilution event is precluded by the requirement in LCO 3.9.2 to close, lock and secure at least one valve in each unborated water source flow path.

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**ACTIONS**

The ACTIONS are modified by a Note allowing the affected flow path(s) 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 main control room. In this way, the flow path(s) can be rapidly isolated when a need for isolation is indicated.

A.1

If only one of the demineralized water isolation valve and/or the makeup line isolation valve is/are OPERABLE, the redundant valve must be restored to OPERABLE status in 72 hours. The allowed Completion Time assures expeditious action will be taken, and is acceptable because the safety function of automatically isolating the clean water source can be accomplished by the redundant isolation valve(s).

B.1

If the Required Actions and associated Completion Time of Condition A are not met, or if both CVS demineralized water isolation valves or both CVS makeup line isolation valves are not OPERABLE (i.e., not able to be closed automatically), then affected flow paths from the demineralized water supply flow path to the RCS must be isolated. Isolation can be accomplished by manually isolating the CVS demineralized water isolation valve(s) or by positioning the 3-way blend valve to only take suction from the boric acid tank. Alternatively, the dilution path may be isolated by closing appropriate isolation valve(s) in the flow path(s) from the demineralized water storage tank to the reactor coolant system.

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**BASES**

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**SURVEILLANCE  
REQUIREMENTS**SR 3.1.9.1

Verification that the CVS demineralized water isolation valves and makeup line isolation valves stroke closed, demonstrates that the valves can perform their safety related function. The Frequency is in accordance with the Inservice Testing Program.

SR 3.1.9.2

Verification that the closure time of each RCS makeup isolation valve is less than that assumed in the safety analysis (i.e.,  $\leq 30$  seconds), is performed by measuring the time required for each valve to close 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 is in accordance with the Inservice Testing Program.

SR 3.1.9.3

This SR verifies that each CVS demineralized water isolation valve actuates to the correct 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.

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**REFERENCES**

1. FSAR Chapter 15, "Accident Analyses."
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