Tennessee Valley Authority, Post Office Box 2000, Soddy Daisy, Tennessee 37384-2000

December 10, 2008

TVA-SQN-TS-08-02 10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority (TVA)	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - UNITS 1 AND 2 - TECHNICAL SPECIFICATIONS (TS) CHANGE - 08-02 "CONTAINMENT PURGE TIME LIMIT AND CONSOLIDATION OF CONTAINMENT ISOLATION VALVE SPECIFICATIONS, SUPPLEMENT NUMBER 1" (TAC NOS. MD8533 AND MD8534)

Reference:TVA letter to NRC dated April 15, 2008, "Sequoyah Nuclear Plant (SQN) - Units 1 and 2 - Technical Specifications (TS) Change - 08-02 Containment Purge Time Limit And Consolidation Of Containment Isolation Valve Specifications"

Pursuant to 10 CFR 50.90, Tennessee Valley Authority (TVA) requested a TS change (TS-08-02) to Licenses DPR-77 and DPR-79 for SQN in the referenced letter. The proposed TS change would change and realign several containment isolation subject matter TSs to NUREG-1431, Revision 3, "Standard Technical Specifications Westinghouse Plants." The primary intent is to eliminate the cumulative time limit of 1000 hours per year for purge and vent valves operation for TS Limiting Condition of Operation (LCO) 3.6.1.9, "Containment Ventilation System."

In discussion with the SQN NRC staff regarding the referenced license amendment request (LAR), it was noted that a minor change to the proposed TSs is needed to ensure compliance with regulation 10 CFR 50.36(d). The change would provide definite clarity to the number of purge lines allowed open during associated modes of applicability, and thus satisfy regulations. The changes would be administrative in nature because TVA had not proposed a change in the number of purge lines allowed open. This supplement also corrects a typographical error within the current TSs.

TVA has determined that this supplement does not change the no significant hazards considerations presented in the referenced letter. The changes presented herein also continue to qualify for categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9) as presented in the referenced letter. In accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Tennessee State Department of Public Health.

The enclosure includes four attachments. The first attachment includes marked TS pages for the supplement changes, identified by either underlines or strikethrough, and revision bars. Only TS pages affected by this supplement are provided. The second attachment includes only the marked TS Bases pages that are affected, with similar change identifiers. The third and fourth attachment provides Unit 1 and 2 clean TS pages and the Unit 1 TS Bases pages, respectively. The clean pages include all licensing amendment request changes.

There are no regulatory commitments associated with this submittal.

If you have any questions about this change, please contact me at 843-7170 or Rusty Proffitt at 843-6651.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 10th day of December, 2008.

Sincerely,

James D. Smith
Manager, Site Licensing and
Industry Affairs

Enclosure:
Supplemental Response to NRC Staff Discussion

cc: See page 3

Enclosure
cc (Enclosure):

Mr. Brendan T. Moroney, Project Manager
U.S. Nuclear Regulatory Commission
Mail Stop 08G-9a
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852-2739

Mr. Lawrence E. Nanney, Director
Division of Radiological Health
Third Floor
L&C Annex
401 Church Street
Nashville, Tennessee 37243-1532

ENCLOSURE

SUPPLEMENTAL RESPONSE TO NRC STAFF DISCUSSION

Subject: Supplemental response for application of license amendment to change and realign Technical Specification (TS) 3.6.3, "Containment Isolation Valves," TS 3.6.1.2, "Secondary Containment Bypass Leakage," TS 3.6.1.9, "Containment Ventilation System," TS 3.9.4, "Containment Building Penetrations," and TS 6.8.4.h, "Containment Leakage Rate Testing Program," to emulate NUREG-1431, Revision 3, "Standard Technical Specification Westinghouse Plants."

1.0 SUMMARY DESCRIPTION

This supplement presents changes that continue to be supported by the evaluation provided in Reference 1 for amendment of Operating Licenses DPR-77 and DPR-79 for Sequoyah Nuclear Plant (SQN) Units 1 and 2.

NRC's ongoing review of Reference 1 noted that TVA proposed to maintain the limitation of allowable containment purge valves opened during modes of applicability. This limitation is one set of containment purge valves (i.e., one set of supply valves and one set exhaust valves) are allowed open during normal plant operation as specified in the proposed Surveillance Requirement (SR) 4.6.3.1. However, TVA proposed to eliminate the explicit reference to this requirement from the limiting condition of operation (LCO) statement and an associated action. Reliance was placed on the proposed LCO 3.6.3 operability statement and actions, consistence with NUREG-1431, for corrective actions to the limitation in SR 4.6.3.1. In discussion with NRC, it was questioned if the proposed change would meet Criterion 2 of 10 CFR 50.36, "Technical Specifications." That is, would the criterion be met if the limitation of containment purge valves was relocated to an SR? An agreement was reached to maintain a specific requirement in the LCO similar to current SQN TSs.

2.0 DETAILED DESCRIPTION

In Reference 1 numerous changes were proposed to TSs 3.6.3, 3.6.1.2, 3.6.1.9, 3.9.4, and 6.8.4.h to emulate NUREG-1431. This supplement revises specific changes noted in Change Item Numbers (CINs) 2, 4, 9a, and 11. The following table provides assistance in the description of the proposed supplement changes. The table provides a comparison of the current TS and the proposed change (bold font indicates additions and strikethroughs indicates deletion). The table provides reference to the corresponding NUREG-1431 specification and the degree to which the proposed change is considered; administrative, less restrictive, or more restrictive, as needed. The supplement changes are identified differently than changes previous presented by use of a brief description in the "Comments" column and use of bold italic font for additions and strikethrough for deletions.

A typographical error has been identified in the current LCO 3.6.3 Action a and b. This error is associated with the containment vacuum relief isolation valves. Specifically, the word "valve" is in plural form with a plural form modifier that is "valves(s)." TVA proposes to correct this by using "valve(s)" in the Action statements. The proposed supplement changes have been included in the proposed Bases.

Change Item Number	NUREG-1431 R3 (ISTS)	Current SQN Technical Specifications	Proposed SQN TSs	Comments
	3.6.3 Containment Isolation	3.6.1.2 Secondary Containment Bypass Leakage (SCBL), 3.6.1.9 Containment Ventilation System (CVS), and 3.6.3 Containment Isolation Valves (CIV)		
	LCOs			
2		3.6.1.9 One pair (one purge supply line and one purge exhaust line) of containment purge system lines may be open; the containment purge supply and exhaust isolation valves in all other containment purge lines shall be closed. Operation with purge supply or exhaust isolation valves open for either purging or venting shall be limited to less than or equal to 1000 hours per 365 days. The 365 day cumulative time period will begin every January 1.	3.6.3 Each containment isolation valve shall be OPERABLE.* ~~3.6.1.9 One pair (one purge supply line and one purge exhaust line) of containment purge system lines may be open; the containment purge supply and exhaust isolation valves in all other containment purge lines shall be closed. Operation with purge supply or exhaust isolation valves open for either purging or venting shall be limited to less than or equal to 1000 hours per 365 days. The 365 day cumulative time period will begin every January 1.~~	ADMINISTRATIVE and LESS RESTRICTIVE Containment purge is maintained by LCO 3.6.3. Operability is measured by proposed SR 4.6.3.1 which requires valves to be maintained closed and when open limits the number of open valves to two paths (i.e., supply and exhaust), proposed SR 4.6.3.6 which requires leakage testing, and proposed SR 4.6.3.7 which requires the valve be restricted from fully opening. *The LCO is modified by a NOTE that specifies the number of containment purge valves allowed open.* This proposal will eliminate the cumulative time limit. Unit 2 TS includes an additional 400 hours for 2007, not shown here.

Change Item Number	NUREG-1431 R3 (ISTS)	Current SQN Technical Specifications	Proposed SQN TSs	Comments
	Actions:			
4	B1	3.6.3 CIV Action b. With one or more penetration flow paths with two containment isolation valves inoperable; except for containment vacuum relief isolation valves(s), isolate each affected penetration within 1 hour by use of at least one closed deactivated automatic valve, closed manual valve, or blind flange and verify# the affected penetration flow path is isolated once per 31 days.	3.6.3 CIV Action b. With ***more than one pair of containment purge lines open or with*** one or more penetration flow paths with two containment isolation valves inoperable **for reasons other than:** **1. leakage rate limits of containment purge isolation valve(s),** **2. leakage rate limits of BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING, or** **3. inoperable**~~; except for~~ containment vacuum relief isolation valves(s), isolate ~~each~~ **the** affected penetration within 1 hour by use of at least one closed **and** deactivated automatic valve, closed manual valve, or blind flange and verify# the affected penetration flow path is isolated once per 31 days.	ADMINISTRATIVE Consistent with Standard Action, except for containment vacuum relief isolation valve(s) which are specific to SQN and the need to repeat the requirement to verify once per 31 days. *Added an action for the event in which more than one pair of containment purge lines are open.*

Change Item Number	NUREG-1431 R3 (ISTS)	Current SQN Technical Specifications	Proposed SQN TSs	Comments
9a	Action Notes	3.6.3 CIV *1. Penetration flow path(s) may be unisolated intermittently under administrative controls. 2. Enter the ACTION of LCO 3.6.1.1, "Primary Containment" when containment isolation valve leakage results in exceeding the overall containment leakage rate acceptance criteria. #3. Isolation devices in high radiation areas may be verified by use of administrative means. #4. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means. ##5. A check valve with flow through the valve secured is only applicable to penetration flow paths with two containment isolation valves.	3.6.3 CIV LCO 3.6.3 Each . . . ---------- **NOTES** ---------- *1. Penetration flow path(s) may be unisolated intermittently under administrative controls. ***2.** Enter the ACTION of LCO 3.6.1.1, "Primary Containment" when containment isolation valve leakage results in exceeding the overall containment leakage rate acceptance criteria. ***3. No more than one pair of Containment purge lines (one set of supply valves and one set of exhaust valves) may be opened.*** ---------- ACTION: ---------- **NOTES** ---------- #~~3~~***1***. Isolation devices in high radiation areas may be verified by use of administrative means. #~~4~~***2***. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means. ##~~5~~***3***. A check valve with flow through the valve secured is only applicable to penetration flow paths with two containment isolation valves. ----------	ADMINISTRATIVE These footnotes are relocated to their respective location either directly after the LCO operability statement or before the Action requirements. This is more consistent with the Standard. Footnote symbols are not removed due to the formatting of the TS. *Single asterisks are provided for each of the LCO modifiers. LCO operating restriction is maintained on purge valves.* *The ACTION Notes are renumbered; however, identifying symbols are not changed.*

Change Item Number	NUREG-1431 R3 (ISTS)	Current SQN Technical Specifications	Proposed SQN TSs	Comments
	Surveillance Requirements			
11	SR 3.6.3.2	3.6.1.9 CVS SR 4.6.1.9.1 The position of the containment purge supply and exhaust isolation valves shall be determined at least once per 31 days.	3.6.~~1.9CVS~~**3 CIV** SR 4.6.~~1.9.1~~**3.1** ~~The position of the containment~~**Verify each** purge supply and**/or** exhaust isolation ~~valves~~ **valve is closed, except when containment purge valves (only one set of supply *valves* and *one set of* exhaust valves ~~*open*~~) are open for pressure control, ALARA or air quality considerations for personnel entry, or for Surveillances that require the valves to be open,** ~~shall be determined~~ at least once per 31 days.	ADMINISTRATIVE SR consistent with Standard, except no valve size is specified and language for one open line is retained (purge supply and/or exhaust isolation valve), rather than just “containment purge valve.” Requirement maintains restriction for one containment system purge line open. *Added “one set of”, “valves”, and deleted “open” to clarify limitation of containment purge valves operation*

Change Item No. 2 Supplement Changes

Within this supplement, proposed changes in CIN 2 do not change. This supplement only identifies that the LCO 3.6.3 operability statement will be modified by an additional note. The additional LCO modifier, Note 3, is discussed under CIN 9a.

Change Item No. 4 Supplement Changes

It is proposed by this supplement to modify Action b of LCO 3.6.3 to maintain a response if more than one pair of containment purge lines are open, similar to deleted action of LCO 3.6.1.9. The change will add the statement, "With more than one pair of containment purge lines open or," to Action b as follows:

> "With more than one pair of containment purge lines open
> or
> with one or more penetration flow paths with two containment isolation valves inoperable for reasons other than: . . . isolate the affected penetration within 1 hour. . ."

Change Item No. 9a Supplement Changes

Within CIN 9a, it is proposed by this supplement to modify the LCO 3.6.3 using a note. This will be the third LCO modifier note and is written as:

> "*3. No more than one pair of Containment purge lines (one set of supply valves and one set of exhaust valves) may be opened."

By this supplement it is proposed to include asterisks on each of the LCO Notes. Also, it is proposed to number the Action Notes, starting with 1 rather than 3. The Action Notes' symbol will not change.

Change Item No. 11 Supplement Changes

Proposed SR 4.6.3.1 included a limitation on the number of containment purge valves that could be open. This limitation was stated as "(only one set of supply and exhaust valves open)." It is proposed, in this supplement, to revise this limitation to read as "(only one set of supply valves and one set of exhaust valves)."

3.0 TECHNICAL EVALUATION

No system background information provided in Reference 1 is succeeded by this supplement.

3.1 ADMINISTRATIVE CHANGES

The changes proposed in this supplement do not result in a technical requirement relaxation or additional restriction than those in current TSs.

Administrative Change to CIN 2

No changes are identified against those proposed in Reference 1. It is identified that the

LCO 3.6.3 operability statement will be modified by an additional note in regards to the containment purge valves. The modifier note is addressed in CIN 9a.

Administrative Change to CIN 4

In Reference 1, it was proposed to delete Action a of LCO 3.6.1.9. The action provided a response to isolate containment purge valve(s), open in excessive of the 1000 hour cumulative time limit or with more than one pair of containment purge lines open within one hour or enter into shutdown requirements. Reference 1 does not propose to eliminate the restriction of the number of containment purge lines open or action to take in the event these valves are determined to be inoperable. It was intended that Action b of LCO 3.6.3 would satisfy the necessary remedial action for open containment purge valves within one or more penetrations not in accordance with SR 4.6.3.1. However, in response to the proposed LCO modifier for containment purge lines, this proposed action will provide operating clarity in the event that containment purge lines are determined to be inoperable (i.e., both valves in these lines are determined to be inoperable). This proposal is administrative because LCO 3.6.1.9 Action a provides similar requirements for containment purge lines found open in excessive of the defined limit.

Administrative Change to CIN 9a

In Reference 1, CIN 9a relocated specific footnotes or note(s) related to LCO 3.6.3. These modifying notes were moved to their respective section and are clearly identified as Notes consistent with the TS writers guide. This change was made to accommodate the formatting of the TSs; resolve the use of a similar note symbol with different modifiers within the TS pages; and is more consistent with NUREG-1431. The footnote symbols were not removed, thereby continuing to provide easy user understanding of the modification.

By this supplement, an additional LCO modifier is added to the proposed Notes Section of LCO 3.6.3. This modifier defines an operating restriction for operability of the containment purge valves. The restriction limits the number of containment purge valves open to no more than one pair of purge lines. One pair of containment purge lines includes, one set of supply valves for a single penetration and one set of exhaust valves for another single penetration. The restriction is, in part, included in the current LCO 3.6.1.9 statement and as such is considered an administrative change. The restriction will maintain an initial assumption of a SQN design basis accident, as discussed in Reference 1. SR 4.6.3.1 includes limitations for opening containment purge valves; however, as described in Reference 1, these limitations are not considered operationally different and would be administrative. This change is administrative and does not effect other proposed changes of Reference 1.

As a result of the added LCO modifier, SQN proposes to include an asterisk on each of the LCO modifiers and renumber the “Action Notes” to eliminate confusion. This change is considered administrative. The proposed TS Bases have been revised to address these supplement changes.

Administrative Change to CIN 11

During development of this supplement, it was identified that the language used for the operating restriction of SR 4.6.3.1 (i.e., only one set of supply and exhaust valves open)

could be interpreted to mean, either the set of inboard supply and exhaust valves or the set of outboard supply and exhaust valves. This interpretation is a result of plant design in that some main control room hand switches, for operation of these valves, control an inboard supply and exhaust valve set or outboard supply and exhaust valve set. SQN proposes to modify the restriction so that the SR 4.6.3.1 states:

> "4.6.3.1 Verify each purge supply and/or exhaust isolation valve is closed, except when the containment purge valves are open (only one set of supply valves and one set of exhaust valves) for pressure control, ALARA or air quality considerations for personnel entry, or for Surveillances that require the valves to be open, at least once per 31 days."

This proposed supplement is still considered administrative and provides clarification for operational personnel. The proposed TS Bases have been updated with this clarification.

3.2 TECHNICAL CHANGES CONCLUSION

The above supplement changes do not affect the UFSAR accident analysis found in Chapter 15. The above discussion provides evidence that the proposed supplement changes are appropriate and continues to protect the health and safety of the public.

4.0 REGULATORY EVALUATION

The regulatory evaluation, including the No Significant Hazards Consideration, presented in Reference 1 is not changed with exception to NUREG-1431, Revision 3, "Standard Technical Specifications Westinghouse Plants," regarding the containment ventilation system found in Section 4.1 "Applicable Regulatory Requirements/Criteria." NUREG-1431 provides generic recommendations for requirements associated with the operation of Westinghouse Electric Company design nuclear power plants. NUREG-1431 does not contain a specification for the containment ventilation system nor the secondary containment bypass leakage paths, but does include conditions for operations of these in the requirements for the containment isolation valves. The proposed changes to the SQN TSs, in Reference 1, are more consistent with the action and surveillance provisions for these items in the NUREG and provide assurance for availability of the associated isolation function. The proposed supplement change is not altogether consistent with NUREG-1431; however, meets the intent for operability and actions for an inoperable containment purge valve.

5.0 ENVIRONMENTAL CONSIDERATION

The environmental consideration provided in Reference 1 is not affected by the changes in this supplement.

6.0 REFERENCES

1. TVA letter to NRC dated April 15, 2008, “Sequoyah Nuclear Plant (SQN) - Units 1 and 2 - Technical Specifications (TS) Change - 08-02 Containment Purge Time Limit and Consolidation of Containment Isolation Valve Specifications”

ATTACHMENTS

1. Proposed Supplement Technical Specifications Changes (Mark-up)
2. Proposed Supplement Technical Specification Bases Changes (Mark-up)
3. Proposed Technical Specifications Clean Pages
4. Proposed Technical Specification Bases Clean Pages - Unit 1

ATTACHMENT 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

PROPOSED SUPPLEMENT TECHNICAL SPECIFICATION CHANGES (MARK-UP)

I. AFFECTED PAGE LIST

Unit 1
3/4 6-15
3/4 6-17

Unit 2
3/4 6-15
3/4 6-17

II. MARKED PAGES

See attached.

INSERT A

d. With one or more BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING not within limit, restore within limit within 4 hours.

e. With one or more penetration flow paths with one or more containment purge supply and/or exhaust isolation valves not within leakage limits, isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange within 24 hours. Verify# the affected penetration flow path is isolated once per 31 days for isolation devices outside containment and prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment. Perform SR 4.6.3.6 once per 92 days for the valve used to isolate the affected penetration flow path.

f. With one or more penetration flow paths of a closed system design with one containment isolation valve inoperable, isolate the affected penetration flow path within 72 hours by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange, and verify# the affected penetration is isolated once per 31 days.

INSERT B

4.6.3.1 Verify each purge supply and/or exhaust isolation valve is closed, except when containment purge valves (only one set of supply valves and one set of exhaust valves) are open for pressure control, ALARA or air quality considerations for personnel entry, or for Surveillances that require the valves to be open, at least once per 31 days.

INSERT C

4.6.3.6 Perform leakage rate testing for each containment purge supply and exhaust isolation valve at least once per 3 months.

4.6.3.7 Verify each containment purge valve is blocked to restrict the valve from opening greater than or equal to 50 degrees, at least once per 18 months.

4.6.3.8 Verify the combined leakage rate for all BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING is less than or equal to 0.25 L_a when pressurized to greater than or equal to P_a in accordance with the Containment Leakage Rate Test program.

INSERT D

BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING leakage from isolation valves that are sealed with fluid from a seal system may be excluded, subject to the provisions of Appendix J, Section III.C.3, when determining the combined leakage rate provided the seal system and valves are pressurized to at least 1.10 P_a (13.2 psig) and the seal system capacity is adequate to maintain system pressure (or fluid head for the containment spray system and RHR spray system valves at penetrations 48A, 48B, 49A and 49B) for at least 30 days.

INSERT E

c. For each containment purge supply and exhaust isolation valve, acceptance criteria is measured leakage rate less than or equal to 0.05 L_a.

d. BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING acceptance criteria are:
   1. The combined bypass leakage rate to the auxiliary building shall be less than or equal to 0.25 L_a by applicable Type B and C tests.

   2. Penetrations not individually testable shall have no detectable leakage when tested with soap bubbles while the containment is pressurized to P_a (12 psig) during each Type A test.

INSERT F

a. With one or more penetration flow paths with <u>one</u> containment isolation valve inoperable for reasons other than:
   1. leakage rate limits of containment purge isolation valve(s),
   2. leakage rate limit of BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING, or
   3. inoperable containment vacuum relief isolation valve(s),

   isolate the affected penetration within 4 hours by use of at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve## with flow through the valve secured; and,

   verify# the affected penetration flow path is isolated once per 31 days for isolation devices outside containment, and prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment.

b. With more than one pair of containment purge lines open
   or
   with one or more penetration flow paths with <u>two</u> containment isolation valves inoperable for reasons other than:
   1. leakage rate limits of containment purge isolation valve(s),
   2. leakage rate limit of BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING, or
   3. inoperable containment vacuum relief isolation valve(s),

   isolate the affected penetration within 1 hour by use of at least one closed and deactivated automatic valve, closed manual valve, or blind flange and verify# the affected penetration flow path is isolated once per 31 days.

INSERT LCO NOTES

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

*1. Penetration flow path(s) may be unisolated intermittently under administrative controls.

*2. Enter the ACTION of LCO 3.6.1.1, "Primary Containment" when containment isolation valve leakage results in exceeding the overall containment leakage rate acceptance criteria.

*3. No more than one pair of Containment purge lines (one set of supply valves and one set of exhaust valves) may be opened.

INSERT ACTION NOTES

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

#1. Isolation devices in high radiation areas may be verified by use of administrative means.

#2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means.

##3. A check valve with flow through the valve secured is only applicable to penetration flow paths with two containment isolation valves.

CONTAINMENT VENTILATION SYSTEM *(DELETED)*

LIMITING CONDITION FOR OPERATION

Supplement Change - one pair of lines limit by LCO 3.6.3

~~3.6.1.9 One pair (one purge supply line and one purge exhaust line) of containment purge system lines may be open; the containment purge supply and exhaust isolation valves in all other containment purge lines shall be closed. Operation with purge supply or exhaust isolation valves open for either purging or venting shall be limited to less than or equal to 1000 hours per 365 days. The 365 day cumulative time period will begin every January 1.~~

Same as LCO 3.6.3

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

~~ACTION:~~

Deleted cumulative limit and move one pair of lines limit to LCO 3.6.3

~~a. With a purge supply or exhaust isolation valve open in excess of the above cumulative limit, or with more than one pair of containment purge system lines open, close the isolation valve(s) in the purge line(s) within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

Revised and moved to by LCO 3.6.3

~~b. With a containment purge supply and/or exhaust isolation valve having a measured leakage rate in excess of 0.05 L_a, restore the inoperable valve to OPERABLE status or isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange within 24 hours. Verify** the affected penetration flow path is isolated once per 31 days for isolation devices outside containment and prior to entering Mode 4 from Mode 5 if not performed within the previous 92 days for isolation devices inside containment. Otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

~~SURVEILLANCE REQUIREMENTS~~

Revised and moved to LCO 3.6.3

~~4.6.1.9.1 The position of the containment purge supply and exhaust isolation valves shall be determined at least once per 31 days.~~

Deleted

~~4.6.1.9.2 The cumulative time that the purge supply and exhaust isolation valves are open over a 365 day period shall be determined at least once per 7 days.~~

Revised and moved to LCO 3.6.3

~~4.6.1.9.3 At least once per 3 months, each containment purge supply and exhaust isolation valve shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than or equal to 0.05 L_a.*~~

Maintained by LCO 3.6.3

~~* Enter the ACTION of LCO 3.6.1.1, "Primary Containment" when purge valve leakage results in exceeding the overall containment leakage rate acceptance criteria.~~

~~** Isolation devices in high radiation areas may be verified by use of administrative means. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means.~~

CONTAINMENT SYSTEMS

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

Insert LCO Notes →

3.6.3 Each containment isolation valve shall be OPERABLE.*

APPLICABILITY: MODES 1, 2, 3 and 4.

Insert Action Notes →

ACTION:

Adds exception for purge valves and BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING

INSERT F

a. With one or more penetration flow paths with one containment isolation valve inoperable; except for containment vacuum relief isolation valves(s), isolate each affected penetration within 4 hours by use of at least one closed deactivated automatic valve, closed manual valve, blind flange, or check valve## with flow through the valve secured; and, verify# the affected penetration flow path is isolated once per 31 days for isolation devices outside containment, and prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment.

b. With one or more penetration flow paths with two containment isolation valves inoperable; except for containment vacuum relief isolation valves(s), isolate each affected penetration within 1 hour by use of at least one closed deactivated automatic valve, closed manual valve, or blind flange and verify# the affected penetration flow path is isolated once per 31 days.

c. With one or more containment vacuum relief isolation valve(s) inoperable, the valve(s) must be returned to OPERABLE status within 72 hours.

Insert A →

~~d~~*g*. With any of the above ACTIONS not met, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Insert SR Note →

SURVEILLANCE REQUIREMENTS

Insert B →

~~4.6.3.1 Deleted~~

Relocated to below LCO statement as NOTES with asterisks on each. Add third note.

*1. Penetration flow path(s) may be unisolated intermittently under administrative controls.

*2. Enter the ACTION of LCO 3.6.1.1, "Primary Containment" when containment isolation valve leakage results in exceeding the overall containment leakage rate acceptance criteria.

Relocated to before the Action requirements address as NOTES and renumbered.

#1. Isolation devices in high radiation areas may be verified by use of administrative means.

#2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means.

##3. A check valve with flow through the valve secured is only applicable to penetration flow paths with two containment isolation valves.

CONTAINMENT VENTILATION SYSTEM *(DELETED)*

LIMITING CONDITION FOR OPERATION

Supplement Change - one pair of lines limit by LCO 3.6.3

~~3.6.1.9 One pair (one purge supply line and one purge exhaust line) of containment purge system lines may be open; the containment purge supply and exhaust isolation valves in all other containment purge lines shall be closed. Operation with purge supply or exhaust isolation valves open for either purging or venting shall be limited to less than or equal to 1000## hours per 365 days. The 365 day cumulative time period will begin every January 1.~~

Same as LCO 3.6.3

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

~~ACTION:~~

Deleted cumulative limit and move one pair of lines limit to LCO 3.6.3

~~a. With a purge supply or exhaust isolation valve open in excess of the above cumulative limit, or with more than one pair of containment purge system lines open, close the isolation valve(s) in the purge line(s) within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

Revised and moved to by LCO 3.6.3

~~b. With a containment purge supply and/or exhaust isolation valve having a measured leakage rate in excess of 0.05 L_a, restore the inoperable valve to OPERABLE status or isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange within 24 hours. Verify** the affected penetration flow path is isolated once per 31 days for isolation devices outside containment and prior to entering Mode 4 from Mode 5 if not performed within the previous 92 days for isolation devices inside containment. Otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

~~SURVEILLANCE REQUIREMENTS~~

Revised and moved to LCO 3.6.3

~~4.6.1.9.1 The position of the containment purge supply and exhaust isolation valves shall be determined at least once per 31 days.~~

Deleted

~~4.6.1.9.2 The cumulative time that the purge supply and exhaust isolation valves are open over a 365 day period shall be determined at least once per 7 days.~~

Revised and moved to LCO 3.6.3

~~4.6.1.9.3 At least once per 3 months, each containment purge supply and exhaust isolation valve shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than or equal to 0.05 L_a.*~~

Maintained by LCO 3.6.3

~~* Enter the ACTION of LCO 3.6.1.1, "Primary Containment" when purge valve leakage results in exceeding the overall containment leakage rate acceptance criteria.~~

~~** Isolation devices in high radiation areas may be verified by use of administrative means. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means.~~

Deleted

~~## 400 additional hours is allowed for calendar year 2007 for operation of the containment ventilation system with purge isolation valves open.~~

CONTAINMENT SYSTEMS

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

Insert LCO Notes →

3.6.3 Each containment isolation valve shall be OPERABLE.*

APPLICABILITY: MODES 1, 2, 3 and 4.

Insert Action Notes →

ACTION:

Add exception for purge valves and BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING

INSERT F

a. With one or more penetration flow paths with one containment isolation valve inoperable; except for containment vacuum relief isolation valves(s), isolate each affected penetration within 4 hours by use of at least one closed deactivated automatic valve, closed manual valve, blind flange, or check valve## with flow through the valve secured; and, verify# the affected penetration flow path is isolated once per 31 days for isolation devices outside containment, and prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment.

b. With one or more penetration flow paths with two containment isolation valves inoperable; except for containment vacuum relief isolation valves(s), isolate each affected penetration within 1 hour by use of at least one closed deactivated automatic valve, closed manual valve, or blind flange and verify# the affected penetration flow path is isolated once per 31 days.

c. With one or more containment vacuum relief isolation valve(s) inoperable, the valve(s) must be returned to OPERABLE status within 72 hours.

Insert A →

~~d~~*g*. With any of the above ACTIONS not met, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Insert SR Note →

SURVEILLANCE REQUIREMENTS

Insert B →

~~4.6.3.1 Deleted~~

Relocated to below LCO statement as NOTES with asterisks on each. Add third note.

*1. Penetration flow path(s) may be unisolated intermittently under administrative controls.

*2. Enter the ACTION of LCO 3.6.1.1, "Primary Containment" when containment isolation valve leakage results in exceeding the overall containment leakage rate acceptance criteria.

Relocated to before the Action requirements as Notes and renumbered.

#1. Isolation devices in high radiation areas may be verified by use of administrative means.

#2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means.

##3. A check valve with flow through the valve secured is only applicable to penetration flow paths with two containment isolation valves.

ATTACHMENT 2

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

PROPOSED SUPPLEMENT TECHNICAL SPECIFICATION BASES CHANGES (MARK-UP)

I. AFFECTED PAGE LIST

Unit 1
Effected Standard Bases Insert Pages for 3.6.3 Containment Isolation Valves

Unit 2
Effected Standard Bases Insert Pages for 3.6.3 Containment Isolation Valves

II. MARKED PAGES

See attached.

BASES

BACKGROUND (continued)

Bases Insert A1→

~~Shutdown Purge System ([42] inch purge valves)~~*Reactor Building Purge Ventilation (RBPV) System*

~~The Shutdown Purge System operates to supply outside air into the containment for ventilation and cooling or heating and may also be used to reduce the concentration of noble gases within containment prior to and during personnel access. The supply and exhaust lines each contain two isolation valves. Because of their large size, the [42] inch purge valves in some units are not qualified for automatic closure from their open position under DBA conditions. Therefore, the [42] inch purge valves are normally maintained closed in MODES 1, 2, 3, and 4 to ensure the containment boundary is maintained.~~

~~Minipurge System ([8] inch purge valves)~~

~~The Minipurge System operates to:~~

~~a. Reduce the concentration of noble gases within containment prior to and during personnel access and~~

~~b. Equalize internal and external pressures.~~

Since the valves used in the ~~Minipurge~~ *RBPV* System are designed to meet the requirements for automatic containment isolation valves, these valves may be opened as needed in MODES 1, 2, 3, and 4.

APPLICABLE SAFETY ANALYSES

The containment isolation valve LCO was derived from the assumptions related to minimizing the loss of reactor coolant inventory and establishing the containment boundary during major accidents. As part of the containment boundary, containment isolation valve OPERABILITY supports leak tightness of the containment. Therefore, the safety analyses of any event requiring isolation of containment is applicable to this LCO.

The DBAs that result in a release of radioactive material within containment are a loss of coolant accident (LOCA) and a rod ejection accident (Ref. 1). In the analyses for each of these accidents, it is assumed that containment isolation valves are either closed or function to close within the required isolation time following event initiation. This ensures that potential paths to the environment through containment isolation valves (including containment purge valves) are minimized. The bounding safety analyses for offsite releases assumes that one pair of containment purge system lines are open at event initiation. The open purge system lines include of one set of supply valves (i.e., inboard and outboard) and one set of exhaust valves (i.e., inboard and outboard). ~~The safety analyses assume that the [42] inch purge valves are closed at event initiation.~~

BASES

APPLICABLE SAFETY ANALYSES (continued)

The DBA analysis assumes that, within ~~60~~ *85* seconds after the accident, isolation of the containment is complete and leakage terminated except for the design leakage rate, L_a. The containment isolation total response time of ~~60~~ *85* seconds includes signal delay, diesel generator startup (for loss of offsite power), and containment isolation valve stroke times.

~~[~~The single failure criterion required to be imposed in the conduct of plant safety analyses was considered in the original design of the containment purge valves. Two valves (i.e., one set) in series on each purge line provide assurance that both the supply and exhaust lines could be isolated even if a single failure occurred. The inboard and outboard isolation valves on each line are provided with diverse power sources, ~~motor operated and~~ pneumatically operated *to open and* spring closed, respectively. This arrangement was designed to preclude common mode failures from disabling both valves on a purge line.]

Bases Insert B1 →

~~[The purge valves may be unable to close in the environment following a LOCA. Therefore, each of the purge valves is required to remain sealed closed during MODES 1, 2, 3, and 4. In this case, the single failure criterion remains applicable to the containment purge valves due to failure in the control circuit associated with each valve. Again, the purge system valve design precludes a single failure from compromising the containment boundary as long as the system is operated in accordance with the subject LCO.]~~

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

LCO

Containment isolation valves form a part of the containment boundary. The containment isolation valves' safety function is related to minimizing the loss of reactor coolant inventory and establishing the containment boundary during a DBA.

The automatic power operated isolation valves are required to have isolation times within limits and to actuate on an automatic isolation signal. The ~~[42] inch~~*containment isolation* purge valves ~~must be maintained sealed closed [or~~ have blocks installed to prevent full opening~~]~~. ~~[~~Blocked purge valves also actuate on an automatic signal.~~]~~ The valves covered by this LCO are listed along with their associated stroke times in the FSAR (Ref. 2).

BASES

LCO (continued)

The normally closed isolation valves are considered OPERABLE when manual valves are closed~~, automatic valves are de-activated and secured in their closed position~~, *and* blind flanges are in place, and closed systems are intact. These passive isolation valves/devices are those listed in Reference 2.

Purge valves with resilient seals ~~[~~and secondary containment ~~bypass~~ *BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING*~~valves]~~ must meet additional leakage rate requirements. The other containment isolation valve leakage rates are addressed by LCO 3.6.1, "*Primary* Containment," as Type C testing.

This LCO provides assurance that the containment isolation valves and purge valves will perform their designed safety functions to minimize the loss of reactor coolant inventory and establish the containment boundary during accidents.

The LCO is modified by three Notes. A second Note directs entry into the applicable required Actions of LCO 3.6.1.1, in the event the isolation valve leakage results in exceeding the overall containment leakage rate.

The first Note allows penetration flow paths to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for containment isolation is indicated. The third Note applies an operating restriction on the containment purge isolation valve(s). No more than one pair of containment purge lines (one set of supply valves and one set of exhaust valves) may be opened; otherwise, the containment purge valves are considered inoperable.

Bases Insert C1 →

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the containment isolation valves are not required to be OPERABLE in MODE 5. The requirements for containment isolation valves during MODE 6 are addressed in LCO 3.9.4, "Containment *Building* Penetrations."

ACTIONS

~~The ACTIONS are modified by a Note allowing penetration flow paths, except for [42] inch purge valve penetration flow paths, to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for containment isolation is indicated. Due to the size of the containment purge line penetration and the fact that those penetrations exhaust directly from the containment atmosphere to the environment, the penetration flow path containing these valves may not be opened under administrative controls. A single purge valve in a penetration flow path may be opened to effect repairs to an inoperable valve, as allowed by SR 3.6.3.1.~~

BASES

ACTIONS (continued)

isolation position should an event occur. This ~~Required~~ *required* Action does not require any testing or device manipulation. Rather, it involves verification that those isolation devices outside containment and capable of being mispositioned are in the correct position. ~~The Completion Time~~ *A Frequency* of "once per 31 days for isolation devices outside containment" is appropriate considering the fact that the devices are operated under administrative controls and the probability of their misalignment is low. For the isolation devices inside containment, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

~~Condition A has been modified by a Note indicating that this Condition is only applicable to those penetration flow paths with two [or more] containment isolation valves. For penetration flow paths with only one containment isolation valve and a closed system, Condition C provides the appropriate actions.~~

Required Action ~~A.2~~*a.* is modified by ~~two~~*three* Notes. *One of the* Note*s* ~~1~~ applies to isolation devices located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. ~~Note 2~~*The second Note* 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 devices once they have been verified to be in the proper position, is small. *The third Note provides clarification that use of a check valve with flow through the valve secured is only applicable to penetration flow paths with two containment isolation valves.*

~~B.1~~ *b.*

With more than one pair of containment purge lines open or with two ~~[or more]~~ containment isolation valves in one or more penetration flow paths inoperable, ~~[~~except for *containment vacuum relief isolation valve(s), and* purge valve or shield building bypass leakage not within limit,~~]~~ the affected penetration flow path must be isolated within 1 hour. 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

BASES

ACTIONS (continued)

~~F.1 and F.2~~ *g.*

If the ~~Required~~ *required* Actions and associated ~~Completion~~ *completion* ~~Times~~ *times* are not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within ~~36~~ *the following 30* hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

[SR ~~3~~*4*.6.3.1

~~Each [42] inch containment purge valve is required to be verified sealed closed at 31 day intervals. This Surveillance is designed to ensure that a gross breach of containment is not caused by an inadvertent or spurious opening of a containment purge valve. Detailed analysis of the purge valves failed to conclusively demonstrate their ability to close during a LOCA in time to limit offsite doses. Therefore, these valves are required to be in the sealed closed position during MODES 1, 2, 3, and 4. A containment purge valve that is sealed closed must have motive power to the valve operator removed. This can be accomplished by de-energizing the source of electric power or by removing the air supply to the valve operator. In this application, the term "sealed" has no connotation of leak tightness. The Frequency is a result of an NRC initiative, Generic Issue B-24 (Ref. 5), related to containment purge valve use during plant operations. In the event purge valve leakage requires entry into Condition E, the Surveillance permits opening one purge valve in a penetration flow path to perform repairs.]~~

~~[SR 3.6.3.2~~

This SR ensures that the ~~minipurge~~ *containment purge isolation* valves are closed as required or, if open, open for an allowable reason. If a purge valve is open in violation of this SR, the valve is considered inoperable. If the inoperable valve is not otherwise known to have excessive leakage when closed, it is not considered to have leakage outside of limits. The SR is not required to be met when the *containment purge isolation* ~~minipurge~~ valves are open for the reasons stated. The valves may be opened for pressure control, ALARA or air quality considerations for personnel entry, or for Surveillances that require the valves to be open. The number of valves open during Modes 1, 2, 3, and 4, is limited to no more than one pair of containment purge lines, that includes one set of supply valves and one set of exhaust valves. The *containment purge isolation*~~minipurge~~ valves are capable of closing in the environment following a LOCA. Therefore, these valves are allowed to be open for limited periods of time. The 31 day Frequency is consistent with other containment isolation valve requirements discussed in SR ~~3~~*4*.6.3.~~3~~*5*. ~~]~~

ATTACHMENT 3

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

PROPOSED TECHNICAL SPECIFICATION CLEAN PAGES

I. PAGE LIST

Unit 1
Index VII
1-2
3/4 6-2
3/4/6-3
3/4 6-15
3/4 6-17
3/4 6-18
3/4 6-18a
3/4 9-4
6-10a

Unit 2
Index VII
1-2
3/4 6-2
3/4/6-3
3/4 6-15
3/4 6-17
3/4 6-18
3/4 6-18a
3/4 9-5
6-9
6-10

II. CLEAN PAGES

See attached.

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

CHANNEL FUNCTIONAL TEST

1.6 A CHANNEL FUNCTIONAL TEST shall be:

a. Analog channels - the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions.

b. Bistable channels - the injection of a simulated signal into the sensor to verify OPERABILITY including alarm and/or trip functions.

c. Digital channels - the injection of a simulated signal into the channel as close to the sensor input to the process racks as practicable to verify OPERABILITY including alarm and/or trip functions.

CONTAINMENT INTEGRITY

1.7 CONTAINMENT INTEGRITY shall exist when:

a. All penetrations required to be closed during accident conditions are either:

1) Capable of being closed by an OPERABLE containment automatic isolation valve system, or

2) Closed by manual valves, blind flanges, or deactivated automatic valves secured in their closed positions, except for valves that are open under administrative control as permitted by Specification 3.6.3.

b. All equipment hatches are closed and sealed.

c. Each air lock is in compliance with the requirements of Specification 3.6.1.3,

d. The containment leakage rates are within the limits of Specification 4.6.1.1.c,

e. The sealing mechanism associated with each penetration (e.g., welds, bellows, or O-rings) is OPERABLE, and

f. Secondary containment bypass leakage is within the limits of Specification 3.6.3.

CONTROLLED LEAKAGE

1.8 This definition has been deleted.

CORE ALTERATION

1.9 CORE ALTERATION shall be the movement of any fuel, sources, reactivity control components, or other components affecting reactivity within the reactor vessel with the head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.

CORE OPERATING LIMIT REPORT

1.10 The CORE OPERATING LIMITS REPORT (COLR) is the unit-specific document that provides core operating limits for the current operating reload cycle. These cycle-specific core operating limits shall be determined for each reload cycle in accordance with Specification 6.9.1.14. Unit operation within these operating limits is addressed in individual specifications.

SECONDARY CONTAINMENT BYPASS LEAKAGE (DELETED)

LIMITING CONDITION FOR OPERATION

SECONDARY CONTAINMENT BYPASS LEAKAGE (DELETED)

SURVEILLANCE REQUIREMENTS

CONTAINMENT VENTILATION SYSTEM (DELETED)

LIMITING CONDITION FOR OPERATION

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 Each containment isolation valve shall be OPERABLE.*

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

*1. Penetration flow path(s) may be unisolated intermittently under administrative controls.

*2. Enter the ACTION of LCO 3.6.1.1, "Primary Containment" when containment isolation valve leakage results in exceeding the overall containment leakage rate acceptance criteria.

*3. No more than one pair of Containment purge lines (one set of supply valves and one set of exhaust valves) may be opened.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTIONS

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

#1. Isolation devices in high radiation areas may be verified by use of administrative means.

#2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means.

##3. A check valve with flow through the valve secured is only applicable to penetration flow paths with two containment isolation valves.

---

a. With one or more penetration flow paths with one containment isolation valve inoperable for reasons other than:
   1. leakage rate limits of containment purge isolation valve(s),
   2. leakage rate limit of BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING, or
   3. inoperable containment vacuum relief isolation valve(s),

   isolate the affected penetration within 4 hours by use of at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve## with flow through the valve secured; and,

   verify# the affected penetration flow path is isolated once per 31 days for isolation devices outside containment, and prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment.

ACTIONS (continued)

b. With more than one pair of containment purge lines open

or

with one or more penetration flow paths with two containment isolation valves inoperable for reasons other than:
1. leakage rate limits of containment purge isolation valve(s),
2. leakage rate limit of BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING, or
3. inoperable containment vacuum relief isolation valve(s),

isolate the affected penetration within 1 hour by use of at least one closed and deactivated automatic valve, closed manual valve, or blind flange and verify# the affected penetration flow path is isolated once per 31 days.

c. With one or more containment vacuum relief isolation valve(s) inoperable, the valve(s) must be returned to OPERABLE status within 72 hours.

d. With one or more BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING not within limit, restore within limit within 4 hours.

e. With one or more penetration flow paths with one or more containment purge supply and/or exhaust isolation valves not within leakage limits, isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange within 24 hours. Verify# the affected penetration flow path is isolated once per 31 days for isolation devices outside containment and prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment. Perform SR 4.6.3.6 once per 92 days for the valve used to isolate the affected penetration flow path.

f. With one or more penetration flow paths of a closed system design with one containment isolation valve inoperable, isolate the affected penetration flow path within 72 hours by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange, and verify# the affected penetration is isolated once per 31 days.

g. With any of the above ACTIONS not met, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

---------- NOTES ----------
* Valves and blind flanges in high radiation areas may be verified by use of administrative means.

4.6.3.1 Verify each purge supply and/or exhaust isolation valve is closed, except when containment purge valves (only one set of supply valves and one set of exhaust valves) are open for pressure control, ALARA or air quality considerations for personnel entry, or for Surveillances that require the valves to be open, at least once per 31 days.

3/4.6.3 CONTAINMENT ISOLATION VALVES

SURVEILLANCE REQUIREMENTS (continued)

4.6.3.2 Verify each automatic containment isolation valve that is not locked, sealed or otherwise secured in position, actuates to the isolation position on an actual or simulated actuation signal, at least once per 18 months.

4.6.3.3 The isolation time of each power operated or automatic containment isolation valve shall be determined to be within its limit when tested pursuant to Specification 4.0.5.

4.6.3.4 Verify each containment isolation manual valve and blind flange that is located inside containment and not locked, sealed, or otherwise secured and required to be closed during accident conditions is closed, except for containment isolation valves that are open under administrative controls prior to entering Mode 4 from Mode 5 if not performed within the previous 92 days.*

4.6.3.5 Verify each containment isolation manual valve and blind flange that is located outside containment and not locked, sealed, or otherwise secured and required to be closed during accident conditions is closed, except for containment isolation valves that are open under administrative controls, at least once per 31 days.*

4.6.3.6 Perform leakage rate testing for each containment purge supply and exhaust isolation valve at least once per 3 months.

4.6.3.7 Verify each containment purge valve is blocked to restrict the valve from opening greater than or equal to 50 degrees, at least once per 18 months.

4.6.3.8 Verify the combined leakage rate for all BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING is less than or equal to 0.25 L_a when pressurized to greater than or equal to P_a in accordance with the Containment Leakage Rate Test Program.

REFUELING OPERATIONS

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

LIMITING CONDITION FOR OPERATION

3.9.4 The containment building penetrations shall be in the following status:

a. The equipment door closed and held in place by a minimum of four bolts,

b. A minimum of one door in each airlock is closed, and both doors of both containment personnel airlocks may be open if:

1. One personnel airlock door in each airlock is capable of closure, and

2. One train of the Auxiliary Building Gas Treatment System is OPERABLE in accordance with Technical Specification 3.9.12, and

c. Each penetration* providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed by an isolation valve, blind flange, manual valve, or equivalent, or

2. Be capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve.

APPLICABILTY:

3.9.4.a. Containment Building Equipment Door - During movement of recently irradiated fuel within the containment.

3.9.4.b. and c. Containment Building Airlock Doors and Penetrations - During movement of irradiated fuel within the containment.

ACTION:

1. With the requirements of the above specification not satisfied for the containment building equipment door, immediately suspend all operations involving movement of recently irradiated fuel in the containment building. The provisions of Specification 3.0.3 are not applicable.

2. With the requirements of the above specification not satisfied for containment airlock doors or penetrations, immediately suspend all operations involving movement of irradiated fuel in the containment building. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.4 Each of the above required containment building penetrations shall be determined to be either in its required condition or capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve once per 7 days during movement of irradiated fuel in the containment building by:

a. Verifying the penetrations are in their required condition, or

b. Verifying the Containment Ventilation isolation valves not locked, sealed, or otherwise secured in position actuate to the isolation position on an actual or simulated actuation signal.

* Penetration flow path(s) providing direct access from the containment atmosphere that transverse and terminate in the Auxiliary Building Secondary Containment Enclosure may be unisolated under administrative controls.

h. Containment Leakage Rate Testing Program

A program shall be established to implement the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50 Appendix J, Option B, as modified by approved exemptions. Visual examination and testing, including test intervals and extensions, shall be in accordance with Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995 with exceptions provided in the site implementing instructions and the following: BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING leakage from isolation valves that are sealed with fluid from a seal system may be excluded, subject to the provisions of Appendix J, Section III.C.3, when determining the combined leakage rate provided the seal system and valves are pressurized to at least 1.10 P_a (13.2 psig) and the seal system capacity is adequate to maintain system pressure (or fluid head for the containment spray system and RHR spray system valves at penetrations 48A, 48B, 49A and 49B) for at least 30 days.

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a, is 12.0 psig.

The maximum allowable containment leakage rate, L_a, at P_a, is 0.25% of the primary containment air weight per day.

Leakage rate acceptance criteria are:

a. Containment overall leakage rate acceptance criteria is $\leq 1.0\ L_a$. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are $\leq 0.60\ L_a$ for the combined Type B and Type C tests, and $\leq 0.75\ L_a$ for Type A tests;

b. Air lock testing acceptance criteria are:

1. Overall air lock leakage rate is $\leq 0.05\ L_a$ when tested at $\geq P_a$.

2. For each door, leakage rate is $\leq 0.01\ L_a$ when pressurized to ≥ 6 psig for at least two minutes.

c. For each containment purge supply and exhaust isolation valve, acceptance criteria is measured leakage rate less than or equal to $0.05\ L_a$.

d. BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING acceptance criteria are:

1. The combined bypass leakage rate to the auxiliary building shall be less than or equal to $0.25\ L_a$ by applicable Type B and C tests.

2. Penetrations not individually testable shall have no detectable leakage when tested with soap bubbles while the containment is pressurized to P_a (12 psig) during each Type A test.

The provisions of SR 4.0.2 do not apply to the test frequencies specified in the Containment Leakage Rate Testing Program.

The provisions of SR 4.0.3 are applicable to the Containment Leakage Rate Testing Program.

i. Configuration Risk Management Program (DELETED)

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

CHANNEL FUNCTIONAL TEST

1.6 A CHANNEL FUNCTIONAL TEST shall be:

a. Analog channels - the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions.

b. Bistable channels - the injection of a simulated signal into the sensor to verify OPERABILITY including alarm and/or trip functions.

c. Digital channels - the injection of a simulated signal into the channel as close to the sensor input to the process racks as practicable to verify OPERABILITY including alarm and/or trip functions.

CONTAINMENT INTEGRITY

1.7 CONTAINMENT INTEGRITY shall exist when:

a. All penetrations required to be closed during accident conditions are either:

1) Capable of being closed by an OPERABLE containment automatic isolation valve system, or
2) Closed by manual valves, blind flanges, or deactivated automatic valves secured in their closed positions, except for valves that are open under administrative control as permitted by Specification 3.6.3.

b. All equipment hatches are closed and sealed.
c. Each air lock is in compliance with the requirements of Specification 3.6.1.3,
d. The containment leakage rates are within the limits of Specification 4.6.1.1.c,
e. The sealing mechanism associated with each penetration (e.g., welds, bellows, or O-rings) is OPERABLE, and
f. Secondary containment bypass leakage is within the limits of Specification 3.6.3.

CONTROLLED LEAKAGE

1.8 This definition has been deleted.

CORE ALTERATION

1.9 CORE ALTERATION shall be the movement of any fuel, sources, reactivity control components, or other components affecting reactivity within the reactor vessel with the head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.

CORE OPERATING LIMITS REPORT

1.10 The CORE OPERATING LIMITS REPORT (COLR) is the unit-specific document that provides core operating limits for the current operating reload cycle. These cycle-specific core operating limits shall be determined for each reload cycle in accordance with Specification 6.9.1.14. Unit operation within these operating limits is addressed in individual specifications.

SECONDARY CONTAINMENT BYPASS LEAKAGE (DELETED)

LIMITING CONDITION FOR OPERATION

SECONDARY CONTAINMENT BYPASS LEAKAGE (DELETED)

SURVEILLANCE REQUIREMENTS

CONTAINMENT VENTILATION SYSTEM (DELETED)

LIMITING CONDITION FOR OPERATION

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 Each containment isolation valve shall be OPERABLE.*

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

*1. Penetration flow path(s) may be unisolated intermittently under administrative controls.

*2. Enter the ACTION of LCO 3.6.1.1, "Primary Containment" when containment isolation valve leakage results in exceeding the overall containment leakage rate acceptance criteria.

*3. No more than one pair of Containment purge lines (one set of supply valves and one set of exhaust valves) may be opened.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTIONS

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

#1. Isolation devices in high radiation areas may be verified by use of administrative means.

#2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means.

##3. A check valve with flow through the valve secured is only applicable to penetration flow paths with two containment isolation valves.

---

a. With one or more penetration flow paths with one containment isolation valve inoperable for reasons other than:
   1. leakage rate limits of containment purge isolation valve(s),
   2. leakage rate limit of BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING, or
   3. inoperable containment vacuum relief isolation valve(s),

   isolate the affected penetration within 4 hours by use of at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve## with flow through the valve secured; and,

   verify# the affected penetration flow path is isolated once per 31 days for isolation devices outside containment, and prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment.

ACTIONS (continued)

b. With more than one pair of containment purge lines open

or

with one or more penetration flow paths with two containment isolation valves inoperable for reasons other than:
1. leakage rate limits of containment purge isolation valve(s),
2. leakage rate limit of BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING, or
3. inoperable containment vacuum relief isolation valve(s),

isolate the affected penetration within 1 hour by use of at least one closed and deactivated automatic valve, closed manual valve, or blind flange and verify# the affected penetration flow path is isolated once per 31 days.

c. With one or more containment vacuum relief isolation valve(s) inoperable, the valve(s) must be returned to OPERABLE status within 72 hours.

d. With one or more BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING not within limit, restore within limit within 4 hours.

e. With one or more penetration flow paths with one or more containment purge supply and/or exhaust isolation valves not within leakage limits, isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange within 24 hours. Verify# the affected penetration flow path is isolated once per 31 days for isolation devices outside containment and prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment. Perform SR 4.6.3.6 once per 92 days for the valve used to isolate the affected penetration flow path.

f. With one or more penetration flow paths of a closed system design with one containment isolation valve inoperable, isolate the affected penetration flow path within 72 hours by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange, and verify# the affected penetration is isolated once per 31 days.

g. With any of the above ACTIONS not met, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

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

* Valves and blind flanges in high radiation areas may be verified by use of administrative means.

4.6.3.1 Verify each purge supply and/or exhaust isolation valve is closed, except when containment purge valves (only one set of supply valves and one set of exhaust valves) are open for pressure control, ALARA or air quality considerations for personnel entry, or for Surveillances that require the valves to be open, at least once per 31 days.

SURVEILLANCE REQUIREMENTS (continued)

4.6.3.2 Verify each automatic containment isolation valve that is not locked, sealed or otherwise secured in position, actuates to the isolation position on an actual or simulated actuation signal, at least once per 18 months.

4.6.3.3 The isolation time of each power operated or automatic containment isolation valve shall be determined to be within its limit when tested pursuant to Specification 4.0.5.

4.6.3.4 Verify each containment isolation manual valve and blind flange that is located inside containment and not locked, sealed, or otherwise secured and required to be closed during accident conditions is closed, except for containment isolation valves that are open under administrative controls prior to entering Mode 4 from Mode 5 if not performed within the previous 92 days.*

4.6.3.5 Verify each containment isolation manual valve and blind flange that is located outside containment and not locked, sealed, or otherwise secured and required to be closed during accident conditions is closed, except for containment isolation valves that are open under administrative controls, at least once per 31 days.*

4.6.3.6 Perform leakage rate testing for each containment purge supply and exhaust isolation valve at least once per 3 months.

4.6.3.7 Verify each containment purge valve is blocked to restrict the valve from opening greater than or equal to 50 degrees, at least once per 18 months.

4.6.3.8 Verify the combined leakage rate for all BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING is less than or equal to 0.25 L_a when pressurized to greater than or equal to P_a in accordance with the Containment Leakage Rate Test Program.

REFUELING OPERATIONS

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

LIMITING CONDITION FOR OPERATION

3.9.4 The containment building penetrations shall be in the following status:

a. The equipment door closed and held in place by a minimum of four bolts,

b. A minimum of one door in each airlock is closed, or both doors of both containment personnel airlocks may be open if:

1. One personnel airlock door in each airlock is capable of closure, and

2. One train of the Auxiliary Building Gas Treatment System is OPERABLE in accordance with Technical Specification 3.9.12, and

c. Each penetration* providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed by an isolation valve, blind flange, manual valve, or equivalent, or

2. Be capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve.

APPLICABILITY:

3.9.4.a. Containment Building Equipment Door - During movement of recently irradiated fuel within the containment.

3.9.4.b. and c. Containment Building Airlock Doors and Penetrations - During movement of irradiated fuel within the containment.

ACTION:

1. With the requirements of the above specification not satisfied for the containment building equipment door, immediately suspend all operations involving movement of recently irradiated fuel in the containment building. The provisions of Specification 3.0.3 are not applicable.

2. With the requirements of the above specification not satisfied for containment airlock doors or penetrations, immediately suspend all operations involving movement of irradiated fuel in the containment building. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.4 Each of the above required containment building penetrations shall be determined to be either in its required condition or capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve once per 7 days during movement of irradiated fuel in the containment building by:

a. Verifying the penetrations are in their required condition, or

b. Verifying the Containment Ventilation isolation valves not locked, sealed, or otherwise secured in position actuate to the isolation position on an actual or simulated actuation signal.

* Penetration flow path(s) providing direct access from the containment atmosphere that transverse and terminate in the Auxiliary Building Secondary Containment Enclosure may be unisolated under administrative controls.

6.8.4 f. Radioactive Effluent Controls Program (Cont.)

of radioactivity when the projected doses in a 31-day period would exceed 2 percent of the guidelines for the annual dose or dose commitment conforming to Appendix I to 10 CFR Part 50,

7) Limitations on the dose rate resulting from radioactive material released in gaseous effluents from the site to areas at or beyond the SITE BOUNDARY shall be in accordance with the following:

1. For noble gases: Less than or equal to a dose rate of 500 mrem/yr to the whole body and less than or equal to a dose rate of 3000 mrem/yr to the skin, and
2. For Iodine-131, Iodine-133, tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to a dose rate of 1500 mrem/year to any organ.

8) Limitations on the annual and quarterly air doses resulting from noble gases released in gaseous effluents from each unit to areas beyond the SITE BOUNDARY conforming to Appendix I to 10 CFR Part 50,

9) Limitations on the annual and quarterly doses to a member of the public from Iodine-131, Iodine-133, tritium, and all radio-nuclides in particulate form with half-lives greater than 8 days in gaseous effluents released from each unit to areas beyond the SITE BOUNDARY conforming to Appendix I to 10 CFR Part 50, and

10) Limitations on the annual dose or dose commitment to any member of the public, beyond the site boundary, due to releases of radioactivity and to radiation from uranium fuel cycle sources conforming to 40 CFR Part 190.

The provisions of SR 4.0.2 and 4.0.3 are applicable to the radioactive effluent controls program surveillance frequency.

g. Radiological Environmental Monitoring Program (DELETED)

h. Containment Leakage Rate Testing Program

A program shall be established to implement the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50 Appendix J, Option B, as modified by approved exemptions. Visual examination and testing, including test intervals and extensions, shall be in accordance with Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995 with exceptions provided in the site implementing instructions and the following: BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING leakage from isolation valves that are sealed with fluid from a seal system may be excluded, subject to the provisions of Appendix J, Section III.C.3, when determining the combined leakage rate provided the seal system and valves are pressurized to at least 1.10 P_a (13.2 psig) and the seal system capacity is adequate to maintain system pressure (or fluid head for the containment spray system and RHR spray system valves at penetrations 48A, 48B, 49A and 49B) for at least 30 days.

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a, is 12.0 psig.

The maximum allowable containment leakage rate, L_a, at P_a, is 0.25% of the primary containment air weight per day.

Leakage rate acceptance criteria are:

a. Containment overall leakage rate acceptance criteria is $\leq 1.0\ L_a$. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are $\leq 0.60\ L_a$ for the combined Type B and Type C tests, and $\leq 0.75\ L_a$ for Type A tests;

b. Air lock testing acceptance criteria are:

1)Overall air lock leakage rate is $\leq 0.05\ L_a$ when tested at $\geq\ P_a$.

2) For each door, leakage rate is $\leq 0.01\ L_a$ when pressurized to ≥ 6 psig for at least two minutes.

c. For each containment purge supply and exhaust isolation valve, acceptance criteria is measured leakage rate less than or equal to $0.05\ L_a$.

d. BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING acceptance criteria are:

1. The combined bypass leakage rate to the auxiliary building shall be less than or equal to $0.25\ L_a$ by applicable Type B and C tests.

2. Penetrations not individually testable shall have no detectable leakage when tested with soap bubbles while the containment is pressurized to P_a (12 psig) during each Type A test.

The provisions of SR 4.0.2 do not apply to the test frequencies specified in the Containment Leakage Rate Testing Program.

The provisions of SR 4.0.3 are applicable to the Containment Leakage Rate Testing Program.

i. Configuration Risk Management Program (DELETED)

j. Technical Specification (TS) Bases Control Program

This program provides a means for processing changes to the Bases of these TSs.

a. Changes to the Bases of the TS shall be made under appropriate administrative controls and reviews.

b. Licensees may make changes to Bases without prior NRC approval provided the changes do not require either of the following:

1. A change in the TS incorporated in the license or

2. A change to the updated FSAR or Bases that requires NRC approval pursuant to 10 CFR 50.59.

c. The Bases Control Program shall contain provisions to ensure that the Bases are maintained consistent with the FSAR.

ATTACHMENT 4

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

PROPOSED TECHNICAL SPECIFICATIONS BASES CLEAN PAGES - Unit 1

I. PAGE LIST

Unit 1
B 3/4 6-1 through B 3/4 6-21

II. CLEAN PAGES

See attached.

BASES

3/4.6.1 PRIMARY CONTAINMENT

The safety design basis for primary containment is that the containment must withstand the pressures and temperatures of the limiting design basis accident (DBA) without exceeding the design leakage rates.

The DBAs that result in a challenge to containment OPERABILITY from high pressures and temperatures are a loss of coolant accident (LOCA), a steam line break, and a rod ejection accident (REA). In addition, release of significant fission product radioactivity within containment can occur from a LOCA or REA. In the DBA analyses, it is assumed that the containment is OPERABLE such that, for the DBAs involving release of fission product radioactivity, release to the environment is controlled by the rate of containment leakage. This leakage rate limitation will limit the site boundary radiation doses to within the limits of 10 CFR 100 during accident conditions. The containment was designed with an allowable leakage rate of 0.25 percent of containment air weight per day. This leakage rate, used in the evaluation of offsite doses resulting from accidents, is defined in the Containment Leakage Rate Test Program, as L_a: the maximum allowable containment leakage rate at the calculated peak containment internal pressure (P_a) resulting from the limiting DBA. The allowable leakage rate represented by L_a forms the basis for the acceptance criteria imposed on all containment leakage rate testing.

Primary containment INTEGRITY or operability is maintained by limiting leakage to within the acceptance criteria of the Containment Leakage Rate Test Program.

3/4.6.1.2 SECONDARY CONTAINMENT BYPASS LEAKAGE

This specification has been relocated.

3/4.6.1.3 CONTAINMENT AIR LOCKS

The limitations on closure and leak rate for the containment air locks are required to meet the restrictions on CONTAINMENT INTEGRITY and containment leak rate. Surveillance testing of the air lock seals provide assurance that the overall air lock leakage will not become excessive due to seal damage during the intervals between air lock leakage tests.

3/4.6.1.4 INTERNAL PRESSURE

The limitations on containment internal pressure ensure that 1) the containment structure is prevented from exceeding its design negative pressure differential with respect to the annulus atmosphere of 0.5 psig and 2) the containment peak pressure does not exceed the maximum allowable internal pressure of 12 psig during LOCA conditions.

3/4.6.1.5 AIR TEMPERATURE

The limitations on containment average air temperature ensure that 1) the containment air mass is limited to an initial mass sufficiently low to prevent exceeding the maximum allowable internal pressure during LOCA conditions and 2) the ambient air temperature does not exceed that temperature allowable for the continuous duty rating specified for equipment and instrumentation located within containment.

The containment pressure transient is sensitive to the initially contained air mass during a LOCA. The contained air mass increases with decreasing temperature. The lower temperature limits of 100°F for the lower compartment, 85°F for the upper compartment, and 60°F when less than or equal to 5% of RATED THERMAL POWER will limit the peak pressure to an acceptable value. The upper temperature limit influences the peak accident temperature slightly during a LOCA; however, this limit is based primarily upon equipment protection and anticipated operating conditions. Both the upper and lower temperature limits are consistent with the parameters used in the accident analyses.

3/4.6.1.6 CONTAINMENT VESSEL STRUCTURAL INTEGRITY

This limitation ensures that the structural integrity of the containment steel vessel will be maintained comparable to the original design standards for the life of the facility. Structural integrity is required to ensure that the vessel will withstand the maximum pressure of 12 psig in the event of a LOCA. Periodic visual inspections in accordance with the Containment Leakage Rate Test Program are sufficient to demonstrate this capability.

3/4.6.1.7 SHIELD BUILDING STRUCTURAL INTEGRITY

This limitation ensures that the structural integrity of the containment shield building will be maintained comparable to the original design standards for the life of the facility. Structural integrity is required to provide 1) protection for the steel vessel from external missiles, 2) radiation shielding in the event of a LOCA, and 3) and annulus surrounding the steel vessel that can be maintained at a negative pressure during accident conditions.

3/4.6.1.8 EMERGENCY GAS TREATMENT SYSTEM (EGTS)

The OPERABILITY of the EGTS cleanup subsystem ensures that during LOCA conditions, containment vessel leakage into the annulus will be filtered through the HEPA filters and charcoal adsorber trains prior to discharge to the atmosphere. This requirement is necessary to meet the assumptions used in the accident analyses and limit the site boundary radiation doses to within the limits of 10 CFR 100 during LOCA conditions. Cumulative operation of the system with the heaters on for 10 hours over a 31 day period is sufficient to reduce the buildup of moisture on the absorbers and HEPA filters. ANSI N510-1975 will be used as a procedural guide for surveillance testing.

3/4.6.1.9 CONTAINMENT VENTILATION SYSTEM

This specification has been relocated.

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

3/4.6.2.1 CONTAINMENT SPRAY SUBSYSTEMS

The OPERABILITY of the containment spray subsystems ensures that containment depressurization and cooling capability will be available in the event of a LOCA. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses.

3/4.6.2.2 CONTAINMENT COOLING FANS

The OPERABILITY of the lower containment vent coolers ensures that adequate heat removal capacity is available to provide long-term cooling following a non-LOCA event. Postaccident use of these coolers ensures containment temperatures remain within environmental qualification limits for all safety-related equipment required to remain functional.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.3 Containment Isolation Valves

BASES

BACKGROUND

The containment isolation valves form part of the containment pressure boundary and provide a means for fluid penetrations not serving accident consequence limiting systems to be provided with two isolation barriers that are closed on a containment isolation signal or which are normally closed. These isolation devices are either passive or active (automatic). Manual valves, de-activated automatic valves secured in their closed position (including check valves with flow through the valve secured), blind flanges, and closed systems are considered passive devices. Check valves, or other automatic valves designed to close without operator action following an accident, are considered active devices. Two barriers in series are provided for each penetration or an approved exemption is provided so that no single credible failure or malfunction of an active component can result in a loss of isolation or leakage that exceeds limits assumed in the safety analyses. One of these barriers may be a closed system. These barriers (typically containment isolation valves) make up the Containment Isolation System.

Automatic isolation signals are produced during accident conditions. Containment Phase "A" isolation occurs upon receipt of a safety injection signal. The Phase "A" isolation signal isolates nonessential process lines in order to minimize leakage of fission product radioactivity. Containment Phase "B" isolation occurs upon receipt of a containment pressure High-High signal and isolates the remaining process lines, except systems required for accident mitigation. In addition to the isolation signals listed above, the purge and exhaust valves receive an isolation signal on a containment high radiation condition. As a result, the containment isolation valves (and blind flanges) help ensure that the containment atmosphere will be isolated from the environment in the event of a release of fission product radioactivity to the containment atmosphere as a result of a Design Basis Accident (DBA).

The OPERABILITY requirements for containment isolation valves help ensure that containment is isolated within the time limits assumed in the safety analyses. Therefore, the OPERABILITY requirements provide assurance that the containment function assumed in the safety analyses will be maintained.

Reactor Building Purge Ventilation (RBPV) System

The RBPV System in part operates to supply outside air into the containment for ventilation and cooling or heating and may also be used to reduce the concentration of noble gases within containment prior to and during personnel access.

The RBPV System provides for mechanical ventilation of the primary containment, the instrument room located within the containment, and the annulus secondary containment located between primary containment and the Shield Building.

BACKGROUND (continued)

The RBPV System includes one supply duct penetration through the Shield Building wall into the annulus area. There are four purge air supply penetrations through the containment vessel, two to the upper compartment and two to the lower containment. Two normally closed 24-inch purge supply isolation valves at each penetration through the containment vessel provide containment isolation.

The RBPV System includes one exhaust duct penetration through the Shield Building wall from the annulus area. There are three purge air exhaust penetrations through the containment vessel, two from the upper compartment and one from the lower containment. There is one pressure relief penetration through the containment vessel. Two normally closed 24-inch purge exhaust isolation valves at each penetration through the containment vessel provide containment isolation. Two normally closed 8-inch pressure relief isolation valves through the containment vessel provide containment isolation.

The RBPV System includes one supply and one exhaust duct penetration through the Shield Building wall and one supply and one exhaust duct penetration through the containment vessel wall for ventilation of the instrument room inside containment. Two normally closed 12-inch purge isolation valves at each supply and exhaust penetration through the containment vessel provide containment isolation.

Since the valves used in the RBPV System are designed to meet the requirements for automatic containment isolation valves, these valves may be opened as needed in MODES 1, 2, 3, and 4.

APPLICABLE SAFETY ANALYSES

The containment isolation valve LCO was derived from the assumptions related to minimizing the loss of reactor coolant inventory and establishing the containment boundary during major accidents. As part of the containment boundary, containment isolation valve OPERABILITY supports leak tightness of the containment. Therefore, the safety analyses of any event requiring isolation of containment is applicable to this LCO.

The DBAs that result in a release of radioactive material within containment are a loss of coolant accident (LOCA) and a rod ejection accident (Ref. 1). In the analyses for each of these accidents, it is assumed that containment isolation valves are either closed or function to close within the required isolation time following event initiation. This ensures that potential paths to the environment through containment isolation valves (including containment purge valves) are minimized. The bounding safety analyses for offsite releases assumes that one pair of containment purge system lines are open at event initiation. The open purge system lines include of one set of supply valves (i.e., inboard and outboard) and one set of exhaust valves (i.e., inboard and outboard).

BASES

APPLICABLE SAFETY ANALYSES (continued)

The DBA analysis assumes that, within 85 seconds after the accident, isolation of the containment is complete and leakage terminated except for the design leakage rate, L_a. The containment isolation total response time of 85 seconds includes signal delay, diesel generator startup (for loss of offsite power), and containment isolation valve stroke times.

The single failure criterion required to be imposed in the conduct of plant safety analyses was considered in the original design of the containment purge valves. Two valves (i.e., one set) in series on each purge line provide assurance that both the supply and exhaust lines could be isolated even if a single failure occurred. The inboard and outboard isolation valves on each line are provided with diverse power sources, pneumatically operated to open and spring closed, respectively. This arrangement was designed to preclude common mode failures from disabling both valves on a purge line.

Additional valves have been identified as barrier valves, which in addition to the containment isolation valves discussed above, are a part of the accident monitoring instrumentation in Technical Specification 3/4.3.3.7 and are designated as Category 1 in accordance with Regulatory Guide 1.97, Revision 2, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident," December 1980.

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

LCO

Containment isolation valves form a part of the containment boundary. The containment isolation valves' safety function is related to minimizing the loss of reactor coolant inventory and establishing the containment boundary during a DBA.

The automatic power operated isolation valves are required to have isolation times within limits and to actuate on an automatic isolation signal. The containment isolation purge valves have blocks installed to prevent full opening. Blocked purge valves also actuate on an automatic signal. The valves covered by this LCO are listed along with their associated stroke times in the FSAR (Ref. 2).

LCO (continued)

The normally closed isolation valves are considered OPERABLE when manual valves are closed, blind flanges are in place, and closed systems are intact. These passive isolation valves/devices are those listed in Reference 2.

Purge valves with resilient seals and secondary containment BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING must meet additional leakage rate requirements. The other containment isolation valve leakage rates are addressed by LCO 3.6.1, "Primary Containment," as Type C testing.

This LCO provides assurance that the containment isolation valves and purge valves will perform their designed safety functions to minimize the loss of reactor coolant inventory and establish the containment boundary during accidents.

The LCO is modified by three Notes. The first Note allows penetration flow paths to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. Providing instruction to the operator to close these valves in an accident situation, and assuring that the environmental conditions will not preclude access to close the valves and that this action will prevent the release of radioactivity outside the containment. For valves with controls located in the control room, these conditions can be satisfied by including a specific reference to closing the particular valves in the emergency procedures, since communication and environmental factors are not affected because of the location of the valve controls. In this way, the penetration can be rapidly isolated when a need for containment isolation is indicated.

A second Note directs entry into the applicable required Actions of LCO 3.6.1, in the event the isolation valve leakage results in exceeding the overall containment leakage rate.

The third Note applies an operating restriction on the containment purge isolation valve(s). No more than one pair of containment purge lines (one set of supply valves and one set of exhaust valves) may be opened; otherwise, a containment purge valve(s) in a line is considered inoperable.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the containment isolation valves are not required to be OPERABLE in MODE 5. The requirements for containment isolation valves during MODE 6 are addressed in LCO 3.9.4, "Containment Building Penetrations."

ACTIONS

a.

In the event one containment isolation valve in one or more penetration flow paths is inoperable, except for containment vacuum relief isolation valve(s), and purge valve or secondary containment BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING leakage not within limit, the affected penetration flow path 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 containment isolation valve, a closed manual valve, a blind flange, and a check valve with flow through the valve secured. For a penetration flow path isolated in accordance with this required Action, the device used to isolate the penetration should be the closest available one to containment. This required Action must be completed within 4 hours. The 4 hour completion time is reasonable, considering the time required to isolate the penetration and the relative importance of supporting containment OPERABILITY during MODES 1, 2, 3, and 4.

For affected penetration flow paths that cannot be restored to OPERABLE status within the 4 hour completion time and that have been isolated in accordance with this required Action, the affected penetration flow paths must be verified to be isolated on a periodic basis. This is necessary to ensure that containment penetrations required to be isolated following an accident and no longer capable of being automatically isolated will be in the isolation position should an event occur. This required Action does not require any testing or device manipulation. Rather, it involves verification that those isolation devices outside containment and capable of being mispositioned are in the correct position. A Frequency of "once per 31 days for isolation devices outside containment" is appropriate considering the fact that the devices are operated under administrative controls and the probability of their misalignment is low. For the isolation devices inside containment, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

Required Action a. is modified by three Notes. One of the Notes applies to isolation devices located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. The second Note 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 devices once they have been verified to be in the proper position, is small. The third Note provides clarification that use of a check valve with flow through the valve secured is only applicable to penetration flow paths with two containment isolation valves.

ACTIONS (continued) b.

With more than one pair of containment purge lines open or with two containment isolation valves in one or more penetration flow paths inoperable, except for containment vacuum relief isolation valve(s), and purge valve or shield building bypass leakage not within limit, the affected penetration flow path must be isolated within 1 hour. 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 de-activated automatic valve, a closed manual valve, and a blind flange. The 1 hour completion time is consistent with the Actions of LCO 3.6.1. In the event the affected penetration is isolated in accordance with this required Action, 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 penetrations requiring isolation following an accident are isolated. A Frequency of once per 31 days for verifying each affected penetration flow path is isolated is appropriate considering the fact that the valves are operated under administrative control and the probability of their misalignment is low.

Required Action b. is modified by two Notes. One of the Notes applies to isolation devices located in high-radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. The second Note 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 devices once they have been verified to be in the proper position is small.

c.

With one or more containment vacuum relief isolation valve inoperable, the inoperable valve flow path must be restored to OPERABLE status or the affected penetration flow path must be isolated.

Note that due to competing requirements and dual functions associated with the containment vacuum relief isolation valves (FCV-30-46, -47, and -48), the air supply and solenoid arrangement is designed such that upon the unavailability of Train A essential control air, the containment vacuum relief isolation valves are incapable of automatic closure and are therefore considered inoperable for the containment isolation function without operator action.

ACTIONS (continued) The containment vacuum relief valves (30-571, -572, and -573) are qualified to perform a containment isolation function. These valves are not powered from any electrical source and no spurious signal or operator action could initiate opening. The valves are spring loaded, swing disk (check) valves with an elastomer seat. The valves are normally closed and are equipped with limit switches that provide fully open and fully closed indication in the main control room (MCR). Based upon the above information, a 72-hour allowed action time is appropriate while actions are taken to return the containment vacuum relief isolation valves to service.

d.

With the secondary containment BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING leakage rate (SR 4.6.3.8) not within limit, the assumptions of the safety analyses are not met. Therefore, the leakage must be restored to within limit. Restoration can be accomplished by isolating the penetration(s) that caused the limit to be exceeded by use of one closed and deactivated automatic valve, closed manual valve, or blind flange. When a penetration is isolated, the leakage rate for the isolated penetration is assumed to be the actual pathway leakage through the isolation device. If two isolation devices are used to isolate the penetration, the leakage rate is assumed to be the lesser actual pathway leakage of the two devices. The 4 hour completion time for secondary containment BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING leakage is reasonable considering the time required to restore the leakage by isolating the penetration(s) and the relative importance of secondary containment bypass leakage to the overall containment function.

e.

In the event one or more containment purge valves in one or more penetration flow paths are not within the purge valve leakage limits, purge valve leakage must be restored to within limits, or the affected penetration flow path must be isolated. The method of isolation must be by 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 de-activated automatic valve, closed manual valve, or blind flange. A purge valve with resilient seals utilized to satisfy this required Action must have been demonstrated to meet the leakage requirements of SR 4.6.3.6. The specified completion time is reasonable, considering that one containment purge valve remains closed so that a gross breach of containment does not exist.

In accordance with this required Action, this penetration flow path must be verified to be isolated on a periodic basis. The periodic verification is necessary to ensure that containment penetrations required to be isolated following an accident, which are no longer capable of being automatically isolated, will be in

ACTIONS (continued) the isolation position should an event occur. This required Action does not require any testing or valve manipulation. Rather, it involves verification that those isolation devices outside containment capable of being mispositioned are in the correct position. For the isolation devices inside containment, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

For the containment purge valve with resilient seal that is isolated in accordance with this required Action e., SR 4.6.3.6 must be performed at least once every 92 days. This assures that degradation of the resilient seal is detected and confirms that the leakage rate of the containment purge valve does not increase during the time the penetration is isolated. Since more reliance is placed on a single valve while in this Condition, it is prudent to perform the SR more often. Therefore, a Frequency of once per 92 days was chosen and has been shown to be acceptable based on operating experience.

Required Action e. is modified by two Notes. One of the Notes applies to isolation devices located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. The second Note 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.

f.

With one or more penetration flow paths of a closed system design with one containment isolation valve inoperable, the inoperable valve flow path must be restored to OPERABLE status or the affected penetration flow path must be isolated. The closed system must meet the requirements of Ref. 3. The systems meeting the requirement of Ref. 3 include the steam generator blowdown valves, component cooling water system valves to and from the excess letdown heat exchanger, and auxiliary feedwater test valves. The associated penetrations include X-14A, X-14B, X-14C, X-14D, X-35, X-40A, X-40B, X-53, X-102 and X-104. 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 de-activated automatic valve, a closed manual valve, and a blind flange. A check valve may not

BASES

ACTIONS (continued) be used to isolate the affected penetration flow path. This required Action 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 the affected penetration flow path is isolated in accordance with this required Action, the affected penetration flow path 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. A Frequency 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.

Required Action f. is modified by two Notes. One of the Notes applies to valves and blind flanges located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. The second Note 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.

g.

If the required Actions and associated completion times are not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within the following 30 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 4.6.3.1

This SR ensures that the containment purge isolation valves are closed as required or, if open, open for an allowable reason. If a purge valve is open in violation of this SR, the valve is considered inoperable. If the inoperable valve is not otherwise known to have excessive leakage when closed, it is not considered to have leakage outside of limits. The SR is not required to be met when the containment purge isolation valves are open for the reasons stated. The valves may be opened for pressure control, ALARA or air quality considerations for personnel entry, or for Surveillances that require the valves to be open. The number of valves open during Modes 1, 2, 3, and 4, is limited to no more than one pair of containment purge lines, that includes one set of supply valves and one set of exhaust valves. The containment purge isolation valves are capable of closing in the environment following a LOCA. Therefore, these valves are allowed to be open for limited periods of time. The 31 day Frequency is consistent with other containment isolation valve requirements discussed in SR 4.6.3.5.

SR 4.6.3.2

Automatic containment isolation valves close on a containment isolation signal to prevent leakage of radioactive material from containment following a DBA. This SR ensures that each automatic containment isolation valve will actuate to its isolation position on a containment isolation signal. The containment isolation signals involved are Phase A, Phase B, Containment Ventilation Isolation, High Containment Pressure, and Safety Injection. This surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass this Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 4.6.3.3

Verifying that the isolation time of each power operated or automatic containment isolation valve is within limits is required to demonstrate OPERABILITY. The isolation time test ensures the valve will isolate in a time period less than or equal to that assumed in the safety analyses. The isolation time and Frequency of this SR are in accordance with Specification 4.0.5.

SR 4.6.3.4

This SR requires verification that each containment isolation manual valve and blind flange located inside containment and not locked, sealed, or otherwise secured and required to be closed during accident conditions is closed. The SR helps to ensure that post accident leakage of radioactive fluids or gases outside of the containment boundary is within design limits. For containment isolation

SURVEILLANCE REQUIREMENTS (continued)

valves inside containment, the Frequency of "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is appropriate since these containment isolation valves are operated under administrative controls and the probability of their misalignment is low. The SR specifies that containment isolation valves that are open under administrative controls are not required to meet the SR during the time they are open. This SR does not apply to valves that are locked, sealed, or otherwise secured in the closed position, since these were verified to be in the correct position upon locking, sealing, or securing.

This Note allows valves and blind flanges located in high radiation areas to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted during MODES 1, 2, 3, and 4, for ALARA reasons. Therefore, the probability of misalignment of these containment isolation valves, once they have been verified to be in their proper position, is small.

SR 4.6.3.5

This SR requires verification that each containment isolation manual valve and blind flange located outside containment and not locked, sealed, or otherwise secured and required to be closed during accident conditions is closed. The SR helps to ensure that post accident leakage of radioactive fluids or gases outside of the containment boundary is within design limits. This SR does not require any testing or valve manipulation. Rather, it involves verification that those containment isolation valves outside containment and capable of being mispositioned are in the correct position. Since verification of valve position for containment isolation valves outside containment is relatively easy, the 31 day Frequency is based on engineering judgment and was chosen to provide added assurance of the correct positions. The SR specifies that containment isolation valves that are open under administrative controls are not required to meet the SR during the time the valves are open. This SR does not apply to valves that are locked, sealed, or otherwise secured in the closed position, since these were verified to be in the correct position upon locking, sealing, or securing.

The Note applies to valves and blind flanges located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted during MODES 1, 2, 3, and 4 for ALARA reasons. Therefore, the probability of misalignment of these containment isolation valves, once they have been verified to be in the proper position, is small.

SR 4.6.3.6

For containment purge valves with resilient seals, additional leakage rate testing beyond the test requirements of 10 CFR 50, Appendix J, Option B, is required to

SURVEILLANCE REQUIREMENTS (continued)

ensure OPERABILITY. Operating experience has demonstrated that this type of seal has the potential to degrade in a shorter time period than do other seal types. Based on this observation and the importance of maintaining this penetration leak tight (due to the direct path between containment and the environment), a Frequency of once per 3 months is established.

SR 4.6.3.7

Verifying that each containment purge valve is blocked to restrict opening to ≤ 50 degrees is required to ensure that the valves can close under DBA conditions within the times assumed in the analyses of References 1 and 2. If a LOCA occurs, the purge valves must close to maintain containment leakage within the values assumed in the accident analysis. At other times when purge valves are required to be capable of closing (e.g., during movement of irradiated fuel assemblies), pressurization concerns are not present, thus the purge valves can be fully open. The 18 month Frequency is appropriate because the blocking devices are typically removed only during a refueling outage.

SR 4.6.3.8

This SR ensures that the combined leakage rate of all secondary containment BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING leakage is less than or equal to the specified leakage rate. This provides assurance that the assumptions in the safety analysis are met. The leakage rate of each bypass leakage path is assumed to be the maximum pathway leakage (leakage through the worse of the two isolation valves) unless the penetration is isolated by use of one closed and de-activated automatic valve, closed manual valve, or blind flange. In this case, the leakage rate of the isolated bypass leakage path is assumed to be the actual pathway leakage through the isolation device. If both isolation valves in the penetration are closed, the actual leakage rate is the lesser leakage rate of the two valves. The Frequency is required by the Containment Leakage Rate Testing Program. This SR simply imposes additional acceptance criteria.

Secondary containment BYPASS LEAKAGE PATHS TO THE AUXILIARY BUILDING leakage is considered part of L_a.

REFERENCES

1. UFSAR, Section 15.0, “Accident Analysis.”
2. UFSAR, Section 6.2.4, “Containment Isolation Systems” and Table 6.2.4-1, “Containment Penetrations.”
3. Standard Review Plan 6.2.4, Revision 2
4. Generic Issue B-20, "Containment Leakage Due to Seal Deterioration."

3/4.6.4 COMBUSTIBLE GAS CONTROL

The hydrogen mixing systems are provided to ensure adequate mixing of the containment atmosphere following a LOCA. This mixing action will prevent localized accumulations of hydrogen from exceeding the flammable limit.

The operability of at least 66 of 68 ignitors in the hydrogen mitigation system will maintain an effective coverage throughout the containment. This system of ignitors will initiate combustion of any significant amount of hydrogen released after a degraded core accident. This system is to ensure burning in a controlled manner as the hydrogen is released instead of allowing it to be ignited at high concentrations by a random ignition source.

3/4.6.5 ICE CONDENSER

The requirements associated with each of the components of the ice condenser ensure that the overall system will be available to provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig during LOCA conditions.

3/4.6.5.1 ICE BED

The OPERABILITY of the ice bed ensures that the required ice inventory will 1) be distributed evenly through the containment bays, 2) contain sufficient boron to preclude dilution of the containment sump following the LOCA and 3) contain sufficient heat removal capability to condense the reactor system volume released during a LOCA. These conditions are consistent with the assumptions used in the accident analyses.

The minimum weight figure of 1145 pounds of ice per basket contains a 15% conservative allowance for ice loss through sublimation which is a factor of 15 higher than assumed for the ice condenser design. The minimum weight figure of 2,225,880 pounds of ice also contains an additional 1% conservative allowance to account for systematic error in weighing instruments. In the

event that observed sublimation rates are equal to or lower than design predictions after three years of operation, the minimum ice baskets weight may be adjusted downward. In addition, the number of ice baskets required to be weighed each 9 months may be reduced after 3 years of operation if such a reduction is supported by observed sublimation data.

The ice baskets contain the ice within the ice condenser. The ice bed is considered to consist of the total volume from the bottom elevation of the ice baskets to the top elevation of the ice baskets. The ice baskets position the ice within the ice bed in an arrangement to promote heat transfer from steam to ice. This arrangement enhances the ice condenser's primary function of condensing steam and absorbing heat energy released to the containment during a Design Basis Accident.

This Surveillance Requirement (SR), ice bed flow channel, ensures that the air/steam flow channels through the ice bed have not accumulated ice blockage that exceeds 15 percent of the total flow area through the ice bed region. The allowable 15 percent buildup of ice is based on the analysis of subcompartment response to a design basis Loss of Coolant Accident with partial blockage of the ice bed flow channels. The analysis did not perform a detailed flow area modeling, but rather lumped the ice condenser bays into six sections ranging from 2.75 bays to 6.5 bays. Individual bays are acceptable with greater than 15 percent blockage, as long as 15 percent blockage is not exceeded for the analysis section.

To provide a 95 percent confidence that flow blockage does not exceed the allowed 15 percent, visual inspection must be made for at least 54 (33 percent) of the 162 flow channels per ice condenser bay. The visual inspection of the ice bed flow channels is to inspect the flow area, by looking down from the top of the ice bed, and where view is achievable up from the bottom of the ice bed. Flow channels to be inspected are determined by random sample. As the most restrictive flow passage location is found at a lattice frame elevation, the 15 percent blockage criteria only applies to "flow channels" that comprise the area:

a. between ice baskets, and

b. past lattice frames and wall panels.

Due to a significantly larger flow area in the regions of the upper deck grating and the lower inlet plenum and turning vanes, it would require a gross buildup of ice on these structures to obtain a degradation in air/steam flow. Therefore, these structures are excluded as part of a flow channel for application of the 15 percent blockage criteria. Plant and industry experience have shown that removal of ice from the excluded structures during the refueling outage is sufficient to ensure they remain operable throughout the operating cycle. Thus, removal of any gross ice buildup on the excluded structures is performed following outage maintenance activities.

Operating experience has demonstrated that the ice bed is the region that is the most flow restrictive, because of the normal presence of ice accumulation on lattice frames and wall panels. The flow area through the ice basket support platform is not a more restrictive flow area because it is easily accessible from the lower plenum and is maintained clear of ice accumulation. There is not a mechanistically credible method for ice to accumulate on the ice basket support platform during plant operation. Plant and industry experience have shown that the vertical flow area through the ice basket support platform remains clear of ice accumulation that could produce blockage. Normally only a glaze may develop or exist on the ice basket support platform which is not significant to blockage of flow area. Additionally, outage maintenance practices provide measures to clear the ice basket support platform following maintenance activities of any accumulation of ice that could block flow areas.

Frost buildup or loose ice is not to be considered as flow channel blockage, whereas attached ice is considered blockage of a flow channel. Frost is the solid form of water that is loosely adherent, and can be brushed off with the open hand.

The frequency of 18 months was based on ice storage tests and the allowance built into the required ice mass over and above the mass assumed in the safety analyses. Operating experience has verified that, with the 18-month interval, the weight requirements are maintained with no significant degradation between surveillances.

Verifying the chemical composition of the stored ice ensures that the ice and the resulting melted water will meet the requirement for borated water for accident analysis. This is accomplished by obtaining at least 24 ice samples. Each sample is taken approximately one foot from the top of the ice of each randomly selected ice basket in each ice condenser bay. The SR is modified by a NOTE that allows the boron concentration and pH value obtained from averaging the individual samples' analysis results to satisfy the requirements of the SR. If either the average boron concentration or the average pH value is outside their prescribed limit, then entry into the LCO ACTION is required. Sodium tetraborate has been proven effective in maintaining the boron content for long storage periods, and it also enhances the ability of the solution to remove and retain fission product iodine. The high pH is required to enhance the effectiveness of the ice and the melted ice in removing iodine from the containment atmosphere. This pH range also minimizes the occurrence of chloride and caustic stress corrosion on mechanical systems and components exposed to ECCS and Containment Spray System fluids in the recirculation mode of operation. The frequency of 54 months is intended to be consistent with the expected length of three fuel cycles, and was developed considering these facts:

a. Long-term ice storage tests have determined that the chemical composition of the stored ice is extremely stable;

b. There are no normal operating mechanisms that decrease the boron concentration of the stored ice, and pH remains within a 9.0-9.5 range when boron concentrations are above approximately 1200 ppm.

c. Operating experience has demonstrated that meeting the boron concentration and pH requirements has never been a problem; and

d. Someone would have to enter the containment to take the sample, and, if the unit is at power, that person would receive a radiation dose.

The SR is modified by a NOTE that allows the chemical analysis to be performed on either the liquid or resulting ice of each sodium tetraborate solution prepared. If ice is obtained from off site sources, then chemical analysis data must be obtained for the ice supplied.

3/4.6.5.2 ICE BED TEMPERATURE MONITORING SYSTEM

This specification is deleted.

3/4.6.5.3 ICE CONDENSER DOORS

The OPERABILITY of the ice condenser doors ensures that these doors will open because of the differential pressure between upper and lower containment resulting from the blowdown of reactor coolant during a LOCA and that the blow-down will be diverted through the ice condenser bays for heat removal and thus containment pressure control. The requirement that the doors be maintained closed during normal operation ensures that excessive sublimation of the ice will not occur because of warm air intrusion from the lower containment.

If an ice condenser inlet door is physically restrained from opening, the system function is degraded, and immediate action must be taken to restore the opening capability of the inlet door. Being physically restrained from opening is defined as those conditions in which an inlet door is physically blocked from opening by installation of a blocking device or by an obstruction from temporary or permanently installed equipment or is otherwise inhibited from opening such as may result from ice, frost, debris, or increased inlet door opening torque beyond the values specified in Surveillance Requirement 4.6.5.3.1.

Note: entry into Limiting Condition for Operation Action Statement 3.6.5.3.b is not required due to personnel standing on or opening an intermediate deck or upper deck door for short durations to perform required surveillances, minor maintenance such as ice removal, or routine tasks such as system walkdowns.

3/4.6.5.4 INLET DOOR POSITION MONITORING SYSTEM

This specification is deleted.

3/4.6.5.5 DIVIDER BARRIER PERSONNEL ACCESS DOORS AND EQUIPMENT HATCHES

The requirements for the divider barrier personnel access doors and equipment hatches being closed and OPERABLE ensure that a minimum bypass steam flow will occur from the lower to the upper containment compartments during a LOCA. This condition ensures a diversion of the steam through the ice condenser bays that is consistent with the LOCA analyses.

3/4.6.5.6 CONTAINMENT AIR RETURN FANS

The OPERABILITY of the containment air return fans ensures that following a LOCA 1) the containment atmosphere is circulated for cooling by the spray system and 2) the accumulation of hydrogen in localized portions of the containment structure is minimized.

3/4.6.5.7 and 3/4.6.5.8 FLOOR AND REFUELING CANAL DRAINS

The OPERABILITY of the ice condenser floor and refueling canal drains ensures that following a LOCA, the water from the melted ice and containment spray system has access for drainage back to the containment lower compartment and subsequently to the sump. This condition ensures the availability of the water for long-term cooling of the reactor during the post accident phase.

3/4.6.5.9 DIVIDER BARRIER SEAL

The requirement for the divider barrier seal to be OPERABLE ensures that a minimum bypass steam flow will occur from the lower to the upper containment compartments during a LOCA. This condition ensures a diversion of steam through the ice condenser bays that is consistent with the LOCA analyses.

3/4.6.5.9 DIVIDER BARRIER SEAL

The requirement for the divider barrier seal to be OPERABLE ensures that a minimum bypass steam flow will occur from the lower to the upper containment compartments during a LOCA. This condition ensures a diversion of steam through the ice condenser bays that is consistent with the LOCA analyses.

This LCO establishes the minimum equipment requirements to ensure that the Divider Barrier Seal performs its safety function to minimize bypassing of the ice condenser by the hot steam and air mixture released into the lower compartment during a Design Basis Accident (DBA). This ensures that most of the gases pass through the ice bed, which condenses the steam and limits pressure and temperature during the accident transient. Limiting the pressure and temperature reduces the release of fission product radioactivity from containment to the environment in the event of a DBA.

Divider barrier integrity ensures that the high energy fluids released during a DBA would be directed through the ice condenser and that the ice condenser would function as designed if called upon to act as a passive heat sink following a DBA. The limiting DBAs considered relative to containment temperature and pressure are the loss-of-coolant accident (LOCA) and the main steam line break (MSLB). The total allowable Divider Barrier leakage flow area is approximately 5 square feet (includes divider barrier seal). A bypass leakage of 5 square feet, or less, will have no affect upon the ability of the Ice Condenser to perform its design function. (Ref. FSAR Sections 3.8.3 and 6.2.1.)

Conducting periodic physical property tests on the Divider Barrier Seal test coupons provides assurance that the seal material has not degraded in the containment environment, including effects of radiation, age and chemical attack.

The visual inspection of the Divider barrier Seal around the perimeter provides assurance that the seal is properly secured in place and no visual evidence of deterioration due to holes, ruptures, chemical attack, abrasion, radiation damage, or changes in physical appearances due to time related exposure to the containment environment.

3/4.6.6 VACUUM RELIEF VALVES

The OPERABILITY of three primary containment vacuum relief lines ensures that the containment internal pressure does not become more negative than 0.1 psid. This condition is necessary to prevent exceeding the containment design limit for internal vacuum of 0.5 psid. A vacuum relief line consists of a self-actuating vacuum relief valve, a pneumatically operated isolation valve, associated piping, and instrumentation and controls.