Southern Nuclear Operating Company

ND-12-2015

Enclosure

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Response to Request for Additional Information Letter No. 01
Related to
License Amendment Request LAR-12-002

Summary Description

In accordance with the provisions of 10 CFR 50.90, by letter dated February 24, 2012 (ML120650172), Southern Nuclear Operating Company (SNC) submitted license amendment request LAR-12-002 to amend the Vogtle Electric Generating Plant (VEGP) Units 3 and 4 combined licenses (COLs) (License Nos. NPF-91 and NPF-92, respectively). During the course of the review of LAR-12-002, the NRC staff identified the need for additional information to continue portions of the review. The NRC's request for additional information (RAI) was provided to SNC in RAI Letter No. 01 related to LAR-12-002, dated September 7, 2012. This Enclosure provides the requested responses to the subject RAI.

Each RAI question and response is listed in the following Table of Contents. Each RAI question and response is separated by divider pages. For each RAI response that requires changes to the LAR-12-002 enclosures, those markups are included following the related RAI response. As an example, for RAI 16-20 Issue 3 the Discussion of Change markup, TS Markup, TS Clean, and Bases Markup pages directly follow the RAI response.

Note that several RAI questions and their responses have been grouped and annotated as "Interlock" Questions. These RAI questions involve interlocks as well as interrelations between actuations signals (i.e., coincident logics). Since these questions are related and the changes overlap common DOCs, TS, and Bases, the common markups follow the collection of RAI responses. This is reflected in the Table of Contents listing of RAI questions in the Enclosure.

Changes to the LAR-12-002 DOCs are shown using redline strikeout. For the TS and Bases pages, any changes are yellow highlighted for easy identification of RAI related changes.

A list of common acronyms is provided below:

Acronym	Definition
COL	Combined License
DOC	Discussion of Change
ESF	Engineered Safety Feature
FSAR	Final Safety Analysis Report
GTS	Generic Technical Specifications
LAR	License Amendment Request
LCO	Limiting Condition for Operation
SNC	Southern Nuclear Operating Company
SR	Surveillance Requirement
TS	Technical Specifications
VEGP	Vogtle Electric Generating Plant

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RAI Letter No. 01
Question 16-1

RAI Letter No. 01

Question 16-1

Description of Change A009

ITS Page: B 3.1.3-5

ITS 3.1.3 • Bases for SR 3.1.3.2

The second paragraph of the bases for ITS SR 3.1.3.2 only quotes the revised first Frequency of SR 3.1.3.2, and does not clarify the intended meaning of the Frequency.

The licensee is requested to replace this paragraph with the following (changes indicated by markup): “The SR is required to be performed once within 7 effective full power days (EFPD) after reaching **an RCS boron concentration that is** ~~the~~ equivalent ~~of~~ **to an** equilibrium RTP all rods out (ARO) boron concentration of 300 ppm.”

<u>SNC Response</u>

SNC concurs that the requested Bases change clarifies the intended meaning of the Frequency. Therefore, the second paragraph of the Bases for proposed SR 3.1.3.2 is revised to state "The SR is required to be performed once within 7 effective full power days (EFPD) after reaching an RCS boron concentration that is equivalent to an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm."

The changes to LAR 12-002 from this RAI Response are reflected in the following revised Bases page.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1

This SR requires measurement of the MTC once at BOC prior to entering MODE 1 in order to demonstrate compliance with the most limiting MTC LCO. Meeting the limit prior to entering MODE 1 assures that the limit will also be met at higher power levels.

The BOC MTC value for ARO will be inferred from isothermal temperature coefficient measurements obtained during the physics tests after refueling. The ARO value can be directly compared to the MTC limit of the LCO. If required, measurement results and predicted design values can be used to establish administrative withdrawal limits for control banks.

SR 3.1.3.2

In similar fashion, the LCO demands that the MTC be less negative than the specified value for EOC full power conditions. This measurement may be performed at any THERMAL POWER, but its results must be extrapolated to the conditions of RTP and all banks withdrawn in order to make a proper comparison with the LCO value. Because the RTP MTC value will gradually become more negative with further core depletion and boron concentration reduction, a 300 ppm SR value of MTC should necessarily be less negative than the EOC LCO limit. The 300 ppm SR value is sufficiently less negative than the EOC LCO limit value to provide assurance that the LCO limit will be met at EOC when the 300 ppm Surveillance criterion is met.

The SR is required to be performed once within 7 effective full power days (EFPD) after reaching an RCS boron concentration that is equivalent to an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm.

If the 300 ppm Surveillance limit is exceeded, it is possible that the EOC limit on MTC could be reached before the planned EOC. Because the MTC changes slowly with core depletion, the second Frequency of 14 EFPD thereafter is sufficient to avoid exceeding the EOC limit.

SR 3.1.3.2 is modified by a Note. The Surveillance limit for RTP boron concentration of 60 ppm is conservative. If the measured MTC at 60 ppm is more positive than the 60 ppm surveillance limit, the EOC limit will not be exceeded because of the gradual manner in which MTC changes with core burnup, and the continued performance of SR 3.1.3.2 is no longer required.

RAI Letter No. 01
Question 16-2

RAI Letter No. 01

Question 16-2

Description of Change A010

ITS Page: 3.1.4-2

ITS 3.1.4 • Action B.1 and bases

Description of Change A010 has two parts: swap the two listed Completion Times for Required Action B.1 and replace their connector "OR" with "AND". The revised Completion Times for Required Action B.1 "Restore rod to within alignment limits" are:

> 1 hour with the OPDMS not monitoring parameters
>
> AND
>
> 8 hours with the OPDMS monitoring parameters

Listing the more restrictive time of 1 hour before 8 hours is warranted. The staff agrees with this part of A010. TS Section 1.2, "Logical Connectors," outlines the use of logical connectors and states that "OR" shall be used when listing "alternative choices, only one of which must be performed." This appears to be the case here regarding the CTS Completion Times for Required Action B.1. The action of restoring the rod to within its alignment limits must be completed within either 1 hour or 8 hours, depending on whether or not OPDMS is monitoring parameters. However, by using the logical connector "AND" as proposed, both completion times would have to be met in all cases; but this is not feasible because the OPDMS system will either be monitoring parameters or it won't be. This seems to be what determines which completion time governs. Because this ambiguity regarding which logical connector to use between two mutually exclusive completion times, which is a construct not used in NUREG-1431, the staff recommends using another approach. The licensee is requested to replace Required Action B.1 with the following set of actions:

> B.1.1.1 Verify OPDMS is monitoring parameters. | 1 hour
>
> AND
>
> B.1.1.2 Restore rod to within alignment limits. | 8 hours
>
> OR
>
> B.1.2 Restore rod to within alignment limits. | 1 hour
>
> OR

SNC Response

SNC concurs with a clarifying revision to TS 3.1.4, Action B; albeit differing from the above request.

These Completion Times are dependent on the status of OPDMS. As such, a "choice" is not available to the operator. The more restrictive of the two options must always be complied with, which conveys consideration of both limitations (i.e., "AND"). However, the presentation is simplified by stating the "8 hours" as an upper limit (deleting "with OPDMS monitoring parameters") always imposed, and the "1 hour with OPDMS not monitoring parameters" as a potentially more limiting requirement – both of which must be considered and complied with. These options are more correctly conveyed as "AND" requirements.

A conforming change is also made to Discussion of Change (DOC) A010. Note that the Bases continue to support the TS requirements as revised.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, and TS Clean pages.

Note 2 imposes a repetitive performance intended to be tied to the Note 1 condition. As a separate Note in the current format, it is not clearly tied to the Note 1 condition. Furthermore, the intended repetitive performance is potentially confusing with the current stated Frequency of "once each cycle." By moving Note 2 to the Frequency column, combining it with "AND" to the moved Note 1, editorially rewording it to more clearly convey the intent of its association with Note 1, and eliminating the "once each cycle" current Frequency, the overall requirement is presented in a more human factored fashion that is intended to reduce potential misapplication.

The overall intent of the current SR is considered to be consistent with the proposed revision. This change is designated as an administrative change and is acceptable because it does not result in technical changes to the TS.

A010 Detailed Description

3.1.4-1 The Completion Time for TS 3.1.4, "Rod Group Alignment Limits," Required Action B.1 is revised to swap the order (to list the 1-hour time before the 8-hour time) and replace the "OR" with "AND." The 8 hour Completion Time is revised to delete "with OPDMS OPERABLE."

Technical Evaluation

The convention for presentation of Required Actions is to list the shortest Completion Times first. For human-factors considerations, the operator should be presented the more immediate requirements prior to requirements with longer times to complete.

As outlined in TS Section 1.2, Logical Connectors, use of "OR" reflects alternative choices where only one of which must be performed. For TS 3.1.4, Required Action B.1 the Completion Time would not allow an arbitrary choice to be made. While ~~only~~ one Completion Time c~~w~~ould ~~apply~~ be more limiting, based on the ~~stated exclusionary nature~~status of OPDMS, consideration of both Completion Times is ~~required~~appropriate. As such, the appropriate logical connector is "AND." The proposed 8 hour Completion Time~~s continue to result in imposition of only one option (based on the stated conditional exclusions)~~ is revised to eliminate "with OPDMS OPERABLE," which remains consistent with the intent of the current requirements. The change is not deemed to result in any change in implementation requirements.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

A011 Detailed Description

3.1.4-1
3.1.4-2
3.1.4-3

Various statements referring to "OPDMS OPERABLE" are revised to refer to "OPDMS monitoring parameters." Various statements referring to "OPDMS inoperable" are revised to refer to "OPDMS not monitoring parameters." These

3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Rod Group Alignment Limits

LCO 3.1.4 All shutdown and control rods shall be OPERABLE.

AND

Individual indicated rod positions shall be within 12 steps of their group step counter demand position.

- NOTE -

Not applicable to Gray Rod Cluster Assemblies (GRCAs) during GRCA bank sequence exchange with the On-Line Power Distribution Monitoring System (OPDMS) ~~OPERABLE~~.

monitoring parameters

A011

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more rod(s) inoperable.	A.1.1 Verify SDM to be within the limits specified in the COLR.	1 hour
	OR	
	A.1.2 Initiate boration to restore SDM within limit.	1 hour
	AND	
	A.2 Be in MODE 3.	6 hours
B. One rod not within alignment limits.	B.1 Restore rod~~,~~ to within alignment limits.	8 hours ~~with the OPDMS OPERABLE~~
	AND	~~OR~~ swap
		1 hour with the OPDMS ~~inoperable~~
	OR	not monitoring parameters

A010

A011

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One rod not within alignment limits.	B.1 Restore rod to within alignment limits.	1 hour with the OPDMS not monitoring parameters AND 8 hours
	OR	
	B.2.1.1 Verify SDM to be within the limits specified in the COLR.	1 hour
	OR	
	B.2.1.2 Initiate boration to restore SDM within limit.	1 hour
	AND	
	B.2.2 Reduce THERMAL POWER to ≤ 75% RTP.	2 hours
	AND	
	B.2.3 Verify SDM is within the limits specified in the COLR.	Once per 12 hours
	AND	
	B.2.4 ---------- **- NOTE -** Only required to be performed when OPDMS is not monitoring parameters. ----------	
	Perform SR 3.2.1.1 and SR 3.2.1.2.	72 hours
	AND	

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Question 16-3, Issue 1

RAI Letter No. 01

Question 16-3

Descriptions of Change A027, A064, D04 and L01

CTS 3.1.9 • SR 3.1.9.1 and bases
CTS 3.4.17 • SR 3.4.17.1, SR 3.4.17.2 and bases
ITS 3.1.9 • SR 3.1.9.1, SR 3.1.9.2, SR 3.1.9.3 and bases
ITS 3.4.11• SR 3.4.11.2, SR 3.4.11.4 and bases
ITS 3.4.16 • SR 3.4.16.1 and bases
ITS 3.5.2 • SR 3.5.2.6, SR 3.5.2.7 and bases
ITS 3.5.4 • SR 3.5.4.6, SR 3.5.4.8 and bases
ITS 3.6.3 • SR 3.6.3.4, SR 3.6.3.5 and bases
ITS 3.6.6 • SR 3.6.6.4 and bases
ITS 3.6.9 • SR 3.6.9.2, SR 3.6.9.3 and bases
ITS 3.7.2 • SR 3.7.2.1, SR 3.7.2.2, SR 3.7.2.3, SR 3.7.2.4 and bases
ITS 3.7.3 • SR 3.7.3.1 and bases
ITS 3.7.7 • SR 3.7.7.1, SR 3.7.7.2 and bases
ITS 3.7.10 • SR 3.7.10.1, SR 3.7.10.2, SR 3.7.10.3 and bases

As described in Description of Change A064, CTS 3.4.17, "Chemical and Volume Control System (CVS) Makeup Isolation Valves," is deleted and its requirements are incorporated into TS 3.1.9, "CVS Demineralized Water Isolation Valves and Makeup Line Isolation Valves." Specifically, CTS 3.4.17 surveillance requirements (SRs) are covered by TS 3.1.9 SRs as follows:

- CTS SR 3.4.17.1, which states "Verify two CVS makeup isolation valves *are OPERABLE by stroking the valves* closed," is retained as a part of <u>existing</u> SR 3.1.9.1; ITS SR 3.1.9.1 states

  > "Verify two CVS demineralized water isolation valves and two CVS makeup line isolation valves *stroke* closed."
  > (Note: Under Description of Change A027, the phrase "are OPERABLE by stroking the valves closed" is changed to "stroke closed.")

- CTS SR 3.4.17.2, which states "Verify *closure time* of each CVS makeup isolation valve is ≤ 30 seconds on an actual or simulated actuation signal," is covered by <u>new</u> SR 3.1.9.2 which states

  > "Verify *closure time* of each CVS makeup isolation valve is within limits on an actual or simulated actuation signal."
  > (Note: Under Description of Change D04, the "≤ 30 seconds" criterion is relocated to the ITS 3.1.9 bases.)

- A frequency of "In accordance with the Inservice Testing Program" is specified for all of the above CTS and ITS SRs.

Also, as described in Description of Change L01, in conjunction with the deletion of the definition for "Actuation Device Test" from TS Section 1.1, and the related SRs in CTS 3.3.2 (SR 3.3.2.7 and SR 3.3.2.8), ITS 3.1.9 adds new SR 3.1.9.3, which states "Verify each CVS

demineralized water isolation valve *actuates to the isolation position on* an actual or simulated actuation signal," with a frequency of (|) 24 months.

From the way the licensee proposes to state ITS SR 3.1.9.1, SR 3.1.9.2, and SR 3.1.9.3, it is not clear to the staff which of these three SRs are intended to verify that

- the closing time limit of 20 seconds for the CVS demineralized water isolation valves, is as assumed in the accident analysis (FSAR Table 15.0-4b); and
- each CVS makeup isolation valve actuates to the isolation position on an actual or simulated actuation signal.

Issue 1: The licensee is requested to (a) provide clarification on the scope of SR 3.1.9.1, SR 3.1.9.2 and SR 3.1.9.3, and state which SRs include the above two verifications; and (b) propose appropriate changes to these SRs and the associated bases to reflect that clarification.

SNC Response

Current TS requirements for CVS demineralized water isolation valves are specified in TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves." There is no specific current Surveillance specifying the verification of the closure time for the demineralized water isolation valves. However, these valves are within the scope of the ASME Code for Operations and Maintenance of Nuclear Power Plants (ASME OM Code), which requires verification of closure time. Additionally, TS 5.5.3, "Inservice Testing Program," provides controls for ASME OM testing. LAR-12-002 proposed no technical changes to the requirements of existing SR 3.1.9.1.

Current TS requirements for CVS makeup isolation valves are found in current TS 3.1.9 and current TS 3.4.17, "Chemical and Volume Control System (CVS) Makeup Isolation Valves." DOC A064 addresses combining these requirements into TS 3.1.9. Current SR 3.4.17.2 requires verification of the closure time of each CVS makeup isolation valve on an actual or simulated actuation signal. As described in DOC A064 this requirements is included as new SR 3.1.9.2. New SR 3.1.9.2 inherently requires verification that the valve actuates to the isolation position by virtue of the explicit requirement to verify closure time. The Bases for new SR 3.1.9.2 also support that this Surveillance verifies the makeup isolation valve actuates to the isolation position on an actual or simulated actuation signal, by acknowledging the requirement that it overlaps with the Actuation Logic Test to provide complete testing of the assumed safety function.

No changes to LAR-12-002 result from this RAI Response.

RAI Letter No. 01
Question 16-3, Issue 2

RAI Letter No. 01

Question 16-3

Issue 2: The licensee is requested to also provide clarification on the scope of the following similar ITS SRs, which are quoted below, and propose appropriate changes to these SRs and their associated bases to reflect that clarification and the following three considerations. In the quotations of these SRs below, language that is relevant to the following three items for consideration is provided in italics.

a. Consider whether to replace the phrase "[is][are] OPERABLE by stroking [it][them]" with "[strokes][stroke]" — see DOC A027

b. Consider whether the automatic actuation verification SRs should use all or just some of the following phrases, for consistency:

— actuate[s] on
— actuates to the closed position on
— actuates to the isolation position on
— actuates to the correct position on
— actuates to relieve vacuum on

c. Consider whether the valve stroke time verification SRs should use both or just one of the following terms, for consistency:

— isolation time
— closure time

- SR 3.4.11.2, Verify each stage 1, 2, and 3 ADS valve is OPERABLE by stroking them open. | In accordance with the Inservice Testing Program
- SR 3.4.11.4, Verify each stage 1, 2, and 3 ADS valve actuates on an actual or simulated actuation signal. | 24 months
- SR 3.4.16.1, Verify each RVHV valve is OPERABLE by stroking it open. | In accordance with the Inservice Testing Program
- SR 3.5.2.6, Verify each CMT outlet isolation valve *is OPERABLE by stroking it* open. | In accordance with the Inservice Testing Program
- SR 3.5.2.7, [Verify] [e]ach CMT outlet isolation valve *actuates on* an actual or simulated actuation signal. | 24 months

<u>SNC Response</u>

a. SNC concurs with replacing the phrase "[is][are] OPERABLE by stroking [it][them]" with "[strokes][stroke]." The following Surveillance Requirements (SRs) that use the phrase "…OPERABLE by stroking…:" are revised:

- TS 3.4.11, "Automatic Depressurization System (ADS) – Operating," SR 3.4.11.2;

- TS 3.4.16, "Reactor Vessel Head Vent (RVHV)," SR 3.4.16.1;
- TS 3.5.2, "Core Makeup Tanks (CMTs) – Operating," SR 3.5.2.6;
- TS 3.5.4, “Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Operating,” current SR 3.5.4.5; and
- TS 3.7.10, "Steam Generator (SG) Isolation Valves," SR 3.7.10.1.

b. SNC concurs with revising the following automatic actuation verification SRs to specify the expected actuation:

- SR 3.4.11.4, by adding “to the open position”;
- SR 3.5.2.7, by adding “to the open position”;
- SR 3.5.4.8, by adding “actuate to the open position” for the PRHR HX air operated outlet isolation valves and by adding “to the isolation position” for the IRWST gutter isolation valves; and
- SR 3.7.10.3, by adding “to the isolation position.”

SNC has determined that the wording of the remaining automatic actuation verification SRs accurately reflects the expected result of the actuation. With respect to the use of "closed position" or "isolation position," for valves that are required to be in the isolation position upon actuation, there is no difference in intent. Each phrase is used in existing Surveillances. Therefore, the use of either "closed position" or "isolation position" is retained as an editorial preference. Similarly, the phrase “to the correct position” is an editorial preference used in current SR 3.6.6.4 with no proposed change. “Correct position” is adequately conveyed in the Bases Background discussion of the system response to an automatic actuation.

c. SNC does not concur with revisions to "isolation time" or "closure time" for consistency. There is no difference in intent. Each phrase is used in existing Surveillances. Therefore, the use of either "isolation time" or "closure time" is retained as an editorial preference.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, and TS Clean pages.

Technical Evaluation

As described TSTF-GG-05-01, subsection 4.1.7.e, Notes are not to be used in the Frequency column unless the Note is located directly above the last Frequency when there is more than one Frequency. As such, this Note is reformatted to the Surveillance column as a Note. As described in TSTF-GG-05-01, subsection 4.1.7.f, when a Surveillance is noted as "only required" or "not required" it must be accompanied by (in this circumstance) "to be performed."

These changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to provide clarification and for consistency with TSTF-GG-05-01. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

A027 **Detailed Description**

3.1.9-2
3.4.11-2
3.4.16-1
3.5.2-2
3.5.4-3
3.7.10-2

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

TS 3.4.11, "Automatic Depressurization System (ADS) – Operating," SR 3.4.11.2 is revised from "... is OPERABLE by stroking them" to "... strokes."

TS 3.4.16, "Reactor Vessel Head Vent (RVHV)," SR 3.4.16.1 is revised from "... is OPERABLE by stroking it" to "... strokes."

TS 3.5.2, "Core Makeup Tanks (CMTs) – Operating," SR 3.5.2.6 is revised from " is OPERABLE by stroking it" to "... strokes."

TS 3.5.4, "Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Operating," current SR 3.5.4.5 is revised from "... valves are OPERABLE by stroking open the valves" to "... valves stroke open."

TS 3.7.10, "Steam Generator (SG) Isolation Valves," SR 3.7.10.1 is revised from "... is OPERABLE by stroking the valve" to "... strokes."

Technical Evaluation

Satisfactory performance of SRs is directly tied to meeting the LCO in accordance with SR 3.0.1. TSTF-GG-05-01, subsection 4.1.7.a, states that the Surveillance statement should be as brief as possible but should also fully identify those requirements appropriate to ensure compliance with the LCO. Including the phrase "are OPERABLE by" is inconsistent with standard convention within other SRs, and inconsistent with Writer's Guide guidance. As an overarching principle established by SR 3.0.1, restating within an SR "are OPERABLE by" is unnecessary.

These changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to provide clarification and for consistency with TSTF-GG-05-01. These changes are designated as administrative changes and

The following changes are designated as Less Restrictive:

DOC / Affected Pages	Detailed Description and Technical Justification
L01	**Detailed Description**
1.1-1 3.1.9-2 3.3.2-12 3.3.2-13 3.4.11-2 3.4.13-2 3.5.2-2 3.5.4-3 3.5.6-3 3.5.8-3 3.6.10-2 3.7.7-2	The TS Definition for Actuation Device Test is deleted. Reference to “overlap with the ACTUATION DEVICE TEST” that is cited in the definition of Actuation Logic Test is replaced with “overlap with the actuated device.” Current TS 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," SR 3.3.2.7 (“Perform ACTUATION DEVICE TEST”) and SR 3.3.2.8 (“Perform ACTUATION DEVICE TEST for squib valves”) are deleted from current TS 3.3.2 and Table 3.3.2-1, Function 26.a, ESF Actuation Subsystem. The equivalent requirement (using phrasing generally consistent with NUREG-1431) is included in individual Specifications for the actuated devices with the same 24 month Frequency as the deleted SRs. The following are the SRs being added: • New SR 3.1.9.3 is added to TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves," stating: “Verify each CVS demineralized water isolation valve actuates to the isolation position on an actual or simulated actuation signal.” • New SR 3.4.11.4 is added to TS 3.4.11, "Automatic Depressurization System (ADS) – Operating," stating: “Verify each stage 1, 2, and 3 ADS valve actuates to the open position on an actual or simulated actuation signal.” • New SR 3.4.11.5 is added to TS 3.4.11, stating: “Verify continuity of the circuit from the Protection Logic Cabinets to each stage 4 ADS valve;" also including a Note to the SR stating: “Squib actuation may be excluded.” • SR 3.5.2.7 is added to TS 3.5.2, "Core Makeup Tanks (CMTs) – Operating," stating: “Verify each CMT outlet isolation valve actuates to the open position on an actual or simulated actuation signal.” Consequently, current SR 3.5.2.7 is renumbered as SR 3.5.2.8. • SR 3.5.4.8 is added to TS 3.5.4, "Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Operating," stating: “Verify both PRHR HX air operated outlet isolation valves actuate to the open position and both IRWST gutter isolation valves actuate to the isolation position on an actual or simulated actuation signal.” Consequently, some subsequent SRs are appropriately renumbered. • SR 3.5.6.9 is added to TS 3.5.6, "In-containment Refueling Water Storage Tank (IRWST) – Operating," stating: “Verify continuity of the circuit from the Protection Logic Cabinets to each IRWST injection and containment recirculation squib valve on an actual or simulated actuation signal;" also

including a Note to the SR stating: "Squib actuation may be excluded." Consequently, current SR 3.5.6.9 and SR 3.5.6.10 are renumbered as SR 3.5.6.10 and SR 3.5.6.11, respectively.

- A new SR is added to current TS 3.6.10, "Vacuum Relief Valves," stating: "Verify each vacuum relief valve actuates to relieve vacuum on an actual or simulated actuation signal." This SR is numbered SR 3.6.9.3, because current TS 3.6.10, "Vacuum Relief Valves," was renumbered as TS 3.6.9 as discussed in DOC M13.
- SR 3.7.7.2 is added to TS 3.7.7, "Startup Feedwater Isolation and Control Valves," stating: "Verify each startup feedwater isolation and control valve actuates to the isolation position on an actual or simulated actuation signal."
- SR 3.7.10.3 is added to TS 3.7.10, "Steam Generator (SG) Isolation Valves," stating "Verify each SG PORV, PORV block valve, and SG blowdown isolation valve actuates to the isolation position on an actual or simulated actuation signal."

Current TS 3.4.13, "Automatic Depressurization System (ADS) – Shutdown, RCS Open," SR 3.4.13.2 is revised to include listing of proposed SR 3.4.11.5.

Current TS 3.5.8, "In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 6," SR 3.5.8.4 is revised to address new SR 3.5.6.9 by adding the renumbered SR 3.5.6.11.

The following new SRs with a 24-month Frequency are included in the new instrument Specifications. The new Specifications result from reformatting of current TS 3.3.2 and are addressed in DOC A028.

- Current SR 3.3.2.9 (renumbered as new SR 3.3.15.2) is revised to eliminate the use of the Actuation Device Test defined term. "Perform ACTUATION DEVICE TEST for pressurizer heater circuit breakers" is replaced with "Verify pressurizer heater circuit breakers trip open on an actual or simulated actuation signal;" also including a Note to the SR stating: "Only required to be met in MODE 4 above the P-19 (RCS Pressure) interlock with the RCS not being cooled by RNS."
- New SR 3.3.15.3 and new SR 3.3.16.2 are added, each requiring: "Verify reactor coolant pump breakers trip open on an actual or simulated actuation signal." SR 3.3.16.2 also includes a Note stating "Only required to be met in MODE 5."
- New SR 3.3.15.4 and new SR 3.3.16.3 are added, each requiring: "Verify CVS letdown isolation valves actuate to the isolation position on an actual or simulated actuation signal." SR 3.3.15.4 also includes a Note stating: "Only required to be met in MODE 4 with the RCS being cooled by the RNS or below the P-12 (Pressurizer Level) interlock." SR 3.3.16.3 also includes two Notes stating: "1. Not required to be met in MODE 5 above the P-12 (Pressurizer Level) interlock;" and "2. Not required to be met in MODE 6 above the P-12 (Pressurizer Level) interlock and water level ≥ 23 feet above the top of the reactor vessel flange."

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	Verify ~~that~~ the motor operated valve in series with each 4th stage ADS valve is fully open.	12 hours
SR 3.4.11.2	Verify ~~that~~ each stage 1, 2, and 3 ADS valve ~~is OPERABLE by stroking them~~ strokes open.	In accordance with the Inservice Testing Program
SR 3.4.11.3	Verify ~~that~~ each stage 4 ADS valve is OPERABLE in accordance with the Inservice Testing Program.	In accordance with the Inservice Testing Program
SR 3.4.11.4	Verify each stage 1, 2, and 3 ADS valve actuates to the open position on an actual or simulated actuation signal.	24 months
SR 3.4.11.5	---------- **- NOTE -** Squib actuation may be excluded. ---------- Verify continuity of the circuit from the Protection Logic Cabinets to each stage 4 ADS valve.	24 months

A038 A038 A027 A038 L01

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 Reactor Vessel Head Vent (RVHV)

LCO 3.4.16 The Reactor Vessel Head Vent shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One flow path inoperable.	A.1 Restore flow path to OPERABLE status.	72 hours
B. Two flow paths inoperable.	B.1 Restore at least one flow path to OPERABLE status.	6 hours
C. Required Action and associated Completion Time not met. ~~OR~~ ~~Requirements of LCO not met for reasons other than Conditions A or B.~~	C.1 Be in MODE 3. AND C.2 Be in MODE 4, with the RCS cooling provided by the RNS.	6 hours 12 hours

A063

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	Verify ~~that~~ each RVHV valve ~~is OPERABLE by stroking it~~ open. strokes	In accordance with the Inservice Testing Program

A038
A027

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time not met. of Condition A, B, C, D, or E OR ~~LCO not met~~ for reasons other than ~~A, B,~~ C~~, D, or E~~. Two CMTs inoperable Condition	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

A052

A068

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify the temperature of the borated water in each CMT is < 120°F.	24 hours
SR 3.5.2.2	Verify the borated water volume in each CMT is ≥ 2500 cu. ft.	7 days
SR 3.5.2.3	Verify each CMT inlet isolation valve is fully open.	12 hours
SR 3.5.2.4	Verify the volume of noncondensible gases in each CMT inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.2.5	Verify the boron concentration in each CMT is ≥ 3400 ppm, and ≤ 3700 ppm.	7 days
SR 3.5.2.6	Verify each CMT outlet isolation valve ~~is OPERABLE~~ ~~by stroking it~~ open. strokes	In accordance with the Inservice Testing Program
SR 3.5.2.~~7~~ 8	Verify system flow performance of each CMT in accordance with the System Level OPERABILITY Testing Program.	10 years
SR 3.5.2.7	Verify each CMT outlet isolation valve actuates to the open position on an actual or simulated actuation signal.	24 months

A027

L01

SURVEILLANCE REQUIREMENTS

	PRHR HX SURVEILLANCE	FREQUENCY
SR 3.5.4.1	Verify the outlet manual isolation valve is fully open.	12 hours
SR 3.5.4.2	Verify the inlet motor operated isolation valve is open.	12 hours
SR 3.5.4.3	PRHR HX Verify the volume of noncondensible gases in the PRHR HX inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.4.~~4~~ 5	Verify ~~that~~ power is removed from the PRHR HX inlet motor operated isolation valve.	31 days
SR 3.5.4.~~5~~ 6	Verify both PRHR HX air operated outlet isolation valves and both IRWST gutter isolation valves ~~are OPERABLE by stroking~~ stroke open ~~the valves~~.	In accordance with the Inservice Testing Program
SR 3.5.4.~~6~~ 9	Verify PRHR HX heat transfer performance in accordance with the System Level OPERABILITY Testing Program.	10 years
SR 3.5.4.7	Verify by visual inspection that the IRWST gutters are not restricted by debris.	24 months

A073 A073 A038 A073 A027

SR 3.5.4.8	Verify both PRHR HX air operated outlet isolation valves actuate to the open position and both IRWST gutter isolation valves actuate to the isolation position on an actual or simulated actuation signal.	24 months

L01

SR 3.5.4.4	----------NOTE---------- Only required to be met when one or more Reactor Coolant Pumps (RCPs) are in operation. ---------- Verify one Loop 1 RCP is in operation.	12 hours

M10

A106

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more blowdown flow paths with two ~~SG~~ SG isolation valves inoperable.	D.1 Isolate the flow path by one closed valve.	8 hours
	~~AND~~	
	~~D.2 Verify that the affected SG blowdown flow path is isolated.~~	~~Once per 7 days~~
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours
	AND	
	E.2 Be in MODE 4 with the RCS cooling provided by the RNS.	24 hours
	AND ---------- NOTE ---------- Not applicable for inoperable PORV(s). ---------- E.3 Be in MODE 5.	36 hours

A106 A107 M11

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.10.1	Verify each ~~steam generator isolation valve (~~PORV block valve~~s (SGS-PL-V027A & B)~~, ~~PORVs (SGS-PL-V233A & B)~~, and blowdown isolation valve~~s (SGS-PL-V074A & B and SGS-PL-V075A & B))~~ ~~is OPERABLE by stroking the valve~~ closed.	In accordance with the Inservice Testing Program
SR 3.7.10.2	Verify the isolation time of each PORV block valve and SG blowdown isolation valve is within limits.	In accordance with the Inservice Testing Program
SR 3.7.10.3	Verify each SG PORV, PORV block valve, and SG blowdown isolation valve actuates to the isolation position on an actual or simulated actuation signal.	24 months

SG SG PORV, strokes

D12 A027 M11 L01 M11

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	Verify the motor operated valve in series with each 4th stage ADS valve is fully open.	12 hours
SR 3.4.11.2	Verify each stage 1, 2, and 3 ADS valve strokes open.	In accordance with the Inservice Testing Program
SR 3.4.11.3	Verify each stage 4 ADS valve is OPERABLE in accordance with the Inservice Testing Program.	In accordance with the Inservice Testing Program
SR 3.4.11.4	Verify each stage 1, 2, and 3 ADS valve actuates to the open position on an actual or simulated actuation signal.	24 months
SR 3.4.11.5	---------- **- NOTE -** Squib actuation may be excluded. ---------- Verify continuity of the circuit from the Protection Logic Cabinets to each stage 4 ADS valve.	24 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 Reactor Vessel Head Vent (RVHV)

LCO 3.4.16 The Reactor Vessel Head Vent shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One flow path inoperable.	A.1 Restore flow path to OPERABLE status.	72 hours
B. Two flow paths inoperable.	B.1 Restore at least one flow path to OPERABLE status.	6 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4, with the RCS cooling provided by the RNS.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	Verify each RVHV valve strokes open.	In accordance with the Inservice Testing Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met. OR Two CMTs inoperable for reasons other than Condition C.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify the temperature of the borated water in each CMT is < 120°F.	24 hours
SR 3.5.2.2	Verify the borated water volume in each CMT is ≥ 2500 cu. ft.	7 days
SR 3.5.2.3	Verify each CMT inlet isolation valve is fully open.	12 hours
SR 3.5.2.4	Verify the volume of noncondensible gases in each CMT inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.2.5	Verify the boron concentration in each CMT is ≥ 3400 ppm, and ≤ 3700 ppm.	7 days
SR 3.5.2.6	Verify each CMT outlet isolation valve strokes open.	In accordance with the Inservice Testing Program
SR 3.5.2.7	Verify each CMT outlet isolation valve actuates to the open position on an actual or simulated actuation signal.	24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.4.1	Verify the PRHR HX outlet manual isolation valve is fully open.	12 hours
SR 3.5.4.2	Verify the PRHR HX inlet motor operated isolation valve is open.	12 hours
SR 3.5.4.3	Verify the volume of noncondensible gases in the PRHR HX inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.4.4	---------- **- NOTE -** Only required to be met when one or more reactor coolant pumps (RCPs) are in operation. ---------- Verify one Loop 1 RCP is in operation.	12 hours
SR 3.5.4.5	Verify power is removed from the PRHR HX inlet motor operated isolation valve.	31 days
SR 3.5.4.6	Verify both PRHR HX air operated outlet isolation valves and both IRWST gutter isolation valves stroke open.	In accordance with the Inservice Testing Program
SR 3.5.4.7	Verify by visual inspection that the IRWST gutters are not restricted by debris.	24 months
SR 3.5.4.8	Verify both PRHR HX air operated outlet isolation valves actuate to the open position and both IRWST gutter isolation valves actuate to the isolation position on an actual or simulated actuation signal.	24 months
SR 3.5.4.9	Verify PRHR HX heat transfer performance in accordance with the System Level OPERABILITY Testing Program.	10 years

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

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

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

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

RAI Letter No. 01
Question 16-3, Issue 3

RAI Letter No. 01

Question 16-3

Issue 3: The licensee is requested to replace "Each" in ITS SR 3.5.2.7 with "Verify each".

- SR 3.5.4.6, Verify both PRHR HX air operated outlet isolation valves and both IRWST gutter isolation valves *stroke* open. | In accordance with the Inservice Testing Program
- SR 3.5.4.8, Verify both PRHR HX air operated outlet isolation valves and both IRWST gutter isolation valves *actuate on* an actual or simulated actuation signal. | 24 months
- SR 3.6.3.4, Verify the *isolation time* of each automatic power operated containment isolation valve is within limits. | In accordance with the Inservice Testing Program
- SR 3.6.3.5, 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. | 24 months
- SR 3.6.6.4, Verify each passive containment cooling system automatic valve in each flow path that is not locked, sealed, or otherwise secured in position, *actuates to the correct position on* an actual or simulated actuation signal. | 24 months
- SR 3.6.6.x, (Note: There is no SR for stroking the PCS automatic valve in each flow path (both to open and to close) in accordance with the Inservice Testing Program.)

<u>SNC Response</u>

SNC concurs with the Issue 3 requested revision to new SR 3.5.2.7. However, the bulleted list of SRs quoted in the RAI is not related with the request and are deemed to be extraneous information. As such, no attempt to address them is made in this response. This extraneous information was discussed during the August 29, 2012 NRC public meeting.

New SR 3.5.2.7 is revised from "Each" to "Verify each."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, and TS Clean pages.

The following changes are designated as Less Restrictive:

DOC / Affected Pages	Detailed Description and Technical Justification
L01	**Detailed Description**
1.1-1 3.1.9-2 3.3.2-12 3.3.2-13 3.4.11-2 3.4.13-2 3.5.2-2 3.5.4-3 3.5.6-3 3.5.8-3 3.6.10-2 3.7.7-2	The TS Definition for Actuation Device Test is deleted. Reference to "overlap with the ACTUATION DEVICE TEST" that is cited in the definition of Actuation Logic Test is replaced with "overlap with the actuated device." Current TS 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," SR 3.3.2.7 ("Perform ACTUATION DEVICE TEST") and SR 3.3.2.8 ("Perform ACTUATION DEVICE TEST for squib valves") are deleted from current TS 3.3.2 and Table 3.3.2-1, Function 26.a, ESF Actuation Subsystem. The equivalent requirement (using phrasing generally consistent with NUREG-1431) is included in individual Specifications for the actuated devices with the same 24 month Frequency as the deleted SRs. The following are the SRs being added: • New SR 3.1.9.3 is added to TS 3.1.9, "Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves," stating: "Verify each CVS demineralized water isolation valve actuates to the isolation position on an actual or simulated actuation signal." • New SR 3.4.11.4 is added to TS 3.4.11, "Automatic Depressurization System (ADS) – Operating," stating: "Verify each stage 1, 2, and 3 ADS valve actuates to the open position on an actual or simulated actuation signal." • New SR 3.4.11.5 is added to TS 3.4.11, stating: "Verify continuity of the circuit from the Protection Logic Cabinets to each stage 4 ADS valve;" also including a Note to the SR stating: "Squib actuation may be excluded." • SR 3.5.2.7 is added to TS 3.5.2, "Core Makeup Tanks (CMTs) – Operating," stating: "Verify ~~E~~each CMT outlet isolation valve actuates to the open position on an actual or simulated actuation signal." Consequently, current SR 3.5.2.7 is renumbered as SR 3.5.2.8. • SR 3.5.4.8 is added to TS 3.5.4, "Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Operating," stating: "Verify both PRHR HX air operated outlet isolation valves actuate to the open position and both IRWST gutter isolation valves actuate to the isolation position on an actual or simulated actuation signal." Consequently, some subsequent SRs are appropriately renumbered. • SR 3.5.6.9 is added to TS 3.5.6, "In-containment Refueling Water Storage Tank (IRWST) – Operating," stating: "Verify continuity of the circuit from the Protection Logic Cabinets to each IRWST injection and containment recirculation squib valve on an actual or simulated actuation signal;" also

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met. OR ~~LCO not met~~ Two CMTs inoperable for reasons other than Condition ~~A, B,~~ C~~, D, or E~~.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

A052

A068

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify the temperature of the borated water in each CMT is < 120°F.	24 hours
SR 3.5.2.2	Verify the borated water volume in each CMT is ≥ 2500 cu. ft.	7 days
SR 3.5.2.3	Verify each CMT inlet isolation valve is fully open.	12 hours
SR 3.5.2.4	Verify the volume of noncondensible gases in each CMT inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.2.5	Verify the boron concentration in each CMT is ≥ 3400 ppm, and ≤ 3700 ppm.	7 days
SR 3.5.2.6	Verify each CMT outlet isolation valve ~~is OPERABLE by stroking it~~ strokes open.	In accordance with the Inservice Testing Program
SR 3.5.2.~~7~~ 8	Verify system flow performance of each CMT in accordance with the System Level OPERABILITY Testing Program.	10 years
SR 3.5.2.7	Verify each CMT outlet isolation valve actuates to the open position on an actual or simulated actuation signal.	24 months

A027

L01

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met. OR Two CMTs inoperable for reasons other than Condition C.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify the temperature of the borated water in each CMT is < 120°F.	24 hours
SR 3.5.2.2	Verify the borated water volume in each CMT is ≥ 2500 cu. ft.	7 days
SR 3.5.2.3	Verify each CMT inlet isolation valve is fully open.	12 hours
SR 3.5.2.4	Verify the volume of noncondensible gases in each CMT inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.2.5	Verify the boron concentration in each CMT is ≥ 3400 ppm, and ≤ 3700 ppm.	7 days
SR 3.5.2.6	Verify each CMT outlet isolation valve strokes open.	In accordance with the Inservice Testing Program
SR 3.5.2.7	Verify each CMT outlet isolation valve actuates to the open position on an actual or simulated actuation signal.	24 months

RAI Letter No. 01
Question 16-3, Issue 4

RAI Letter No. 01

Question 16-3

Issue 4: The licensee is requested to include a new SR in ITS 3.6.6 to "Verify each passive containment cooling system automatic valve in each flow path that is not locked, sealed, or otherwise secured in position *strokes to the correct position*" with a frequency of "In accordance with the Inservice Testing Program", or justify omitting it.

- SR 3.6.9.2, Verify each vacuum relief flow path is OPERABLE in accordance with the Inservice Testing Program. | In accordance with the Inservice Testing Program (Note; The 'LCO" section of the bases for ITS 3.6.9 says "A vacuum relief flow path is OPERABLE if the MOV opens on an ESF open signal and the self-actuated check valves open on a negative differential pressure of 0.2 psi.)

<u>SNC Response</u>

SNC does not concur with adding a new SR.

Current TS 3.6.6 includes SR 3.6.6.4 requiring "Verify each passive containment cooling system automatic valve in each flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal." The Frequency is 24 months, which is typical for these Surveillances and is consistent with the Actuation Device Test being deleted by DOC L01.

The request to have the Surveillance state "strokes to the correct position" is not adopted. The current equivalent of "actuates to the correct position" is the preferred current TS wording. Additionally, there is no current TS Surveillance requiring specific verification that the passive containment cooling system valves stroke open and closed. However, these valves are within the scope of the ASME Code for Operations and Maintenance of Nuclear Power Plants (ASME OM Code), which requires valve stroke verification. TS 5.5.3, "Inservice Testing Program," provides controls for ASME OM testing. LAR-12-002 proposed no technical changes to these requirements.

Note that the bulleted SR 3.6.9.2 quoted in the RAI is not related with the request and is deemed extraneous information. As such, no attempt to address it is made in this response. This extraneous information was discussed during the August 29, 2012 NRC public meeting.

No changes to LAR-12-002 result from this RAI Response.

RAI Letter No. 01
Question 16-3, Issue 7

RAI Letter No. 01

Question 16-3

Issue 7: The licensee is requested to enhance the bases for ITS SR 3.7.10.2 and SR 3.7.10.3 to explain why these SRs do not include the SG PORVs.

SNC Response

SNC concurs with the need for a revision to the LAR. During the review of this RAI, it was identified that new SR 3.7.10.3 should also address the actuation of the SG PORV on an actual or simulated actuation signal. The current Table 3.3.2-1, Function 29, "SG Power Operated Relief Valve and Block Valve Isolation," requires auto-actuation of PORVs as well as PORV block valves and SG blowdown isolation valves. Current SR 3.3.2.7 Actuation Device Test, was replaced with device-specific "actual or simulated actuation signal" tests as addressed in LAR Discussion of Change (DOC) L01. As presented in the LAR, the new SR 3.7.10.3 is one such device-specific test; however, it listed only the PORV block valves and SG blowdown isolation valves. New SR 3.7.10.3 is revised with this RAI response to include SG PORVs in SR 3.7.10.3.

SNC does not concur with adding an explanation to the Bases to address why new SR 3.7.10.2 does not include the SG PORVs. New SR 3.7.10.2 ("Verify the isolation time ... "), as described in DOC M11, is relocated from current TS 3.6.3, "Containment Isolation Valves," SR 3.6.3.4. This existing SR does not apply to PORVs since PORVs are not containment isolation valves, and as such, new SR 3.7.10.2 does not apply to PORVs. It is not appropriate to include discussions in the Bases of why certain equipment is not addressed by a given SR. Note that SR 3.7.10.2 is editorially revised to consistently refer to the "PORV block valve" in lieu of "SR PORV block valve."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

including a Note to the SR stating: "Squib actuation may be excluded." Consequently, current SR 3.5.6.9 and SR 3.5.6.10 are renumbered as SR 3.5.6.10 and SR 3.5.6.11, respectively.

- A new SR is added to current TS 3.6.10, "Vacuum Relief Valves," stating: "Verify each vacuum relief valve actuates to relieve vacuum on an actual or simulated actuation signal." This SR is numbered SR 3.6.9.3, because current TS 3.6.10, "Vacuum Relief Valves," was renumbered as TS 3.6.9 as discussed in DOC M13.
- SR 3.7.7.2 is added to TS 3.7.7, "Startup Feedwater Isolation and Control Valves," stating: "Verify each startup feedwater isolation and control valve actuates to the isolation position on an actual or simulated actuation signal."
- SR 3.7.10.3 is added to TS 3.7.10, "Steam Generator (SG) Isolation Valves," stating "Verify each SG PORV, PORV block valve, and SG blowdown isolation valve actuates to the isolation position on an actual or simulated actuation signal."

Current TS 3.4.13, "Automatic Depressurization System (ADS) – Shutdown, RCS Open," SR 3.4.13.2 is revised to include listing of proposed SR 3.4.11.5.

Current TS 3.5.8, "In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 6," SR 3.5.8.4 is revised to address new SR 3.5.6.9 by adding the renumbered SR 3.5.6.11.

The following new SRs with a 24-month Frequency are included in the new instrument Specifications. The new Specifications result from reformatting of current TS 3.3.2 and are addressed in DOC A028.

- Current SR 3.3.2.9 (renumbered as new SR 3.3.15.2) is revised to eliminate the use of the Actuation Device Test defined term. "Perform ACTUATION DEVICE TEST for pressurizer heater circuit breakers" is replaced with "Verify pressurizer heater circuit breakers trip open on an actual or simulated actuation signal;" also including a Note to the SR stating: "Only required to be met in MODE 4 above the P-19 (RCS Pressure) interlock with the RCS not being cooled by RNS."
- New SR 3.3.15.3 and new SR 3.3.16.2 are added, each requiring: "Verify reactor coolant pump breakers trip open on an actual or simulated actuation signal." SR 3.3.16.2 also includes a Note stating "Only required to be met in MODE 5."
- New SR 3.3.15.4 and new SR 3.3.16.3 are added, each requiring: "Verify CVS letdown isolation valves actuate to the isolation position on an actual or simulated actuation signal." SR 3.3.15.4 also includes a Note stating: "Only required to be met in MODE 4 with the RCS being cooled by the RNS or below the P-12 (Pressurizer Level) interlock." SR 3.3.16.3 also includes two Notes stating: "1. Not required to be met in MODE 5 above the P-12 (Pressurizer Level) interlock;" and "2. Not required to be met in MODE 6 above the P-12 (Pressurizer Level) interlock and water level ≥ 23 feet above the top of the reactor vessel flange."

A106

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more blowdown flow paths with two ~~SG~~ SG isolation valves inoperable.	D.1 Isolate the flow path by one closed valve.	8 hours
	~~AND~~	
	~~D.2 Verify that the affected SG blowdown flow path is isolated.~~	~~Once per 7 days~~
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours
	AND	
	E.2 Be in MODE 4 with the RCS cooling provided by the RNS.	24 hours
	AND ---------- NOTE ---------- Not applicable for inoperable PORV(s). ---------- E.3 Be in MODE 5.	36 hours

A106

A107

M11

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.10.1	Verify each ~~steam generator isolation valve (~~PORV block valve~~s (SGS-PL-V027A & B)~~, ~~PORVs (SGS-PL-V233A & B)~~, and blowdown isolation valve~~s (SGS-PL-V074A & B and SGS-PL-V075A & B)) is OPERABLE by stroking the valve~~ closed.	In accordance with the Inservice Testing Program
SR 3.7.10.2	Verify the isolation time of each PORV block valve and SG blowdown isolation valve is within limits.	In accordance with the Inservice Testing Program
SR 3.7.10.3	Verify each SG PORV, PORV block valve, and SG blowdown isolation valve actuates to the isolation position on an actual or simulated actuation signal.	24 months

SG

SG PORV,

strokes

D12

A027

M11

L01

M11

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.10.2

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

SR 3.7.10.3

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

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

REFERENCES

1. Section 10.3.2.2.3, “Power-Operated Atmospheric Relief Valves.”
2. Section 10.4.8, “Steam Generator Blowdown System.”
3. Regulatory Guide 1.177, 8/98, “An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications.”
4. Section 6.2.3, "Containment Isolation System."

RAI Letter No. 01
Question 16-4

RAI Letter No. 01

Question 16-4

Description of Change L06
TS 3.2.5
- SR 3.2.5.1 Frequency

Description of Change L06 proposes to remove the 12-hour Frequency of SR 3.2.5.1 ("Verify the parameters a. through d. to be within their limits."), which applies whenever OPDMS alarms are inoperable. Since the other 24-hour Frequency for this surveillance is apparently justified, in part, based on the operability of the OPDMS alarms, the staff concludes that in order to remove any reference to the alarm status in the Frequency, the 12-hour Frequency, not the 24-hour Frequency should be retained. The licensee is requested to specify the 12-hour Frequency for TS SR 3.2.5.1, with suitable changes to the bases, or withdraw Description of Change L06.

SNC Response

SNC does not concur with the requested change. NUREG-1431, "Standard Technical Specifications – Westinghouse Planets," Revision 1, dated April 1995, contained similar Surveillance Requirement (SR) Frequencies specifying one Frequency for normal operation, and a second Frequency based on the inoperability of alarms. Technical Specifications Task Force (TSTF) Generic Change TSTF-110A, "Delete SR frequencies based on inoperable alarms," Revision 2, deleted the Frequencies based on inoperable alarms. TSTF-110A was approved by the NRC for incorporation in NUREG-1431 on October 3, 1997. The "normal" Frequencies were retained in the TS, while the shorter Frequencies associated with the inoperable alarms were deleted.

The alarms serve indication only. Operating practices will dictate the appropriate actions to be taken under conditions in which the OPDMS alarms are not functional. Compensatory measures that may be taken during degraded alarm conditions are not necessary to be specified in TS. As stated in the current SR 3.2.5.1 Bases and in the proposed SR 3.2.5.1 Bases, a 24 hour Surveillance interval provides assurance that the system is functioning properly and that the core limits are met. There is no adverse effect in retaining only the normal Surveillance Frequency. The proposed change is consistent with basis for the changes in the NRC staff-approved TSTF-110, Rev. 2.

No changes to LAR-12-002 result from this RAI Response.

RAI Letter No. 01
Question 16-5, Issue 1

RAI Letter No. 01

Question 16-5

Description of Change M06

CTS 3.4.3 · LCO 3.4.3
CTS 3.4.4 · LCO Notes 1, 2 and 3
CTS 3.4.8 · LCO Notes 2 and 3
CTS 3.4.14 · LCO Notes 2 and 3
ITS 3.4.3 · LCO 3.4.3.a, 3.4.3.b and 3.4.3.c
ITS 3.4.4 · LCO Note
ITS 3.4.8 · LCO Note
ITS 3.4.14 · LCO Note

CTS contain two LCO Notes that specify limitations to ensure that (1) the start of an RCP does not result in an unanalyzed RCS pressure transient, and (2) the pressure transient resulting from the start of an RCP does not exceed the RCS low temperature overpressure protection (LTOP) capability.

Description of Change M06 proposes to move these notes from the following LCOs:

• CTS 3.4.4, “RCS Loops” (Applicability: Modes 1 and 2, Modes 3, 4, and 5, whenever the reactor trip breakers are closed.)

• CTS 3.4.8, “Minimum RCS Flow” (Applicability: Modes 3, 4, and 5, whenever the reactor trip breakers are open and with unborated water sources not isolated from the RCS.)

• CTS 3.4.14, “LTOP System” (Applicability: Mode 4 when any cold leg temperature is ≤ 275°F, Mode 5, Mode 6 when the reactor vessel head is on.)

The licensee proposes to incorporate these two LCO Notes verbatim as LCO 3.4.3.b and LCO 3.4.3.c into

• ITS 3.4.3, “RCS P/T Limits,” (Applicability: At all times.)

These two LCO Notes state:

— No RCP shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%.

— No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed.

Issue 1: The licensee is requested to provide the following background information concerning the relocation of the two notes from LCOs 3.4.4, 3.4.8, and 3.4.14 to LCO 3.4.3. Also, provide explicit references to supporting information in the FSAR, PTLR, and applicable approved topical and technical reports.

a. Descriptions of the analyzed limiting RCS overpressure transients with RCS

— (Average or cold leg?) temperatures above 350 degrees F;

— (Average or cold leg?) temperatures at or below 350 degrees F; but cold leg temperatures above 275 degrees F; and

— Cold leg temperatures at or below 275 degrees F.

b. (Regarding the first note) Description of the technical basis for the 92 percent pressurizer level upper limit above which a RCP cannot be started when RCS (average or cold leg?) temperature is above 350 degrees F.

c. (Regarding the first note) Confirmation that with RCS (average or cold leg?) temperature greater than 350 degrees F, the pressurizer safety relief valves provide over-pressure protection of the RCS, limiting RCS pressure to 110 percent of design pressure, provided that pressurizer level is at or below 92 percent, for the limiting RCS overpressure transient.

d. (Regarding the second note) Confirmation that with one or more RCS (average or cold leg?) temperatures at or below 350 degrees F, but cold leg temperature above 275 degrees F, the pressurizer safety relief valves provide over-pressure protection of the RCS, limiting RCS pressure to 110 percent of design pressure, regardless of pressurizer level (above 92 percent to water solid), for the limiting RCS overpressure transient.

e. (Regarding the second note) Confirmation that with one or more RCS cold leg temperatures at or below 275 degrees F, one operable RNS suction relief valve provides over-pressure protection of the RCS, limiting RCS pressure to below the RCS pressure limit curve associated with the RCS cold leg temperatures, for the limiting RCS overpressure transient.

f. (Regarding the second note) Confirmation of the accuracy of the following statement, which is based on the “Applicable Safety Analyses” section of the bases for CTS 3.4.14:

> The RNS suction relief valve has insufficient flow capacity to provide low temperature overpressure protection for the following transients:
>
> 1. Injection from an unisolated accumulator.
>
> 2. Start of an RCP with
>
> A. the RCS water solid <u>AND</u> temperature of any RCS cold leg at or below 350 degrees F
>
> <u>AND</u>
>
> B.1 secondary side water temperature of each [both] steam generator (SG) greater than 50 degrees F above each [any] of the RCS cold leg temperatures
>
> <u>OR</u>
>
> B.2 RCP start speed more than 25 percent of RCP [rated] speed.

g. Not used

The requested information is needed to enable the staff to determine whether the bases for the affected specifications are consistent with both the associated TS requirements, and the VEGP 3&4 licensing basis

SNC Response

SNC concurs with the need for revision. The changes originally proposed with Discussion of Change (DOC) M06 are being withdrawn. As such, the specific detailed supporting information outlined in the request is not required to support review of the change.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

revises the Completion Time to be consistent with NUREG-1431 and with other Completion Times in the TS that are associated with placing the unit in Mode 5. This change in Completion Time is necessary to ensure a safe and orderly shutdown to Mode 5.

With this change, a specific Completion Time to place the unit in Mode 4 with RCS pressure < 500 psig is no longer specified. This is acceptable because the Actions result in transitioning through Mode 4 in order to comply with the requirement to place the unit in Mode 5 within 36 hours. The proposed Completion Time to reach Mode 5 provides assurance that the unit will continue to transition into Mode 4 with RCS pressure < 500 psig in a timely manner.

This change is designated as more restrictive because it results in placing the unit in a lower Mode of operation than currently required.

M06 Detailed Description

~~3.4.3-1~~
~~3.4.4.1~~
~~3.4.8-1~~
~~3.4.14-1~~

Not Used.~~The current TS 3.4.4, "RCS Loops," LCO is modified by Note 2 that states: "No RCP shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%," and Note 3 that states: "No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed." Notes 2 and 3 are deleted from TS 3.4.4, and are incorporated in TS 3.4.3 as LCO 3.4.3.b and LCO 3.4.3.c.~~

~~The current TS 3.4.8, "Minimum RCS Flow," LCO is modified by Note 2 that states: "No RCP shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%," and Note 3 that states: "No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed." Notes 2 and 3 are deleted from TS 3.4.8, and are incorporated in TS 3.4.3 as LCO 3.4.3.b and LCO 3.4.3.c.~~

~~The current TS 3.4.14, "Low Temperature Overpressure Protection (LTOP) System," LCO is modified by two notes. Note 1 states: "No reactor coolant pump (RCP) shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%." Note 2 states: "No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed." Notes 1 and 2 are deleted from TS 3.4.14, and are incorporated in TS 3.4.3, "RCS Pressure and Temperature (P/T) Limits," as LCO 3.4.3.b and LCO 3.4.3.c.~~

~~The current TS 3.4.3 LCO is reformatted as LCO 3.4.3.a for consistency with the changes described above.~~

~~Technical Evaluation~~

~~The current TS 3.4.4 Applicability requires the LCO to be met during operation in Modes 1 and 2, and in Modes 3, 4, and 5 whenever the reactor trip breakers are closed. Therefore, the LCO is not required to be met when the plant is operating in Modes 3, 4, and 5 when any reactor trip breaker is open. However, current TS 3.4.4, Notes 2 and 3 are applicable with the reactor trip breakers open or closed. Therefore, both Notes specify requirements that are outside of the Applicability of TS 3.4.4. In addition, the current TS 3.4.4 Required Actions do not address what actions should be taken in the unlikely event that either Note is violated.~~

~~The current TS 3.4.8 Applicability requires the LCO to be met during operation in Modes 3, 4, and 5, whenever the reactor trip breakers are open and with unborated water sources not isolated from the RCS. Therefore, the LCO is not required to be met when the plant is operating in Modes 3, 4, and 5 when any reactor trip breaker is closed, or when unborated water sources are isolated from the RCS. However, current TS 3.4.8, Notes 2 and 3 are applicable with the reactor trip breakers open or closed or whether unborated water sources are isolated or not. Therefore, both Notes specify requirements that are outside of the Applicability of current TS 3.4.8. In addition, the current TS 3.4.8 Required Actions do not address what actions should be taken in the unlikely event that either Note is violated.~~

~~The current TS 3.4.14 Applicability requires the LCO to be met during operation in Mode 4 when any cold leg temperature is ≤ 275°F, Mode 5, and Mode 6 when the reactor vessel head is on. Therefore, the LCO is not required to be met when the plant is operating in Mode 4 with any cold leg temperature > 275°F, Mode 3, Mode 2, or Mode 1. However, current TS 3.4.14, Note 1 is limited to RCS temperature ≥ 350˚F and TS 3.4.14, Note 2 is applicable at RCS temperature up to 350˚F. Therefore, both Notes specify requirements that are outside of the Applicability of current TS 3.4.14. In addition, the current TS 3.4.14 Required Actions do not address what actions should be taken in the unlikely event that either Note is violated.~~

~~TS current 3.4.4 is intended to require an adequate forced flow rate for core heat removal. Current TS 3.4.8 is intended to ensure that in the event of an inadvertent boron dilution, sufficient RCS flow is available to allow for adequate mixing. Current TS 3.4.14 provides RCS overpressure protection by having a maximum coolant input capability and having adequate pressure relief capacity. Current TS 3.4.3 establishes the operating limits that provide a margin to brittle failure of the reactor vessel and piping of the reactor coolant pressure boundary (RCPB). The current TS 3.4.4, TS 3.4.8 and TS 3.4.14 LCO Notes provide operational limits for RCP operation that would be better addressed by TS 3.4.3. The current TS 3.4.4 Bases, TS 3.4.8 Bases, and TS 3.4.14 Bases state that the restraints provided in Notes 1 and 2 and Notes 2 and 3, respectively, are to prevent a low temperature overpressure event due to a thermal transient when an RCP is started. The Applicability of TS 3.4.3 is "at all times." Therefore, moving the limitations of current TS 3.4. 4, LCO Notes 2 and 3, TS 3.4.8, LCO Notes 2 and 3,~~

~~and TS 3.4.14, LCO Notes 1 and 2 to proposed LCO 3.4.3.b and LCO 3.4.3.c, provides assurance that the limitations are in place during the specified conditions.~~

~~The revised LCO continues to prohibit starting RCPs while operating in specified conditions. However, in the event that the limitations are not met (i.e., an RCP is started when not allowed by the proposed LCO) resulting in failure to meet the LCO, revised TS 3.4.3 provides appropriate actions including restoration of parameters to within limits and evaluation to determine if the RCS is acceptable for continued operation. Similar actions are not provided in current TS 3.4.4, current TS 3.4.8, and current TS 3.4.14.~~

~~This change is acceptable because limitations for starting RCPs continue to be specified. In addition, the Applicability ensures that the limitations are specified during operation in the specified pressures and temperatures and appropriate Required Actions are specified to restore parameters and evaluate the condition of the RCS if the limitations are not met when starting an RCP.~~

~~This change is designated as more restrictive because the TS 3.4.3 Applicability encompasses the conditions provided in the limitations more fully than currently provided in TS 3.4.4, TS 3.4.8, and TS 3.4.14, and because appropriate Actions are now required in the event the limitations are not met.~~

M07 **Detailed Description**

3.4.6-1 The current TS 3.4.6, "Pressurizer Safety Valves," Applicability Note is revised to include a requirement that "One pressurizer safety valve at a time may be inoperable for hot lift setting adjustment."

Technical Evaluation

The current TS 3.4.6 Applicability Note states "The lift settings are not required to be within the LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions." The Note allows entry into MODES 3 and 4 with the lift setpoints outside the LCO limits. This permits testing and examination of the safety valves at high pressure and temperature near their normal operating range, but only after the valves have had a preliminary cold setting. The cold setting gives assurance that the valves are OPERABLE near their design condition. However, the associated Bases go further, stating that "Only one valve at a time will be removed from service for testing." This prohibition, limiting how lift settings and testing are performed, is not stated in the Note. The proposed Note provides assurance that during Modes 3 and 4, at least one pressurizer safety valve that has had a preliminary cold setting is available to provide overpressure protection.

This change is designated as more restrictive because it explicitly limits the number of pressurizer safety valves that can be inoperable during hot lift setting activities.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------- **- NOTE -** Required Action A.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameters to within limits. AND A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE ~~4 with RCS pressure < 500 psig~~. 5	6 hours ~~24~~ hours 36
C. ---------- **- NOTE -** Required Action C.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1 Initiate action to restore parameter(s) to within limits. AND C.2 Determine RCS is acceptable for continued operation.	Immediately Prior to entering MODE 4

M05

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.4 RCS Loops

LCO 3.4.4 Two RCS loops shall be OPERABLE with four Reactor Coolant Pumps (RCPs) in operation with variable speed control bypassed.

- NOTES -

~~1. No RCP shall be started when the reactor trip breakers are closed~~. A042

1. ~~2.~~ No RCP shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%.

2. ~~3.~~ No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed.

removed from operation

3. ~~4.~~ All RCPs may be ~~de-energized~~ in MODE 3, 4, or 5 for ≤ 1 hour per 8 hour period provided: A047

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

---

with Plant Control System capable of rod withdrawal or one or more rods not fully inserted L07

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5~~, whenever the reactor trip breakers are closed~~.

A.1 Suspend start of any RCP. Immediately
AND A042

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------- **- NOTE -** Required Action ~~A.1~~ s must be completed whenever Condition A is entered. ---------- Requirements of LCO not met in MODE 1 or 2. L07	~~A.1~~ A.2 Be in MODE 3 ~~with the reactor trip breakers open~~.	6 hours L07
	AND A.3 Initiate action to fully insert all rods.	6 hours
	AND A.4 Place the Plant Control System in a condition incapable of rod withdrawal.	6 hours L07

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 Minimum RCS Flow

LCO 3.4.8 At least one Reactor Coolant Pump (RCP) shall be in operation with a total flow through the core of ~~at least~~ ≥ 3,000 gpm. A045

- NOTES - A046

1. All RCPs may be ~~de-energized~~ removed from operation for ≤ 1 hour per 8 hour period provided:

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%.

3. No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed.

APPLICABILITY: MODES 3, 4, and 5~~, whenever the reactor trip breakers are open~~ and ~~with~~ with Plant Control System incapable of rod withdrawal, all rods fully inserted, unborated water sources not isolated from the RCS. L07

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. No RCP in operation.	A.1 Isolate all sources of unborated water.	1 hour
	AND	
	A.2 Perform SR 3.1.1.1.	1 hour

M08

- NOTE -
Required Action A.2 shall be completed prior to starting any RCP whenever this Condition is entered.

A060

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 Low Temperature Overpressure Protection (LTOP) ~~System~~

A060

methods

o p

A060

LCO 3.4.14 At least one of the following ~~O~~verpressure ~~P~~rotection ~~Systems~~ shall be OPERABLE, with the accumulators isolated:

a. The Normal Residual Heat Removal System (RNS) suction relief valve with lift setting within the limit specified in the PTLR, or

b. The RCS depressurized and an RCS vent of ≥ 4.15 square inches.

S

- NOTE -

1. No reactor coolant pump (RCP) shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%.

2. No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed.

3.

APPLICABILITY: MODE 4 when any cold leg temperature is ≤ 275°F,
MODE 5,
MODE 6 when the reactor vessel head is on.

- NOTE -

Accumulator isolation is only required when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR.

A061

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------- **- NOTE -** Required Action A.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameters to within limits. <u>AND</u> A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 5.	6 hours 36 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.4 RCS Loops

LCO 3.4.4 Two RCS loops shall be OPERABLE with four Reactor Coolant Pumps (RCPs) in operation with variable speed control bypassed.

- NOTES -

1. No RCP shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%.

2. No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed.

3. All RCPs may be removed from operation in MODE 3, 4, or 5 for ≤ 1 hour per 8 hour period provided:

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5 with Plant Control System capable of rod withdrawal or one or more rods not fully inserted.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------- **- NOTE -** Required Actions must be completed whenever Condition A is entered. ---------- Requirements of LCO not met in MODE 1 or 2.	A.1 Suspend start of any RCP. AND A.2 Be in MODE 3. AND	Immediately 6 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 Minimum RCS Flow

LCO 3.4.8 At least one Reactor Coolant Pump (RCP) shall be in operation with a total flow through the core of ≥ 3,000 gpm.

- NOTES -

1. All RCPs may be removed from operation for ≤ 1 hour per 8 hour period provided:

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%.

3. No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed.

APPLICABILITY: MODES 3, 4, and 5 with Plant Control System incapable of rod withdrawal, all rods fully inserted, and unborated water sources not isolated from the RCS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------- **- NOTE -** Required Action A.2 shall be completed prior to starting any RCP whenever this Condition is entered. ---------- No RCP in operation.	A.1 Isolate all sources of unborated water. AND A.2 Perform SR 3.1.1.1.	1 hour 1 hour

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 Low Temperature Overpressure Protection (LTOP)

LCO 3.4.14 At least one of the following overpressure protection methods shall be OPERABLE, with the accumulators isolated:

a. The Normal Residual Heat Removal System (RNS) suction relief valve with lift setting within the limit specified in the PTLR; or

b. The RCS depressurized and an RCS vent of ≥ 4.15 square inches.

- NOTES -

1. No reactor coolant pump (RCP) shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%.

2. No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed.

3. Accumulator isolation is only required when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR.

APPLICABILITY: MODE 4 when any cold leg temperature is ≤ 275°F,
MODE 5,
MODE 6 when the reactor vessel head is on.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. An accumulator not isolated when the accumulator pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	A.1 Isolate affected accumulator.	1 hour

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.3 RCS Pressure and Temperature (P/T) Limits

BASES

BACKGROUND

All components of the RCS are designed to withstand effects of cyclic loads due to system pressure and temperature changes. These loads are introduced by startup (heatup) and shutdown (cooldown) operations, power transients, and reactor trips. This LCO limits the pressure and temperature changes during RCS heatup and cooldown, within the design assumptions and the stress limits for cyclic operation.

The PTLR contains P/T limit curves for heatup, cooldown, RCS inservice leak and hydrostatic (ISLH) testing, and data for the maximum rate of change of reactor coolant temperature.

Each P/T limit curve defines an acceptable region for normal operation. The usual use of the curves is operational guidance during heatup or cooldown maneuvering, when pressure and temperature indications are monitored and compared to the applicable curve to determine that operation is within the allowable region.

The LCO establishes operating limits that provide a margin to brittle failure of the reactor vessel and piping of the reactor coolant pressure boundary (RCPB). The vessel is the component most subject to brittle failure, and the LCO limits apply mainly to the vessel. The limits do not apply to the pressurizer, which has different design characteristics and operating functions.

10 CFR 50, Appendix G (Ref. 1) requires the establishment of P/T limits for specific material fracture toughness requirements of the RCPB materials. An adequate margin to brittle failure must be provided during normal operation, anticipated operational occurrences, and system hydrostatic tests. Reference 1 mandates the use of the ASME Code, Section III, Appendix G (Ref. 2).

The neutron embrittlement effect on the material toughness is reflected by increasing the nil ductility reference temperature (RT_{NDT}) as exposure to neutron fluence increases.

The actual shift in the RT_{NDT} of the vessel material will be established periodically by removing and evaluating the irradiated reactor vessel material specimens, in accordance with ASTM E 185 (Ref. 3) and

BASES

LCO

The two elements of this LCO are:

a. The limit curves for heatup, cooldown, RCS ISLH testing and criticality; and

b. Limits on the rate of change of temperature.

The LCO limits apply to all components of the RCS, except the pressurizer. These limits define allowable operating regions and permit a large number of operating cycles while providing a wide margin to nonductile failure.

The limits for the rate of change of temperature control the thermal gradient through the vessel wall and are used as inputs for calculating the heatup, cooldown, and RCS ISLH testing P/T limit curves. Thus, the LCO for the rate of change of temperature restricts stresses caused by thermal gradients and also ensures the validity of the P/T limit curves.

Violating the LCO limits places the reactor vessel outside of the bounds of the stress analyses and can increase stresses in other RCPB components. The consequences depend on several factors, as follow:

a. The severity of the departure from the allowable operating P/T regime or the severity of the rate of change of temperature;

b. The length of time the limits were violated (longer violations allow the temperature gradient in the thick vessel walls to become more pronounced); and

c. The existences, sizes, and orientations of flaws in the vessel material.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Therefore, in MODE 3, 4 or 5 with the PLS capable of rod withdrawal or one or more rods not fully inserted, accidental control rod withdrawal from subcritical is postulated and requires the RCPs to be OPERABLE and in operation to ensure that the accident analysis limits are met.

In MODES 3, 4 and 5 with the PLS incapable of rod withdrawal and all rods fully inserted, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. This is addressed in LCO 3.4.8, "Minimum RCS Flow."

RCS Loops satisfy Criteria 2 and 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of this LCO is to require an adequate forced flow rate for core heat removal. Flow is represented by the number of RCPs in operation for removal of heat by the SGs. To meet safety analysis acceptance criteria for DNB, four pumps are required in MODES 1 and 2. The requirement that at least four RCPs must be operating in MODES 3, 4 and 5 when the PLS is capable of rod withdrawal or one or more rods are not fully inserted provides assurance that, in the event of a rod withdrawal accident, there will be adequate flow in the core to avoid exceeding the DNBR limit. Bypass of the RCP variable speed control ensures that the pumps are operating at full flow.

With the PLS not capable of rod withdrawal and all rods fully inserted only a minimum RCS flow of 3,000 gpm is necessary to ensure removal of decay heat from the core in accordance with LCO 3.4.8, Minimum RCS Flow.

Note 1 prohibits startup of an RCP when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

Note 2 requires that the secondary side water temperature of each SG be ≤ 50°F above each of the RCS cold leg temperatures before the start of an RCP with any RCS cold leg temperature ≤ 350°F, and the RCP must be started at ≤ 25% of RCP speed. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started. This limitation also helps to ensure that the RNS system pressure remains below both the piping design pressure and the acceptable RNS relief valve inlet pressure.

BASES

LCO (continued)

Note 3 permits all RCPs to be removed from operation in MODE 3, 4, or 5 for ≤ 1 hour per 8 hour period. The purpose of the Note is to permit tests that are designed to validate various accident analysis values. One of these tests is for the validation of the pump coastdown curve, used as input to a number of accident analyses including a loss of flow accident.

This test is generally performed in MODE 3 during the initial startup testing program, and as such should only be performed once. If, however, changes are made to the RCS that would cause a change to the flow characteristics of the RCS, the input values of the coastdown curve may need to be revalidated by conducting the test again.

Another test performed during the startup testing program is the validation of the rod drop times during cold conditions, both with and without flow.

The no-flow tests may be performed in MODE 3, 4, or 5, and require that the pumps be stopped for a short period of time. The Note permits removing all RCPs from operation in order to perform this test and validate the assumed analysis values. As with the validation of the pump coastdown curve, this test should only be performed once, unless the flow characteristics of the RCS are changed. The 1 hour time period specified is adequate to perform the desired tests and experience has shown that boron stratification is not a problem during this short period with no forced flow.

Utilization of the Note is permitted provided the following conditions are met along with any other conditions imposed by initial startup test procedures:

a. No operations are permitted that would dilute the RCS boron concentration with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Boron reduction with coolant at boron concentrations less than required to assure SDM is maintained is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation and

b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause natural circulation flow obstruction.

An OPERABLE RCS loop is composed of two OPERABLE RCPs in operation providing forced flow for heat transport and an OPERABLE SG.

BASES

LCO (continued)

Note 1 permits all RCPS to be removed from operation for ≤ 1 hour per 8 hour period. The purpose of the Note is to permit tests that are designed to validate various accident analysis values. One of these tests is for the validation of the pump coastdown curve, used as input to a number of accident analyses including a loss of flow accident. This test is generally performed in MODE 3 during the initial startup testing program, and as such should only be performed once. If, however, changes are made to the RCS that would cause a change to the flow characteristics of the RCS, the input values of the coastdown curve may need to be revalidated by conducting the test again.

Another test performed during the startup testing program is the validation of the rod drop times during cold conditions, both with and without flow.

The no-flow tests may be performed in MODE 3, 4, or 5, and require that the pumps be stopped for a short period of time. The Note permits removing all RCPs from operation in order to perform this test and validate the assumed analysis values. As with the validation of the pump coastdown curve, this test should only be performed once, unless the flow characteristics of the RCS are changed. The 1 hour time period specified is adequate to perform the desired tests and experience has shown that boron stratification is not a problem during this short period with no forced flow.

Utilization of the Note is permitted provided the following conditions are met along with any other conditions imposed by initial startup test procedures:

a. No operations are permitted that would dilute the RCS boron concentration with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Boron reduction with coolant at boron concentrations less than required to assure SDM is maintained is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation and

b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause natural circulation flow obstruction.

Note 2 prohibits startup of an RCP when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

BASES

LCO (continued)

Note 3 requires that the secondary side water temperature of each SG be ≤ 50°F above each of the RCS cold leg temperatures before the start of an RCP with any RCS cold leg temperature ≤ 350°F, and the RCP must be started at ≤ 25% of RCP speed. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started. This limitation also helps to ensure that the RNS system pressure remains below both the piping design pressure and the acceptable RNS relief valve inlet pressure.

APPLICABILITY

Minimum RCS flow is required in MODES 3, 4, and 5 with the Plant Control System incapable of rod withdrawal, all rods inserted, and unborated water sources not isolated from the RCS because an inadvertent BDE is considered possible in these MODES.

In MODES 1 and 2, and in MODES 3, 4, and 5 with the Plant Control System capable of rod withdrawal or one or more rods not fully inserted, LCO 3.4.4 requires all four RCPs to be in operation. Thus, in the event of an inadvertent boron dilution, adequate mixing will occur.

A minimum mixing flow is not required in MODE 6 because LCO 3.9.2 requires that all valves used to isolate unborated water sources shall be secured in the closed position. In this situation, an inadvertent BDE is not considered credible.

ACTIONS

A.1

If no RCP is in operation, all sources of unborated water must be isolated within 1 hour. This action assures that no unborated water will be introduced into the RCS when proper mixing cannot be assured. The allowed Completion Time requires that prompt action be taken, and is based on the low probability of a DBA occurring during this time.

A.2

The Requirement to perform SR 3.1.1.1 (SDM verification) within 1 hour assures that if the boron concentration in the RCS has been reduced and not detected by the source range instrumentation, prompt action may be taken to restore the required SDM. The allowed Completion Time is consistent with that required by Action A.1 because the conditions and consequences are the same.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.14 Low Temperature Overpressure Protection (LTOP)

BASES

BACKGROUND

LTOP limits RCS pressure at low temperatures so that the integrity of the reactor coolant pressure boundary (RCPB) is not compromised by violating the pressure and temperature (P/T) limits of 10 CFR 50, Appendix G (Ref. 1). The reactor vessel is the limiting RCPB component for demonstrating such protection. The PTLR provides the limits which set the maximum allowable setpoints for the Normal Residual Heat Removal System (RNS) suction relief valve. LCO 3.4.3 provides the maximum RCS pressure for the existing RCS cold leg temperature during cooldown, shutdown, and heatup to meet the Reference 1 requirements during the LTOP MODES.

The reactor vessel material is less tough at low temperatures than at normal operating temperature. As the vessel neutron exposure accumulates, the material toughness decreases and becomes less resistant to pressure stress at low temperatures (Ref. 2). RCS pressure, therefore, is maintained low at low temperatures and is increased only as temperature is increased.

The potential for vessel overpressurization is most acute when the RCS is water solid, occurring only while shutdown; a pressure fluctuation can occur more quickly than an operator can react to relieve the condition. Exceeding the RCS P/T limits by a significant amount could cause brittle cracking of the reactor vessel. LCO 3.4.3, “RCS Pressure and Temperature (P/T) Limits,” requires administrative control of RCS pressure and temperature during heatup and cooldown to prevent exceeding the PTLR limits.

This LCO provides RCS overpressure protection by having a maximum coolant input capability and having adequate pressure relief capacity. Limiting coolant input capability requires isolating the accumulators. The pressure relief capacity requires the RNS suction relief valve or a depressurized RCS and an RCS vent of sufficient size. The RNS suction relief valve or the open RCS vent is the overpressure protection device that acts to terminate an increasing pressure event.

<u>RNS Suction Relief Valve Requirements</u>

During the LTOP MODES, the RNS system is operated for decay heat removal. Therefore, the RNS suction isolation valves are open in the

BASES

APPLICABLE SAFETY ANALYSES (continued)

The PTLR contains the acceptance limits that define the LTOP requirements. Any change to the RCS must be evaluated against the Reference 4 analyses to determine the impact of the change on the LTOP acceptance limits.

Transients that are capable of overpressurizing the RCS are categorized as either mass or heat input transients. The events listed below were used in the analysis to size the RNS suction relief valve. Therefore, any events with a mass or heat input greater than the listed events cannot be accommodated and must be prevented.

Mass Input

a. Makeup water flow rate to the RCS assuming both CVS makeup pumps are in operation and letdown is isolated.

Heat Input

a. Restart of one reactor coolant pump (RCP) with water in the steam generator secondary side 50°F hotter than the primary side water, and the RCS water solid.

RNS Suction Relief Valve Performance

Since the RNS suction relief valve does not have a variable P/T lift setpoint, the analysis must show that with chosen setpoint, the relief valve will pass flow greater than that required for the limiting LTOP transient while maintaining RCS pressure less than the minimum of either the P/T limit curve, 110 percent of the design pressure of the normal residual heat removal system, or the acceptable RNS relief valve inlet pressure. The current analysis shows that up to a temperature of 70°F, the mass input transient is limiting, and above this temperature the heat input transient is limiting.

To prevent the possibility of a heat input transient, and thereby limit the required flow rate of the RNS suction relief valve, administrative requirements in the LCO note have been imposed for starting an RCP.

BASES

LCO (continued)

b. A depressurized RCS and an RCS vent.

An RCS vent is OPERABLE when open with an area of ≥ 4.15 square inches.

Each of these methods of overpressure prevention is capable of mitigating the limiting LTOP transient.

Note 1 prohibits startup of an RCP when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

Note 2 requires that the secondary side water temperature of each SG be ≤ 50°F above each of the RCS cold leg temperatures before the start of an RCP with any RCS cold leg temperature ≤ 350°F, and the RCP must be started at ≤ 25% of RCP speed. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started. This limitation also helps to ensure that the RNS system pressure remains below both the piping design pressure and the acceptable RNS relief valve inlet pressure.

Note 3 provides that accumulator isolation is only required when the accumulator pressure is more than or at the maximum RCS pressure for the existing temperature, as allowed by the P/T limit curves. This Note permits the accumulator discharge isolation valve Surveillance to be performed only under these pressure and temperature conditions.

APPLICABILITY

This LCO is applicable in MODE 4 when any cold leg temperature is below 275°F, MODE 5, and in MODE 6 when the reactor vessel head is on. The pressurizer safety valves provide overpressure protection that meets the Reference 1 P/T limits above 275°F. In MODE 6, when the reactor vessel head is off, overpressurization cannot occur.

LCO 3.4.3 provides the operational P/T limits for all MODES. LCO 3.4.6, “Pressurizer Safety Valves,” requires the OPERABILITY of the pressurizer safety valves that provide overpressure protection during MODES 1, 2, and 3, and MODE 4 with the RNS isolated or RCS temperature ≥ 275°F.

Low temperature overpressure prevention is most critical during shutdown when the RCS is water solid, and a mass or heat input transient can cause a very rapid increase in RCS pressure with little or no time for operator action to mitigate the event.

RAI Letter No. 01
Question 16-5, Issue 2

RAI Letter No. 01

Question 16-5

Issue 2: The licensee is requested to review the bases for TS 3.4.3, 3.4.4, 3.4.8, and 3.4.14 to ensure the bases accurately reflect the proposed revised presentation of the two notes in LCO 3.4.3 and also the revised applicability and actions from replacement of "with RTBs closed / open." Examples of bases content in need of revising are the following; note that the out-of-date phrases are in **bold**:

a. On page B 3.4.4-3, the next to last paragraph of the "Applicable Safety Analyses" section of the bases for TS
3.4.4, states "In MODES 3, 4 and 5 **with the RTBs open**, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. This is addressed in LCO 3.4.8, "Minimum RCS Flow."

b. On page B 3.4.4-6, the last paragraph of the "Actions" section of the bases for TS 3.4.4, states "The Completion Time of 1 hour is reasonable to allow for **planned opening of the reactor trip breakers**, since plant cool-down is not required."

c. In the "Applicable Safety Analyses" section of the bases for TS 3.4.14, the last paragraph on page B 3.4.14-3 states "To prevent the possibility of a heat input transient, and thereby limit the required flow rate of the RNS suction relief valve, **administrative requirements in the LCO note have been imposed for starting an RCP**."

TS 3.4.4 – other changes:

As noted above, CTS 3.4.4 is applicable in "Modes 3, 4, and 5, whenever the reactor trip breakers are closed." CTS LCO 3.4.4 Note 1 states that "No RCP shall be started when the reactor trip breakers are closed." As described by DOC A042 and DOC L07, this restriction is reformatted as action requirements in

• ITS 3.4.4, "RCS Loops."

As described in DOC L07, the TS 3.4.4 Applicability is also changed, which results in additional changes in the action requirements. Text added by these changes in the applicability and action requirements are denoted below by italic font and bold font, respectively; removed text is lined out:

LCO 3.4.4 Two RCS loops shall be OPERABLE with four Reactor Coolant Pumps (RCPs) in operation with variable speed control bypassed."

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5~~, whenever the reactor trip breakers are closed~~ *with Plant Control System capable of rod withdrawal or one or more rods not fully inserted*.

ACTIONS

A. Requirements of LCO not met in MODE 1 or 2. |

A.1 Suspend start of any RCP. | Immediately

AND

A.2 Be in MODE 3. | 6 hours ~~*A.1 Be in MODE 3 with the reactor trip breakers open. | 6 hours*~~

AND

A.3 Initiate action to fully insert all rods. | 6 hours

AND

A.4 Place the Plant Control System in a condition incapable of rod withdrawal. | 6 hours

B. Requirements of LCO not met in MODE 3, 4, or 5. |

B.1 Suspend start of any RCP. | Immediately ~~*B.1 Open reactor trip breakers. | 1 hour*~~

AND

B.2 Initiate action to fully insert all rods. | 1 hour

AND

B.3 Place the Plant Control System in a condition incapable of rod withdrawal. | 1 hour

The opportunity to start a RCP when the "plant control system is capable of rod withdrawal or one or more rods are not fully inserted" exists only when one or more RCPs are not running under these unit conditions. In such cases, the proposed action requirements of ITS 3.4.4 will preclude starting an idle RCP. This all but eliminates the potential for an RCS low temperature overpressure event that is caused by a RCP start with the reactor trip breakers closed.

The CTS LCO 3.4.4 Notes 1, 2, and 3 all have to do with safely starting RCPs, which must be accomplished in order to meet the LCO 3.4.4 requirement that 4 RCPs be in operation – and to do this prior to entering the LCO's Applicability, which occurs by closing the RTBs and making the plant control system capable of rod withdrawal. For LCO 3.4.4, the notes function like a list of "precautions" at the beginning of a plant procedure for operating a system.

TS 3.4.8 – other changes:

As described in DOC L07, the CTS 3.4.8 Applicability is changed, as follows. Added text is denoted by bold font; removed text is lined out. The editorial change to the LCO is based on DOC A045.

LCO 3.4.8 At least one Reactor Coolant Pump (RCP) shall be in operation with a total flow through the core of ~~at least~~ **≥** 3,000 gpm.

APPLICABILITY: MODES 3, 4, and 5 **with Plant Control System incapable of rod withdrawal, all rods fully inserted**, ~~whenever the reactor trip breakers are open~~ and ~~with~~ unborated water sources not isolated from the RCS.

In Modes 3, 4, and 5, LCO 3.4.8 applies when LCO 3.4.4 does not apply. With no RCP in operation, LCO 3.4.8 is not met and Condition A is entered. In order to restore compliance with the LCO, an RCP must be placed in operation. Moving the two LCO notes regarding RCP start

conditions from TS 3.4.8 to TS 3.4.3 removes important reminders for the operator preparing to start an RCP.

TS 3.4.14 – other changes:

The Applicability of TS 3.4.14 is not changed by this LAR:

APPLICABILITY: MODE 4 when any cold leg temperature is ≤ 275°F,
MODE 5,
MODE 6 when the reactor vessel head is on.

However, should an RCP need to be started, the operator must follow the limiting conditions for starting an RCP, as specified by CTS LCO 3.4.14 Note 2. Moving the two LCO notes regarding RCP start conditions from TS 3.4.14 to TS 3.4.3 removes important reminders for the operator preparing to start an RCP during plant conditions requiring an operable method of low temperature overpressure protection.

SNC Response

SNC concurs with the conforming Bases changes cited in the initial portion of this RAI as item a. and item b are appropriate. However, since the changes originally proposed with Discussion of Change (DOC) M06 are being withdrawn (as discussed in response to RAI Question 16-5, Issue 1), the Bases example cited in RAI item c. is appropriate as stated and is not revised.

Also consistent with withdrawing the change addressed in DOC M06 (as discussed in response to RAI Question 16-5, Issue 1), SNC concurs with retaining the “important reminders for the operator preparing to start an RCP” as described in “TS 3.4.8 - other changes” and “TS 3.4.14 – other changes.”

In review of the Bases for issues similar to the change examples cited in the initial portion of the RAI as item a. and item b., additional changes to the TS 3.4.4 Bases were identified. No additional changes were identified for the TS 3.4.8 Bases. The following conforming changes are made:

a. Bases page B 3.4.4-1, last Background paragraph, first sentence revises “reactor trip breakers open” to “Plant Control System (PLS) incapable of rod withdrawal and all rods fully inserted.” (Other references to “plant control system” on page B 3.4.4 – 2 are editorially revised to use the defined acronym.)

b. Bases page B 3.4.4-3, next to last paragraph of the Applicable Safety Analyses, first sentence, revises “RTBs open” to “PLS incapable of rod withdrawal and all rods fully inserted.”

c. Bases page B 3.4.4-5, last paragraph of the new TS 3.4.4, Actions B.1, B.2, and B.3 Bases discussion revises "planned opening of the reactor trip breakers” to “making PLS incapable of rod withdrawal and fully inserting all control rods."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases pages.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.4 RCS Loops

BASES

BACKGROUND

The primary function of the RCS is removal of the heat generated in the fuel due to the fission process, and transfer of this heat, via the steam generators (SGs) to the secondary plant.

The secondary functions of the RCS include:

a. Moderating the neutron energy level to the thermal state, to increase the probability of fission;

b. Improving the neutron economy by acting as a reflector;

c. Carrying the soluble neutron poison, boric acid;

d. Providing a second barrier against fission-product release to the environment; and

e. Removal of the heat generated in the fuel due to fission-product decay following a unit shutdown.

The reactor coolant is circulated through two loops connected in parallel to the reactor vessel, each containing a SG, two reactor coolant pumps (RCPs), and appropriate flow and temperature instrumentation for both control and protection. The reactor vessel contains the fuel. The SGs provide the heat sink to the isolated secondary coolant. The RCPs circulate the primary coolant through the reactor vessel and SGs at a sufficient rate to ensure proper heat transfer and prevent fuel damage. This forced circulation of the reactor coolant ensures mixing of the coolant for proper boration and chemistry control.

The RCPs must be started using the variable speed controller with the Plant Control System (PLS) incapable of rod withdrawal and all rods fully inserted. The controller shall be bypassed prior to making the PLS capable of rod withdrawal or withdrawing one or more rods.

APPLICABLE SAFETY ANALYSES

MODES 1 and 2

Safety analyses contain various assumptions for the design bases accident initial conditions including RCS pressure, RCS temperature, reactor power level, core parameters, and safety system setpoints. The important aspect for this LCO is the reactor coolant forced flow rate, which is represented by the number of RCS loops and RCPs in service.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Both transient and steady state analyses have been performed to establish the effect of flow on the departure from nucleate boiling (DNB). The transient and accident analyses for the plant have been performed assuming two RCS loops are initially in operation. The majority of the plant safety analyses are based on initial conditions at high core power or zero power. The accident analyses, where RCP operation is most important are the four pump coastdown, single pump locked rotor, single pump broken shaft or coastdown, and rod withdrawal events (Ref. 1).

Steady state DNB analysis has been performed for the two RCS loop operation. For two RCS loop operation, the steady state DNB analysis, which generates the pressure and temperature Safety Limit (SL) (i.e., the departure from nucleate boiling ratio (DNBR) limit) assumes a maximum power level of 100% RATED THERMAL POWER (RTP). This is the design overpower condition for two RCS loop operation. The value for the accident analysis setpoint of the nuclear overpower (high flux) trip is 118% and is based on an analysis assumption that bounds possible instrumentation errors. The DNBR limit defines a locus of pressure and temperature points which result in a minimum DNBR greater than or equal to the critical heat flux correlation limit.

The plant is designed to operate with both RCS loops in operation to maintain DNBR above the SL, during all normal operations and anticipated transients. By ensuring heat transfer in the nucleate boiling region, adequate heat transfer is provided between the fuel cladding and the reactor coolant.

MODES 3, 4, and 5

Whenever the PLS is capable of rod withdrawal or one or more rods are not fully inserted, there is the possibility of an inadvertent rod withdrawal from subcritical, resulting in a power excursion in the area of the withdrawn rod. Such a transient could be caused by a malfunction of the PLS. In addition, the possibility of a power excursion due to the ejection of an inserted control rod is possible with the breakers closed or open. Such a transient could be caused by the mechanical failure of a CRDM. The initial power rise is terminated by doppler broadening in the fuel pins, followed by rod insertion. During this event, if there is not adequate coolant flow along the clad surface of the fuel, there is a potential to exceed the departure from nucleate boiling ratio (DNBR) limit. Therefore, the required coolant flow is an initial condition of a design basis event that presents a challenge to the integrity of a fission product barrier.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Therefore, in MODE 3, 4 or 5 with the PLS capable of rod withdrawal or one or more rods not fully inserted, accidental control rod withdrawal from subcritical is postulated and requires the RCPs to be OPERABLE and in operation to ensure that the accident analysis limits are met.

In MODES 3, 4 and 5 with the PLS incapable of rod withdrawal and all rods fully inserted, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. This is addressed in LCO 3.4.8, "Minimum RCS Flow."

RCS Loops satisfy Criteria 2 and 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of this LCO is to require an adequate forced flow rate for core heat removal. Flow is represented by the number of RCPs in operation for removal of heat by the SGs. To meet safety analysis acceptance criteria for DNB, four pumps are required in MODES 1 and 2. The requirement that at least four RCPs must be operating in MODES 3, 4 and 5 when the PLS is capable of rod withdrawal or one or more rods are not fully inserted provides assurance that, in the event of a rod withdrawal accident, there will be adequate flow in the core to avoid exceeding the DNBR limit. Bypass of the RCP variable speed control ensures that the pumps are operating at full flow.

With the PLS not capable of rod withdrawal and all rods fully inserted only a minimum RCS flow of 3,000 gpm is necessary to ensure removal of decay heat from the core in accordance with LCO 3.4.8, Minimum RCS Flow.

Note 1 prohibits startup of an RCP when the RCS temperature is $\geq$ 350°F unless pressurizer level is < 92%. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

Note 2 requires that the secondary side water temperature of each SG be ≤ 50°F above each of the RCS cold leg temperatures before the start of an RCP with any RCS cold leg temperature ≤ 350°F, and the RCP must be started at ≤ 25% of RCP speed. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started. This limitation also helps to ensure that the RNS system pressure remains below both the piping design pressure and the acceptable RNS relief valve inlet pressure.

BASES

ACTIONS (continued)

The Completion Time of 1 hour is reasonable to allow for making PLS incapable of rod withdrawal and fully inserting all control rods, since plant cool-down is not required.

SURVEILLANCE REQUIREMENTS

SR 3.4.4.1

This SR requires verification every 12 hours that each RCS loop is in operation with the pump variable speed control bypassed. Verification includes flow rate and temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal while maintaining the margin to DNB. The Frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the main control room to monitor RCS loop performance.

REFERENCES

1. Chapter 15, “Accident Analysis.”

RAI Letter No. 01
Question 16-5, Issue 3

RAI Letter No. 01

Question 16-5

Issue 3: The licensee is requested to include an LCO Note in LCO 3.4.4, LCO 3.4.8, and LCO 3.4.14 that reminds the operator to observe the limitations specified by LCO 3.4.3 when starting an RCP.

SNC Response

SNC concurs with retaining LCO Notes in TS 3.4.4, TS 3.4.8, and TS 3.4.14 that remind the operator to observe the limitations when starting an RCP. The changes originally proposed with Discussion of Change (DOC) M06 are being withdrawn. Refer to response to RAI Question 16-5, Issue 1 for these changes.

No changes to LAR-12-002 result from this RAI response.

RAI Letter No. 01
Question 16-6, Issue 6

RAI Letter No. 01

Question 16-6

Descriptions of Change A046 and A047

ITS 3.4.4 • Bases “LCO”
ITS 3.4.8 • Bases “LCO”

As described in Descriptions of Change A046 and A047, the phrase “may be de-energized” in the current LCO note is revised to read “may be removed from operation”; the staff notes additional conforming changes that are needed in the “LCO” section of the bases, regarding the discussion of the LCO note. The licensee is requested to revise the following text to be consistent with the revised phrasing of the notes.

- On Page B 3.4.4-4, the phrase “the de-energizing of the pump” in the fourth paragraph needs to be revised.
- On Page B 3.4.8-2, the phrase “the de-energizing of the pump” in the third paragraph needs to be revised.

<u>SNC Response</u>

SNC concurs with the need for revision. The following changes are made:

- Bases page B 3.4.4-4, first paragraph, second sentence, revises “the de-energizing of the pump” to state "removing all RCPs from operation";
- Bases page B 3.4.8-2, third paragraph, second sentence, revises “the de-energizing of the pump” to state "removing all RCPs from operation."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases pages.

BASES

LCO (continued)

Note 3 permits all RCPs to be removed from operation in MODE 3, 4, or 5 for ≤ 1 hour per 8 hour period. The purpose of the Note is to permit tests that are designed to validate various accident analysis values. One of these tests is for the validation of the pump coastdown curve, used as input to a number of accident analyses including a loss of flow accident.

This test is generally performed in MODE 3 during the initial startup testing program, and as such should only be performed once. If, however, changes are made to the RCS that would cause a change to the flow characteristics of the RCS, the input values of the coastdown curve may need to be revalidated by conducting the test again.

Another test performed during the startup testing program is the validation of the rod drop times during cold conditions, both with and without flow.

The no-flow tests may be performed in MODE 3, 4, or 5, and require that the pumps be stopped for a short period of time. The Note permits removing all RCPs from operation in order to perform this test and validate the assumed analysis values. As with the validation of the pump coastdown curve, this test should only be performed once, unless the flow characteristics of the RCS are changed. The 1 hour time period specified is adequate to perform the desired tests and experience has shown that boron stratification is not a problem during this short period with no forced flow.

Utilization of the Note is permitted provided the following conditions are met along with any other conditions imposed by initial startup test procedures:

a. No operations are permitted that would dilute the RCS boron concentration with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Boron reduction with coolant at boron concentrations less than required to assure SDM is maintained is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation and

b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause natural circulation flow obstruction.

An OPERABLE RCS loop is composed of two OPERABLE RCPs in operation providing forced flow for heat transport and an OPERABLE SG.

BASES

LCO (continued)

Note 1 permits all RCPS to be removed from operation for ≤ 1 hour per 8 hour period. The purpose of the Note is to permit tests that are designed to validate various accident analysis values. One of these tests is for the validation of the pump coastdown curve, used as input to a number of accident analyses including a loss of flow accident. This test is generally performed in MODE 3 during the initial startup testing program, and as such should only be performed once. If, however, changes are made to the RCS that would cause a change to the flow characteristics of the RCS, the input values of the coastdown curve may need to be revalidated by conducting the test again.

Another test performed during the startup testing program is the validation of the rod drop times during cold conditions, both with and without flow.

The no-flow tests may be performed in MODE 3, 4, or 5, and require that the pumps be stopped for a short period of time. The Note permits removing all RCPs from operation in order to perform this test and validate the assumed analysis values. As with the validation of the pump coastdown curve, this test should only be performed once, unless the flow characteristics of the RCS are changed. The 1 hour time period specified is adequate to perform the desired tests and experience has shown that boron stratification is not a problem during this short period with no forced flow.

Utilization of the Note is permitted provided the following conditions are met along with any other conditions imposed by initial startup test procedures:

a. No operations are permitted that would dilute the RCS boron concentration with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Boron reduction with coolant at boron concentrations less than required to assure SDM is maintained is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation and

b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause natural circulation flow obstruction.

Note 2 prohibits startup of an RCP when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

RAI Letter No. 01
Question 16-7

RAI Letter No. 01

Question 16-7

Description of Change M08

ITS 3.4.8 • Condition A Note and bases

Description of Change M08 revises CTS 3.4.8, “Minimum RCS Flow,” Condition A by adding a Note, which states “Required Action A.2 shall be completed whenever this Condition is entered.” The bases for Required Action A.2 are revised to discuss the use of this new Note. The licensee is requested to clarify the bases statement that says

“This ensures that SR 3.1.1.1 [verify SDM within limits] will be performed prior to starting an RCP, even when Condition A is exited prior to performing Required Action A.2. Performance of SR 3.1.1.1 is necessary to assure SDM is properly evaluated prior to starting an RCP.”

Placing at least one RCP in operation is an implicit action when in Condition A (i.e., restore compliance with LCO), even though it is not explicitly stated. The Condition-A Note, as stated, will not prevent the plant operators from starting one RCP before completing a satisfactory performance of SR 3.1.1.1—the condition note may need to be explicit about not starting an RCP before successful performance of SR 3.1.1.1. (See other comment about including a note in LCO 3.4.4, LCO 3.4.8, and LCO 3.4.14 that directs the operator to verify that the RCP safe starting conditions in LCO 3.4.3 are met before starting an RCP.) The licensee is requested to revise the condition note and the bases for Action A.2 to resolve the noted inconsistency between the bases and the actual effectiveness of the note.

<u>SNC Response</u>

SNC concurs with the need for a revision.

The TS 3.4.8, Condition A, Note is revised to state "Required Action A.2 shall be completed prior to starting any RCP whenever this Condition is entered."

The TS 3.4.8 Actions Bases, last paragraph, first sentence, is revised to state "Condition A is modified by a Note that requires Required Action A.2 to be performed prior to starting any RCP whenever the Condition is entered."

Discussion of Change (DOC) M08 is revised to reflect the change to the TS 3.4.8 Condition A Note.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

M08 **Detailed Description**

3.4.8-1 Current TS 3.4.8, "Minimum RCS Flow," Condition A is revised to add a Note stating "Required Action A.2 shall be completed prior to starting any RCP whenever this Condition is entered."

Technical Evaluation

The current TS 3.4.8 LCO requires that at least one Reactor Coolant Pump (RCP) shall be in operation with a total flow through the core of at least 3,000 gpm. In the event no RCP is in operation, the Required Actions of current Condition A require all sources of unborated water to be isolated and current SR 3.1.1.1 to be performed. The Required Action to perform SR 3.1.1.1 assures that if the boron concentration in the Reactor Coolant System (RCS) has been reduced and not detected by the source range instrumentation, prompt action may be taken to restore the required Shutdown Margin.

However, once current Required Action A.1 is performed (all sources of unborated water are isolated within 1 hour) the LCO is no longer applicable because the current TS 3.4.8 Applicability is "MODES 3, 4, and 5, whenever the reactor trip breakers are open and with unborated water sources not isolated from the RCS." Therefore, current Required Action A.2 would not be required to be completed once all unborated water sources are isolated because the Applicability for the LCO is exited. The proposed Note ensures that the Shutdown Margin is verified prior to starting any RCP once Condition A is entered, even if all unborated water sources are isolated.

This change is designated as more restrictive because it adds a Note to ensure that Required Action A.2 is completed prior to starting any RCP once Condition A is entered, even if all unborated water sources are isolated and the Applicability for the LCO is exited.

M09 **Detailed Description**

3.4.14-2 Current TS 3.4.14, "Low Temperature Overpressure Protection (LTOP) System," Condition C, is revised from "The RNS suction relief valve inoperable," to "Required LTOP method inoperable for reasons other than Condition A or B."

Technical Evaluation

The current TS 3.4.14 LCO requires accumulators to be isolated and either the Normal Residual Heat Removal System (RNS) suction relief valve with lift setting within the limit specified in the Pressure Temperature Limits Report (PTLR), or the RCS depressurized with an RCS vent of ≥ 4.15 square inches.

Current TS 3.4.14 provides Actions in the event an accumulator is not isolated when required (Condition A) and for an inoperable RNS suction relief valve (Condition C). However, no Condition currently addresses the Actions required to be taken in the event the required method of LTOP consisting of RCS depressurized and an RCS vent of ≥ 4.15 square inches is not Operable in

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 Minimum RCS Flow

LCO 3.4.8 At least one Reactor Coolant Pump (RCP) shall be in operation with a total flow through the core of ~~at least~~ ≥ 3,000 gpm. A045

- NOTES - A046

1. All RCPs may be ~~de-energized~~ removed from operation for ≤ 1 hour per 8 hour period provided:

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%.

3. No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed.

APPLICABILITY: MODES 3, 4, and 5~~, whenever the reactor trip breakers are open~~ and ~~with~~ with Plant Control System incapable of rod withdrawal, all rods fully inserted, unborated water sources not isolated from the RCS. L07

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. No RCP in operation.	A.1 Isolate all sources of unborated water.	1 hour
	AND	
	A.2 Perform SR 3.1.1.1.	1 hour

M08

- NOTE -
Required Action A.2 shall be completed prior to starting any RCP whenever this Condition is entered.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 Minimum RCS Flow

LCO 3.4.8 At least one Reactor Coolant Pump (RCP) shall be in operation with a total flow through the core of ≥ 3,000 gpm.

- NOTES -

1. All RCPs may be removed from operation for ≤ 1 hour per 8 hour period provided:

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started when the RCS temperature is ≥ 350°F unless pressurizer level is < 92%.

3. No RCP shall be started with any RCS cold leg temperature ≤ 350°F unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures and the RCP is started at ≤ 25% of RCP speed.

APPLICABILITY: MODES 3, 4, and 5 with Plant Control System incapable of rod withdrawal, all rods fully inserted, and unborated water sources not isolated from the RCS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------- **- NOTE -** Required Action A.2 shall be completed prior to starting any RCP whenever this Condition is entered. ---------- No RCP in operation.	A.1 Isolate all sources of unborated water. AND A.2 Perform SR 3.1.1.1.	1 hour 1 hour

BASES

ACTIONS (continued)

Condition A is modified by a Note that requires Required Action A.2 to be performed prior to starting any RCP whenever the Condition is entered. This ensures that SR 3.1.1.1 will be performed prior to starting an RCP, even when Condition A is exited prior to performing Required Action A.2. Performance of SR 3.1.1.1 is necessary to assure SDM is properly evaluated prior to starting an RCP.

SURVEILLANCE REQUIREMENTS

SR 3.4.8.1

This Surveillance requires verification every 12 hours that a minimum mixing flow is present in the RCS. A Frequency of 12 hours is adequate considering the low probability of an inadvertent BDE during this time, and the ease of verifying the required RCS flow.

REFERENCES None.

RAI Letter No. 01
Question 16-8

RAI Letter No. 01

Question 16-8

Description of Change D05
ITS 3.5.1• SR 3.5.1.4 and bases

In CTS 3.5.1, “Accumulators,” the second Frequency of SR 3.5.1.4 states the volume increase as “51 cu. ft.” and “3%”. The 3-percent value is removed from the Frequency because “the percent value is providing a calculation that is not referenced to anything specific, like total volume or indicated volume. TSTF-GG-05-01, subsection 3.3.4.e states to avoid the use of formulas and calculations where possible.” The CTS and ITS bases for SR 3.5.1.4 state the 3-percent value but not the 51 cu. ft. value. The licensee is requested to revise the bases for SR 3.5.1.4 to include both values and correlate the 3-percent value to the 51 cu. ft. value.

SNC Response

SNC concurs with the requested change. The SR 3.5.1.4 Bases are revised from "a 3% volume increase" to "a 51 cu. ft. (i.e., 3% of nominal required borated water volume of 1700 cu. ft.) volume increase."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases page.

BASES

SURVEILLANCE REQUIREMENTS (continued)

continuous monitoring. The 12 hour Frequency is considered reasonable considering the availability of the control room alarms and the likelihood that, with any deviation which may occur, the accumulators will perform their safety function with slight deviations in these parameters.

SR 3.5.1.4

The boron concentration should be verified to be within required limits for each accumulator every 31 days, since the static design of the accumulators limits the ways in which the concentration can be changed. The 31 day Frequency is adequate to identify changes that could occur from mechanisms such as in-leakage. Sampling the affected accumulator within 6 hours after a 51 cu. ft. (i.e., 3% of nominal required borated water volume of 1700 cu. ft.) volume increase will promptly identify whether the volume change has caused a reduction of boron concentration to below the required limit. It is not necessary to verify boron concentration if the added water inventory is from the in-containment refueling water storage tank (IRWST), because the water contained in the IRWST is within the accumulator boron concentration requirements. This is consistent with the recommendation of NUREG-1366 (Ref. 6).

SR 3.5.1.5

Verification every 31 days that power is removed from each accumulator isolation valve operator when the pressurizer pressure is ≥ 2000 psig ensures that an active failure could not result in the undetected closure of an accumulator motor operated isolation valve. If this were to occur, reduced accumulator capacity might be available for injection following a DBA that required operation of the accumulators. Since power is removed under administrative control, the 31 day Frequency will provide adequate assurance that power is removed.

This SR allows power to be supplied to the motor operated isolation valves when pressurizer pressure is < 2000 psig, thus allowing operational flexibility by avoiding unnecessary delays to manipulate the breakers during unit startup or shutdowns.

Should closure of a valve occur, the safeguard actuation signal provided to the valve would open a closed valve, if required.

RAI Letter No. 01
Question 16-9

RAI Letter No. 01

Question 16-9

Description of Change L17
TS 3.5.2 • Condition D, Required Action D.1, SR 3.5.2.4 and bases
TS 3.5.4 • Condition C, Required Action C.1, SR 3.5.4.3 and bases
TS 3.5.5 • Condition C, Required Action C.1 and bases
TS 3.5.6 • Condition B, Required Action B.1, Condition C, Required Action C.1, SR 3.5.6.3 and bases
TS 3.5.7 • Condition B, Required Action B.1, Condition C, Required Action C.1 and bases
TS 3.5.8 • Condition B, Required Action B.1, Condition C, Required Action C.1 and bases

TS 3.5.2, TS 3.5.4, TS 3.5.5, TS 3.5.6, TS 3.5.7, and TS 3.5.8 have Conditions and Surveillances that address non-condensable gases that are not within limit. The “limit” of non-condensable gases, when a system becomes inoperable, is difficult to determine and assess; it is not defined in the Bases. Surveillances of collection chambers, with level detectors and alarms, allow for venting of gases prior to the associated system becoming inoperable from non-condensable gas accumulation. The existing TS wording is more appropriate than that proposed. The licensee is requested to withdraw changes to CTS associated with Description of Change L17.

<u>SNC Response</u>

SNC concurs with revising the presentation. However, SNC has determined that the appropriate change is to retain the explicit limits in the SRs that address noncondensible gases. Reference to "within limits" in the Conditions and Required Actions is consistent with the presentation of other limits in the TS and with TSTF-GG-05-01,"Writer's Guide for Plant-Specific Improved Technical Specifications.”

The Writer’s Guide provides guidance on the format and content of the improved Technical Specifications. Subsection 4.1.6, "Chapter 3 Actions Content," paragraph f, states that typically, Conditions and Required Actions referring to parameter limits follow the rule for LCOs. For LCOs which require more than one parameter limit be met, the Conditions and Required Actions will only refer to the parameters as "not within limits" or "within limits." For an LCO which requires a single limit on a single parameter, the Conditions and Required Actions will specify the precise limit.

The LCOs for TS 3.5.2, "Core Makeup Tanks (CMTs) – Operating," TS 3.5.4, "Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Operating," TS 3.5.5, "Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Shutdown, Reactor Coolant System (RCS) Intact," TS 3.5.6, "In-containment Refueling Water Storage Tank (IRWST) – Operating," TS 3.5.7, "In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 5," and TS 3.5.8, "In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 6," all require more than one parameter limit be met. Therefore, the use of "within limit[s]" in the Conditions and Required Actions for these TS is appropriate and consistent with the guidance provided in the TSTF Writer's Guide. These proposed changes remain.

Response to RAI No. 01
Question 16-9

The proposed changes to SR 3.5.2.4, SR 3.5.4.3, and SR 3.5.6.3 are withdrawn. Discussion of Change (DOC) L17 and the associated No Significant Hazards Consideration (NSHC) are revised for consistency. The revision removes certain changes previously submitted in the LAR. This revision does not alter the validity of the original conclusion of significant hazards considerations performed in accordance with 10 CFR 50.92 for the LAR.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, NSHC, TS Markup, TS Clean, and Bases pages.

3.4.10-1 Required Action B.1, "Perform SR 3.4.10.2," within 4 hours.

Technical Evaluation

In the event the Dose Equivalent XE-133 concentration is > 280 µCi/gm, the TS 3.4.10 Actions require entry into Condition B. Within 4 hours of entering Condition B, Required Action B.1 currently requires SR 3.4.10.2 to be performed. SR 3.4.10.2 verifies that the reactor coolant Dose Equivalent I-131 specific activity is ≤ 1.0 µCi/gm. In addition, upon entry into Condition B, Required Action B.2 currently requires that the plant be placed in Mode 3 with T_{avg} < 500˚F within 6 hours.

TS 3.4.10 does not specify a default condition to enter in the event the current Required Action B.1 is not completed within 4 hours. Current Required Action B.2 requires placing the plant in Mode 3 with T_{avg} < 500˚F within 6 hours. However, during this required shutdown, the Operator may be distracted by the need to perform the current Required Action B.1. Therefore, deleting the current Required Action B.1 results in reducing Operator burden in the event Condition B is entered.

This change is acceptable because the Actions continue to require that the plant be removed from the Applicability of TS 3.4.10 in the event Condition B is entered. Performing SR 3.4.10.2 within 4 hours of entering Condition B does not result in a more conservative action in the event the Dose Equivalent I-131 is found not within limits, because the plant is already required to be in Mode 3 with T_{avg} < 500˚F within 6 hours by the current Required Action B.2. This provides assurance that requirements of the safety analyses are preserved.

This change is designated as less restrictive because it removes an action currently required to be performed.

L17 Detailed Description

Current TS 3.5.2, "Core Makeup Tanks (CMTs) - Operating," is revised as follows:

3.5.2-1
~~3.5.2-2~~
3.5.4-1
~~3.5.4-3~~
3.5.5-1
3.5.6-1
~~3.5.6-2~~
3.5.7-1
3.5.8-1

- Condition D is revised from "One CMT inoperable due to presence of noncondensible gases in one high point vent," to "One CMT inlet line with noncondensible gas volume not within limit."
- Required Action D.1 is revised from "Vent noncondensible gases," to "Restore CMT inlet line noncondensible gas volume to within limit."
- ~~SR 3.5.2.4 is revised from "Verify the volume of noncondensible gases in each CMT inlet line has not caused the high point water level to drop below the sensor," to "Verify the volume of noncondensible gases in each CMT inlet line is within limit."~~

Current TS 3.5.4, "Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Operating," is revised as follows:

- Condition C is revised from "Presence of non-condensible gases in the high point vent," to "PRHR HX inlet line noncondensible gas volume not within limit."
- Required Action C.1 is revised from "Vent noncondensible gases," to

"Restore PRHR HX inlet line noncondensible gas volume to within limit."

- ~~SR 3.5.4.3 is revised from "Verify the volume of noncondensible gases in the PRHR HX inlet line has not caused the high point water level to drop below the sensor," to "Verify the volume of noncondensible gases in the PRHR HX inlet line is within limit."~~

Current TS 3.5.5, "Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Shutdown, Reactor Coolant System (RCS) Intact," is revised as follows:

- Condition C is revised from "Presence of non-condensible gases in the high point vent," to "PRHR HX inlet line noncondensible gas volume not within limit."
- Required Action C.1 is revised from "Vent noncondensible gases," to "Restore PRHR HX inlet line noncondensible gas volume to within limit."

Current TS 3.5.6, "In-containment Refueling Water Storage Tank (IRWST) – Operating," is revised as follows:

- Condition B is revised from "One IRWST injection line inoperable due to presence of noncondensible gases in one high point vent," to "One IRWST injection flow path with noncondensible gas volume in one squib valve outlet line pipe stub not within limit."
- Required Action B.1 is revised from "Vent noncondensible gases," to "Restore noncondensible gas volume in squib valve outlet line pipe stub to within limit."
- Condition C is revised from "One IRWST injection line inoperable due to presence of noncondensible gases in both high point vents," to "One IRWST injection flow path with noncondensible gas volume in both squib valve outlet line pipe stubs not within limit."
- Required Action C.1 is revised from "Vent noncondensible gases from one high point vent," to "Restore noncondensible gas volume in one squib valve outlet line pipe stub to within limit."
- ~~SR 3.5.6.3 is revised from "Verify the volume of noncondensible gases in each of the four IRWST injection squib valve outlet line pipe stubs has not caused the high-point water level to drop below the sensor," to "Verify the volume of noncondensible gases in each of the four IRWST injection squib valve outlet line pipe stubs is within limits."~~

Current TS 3.5.7, "In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 5," is revised as follows:

- Condition B is revised from "Required IRWST injection line inoperable due to presence of noncondensible gases in one high point vent," to "Required IRWST injection flow path with noncondensible gas volume in one squib valve outlet line pipe stub not within limit."
- Required Action B.1 is revised from "Vent noncondensible gases," to "Restore noncondensible gas volume in squib valve outlet line pipe stub to

Required Action C.1, TS 3.5.6, Required Action B.1, TS 3.5.6, Required Action C.1, TS 3.5.7, Required Action B.1, TS 3.5.7 Required Action C.1, TS 3.5.8, Required Action B.1, and TS 3.5.8, Required Action C.1 are revised to replace a specific method of restoration with a more general action to restore the parameter, in this case noncondensible gas volume, to within its limit. This change is made for consistency with the revised entry conditions associated with the Required Actions. Only the specific method is deleted from the action. The associated Bases, both current and revised, describe an appropriate method for restoration. Changes to the Bases are controlled by the TS Bases Control Program. This program provides for the evaluation of changes to ensure the Bases are properly controlled.

Because the revised Actions still assure that the parameter is restored, this detail is not required to be in the TS to provide adequate protection of the public health and safety. The revised Actions continue to provide assurance that operation with a noncondensible gas volume that can affect the associated flow path is allowed for only a limited period of time. These changes are designated as less restrictive because the specific method of restoration is deleted and replaced with a more general requirement to restore within the limit.

~~Current SR 3.5.2.4, SR 3.5.4.3 and SR 3.5.6.3 are revised to replace a specific method of determining noncondensible gas volume accumulation with a more general requirement to ensure that the volume of noncondensible gas is within limit. This change is made to allow the use of alternative methods to determine the volume of noncondensible gas. Only the specific method is deleted from the SR. The associated Bases, both current and revised, describe an appropriate method for restoration. Changes to the Bases are controlled by the TS Bases Control Program. This program provides for the evaluation of changes to ensure the Bases are properly controlled.~~

~~Because the revised SRs still assure that the volume of noncondensible gas is periodically verified within limit, this detail is not required to be in the TS to provide adequate protection of the public health and safety. The revised SRs continue to provide assurance that noncondensible gas volume that can affect the associated flow path is detected. These changes are designated as less restrictive because the specific method of performance is deleted and replaced with a more general requirement to be within limit.~~

systems, and components are maintained consistent with the safety analyses and licensing basis. The performance of SR 3.4.10.2 is not related to an accident initiator nor credited with mitigation of the consequences of an accident. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   The proposed change does not involve a physical alteration of the plant as described in the FSAR. No new equipment is being introduced, and equipment is not being operated in a new or different manner. There are no setpoints, at which protective or mitigative actions are initiated, affected by this change. This change will not alter the manner in which equipment operation is initiated, nor will the function demands on credited equipment be changed. No change is being made to the procedures relied upon to respond to an off-normal event as described in the FSAR as a result of this change. As such, no new failure modes are being introduced. The change does not alter assumptions made in the safety analysis and licensing basis. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   The proposed change will not reduce a margin of safety because it has no effect on any assumption of the safety analyses. The change maintains requirements within the safety analyses and licensing basis. The result of performing the additional surveillance does not provide any additional margin of safety; as such, eliminating the Required Action for performing the additional surveillance does not result in a significant reduction in a margin of safety.

Based on the above, it is concluded that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of “no significant hazards consideration” is justified.

L17 SNC proposes to amend TS as follows:

1. Current TS 3.5.2, "Core Makeup Tanks (CMTs) - Operating," Condition D is revised from "One CMT inoperable due to presence of noncondensible gases in one high point vent," to "One CMT inlet line with noncondensible gas volume not within limit."
2. Current TS 3.5.2, Required Action D.1 is revised from "Vent noncondensible gases," to “Restore CMT inlet line noncondensible gas volume to within limit.”
3. ~~Current TS 3.5.2, SR 3.5.2.4 is revised from "Verify the volume of noncondensible gases in each CMT inlet line has not caused the high point water level to drop below the sensor," to "Verify the volume of noncondensible gases in each CMT inlet line is within limit."~~

~~4.~~3. Current TS 3.5.4, "Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Operating," Condition C is revised from "Presence of noncondensible gases in the high point vent," to "PRHR HX inlet line noncondensible gas volume not within limit."

~~5.~~4. Current TS 3.5.4, Required Action C.1 is revised from "Vent noncondensible gases," to "Restore PRHR HX inlet line noncondensible gas volume to within limit."

~~6. Current TS 3.5.4, SR 3.5.4.3 is revised from "Verify the volume of noncondensible gases in the PRHR HX inlet line has not caused the high point water level to drop below the sensor," to "Verify the volume of noncondensible gases in the PRHR HX inlet line is within limit."~~

~~7.~~5. Current TS 3.5.5, "Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Shutdown, Reactor Coolant System (RCS) Intact," Condition C is revised from "Presence of noncondensible gases in the high point vent," to "PRHR HX inlet line noncondensible gas volume not within limit."

~~8.~~6. Current TS 3.5.5, Required Action C.1 is revised from "Vent noncondensible gases," to "Restore PRHR HX inlet line noncondensible gas volume to within limit."

~~9.~~7. Current TS 3.5.6, "In-containment Refueling Water Storage Tank (IRWST) – Operating," Condition B is revised from "One IRWST injection line inoperable due to presence of noncondensible gases in one high point vent," to "One IRWST injection flow path with noncondensible gas volume in one squib valve outlet line pipe stub not within limit."

~~10.~~8. Current TS 3.5.6, Required Action B.1 is revised from "Vent noncondensible gases," to "Restore noncondensible gas volume in squib valve outlet line pipe stub to within limit."

~~11.~~9. Current TS 3.5.6, Condition C is revised from "One IRWST injection line inoperable due to presence of noncondensible gases in both high point vents," to "One IRWST injection flow path with noncondensible gas volume in both squib valve outlet line pipe stubs not within limit."

~~12.~~10. Current TS 3.5.6, Required Action C.1 is revised from "Vent noncondensible gases from one high point vent," to "Restore one squib valve outlet line pipe stub noncondensible gas volume to within limit."

~~13. Current TS 3.5.6, SR 3.5.6.3 is revised from "Verify the volume of noncondensible gases in each of the four IRWST injection squib valve outlet line pipe stubs has not caused the high-point water level to drop below the sensor," to "Verify the volume of noncondensible gases in each of the four IRWST injection squib valve outlet line pipe stubs is within limit."~~

~~14.~~11. Current TS 3.5.7, "In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 5," Condition B is revised from "Required IRWST injection line inoperable due to presence of noncondensible gases in one high point vent," to "Required IRWST injection flow path with noncondensible gas volume in one squib valve outlet line pipe stub not within limit."

~~15.~~12. Current TS 3.5.7, Required Action B.1 is revised from "Vent noncondensible gases," to "Restore noncondensible gas volume in squib valve outlet line pipe stub to within limit."

~~16.~~13. Current TS 3.5.7, Condition C is revised from "Required IRWST injection line inoperable due to presence of noncondensible gases in both high point vents," to "Required IRWST injection flow path with noncondensible gas volume in both squib valve outlet line pipe stubs not within limit."

~~17.~~14. Current TS 3.5.7, Required Action C.1 is revised from "Vent noncondensible gases from one high point vent," to "Restore one squib valve outlet line pipe stub noncondensible gas volume to within limit."

~~18.~~15. TS 3.5.8, "In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 6," Condition B is revised from "Required IRWST injection line inoperable due to presence of noncondensible gases in one high point vent," to "Required IRWST injection flow path with noncondensible gas volume in one squib valve outlet line pipe stub not within limit."

~~19.~~16. Current TS 3.5.8, Required Action B.1 is revised from "Vent noncondensible gases," to "Restore noncondensible gas volume in squib valve outlet line pipe stub to within limit."

~~20.~~17. Current TS 3.5.8, Condition C is revised from "Required IRWST injection line inoperable due to presence of noncondensible gases in both high point vents," to "Required IRWST injection flow path with noncondensible gas volume in both squib valve outlet line pipe stubs not within limit."

~~21.~~18. Current TS 3.5.8, Required Action C.1 is revised from "Vent noncondensible gases from one high point vent," to "Restore one squib valve outlet line pipe stub noncondensible gas volume to within limit."

SNC has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, “Issuance of amendment,” as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed change does not involve a physical alteration of the plant or a change in the methods governing normal plant operations. The proposed change provides less stringent TS requirements by not ~~expressly~~ explicitly specifying the ~~method of determining or restoring the~~ noncondensible gas volume limit~~that can adversely affect the associated flow path~~; however, the requirement that noncondensible gas volume be within limit is not changed. These less stringent requirements do not result in operations that significantly increase the probability of initiating an analyzed event, and do not alter assumptions relative to mitigation of an accident or transient event. The less restrictive requirements continue to ensure process variables, structures, systems, and components are maintained consistent with the safety analyses and licensing basis. Therefore, this change does not involve a significant

increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   The proposed change does not involve a physical alteration of the plant as described in the FSAR. No new equipment is being introduced, and equipment is not being operated in a new or different manner. There are no setpoints, at which protective or mitigative actions are initiated, affected by this change. This change will not alter the manner in which equipment operation is initiated, nor will the function demands on credited equipment be changed. No change is being made to the procedures relied upon to respond to an off-normal event as described in the FSAR as a result of this change. As such, no new failure modes are being introduced. The change does not alter assumptions made in the safety analysis and licensing basis. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   The proposed change will not reduce a margin of safety because it has no effect on any assumption of the safety analyses. The amended actions ~~and surveillances~~ continue to assure that noncondensible gas volumes are maintained and restored to within acceptable limits. The change maintains requirements within the safety analyses and licensing basis. As such, there is no technical change to the requirements and therefore, there is no significant reduction in a margin of safety.

Based on the above, it is concluded that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of “no significant hazards consideration” is justified.

L18 SNC proposes to amend current TS 3.6.8, "Containment Penetrations," LCO 3.6.8.d.2 to allow the penetration flow path to be open provided it can be closed prior to steaming into the containment. In conjunction, current SR 3.6.8.3 as well as the corresponding containment Isolation function required in current TS 3.3.2, “Engineered Safety Feature Actuation System (ESFAS) Instrumentation," Table 3.3.2-1 Function 3.a for Modes 5 and 6, are removed. This removes requirements for Operable containment isolation signals in Modes 5 and 6, allowing manual operator actions to affect any required isolation prior to steaming into the containment.

SNC has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, “Issuance of amendment,” as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time not met. of Condition A, B, C, D, or E OR ~~LCO not met~~ for reasons other than ~~A, B,~~ C~~, D, or E~~. Two CMTs inoperable Condition	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

A052

A068

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify the temperature of the borated water in each CMT is < 120°F.	24 hours
SR 3.5.2.2	Verify the borated water volume in each CMT is ≥ 2500 cu. ft.	7 days
SR 3.5.2.3	Verify each CMT inlet isolation valve is fully open.	12 hours
SR 3.5.2.4	Verify the volume of noncondensible gases in each CMT inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.2.5	Verify the boron concentration in each CMT is ≥ 3400 ppm, and ≤ 3700 ppm.	7 days
SR 3.5.2.6	Verify each CMT outlet isolation valve ~~is OPERABLE by stroking it~~ strokes open.	In accordance with the Inservice Testing Program
SR 3.5.2.~~7~~ 8	Verify system flow performance of each CMT in accordance with the System Level OPERABILITY Testing Program.	10 years
SR 3.5.2.7	Verify each CMT outlet isolation valve actuates to the open position on an actual or simulated actuation signal.	24 months

A027

L01

SURVEILLANCE REQUIREMENTS

	PRHR HX SURVEILLANCE	FREQUENCY
SR 3.5.4.1	Verify the outlet manual isolation valve is fully open.	12 hours
SR 3.5.4.2	Verify the inlet motor operated isolation valve is open.	12 hours
SR 3.5.4.3 PRHR HX	Verify the volume of noncondensible gases in the PRHR HX inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.4.~~4~~ 5	Verify ~~that~~ power is removed from the inlet motor operated isolation valve. HX PRHR HX	31 days
SR 3.5.4.~~5~~ 6	Verify both PRHR air operated outlet isolation valves and both IRWST gutter isolation valves ~~are OPERABLE by stroking~~ open ~~the valves~~. stroke	In accordance with the Inservice Testing Program
SR 3.5.4.~~6~~ 9	Verify PRHR HX heat transfer performance in accordance with the System Level OPERABILITY Testing Program.	10 years
SR 3.5.4.7	Verify by visual inspection that the IRWST gutters are not restricted by debris.	24 months

A073 A073 A038 A073 A027

SR 3.5.4.8	Verify both PRHR HX air operated outlet isolation valves actuate to the open position and both IRWST gutter isolation valves actuate to the isolation position on an actual or simulated actuation signal.	24 months

L01

SR 3.5.4.4	----------NOTE---------- Only required to be met when one or more Reactor Coolant Pumps (RCPs) are in operation. ---------- Verify one Loop 1 RCP is in operation.	12 hours

M10

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
IRWST borated water volume ~~< 100% and > 97% of limit.~~ ≤ 73,100 cu. ft and > 70,907 cu. ft.		A078
E. One motor operated IRWST isolation valve not fully open. OR Power is not removed from one or more motor operated IRWST isolation valves.	E.1 Restore motor operated IRWST isolation valve to fully open condition with power removed from both valves.	1 hour
F. Required Action and associated Completion Time not met. of Condition A, B, C, D, or E OR LCO not met for reasons other than Condition A, B, C, D, or E.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours A077

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.6.1	Verify the IRWST water temperature is < 120°F.	24 hours
SR 3.5.6.2	Verify the IRWST borated water volume is > 73,100 cu. ft.	24 hours
SR 3.5.6.3	Verify the volume of noncondensible gases in each of the four IRWST injection squib valve outlet line pipe stubs has not caused the high-point water level to drop below the sensor.	24 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met. OR Two CMTs inoperable for reasons other than Condition C.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify the temperature of the borated water in each CMT is < 120°F.	24 hours
SR 3.5.2.2	Verify the borated water volume in each CMT is ≥ 2500 cu. ft.	7 days
SR 3.5.2.3	Verify each CMT inlet isolation valve is fully open.	12 hours
SR 3.5.2.4	Verify the volume of noncondensible gases in each CMT inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.2.5	Verify the boron concentration in each CMT is ≥ 3400 ppm, and ≤ 3700 ppm.	7 days
SR 3.5.2.6	Verify each CMT outlet isolation valve strokes open.	In accordance with the Inservice Testing Program
SR 3.5.2.7	Verify each CMT outlet isolation valve actuates to the open position on an actual or simulated actuation signal.	24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.4.1	Verify the PRHR HX outlet manual isolation valve is fully open.	12 hours
SR 3.5.4.2	Verify the PRHR HX inlet motor operated isolation valve is open.	12 hours
SR 3.5.4.3	Verify the volume of noncondensible gases in the PRHR HX inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.4.4	---------- **- NOTE -** Only required to be met when one or more reactor coolant pumps (RCPs) are in operation. ---------- Verify one Loop 1 RCP is in operation.	12 hours
SR 3.5.4.5	Verify power is removed from the PRHR HX inlet motor operated isolation valve.	31 days
SR 3.5.4.6	Verify both PRHR HX air operated outlet isolation valves and both IRWST gutter isolation valves stroke open.	In accordance with the Inservice Testing Program
SR 3.5.4.7	Verify by visual inspection that the IRWST gutters are not restricted by debris.	24 months
SR 3.5.4.8	Verify both PRHR HX air operated outlet isolation valves actuate to the open position and both IRWST gutter isolation valves actuate to the isolation position on an actual or simulated actuation signal.	24 months
SR 3.5.4.9	Verify PRHR HX heat transfer performance in accordance with the System Level OPERABILITY Testing Program.	10 years

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.6.1	Verify the IRWST water temperature is < 120°F.	24 hours
SR 3.5.6.2	Verify the IRWST borated water volume is > 73,100 cu. ft.	24 hours
SR 3.5.6.3	Verify the volume of noncondensible gases in each of the four IRWST injection squib valve outlet line pipe stubs has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.6.4	Verify the IRWST boron concentration is ≥ 2600 ppm and ≤ 2900 ppm.	31 days AND Once within 6 hours after each solution volume increase of ≥ 15,000 gal
SR 3.5.6.5	Verify each motor operated IRWST isolation valve is fully open.	12 hours
SR 3.5.6.6	Verify power is removed from each motor operated IRWST isolation valve.	31 days
SR 3.5.6.7	Verify each motor operated containment recirculation isolation valve is fully open.	31 days
SR 3.5.6.8	Verify each IRWST injection and containment recirculation squib valve is OPERABLE in accordance with the Inservice Testing Program.	In accordance with the Inservice Testing Program
SR 3.5.6.9	---------- - NOTE - Squib actuation may be excluded. ---------- Verify continuity of the circuit from the Protection Logic Cabinets to each IRWST injection and containment recirculation squib valve on an actual or simulated actuation signal.	24 months

RAI Letter No. 01
Question 16-10

RAI Letter No. 01

Question 16-10

Description of Change A083
ITS 3.6.5 · Conditions B and C
ITS 3.6.4 · Condition B
ITS 3.6.9 · Condition B

As described in Description of Change A083, TS 3.6.5, "Containment Air Temperature," Condition B is divided into two separate Conditions: new Condition B to address Modes 1 through 4, and new Condition C to address Modes 5 and 6. During the review of these changes, the staff noted that similar changes should also be made to CTS 3.6.4, "Containment Pressure," Condition B, and CTS 3.6.10, "Vacuum Relief Valves," Condition C. The licensee is requested to include similar changes to CTS 3.6.4 and CTS 3.6.10.

SNC Response

SNC concurs with including conforming changes to TS 3.6.4 and new TS 3.6.9, similar to those shown in TS 3.6.5 and described in Discussion of Change (DOC) A083. DOC A083 is revised to capture changes to all three TS.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

Technical Evaluation

This change (wording preferences, editorial changes, reformatting, revised numbering, etc.) is made to provide consistency with NUREG-1431, SR 3.6.3.2. In addition, the current Bases do not include the term "containment." This change is designated as an administrative change and is acceptable because it does not result in a technical change to the TS.

A083 **Detailed Description**

3.6.4-1
3.6.5-1
3.6.10-1

TS 3.6.4, “Containment Pressure,” and TS 3.6.5, "Containment Air Temperature," each revise Condition B by dividing it into two separate Conditions: one for when the unit is in Mode 1, 2, 3, or 4 (proposed Condition B) and the other for when the unit is in Mode 5 or 6 (proposed Condition C). Current Required Actions B.1 and B.2 will remain as the Required Actions for proposed Condition B and current Required Action B.3 is renumbered as Required Action C.1 for proposed Condition C. Consistent with this change, TS 3.6.5, Required Action B.2 is changed to only require placing the unit in Mode 5, instead of Mode 5 or 6. The Completion Time for proposed Required Action C.1 is 8 hours.

Current TS 3.6.10, “Vacuum Relief Valves,” Condition C is divided into two separate Conditions: one for when the unit is in Mode 1, 2, 3, or 4 (proposed Condition C) and the other for when the unit is in Mode 5 or 6 (proposed Condition D). Current Required Actions C.1 and C.2 will remain as the Required Actions for proposed Condition C and current Required Action C.3 is renumbered as Required Action D.1 for proposed Condition D.

Technical Evaluation

The Action ~~B~~ being divided provides the actions required to be taken when the ~~containment average air temperature~~LCO is not restored to within the limit(s) ~~in 8 hours, as specified in Action A~~. Splitting the current Action ~~B~~ into two separate Actions is an editorial change. The actions required to be taken when the Required Action and associated Completion Time of ~~Condition A~~other Actions are not met are not changed. If the unit is initially in Mode 1, 2, 3, or 4, then the first proposed new Condition ~~B~~ is entered, which requires a unit shutdown to Mode 3 within 6 hours and to Mode 5 within 36 hours. This is the same as the current requirements. For TS 3.6.5, ~~W~~while the proposed Required Action B.2 does not specify that an option is to be in Mode 6, it is always an option. It is not necessary to state that the unit can go to a lower Mode.

Once in Mode 5, the second proposed new Condition ~~C~~ is entered. The actions required to be taken by the second proposed new Condition ~~C require the containment equipment hatch or containment airlock to be opened within~~ state the Completion Time as 8 ~~-~~hours. Currently, while 44 hours is allowed ~~to open the containment equipment hatch or containment airlock~~, the time starts upon entry into the original Condition now being split~~B~~. Since the second proposed new Condition ~~C~~ is not entered until after Mode 5 is reached, and the first proposed

Condition's Required Action ~~B.2~~ allows 36 hours for ~~this~~entering Mode 5, the proposed 8 hour Completion Time for the second new ~~of~~ Condition's Required Action ~~C.1~~ allows no more time than is currently allowed.

This change is designated as an administrative change and is acceptable because it does not result in technical changes to the TS.

A084 Detailed Description

3.6.4-1
3.6.5-1

TS 3.6.4, "Containment Pressure," and TS 3.6.5, "Containment Air Temperature," include an Applicability statement that rolls over onto a second line and the second line is not indented as required by TSTF-GG-05-01, subsection 2.5.4.b.1. The second line for these Applicability statements is indented in the proposed Applicability.

Technical Evaluation

This change (wording preferences, editorial changes, reformatting, revised numbering, etc.) is made to provide clarification and for consistency with TSTF-GG-05-01. This change is designated as an administrative change and is acceptable because it does not result in technical changes to the TS.

A085 Detailed Description

3.6.6-1

The second Condition of TS 3.6.6, "Passive Containment Cooling System (PCS) – Operating," Condition D, which states "LCO not met for reasons other than A, B, or C" is being changed by adding the word "Condition" before "A, B, or C."

Technical Evaluation

The phrase "A, B, or C" in the current TS 3.6.6 Condition D wording is referring to the Conditions A, B, and C. Therefore, for clarification and consistency with the manner to which Conditions are referred and TSTF-GG-05-01, subsection 4.1.6.i.5.ii, the word "Condition" is being added. This change is designated as an administrative change and is acceptable because it does not result in technical changes to the TS.

A086 Detailed Description

3.6.6-1
3.6.7-1

TS 3.6.6, "Passive Containment Cooling System (PCS) – Operating," and TS 3.6.7, "Passive Containment Cooling System (PCS) – Shutdown," Required Action B.1 states to "Restore flow paths to OPERABLE status." Proposed TS 3.6.6 Required Action B.1 states to "Restore one flow path to OPERABLE status."

Technical Evaluation

Current TS 3.6.6 and 3.6.7 Action A provides the requirements when one passive

3.6 CONTAINMENT SYSTEMS

3.6.4 Containment Pressure

LCO 3.6.4 Containment pressure shall be ≥ -0.2 psig and ≤ +1.0 psig.

APPLICABILITY: MODES 1, 2, 3, and 4.
MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter.

Indent 5 spaces

A084

- NOTE -

The high pressure LCO limit is not applicable in MODES 5 or 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment pressure not within limits.	A.1 Restore containment pressure to within limits.	1 hour
B. Required Action of Condition A and associated Completion Time not met. in MODE 1, 2, 3, or 4	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6.	~~AND~~ ~~B.3~~ C.1 Open a containment air flow path ≥ 6 inches in diameter.	~~44~~ 8 hours

A083

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1	Verify containment pressure is within limits.	12 hours

3.6 CONTAINMENT SYSTEMS

3.6.~~10~~ 9 Vacuum Relief Valves

LCO 3.6.~~10~~ 9 Two vacuum relief flow paths shall be OPERABLE.

AND

Containment inside to outside differential air temperature shall be ≤ 90°F.

APPLICABILITY: MODES 1, 2, 3, and 4.
MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One vacuum relief flow path inoperable.	A.1 Restore vacuum relief flow path to OPERABLE status.	72 hours
B. Containment inside to outside differential air temperature > 90°F.	B.1 Restore containment inside to outside differential air temperature to within limit.	8 hours
	OR	
	B.2 Reduce containment average temperature ≤ 80°F.	8 hours
C. Required Action and associated Completion Time of Condition~~s~~ A or B not met in MODE 1, 2, 3, or 4.	C.1 Be in MODE 3.	6 hours
	AND	
	C.2 Be in MODE 5.	36 hours
OR	~~AND~~	
Both vacuum relief flow paths inoperable.	~~C.3~~ D.1 Open a containment air flow path ≥ 6 inches in diameter.	~~44~~ 8 hours

A099

A083

D. Required Action and associated Completion Time of Condition A or B not met in MODE 5 or 6.

OR

Both vacuum relief flow paths inoperable in MODE 5 or 6.

3.6 CONTAINMENT SYSTEMS

3.6.4 Containment Pressure

LCO 3.6.4 Containment pressure shall be ≥ -0.2 psig and ≤ +1.0 psig.

APPLICABILITY: MODES 1, 2, 3, and 4.
MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter.

- NOTE -

The high pressure LCO limit is not applicable in MODES 5 or 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment pressure not within limits.	A.1 Restore containment pressure to within limits.	1 hour
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. Required Action and associated Completion Time of Condtion A not met in MODE 5 or 6.	C.1 Open a containment air flow path ≥ 6 inches in diameter.	8 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1	Verify containment pressure is within limits.	12 hours

3.6 CONTAINMENT SYSTEMS

3.6.9 Vacuum Relief Valves

LCO 3.6.9 Two vacuum relief flow paths shall be OPERABLE.

AND

Containment inside to outside differential air temperature shall be ≤ 90°F.

APPLICABILITY: MODES 1, 2, 3, and 4.
MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter.

ACTIONS

CONDITION		REQUIRED ACTION		COMPLETION TIME
A.	One vacuum relief flow path inoperable.	A.1	Restore vacuum relief flow path to OPERABLE status.	72 hours
B.	Containment inside to outside differential air temperature > 90°F.	B.1	Restore containment inside to outside differential air temperature to within limit.	8 hours
		OR		
		B.2	Reduce containment average temperature ≤ 80°F.	8 hours
C.	Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4. OR Both vacuum relief flow paths inoperable in MODE 1, 2, 3, or 4.	C.1	Be in MODE 3.	6 hours
		AND		
		C.2	Be in MODE 5.	36 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A or B not met in MODE 5 or 6. OR Both vacuum relief flow paths inoperable in MODE 5 or 6.	D.1 Open a containment air flow path ≥ 6 inches in diameter.	8 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.9.1	Verify containment inside to outside differential air temperature is ≤ 90°F.	12 hours
SR 3.6.9.2	Verify each vacuum relief flow path is OPERABLE in accordance with the Inservice Testing Program.	In accordance with the Inservice Testing Program
SR 3.6.9.3	Verify each vacuum relief valve actuates to relieve vacuum on an actual or simulated signal.	24 months

BASES

APPLICABILITY (continued)

Therefore, maintaining containment pressure within the low pressure limit is essential to ensure initial conditions assumed in the cooling events in MODES 1 through 4 and in MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter. With a 6 inch diameter or equivalent containment air flow path, the vacuum relief function is not needed to mitigate a low pressure event.

ACTIONS

A.1

When containment pressure is not within the limits of the LCO, it must be restored within 1 hour. The Required Action is necessary to return operation to within the bounds of the containment analysis. The 1 hour Completion Time is consistent with the ACTIONS of LCO 3.6.1, "Containment," which requires that containment be restored to OPERABLE status within 1 hour.

B.1, B.2, and C.1

If the containment pressure cannot be restored to within its limits within the required Completion Time in MODE 1, 2, 3, or 4, the plant must be placed in a condition 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 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.

If the containment high pressure limit is still not met, Condition C applies.

Once in MODE 5 or 6, Required Action C.1 requires that a containment air flow path ≥ 6 inches in diameter shall be opened within 8 hours from condition entry. Any flow path (or paths) with an area equivalent to 6 inches in diameter is adequate to provide the necessary air flow.

BASES

ACTIONS (continued)

The primary means of opening a containment air flow path is by establishing a containment air filtration system (VFS) air flow path into containment. Manual actuation and maintenance as necessary to open a purge supply, purge exhaust, or vacuum relief flow path are available means to open a containment air flow path. In addition, opening of a spare penetration is an acceptable means to provide the necessary flow path. Opening of an equipment hatch or a containment airlock is acceptable, but may not be possible due to the differential pressure condition. Containment air flow paths opened must comply with LCO 3.6.7, "Containment Penetrations."

The 8 hour Completion Time is reasonable for opening a containment air flow path in an orderly manner.

SURVEILLANCE REQUIREMENTS

SR 3.6.4.1

Verifying that containment pressure is within limits ensures that unit operation remains within the limits assumed in the containment analysis. The 12 hour Frequency of this SR was developed based on operating experience related to trending of both containment pressure variations during the applicable MODES. Furthermore, the 12 hour Frequency is considered adequate in view of other indications available in the main control room, including alarms, to alert the operator to an abnormal containment pressure condition.

REFERENCES

1. Section 6.2, "Containment Systems."

BASES

APPLICABILITY

In MODES 1 through 6, the potential exists for excessive containment cooling events to produce a negative containment pressure below the design limit. However, in MODE 5 or 6, a containment air flow path may be opened (LCO 3.6.7, Containment Penetrations), providing a vacuum relief path that is sufficient to preclude a negative containment pressure below the design limit.

Therefore, the vacuum relief flow paths are required to be OPERABLE in MODES 1 through 4 and in MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter. With a 6 inch diameter or equivalent containment air flow path, the vacuum relief function is not needed to mitigate a low pressure event.

ACTIONS

A.1

When one of the required vacuum relief flow paths is inoperable, the inoperable flow path must be restored to OPERABLE status within 72 hours. The specified time period is consistent with other LCOs for the loss of one train of a system required to mitigate the consequences of a LOCA or other DBA.

B.1 and B.2

If the containment inside to outside differential air temperature is > 90°F, then the differential air temperature shall be restored to within the limit within 8 hours. The 8-hour Completion Time is reasonable, considering that limit is based on a worst case condition and the time needed to reduce the containment temperature while controlling pressure within limits of LCO 3.6.4, Containment Pressure.

If the differential temperature cannot be restored, Required Action B.2 provides an alternate requirement. Reduction of the containment average temperature to ≤ 80°F provides an initial condition for excessive cooling events that ensures the vacuum relief system capacity is sufficient (Ref. 1).

C.1, C.2, and D.1

If the Required Action and associated Completion Time of Conditions A or B are not met in MODE 1, 2, 3, or 4, or both vacuum relief flow paths are inoperable in MODE 1, 2, 3, or 4, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 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

ACTIONS (continued)

Once in MODE 5 or 6, Required Action D.1 requires that a containment air flow path ≥ 6 inches in diameter shall be opened within 8 hours. Any flow path (or paths) with an area equivalent to 6 inches in diameter is adequate to provide the necessary air flow.

The primary means of opening a containment air flow path is by establishing a VFS air flow path into containment. Manual actuation and maintenance as necessary to open a purge supply, purge exhaust, or vacuum relief flow path are available means to open a containment air flow path. In addition, opening of a spare penetration is an acceptable means to provide the necessary flow path. Opening of an equipment hatch or a containment airlock is acceptable. Containment air flow paths opened must comply with LCO 3.6.7, "Containment Penetrations."

The 8 hour Completion Time is reasonable for opening a containment air flow path in an orderly manner.

SURVEILLANCE REQUIREMENTS

SR 3.6.9.1

Verification that the containment inside to outside differential air temperature is ≤ 90°F is required every 12 hours. The containment inside to outside differential air temperature is the difference between the outside ambient air temperature (measured by the site meteorological instrumentation or equivalent) and the inside containment average air temperature (measured using the same instrumentation as used for SR 3.6.5.1).

The Frequency is based on the normally stable containment average air temperature and the relatively small outside ambient air temperature changes within this time.

SR 3.6.9.2

This SR cites the Inservice Testing Program, which establishes the requirement that inservice testing of the ASME Code Class 1, 2, and 3 valves shall be performed in accordance with the ASME OM Code (Ref. 2). Therefore, SR Frequency is governed by the Inservice Testing Program.

RAI Letter No. 01
Question 16-11

RAI Letter No. 01

Question 16-11

Description of Change A084

ITS 3.6.5 · Applicability
ITS 3.6.4 · Applicability

As described in Description of Change A084, TS 3.6.5, “Containment Air Temperature,” Applicability is revised to correct a formatting error. During the review of this change, the staff noted that a similar change should also be made to CTS 3.6.4, “Containment Pressure,” Applicability. The licensee is requested to include a similar change to CTS 3.6.4.

<u>SNC Response</u>

SNC concurs with correcting the formatting.

TS 3.6.4 Applicability is revised to indent the second Applicability. Discussion of Change (DOC) A084 is revised to acknowledge the change.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, and TS Clean pages.

Condition's Required Action allows 36 hours for entering Mode 5, the proposed 8 hour Completion Time for the second new Condition's Required Action allows no more time than is currently allowed.

This change is designated as an administrative change and is acceptable because it does not result in technical changes to the TS.

A084 Detailed Description

3.6.4-1
3.6.5-1

TS 3.6.4, "Containment Pressure," and TS 3.6.5, "Containment Air Temperature," include~~s~~ an Applicability ~~of "MODES 5 and 6 with both containment equipment hatches and both containment airlocks closed." However, this Applicability~~ statement that rolls over onto a second line and the second line is not indented as required by TSTF-GG-05-01, subsection 2.5.4.b.1. The second line for these~~is~~ Applicability statements is indented in the proposed Applicability.

Technical Evaluation

This change (wording preferences, editorial changes, reformatting, revised numbering, etc.) is made to provide clarification and for consistency with TSTF-GG-05-01. This change is designated as an administrative change and is acceptable because it does not result in technical changes to the TS.

A085 Detailed Description

3.6.6-1

The second Condition of TS 3.6.6, "Passive Containment Cooling System (PCS) – Operating," Condition D, which states "LCO not met for reasons other than A, B, or C" is being changed by adding the word "Condition" before "A, B, or C."

Technical Evaluation

The phrase "A, B, or C" in the current TS 3.6.6 Condition D wording is referring to the Conditions A, B, and C. Therefore, for clarification and consistency with the manner to which Conditions are referred and TSTF-GG-05-01, subsection 4.1.6.i.5.ii, the word "Condition" is being added. This change is designated as an administrative change and is acceptable because it does not result in technical changes to the TS.

A086 Detailed Description

3.6.6-1
3.6.7-1

TS 3.6.6, "Passive Containment Cooling System (PCS) – Operating," and TS 3.6.7, "Passive Containment Cooling System (PCS) – Shutdown," Required Action B.1 states to "Restore flow paths to OPERABLE status." Proposed TS 3.6.6 Required Action B.1 states to "Restore one flow path to OPERABLE status."

Technical Evaluation

3.6 CONTAINMENT SYSTEMS

3.6.4 Containment Pressure

LCO 3.6.4 Containment pressure shall be ≥ -0.2 psig and ≤ +1.0 psig.

APPLICABILITY: MODES 1, 2, 3, and 4.
MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter.

Indent 5 spaces

A084

- NOTE -

The high pressure LCO limit is not applicable in MODES 5 or 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment pressure not within limits.	A.1 Restore containment pressure to within limits.	1 hour
B. Required Action of Condition A and associated Completion Time not met. in MODE 1, 2, 3, or 4	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6.	~~AND~~ ~~B.3~~ C.1 Open a containment air flow path ≥ 6 inches in diameter.	~~44~~ 8 hours

A083

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1	Verify containment pressure is within limits.	12 hours

3.6 CONTAINMENT SYSTEMS

3.6.4 Containment Pressure

LCO 3.6.4 Containment pressure shall be ≥ -0.2 psig and ≤ +1.0 psig.

APPLICABILITY: MODES 1, 2, 3, and 4.
MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter.

- NOTE -

The high pressure LCO limit is not applicable in MODES 5 or 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment pressure not within limits.	A.1 Restore containment pressure to within limits.	1 hour
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. Required Action and associated Completion Time of Condtion A not met in MODE 5 or 6.	C.1 Open a containment air flow path ≥ 6 inches in diameter.	8 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1	Verify containment pressure is within limits.	12 hours

RAI Letter No. 01
Question 16-12

RAI Letter No. 01

Question 16-12

Description of Change M11
TS 3.7.1 · Bases for Required Action B.1

As described in Description of Change M11, TS 3.7.1, “Main Steam Safety Valves (MSSVs),” Condition B is added for “One or both steam generators with one or more MSSVs inoperable for closing.” During the review of this change, the staff noted that in the discussion of Action B.1 in the bases, the phrase “inoperable for opening” should be “inoperable for closing” to match the Condition B description The licensee is requested to correct this editorial error in the bases.

SNC Response

SNC concurs with the requested change. The Bases for proposed TS 3.7.1, Action B.1 discussion is revised from "With one or both steam generators with one or more MSSVs inoperable for opening, the inoperable MSSV must be restored to OPERABLE status within 72 hours," to read "With one or both steam generators with one or more MSSVs inoperable for closing, the inoperable MSSV must be restored to OPERABLE status within 72 hours."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases page.

BASES

ACTIONS (continued)

where:

Q = Nominal NSSS power rating of the plant (including reactor coolant pump heat), MWt

K = Conversion factor, 947.82 (Btu/sec)/MWt

w_s = Minimum total steam flow rate capability of the OPERABLE MSSVs on any one steam generator at the highest OPERABLE MSSV opening pressure, including tolerance and accumulation as appropriate, lbm/sec

h_{fg} = Heat of vaporization at the highest MSSV opening pressure, including tolerance and accumulation as appropriate, Btu/lbm

N = Number of steam generators in the plant

To determine the Table 3.7.1-1 Maximum Allowable Power, the Maximum NSSS Power calculated using the equation above is reduced by 9% RTP to account for Nuclear Instrument System trip channel uncertainties.

The allowed Completion Times are reasonable based on operating experience to accomplish the Required Actions in an orderly manner without challenging unit systems.

B.1

With one or both steam generators with one or more MSSVs inoperable for closing, the inoperable MSSV must be restored to OPERABLE status within 72 hours. 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.

RAI Letter No. 01
Question 16-13

RAI Letter No. 01

Question 16-13

Description of Change M04

TS 3.7.10 · Bases for Required Action C.1 and Required Action D.1

As described in Description of Change M04, TS 3.7.10, “Steam Generator (SG) Isolation Valves,” Action A.2 is added to verify the affected flow path is isolated with Completion Time (CT) of “Once per 31 days.” During the review of this change, the staff, however, notes that the conforming change to the discussion of Action C.1 in the TS Bases contains an error which needs to be corrected, namely the phrase “per Required Action A.1” should be ”per Required Action A.2.” Also, the discussion of Action D.1 contains a similar error, namely the phrase “per Required Action B.1” should be ”per Required Action B.2.” The licensee is requested to correct these errors in the bases.

<u>SNC Response</u>

SNC concurs with the requested change.

The Bases for proposed TS 3.7.10, Required Action C.1, are revised from "In the event the affected flow path is isolated in accordance with Required Action C.1, the affected penetration must be verified to be isolated on a periodic basis per Required Action A.1, which remains in effect." to read "In the event the affected flow path is isolated in accordance with Required Action C.1, the affected penetration must be verified to be isolated on a periodic basis per Required Action A.2, which remains in effect."

In addition to the requested change, an editorial change is also made to the Bases for proposed TS 3.7.10, Required Action D.1, to correct a typo of "Requried" to "Required." The Bases for proposed TS 3.7.10, Required Action D.1, are revised from "In the event the affected flow path is isolated in accordance with Required Action D.1, the affected penetration must be verified to be isolated on a periodic basis per Requiried Action B.1, which remains in effect." to read "In the event the affected flow path is isolated in accordance with Required Action D.1, the affected penetration must be verified to be isolated on a periodic basis per Required Action B.2, which remains in effect."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases pages.

BASES

ACTIONS (continued)

allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since the function of locking, sealing, or securing components is to ensure that these devices are not inadvertently repositioned. Therefore, the probability of misalignment of these valves, once they have been verified to be in the proper position, is small.

B.1 and B.2

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

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

C.1

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

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

BASES

ACTIONS (continued)

D.1

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

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

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

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

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

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

RAI Letter No. 01
Question 16-14

RAI Letter No. 01

Question 16-14

TS 3.8.1 · SR 3.8.1.2 and bases

SR 3.8.1.2 uses the term “combined demands” while the Bases uses the term “coincident demands;” for consistency, the staff recommends using “combined demands” in both places. The licensee is requested to make this change.

SNC Response

SNC concurs with revising SR 3.8.1.2 Bases for clarity. The change makes the SR and the Bases consistent by using the phrase “combined” instead of “coincident.”

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases page.

BASES

SURVEILLANCE REQUIREMENTS (continued)

charger voltage level after a response to a loss of AC power. The time period is sufficient for the charger temperature to have stabilized and to have been maintained for at least 2 hours.

The other option requires that each battery charger be capable of recharging the battery after a service test coincident with supplying the largest combined demands of the various continuous steady state loads (irrespective of the status of the plant during which these demands occur). This level of loading may not normally be available following the battery service test and will need to be supplemented with additional loads. The duration for this test may be longer than the charger sizing criteria since the battery recharge is affected by float voltage, temperature, an the exponential decay in charging current. The battery is recharged when the measured charging current is ≤ 2 amps.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 24 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

SR 3.8.1.3

A battery service test is a special test of battery capability, as found, to satisfy the design requirements (battery duty cycle) of the Class 1E DC electrical power system. The discharge rate and test length corresponds to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of 24 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 9) and Regulatory Guide 1.129 (Ref. 10), which state that the battery service test should be performed with intervals between tests not to exceed 24 months. This Surveillance may be performed during any plant condition with the spare battery and charger providing power to the bus.

This SR is modified by a Note. The Note allows the performance of a modified performance discharge test in lieu of a service test.

The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity,

RAI Letter No. 01
Question 16-15

RAI Letter No. 01

Question 16-15

Description of Change L22

CTS 3.8.2 • Action A and bases
ITS 3.8.2 • Condition A, Required Action A.1, Required Action A.2, Required Action A.3, Action B and bases

The proposed 7 day Completion Time for ITS 3.8.2 Required Action A.3 under Description of Change L22, is not consistent with the time allowed to restore one or both battery chargers in one electrical division by TSTF-500-A, Rev 2; it should be 72 hours, not 7 days. TSTF-500-A states (referring to DC Sources – Operating and Shutdown):

> TS 3.8.4, Required Action A.3, and TS 3.8.5, Required Action A.3, each contain a 72 hour Completion Time vice the 7 day Completion Time in TSTF-360-A. Licensees wishing to adopt a Completion Time for Required Action A.3 longer than 72 hours will need to demonstrate that the Completion Time is appropriate for the plant in accordance with the guidance in Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," and RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis." Alternatively, the 7 day Completion Time can be justified by an acceptable method, such as a regulatory commitment that an alternate means to charge the batteries will be available that is capable of being supplied power from a power source that is independent of the offsite power supply. Otherwise, the 72 hour Completion Time must be adopted.

The licensee is requested to propose a 72 hour completion time for new Required Action A.3, or justify a longer Completion Time according to the above guidance in TSTF-500-A, and describe that justification in the bases for Required Action A.3.

<u>SNC Response</u>

SNC concurs with revising TS 3.8.2 new Required Action A.3 Completion Time to be 72 hours. The change makes the Required Action Completion Time consistent with NUREG-1431 as modified in Revision 4 issued April 2012. The original LAR-12-002 proposed 7 days was consistent with NUREG-1431, Revision 3.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

The new Action A consists of the following:

- Condition A: One or more required battery chargers in one division inoperable
- Required Action A.1: Restore battery terminal voltage to greater than or equal to the minimum established float voltage with Completion Time of 6 hours;
- Required Action A.2: Verify battery float current ≤ 2 amps with Completion Time of once per 24 hours; and
- Required Action A.3: Restore battery charger(s) to Operable status with Completion Time of 72 ~~days~~hours.

Technical Evaluation

Current TS Required Actions for an inoperable battery charger are the same as for an inoperable battery or a completely deenergized DC electrical power subsystem, which requires immediate actions in accordance with current Action A.

New Action A and associated Required Actions A.1, A.2, and A.3 are added to TS 3.8.2 to address battery charger inoperability. These Actions address the condition where one or more battery charger(s) for any one division becomes inoperable. Note that the proposed addition is the same as TS 3.8.1, DC Sources – Operating, Condition A, Required Actions A.1, A.2 and A.3 and their associated Completion Times.

The proposed Required Action A.3 for TS 3.8.2 provides a 72-hour~~day~~ restoration time for inoperable battery charger(s) on one division. This time is contingent on a focused and tiered approach to assuring adequate battery capability is maintained.

The first priority is to minimize the battery discharge. Required Action A.1 assures the discharge is terminated by requiring that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within 6 hours.

The second tier action (Required Action A.2) requires that within 24-hours (and continuing at 24-hour intervals) that verification is made that the battery has sufficient capacity to perform its assumed duty cycle. The 24 hours is provided since there may involve some recharging of lost capacity that occurred during the initial 2 hours. This provides a reasonable time to fully recharge the battery.

Given that the DC buses remain energized (as required by TS 3.8.6), the battery discharge (if it was occurring) is terminated (Required Action A.1), and that the battery is fully recharged (Required Action A.2), there is reasonable basis for extending the restoration time for an inoperable charger to 72 hours~~days~~.

This change is designated as less restrictive because it extends the restoration time for an inoperable charger to 72 hours~~days~~. The proposed TS change is consistent with NUREG-1431, Revision 4.0.

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 DC Sources – Shutdown

LCO 3.8.2 DC electrical power subsystems shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.6, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

- NOTE -

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A.~~ One or more required DC electrical power subsystems inoperable.	~~A.~~1 Declare affected required features inoperable.	Immediately
	OR	
	~~A.2.1~~ ~~Suspend CORE ALTERATIONS.~~	~~Immediately~~
	~~AND~~	
	~~A.2.2~~ Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	~~A.2.3~~ Suspend operations with a potential for draining the reactor vessel.	Immediately
	AND	

Insert 3.8.2-1

B

B

B.2.1

B.2.2

L22

L03

A. One or more required battery chargers in one division inoperable.	A.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage.	6 hours
	AND	
	A.2 Verify battery float current ≤ 2 amps.	Once per 24 hours
	AND	
	A.3 Restore battery charger(s) to OPERABLE status.	72 hours

Insert 3.8.2-1

L22

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 DC Sources – Shutdown

LCO 3.8.2 DC electrical power subsystems shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.6, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

- NOTE -

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required battery chargers in one division inoperable.	A.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage.	6 hours
	AND	
	A.2 Verify battery float current ≤ 2 amps	Once per 24 hours
	AND	
	A.3 Restore battery charger(s) to OPERABLE status.	72 hours

BASES

ACTIONS (continued)

A discharged battery having terminal voltage of at least the minimum established float voltage indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus, there is good assurance of fully recharging the battery within 24 hours, avoiding a premature shutdown with its own attendant risk.

If the charger is operating in the current limit mode after 6 hours that is an indication that the battery is partially discharged and its capacity margins will be reduced. The time to return the battery to its fully charged condition in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within 24 hours (Required Action A.2).

Required Action A.2 requires that the battery float current be verified as less than or equal to 2 amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it has now been fully recharged. If at the expiration of the initial 24 hour period the battery float current is not less than or equal to 2 amps this indicates there may be additional battery problems and the battery must be declared inoperable.

Required Action A.3 limits the restoration time for the inoperable battery charger to 72 hours. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used (e.g., balance of plant non-Class 1E battery charger). The 72 hour Completion Time reflects a reasonable time to effect restoration of the qualified battery charger to OPERABLE status.

B.1, B.2.1, B.2.2, B.2.3, and B.2.4

With one or more of the required (per LCO 3.8.6, “Distribution Systems – Shutdown”) Class 1E DC power subsystems inoperable for reasons other than Condition A, the remaining subsystems may be capable of supporting sufficient systems to allow continuation of fuel movement and/or operations with a potential for draining the reactor vessel. By allowing the option to declare required features inoperable with the associated DC power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO

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Question 16-16

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Question 16-16

Description of Change A112

TS 3.8.5 • LCO, Condition A, Condition B, Condition C, Condition D and bases

As described in Description of Change A112, TS 3.8.5, “Distribution Systems – Operating,” Conditions A and C, and associated Required Actions are reworded to refer to

• One ~~Division~~ AC instrument and control bus **Division** and

• Two ~~Divisions~~ AC instrument and control bus **Divisions**.

TS 3.8.5 Conditions B and D, and associated Required Actions are reworded to refer to

• One ~~Division~~ DC electrical power distribution subsystem **Division** and

• Two ~~Divisions~~ DC electrical power distribution subsystem **Divisions**.

The “Background” section of the bases for TS 3.8.5 states:

> The Class 1E AC distribution Divisions B and C each consists of two 208/120 V buses….The Class 1E DC distribution Divisions B and C each consists of two 250 VDC buses.

In light of this description, the rewording of Actions A, B, C, and D appears correct for Divisions B and C only if an AC or DC “Division” is considered inoperable regardless of whether one or both buses in the Division are inoperable. In addition, it seems the LCO should refer to “Division A, B, C, and D AC instrument and control buses;” and not “bus.” The “Actions” section of the bases also needs revising to be consistent with the proposed changes to the associated TS action requirements.

The licensee is requested to consider these comments and propose clarifying changes to the Actions, the bases, or both.

<u>SNC Response</u>

SNC concurs with revising TS 3.8.5 for nomenclature clarification and consistency.

- TS 3.8.5, “Distribution Systems – Operating," and TS 3.8.6, “Distribution Systems – Shutdown,” are revised to delete “bus” from the name for subsystem “AC instrument and control” to more closely align with terminology in FSAR Chapter 8;
- TS 3.8.5 LCO is revised to specify the two electrical power distribution subsystems in a list format. This clarifies that both DC and AC instrument and control divisions are electrical power distribution subsystems; and
- TS 3.8.5 Condition E is revised to remove “distribution subsystems” for simplification and consistency in Condition phrasing.

These changes are added to Discussion of Change (DOC) A112. Conforming and clarifying changes are also made to the TS 3.8.5 Action Bases, which include clarifying that one or both Division B or C buses inoperable result in the associated division being inoperable. This is consistent with the LCO Bases defining the scope of the division as reflected in Table B 3.8.5-1.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

A112 Detailed Description

3.8.5-1 TS 3.8.5, "Distribution Systems – Operating," and TS 3.8.6, "Distribution Systems – Shutdown," are revised to delete "bus" from the name for subsystem "AC instrument and control."

TS 3.8.5 LCO is revised to specify the two electrical power distribution subsystems in a list format.

TS 3.8.5, Conditions A, B, C, D, and ~~D~~E are revised to move "Division" or "Divisions" such that the Condition ~~ends with~~reads "~~D~~division inoperable" or "~~D~~divisions inoperable"; for example Condition A is revised to "One AC instrument and control ~~bus D~~division inoperable."

TS 3.8.5 Required Actions A.1, B.1, C.1, and D.1 are revised to add "~~D~~division" such that each of these "Restore" Required Action ends with "~~D~~division to OPERABLE status." For example, Required Action A.1 is revised to "Restore AC instrument and control ~~bus D~~division to OPERABLE status."

TS 3.8.5 Required Action C.1 and Required Action D.1 are revised from "Restore..." to "Restore one... ."

TS~~-~~ 3.8.5 Condition E is revised to remove "divisions with" and "distribution subsystems."

Technical Evaluation

The nomenclature used for the two Class 1E electrical power distribution subsystems is clarified by deleting "bus" from the name for subsystem "AC instrument and control" and the TS 3.8.5 LCO reformatted to clarify that both DC and AC instrument and control divisions are electrical power distribution subsystems. The Actions are revised to present inoperabilities of divisions.

As described in the TS Bases, current TS 3.8.5 Action A provides the requirements when one ~~D~~division of the AC instrument and control ~~bus~~ electrical power distribution subsystem is inoperable and current Action B provides the requirements when one ~~D~~division of the DC electrical power distribution subsystem is inoperable. Current TS 3.8.5 Actions C and D provide the requirements when two ~~D~~divisions of the AC instrument and control ~~buses~~ electrical power distribution subsystem are inoperable and two ~~D~~divisions of the DC electrical power distribution subsystem~~s~~ are inoperable, respectively. The revised wording of the Conditions and Required Actions provides for clarity and consistency without changing the intent or technical requirements. Therefore, usability is enhanced.

In the event two ~~D~~divisions of the AC instrument and control ~~buses~~ electrical power distribution subsystem are inoperable, once a single ~~D~~division of AC instrument and control ~~bus~~ is restored to Operable status, TS 3.8.5 Condition C no longer applies. Thus Required Action C.1 is clarified to "Restore one AC instrument and control ~~bus D~~division to OPERABLE status." Only a single AC instrument and control ~~bus D~~division must be restored within the required 2 hours.

Since Action A was also entered when the first ~~D~~division of AC instrument and control ~~buses~~ became inoperable, Action A governs the restoration of the remaining inoperable AC instrument and control division ~~bus~~. Therefore, for clarity and consistency with the actual requirements, proposed TS 3.8.5 Required Actions C.1 and D.1 only require the restoration of one AC instrument and control ~~bus~~ ~~D~~division and one DC ~~electrical power distribution subsystem D~~division, respectively. Minor wording clarification and reformatting are made for consistency and more standard TS phrasing. Since these changes do not result in any technical change to the current requirements, they are considered administrative. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

A113 Detailed Description

3.8.7-3 TS 3.8.7, “Battery Parameters,” is revised to add the word “float” to SR 3.8.7.2 and SR 3.8.7.5. Specifically, SR 3.8.7.2 is revised from “Verify each battery pilot cell voltage is ≥ 2.07 V” to “Verify each battery pilot cell float voltage is ≥ 2.07 V” and SR 3.8.7.5 is revised from “Verify each battery connected cell voltage is ≥ 2.07 V” to “Verify each battery connected cell float voltage is ≥ 2.07 V.”

Technical Evaluation

The word “float” is added to SR 3.8.7.2 and SR 3.8.7.5 for consistency with TS 3.8.7 Condition A. Condition A states, “One or more batteries in one division with one or more battery cells float voltage < 2.07 V.”

The addition of the word “float” to SR 3.8.7.2 and SR 3.8.7.5 is consistent with the Bases. The SR 3.8.7.2 and SR 3.8.7.5 Bases state, “SRs 3.8.7.2 and 3.8.7.5 require verification that the cell float voltages are equal to or greater than the short term absolute minimum voltage of 2.07 V.” The revised presentation of SR 3.8.7.2 and SR 3.8.7.5 is consistent with NUREG-1431 SR 3.8.6.2 and SR 3.8.6.5.

The proposed changes are for consistency within TS 3.8.7. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

A114 Detailed Description

3.9.1-1 TS 3.9.1, "Boron Concentration," includes a Note to the Applicability that states "Only applicable to the fuel transfer canal and the refueling cavity when connected to the RCS." This Note is revised to read "Applicable to the fuel transfer canal and the refueling cavity only when connected to the RCS."

Technical Evaluation

This change for wording preference is made to provide clarification. The current wording of the Note could imply that "only" the fuel transfer canal and the refueling cavity boron concentration are required to meet the LCO when these two areas are connected to the Reactor Coolant System (RCS). However, the correct meaning of the Note is that the boron concentration limit is applicable to the two areas only when the two areas are actually connected to the RCS. To alleviate

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 Distribution Systems – Operating

LCO 3.8.5 The following Division A, B, C, and D ~~AC instrument and control bus and DC~~ electrical power distribution subsystems shall be OPERABLE~~.~~ A112

... :
a. DC; and
b. AC instrument and control.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ~~Division~~ AC instrument and control ~~bus~~ inoperable. (division)	A.1 Restore AC instrument and control ~~bus~~ to OPERABLE status. (division)	6 hours ~~AND~~ ~~12 hours from discovery of failure to meet the LCO~~ A112 L04
B. One ~~Division~~ DC ~~electrical power distribution subsystem~~ inoperable. (division)	B.1 Restore DC ~~electrical power distribution subsystem~~ to OPERABLE status. (division)	6 hours ~~AND~~ ~~12 hours from discovery of failure to meet the LCO~~ A112 L04
C. Two ~~Divisions~~ AC instrument and control ~~bus~~ inoperable. (divisions)	C.1 Restore one AC instrument and control ~~bus~~ to OPERABLE status. (division)	2 hours ~~AND~~ ~~16 hours from discovery of failure to meet the LCO.~~ A112 L04
D. Two ~~Divisions~~ DC ~~electrical power distribution subsystem~~ inoperable. (divisions)	D.1 Restore one DC ~~electrical power distribution subsystem~~ to OPERABLE status. (division)	2 hours ~~AND~~ ~~16 hours from discovery of failure to meet the LCO.~~ A112 L04

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time not met. of Condition A, B, C, or D	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours
F. Two ~~Divisions with~~ inoperable ~~distribution subsystems~~ divisions that result in a loss of safety function.	F.1 Enter LCO 3.0.3.	Immediately

A104

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	Verify correct breaker and switch alignments and voltage to required DC and AC instrument and control ~~bus~~ electrical power distribution subsystems.	7 days

A112

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
3	A.2.~~4~~ Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND	
4	A.2.~~5~~ Initiate actions to restore required DC and AC instrument and control ~~bus~~ electrical power distribution subsystems to OPERABLE status.	Immediately

L03

A112

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.1	Verify correct breaker and switch alignments and voltage to required DC and AC instrument and control ~~bus~~ electrical power distribution subsystems.	7 days

A112

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 Distribution Systems – Operating

LCO 3.8.5 The following Division A, B, C, and D electrical power distribution subsystems shall be OPERABLE:

a. DC; and

b. AC instrument and control.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One AC instrument and control division inoperable.	A.1 Restore AC instrument and control division to OPERABLE status.	6 hours
B. One DC division inoperable.	B.1 Restore DC division to OPERABLE status.	6 hours
C. Two AC instrument and control divisions inoperable.	C.1 Restore one AC instrument and control division to OPERABLE status.	2 hours
D. Two DC divisions inoperable.	D.1 Restore one DC division to OPERABLE status.	2 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours
F. Two inoperable divisions that result in a loss of safety function.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	Verify correct breaker and switch alignments and voltage to required DC and AC instrument and control electrical power distribution subsystems.	7 days

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.4 Initiate actions to restore required DC and AC instrument and control electrical power distribution subsystems to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.1	Verify correct breaker and switch alignments and voltage to required DC and AC instrument and control electrical power distribution subsystems.	7 days

BASES

APPLICABILITY

The Class 1E AC instrument and control and DC electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

The Class 1E AC instrument and control and DC electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for Specification 3.8.6, "Class 1E Distribution Systems – Shutdown."

ACTIONS

A.1

With one Class 1E AC instrument and control division inoperable (for Division B or C, either one or both required distribution panels inoperable can cause that division to be inoperable) the remaining Class 1E AC instrument and control divisions have the capacity to support a safe shutdown and to mitigate all DBAs, based on conservative analysis.

Because of the passive system design and the use of fail-safe components, the remaining Class 1E AC instrument and control divisions have the capacity to support a safe shutdown and to mitigate most design basis accidents following a subsequent worst case single failure. The 6 hour Completion Time is reasonable based on engineering judgement balancing the risks of operation without one AC instrument and control division against the risks of a forced shutdown. Additionally, the Completion Time reflects a reasonable time to assess plant status; attempt to repair or replace, thus avoiding an unnecessary shutdown; and, if necessary, prepare and effect an orderly and safe shutdown.

This 6 hour limit is shorter than Completion Times allowed for most supported systems which would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 6 hours, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while allowing stable operations to continue;

BASES

ACTIONS (continued)

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected division; and

c. The potential for an event in conjunction with a single failure of a redundant component.

The 6 hour Completion Time takes into account the importance to safety of restoring the Class 1E AC instrument and control division to OPERABLE status, the passive design of the ESF systems, the redundant capability afforded by the other OPERABLE Class 1E AC instrument and control divisions, and the low probability of a DBA occurring during this period which requires more than two OPERABLE AC instrument and control divisions.

The 6 hour Completion Time is also consistent with the time specified for restoration of one (of four) Protection and Safety Monitoring System actuation division (LCO 3.3.15, Engineered Safety Feature Actuation System (ESFAS) Actuation Logic - Operating). Depending on the nature of the AC instrument and control inoperability, one supported division of instrumentation could be considered inoperable. Inoperability of a PMS division is similar to loss of one AC instrument and control division. In both cases, actuation of the safety functions associated with one of the four subsystems/divisions may no longer be available.

B.1

With one Class 1E DC electrical power distribution subsystem division inoperable (for Division B or C, either one or more required buses or distribution panels inoperable can cause that division to be inoperable), the remaining divisions have the capacity to support a safe shutdown and to mitigate all DBAs, based on conservative analysis.

Because of the passive system design and the use of fail-safe components, the remaining divisions have the capacity to support a safe shutdown and to mitigate most design basis accidents following a subsequent worst case single failure. The 6 hour Completion Time is reasonable based on engineering judgement balancing the risks of operation without one division against the risks of a forced shutdown. Additionally, the completion time reflects a reasonable time to assess plant status; attempt to repair or replace, thus avoiding an unnecessary shutdown; and, if necessary, prepare and effect an orderly and safe shutdown.

BASES

ACTIONS (continued)

Condition D represents two divisions without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining divisions and restoring power to one affected division.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected divisions; and

c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for one DC electrical power distribution subsystem division is consistent with Regulatory Guide 1.93 (Ref. 4).

E.1 and E.2

If the inoperable divisions(s) cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to MODE 5 where the probability and consequences on an event are minimized. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

LCO (continued)

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the unit in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

APPLICABILITY

The Class 1E AC instrument and control and DC electrical power distribution subsystems are required to be OPERABLE in MODES 5 and 6 and during movement of irradiated fuel assemblies provide assurance that:

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;

b. Systems needed to mitigate a fuel handling accident are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition and refueling condition.

The Class 1E AC instrument and control and DC electrical power distribution subsystem requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.5, “Distribution Systems – Operating.”

ACTIONS

LCO 3.0.3 is not applicable while in MODE 5 or 6. However, since irradiated fuel assembly movement can occur in MODE 1, 2, 3, or 4, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operations. Entering LCO 3.0.3, while in MODE 1, 2, 3, or 4 would require the unit to be shutdown unnecessarily.

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If one or more required Class 1E DC or Class 1E AC instrument and control electrical power distribution subsystems are inoperable, the remaining OPERABLE divisions may be capable of supporting required features to allow continuation of fuel movement and/or operations with a potential for draining the reactor vessel. By allowing the option to declare

BASES

ACTIONS (continued)

required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions will be implemented in accordance with the affected equipment LCO Required Actions. In many instances this would likely involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend movement of irradiated fuel assemblies, any activities that could potentially result in inadvertent draining of the reactor vessel, and operations involving positive reactivity additions that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6)). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions will minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC instrument and control and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power.

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

This Surveillance verifies that the Class 1E AC instrument and control and DC electrical power distribution subsystems are functioning properly, with the required circuit breakers and switches properly aligned. The verification of proper voltage availability on the buses ensures that the required power is readily available for motive as well as control functions for critical system

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TS 5.6.6

On page 5.6-5, there is a formatting error that requires correction. There is a list of items (listed a through h) in TS 5.6.6 on the page. Two of the items (items d and e) have been incorrectly merged into one run-on item d. Item e needs to be separated from item d and reformatted so the list is accurate.

SNC Response

SNC concurs with separating item d and item e in proposed TS 5.6.5, "Steam Generator Tube Inspection."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised TS Clean page.

5.6 Reporting Requirements

5.6.6 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.4, "Steam Generator (SG) Program." The report shall include:

a. The scope of inspections performed on each SG,

b. Active degradation mechanisms found,

c. Nondestructive examination techniques utilized for each degradation mechanism,

d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,

e. Number of tubes plugged during the inspection outage for each active degradation mechanism,

f. Total number and percentage of tubes plugged to date,

g. The results of condition monitoring, including the results of tube pulls and in-situ testing, and

h. The effective plugging percentage for all plugging in each SG.

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Question 16-18, Issue 2

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Question 16-18

Descriptions of Change A024, A028, and L10

ITS 3.3.1 • Bases "Actions" • Bases SR 3.3.1.8 • Bases SR 3.3.1.9
ITS 3.3.2 • Bases "Actions" • Bases SR 3.3.2.2 • Bases SR 3.3.2.3
ITS 3.3.3 • Bases "Actions"
ITS 3.3.4 • Bases "Actions"
ITS 3.3.8 • Bases "Actions" • Bases SR 3.3.8.2 • Bases SR 3.3.8.3
ITS 3.3.9 • Bases "Actions"
ITS 3.3.10 • Bases "Actions" • Bases SR 3.3.10.2 • Bases SR 3.3.10.3
ITS 3.3.11 • Bases "Actions"
ITS 3.3.13 • Bases "Actions"
ITS 3.3.14 • Bases "Actions"

Issue 1: Not used

Issue 2: On ITS Page B 3.3.8-34, in the "Actions" section of the bases for ITS 3.3.8, the licensee is requested to revise the second paragraph as indicated for clarity.

> "In the event a channel's as-found condition is outside the as-found tolerance described in the SP, or the channel is not functioning as required, or the transmitter, *or the Protection and Safety Monitoring System Division, associated with a specific Function* is found inoperable, then all affected **protection** Functions ~~provided~~ **supported** by **or dependent on** that channel must be declared inoperable and the LCO Condition(s) entered for the *particular* protection Function(s) affected. *When the Required Channels are specified only on a per steam line, per loop, per SG, basis, then the Condition may be entered separately for each steam line, loop, SG, etc., as ~~appropriate~~* **specified by Notes in the ACTIONS that allow separate condition entry; such notes always state the basis for separate condition entry**.

Similar changes are also requested for the second paragraph in the "Actions" section of the bases for ITS 3.3.10, 3.3.11, 3.3.13, and 3.3.14.

<u>SNC Response</u>

SNC does not concur with the need for revision. The proposed Bases revision reflects wording preferences with no specific deficiency identified. These wording preferences are unrelated to any specific change to Technical Specifications or other Bases included in LAR-12-002. These proposed changes affect Generic Technical Specifications for AP1000 (GTS) wording, which adequately conveys the intent.

Specifically, "Functions" is commonly used throughout both the Technical Specifications and associated Bases in this context. While "protection function" is also used, as is "safety function" and "protective function," there is no specific confusion or intended difference in these contexts and the phrases are often used interchangeably. The GTS phrase "Functions provided by that channel" is also generic enough wording to convey both "Functions supported by" and "Functions dependent on" that channel. The Bases for the separate-Condition-entry Note also

convey the intent of the TS 3.3.8 Actions Note. The proposed wording implies there are multiple Actions Notes and makes a broad general statement (i.e., “always”). These changes are not deemed to provide improved wording, and deviate from wording found in the GTS.

Additionally, the existing paragraph with proposed changes is consistent with the paragraph in TS 3.3.2 Bases in NUREG-1431. Since the proposed Bases revision applies to wording found in both the GTS and NUREG-1431, SNC prefers to maintain this consistency.

No changes to LAR-12-002 result from this RAI Response.

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Question 16-18, Issue 3

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Question 16-18

Issue 3: The licensee is requested to (1) explain the meaning of the second paragraph of the "Actions" section of the bases for ITS 3.3.9, which is not clear to the staff because the ESFAS manual actuation functions bypass the automatic actuation function's voting logic; and (2) explain why the bases for ITS 3.3.12 do not have this paragraph.

SNC Response

SNC concurs with Bases revision for clarity. The new TS 3.3.9 Action Bases second paragraph is deleted. This will achieve consistency with the other Instrumentation Bases for manual functions, actuation logic, and hardware-type functions (e.g., Reactor Trip Breaker). This will result in consistency with the Bases for new TS 3.3.12, which also does not retain this paragraph for similar reasons.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases page.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

This Function is required to be OPERABLE in MODES 1, 2, and 3, and MODE 4 with the RCS cooling not being provided by the RNS. In MODE 4 with the RCS cooling being provided by the RNS the steam generators are not being used for RCS cooling and the potential for a SGTR is minimized due to the reduced mass and energy in the RCS and steam generators.

15. Containment Vacuum Relief Valve Actuation - Manual Initiation

The purpose of the vacuum relief lines is to protect the containment vessel against damage due to a negative pressure (i.e., a lower pressure inside than outside).

The operator can open the vacuum relief valves at any time from the main control room by actuating either of the two vacuum relief actuation switches. There are two switches in the main control room, either of which will actuate vacuum relief in all divisions.

Manual Containment Vacuum Relief Valve actuation must be OPERABLE in MODES 1 through 4 and in MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter. With a 6 inch diameter or equivalent containment air flow path, the vacuum relief function is not needed to mitigate a low pressure event.

ESFAS Manual Initiation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this specification may be entered independently for each Function listed on Table 3.3.9-1. The Completion Time(s) of the inoperable equipment of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

RAI Letter No. 01
Question 16-19, Issue 1

RAI Letter No. 01

Question 16-19

Description of Change M01

CTS SR 3.3.1.7 RTCOT • ITS SR 3.3.4.1 ALT • ITS SR 3.3.6.1 ALT
CTS SR 3.3.1.8 RTCOT • ITS SR 3.3.1.6 COT • ITS SR 3.3.2.2 COT
CTS SR 3.3.1.9 RTCOT • ITS SR 3.3.1.7 COT • ITS SR 3.3.2.2 COT • ITS SR 3.3.3.2 COT
CTS 5.5.14.c
ITS bases "References" • 3.3.1, 3.3.3, 3.3.4, 3.3.6, 3.3.8, 3.3.10, 3.3.11, 3.3.13, 3.3.14

The "References" section of the bases for ITS 3.3.1, 3.3.3, 3.3.4, 3.3.6, 3.3.8, 3.3.10, 3.3.11, 3.3.13, and 3.3.14 lists APP-GW-GSC-020, "Technical Specification Completion Time and Surveillance Frequency Justification" (also known as WCAP-16787-P; ML080800193) (non-proprietary ML080800189). This report refers to the Reactor Trip Channel Operational Test (RTCOT). In Description of Change M01, the licensee proposes to use COT (ITS SR 3.3.1.7) and Actuation Logic Test (ALT) (ITS SR 3.6.6.1) in place of RTCOT, and delete the definition of RTCOT.

Issue 1: The licensee is requested to explain how deletion of RTCOT definition from TS will be reconciled in the licensing basis.

<u>SNC Response</u>

As described in Discussion of Change (DOC) M01, the current requirements for RTCOT are encompassed in revising current RTCOT Surveillance SR 3.3.1.7 to an Actuation Logic Test Surveillance in new SR 3.3.4.1 and new SR 3.3.6.1, as well as revising current RTCOT Surveillances 3.3.1.8 and SR 3.3.1.9 to a COT Surveillance in new SR 3.3.1.6, SR 3.3.1.7, SR 3.3.2.2, and SR 3.3.3.2.

To address the relationship of these new Surveillances to the use of "RTCOT" in APP-GW-GSC-020, "AP1000 Protection and Safety Monitoring System Technical Specification Completion Time and Surveillance Frequency Justification," the Bases for each Surveillance that originated as an RTCOT will be revised to reference that APP-GW-GSC-020 describes the test as the "RTCOT."

In review of this RAI, it was recognized that new TS 3.3.2 Bases Reference 2 was incorrectly cited. Reference 2 is corrected to be "APP-GW-GSC-020, 'AP1000 Protection and Safety Monitoring System Technical Specification Completion Time and Surveillance Frequency Justification'." Additionally, new TS 3.3.6 Bases Reference 1 is unused and is deleted resulting in renumbering of Reference 2 and citations to it.

Note that the Surveillance Frequencies are unchanged and continue to be supported by APP-GW-GSC-020 as cited in the Bases.

The changes to LAR 12-002 from this RAI Response are reflected in the following revised Bases pages.

BASES

SURVEILLANCE REQUIREMENTS (continued)

If the COT cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the COT can be performed using portable test equipment.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this COT. This portion of the COT ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

This test frequency of 92 days is justified based on Reference 6 (which refers to this test as "RTCOT") and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the Protection and Safety Monitoring System cabinets to the operator within 10 minutes of a detectable failure.

During the COT, the Protection and Safety Monitoring System cabinets in the division under test may be placed in bypass.

<u>SR 3.3.1.7</u>

SR 3.3.1.7 is the performance of a COT as described in SR 3.3.1.6 (note that Reference 6 refers to this test as an "RTCOT"), except it is modified by a Note that allows this surveillance to be satisfied if it has been performed within the previous 92 days. The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable. This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel's response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation.

BASES

SURVEILLANCE REQUIREMENTS (continued)

To the extent possible, protection and safety monitoring system functional testing is accomplished with continuous system self-checking features and the continuous functional testing features. The COT shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the COT cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the COT can be performed using portable test equipment.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this COT. This portion of the COT ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

This test frequency of 92 days is justified based on Reference 2 (which refers to this test as "RTCOT") and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the protection and safety monitoring system cabinets to the operator within 10 minutes of a detectable failure.

SR 3.3.2.2 is modified by two Notes. The first Note allows this surveillance to be satisfied if it has been performed within the previous 92 days. The second Note provides a 4 hour delay in the requirement to perform this Surveillance when entering MODE 3 from MODE 2. This note allows a normal shutdown to proceed without a delay for testing in MODE 2 and for a short time in MODE 3 until the RTBs are open and SR 3.3.2.2 is no longer required to be performed. If the unit is to be in MODE 3 with the RTBs closed for a time greater than 4 hours, this Surveillance must be performed prior to 4 hours after entry into MODE 3.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Each channel response must be verified every 24 months on a STAGGERED TEST BASIS (i.e., all four Protection Channel Sets would be tested after 96 months). Response times cannot be determined during plant operation because equipment operation is required to measure response times. Experience has shown that these components usually pass this surveillance when performed on a refueling frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.3.2.4 is modified by a note exempting neutron detectors from RTS RESPONSE TIME testing. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

REFERENCES

1. Chapter 7.0, “Instrumentation and Controls.”

2. APP-GW-GSC-020, “Technical Specification Completion Time and Surveillance Frequency Justification.”

BASES

SURVEILLANCE REQUIREMENTS (continued)

Since software does not degrade, software functional testing involves verifying that the software code has not changed and that the software code is executing.

To the extent possible, protection and safety monitoring system functional testing is accomplished with continuous system self-checking features and the continuous functional testing features. The COT shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the COT cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the COT can be performed using portable test equipment.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this COT. This portion of the COT ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

This test frequency of 92 days is justified based on Reference 2 (which refers to this test as "RTCOT") and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the protection and safety monitoring system cabinets to the operator within 10 minutes of a detectable failure.

SR 3.3.3.2 is modified by a Note. The Note allows this surveillance to be satisfied if it has been performed within 92 days of the Frequencies prior to reactor startup and four hours after reducing power below P-10. The Frequency of "prior to reactor startup" ensures this surveillance is performed prior to critical operations and applies to the source, intermediate and power range low instrument channels. The Frequency of "4 hours after reducing power below P-10" allows a normal shutdown to be completed and the unit removed from the MODE of Applicability for this surveillance without a delay to perform the testing required by this

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.4.1

SR 3.3.4.1 is the performance of a ACTUATION LOGIC TEST every 92 days.

An ACTUATION LOGIC TEST is performed on each required channel to provide reasonable assurance that the entire channel will perform the intended Function.

A test subsystem is provided with the protection and safety monitoring system to aid the plant staff in performing the ACTUATION LOGIC TEST. The test subsystem is designed to allow for complete functional testing by using a combination of system self checking features, functional testing features, and other testing features. Successful functional testing consists of verifying that the capability of the system to perform the safety function has not failed or degraded.

For hardware functions this would involve verifying that the hardware components and connections have not failed or degraded. Generally this verification includes a comparison of the outputs from two or more redundant subsystems or channels.

Since software does not degrade, software functional testing involves verifying that the software code has not changed and that the software code is executing.

To the extent possible, protection and safety monitoring system functional testing is accomplished with continuous system self-checking features and the continuous functional testing features. The ACTUATION LOGIC TEST shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the ACTUATION LOGIC TEST cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the ACTUATION LOGIC TEST can be performed using portable test equipment.

This test frequency of 92 days is justified based on Reference 1 (which refers to this test as an “RTCOT”) and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the protection and safety monitoring system cabinets to the operator within 10 minutes of a detectable failure.

BASES

SURVEILLANCE REQUIREMENTS (continued)

A test subsystem is provided with the protection and safety monitoring system to aid the plant staff in performing the ACTUATION LOGIC TEST. The test subsystem is designed to allow for complete functional testing by using a combination of system self checking features, functional testing features, and other testing features. Successful functional testing consists of verifying that the capability of the system to perform the safety function has not failed or degraded.

For hardware functions this would involve verifying that the hardware components and connections have not failed or degraded. Generally this verification includes a comparison of the outputs from two or more redundant subsystems or channels.

Since software does not degrade, software functional testing involves verifying that the software code has not changed and that the software code is executing.

To the extent possible, protection and safety monitoring system functional testing is accomplished with continuous system self-checking features and the continuous functional testing features. The ACTUATION LOGIC TEST shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the ACTUATION LOGIC TEST cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the ACTUATION LOGIC TEST can be performed using portable test equipment.

This test frequency of 92 days is justified based on Reference 1 (which refers to this test as “RTCOT”) and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the protection and safety monitoring system cabinets to the operator within 10 minutes of a detectable failure.

During the ACTUATION LOGIC TEST, the protection and safety monitoring system cabinets in the division under test may be placed in bypass.

BASES

REFERENCES

1. APP-GW-GSC-020, “Technical Specification Completion Time and Surveillance Frequency Justification.”

RAI Letter No. 01
Question 16-20, Issue 1

RAI Letter No. 01

Question 16-20

Descriptions of Change A024 and D01

CTS 3.3.1 • SR 3.3.1.6 and bases
ITS 3.3.7 • SR 3.3.7.1 and bases

Issue 1: On ITS Page B 3.3.7-2, in the "Actions" section of the bases for ITS 3.3.7, "RTS Trip Actuation Devices," the licensee is requested to revise the first paragraph by replacing "on Table 3.3.7-1" with "in LCO 3.3.7", as there is no such table.

SNC Response

SNC concurs with the requested change. The proposed TS 3.3.7 LCO Actions Bases discussion, first paragraph, second sentence, is revised to replace reference to "on Table 3.3.7-1" with "in LCO 3.3.7."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases page.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

or declared inoperable under Function 1 above. OPERABILITY of both trip mechanisms on each breaker ensures that no single trip mechanism failure will prevent opening the breakers on a valid signal.

This trip Function must be OPERABLE in MODES 1 and 2. In MODES 3, 4, and 5, this RTS trip Function must be OPERABLE when the Plant Control System (PLS) is capable of rod withdrawal or when one or more rods are not fully inserted.

The RTS Trip Actuation Devices satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in LCO 3.3.7.

A.1

Condition A addresses the situation where one or both RTS Trip Actuation functions within one division are inoperable. With one division inoperable, the Required Action is to open the RTBs in the inoperable division within 8 hours. The 8 hour Completion Time is considered reasonable since the protective function will still function.

B.1

Condition B addresses the situation where one or both RTS Trip Actuation functions within two divisions are inoperable. With two divisions inoperable, the Required Action is to restore one division to OPERABLE status within 1 hour. The 1 hour Completion Time is considered reasonable since the protective function will still function.

C.1

Condition C addresses the situation where the Required Action and associated Completion Time of Condition A or B are not met in MODE 1 or 2, or there are one or both RTS Trip Actuation functions within three or more divisions inoperable in MODE 1 or MODE 2. Required Action C.1 directs that the plant must be placed in MODE 3 within 6 hours. The allowed Completion Times for Required Action C.1 is reasonable, based on operating experience, to reach the specified condition from full power conditions in an orderly manner and without challenging plant systems.

RAI Letter No. 01
Question 16-20, Issue 2

RAI Letter No. 01

Question 16-20

Issue 2: On ITS Page B 3.3.7-3, in the bases for ITS SR 3.3.7.1, the licensee is requested to revise the first paragraph as indicated for clarity:

> "SR 3.3.7.1 is the performance of a TADOT every 92 days on a STAGGERED TEST BASIS **for four divisions**. This test shall verify OPERABILITY by actuation of the end devices."

SNC Response

SNC concurs with the requested change. The first sentence of the Bases for proposed SR 3.3.7.1 is revised by adding "for four divisions."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases page.

BASES

ACTIONS (continued)

D.1 and D.2

Condition D addresses the situation where the Required Action and associated Completion Time of Condition A or B are not met in MODE 3, 4, or 5, or there are there are one or both RTS Trip Actuation functions within three or more divisions inoperable in MODE 3, 4, or 5. Required Action D.1 requires initiating action to fully insert all control rods within 1 hour, and Required Action D.2 requires that the Plant Control System be placed in a condition incapable of rod withdrawal within 1 hour. The allowed Completion Times are reasonable, based on operating experience, to reach the specified condition in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.7.1

SR 3.3.7.1 is the performance of a TADOT on both reactor trip breakers associated with a single division every 92 days on a STAGGERED TEST BASIS for four divisions. This test shall verify OPERABILITY by actuation of the end devices.

The Reactor Trip Breaker (RTB) test shall include separate verification of the undervoltage and shunt trip mechanisms. Each RTB in a division shall be tested separately in order to minimize the possibility of an inadvertent trip. Both breakers in a single division are tested during each STAGGERED TEST.

The Frequency of every 92 days on a STAGGERED TEST BASIS is adequate based on industry operating experience, considering instrument reliability and operating history data. In addition, the design provides additional breakers to enhance reliability.

REFERENCES

1. Chapter 15.0, “Accident Analysis.”

RAI Letter No. 01
Question 16-20, Issue 3

RAI Letter No. 01

Question 16-20

Issue 3: Description of Change D01 moved the Note ("This Surveillance must be performed on both reactor trip breakers associated with a single division.") from CTS SR 3.3.1.6 to the second paragraph of the associated bases. The licensee is requested to retain the Note in ITS SR 3.3.7.1, and maintain the bases for SR 3.3.7.1 consistent with the CTS bases language (i.e., add the sentence "The SR is modified by a Note to clarify that both breakers in a single division are to be tested during each STAGGERED TEST.") Testing both breakers in each division every 368 days at a 92-day interval for each subsequent division is a needed clarification of the Frequency requirement because the staggered testing is based on four divisions, not 8 RTBs.

SNC Response

SNC concurs with retaining the detail in new SR 3.3.7.1 that each performance requires testing of both breakers in the division. However, the format is simplified to place the phrase "on both reactor trip breakers in one division" within the Surveillance statement and eliminate the current SR 3.3.1.6 Note.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

The following changes are designated as Detail Removed Changes:

DOC / Affected Pages	Detailed Description and Technical Justification
D01	**Detailed Description**
3.3.1-9 3.3.1-14	Current TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," Table 3.3.1-1 Function 17, Reactor Trip Breakers, Required Channels design detail “with 2 RTBs per division” is relocated from the TS. Current TS Table 3.3.1-1 Function 18, Reactor Trip Breaker (RTB) Undervoltage and Shunt Trip Mechanisms, Required Channels design detail “1 each per RTB mechanism” is removed from TS and replaced with “4 divisions.” Current TS 3.3.1 SR 3.3.1.6 Note stating "This Surveillance must be performed on both reactor trip breakers associated with a single division," is ~~relocated from the TS to the associated Bases~~rewritten into the Surveillance text to state “Perform TADOT on both reactor trip breakers in one~~associated with a single~~ division.”
	Technical Evaluation
	The design provides eight reactor trip breakers (RTBs) arranged in four divisions with two RTBs per division. Each RTB is equipped with an undervoltage trip attachment and a shunt trip device. The current Action Condition for inoperabilities of these Functions (Actions N and O) references inoperable “divisions.” Any breaker or trip device inoperability will result in entry into the Actions. The specific design details are not necessary for assuring Operability or compliance with TS Actions. Removal of the channel design detail is consistent with current Conditions N and O that are based on "division" Operability, not individual component Operability.
	Current SR 3.3.1.6 is performed on a Staggered Test Basis, based on the number of divisions. ~~Therefore, t~~Testing the two reactor trip breakers in the division for each surveillance interval~~being tested~~ is ~~inherently required before the Surveillance could be considered complete~~currently stated in the Note. However, Surveillance Notes typically (refer to Improved TS Writer’s Guide, TSTF GG 05 01, subsection 4.1.7.d) allow a limited exception to the Surveillance Requirement acceptance criteria or requirement to perform. In this case, the Note is stating expected attributes of each test and that is better presented within the Surveillance text.~~It is not typical for Surveillances to detail all the specific components in the design that are required by the LCO, and therefore implicitly required in the stated Surveillances. The removal of these details for requiring the Surveillance to be performed on both reactor trip breakers associated with a single division from the TS is acceptable because this type of information is not necessary to be included in the TS to provide adequate protection of public health and safety.~~ Rewriting the Note into the ~~N~~new SR 3.3.7.1 still retains the requirement for performing the Trip Actuating Device Operational Test (TADOT) on ~~the~~ both reactor trip breakers ~~and the associated undervoltage and shunt trip mechanisms~~within the division.
	These changes are acceptable because these types of design and procedural

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~SR 3.3.1.5~~	~~- NOTE -~~ ~~Required to be met within 24 hours after reaching 50% RTP.~~ ~~Calibrate excore channels to agree with incore detector measurements.~~	~~92 EFPD~~
SR ~~3.3.1.6~~ 3.3.7.1	~~- NOTE -~~ ~~This Surveillance must be performed on both reactor trip breakers associated with a single division.~~ Perform TADOT on both reactor trip breakers in one division	92 days on a STAGGERED TEST BASIS
~~SR 3.3.1.7~~	~~Perform RTCOT.~~	~~92 days~~
~~SR 3.3.1.8~~	~~- NOTE -~~ ~~Not required to be performed for source range instrumentation prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3.~~ ~~Perform RTCOT in accordance with Setpoint Program.~~	~~92 days~~

D01

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A or B not met in MODE 3, 4, or 5. OR One or both Functions within three or more divisions inoperable in MODE 3, 4, or 5.	D.1 Initiate action to fully insert all rods. AND D.2 Place the Plant Control System in a condition incapable of rod withdrawal.	6 hours 6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.7.1	Perform TADOT on both reactor trip breakers in one division.	92 days on a STAGGERED TEST BASIS

BASES

ACTIONS (continued)

D.1 and D.2

Condition D addresses the situation where the Required Action and associated Completion Time of Condition A or B are not met in MODE 3, 4, or 5, or there are there are one or both RTS Trip Actuation functions within three or more divisions inoperable in MODE 3, 4, or 5. Required Action D.1 requires initiating action to fully insert all control rods within 1 hour, and Required Action D.2 requires that the Plant Control System be placed in a condition incapable of rod withdrawal within 1 hour. The allowed Completion Times are reasonable, based on operating experience, to reach the specified condition in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.7.1

SR 3.3.7.1 is the performance of a TADOT on both reactor trip breakers associated with a single division every 92 days on a STAGGERED TEST BASIS for four divisions. This test shall verify OPERABILITY by actuation of the end devices.

The Reactor Trip Breaker (RTB) test shall include separate verification of the undervoltage and shunt trip mechanisms. Each RTB in a division shall be tested separately in order to minimize the possibility of an inadvertent trip. Both breakers in a single division are tested during each STAGGERED TEST.

The Frequency of every 92 days on a STAGGERED TEST BASIS is adequate based on industry operating experience, considering instrument reliability and operating history data. In addition, the design provides additional breakers to enhance reliability.

REFERENCES

1. Chapter 15.0, “Accident Analysis.”

RAI Letter No. 01
Question 16-21

RAI Letter No. 01

Question 16-21

Description of Change A028

ITS page: B 3.3.8-29

ITS 3.3.8 Bases “Applicable Safety Analyses, LCOs, and Applicability"
On page B 3.3.8-29, the bases discussion of ESFAS instrument Function 17, “Source Range Neutron Flux Doubling,” uses the phrase “source range neutron flow” in the first and last paragraphs. The licensee is requested to correct these typos; i.e., change “flow” to “flux.”

SNC Response

SNC concurs with the requested change. "Source range neutron flow" is revised to "source range neutron flux" in two locations in the proposed TS 3.3.8, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," Applicable Safety Analyses, LCOs, and Applicability Bases discussion for Function 17.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases page.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

17. Source Range Neutron Flux Doubling

The source range neutron detectors are used for this Function. A signal to block boron dilution is derived from source range neutron flux increasing at an excessive rate (source range flux doubling). The LCO requires four divisions to be OPERABLE. There are four divisions and two-out-of-four logic is used. On a coincidence of excessively increasing source range neutron flux in two of the four divisions, demineralized water is isolated from the makeup pumps and reactor coolant makeup is isolated from the reactor coolant system to preclude a boron dilution event.

The Boron Dilution Block ESFAS protective function is actuated by Source Range Neutron Flux Doubling.

The signal to block boron dilution on source range neutron flux increasing at an excessive rate (source range flux doubling) must be OPERABLE in MODES 2 or 3, when not critical or during an intentional approach to criticality, and MODES 4 or 5. This Function is not applicable in MODES 4 and 5 if the demineralized water makeup flow path is isolated. In MODE 6, a dilution event is precluded by the requirement in LCO 3.9.2 to close, lock and secure at least one valve in each unborated water source flow path.

18. IRWST Level – Low 3

A low IRWST level coincident with a ADS Stage 4 Actuation signal will open the containment recirculation valves. Four channels of IRWST Level – Low 3 instrumentation are provided to permit one channel to be in trip or bypass indefinitely and still ensure that no single random failure will disable this trip Function.

The IRWST Containment Recirculation Valve Actuation ESFAS protective function is actuated by IRWST Level – Low 3.

Four channels of IRWST Level - Low 3 are required to be OPERABLE in MODES 1, 2, 3, 4, and 5, and MODE 6 with the upper internals in place.

19. Reactor Coolant Pump Bearing Water Temperature – High

The CCS containment isolation valves are closed and the RCPs are tripped if two-out-of-four sensors on any RCP indicate high bearing water temperature.

RAI Letter No. 01
Question 16-24, Issue 1

RAI Letter No. 01

Question 16-24

Description of Change A028

ITS page: B 3.3.8-28
ITS 3.3.8 • Functions 7, 15, 16; • Required Actions J.1 and J.2; • Bases "Applicable Safety Analyses, LCOs, and Applicability"

With the unit in Mode 4, with one or two inoperable channels for ITS 3.3.8 Function 7, 15, or 16, Required Action J.1 requires entering Mode 5 within 180 hours; if three channels are inoperable, the completion time is reduced to 37 hours. Required Action J.2, which requires initiating action to open the RCS pressure boundary within 180 hours.

Issue 1: The opening the RCS pressure boundary in Mode 5 should be large enough to allow sufficient gravity safety injection flow from the IRWST. The licensee is requested to explain how Required Action J.2 will ensure the RCS opening is adequately sized and maintained open while the automatic actuation of the ADS or CMT is degraded or lost?

<u>SNC Response</u>

Opening the RCS pressure boundary, to meet Required Action J.2, results in entering the Applicability of proposed TS 3.4.13, "Automatic Depressurization System (ADS) – Shutdown, RCS Open." Proposed LCO 3.4.13 requires ADS stage 1, 2, and 3 flow paths to be open and two ADS stage 4 flow paths to be Operable. The Bases for proposed TS 3.4.13 state that this ensures in-containment refueling water storage tank (IRWST) injection and containment recirculation can occur, if needed.

The equivalent actions are specified in current TS 3.3.2, Required Action V.2.2, which requires initiating action to open the RCS Pressure boundary and establish a pressurizer level ≥ 20% within 180 hours. As such, the only changes made by SNC in LAR-12-002 with respect to this Required Action are editorial, i.e., renumbering and reformatting of the presentation. No technical changes to existing requirements were introduced. The existing requirements continue to be appropriate and adequate for the applicable conditions.

No changes to LAR-12-002 result from this RAI Response.

RAI Letter No. 01
Question 16-24, Issue 2

RAI Letter No. 01

Question 16-24

Issue 2: The licensee is requested to change the completion time for Required Action J.2 to say "Immediately upon entry into Mode 5" to remove any ambiguity should Mode 5 not be entered within the completion time of Required Action J.1 and to ensure the RCS pressure boundary is not opened in Mode 4. The applicant is also requested to consider this change for the other similar required actions in ITS 3.3.8 (P.3), ITS 3.3.9 (G.2, J.3), and ITS 3.3.10 (C.3, E.2.2).

SNC Response

SNC does not concur with the need for revision. The new TS 3.3.8, Required Action J.2, equivalent actions are specified in the current TS 3.3.2, Required Action V.2.2, which requires initiating action to open the RCS Pressure boundary and establish a pressurizer level ≥ 20% within 180 hours. As such, the only changes made by SNC in LAR-12-002 with respect to this Required Action are editorial, i.e., renumbering and reformatting of the presentation. No technical changes to existing requirements were introduced. The existing requirements continue to be appropriate and adequate for the applicable conditions as approved in AP1000 GTS.

Specifically, the new Required Action J.2, stating in part "Initiate action to open the RCS pressure boundary," implicitly requires achieving cold shutdown (i.e., Mode 5) conditions even if the new Required Action J.1 to be in Mode 5 is not met within the required Completion Time.

No changes to LAR-12-002 result from this RAI Response.

RAI Letter No. 01
Question 16-25, Issue 1

RAI Letter No. 01

Question 16-25

Description of Change A028
CTS Pages: 3.3.2-19,25
ITS Pages: 3.3.10-1,3,5; B 3.3.10-1,7
CTS markup - pdf page No.: 194
ITS 3.3.10 • Actions Note • Required Action A.2 • Table 3.3.10-1 • Bases "Background"
ITS 3.3.8 • Bases "Background"
ITS 3.3.15 • Bases "Background"
ITS 3.3.16 • Bases "Background"

According to FSAR Figure 7.2-1 Sheet 16 (on page 7.2-57), Sheet 12 (on page 7.2-49), and Sheet 15 (on page 7.2-55); also see Table 7.3-1 (Sheet 2 of 9) Actuation Signal 3.f (on page 7.3-27):

Both Loop 1 and Loop 2 Hot Leg Level – Low 2 instrumentation channels must actuate (output = 1) (both hot leg levels ≤ Low-2 setpoint) coincidentally to produce a low level signal (output = 1) coincident with P-12 signal (output = 1) (pressurizer level ≤ setpoint) and coincident with Low Pressurizer Level CMT Block Control with "Block signal" output = 1 (blocked) and "Reset signal" output = 0, in order to send (after a time delay) a signal, with output = 1, to produce a 4th Stage ADS Actuation signal (output = 1) which signals the IRWST injection valves to open in addition to signaling the 4th Stage ADS valves (after time delays) to open.

Issue 1: The licensee is requested to revise ITS 3.3.10, "ESFAS RCS Hot Leg Level Instrumentation," by retaining the single function presentation of current TS 3.3.2 Function 10.c for proposed Function 1, "Loop 1 Hot Leg Level – Low 2" and proposed Function 2, Loop 2, "Hot Leg Level – Low 2", in Table 3.3.10-1, as follows:

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION
1. Hot Leg Level – Low 2	4(a)(c),5(c)	1 per loop	C
	6(b)(c)	1 per loop	D
2. Hot Leg Level – Low 1	4(a)(c),5(c)	1 per loop	E
	6(c)(d)	1 per loop	F

SNC Response

SNC concurs with listing Hot Leg Level – Low 2 as a single Function. New TS 3.3.10, "ESFAS RCS Hot Leg Level Instrumentation," retains the single Function presentation of current TS 3.3.2 Function 10.c, as new Table 3.3.10 Function 1, and renumbers the remaining Function. Conforming editorial changes are made to new TS 3.3.10, Required Action A.2 Note, as well as Discussion of Change (DOC) A028.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

J.2, J.3, and J.4 delete the extraneous phrases “If in MODE 4,” “If in MODE 4 or 5,” and “If in MODE 6,” respectively. These are the Modes in which these Actions would be entered; therefore there is no “if” consideration. Also discussed in DOC L12 is the revision of current TS 3.3.2 Action Q to new TS 3.3.9 Action F. Current Required Action CC.2 “Be in MODE 5” contains non-standard extraneous option “or 6;" which is deleted from new Required Action L.2. The TS are consistent in implicit understanding for the allowance of lower Modes. For example, many shutdown Actions contain requirements for being both in Mode 3 and in Mode 5; however, there is no conflict in exiting Mode 3 and achieving Mode 4 in route to Mode 5.

Since the Functions retained in new TS 3.3.9 each require the same current SR 3.3.2.3 (renumbered as new SR 3.3.9.1), the SRs column listing in new Table 3.3.9-1 is deleted as is the SRs Note referencing the Table to identify applicable SRs. As such, new SR 3.3.9.1 is inherently applicable to each Function. Other SRs not retained in new TS 3.3.9 are addressed in other new TS or other discussed changes.

<u>New TS 3.3.10, Engineered Safety Feature Actuation System (ESFAS) Reactor Coolant System (RCS) Hot Leg Level Instrumentation</u>

The following current Table 3.3.2-1 Functions are reformatting into the new Table 3.3.10-1:

- Function 10.c, Coincident RCS Loop 1 and 2 Hot Leg Level -- Low 2; and
- Function 28.a, Hot Leg Level – Low 1

Current Function 10.c is reformatted as new Table 3.3.10-1 Function~~s~~ 1~~ and 2~~, with editorial removal of “RCS” for consistency with current Function 28.a. “Coincident” describing the trip logic detail is also editorially removed since the logic is reformatted as part of new TS 3.3.15 and TS 3.3.16 (as described in DOC A035). Editorial removal of “Loop 1 and Loop 2” is also consistent with current Function 28.a. ~~There are two separate Hot Leg Level – Low 2 actuation Functions with one instrument requied on each hot leg. Therefore the reformatted presentation with each loop being an independent Function also results in specifying the Required Channels as “1”; editorially removing “per loop.”~~ This reformatting provides clarification and consistency with other instrument Functions.

Current TS 3.3.2 Actions C and BB are retained as new TS 3.3.10 Action A, which reformats the current TS 3.3.2 Required Action BB.2 as new TS 3.3.10 Required Action A.2 and its associated Note. New TS 3.3.10 Action B directs the entry into Table 3.3.10-1 for identifying the default Action associated with the inoperable Function(s). Current TS 3.3.2 Actions Y and AA are each split into two new Actions based on Mode differences; new TS 3.3.10 Actions C and D, and new TS 3.3.10 Actions E and F, respectively. New TS 3.3.10 Required Actions C.2, C.3, D.2, E.2.1, E.2.2, and F.1 delete the extraneous phrases “If in MODE 4,” “If in MODE 4 or 5,” and “If in MODE 6.” These are the Modes in which these Actions would be entered; therefore there is no “if” consideration.

Since the Functions retained in new TS 3.3.10 each require the same set of SRs, the SRs column listing in new Table 3.3.10-1 is deleted as is the SRs Note referencing the Table to identify applicable SRs. As such, each SR retained in new TS 3.3.10 is inherently applicable to each Function. Current SRs 3.3.2.1, 3.3.2.4,

A028

RCS Hot Leg Level

3.3.10 ~~3.3.2~~

3.3 INSTRUMENTATION

Reactor Coolant System (RCS) Hot Leg Level

~~3.3.2~~ Engineered Safety Feature Actuation System (ESFAS) Instrumentation

3.3.10

RCS Hot Leg Level

LCO ~~3.3.2~~ The ESFAS instrumentation for each function in Table ~~3.3.2-1~~ shall be OPERABLE.

channels

3.3.10-1

APPLICABILITY: According to Table ~~3.3.2-1~~.

ACTIONS

- NOTE~~S~~ -

~~1.~~ Separate condition entry is allowed for each Function.

~~2. The Conditions for each Function are given in Table 3.3.2-1. If the Required Actions and associated Completion Times of the first Condition are not met, refer to the second Condition.~~

Required Action and associated Completion Time of Condition A not met.

CONDITION	REQUIRED ACTION	COMPLETION TIME
B ~~A.~~ ~~One or more Functions with one or more required channels or divisions inoperable.~~	B ~~A.~~1 Enter the Condition referenced in Table ~~3.3.2-1~~ 3.3.10-1 for the channel~~(s) or division(s)~~.	Immediately
~~B. One or two channels or divisions inoperable.~~	~~B.1 Place one inoperable channel or division in bypass or trip.~~	~~6 hours~~
	~~AND~~	
	~~B.2 With two inoperable channels or divisions, place one inoperable channel or division in bypass and one inoperable channel or division in trip.~~	~~6 hours~~
A ~~C~~. One channel inoperable.	A ~~C.~~1 Place inoperable channel in bypass.	6 hours
	AND ----------NOTE---------- Only applicable to Function 1. ---------- A.2 Continuously monitor hot leg level.	6 hours

A028 RCS Hot Leg Level 3.3.10 ~~3.3.2~~

3.3.10-1

Table ~~3.3.2-1~~ (page 6 of 13)
Engineered Safeguards Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	~~SURVEILLANCE REQUIREMENTS~~
~~10. ADS Stage 4 Actuation~~				
~~a. Manual Initiation Coincident with~~	~~1,2,3,4~~	~~2 switch sets~~	~~E,O~~	~~SR 3.3.2.3~~
	~~5[j],6[j,k]~~	~~2 switch sets~~	~~G,X~~	~~SR 3.3.2.3~~
~~RCS Wide Range Pressure – Low, or~~	~~1,2,3,4~~	~~4~~	~~B,O~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
	~~5[j],6[j,k]~~	~~4~~	~~B,X~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
~~ADS Stages 1, 2 & 3 Actuation~~	~~Refer to Function 9 (Stages 1, 2, & 3 Actuation) for initiating functions and requirements~~			
~~b. CMT Level – Low 2~~	~~1,2,3,4~~	~~4 per tank~~	~~B,O~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
	~~5[j,l]~~	~~4 per OPERABLE tank~~	~~B,V~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
~~Coincident with RCS Wide Range Pressure – Low, and~~	~~1,2,3,4~~	~~4~~	~~B,O~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
	~~5[j,l]~~	~~4~~	~~B,V~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
~~Coincident with ADS Stages 1, 2 & 3 Actuation~~	~~1,2,3,4,5[j,l]~~	~~Refer to Function 9 (ADS Stages 1, 2 & 3 Actuation) for initiating functions and requirements~~		
1 ~~c. Coincident RCS Loop 1 and 2~~ Hot Leg Level – Low 2	(a) ~~4[c],5[j],6[j]~~	A034 1 per loop	~~BB,Y~~ C	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
A035	6[b]	1 per loop	D	

(a) ~~(c)~~ With the RCS being cooled by the RNS.

~~(j) Not applicable when the required ADS valves are open. See LCO 3.4.12 and LCO 3.4.13 for ADS valve and equivalent relief area requirements.~~

(b) ~~(k)~~ With upper internals in place.

~~(l) With pressurizer level ≥ 20%.~~

A028 RCS Hot Leg Level 3.3.10 ~~3.3.2~~

3.3.10-1

Table ~~3.3.2-1~~ (page 12 of 13)
Engineered Safeguards Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	~~SURVEILLANCE REQUIREMENTS~~
~~24. Refueling Cavity Isolation~~				
~~a. Spent Fuel Pool Level – Low~~	~~6~~	~~3~~	~~H,P~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
~~25. ESF Coincidence Logic~~				
~~a. Coincidence Logic~~	~~1,2,3,4~~	~~4 divisions, 1 battery backed subsystem per division~~	~~D,O~~	~~SR 3.3.2.2~~
	~~5,6~~	~~4 divisions, 1 battery backed subsystem per division~~	~~G,W~~	~~SR 3.3.2.2~~
~~26. ESF Actuation~~				
~~a. ESF Actuation Subsystem~~	~~1,2,3,4~~	~~4 divisions, 1 battery backed subsystem per division~~	~~D,O~~	~~SR 3.3.2.2~~ ~~SR 3.3.2.7~~ ~~SR 3.3.2.8~~
	~~5,6~~	~~4 divisions, 1 battery backed subsystem per division~~	~~G,W~~	~~SR 3.3.2.2~~ ~~SR 3.3.2.7~~
~~27. Pressurizer Heater Trip~~				
~~a. Core Makeup Tank Actuation~~	~~1,2,3,4[b,m]~~	~~Refer to Function 2 (Core Makeup Tank Actuation) for all initiating functions and requirements. In addition to the requirements for Function 2, SR 3.3.2.9 also applies.~~		
~~b. Pressurizer Water Level, High 3~~	~~1,2,3,4[b,m]~~	~~4~~	~~B,N~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
~~28. Chemical and Volume Control System Letdown Isolation~~				
2 ~~a.~~ Hot Leg Level – Low 1	(a)(c) (c) $4^{[c,p]}$,$5^{[p]}$,~~$6^{[p,q]}$~~	1 per loop	~~C,AA~~ E	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
	$6^{(c)(d)}$	1 per loop	F	

~~(b) With the RCS not being cooled by the Normal Residual Heat Removal System (RNS).~~

(a) ~~(c)~~ With the RCS being cooled by the RNS.

~~(m) Above the P-19 (RCS Pressure) interlock.~~

(c) ~~(p)~~ Below the P-12 (Pressurizer Level) interlock.

(d) ~~(q)~~ With the water level < 23 feet above the top of the reactor vessel flange.

3.3 INSTRUMENTATION

3.3.10 Engineered Safety Feature Actuation System (ESFAS) Reactor Coolant System (RCS) Hot Leg Level Instrumentation

LCO 3.3.10 The ESFAS RCS Hot Leg Level instrumentation channels for each function in Table 3.3.10-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.10-1.

ACTIONS

- NOTE -

Separate condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Place inoperable channel in bypass. AND A.2 ---------- **- NOTE -** Only applicable to Function 1. ---------- Continuously monitor hot leg level.	6 hours 6 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Enter the Condition referenced in Table 3.3.10-1 for the channel.	Immediately

Table 3.3.10-1 (page 1 of 1)
Engineered Safeguards Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
1. Hot Leg Level – Low 2	4[(a)],5	1 per loop	C
	6[(b)]	1 per loop	D
2. Hot Leg Level – Low 1	4[(a)(c)],5[(c)]	1 per loop	E
	6[(c)(d)]	1 per loop	F

(a) With the RCS being cooled by the RNS.

(b) With upper internals in place.

(c) Below the P-12 (Pressurizer Level) interlock.

(d) With the water level < 23 feet above the top of the reactor vessel flange.

B 3.3 INSTRUMENTATION

B 3.3.10 Engineered Safety Feature Actuation System (ESFAS) Reactor Coolant System (RCS) Hot Leg Level Instrumentation

BASES

BACKGROUND

A description of the ESFAS Instrumentation is provided in the Bases for LCO 3.3.8, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation."

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY

The required channels of ESFAS instrumentation provide plant protection in the event of any of the analyzed accidents. A description of ESFAS P-12 interlocks is provided in the Bases for LCO 3.3.8. ESFAS protective functions include:

ADS Stage 4 Actuation

A description of the ADS Stage 4 Actuation is provided in the Bases for LCO 3.3.8.

Chemical and Volume Control System (CVS) Letdown Isolation

A description of the Chemical and Volume Control System (CVS) Letdown Isolation is provided in the Bases for LCO 3.3.8.

The following are descriptions of the individual instrument Functions required by this LCO as presented in Table 3.3.10-1. Each Function also provides the ESFAS protective functions actuated by the instrumentation.

1. Hot Leg Level – Low 2

A signal to automatically open the ADS Stage 4 is generated when coincident loop 1 and 2 reactor coolant system hot leg level indication decreases below an established setpoint for a duration exceeding an adjustable time delay. The ADS provides a sequenced depressurization of the reactor coolant system to allow passive injection from the Core Makeup Tanks (CMTs), accumulators, and the IRWST to mitigate the effects of a LOCA. This Function is required to be OPERABLE in MODE 4 with the RCS being cooled by the RNS. This Function is also required to be OPERABLE in MODE 5, and in MODE 6 with the upper internals in place.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

2. Hot Leg Level – Low 1

A signal to isolate the Chemical and Volume Control System (CVS) letdown valves is generated upon the occurrence of a Low 1 hot leg level in either of the two RCS hot leg loops. This helps to maintain reactor system inventory in the event of a LOCA. This Function can be blocked in MODES 1, 2, and 3 and is automatically reset when P-12 is first activated. It may be manually reset as well. This Function is required to be OPERABLE in MODE 4 with the RCS being cooled by the RNS and below the P-12 (Pressurizer Level) interlock. This Function is also required to be OPERABLE in MODE 5 below the P-12 interlock, and in MODE 6 below the P-12 interlock and with the water level < 23 feet above the top of the reactor vessel flange.

ESFAS instrumentation Hot Leg Level satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this specification may be entered independently for each Function listed on Table 3.3.10-1. The Completion Time(s) of the inoperable equipment of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function. Where the required channels are specified on a per loop basis, separate Condition entry is allowed for each loop.

In the event a channel's as-found condition is outside the as-found tolerance described in the Setpoint Program, or the channel is not functioning as required, or the transmitter, or the Protection and Safety Monitoring System Division, associated with a specific Function is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition(s) entered for the particular protection Function(s) affected.

A.1 and A.2

With one channel inoperable, the affected channel must be placed in a bypass condition within 6 hours. For Function 1, if one channel is placed in bypass, automatic actuation will not occur. For Function 2, the 6 hours allowed to place the inoperable channel in the bypass condition is justified in Reference 3. If one CVS isolation channel is bypassed, the logic becomes one-out-of-one. A single failure in the remaining channel could

BASES

ACTIONS (continued)

cause a spurious CVS isolation. Spurious CVS isolation, while undesirable, would not cause an upset plant condition. Therefore, Required Action A.2 requires continuous monitoring of the hot leg level. This provides sufficient information to permit timely operator action to ensure that ADS Stage 4 actuation can occur, if needed to mitigate events requiring RCS makeup, boration, or core cooling. Operator action to manually initiate ADS Stage 4 actuation is assumed in the analysis of shutdown events (Ref. 4). It is also credited in the shutdown PRA (Ref. 5) when automatic actuation is not available.

Required Action A.2 is modified by a Note stating that the action is only applicable to Function 1.

B.1

Condition B addresses the situation where the Required Action and associated Completion Time of Condition A is not met. The Required Action is to refer to Table 3.3.10-1 and to take the Required Actions for the protection Functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

C.1, C.2, and C.3

If the Required Action and associated Completion Time of Condition A are not met for Function 1 in Table 3.3.10-1, the plant must be placed in a MODE in which the likelihood and consequences of an event are minimized. This is accomplished by placing the plant in MODE 5 within 12 hours (Required Action C.2). The 12 hours is a reasonable time to reach MODE 5 from MODE 4 with RCS cooling provided by the RNS (approximately 350°F) in an orderly manner without challenging plant systems.

Required Action C.3 requires initiation of action within 12 hours to close the RCS pressure boundary and establish ≥ 20% pressurizer level. The 12 hour Completion Time allows transition to MODE 5, if needed, prior to initiating action to open the RCS pressure boundary.

Required Action C.1 minimizes the potential for a criticality event by suspension of positive reactivity additions. Required Actions C.2 and C.3 minimize the consequences of a loss of decay heat removal event by optimizing conditions for RCS cooling in MODE 5 using the PRHR HX.

BASES

ACTIONS (continued)

Additionally, maximizing RCS inventory and maintaining RCS temperature as low as practical further minimize the consequences of a loss of decay heat removal event. Closing the RCS pressure boundary in MODE 5 assures that PRHR HX cooling is available

D.1 and D.2

If the Required Action and associated Completion Time of Condition A are not met for Function 1 in Table 3.3.10-1, the plant must be placed in a condition in which the likelihood and consequences of an event are minimized. This is accomplished by immediately initiating action to establish the reactor cavity water level ≥ 23 feet above the top of the reactor vessel flange (Required Action D.2) and suspend positive reactivity additions (Required Action D.1).

Required Action D.2 minimizes the consequences of a loss of decay heat removal event by optimizing conditions for RCS cooling in MODE 6 using IRWST injection.

Additionally, maximizing RCS inventory and maintaining RCS temperature as low as practical further minimize the consequences of a loss of decay heat removal event. Additionally, the potential for a criticality event is minimized by suspension of positive reactivity additions.

E.1.1, E.1.2.1, E.1.2.2, E.2.1, and E.2.2

If the Required Action and associated Completion Time of Condition A are not met for Function 2 in Table 3.3.10-1, the plant must be placed in a condition where the instrumentation Function for valve isolation is no longer needed. This is accomplished by isolating the affected flow path within 24 hours. By isolating the CVS letdown flow path from the RCS, the need for automatic isolation is eliminated.

To assure that the flow path remains closed, the flow path shall be isolated by the use of one of the specified means (Required Action E.1.2.1) or the flow path shall be verified to be isolated (Required Action E.1.2.2). A means of isolating the affected flow path includes at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured, within 7 days. If one of the Required Action E.1.2.1 specified isolation means is not used, the affected flow path shall be verified to be isolated once per 7 days.

BASES

ACTIONS (continued)

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

If the flow path cannot be isolated in accordance with Required Actions E.1.1, E.1.2.1 and E.1.2.2, the plant must be placed in a MODE in which the likelihood and consequences of an event are minimized. This is accomplished by placing the plant in MODE 5 within 12 hours. The 12 hours is a reasonable time to reach MODE 5 from MODE 4 with RCS cooling provided by the RNS (approximately 350°F) in an orderly manner without challenging plant systems.

Required Action E.2.2 requires initiation of action, within 12 hours, to establish ≥ 20% pressurizer level, This minimizes the consequences of an event by optimizing conditions for RCS cooling in MODE 5 using the PRHR HX. The 12 hour Completion Time allows transition to MODE 5 in accordance with E.2.1, if needed, prior to initiating action to establish the pressurizer level.

F.1

If the Required Action and associated Completion Time of Condition A are not met for Function 2 in Table 3.3.10-1, the plant must be placed in a condition where the instrumentation Function for valve isolation is no longer needed. This is accomplished by immediately initiating action to establish the reactor cavity water level ≥ 23 feet above the top of the reactor vessel flange.

Required Action F.1 minimizes the consequences of an event by optimizing conditions for RCS cooling in MODE 6 using IRWST injection.

RAI Letter No. 01
Question 16-25, Issue 2

RAI Letter No. 01

Question 16-25

Issue 2: Note that ITS Table 3.3.10-1 Footnote (c), which says "Below the P-12 (Pressurizer Level) interlock." can also apply in Modes 4, 5, and 6 to the Hot Leg Level – Low 2 Function. The licensee is requested to annotate the Applicability for this Function with Footnote (c) as indicated in the above table, and also to revise the bases to accurately describe the revised requirements.

SNC Response

SNC does not concur with including the requested revision to limit the Applicability for new TS 3.3.10, Hot Leg Level – Low 2 Function. The requested addition of footnote (c) ("Below the P-12 (Pressurizer Level) interlock") would relax the Applicability of this Function as a "less restrictive" change. Evaluation of this change was not within the scope of LAR-12-002. As such, evaluation of the proposed change is not being pursued for inclusion in this LAR.

There are no changes to LAR-12-002 as a result of this RAI Response.

RAI Letter No. 01
Question 16-25, Issue 3

RAI Letter No. 01

Question 16-25

Issue 3: The licensee is requested to revise the first paragraph of the "Actions" section of the bases for ITS 3.3.10 by deleting the last sentence, which says, "Where the required channels are specified on a per loop basis, separate Condition entry is allowed for each loop." With this deletion, the proposed Actions Note is then appropriate: "Separate condition entry is allowed for each Function." Alternatively, the number of required channels could be listed as "2" for both hot leg level instrument functions as a further simplification which removes another design detail which is adequately stated in the bases.

SNC Response

SNC does not concur with the requested Bases change. The current TS 3.3.2 Action Bases (consistent with AP1000 Generic Technical Specifications) provide the clarification: "When the Required Channels are specified only on a per steam line, per loop, per SG, basis, then the Condition may be entered separately for each steam line, loop, SG, etc., as appropriate." This clarification is carried forward into new TS 3.3.10 Bases.

This provision provides appropriate clarification that addresses the possible inoperable condition of both RCS hot leg level instruments (either Low-1 or Low-2 with both channels inoperable). Without the separate Condition entry Note applying to loop as clarified in the Bases, Actions would not have a Condition to address both loops with inoperable channels.

It is also noted that this practice is common to other Standard TS, including NUREG-1431 Standard Technical Specifications – Westinghouse Plants. When listing instrumentation functions as a single Table entry and specifying the number of channels on a per-component basis, where the process monitoring of each component provides independent input for the actuation, the Bases describes the application of the separate Condition entry Actions Note. Refer for example to NUREG-1431 Bases for TS 3.3.2.

There are no changes to LAR-12-002 as a result of this RAI Response.

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Question 16-28, Issue 2

RAI Letter No. 01

Question 16-28

Issue 2: The licensee is requested to include current TS 3.3.2 Function 21.b, "Auxiliary Spray Isolation - Manual Initiation," in ITS 3.3.9. A suggested specification for this function in ITS Table 3.3.9-1 is illustrated in Example 2 (Function 16). Apparently, changes associated with Description of Change A033 overlooked this manual initiation function. The licensee is requested to take another look at manual functions in current TS Table 3.3.2-1, which are proposed for deletion because they reference another function, to ensure no other similar omissions have occurred.

RAI 16-28 Examples 1 and 2 attached

SNC Response

SNC concurs with the need for revision.

The proposed TS 3.3.9, "Engineered Safety Feature Actuation System (ESFAS) Manual Initiation," Applicable Safety Analyses, LCOs, and Applicability Bases section for Function 10, "Chemical Volume and Control System Makeup Isolation – Manual Initiation," is revised to include the auxiliary spray line and letdown purification line isolation on this manual initiation signal. This is consistent with the design described in the FSAR subsection 7.3.1.2.15. DOC A033 captured this relationship in discussing the selection of the most restrictive Applicable Modes or Other Specified Conditions for the Applicability of new Table 3.3.9-1, Function 10 (i.e., current Table 3.3.2-1, Function 16.e addresses deleted current Function 21.b).

SNC has further reviewed the manual Functions in current Table 3.3.2-1 for additional oversights and identified that the listing of deleted Functions discussed in DOC A033 inadvertently left out listing current Function 8.e, Manual Initiation. Function 8.e is added to the A033 discussion. No other omissions or oversights have been identified.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC and Bases pages.

Condition O would require that the unit be placed in Mode 5. Therefore, the Actions of current TS 3.3.2, Condition O are adopted for the new TS 3.3.8, Function 2 as new TS 3.3.8, Condition H.

For current Functions 4.c.(1) and 29, the referenced Conditions (current B,M and B,N, respectively) are combined to capture the more restrictive of both; i.e., three new Required Actions G.1 to "Be in MODE 3 – 6 hours", G.2 to "Be in MODE 4 – 12 hours, and G.3 to "Establish RCS cooling provided by RNS – 24 hours."

In the case of current Functions 11.b and 30.a, the referenced Conditions (current B,L and B,T, respectively) are combined to capture the more restrictive of both; i.e., current Required Action for Condition L (as it impacts the ability to trip the Reactor Coolant Pumps) to "Be in MODE 3 – 6 hours" is retained as new Required Action O.2, while the current Actions for Condition T (as revised by DOC L12) to "Declare affected isolation valve(s) inoperable – Immediately" is retained as new Required Action O.1.

Each of the remaining combined Functions was evaluated in the same manner, with the most restrictive Action(s) being specified for the revised Functions. Because the most restrictive actions would be required to be taken in the current TS, these changes are administrative.

Each of the current Functions being combined reference the same four current SRs (i.e., SR 3.3.2.1, SR 3.3.2.4, SR 3.3.2.5, and SR 3.3.2.6). Therefore, there is no change in the SRs associated with combining the Functions as described.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

A033 Detailed Description

3.3.2-15 through 3.3.2-25

TS 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, Table 3.3.2-1, Engineered Safeguards Actuation System Instrumentation, is revised to eliminate entries that merely reference other Functions as follows:

- Function 2.c, Safeguards Actuation;
- Function 2.d, ADS Stages 1, 2, & 3 Actuation;
- Function 3.b, Manual Initiation of Passive Containment Cooling;
- Function 3.c, Safeguards Actuation;
- Function 5.a, Manual Main Feedwater Isolation;
- Function 5.c, Reactor Trip;
- Function 6.c, Safeguards Actuation;
- Function 6.d, Coincident signal on Reactor Trip;
- Function 7.a, Manual Initiation;
- Function 7.c, Safeguards Actuation;
- Function 7.d, Coincident signal on Reactor Trip;
- Function 8.c, Manual Initiation;
- Function 8.d, Coincident signal on Reactor Trip;
- Function 8.e, Manual Initiation;
- Function 9.b, Coincident with CMT Actuation;

- Function 10.a, ADS Stages 1, 2 & 3 Actuation;
- Function 10.b, Coincident with ADS Stages 1, 2 & 3 Actuation;
- Function 11.a, ADS Stages 1, 2 & 3 Actuation;
- Function 11.c, Manual CMT Actuation;
- Function 11.e, Safeguards Actuation;
- Function 13.d, ADS Stages 1, 2 & 3 Actuation;
- Function 13.e, CMT Actuation;
- Function 14.a, Passive Residual Heat Removal Heat Exchanger Actuation;
- Function 15.b, Reactor Trip;
- Function 16.b, Coincident signal on Safeguards Actuation;
- Function 16.f, Source Range Neutron Flux Doubling;
- Function 16.g, Coincident signal on Reactor Trip;
- Function 17.b, Safeguards Actuation;
- Function 19.b, Containment Isolation;
- Function 21.b, Manual Initiation;
- Function 22.b, ADS 4th Stage Actuation;
- Function 23.b, ADS Stage 4 Actuation; and
- Function 27.a, Core Makeup Tank Actuation.

Technical Evaluation

The current structure of TS 3.3.2, Table 3.3.2-1 includes certain Functions that reference other Functions in lieu of separately specifying the number of Required Channels, Conditions, SRs and, in some cases, Applicable Modes or Other Specified Conditions (Mode). Current TS 3.3.2, including current TS Table 3.3.2-1, is being revised by breaking the Specification into specific subsets of the Protection and Safety Monitoring System (PMS) function. The reformatting of current TS 3.3.2 and current TS Table 3.3.2-1 are discussed in DOC A028. The referencing Functions are not necessary as a result of the reformatting and are deleted.

Some of the referencing Functions refer to the referenced Function for all Applicable Modes or Other Specified Conditions, Required Channels, Conditions, and SRs. As such, there are no requirements being conveyed. The listing serves solely as information related to the design, which is appropriate for, and already provided in, the TS Bases. Deleting these Functions is administrative because no technical changes result. The following current Functions reference other Functions for all requirements, and are deleted:

- Function 7.a
- Function 8.c
- Function 8.d
- Function 8.e
- Function 9.b
- Function 10.a
- Function 11.a
- Function 11.c
- Function 11.e
- Function 13.e

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

This Function is required to be OPERABLE in MODES 1, 2, 3, and 4, and MODE 5 with the RCS pressure boundary intact. This ensures that PRHR can be actuated in the event of a loss of the normal heat removal systems.

10. Chemical Volume and Control System Makeup Isolation - Manual Initiation

The CVS makeup line, auxiliary spray line, and letdown purification line are isolated following certain events to prevent overfilling of the RCS.

Manual Chemical Volume Control System Makeup Isolation is actuated by either of two switches in the main control room. Either switch closes Chemical Volume Control System makeup line , auxiliary spray line, and letdown purification line isolation valves. The LCO requires two switches to be OPERABLE.

This Function is required to be OPERABLE in MODES 1 through 3, and MODE 4 with the RCS not being cooled by the RNS.

11. Normal Residual Heat Removal System Isolation - Manual Initiation

The RNS suction line is isolated by closing the containment isolation valves to provide containment isolation following an accident

The operator can initiate RNS isolation at any time from the control room by simultaneously actuating two switches in the same actuation set. Because an inadvertent actuation of RNS isolation could have serious consequences, two switches must be actuated simultaneously to initiate isolation. There are two sets of two switches in the control room. Simultaneously actuating the two switches in either set will isolate the RNS in the same manner as the automatic actuation signal. Two Manual Initiation switches in each set are required to be OPERABLE to ensure no single failure disables the Manual Initiation Function.

This Function is required to be OPERABLE in MODES 1, 2, and 3.

12. In-Containment Refueling Water Storage Tank (IRWST) Injection Line Valve Actuation - Manual Initiation

The PXS provides core cooling by gravity injection and recirculation for decay heat removal following an accident. Manual initiation will generate a signal to open the IRWST injection line and actuate IRWST injection.

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Question 16-28, Issue 3

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Question 16-28

Issue 3: ITS Table 3.3.9-1 Function 5, "MFW Control Valve Isolation – Manual Initiation," corresponds to CTS Table 3.3.2-1 Function 6.a, "MFW Control Valve Isolation Manual Initiation" and Function 7.a, "Main Feedwater Pump Trip and Valve Isolation Manual Initiation". However, FSAR Figure 7.2-1 Sheet 10 shows that one of two manual switches labeled "Manual Feedwater Isolation" will initiate

- closing of MFW control valves
- closing of MFW isolation valves
- closing of MFW crossover leg valves
- tripping of MFW pumps
- closing of startup feedwater control valves
- closing of startup feedwater isolation valves
- tripping of startup feedwater pumps

It appears that the proposed title for ITS Table 3.3.9-1 Function 5 is not fully descriptive of the design of this manual function. The licensee is requested to revise the title to be either

"Main Feedwater Control, Isolation, and Crossover Valve Closure, Startup Feedwater Control and Isolation Valve Closure, and Main Feedwater Pump and Startup Feedwater Pump Trip – Manual Initiation,"

or, to put it more simply (with the details in the bases),

"Feedwater Isolation – Manual Initiation."

<u>SNC Response</u>

SNC concurs with revising the new Table 3.3.9-1 Function 5 title to "Feedwater Isolation – Manual Initiation."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

Current Referenced Function (Fn) Applicability	Current Referencing Function (Fn) Applicability (Being Deleted)
Fn 16.e, Modes 1, 2, Modes 3 and 4 not applicable for valve isolation Functions whose associated flow path is isolated, and Mode 4 with RCS not being cooled by RNS and not applicable for valve isolation Functions whose associated flow path is isolated	Fn 21.b – Modes 1 and 2
Fn 18.b, Modes 1, 2, and 3 *Note that Mode 4 is added based on Applicability of Fn 8.d, Coincident P-4, as discussed in DOC A028 for new TS 3.3.12.*	Fn 5.c – Modes 1 and 2 Fn 6.d – Modes 1 and 2 Fn 7.d – Modes 1 and 2

Therefore, the individual Applicable Modes or Other Specified Conditions currently specified in the deleted Functions is less restrictive than the Applicable Modes or Other Specified Conditions currently specified for the referenced Function. These Applicabilities may be modified by other changes; however, the more restrictive Applicability of all related Functions is retained.

Since current TS Table 3.3.2-1, Function 6.a, also reflects current Functions 5.a, 7.a, and 8.e, the title for new Function 5 in TS Table 3.3.9-1 is editorially clarified to be "Feedwater Isolation – Manual Initiation."

The referencing statement for deleted Function 27.a refers to Function 2, but includes a statement that in addition to the requirements for Function 2, SR 3.3.2.9 also applies. Disposition of current SR 3.3.2.9 with respect to the Pressurizer Heater Trip Function is addressed in DOC L01.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

A034 Detailed Description

3.3.2-8
3.3.2-9
3.3.2-18
3.3.2-19
3.3.2-24

The following Applicable Modes or Other Specified Conditions (and associated Footnotes) in current TS 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," Table 3.3.2-1, are revised as follows in new Table 3.3.8-1, new Table 3.3.9-1, and new Table 3.3.10-1:

A028

3.3.9-1

Table ~~3.3.2-1~~ (page 4 of 13)
Engineered Safeguards Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	~~SURVEILLANCE REQUIREMENTS~~
5 ~~6~~. ~~Main~~ Feedwater ~~Control Valve~~ Isolation	A033			
~~a.~~ Manual Initiation	1,2,3,4~~(e)~~ L12	2 switches	~~E,S~~ F	~~SR 3.3.2.3~~
~~b. SG Narrow Range Water Level – High 2~~	~~1,2,3,4(b,e)~~	~~4 per SG~~	~~B,R~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
~~c. Safeguards Actuation~~	~~1,2,3,4(e)~~	~~Refer to Function 1 (Safeguards Actuation) for all initiating functions and requirements.~~		
~~d. Reactor Coolant Average Temperature (T_{avg}) – Low 1~~	~~1,2~~	~~4~~	~~B,L~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
~~– Coincident with Reactor Trip~~	~~1,2~~	~~Refer to Function 18.b (ESFAS Interlocks, Reactor Trip, P-4) for requirements.~~		
~~7. Main Feedwater Pump Trip and Valve Isolation~~				
~~a. Manual Initiation~~	~~Refer to Function 6.a (Manual Main Feedwater Control Valve Isolation) for requirements.~~			
~~b. SG Narrow Range Water Level – High 2~~	~~1,2,3,4(b,e)~~	~~4 per SG~~	~~B,R~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
~~c. Safeguards Actuation~~	~~1,2,3,4(e)~~	~~Refer to Function 1 (Safeguards Actuation) for all initiating functions and requirements.~~		
~~d. Reactor Coolant Average Temperature T_{avg} – Low 2~~	~~1,2~~	~~2 per loop~~	~~B,L~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.4~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.6~~
~~– Coincident with Reactor Trip~~	~~1,2~~	~~Refer to Function 18.b (ESFAS Interlocks, Reactor Trip, P-4) for requirements.~~		

~~(b) With the RCS not being cooled by the Normal Residual Heat Removal System (RNS).~~

~~(e) Not applicable for valve isolation Functions whose associated flow path is isolated.~~

Table 3.3.9-1 (page 1 of 2)
Engineered Safeguards Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
1.	Safeguards Actuation - Manual Initiation	1,2,3,4	2 switches	E
		5	2 switches	J
2.	Core Makeup Tank (CMT) Actuation - Manual Initiation	1,2,3,4[a]	2 switches	D
		4[b], 5[c]	2 switches	G
3.	Containment Isolation - Manual Initiation	1,2,3,4	2 switches	E
4.	Steam Line Isolation - Manual Initiation	1,2,3,4	2 switches	F
5.	Feedwater Isolation - Manual Initiation	1,2,3,4	2 switches	F
6.	ADS Stages 1, 2 & 3 Actuation - Manual Initiation	1,2,3,4	2 switch sets	E
		5[d]	2 switch sets	H
7.	ADS Stage 4 Actuation - Manual Initiation	1,2,3,4	2 switch sets	E
		5	2 switch sets	H
		6[e]	2 switch sets	I
8.	Passive Containment Cooling Actuation - Manual Initiation	1,2,3,4	2 switches	E
		5[f]	2 switches	J
		6[f]	2 switches	K
9.	Passive Residual Heat Removal Heat Exchanger Actuation - Manual Initiation	1,2,3,4	2 Switches	E
		5[c]	2 switches	G
10.	Chemical Volume and Control System Makeup Isolation - Manual Initiation	1,2,3,4[a]	2 switches	F
11.	Normal Residual Heat Removal System Isolation - Manual Initiation	1,2,3	2 switch sets	F

(a) With the RCS not being cooled by the Normal Residual Heat Removal System (RNS).

(b) With the RCS being cooled by the RNS.

(c) With the RCS pressure boundary intact.

(d) With RCS pressure boundary intact and with pressurizer level ≥ 20%.

(e) With upper internals in place.

(f) With decay heat > 6.0 MWt.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

Manual CMT Valve Actuation is accomplished by either of two switches in the main control room. Either switch activates all four divisions.

Manual CMT Valve Actuation must be OPERABLE in MODES 1 through 3, and MODE 4 with the Reactor Coolant System (RCS) not cooled by the Normal Residual Heat Removal System (RNS). Manual actuation of the CMT valves is additionally required in MODE 4 when the RCS is being cooled by the RNS, and MODE 5 with the RCS pressure boundary intact. Actuation of this Function is not required in MODE 5 with the RCS pressure boundary open, or MODE 6 because the CMTs are not required to be OPERABLE in these MODES.

3. Containment Isolation - Manual Initiation

Containment isolation is necessary to prevent or limit the release of radioactivity to the environment in the event of a large break LOCA.

Manual Containment Isolation is accomplished by either of two switches in the main control room. Either switch actuates all four ESFAS divisions. Manual initiation of Containment Isolation must be OPERABLE in MODES 1, 2, 3, and 4, when containment integrity is required.

4. Steam Line Isolation - Manual Initiation

Isolation of the main steam lines provides protection in the event of a Steam Line Break (SLB) inside or outside containment.

Manual initiation of Steam Line Isolation can be accomplished from the main control room. There are two switches in the main control room and either switch can initiate action to immediately close all main steam isolation valves (MSIVs).

The LCO requires two OPERABLE channels in MODES 1, 2, 3, and 4. In MODES 5 and 6, this Function is not required to be OPERABLE because there is insufficient energy in the secondary side of the unit to cause an accident.

5. Feedwater Isolation - Manual Initiation

The primary Function of Feedwater Isolation is to prevent damage to the turbine due to water in the steam lines and to stop the excessive flow of feedwater into the SGs.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

Manual Feedwater Isolation can be accomplished from the main control room. There are two switches in the main control room and either switch can initiate action in both divisions to close all main and startup feedwater control, isolation and crossover valves, trip all main and startup feedwater pumps, and trip the turbine.

Feedwater isolation is necessary in MODES 1, 2, 3, and 4 to mitigate the effects of a large SLB or feedwater line break (FLB). In MODES 5 and 6, the energy in the RCS and the steam generators is low and this function is not required to be OPERABLE.

6. ADS Stages 1, 2, & 3 Actuation - Manual Initiation

The Automatic Depressurization System (ADS) provides a sequenced depressurization of the reactor coolant system to allow passive injection from the CMTs, accumulators, and the in-containment refueling water storage tank (IRWST) to mitigate the effects of a LOCA.

The operator can initiate an ADS Stages 1, 2, and 3 actuation from the main control room by simultaneously actuating two ADS actuation devices in the same set. There are two sets of two switches each in the main control room. Simultaneously actuating the two devices in either set will actuate ADS Stages 1, 2, and 3.

This Function must be OPERABLE in MODES 1 through 4, and MODE 5 with the RCS pressure boundary intact and with pressurizer level ≥ 20%. In MODE 5 with the RCS open and in MODE 6, LCO 3.4.13, ADS - Shutdown, RCS Open, required the ADS Stages 1, 2, and 3 valves to be open. Thus, Manual actuation is not required.

7. ADS Stage 4 Actuation - Manual Initiation

The ADS provides a sequenced depressurization of the reactor coolant system to allow passive injection from the CMTs, accumulators, and the IRWST to mitigate the effects of a LOCA.

The fourth stage depressurization valves open on manual actuation. The operator can initiate Stage 4 of ADS from the main control room. There are two sets of two switches each in the main control room. Actuating the two switches in either set will actuate all 4th stage ADS valves. This manual actuation is interlocked to actuate with either the low RCS pressure signal or with the ADS Stages 1, 2, & 3 actuation. These interlocks minimize the potential for inadvertent

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Description of Change A028

CTS Page: B 3.3.2-48
ITS Pages: 3.3.15-1, B 3.3.15-1

ITS 3.3.15 • Bases "Background" • Bases "Applicable Safety Analyses, LCOs, and Applicability"
ITS 3.3.16 • Bases "Background" • Bases "Applicable Safety Analyses, LCOs, and Applicability"

Issue 1: The licensee is requested to make the following editorial clarifications in the "Applicable Safety Analyses, LCOs, and Applicability" section of the bases for ITS 3.3.15, "ESFAS Actuation Logic – Operating"

- In first sentence of first paragraph change "required channels" to "required divisions."
- In second paragraph change "individual instrument Functions" to "ESF actuation logic Functions."

<u>SNC Response</u>

SNC concurs with clarifying Bases changes to new TS 3.3.15. In addition, conforming changes were made to new TS 3.3.16 Bases. The following changes are made to new TS 3.3.15 Bases and to new TS 3.3.16 Bases:

- Applicable Safety Analyses, LCOs, and Applicability, first paragraph, first sentence, revise "channels of ESFAS instrumentation" to "divisions of ESFAS actuation logic"; and
- Applicable Safety Analyses, LCOs, and Applicability, second paragraph, first sentence, revise "individual instrument Functions" to "ESFAS actuation logic Functions."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases pages.

B 3.3 INSTRUMENTATION

B 3.3.15 Engineered Safety Feature Actuation System (ESFAS) Actuation Logic - Operating

BASES

BACKGROUND

A description of the ESFAS Instrumentation is provided in the Bases for LCO 3.3.8, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation."

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY

The required divisions of ESFAS actuation logic provide plant protection in the event of any of the analyzed accidents. ESFAS protective functions include:

ESF Coincidence Logic

A description of the ESF Coincidence Logic is provided in the Bases for LCO 3.3.8.

ESF Actuation

A description of the ESF Actuation Subsystem is provided in the Bases for LCO 3.3.8.

The following are descriptions of the ESFAS actuation logic Functions required by this LCO:

a. ESF Coincidence Logic

This LCO requires four divisions of ESF coincidence logic, each set with one battery backed logic group OPERABLE to support automatic actuation. If one division of battery backed coincidence logic is OPERABLE in all four divisions, an additional single failure will not prevent ESF actuations because three divisions will still be available to provide redundant actuation for all ESF Functions. This Function is required to be OPERABLE in MODES 1, 2, 3, and 4. The ESF Coincidence Logic requirements for MODES 5 and 6 are discussed in LCO 3.3.16, "ESFAS Actuation Logic - Shutdown."

b. ESF Actuation

This LCO requires that for each division of ESF actuation, one battery backed logic group be OPERABLE to support both automatic and manual actuation. If one battery backed logic group is OPERABLE for the ESF actuation subsystem in all four divisions, a single failure will

B 3.3 INSTRUMENTATION

B 3.3.16 Engineered Safety Feature Actuation System (ESFAS) Actuation Logic - Shutdown

BASES

BACKGROUND

A description of the ESFAS Instrumentation is provided in the Bases for LCO 3.3.8, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation."

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY

The required divisions of ESFAS actuation logic provide plant protection in the event of any of the analyzed accidents. ESFAS protective functions include:

ESF Coincidence Logic

A description of the ESF Coincidence Logic is provided in the Bases for LCO 3.3.8.

ESF Actuation

A description of the ESF Actuation Subsystem is provided in the Bases for LCO 3.3.8.

The following are descriptions of the ESFAS actuation logic Functions required by this LCO:

a. ESF Coincidence Logic

This LCO requires four divisions of ESF coincidence logic, each set with one battery backed logic group OPERABLE to support automatic actuation. If one division of battery backed coincidence logic is OPERABLE in all four divisions, an additional single failure will not prevent ESF actuations because three divisions will still be available to provide redundant actuation for all ESF Functions.

This Function is required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel because of the potential for a fission product release following a fuel handling accident, or other DBA. The LCO is modified by a Note stating that only the divisions necessary to support Main Control Room Isolation and Air Supply Initiation are required to be OPERABLE during movement of irradiated fuel assemblies when not in MODE 1, 2, 3, 4, 5, or 6. This supports TS 3.3.13, “Engineered Safety Feature Actuation System

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Question 16-30, Issue 2

RAI Letter No. 01

Question 16-30

Issue 2: The licensee is requested to explain in the bases what is meant by "ESF actuation subsystem" in terms of the PMS hardware components which are included.

SNC Response

SNC does not concur with the requested Bases change. This specific request involves design detail which is not provided in GTS or current VEGP TS. Furthermore, this level of design detail is not deemed necessary for TS Bases. Training and other design documents appropriately address this design detail. The new TS 3.3.15 and TS 3.3.16 Bases refer to the new TS 3.3.8 Bases for the description of the ESF Actuation Subsystem. The description detail presented in Bases for new TS 3.3.8 is consistent with the content in the GTS. There are no hardware changes related to this LAR. The general content of the TS Bases does not convey detailed descriptions of the PMS hardware components, but rather focus on functional capabilities of the TS operability requirements. As such, the requested PMS hardware components which are included ESF Actuation Subsystem is provided below without adding that detail to the Bases.

Reference WCAP-16675-P (APP-GW-GLR-071), Revision 5, AP1000™ Protection and Safety Monitoring System Architecture Technical Report. The PMS manual and automatic actuation signal path includes the following subsystems:

- Field Transmitters and Sensors
- Nuclear Instrumentation System (NIS)
- Manual Main Control Room (MCR) Switches
- Plant Protection Subsystem (Bistable Processor Logic (BPL))
- RT and ESF Coincidence Logic (Local Coincidence Logic (LCL))
- Reactor Trip Matrix (RTM)
- ESF Actuation Subsystems (Integrated Logic Cabinet (ILC) with Integrated Logic Processor (ILP) and Component Interface Module (CIM))

The ESF Actuation Subsystem receives the system level actuation signals from the ESF Coincidence Logic (LCL). The ESF Actuation Subsystem is located in the Integrated Logic Cabinet (ILC), consisting of the Integrated Logic Processor (ILP) and the Component Interface Module (CIM). The CIMs provide the on/off control of individual safety-related plant components and receive status feedback from the components. In addition, the CIMs also provide the priority logic that assures that the non-safety control system (PLS) does not interfere with the safety functions.

There are no changes to LAR-12-002 from this RAI Response.

RAI Letter No. 01
Question 16-31, Issue 1

RAI Letter No. 01

Question 16-31

Description of Change M03

CTS 3.3.3 Function 18 • Bases for LCO 3.3.3.18
ITS 3.3.17 Function 18 • LCO Note (c) • Bases for LCO 3.3.17.18
CTS pages: 3.3.3-3, B 3.3.3-5
ITS pages: 3.3.17-3, B 3.3.17-5

Current TS 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," Function 18, "Remotely Operated [i.e., active] Containment Isolation Valve Position," requires one position indication channel "per valve" for each remotely operated containment isolation valve [CIV].

Corresponding improved TS 3.3.17 Function 18, renamed "Penetration Flow Path Remotely Operated CIV Position," requires two position indication channels "per penetration flow path." For penetration flow paths with two remotely operated ("active") CIVs, this LCO requirement is equivalent to the current requirement of "1/valve." This new LCO is modified by a new note, Note (c). This note says "Only one position indication channel is required for penetration flow paths with only one installed control room [position] indication channel."

Issue 1: The "LCO" section of the bases for ITS 3.3.17 states that "Note (c) requires a single channel of CIV position indication for a penetration flow path with two active valves." The next sentence, which appears to need clarification, such as suggested by the following markup, says "For containment penetrations with only one active CIV valve**, Note (c) also requires only a single channel of CIV** position indication to be OPERABLE." These two statements do not appear to be consistent with the proposed change to the definition of Function 18, which considers each penetration flow path to be a separate function, instead of the position indication of each "active" CIV, regardless of which penetration flow path contains the CIV. The licensee is requested to clarify the bases discussion of the operability requirements for Function 18.

<u>SNC Response</u>

SNC concurs with the need to clarify the new TS 3.3.17 Bases with respect to Function 18.

The new TS 3.3.17 LCO Bases discussion for Function 18 is revised to move the last line on page B 3.3.17-5 to between "CIV" and "valve" on the second line of page B 3.3.17-6. This line was inadvertently placed incorrectly. This clarifies the intended presentation, which is generally consistent with NUREG-1431 Bases for the same TS Function and footnotes.

Additional minor clarifications are also included with the revised Bases pages provided. The VEGP TS and Bases do not utilize the acronym "CIV" except in the drafted Bases for new TS 3.3.17, Function 18. These acronyms are replaced with phrases that more clearly relate the intent without introducing the acronym.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases pages.

BASES

LCO (continued)

13, 14, 15, 16. Core Exit Temperature

Core Exit Temperature is provided for verification and long term surveillance of core cooling.

An evaluation was made of the minimum number of valid core exit thermocouples necessary for In-Core Cooling (ICC) detection. The evaluation determined the reduced complement of core exit thermocouples necessary to detect initial core recovery and trend the ensuing core heatup. The evaluations account for core nonuniformities including incore effects of the radial decay power distribution and excore effects of condensate runback in the hot legs and nonuniform inlet temperatures. Based on these evaluations, adequate ICC detection is assured with two valid core exit thermocouples per quadrant. Core Exit Temperature is also used for plant stabilization and cooldown monitoring.

Two OPERABLE channels of Core Exit Temperature are required in each quadrant to provide indication of radial distribution of the coolant temperature rise across representative regions of the core. Power distribution symmetry was considered in determining the specific number and locations provided for diagnosis of local core problems. Two thermocouples in each of the two divisions ensure a single failure will not disable the ability to determine the temperature at two locations within a quadrant.

17. Passive Containment Cooling System (PCS) Heat Removal

The PCS Heat Removal must be capable of removing the heat from the containment following a postulated LOCA or steam line break (SLB). Two tank level instruments provide indication that sufficient water is available to meet this requirement. The PCS flow instrument provides a diverse indication of the PCS heat removal capability. The PCS flow instrument can be used to satisfy one of the two required channels when the PCS level channel in the same electrical division is inoperable.

18. Penetration Flow Path Remotely Operated Containment Isolation Valve Position

The Penetration Flow Path Remotely Operated Containment Isolation Valve Position is provided for verification of containment OPERABILITY. The LCO requires one channel of valve position indication in the control room to be OPERABLE for each valve in a containment penetration flow path actuated on a containment isolation signal, i.e., two total channels of valve position indication

BASES

LCO (continued)

for a penetration flow path with two active valves. For containment penetrations with only one active valve having post-accident monitoring control room indication, Note (c) requires a single channel of valve position indication to be OPERABLE. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve, as applicable, and prior knowledge of a passive valve, or via system boundary status. If a normally active valve is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE. Note (b) to the Required Channels states that the Function is not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. Each penetration is treated separately and each penetration flow path is considered a separate function. Therefore, separate Condition entry is allowed for each penetration flow path with one or more inoperable position indicators.

19. IRWST to RNS Suction Valve Status

The position of the motor-operated valve in the line from the IRWST to the pump suction header is monitored to verify that the valve is closed following postulated events. The valve must be closed to prevent loss of IRWST inventory into the RNS.

APPLICABILITY

The PAM instrumentation LCO is applicable in MODES 1, 2, and 3. These variables provide the information necessary to assess the process of accomplishing or maintaining critical safety functions following Design Basis Accidents (DBAs). The applicable DBAs are assumed to occur in MODES 1, 2, and 3. In MODES 4, 5, and 6, plant conditions are such that the likelihood of an event that would require PAM instrumentation is low; therefore, the PAM instrumentation is not required to be OPERABLE in these MODES.

ACTIONS

The ACTIONS Table has been modified by two Notes. The first Note excludes the MODE change restriction of LCO 3.0.4. This exception allows entry into an applicable MODE while relying on the ACTIONS even though the ACTIONS may eventually require a plant shutdown. This exception is acceptable due to the passive function of the instruments, the operator's ability to respond to an accident using alternate instruments and methods, and low probability of an event requiring these instruments.

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Issue 2: For a penetration flow path "with only one installed control room indication channel" if the one channel becomes inoperable, Condition A (One or more Functions with one required channel inoperable.) would be entered, allowing 30 days to restore the inoperable required channel to operable status. However, it seems that the 7-day Completion Time of Condition C is more appropriate for this situation (no operable position indication for any active CIV in a penetration flow path) in order to be consistent with the required actions for penetration flow path functions with two "installed control room [position] indication" channels. In addition, as noted in item 1 above, the bases do not accurately describe Note (c). The licensee is requested to correct this apparent inconsistency in the action requirements between penetration flow path remotely operated CIV position indication functions with one required active CIV and two required active CIVs.

SNC Response

SNC does not concur with the need for any revision to TS 3.3.17 Actions with respect to Function 18. The applicable Action for one inoperable channel has not been modified by the LAR changes to current Table 3.3.3-1 for Function 18. The current Function 18 Required Channels specify "1/valve." In the event that the control room post-accident monitoring (PAM) indications require only one valve position indication for a containment penetration, the current requirements would impose Action A if that indication channel were to be discovered inoperable. This is the same result even in the event that control room post PAM indications require two valve position indication for a containment penetration. As noted in the RAI, the Condition A applies for one required channel inoperable; whether or not there is a second valve indication in the flow path.

It is also noted that NUREG-1431, TS 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," Function 9 provides the equivalent requirement presented in VEGP LAR-12-002 changes. Similarly, for NUREG-1431, Action A is entered if one indication channel were to be discovered inoperable in a penetration flow path that requires only one valve position.

There are no changes to LAR-12-002 from this RAI Response.

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Question 16-32, Issue 1

RAI Letter No. 01

Question 16-32

Provide further justification/clarification regarding Descriptions of Change R1, R2, and L18.

Descriptions of Change R1 and R2 propose that current Technical Specifications (TS) 3.9.5, "Containment Penetrations" and 3.9.6, "Containment Air Filtration System (VFS)," respectively, be removed from TS and relocated to a document that is controlled in accordance with 10 CFR 50.59.

In the technical evaluation of R1, the licensee appears to assert that the objective of the requirements of current TS 3.9.5 and 3.9.6—mitigation of the radiological consequences of a fuel handing accident in Mode 6—are adequately addressed by current TS 3.6.8, "Containment Penetrations," as modified in accordance with Description of Change L18, and renumbered as new TS 3.6.7. However, the staff does not agree that the provisions of new TS 3.6.7, "Containment Penetrations," provide the same defense-in-depth capability for mitigating radiological consequences as do current TS 3.9.5 for a fuel handing accident in containment and current TS 3.9.6 for a fuel handing accident in the fuel building.

The justification for relocating these Specifications contains no information beyond that provided previously during the staff's review of the generic TS in the AP600 and AP1000 design certification applications. The justification also fails to address how these LCOs provide defense-in-depth capability for mitigating control room occupant dose from a fuel handling accident.

Issue 1:

(a) The licensee is requested to withdraw the proposed relocations of current TS 3.9.5 and 3.9.6 from the LAR since their inclusion resolved staff concerns during the review of the AP600 and AP1000 designs. The licensee may propose to include these requirements as short-term availability controls, along with an appropriate RTNSS evaluation;

(b) Alternatively, the licensee may provide further justification to support the relocation of current TS 3.9.5 and 3.9.6. As a part of this revised justification, the licensee is requested to (1) state where the requirements of current TS 3.9.5 and 3.9.6 will be relocated, (2) state how the information in the bases will be maintained or placed in the FSAR, (3) describe how each requirement will be revised before being implemented, and (4) commit to control changes to those requirements in accordance with 10 CFR 52.98, which is the correct reference for changes to FSAR information.

<u>SNC Response</u>

SNC concurs with providing further justification to support the relocation of current TS 3.9.5 and TS 3.9.6.

The NRC Staff concerns related to the inclusion of TS 3.9.5 and TS 3.9.6 during the review of the AP600 are discussed in NUREG-1512, "Final Safety Evaluation Report Related to Certification of the AP600 Standard Design," Section 16.3, and referenced FSER Open Item 16.3-1. In NUREG-1512, the Staff summarized the issue as follows:

> "The staff took the position that, although the analyzed dose from a fuel handling accident may not exceed the dose acceptance criteria, the principle of defense-in-depth makes it prudent to establish some type of containment barrier to a postulated release from a fuel handling accident."

The TS 3.9.5 and TS 3.9.6 Bases, Applicable Safety Analyses, also support only that these TS are included as "defense-in-depth."

The Investment Protection Short Term Availability Controls found in FSAR 16.3 also did not meet Technical Specifications 10 CFR 50.36 selection criteria; however, they were selected for control in FSAR 16.3 based on PRA insights that identified systems, structures and components that are important in protecting the utility's investment and for preventing and mitigating severe accidents. This provided a defense-in-depth control associated with these insights. As provided in LAR DOC R1 and R2, the PRA shows that the importance in this regard for the current TS 3.9.5 and TS 3.9.6 controls is not significant (i.e., is less than 1.3% of the AP1000 Shutdown Large Release Frequency). Therefore, not only do the controls in current TS 3.9.5 and TS 3.9.6 not meet 10 CFR 50.36 for inclusion in TS, they also would not meet the type of evaluation criteria that was applied to identifying controls applicable for FSAR Section 16.3.

Notwithstanding, the proposed relocation continues to provide an equivalent defense-in-depth protection. No technical changes are proposed with the relocation. The document to which these TS are being relocated is being drafted as the "Technical Requirements Manual (TRM)" and will be incorporated by reference into FSAR Chapter 16, as a site-specific portion of the FSAR. The TRM portions of the site-specific FSAR (containing the relocated TS requirements) will continue to provide controls similar to the controls provided for the FSAR 16.3 Investment Protection Short Term Availability Controls, and support appropriate controls for defense-in-depth protection afforded by these current TS.

Finally, it is noted that TS 3.6.8 remains with similar containment closure controls during all of Mode 5 and 6 (i.e., until all fuel is removed from the reactor vessel). Since this encompasses nearly the entire period when TS 3.9.5 would be applicable (i.e., during movement of irradiated fuel assemblies within containment until the last fuel assembly is removed from the core), there remains both TS controls as well as the relocated TRM controls that require the ability to enact containment closure.

In addition to the above discussion, the specific RAI requests are addressed as follows:

(1) LAR-12-002, Enclosure 5, List of Regulatory Commitments, provides that

   a. "SNC commits to relocate the Containment Penetrations during movement of irradiated fuel assemblies within containment Specification to a document that is controlled in accordance with 10 CFR 50.59"; and

   b. "SNC commits to relocate the VFS exhaust subsystem Specification to a document that is controlled in accordance with 10 CFR 50.59."

   This licensee controlled document is being drafted as the "Technical Requirements Manual (TRM)" and will be incorporated by reference into FSAR Chapter 16, as a site-specific portion of the FSAR. As requested in part (4) of the RAI, the commitment is revised to reflect that the document will be controlled in accordance with 10 CFR 52.98.

(2) SNC intends to relocate the Bases for current TS 3.9.5 and TS 3.9.6 to the TRM along with the Specification requirements. SNC is updating the LAR Enclosure 5 comments to also explicitly reference relocation of the Bases to a 10 CFR 52.98 controlled document.

(3) The commitment to relocate the TS and associated Bases involves only format changes to reflect TRM content versus Technical Specification content, as well as appropriate terminology changes such as requiring "functionality" versus "operability." For example, the numbering scheme would provide for a unique numbering different than "LCO 3.9.5" numbering for the Technical Specification. Similar formatting, numbering, and editorial changes would be made in capturing pertinent Definitions, Use and Applications, as well as LCO Applicability and SR Applicability Technical Specifications for inclusion in the TRM. All such changes (as well as any future changes) would be made in accordance with 10 CFR 52.98. All changes, including initial adoption into FSAR Chapter 16, would be reported to the NRC in accordance with applicable Regulations.

(4) Since the material being relocated is considered site-specific FSAR content, and is not within the scope of the referenced design certification rule, 10 CFR 52.98(c)(2) specifies that changes "are subject to the applicable change processes in 10 CFR part 50, unless they also involve changes to or noncompliance with information within the scope of the referenced design certification rule." 10 CFR 50.59(b) states "This section applies to each holder of an operating license issued under this part or a combined license issued under part 52 of this chapter." Since 10 CFR 52.98 leads to implementing the change process in 10 CFR 50.59, either citation is deemed appropriate. However, SNC will make the requested revision to the committed to change process, to refer instead to 10 CFR 52.98.

The changes to LAR-12-002 from this RAI response are shown in the following List of Regulatory Commitments page revision.

The following table identifies the regulatory commitments in this document. Any other statements in this submittal represent intended or planned actions. They are provided for information purposes and are not considered to be regulatory commitments.

REGULATORY COMMITMENTS	DUE DATE / EVENT
SNC commits to provide to the NRC using an industry database the operating data (for each calendar month) that is described in Generic Letter 97-02, "Revised Contents of the Monthly Operating Report," by the last day of the month following the end of each calendar quarter. The regulatory commitment will be based on use of an industry database (e.g., the industry's Consolidated Data Entry (CDE) program, currently being developed and maintained by the Institute of Nuclear Power Operations).	Ongoing
SNC commits to relocate the Containment Penetrations during movement of irradiated fuel assemblies within containment Specification, and the associated Bases, to a document that is controlled in accordance with 10 CFR ~~50.59~~52.98.	Within 90 days of issuance of this Amendment
SNC commits to relocate the VFS exhaust subsystem Specification, and the associated Bases, to a document that is controlled in accordance with 10 CFR ~~50.59~~52.98.	Within 90 days of issuance of this Amendment
SNC commits to relocate Table 3.3.3-1, footnote (a), "RCS Subcooling calculated from pressurizer pressure and RCS hot leg temperature," to the TS Bases	Within 90 days of issuance of this Amendment
SNC commits to relocate the closure time requirement (i.e., < 30 seconds) of each CVS makeup line isolation valve to the new SR 3.1.9.2 TS Bases.	Within 90 days of issuance of this Amendment
SNC commits to add detail to the new SR 3.3.7.1 TS Bases stating that both RTBs are tested in one division.	Within 90 days of issuance of this Amendment
SNC commits to relocate details of design related to Passive Residual Heat Removal (PRHR) Flow, PRHR Outlet Temperature, Passive Containment Cooling System (PCS) Storage Tank Level, and PCS Flow to the new TS 3.3.17 Bases.	Within 90 days of issuance of this Amendment

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Issue 2:

Current LCO 3.6.8.d states:

The containment penetrations shall be in the following status:

d. Each penetration providing direct access from the containment atmosphere to the outside atmosphere *either:*

1. closed by a manual or automatic isolation valve, blind flange, or equivalent*, or*

2. capable of being closed by an OPERABLE Containment Isolation signal.

In Description of Change L18, the licensee proposes to revise current TS LCO 3.6.8.d to remove any requirement for manual containment isolation initiation functions to be operable in Modes 5 and 6. As a part of the discussion, the licensee points out that item d.2 does not imply that automatic containment isolation initiation functions are required by current TS 3.3.2, "Engineered Safety Feature Actuation System (ESFAS)," in Modes 5 and 6 because current LCO 3.3.2 actually requires operability of only manual containment isolation initiation functions in Modes 5 and 6.

The proposed (and renumbered as discussed in Description of Change M13) LCO 3.6.7.d states:

The containment penetrations shall be in the following status:

d. Each penetration providing direct access from the containment atmosphere to the outside atmosphere, if open, can be closed by a manual or automatic isolation valve, blind flange, or equivalent prior to steaming into the containment.

The licensee also makes the following statement in Description of Change L18 (emphasis added): This change [to LCO 3.6.8.d] is designated as less restrictive since the proposed LCO [3.6.7.d] would remove requirements for Operable [manual] containment isolation signals in Modes 5 and 6, allowing *manual operator action to affect any required isolation*.
The licensee's use of the phrase "manual operator action" in the above quotation from Description of Change L18, as the means to isolate containment air filter supply and exhaust penetrations, is taken to mean "no use of signals from manual containment isolation initiation functions." This includes Function 19.b, "Containment Air Filtration System Isolation – Containment Isolation," which is specified in Table 3.3.2-1 of current TS 3.3.2, and which references Function 3 (taken to mean Functions 3.a, 3.b, and 3.c) of current TS 3.3.2. The licensee is requested to describe in more detail how this and other penetration flow paths, which are closed upon a containment isolation signal (whether automatic or manual) with the unit in Modes 1, 2, 3, or 4, will be closed in Mode 5 or 6 "prior to steaming into the containment" for the limiting case, without reliance on manual containment isolation initiation functions.

SNC Response

SNC concurs with providing more detail on how the new LCO 3.6.8.d requirement to have the ability to close containment penetration flow paths providing direct access from the containment atmosphere to the outside atmosphere prior to steaming into the containment will be met.

FSAR Section 19E.2.6.2, Design Features to Address Shutdown Safety, outlines the containment closure capability in Modes 5 and 6. Specifically related to the containment penetration flow paths providing direct access from the containment atmosphere to the outside atmosphere this section states (shown below with emphasis added) that the assumption allows for no use of signals from manual containment isolation initiation functions:

> Containment penetrations, including purge system flow paths, that provide direct access from containment atmosphere to outside atmosphere must be isolated or isolatable on at least one side. Isolation may be achieved by an operable automatic isolation valve <u>or by a manual isolation valve, blind flange, or equivalent</u>.

FSAR Section 19E.3.1.3.5, Reduced-Inventory Operations, discusses the timing impact for achieving containment closure prior to steaming in the containment. While this discussion focuses on the containment hatches (they are the largest opening and may require more manual operator action that other penetrations would to achieve closure), the intent is applicable to all penetrations that would be required to be closed. This discussion recognizes the range of times that may be applicable and the ensuing limitations that may or may not be appropriate given the time to steaming:

> The time after shutdown impacts the requirements for containment closure during shutdown as discussed in Subsection 19E.2.6.2 of this appendix (and captured in the Technical Specifications). For reduced inventory conditions, if the time to steaming (inside containment) following a loss of heat sink event is less than the time required to close the containment equipment hatches, then these hatches should be closed. If the time after shutdown is sufficiently long, such that steaming to containment would not occur prior to the containment hatches being able to be closed, then the equipment hatches could be open, with the ability to close them.

These FSAR discussions of the shutdown event and the assumed Technical Specification controls do not state any reliance on automatic signals nor use of signals from manual containment isolation initiation functions. As such, the change to allow manual operator actions for closure of containment penetration flow paths providing direct access from the containment atmosphere is consistent with the FSAR shutdown event assumptions.

While the actual procedures have not been developed, and actual detailed implementation may vary, meeting the TS requirements ultimately dictate the viability of compliance options.

The change <u>allows</u> for no use of signals from manual containment isolation initiation functions. However, it is anticipated that the normal practice would rely on the functionality of the safety-related PMS and the capability to initiate manual containment isolation by the control room operator from within the control room. Additional capability is also anticipated to be available to initiate manual closure of individual isolation valves from the non-safety plant control system by the control room operator from within the control room.

In the event that these preferred options are not available, procedures would ensure that the remote isolation of open containment penetration flow paths providing direct access from the containment atmosphere to the outside atmosphere could be accomplished in the time available prior to steaming into the containment. As outlined in the TS 3.6.8 Bases:

> The assumptions used in determining the required closure time for the various containment openings should be conservative, and should be consistent with the plant operating procedures, staffing levels, and status of the containment openings. The evaluation should consider the ability to close the containment for the limiting loss of shutdown cooling event, and considering the possibility of a station blackout. In determining if containment can be closed within the time permitted to containment closure specified in Figure B 3.6.7-1, the time to close containment penetrations must include both the diagnosis and decision-making time and the time required to physically complete the closure action.

Therefore, condition-specific evaluations are required to assure compliance with the TS.

There are no changes to LAR-12-002 from this RAI response.

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Issue 3:

The licensee also proposes omitting the currently-specified Modes 5 and 6 applicability of Function 3.a, "Containment Isolation – Manual Initiation," (see FSAR Figure 7.2-1, Sheet 13) in current TS 3.3.2, Table 3.3.2-1, from corresponding Function 3, "Containment Isolation - Manual Initiation," in Table 3.3.9-1 of new TS 3.3.9, "ESFAS Manual Initiation."

However, Table 3.3.2-1 of current TS 3.3.2, specifies two other manual functions that initiate containment isolation in Mode 5 or Mode 6, or both:

- Function 3.b, "Containment Isolation - Manual Initiation of Passive Containment Cooling," and referenced Function 12.a, "Passive Containment Cooling Actuation – Manual Initiation," are both required to be operable in Modes 5 and 6 for unisolated penetration flow paths when decay heat > 6.0 MWt.
  Current Function 12.a is retained as Function 8, "Passive Containment Cooling Actuation - Manual Initiation," in Table 3.3.9-1 of new TS 3.3.9.

- Function 3.c, "Containment Isolation – Safeguards Actuation," and referenced Function 1.a, "Safeguards Actuation – Manual Initiation," are both required to be operable in Mode 5 for unisolated penetration flow paths.
  Current Function 1.a is retained as Function 1, "Safeguards Actuation - Manual Initiation," in Table 3.3.9-1 of new TS 3.3.9.

The licensee is requested to justify omitting the Modes 5 and 6 applicability of current TS 3.3.2 Function 3.a, "Containment Isolation - Manual Initiation," from corresponding new TS 3.3.9 Function 3, while

(1) Function 1 and Function 8 of new TS 3.3.9 both provide manual containment isolation signals;

(2) new TS 3.3.9 requires Function 1 to be operable in Modes 5, and Function 8 to be operable in Modes 5 and 6 for unisolated penetration flow paths with decay heat > 6.0 MWt; and

(3) current TS LCO 3.9.5.d.2 relies on operable [manual] containment isolation signals during movement of irradiated fuel assemblies within containment.

<u>SNC Response</u>

SNC concurs with providing more detail on omitting the Modes 5 and 6 Applicability of current Table 3.3.2-1 Function 3.a.

Current Table 3.3.2-1, Function 12.a, "Passive Containment Cooling Actuation – Manual Initiation," continues to be required (as new TS Table 3.3.9-1, Function 8) in Modes 5 and 6 to support operability of the Passive Containment Cooling System (PCS) required by new TS 3.6.6. While Passive Containment Cooling Actuation – Manual Initiation, by design, also

provides a Containment Isolation System Isolation, concurrent containment isolation is not required for operability of PCS.

Current Table 3.3.2-1, Function 1.a, “Safeguards Actuation – Manual Initiation,” continues to be required (as new TS Table 3.3.9-1, Function 1) in Mode 5 to support operability of the core makeup tank (CMT) required by TS 3.5.3. While Safeguards Actuation – Manual Initiation, by design, also provides a Containment Isolation System Isolation, concurrent containment isolation is not required for operability of CMTs.

As such, the new TS Table 3.3.9, Function 3, “Containment Isolation – Manual Initiation,” would typically remain functional from Passive Containment Cooling Actuation – Manual Initiation and from Safeguards Actuation – Manual Initiation signals. However, neither the Containment Isolation – Manual Initiation, nor support from these other actuation signals, is required in Mode 5 or 6, as discussed in Discussion of Change (DOC) L18.

The current TS 3.9.5, “Containment Penetrations,” LCO item d.2, is being relocated as described in DOC R1, and discussed in additional detail in the response to RAI Question 16-32, Issue 1. As outlined in these discussions, the current requirement for operable [manual] containment isolation signals during movement of irradiated fuel assemblies within containment is relocated with no technical change. An editorial change from “operable” [manual] containment isolation signals to requiring “functional” signals is also outlined in the RAI Question 16-32, Issue 1 response. Evaluating “functionality” would involve assuring functionality of the supporting signals as well. As such, the requirement for “functionality” of the manual containment isolation signals is implicitly captured with the relocation of current TS 3.9.5.d.2. As discussed in DOC R1 and RAI Question 16-32, Issue 1, any changes would be evaluated in accordance with applicable Regulations.

There are no changes to LAR-12-002 from this RAI response.

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Description of Changes A018 and A019

ITS 3.2.1 • SR 3.2.1.1 Note • SR 3.2.1.2 Note
ITS 3.2.2 • SR 3.2.2.1 Note

Current SR 3.2.1.1 and SR 3.2.1.2 each have three Frequencies, which require verification of FQW(Z) [for SR 3.2.1.1] and FQC(Z) [for SR 3.2.1.2] limits:

"Once after each refueling prior to THERMAL POWER exceeding 75% RTP
AND
Once within 12 hours after achieving equilibrium conditions after exceeding, by ≥ 10% RTP, the THERMAL POWER at which [FQC(Z)][FQW(Z)] was last verified
AND
31 effective full power days (EFPD) thereafter"

Description of Change A018 proposes to split each of these two SRs into two Surveillances;

- one pair of SRs with the "Once after each refueling prior to THERMAL POWER exceeding 75% RTP" Frequency (i.e., new SR 3.2.1.1 and SR 3.2.1.2), and
- the remaining pair of SRs with the remaining two Frequencies (i.e., new SR 3.2.1.3 and SR 3.2.1.4).

Currently, there are two Notes applicable to both SR 3.2.1.1 and SR 3.2.1.2, which state:

> "1. During power escalation at the beginning of each cycle, THERMAL POWER may be increased until a power level for extended operation has been achieved at which a power distribution map is obtained.
>
> 2. If the OPDMS becomes inoperable while in MODE 1 these surveillances must be performed within 31 days of the last verification of OPDMS parameters."

Description of Change A018 proposes to replace the existing Note 1 with a new Note posted on new SR 3.2.1.1 and SR 3.2.1.2 which states "Not required to be performed if OPDMS was monitoring parameters upon exceeding 75% RTP."

The staff does not think this new Note is needed for new SR 3.2.1.1 and SR 3.2.1.2 considering LCO 3.2.1 Applicability statement which says "MODE 1 with On-line Power Distribution Monitoring System (OPDMS) not monitoring parameters." If OPDMS was monitoring parameters upon exceeding 75% RTP, LCO 3.2.1 requirements (performance of SR 3.2.1.1 and SR 3.2.1.2 included) are not applicable, and plant operators, therefore, would not have to look into these SRs to see the posted Note. This point applies similarly to the new Note posted on new SR 3.2.2.1 as described in Description of Changes A019.

The licensee is requested to remove this Note from new SR 3.2.1.1 and SR 3.2.1.2, and adjust the associated changes in the bases accordingly.

SNC Response

SNC does not concur with removing Notes from new SR 3.2.1.1, SR 3.2.1.2, and SR 3.2.2.1.

The above RAI correctly notes that

> "*If OPDMS was monitoring parameters upon exceeding 75% RTP, LCO 3.2.1 requirements (performance of SR 3.2.1.1 and SR 3.2.1.2 included) are not applicable, and plant operators, therefore, would not have to look into these SRs to see the posted Note.*"

However, as discussed in DOC A018 and A019, the basis for inclusion of the Notes is not compliance at the time the plant is initially exceeding 75% RTP, but the situation of when OPDMS ceases to monitor parameters at some point after initial power escalation above 75%. In this event, these SRs would not have been performed (as noted by the NRC they were not required to be performed), and therefore, at the time of entry into the Applicability of these TS, it would be discovered as a failure to perform a Surveillance within the specified Frequency. As stated in SR 3.0.1, "failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO." This is not the intended application in this situation as supported in current Bases.

SNC contends that elimination of the Notes reflects a more restrictive change, and would result in unintended immediate entry into the Actions for TS 3.2.1 and TS 3.2.2. Therefore, the change is not included.

There are no changes to LAR-12-002 from this RAI response.

RAI Letter No. 01
Question 16-34

RAI Letter No. 01

Question 16-34

Description of Changes A023

ITS 3.2.5 • Bases for Action B.1 only

As described in Description of Change A023, the licensee proposes to delete the Note posted on LCO 3.2.5 Required Action B.1. During the review of this change, the staff noted that a conforming change should also be made to the discussion of the Note in the associated bases. The licensee is requested to address the missing change to the associated bases.

SNC Response

SNC concurs with correcting the Bases to be consistent with the DOC A023 related deletion of the Note to TS 3.2.5, Required Action B.1.

The change to LAR-12-002 from this RAI response is shown in the following revised Bases page.

BASES

ACTIONS

A.1

With any of the OPDMS-monitored power distribution parameters outside of their limits, the assumptions used as most limiting base conditions for the DBA analyses may no longer be valid. The 1 hour operator ACTION requirement to restore the parameter to within limits is consistent with the basis for the anticipated operational occurrences and provides time to assess if there are instrumentation problems. It also allows the possibility to restore the parameter to within limits by rod cluster control assembly (RCCA) motion if this is possible. The OPDMS will continuously monitor these parameters and provide an indication when they are approaching their limits.

B.1

If the OPDMS-monitored power distribution parameters cannot be restored to within their limits within the Completion Time of ACTION A.1, it is likely that the problem is not due to a failure of instrumentation. Most of these parameters can be brought within their respective limits by reducing THERMAL POWER because this will reduce the absolute power density at any location in the core thus providing margin to the limit.

If the parameters cannot be returned to within limits as power is being reduced, THERMAL POWER must be reduced to < 50% RTP where the LCOs are no longer applicable.

The Completion Time of 4 hours provides an acceptable time to reduce power in an orderly manner and without allowing the plant to remain outside the $F^N_{\Delta H}$ limits for an extended period of time.

C.1

If the SDM requirements are not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. It is assumed that boration will be continued until the SDM requirements are met. In the determination of the required combination of boration flow rate and boron concentration, there is no unique requirement that must be satisfied. Since it is imperative to raise the boron concentration of the RCS as soon as possible, the boron concentration should be a concentrated solution. The operator should begin boration with the best source available for the plant conditions.

RAI Letter No. 01
Question 16-35

RAI Letter No. 01

Question 16-35

Description of Changes A118

ITS 5.5.13

As described in Description of Change A118, the licensee proposes to reformat (renumbering) the different provisions established for the plant Ventilation Filter Testing Program (VFTP) to improve their clarity. During the review of this change, the staff noted that conforming changes should also be made within the VFTP description to reflect the new numbering scheme. The licensee is requested to address the missing changes in TS 5.5.1

SNC Response

SNC concurs with including the conforming changes to TS 5.5.13 consistent with the changes described in DOC A118.

The change to LAR-12-002 from this RAI response is shown in the following revised TS Markup and TS Clean pages.

A118

5.5 Programs and Manuals

5.5.12 Main Control Room Envelope Habitability Program (continued)

e. The quantitative limits on unfiltered air inleakage into the MCRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of MCRE occupants to these hazards will be within the assumptions in the licensing basis.

f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing MCRE habitability, determining MCRE unfiltered inleakage, and measuring MCRE pressure and assessing the MCRE boundary as required by paragraphs c and d, respectively.

5.5.13 Ventilation Filter Testing Program (VFTP)

a.

A program shall be established to implement the following required testing of the VES.

a.1 a.2

Tests described in Specification 5.5.13.~~a~~ and 5.5.13.~~b~~ shall be performed: i) initially, ii) once each 24 months, iii) after partial or complete replacement of a HEPA filter or charcoal adsorber, iv) ~~after any~~ following detection of, or evidence of, penetration or intrusion of water or other material into any portion of the VES that may have an adverse effect on the functional capability of the filters, and v) following painting, fire, or chemical release in any ventilation zone communicating with the VES that may have an adverse effect on the functional capability of the system. A123

a.3

Tests described in Specification 5.5.13.~~c~~ shall be performed: i) after each 720 hours of system operation or at least once each 24 months, whichever comes first, ii) following painting, fire, or chemical release in any ventilation zone communicating with the VES that may have an adverse effect on the functional capability of the carbon media, and iii) following detection of, or evidence of, penetration or intrusion of water or other material into any portion of the VES that may have an adverse effect on the functional capability of the carbon media.

a.4

Tests described in 5.5.13.~~d~~ shall be performed once per 24 months.

1

~~a~~. Demonstrate for the VES that an inplace test of the high efficiency particulate air (HEPA) filter shows a penetration and system bypass ≤ 0.05% when tested in accordance with Regulatory Guide 1.52, Revision 3, and ASME N510-1989 at a flow rate at least 600 cfm greater than the ~~flow measured by VES-FT-003A/B. The flow rate being measured is a combination of the VES breathable air supply flow and the recirculation flow drawn through the eductor.~~ VES makeup flow rate D14

5.5 Programs and Manuals

5.5.12 Main Control Room Envelope Habitability Program (continued)

e. The quantitative limits on unfiltered air inleakage into the MCRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of MCRE occupants to these hazards will be within the assumptions in the licensing basis.

f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing MCRE habitability, determining MCRE unfiltered inleakage, and measuring MCRE pressure and assessing the MCRE boundary as required by paragraphs c and d, respectively.

5.5.13 Ventilation Filter Testing Program (VFTP)

a. A program shall be established to implement the following required testing of the VES.

Tests described in Specification 5.5.13.a.1 and 5.5.13.a.2 shall be performed: i) initially, ii) once each 24 months, iii) after partial or complete replacement of a HEPA filter or charcoal adsorber, iv) following detection of, or evidence of, penetration or intrusion of water or other material into any portion of the VES that may have an adverse effect on the functional capability of the filters, and v) following painting, fire, or chemical release in any ventilation zone communicating with the VES that may have an adverse effect on the functional capability of the system.

Tests described in Specification 5.5.13.a.3 shall be performed: i) after each 720 hours of system operation or at least once each 24 months, whichever comes first, ii) following painting, fire, or chemical release in any ventilation zone communicating with the VES that may have an adverse effect on the functional capability of the carbon media, and iii) following detection of, or evidence of, penetration or intrusion of water or other material into any portion of the VES that may have an adverse effect on the functional capability of the carbon media.

Tests described in 5.5.13.a.4 shall be performed once per 24 months.

RAI Letter No. 01
“Interlocks”

- Question 16-18, Issue 5
- Question 16-22
- Question 16-23
- Question 16-26, Issue 2
- Question 16-26, Issue 3
- Question 16-26, Issue 4
- Question 16-26, Issue 5
- Question 16-27
- Question 16-28, Issue 1
- Question 16-29

RAI Letter No. 01

Question 16-18

Issue 5: Description of Change L10 inserts the following paragraph into the ITS bases for Channel Operational Test (COT) surveillances—SR 3.3.8.2 and SR 3.3.10.2; and Channel Calibration surveillances—SR 3.3.1.8, SR 3.3.1.9, SR 3.3.8.3, and SR 3.3.10.3.

> *"Functions with interlocks* implicitly required to support the function's OPERABILITY are also addressed by this [CHANNEL CALIBRATION] [COT]. This portion of the [CHANNEL CALIBRATION] [COT] ensures the associated *function(s) are* not bypassed when <u>within the required interlock power level</u>. This can be accomplished by ensuring the interlocks are calibrated properly, or the function OPERABILITY can be met if the interlock is manually tripped to properly enable the affected Functions. When an interlock is inoperable such that the associated Function is not enabled at the proper unit conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken."

Description of Change L10 inserts the following paragraph in the ITS bases for Channel Operational Test surveillances—SR 3.3.8.2 and SR 3.3.10.2; and Channel Calibration surveillances—SR 3.3.2.3 and SR 3.3.3.3.

> *"Interlocks* implicitly required to support the function's OPERABILITY are also addressed by this [CHANNEL CALIBRATION] [COT]. This portion of the [CHANNEL CALIBRATION] [COT] ensures the associated function is not bypassed when <u>within the required interlock power level</u>. This can be accomplished by ensuring the interlocks are calibrated properly, or the function OPERABILITY can be met if the interlock is manually tripped to properly enable the affected Function. When an interlock is inoperable such that the associated Function is not enabled at the proper unit conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken."

Description of Change L10 does not insert either paragraph in the ITS bases for the Channel Operational Test surveillance—SR 3.3.2.2 or Channel Calibration surveillances— SR 3.3.13.3 and SR 3.3.14.3.

1. The licensee is requested to clarify the phrase “within the required interlock power level” which is indicated by underlining in the above quoted paragraphs. The RTS and ESFAS interlocks or permissive are not just based on neutron flux power levels:

- Intermediate range neutron flux above setpoint (P-6)
- Power range nuclear power above setpoint (P-10)
- Reactor trip breaker (RTB) open (P-3)
- Reactor trip initiated or RTBs open (P-4)
- Pressurizer pressure below setpoint (P-11)
- Pressurizer level below setpoint (P-12)
- Reactor coolant system pressure below setpoint (P-19)

2. The licensee is requested to clarify how interlock operability is verified for each ITS instrumentation function that (a) requires a COT and a Channel Calibration as listed above and (b) has in its SR bases the following statement from the above two paragraphs: “This can be accomplished by ensuring the interlocks are calibrated properly, or the function OPERABILITY

can be met if the interlock is manually tripped to properly enable the affected Function." The staff believes that for the supported RTS and ESFAS functions to be operable,

- Both the manual and automatic switching of each interlock at its setpoint needs to be verified as a part of its supported functions' Channel Calibration and COT; and
- Each interlock's setpoint should be governed by TS 5.5.14, "Setpoint Program."

3. The licensee is requested to enhance the TS 3.3.1 and TS 3.3.8 bases so that the discussions of the RTS and ESFAS interlocks describe— for each supported function— how the interlock signal is used coincident with a partial (divisional) trip/actuation signal, or coincident with a RT or an ESF voted actuation signal to achieve RT or ESF end device actuation.

4. The licensee is requested to explain why the above paragraph is not included in the ITS bases for the Channel Operational Test surveillance—SR 3.3.2.2, and Channel Calibration surveillances— SR 3.3.13.3 and SR 3.3.14.3.

SNC Response

In response to Item #1, SNC concurs with revising to clarify. The Bases phrase "is not bypassed when within the required interlock power level" is changed to "is not bypassed when required to be enabled." This more clearly conveys the intent.

In response to Item #2, SNC concurs with the clarifying the Bases related to the applicability of the TS 5.5.14, "Setpoint Program" (SP) to the interlock calibrations.

Each RTS and ESFAS actuation function is required operable during the stated TS Applicability. The Applicability for certain Functions is based on transitioning above or below certain interlocks, while others are not directly tied to an interlock. However, while operating within the TS required Applicability for any Function, its associated supporting interlock is not required to automatically change state. The interlock status is established in conjunction with assuring Function operability prior to entering the required Applicability. The automatic switching for the interlock Functions are designed as a backup to manual operator actions to ensure interlocked Functions are enabled under the conditions assumed in the safety analyses and as required during the TS Applicability.

As described in the COL TS Bases and discussed in Discussion of Change (DOC) L10, the COL TS Actions for inoperable interlocks allow continued plant operation when the interlock is verified to be in the required state for the existing plant conditions (i.e., a manual action is taken to assure the status of required Functions). The current TS allow Functions that are supported by manually enforced interlocks to be considered OPERABLE. As such, the automatic switching is not required to ensure operability of the supported Function. Therefore, the LAR does not revise this approach to OPERABILITY of a Function.

The intent of Channel Operational Tests and Channel Calibration Surveillances of interlock functions (which are applied to each interlock except P-3) is to perform them in accordance with the TS 5.5.14, "Setpoint Program (SP)." (For the reactor trip breaker position switches that provide input to the P-3 interlock function, as described in current Bases, they only function to energize or de-energize or open or close contacts. Therefore, the P-3 interlock has no adjustable trip setpoint and does not require channel calibration or COT Surveillances.) The

Bases will be clarified to address this intent, which is consistent with the existing requirements and consistent with the proposed changes which still maintain the requirement for COT and Channel Calibration Surveillances to be performed in accordance with the SP.

Therefore, in support of implementation of the revised interlock presentation, the Bases paragraphs inserted in conjunction with the DOC L10 change (i.e., those quoted in the RAI), are revised as shown below and reflected in changes to DOC L10. The Bases revision will also address the editorial inconsistencies identified such that all instances will read (applying the bracketed portions as applicable to the specific Surveillance) as follows (new insertions underlined):

> [~~Functions with~~]Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this [CHANNEL CALIBRATION] [COT]. This portion of the [CHANNEL CALIBRATION] [COT] ensures the associated function~~*(s) are*~~ is not bypassed when ~~within the required interlock power level~~ required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually ~~tripped~~ enforced to properly enable the affected Functions. When an interlock is ~~inoperable such that~~ not supporting the associated Function's OPERABILITY ~~is not enabled~~ at the ~~proper~~ existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

[Note the above Bases insert is further modified to address Actuation Logic Test Surveillance Bases. These changes are discussed and presented in response to RAI Question 16-26, Issue 2.]

In response to Item #3, refer to the response to RAI Question 16-28, Issue 1, which addresses a similar request for additional Bases to clarify design detail related to interlocks. This specific request involves design detail which is not provided in GTS or current VEGP TS. Furthermore, this level of design detail is not deemed appropriate for TS Bases. Training and other design documents appropriately address this design detail. However, detail is provided in the RAI Question 16-28, Issue 1, response to enable more efficient discussion between the staff and the licensee about how the interlock signal is used coincident with a partial (divisional) trip/actuation signal or coincident with a RT or an ESF voted actuation signal, to achieve RT or ESF end device actuation.

In response to Item #4, SNC provides the following explanation. The Bases paragraph addressed in Item #2 above is being included in the Bases for new SR 3.3.2.2, as well as other COT and Channel Calibration SRs for Functions that have associated interlocks. Therefore, the subject Bases paragraph is added to the Bases for new SR 3.3.2.2 as well as new SR 3.3.3.2. Additionally, it is identified that the inserted paragraph is applicable to new SR 3.3.1.6 and new SR 3.3.1.7 and therefore is also added to these associated Bases.

In reviewing this portion of the change, it is recognized that specifics of the P-6 and P-10 reflected in the current SR 3.3.1.9 Note should have been deleted consistent with the DOC L10 discussion. With the changes addressed in DOC L10, verification that the P-6 and/or P-10 interlocks are in the required state is implicitly treated as a part of the COT required by new SR 3.3.2.2 and new SR 3.3.3.2. As such, DOC L10 is revised to reflect deleting the current

SR 3.3.1.9 Note. Other editorial conforming changes resulting from this change are made to DOCs A024 and A026.

The Functions required by new TS 3.3.13, “Engineered Safety Feature Actuation System (ESFAS) Control Room Air Supply Radiation Instrumentation,” and new TS 3.3.14, “Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation,” are not designed with supporting interlocks. As such, the Bases description of COT and Channel Calibration for interlocks is not applicable and not proposed for inclusion.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

RAI Letter No. 01

Question 16-22

Description of Change A028

ITS 3.3.8 Bases “Applicable Safety Analyses, LCOs, and Applicability”

ITS page: B 3.3.8-14

On page B 3.3.8-14, the bases discussion of the ESFAS protective function of “Main Feedwater Pump Trip and Valve Isolation” includes the sentence, “The Reactor Trip Signal also initiates a turbine trip signal whenever a reactor trip (P-4) is generated.” The licensee is requested to explain why this sentence is relevant to the discussion, or revise it so its relevance is clear.

SNC Response

SNC concurs that the sentence describing turbine trip on a reactor trip (P-4) signal is not relevant to the referenced discussion. The Main Feedwater Pump Trip and Valve Isolation discussion in the proposed TS 3.3.8, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," Applicable Safety Analyses, LCOs, and Applicability Bases section is revised to delete the last sentence. This sentence is appropriately stated under the discussion of Turbine Trip.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases page.

RAI Letter No. 01

Question 16-23

Description of Change A028

ITS pages: B 3.3.8-12, 13, 15, 16, 17

ITS 3.3.8 Bases "Applicable Safety Analyses, LCOs, and Applicability"
The bases discussions of the ESFAS protective functions do not consistently describe the associated ESFAS instrumentation functions, which upon 2 of 4 channels (1 of 2 in some cases) reaching the specified nominal actuation setting will initiate the protective function. Staff noted the bases discussions of the following ESFAS protective functions need additional information regarding the supporting instrumentation, including interlocks, coincidence, and/or manual functions:

- Safeguards Actuation,
- Steam Line Isolation,
- Startup Feedwater Isolation,
- ADS Stages 1, 2 & 3 Actuation,
- ADS Stage 4 Actuation,
- Boron Dilution Block (include P-4),
- Containment Air Filtration System Isolation,
- Main Control Room Isolation and Air Supply Initiation,
- Auxiliary Spray and Purification Line Isolation,
- IRWST Containment Recirculation Valve Actuation ("Manual initiation or automatic actuation on **an ADS Stage 4 actuation** ~~a Safeguards Actuation~~ signal coincident with a Low 3 level signal in the IRWST will open these valves."), and
- Containment Vacuum Relief Valve Actuation.

The licensee is requested to revise these bases discussions with the additional information, and to also correct editorial items as indicated.

<u>SNC Response</u>

SNC concurs with additional Bases revisions for ESFAS protective functions to consistently discuss the supporting actuation instrumentation, including coincidence, and/or manual actuation signals. In addition to adding the actuation signals to the RAI listed Functions, each of the other Functions was revised for consistent formatting; providing bulleted listing of actuation signals when there were two or more. Additional reformatting included reordering some Bases descriptions for the ESFAS protective functions to provide more logical grouping.

As noted in the RAI, the listing of actuation signals for the IRWST Containment Recirculation Valve Actuation revised "Safeguards Actuation" to correctly reflect "ADS Stage 4 Actuation."

Supporting interlocks are applicable to individual signals. The interlock Bases discussions are provided separate from the ESFAS protective function discussions. This separation in the current Bases presentation, and the technical content for those separate interlock discussions, are consistent with the AP1000 Generic Technical Specifications and are not revised by this

response. However, for the new TS 3.3.10, “Engineered Safety Feature Actuation System (ESFAS) Reactor Coolant System (RCS) Hot Leg Level Instrumentation,” the Bases are revised to provide an additional cross reference to the description of the P-12 interlock found in Bases for new TS 3.3.8. The P-12 interlock is a supporting interlock for this Function. The remaining actuation Functions reformatted into new TS 3.3.9, TS 3.3.11, TS 3.3.12, TS 3.3.13, and TS 3.3.14, are not designed with supporting interlocks.

For additional discussion of the presentation detail for interlocks, refer to responses to RAI Letter No. 1, Questions 16-18 (Issue 5), 16-26, 16-27, 16-28 (Issue 1), and 16-29.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised Bases pages.

RAI Letter No. 01

Question 16-26

Descriptions of Change A028 and L12

CTS Pages: B 3.3.2-2,3,4,5
ITS Pages: 3.3.15-1; B 3.3.15-1; 3.3.16-1

CTS 3.3.1 • Function 19
CTS 3.3.2 • Function 8.d, 18.b, and 25
ITS 3.3.6 • LCO
ITS 3.3.8 Bases “Background” • Bases “Applicable Safety Analyses, LCOs, and Applicability”
ITS 3.3.12 • LCO • SR 3.3.12.1 TADOT
ITS 3.3.15 Bases “Background”
ITS 3.3.16 Bases “Background”

Issue 1: Not used

Issue 2: More specifically, on page B 3.3.8-4 the “Background” section of the bases for ITS 3.3.8 states:

> “The ESF coincidence logic contains the necessary equipment to:
>
> - Permit reception of the data supplied by the four divisions of plant protection and perform voting on the trip outputs;
> - Perform system level logic using the input data from the plant protection subsystems and transmit the output to the ESF actuation subsystems; and
> - Provide redundant hardware capable of providing system level commands to the ESF actuation subsystems.”

The licensee is requested to

(a) clarify in the TS bases whether the assertion by Description of Change L10 is correct; namely that ESF coincidence logic in each PMS division includes not only the voting logic that processes each ESFAS plant protection instrumentation function channel trip output from each of the four PMS divisions, but also all interlock and coincidence signals processed both before and after the voting logic, which is usually depicted on FSAR Figure 7.2-1 with “AND” logic gates; and

(b) identify

- the RTS or ESFAS TS instrumentation function(s) that specify the operability, applicability, action, and surveillance requirements for each “AND” logic gate and each signal reversal logic gate, that is depicted on FSAR Figure 7.2-1 (Sheets 2 through 19);

- which type of PMS processing module (see Figures 2.1, 2.2, and 2.3 of WCAP-16438-P, Rev. 3 (APP-GW-JJ-002, Rev. 3) implements each “AND” logic gate and each signal reversal logic gate; and the SRs that apply to each of these logic gates.

SNC Response

SNC concurs with additional clarification of the Discussion of Change (DOC) L10, as well as additional clarification to the Bases regarding RT and ESFAS interlocks role in supporting operability of associated RT and ESFAS actuation Functions.

Each interlock, with the exception of P-3, is provided by process sensors and bistable trips processed within the Plant Protection Subsystem (BPL), with trip settings established in accordance with TS 5.5.14, Setpoint Program. For the reactor trip breaker position switches that provide input to the P-3 interlock function, as described in current Bases, they only function to energize or de-energize or open or close contacts. Therefore, the P-3 interlock has no adjustable trip setpoint. This processing applies to trip, actuation, and interlock signals. The results of the BPL logic are communicated to the local coincidence logic (LCL). Prior to the RTS and ESFAS divisional voting logic in the LCL (e.g., 2oo4), the interlock logic elements (And, Or, Not, Coincidence, Memory, etc. shown in FSAR Figure 7.2-1) are performed in the BPL processors. Interlock signals are typically applied prior to the divisional voting logic and are performed in the BPL processors. The specific actuation process sensors and the associated supporting interlocks are summarized in RAI Table 16-01, which also includes additional information addressing RAI Question 16-28 Issue 1.

The operability of the instrument channels and associated interlocks performed in the BPL is verified by TS required Channel Calibration and Channel Operational Test (COT) Surveillances. These surveillances include verification of the proper operation of the interlocks that function prior to the LCL voting. Performance of the COT verifies that injected signals produce the correct result at the input to the coincidence logic (LCL) according to the BPL setpoints and logic. Performance of Channel Calibrations verifies that the bistable trips (actuation Functions and applicable associated interlocks) are calibrated in accordance with the Setpoint Program. The COT also provides overlap with the Actuation Logic Test Surveillances.

The divisional voting logic and the subsequent interlock logic elements (And, Or, Not, Coincidence, Memory, Time delay, etc.) shown in the FSAR Figure 7.2-1 sheets are performed by the LCL processors (i.e., RT and ESF Coincidence Logic). The Coincidence Logic has TS specified LCO, Applicability, Actions, and Surveillances in ITS TS 3.3.6 for RT, and ITS TS 3.3.15 and ITS TS 3.3.16 for ESFAS. The interlock logic elements that support coincident logic in the LCL are considered support features for the associated divisional coincident logic. This is described in the Bases as the "system level logic."

The operability of the RT and ESF Coincidence Logic performed in the LCL is verified by the Actuation Logic Test Surveillances. These Surveillances verify proper operation of the interlocks that function after the LCL divisional voting. These Surveillances verify that no failures that affect the RT or ESF actuation Functions have occurred in the LCL.

The interlocks performed in the LCL logic include processing of the P-3 and portions of the P-11 interlocks. These LCL processed interlocks are associated with the following ESFAS Functions:

- Containment Pressure – High 2 (interlocked with P-3);
- Pressurizer Pressure – Low (interlocked with P-3);
- Steam Line Pressure – Low (interlocked with P-3);
- RCS Cold Leg Temperature (T_{cold}) – Low (interlocked with P-3);
- Containment Radioactivity – High 2 (interlocked with P-11); and
- Safeguards/ Normal Residual Heat Removal System Isolation (interlocked with P-11).

These specific P-11 interlock signals listed above are applied after divisional voting, while other P-11 interlocks are performed in the BPL.

For additional detailed information to enable more efficient discussion between the staff and the licensee, RAI Table 16-05 is provided to list each interlock, the interlocked functions supported (with cross reference to both CTS and ITS functions), and the BPL or LCL subsystem within PMS where the interlock is applied.

Note that these functional logic elements (i.e., And, Or, Not, Coincidence, Memory, etc. shown in FSAR Figure 7.2-1), for both BPL and LCL enacted interlocks, do not exist in hardware, but are programmed in software. Software failures are not anticipated to be localized to individual logic elements shown in FSAR Figure 7.2-1. The protection software has been developed using a high-quality process with extensive testing. Latent software errors are highly-unlikely. Incorrect operation of software is expected to be a result of a hardware malfunction which would affect many different software elements.

If any interlock or coincidence signals processed either before or after the voting logic interlock are not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate operability evaluations performed for the affected Function(s), which would evaluate potential operability impact on individual instrument Function channels and/or the coincident logic subsystem channel. Adverse impacts to operability could be evaluated to affect individual instrumentation channels, or may be evaluated to impact the divisional coincident logic. In either outcome, the appropriate actions are provided by the TS Actions for the affected supported feature(s).

If software nonconforming conditions are discovered, while the actual determination of appropriate TS Actions would be made by licensed SROs on evaluation of the specific conditions identified, it would be reasonable to expect that software failures would be considered in the broad context of RT and/or ESF coincidence logic failures. Therefore, the discussion provided in DOC L10 is valid for this situation. However, changes have been made to DOC L10 to enhance and clarify the discussion consistent with the additional detail provided with this RAI response.

Therefore, as a result of reviewing the case for interlocks directly affecting logic, additional changes are made in the Bases for Actuation Logic Test Surveillance. A description of the interlock support role (provided in DOC L10), which had been inserted in Channel Calibration and COT Surveillance Bases, is now inserted in the Actuation Logic Test Surveillance Bases as a result of this RAI response. (Note that response to RAI Question 16-18, Issue 5, also made changes to this Bases insert.)

Further discussion of potential nonconforming conditions for interlocks is also provided for information

a. <u>Potential Plant Protection Subsystem (BPL) Failures</u>

Potential failures of the Bistable Processor Logic modules are analyzed in the FMEA of AP1000 Protection and Safety Monitoring System (APP-GW-JJ-002, WCAP-16438-P; see DCD Reference 7.2.4.1). These include potential failures of the following BPL process station hardware modules (APP-GW-JJ-002, Section 4.1):

Processor Module
Analog Input Modules
Digital Input Modules
Pulse Input Module
CI Communication Module
Fiber-optic HSL Connection to Other Divisions' LCLs
Analog Signal Isolators

The FMEA reports that all BPL failure modes are self-revealing or immediately detected by diagnostics and alarmed (Section 4.1, BPL Process Station).

b. Potential RT and ESF Coincidence Logic (LCL) Failures

Potential failures of the RT and ESF Coincidence Logic modules are analyzed in the FMEA of AP1000 Protection and Safety Monitoring System (APP-GW-JJ-002). These include potential failures of the following LCL process station hardware modules (APP-GW-JJ-002, Section 4.2):

PM Processor Module Performing RT Function
PM Processor Module Performing ESF Actuation Function
PM Processor Module Performing Only HSL Function
CI Communication Module
DO Relay Output Module
Digital Input Module
Fiber-optic HSL Connection to ILC Process Stations
Digital Signal Isolators (for non-Class 1E switches in RSW)

The FMEA reports that all LCL failure modes, except for two, are self-revealing or immediately detected by diagnostics and alarmed (Section 4.2, LCL Process Station). The remaining failure modes are detected by periodic surveillance testing. These failures are:

- Failure of communication between processor modules through the global memory of the CI module – Detected by diagnostics or Actuation Logic Test Surveillances,.
- Digital Input Module - Single channel fails OFF (OFF implies in the normal state when the switch is not activated) – Detected by TADOT Surveillances.

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC, TS Markup, TS Clean, and Bases pages.

RAI Letter No. 01

Question 16-26 – Issue 3

The licensee is requested to clarify Description of Change L10, for example, such as the following statements as indicated:

> "For these ~~TS~~RTS trip and ESFAS actuation Functions to be Operable, the associated RTS and ESFAS interlock Functions would have to be in the required state as a support feature for operability. These RTS and ESFAS interlock functions do not directly trip the reactor or initiate an ESFAS function actuation, and as such are removed from the actuation instrumentation listing in TS. The role of the interlocks~~,~~ and their operability relationship to supported ~~TS~~RTS trip and ESFAS actuation Functions~~, is retained~~ are described in the TS Bases, as well as ~~being described~~ in Final Safety Analysis Report (FSAR) Chapter 7, Instrumentation and Controls."
> "Furthermore, the supported RTS trip and ESFAS actuation Function's specified Applicability, which relates to the sensor and setpoint for the generation of the interlock signal, is tied to operation above or below (as applicable) the various associated interlock~~s~~ setpoints. As such, the ~~TS required~~ transition of the unit ~~actuation Functions~~ ~~transition~~ into various specified conditions of the Applicability of RTS trip and ESFAS actuation Functions requires the interlock functions to be Operable because ~~when the interlock function would be~~ they automatically back~~ing~~ up ~~the~~ operator actions to ~~assure~~ unblock the supported RTS trip and ESFAS actuation Functions ~~functions are not blocked~~ when they are required to be Operable. In addition, LCO 3.0.4 requires the operators to ~~assure~~ ensure RTS trip and ESFAS actuation operability prior to entering their Applicability. These TS requirements remain in effect and impose the necessary operability requirements ~~related to~~ for the removed interlock Functions."
> "Interlock Operability is adequately addressed by each related Function's requirement to be Operable and the requirement for actuation logic operability."
>
> "~~This~~ The reactor trip breaker open, P-3, interlock Function supports operability of all automatic Safeguards Actuations at the Engineered Safety Features (ESF) coincident logic subsystem, i.e., current Table 3.3.2-1, Function 25."
>
> "The P-6 Function supports operability of the automatic Safeguards ~~Actuations~~ Actuation to block boron dilution on a voted source range flux doubling signal, ~~This~~ at the Engineered Safety Features (ESF) coincident logic subsystem, i.e., current Table 3.3.2-1, Function 25."
>
> "The P-11 Function supports operability of these automatic [please list function names/] Safeguards Actuations at the Engineered Safety Features (ESF) coincident logic subsystem, i.e., current Table 3.3.2-1, Function 25."

Similar clarifications are requested for the discussions of "P-12: Actions M, BB, and Y."

SNC Response

SNC concurs with clarifying DOC L10. The changes include:

- Adding clarifying specificity "RTS trip and ESFAS actuation"
- Rewording each interlock discussion of actions referenced for current TS interlocks supporting ESFAS actuation Functions being removed (i.e., TS 3.3.2, Actions D, L, M, N, Y, and BB). These changes included adding and or clarifying the specific supported TS ESFAS actuation Functions. This review and revision also lead to the following Bases modifications for added clarity:
    - P-11 ESFAS Bases adds "The Containment Pressure – High 2 and Containment Radioactivity – High 2 channels are automatically unblocked above the P-11 interlock, with manual block permitted below P-11"; and
    - P-12 Bases adds specific reference to Pressurizer Water Level – Low 1 and Pressurizer Water Level – Low 2 signals.
- Certain of the RAI suggested changes and other L10 statements are revised to reword discussions that refer to "interlock operability" to more clearly relate the necessary "support for the operability of TS RTS trip and ESFAS actuation Functions." Also added is the recognition that:

    > "If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate operability evaluations performed for the affected Function(s), which would evaluate potential operability impact on individual instrument Function channels and/or the coincident logic subsystem channel. Adverse impacts to operability could be evaluated to affect individual instrumentation channels, or may be evaluated to impact the divisional coincident logic. In either outcome, the appropriate actions are provided by the affected supported feature(s)."

- Certain of the RAI suggested changes and other L10 statements related to TS RTS trip and ESFAS actuation Function's Applicability are also clarified. The clarification includes acknowledgement that not all Functions supported by interlocks have the associated Applicability tied to the state of an interlock. Furthermore, DOC L10 change clarifies that:

    > "while operating within the TS required Applicability for that Function, its associated supporting interlock is not required to automatically change state. The interlock status must be established in conjunction with assuring supported Function's operability prior to entering the required Applicability."

The changes to LAR-12-002 from this RAI Response are reflected in the following revised DOC and Bases pages.

RAI Letter No. 01

Question 16-26 – Issue 4

The licensee is requested to identify which Channel Calibration surveillance requirement (by ITS SR number) is intended to govern the calibration of each process sensor that supports an RTS or ESFAS interlock:

1. Reactor trip breaker (RTB) open (P-3):
    - RTB open/close position indication (TRUE signal is open)
2. Reactor trip initiated or RTBs open (P-4):
    - Reactor trip initiation signal TRUE or
    - RTB open/close indication (TRUE signal is open)
3. Intermediate range neutron flux above setpoint (P-6):
    - intermediate range neutron monitors
4. Power range nuclear power above setpoint (P-10):
    - Power range neutron monitors
5. Pressurizer pressure below setpoint (P-11):
    - pressurizer pressure sensors
6. Pressurizer level below setpoint (P-12):
    - pressurizer level sensors
7. Reactor coolant system pressure below setpoint (P-19):
    - RCS hot leg pressure sensors

<u>SNC Response</u>

The LAR reformatted Instrumentation and Controls TS provide Channel Calibration Surveillances for the actuation Functions addressed by the new TS. For the actuation Functions that may have blocking/enabling interlocks, the Bases for each of these Channel Calibrations describes the necessity for ensuring interlocks are calibrated properly in accordance with the SP. Refer to response to RAI Question 16-18, Issue 5 (Item 2) for clarifications being made to these Bases.

The new TS 3.3.1 and TS 3.3.8 Bases retain existing discussions of RTS and ESFAS Interlocks that relate which actuation Functions have blocking/enabling interlocks. To further assist the NRC review, refer to RAI Tables 16-01, 16-02, and 16-03 provided at the end of this series of "Interlock" RAIs. These Tables provide a summary overview of these interrelations as well as additional design detail associated with these interlocks. Similar information can also be found in FSAR Table 7.2-2 and Table 7.3-1, where the relations are tabulated by actuation Function.

As can be seen from these references, there may be more than one TS Channel Calibration Surveillance that would be required to verify appropriate interlock calibration for a given interlock. However, the actual procedures (still being developed; actual detailed implementation may vary) are anticipated to be designed to have one calibration for each interlock sensor, which would then be referenced as required for completing associated actuation Function(s) channel calibration(s) in other procedures.

For the reactor trip breaker position switches that provide input to the P-3 interlock and P-4 actuation function, as described in current Bases, they only function to energize or de-energize

or open or close contacts. Therefore, these interlocks have no adjustable trip setpoint and do not require channel calibration.

To address the specific request, below is the list of interlock versus applicable TS Channel Calibration SRs:

- P-6:
  - SR 3.3.2.3
  - SR 3.3.8.3
- P-10:
  - SR 3.3.1.8
  - SR 3.3.1.9
  - SR 3.3.2.3
  - SR 3.3.3.3
- P-11:
  - SR 3.3.8.3
- P-12:
  - SR 3.3.8.3
  - SR 3.3.10.3
- P-19:
  - SR 3.3.8.3

There are no changes to LAR-12-002 from this RAI Response.

RAI Letter No. 01

Question 16-26

Issue 5: The licensee is requested to provide a list of all sensor instruments used by PMS Division A, and for each sensor list all (a) RTS and ESFAS instrumentation Functions for which it provides an analog or digital input signal for comparison to a trip or actuation setpoint, which determines the channel’s trip/actuation signal to coincidence ESF/RT voting logic in all four divisions (b) RTS and ESFAS interlock Functions for which it provides an analog or digital input signal for comparison to the interlock setpoint, which determines the interlock signal to coincident logic (“AND” logic gates). (c) Also, for each sensor, list the specified SRs and LCO Applicabilities, using the revised numbering of the TS requirements. For Divisions B, C, and D provide the above information only where it varies from Division A.

SNC Response

SNC concurs with the request to provide additional design detail to assist in the review.

The RAI Question 16-28, Issue 1, response provides RAI Tables 16-01, 16-02, and 16-03 for ESF, RT, and Manual Functions, which list the input signals and the associated interlocks. The Sensors column of the table lists cases where sensors and their bistable status are shared between ESF and RT functions and cases where one or more of the divisions do not include sensors (e.g., sensors installed only in divisions A, B, and C).

Logic details of the interlock functions and their sensor inputs are provided in RAI Table 16-04, Interlock Logic States.

The TS References column of Table 16-01 specifies the TS location of the applicable TS requirements. Each referenced TS specifies applicable SRs and LCO Applicability for each sensor.

There are no changes to LAR-12-002 from this RAI Response.

RAI Letter No. 01

Question 16-27

Description of Change A028

ITS 3.3.8 • LCO • Bases "Background" • Bases "Applicable Safety Analyses, LCOs, and Applicability"
ITS 3.3.15 • LCO • Bases "Background"
ITS 3.3.16 • LCO • Bases "Background"

The licensee is requested to include in the ESFAS Function and/or Specification Titles, as appropriate, the following information that the LAR proposes to move to the bases:

1. Coincident instrument function signals (partial actuations) – both before and after setpoint comparison, and before and after voting logic

2. Coincident permissive/interlock signals (required state for supporting operability, and whether changing state to enable or to block is manual or automatic) – input both before or after setpoint comparison, and before or after voting logic

3. Coincident ESF actuation signal (voting logic satisfied)

4. Coincident manual ESF actuation signal

<u>SNC Response</u>

SNC does not concur. The current TS Table 3.3.2-1 Functions 25 and 26 (new TS 3.3.15 and TS 3.3.16) do not include the requested design detail with the Function title. Other Functions in current TS Table 3.3.2-1 that contain partial coincident logic design that is being moved to the Bases are the subject of RAI Question 16-28, Issue 1. Refer to the SNC Response for RAI Question 16-28, Issue 1.

In general, the detail provided in the current Bases is deemed appropriate. More specific detailed logic design is appropriate for more in-depth training and engineering design documents. However, the response to RAI Question 16-28, Issue 1 provides an additional Bases summary of pertinent ESF logic.

There are no changes to LAR-12-002 as a result of this RAI Response.

RAI Letter No. 01

Question 16-28

Descriptions of Change A028, A033, A034 and A035

ITS 3.3.8 • Bases "Background" • Bases "Applicable Safety Analyses, LCOs, and Applicability"
ITS 3.3.9 Function 5
ITS 3.3.15 • Bases "Background"
ITS 3.3.16 • Bases "Background"

Description of Change A033 proposes to delete current TS Table 3.3.2-1 function listings that "merely reference other Functions." The NRC staff noted these function references are of two kinds: (1) Functions that reference another ESF Actuation Function in Table 3.3.2-1; and (2) Functions that reference another ESF Actuation Function in Table 3.3.2-1 and must actuate coincident with the referenced function.

Issue 1: The licensee is requested to maintain the current references to other functions, consistent with the sensor-centric approach for listing ESFAS functions in ITS Table 3.3.8-1, and consistent with the request of the other RAI regarding ITS 3.3.8 and A028. The proposed TS bases retain most of the content of the discussions of instrumentation and actuation functions of the current TS bases. The staff requests the licensee to enhance the bases for ITS 3.3.1 through 3.3.16, as appropriate to more clearly and systematically explain the dependencies among functions and between functions and interlocks. Also, use consistent structure, content scope, and language in the bases discussions for the ESFAS instrumentation and ESF actuation functions.

For example, consider current Function 13, which is listed in CTS Table 3.3.2-1 as follows. Note that the following provides the proposed ITS alpha-numerical designations for the listed functions in brackets, the required state of associated interlock(s), and denotes coincidence references using italics.

13. Passive Residual Heat Removal Heat Exchanger Actuation
a. Manual Initiation [Fn 3.3.9.9]
b. SG Narrow Range Water Level – Low *Coincident with Startup Feedwater Flow – Low* [LCO 3.3.11]
c. SG Wide Range Water Level – Low [Fn 3.3.8.21]
d. ADS Stages 1, 2 & 3 Actuation ***(proposed for deletion)***
e. CMT Actuation ***(proposed for deletion)***
f. Pressurizer Water Level – High 3 (> P-19) [Fn 3.3.8.10]

Expanding the references to other actuation functions unveils the full dependency of the PRHR HX Actuation function on other ESFAS instrumentation functions and interlocks:

13. PRHR HX Actuation
d. ADS Stages 1, 2 & 3 Actuation <u>references</u>
9. ADS Stages 1, 2 & 3 Actuation
a. Manual Initiation [Fn 3.3.9.6]
b. CMT Level - Low 1 *Coincident with CMT Actuation* [Fn 3.3.8.15]
e. CMT Actuation <u>references</u>
2. CMT Actuation

a. Manual Initiation [Fn 3.3.9.2]
b. Pressurizer Water Level - Low 2 (> P-12) [Fn 3.3.8.7]
c. Safeguards Actuation references
    1. Safeguards Actuation
        a. Manual Initiation [Fn 3.3.9.1]
        b. Containment Pressure – High 2 [Fn 3.3.8.2]
        c. Pressurizer Pressure – Low (> P-11) [Fn 3.3.8.5]
        d. Steam Line Pressure – Low (> P-11) [Fn 3.3.8.24]
        e. Cold Leg Temperature – Low (> P-11) [Fn 3.3.8.11]
d. ADS Stages 1, 2, & 3 Actuation references
    9. ADS Stages 1, 2, & 3 Actuation
        a. Manual Initiation [Fn 3.3.9.6]
        b. CMT Level - Low 1 *Coincident with CMT Actuation* [Fn 3.3.8.15]

Retaining all the dependencies in the function titles in ITS 3.3.8, 3.3.9, and 3.3.11, for the above example, and to be consistent with the ESFAS function table in NUREG-1430, Rev. 4, would look something like the two examples of the ITS 3.3.8 and 3.3.9 ESFAS instrumentation tables, which are provided with this request for additional information letter. These examples were prepared to make a point about retaining in TS information about RTS and ESFAS functional interdependencies to enable more efficient discussion between the staff and the licensee about Descriptions of Change A024, A028, A033, A034 and A035. These examples are for illustration only, may contain incorrect information, and may not be comprehensive of all functions, interlocks, coincidences, and permissive. Also note that example Table 3.3.9-1 contains a column for interlock status, which seems to be unnecessary, but was retained for illustration and in case any manual ESFAS function depends upon any ESFAS interlock.

SNC Response

SNC does not concur with retaining all the current TS cross references and system actuation dependencies to other functions in the reformatting of the "sensor-centric" actuation instrumentation function titles in the new TS 3.3.8, TS 3.3.9, and TS 3.3.11. The TS requirements are maintained as presented in the LAR in order to provide the enhanced operational focus on the operability requirements, while retaining in the TS Bases the design details of the various cross references and system actuation dependencies. This approach is designed to reduce excessive and extraneous complexity of the design detail, while retaining all necessary limiting conditions for operability.

However, additional clarifying Bases are provided in response to RAI Letter No. 1, Question 16-23, which are intended to accomplish the goal of more clearly elaborating these design cross-references and dependencies. Furthermore, to enable more efficient discussion between the staff and the licensee about Descriptions of Change A024, A028, A033, A034 and A035 (i.e., the stated basis for the NRC request), the RAI example Tables have been modified and additional Tables created that summarize design detail consistent with FSAR Chapter 7. These RAI Tables listed below are provided following the series of "interlock" RAI responses.

- Table 16-01, ESF Protective Functions, Coincident Functions, and Interlock Status
- Table 16-02, ESF Manual Functions, Coincident Functions, and Permissive Status
- Table 16-03, RT Protective Functions and Interlock Status
- Table 16-04, Interlock Logic States

The LAR (DOCs A024 and A028) cited that the reformatting for Instrumentation and Controls section followed the general approach currently in use in the Improved Standard Technical Specifications for Babcock and Wilcox Plants, NUREG-1430. The ESFAS function table in NUREG-1430, TS 3.5.5, included parenthetical cross-reference to actuated systems even though this information-only design detail was unnecessary for fundamental TS compliance. Due to the increased dependencies in the AP1000 design compared to than presented in NUREG-1430, attempting to include similar information in the VEGP TS is not desired. The complexity of the design dependencies is more appropriately conveyed within the TS Bases. Therefore, SNC has chosen to enhance the Bases to more clearly and systematically explain the dependencies among functions and between functions. The Bases changes also provide more consistent structure, content scope, and language for the ESFAS instrumentation and ESF actuation functions.

The changes to LAR-12-002 from this RAI Response are reflected in the response to RAI Letter No. 1, Question 16-23.

RAI Letter No. 01

Question 16-29

Description of Change A028
ITS 3.3.8 • Bases "Background" • Bases "Applicable Safety Analyses, LCOs, and Applicability"
ITS Pages: B 3.3.8 -9, 10, 11

The "Applicable Safety Analyses, LCOs, and Applicability" section of the bases for ITS 3.3.8 describe the ESFAS interlocks P-3, P-4, P-6, P-11, P-12, and P-19 using the descriptions from the bases for current TS 3.3.2, except for the discussions of Applicability of these interlocks. The licensee is requested to restore to the bases those interlock applicability discussions and add clarification regarding the logical output state each interlock must be in to support operability of its associated ESF instrumentation functions and/or actuation logic functions during the specified operational modes or other conditions during which the functions are required to be operable. The clarifications should highlight how the automatic change of state of each interlock at its setting enables the capability of the supported ESF functions to automatically initiate ESF systems for actuation or isolation.

<u>SNC Response</u>

SNC does not concur with the requested change. With ESFAS interlocks supporting operability of applicable Functions, the Function's Applicability governs when the interlock must be evaluated for any adverse impact on that Function's Operability. The current TS Table 3.3.2-1 Applicability for various interlocks is not as encompassing as each potentially impacted Function's Applicability. For example, the P-6 interlock (current Function 18.c) is currently Mode 2, while the supported current Function 15.a, Source Range Neutron Flux Doubling, has Applicability requirements in Modes 2 and 3, except when critical or during intentional approach to criticality, and Mode 4. Therefore, it would be inappropriate to state only Mode 2 Applicability for the P-6 interlock. This impact of the change reflects a more-restrictive implementation of the change. As such, Applicability discussions are appropriately presented for the explicitly stated TS Function Applicabilities.

Also note that each RTS and ESFAS actuation function is required operable during the stated TS Applicability. The Applicability for certain Functions is based on transitioning above or below certain interlocks, while others are not directly tied to an interlock. However, while operating within the TS required Applicability for any Function, its associated supporting interlock is not required to automatically change state. The interlock status is established in conjunction with assuring Function operability prior to entering the required Applicability. The automatic switching for the interlock Functions are designed as a backup to manual operator actions to ensure interlocked Functions are enabled under the conditions assumed in the safety analyses and as required during the TS Applicability.

The request for "further level of detail regarding the logical output state each interlock must be in to support operability of its associated ESF instrumentation functions and/or actuation logic functions," and the request to "highlight how the automatic change of state of each interlock at its setting enables the capability of the supported ESF functions," are levels of detail that are not provided in current TS and associated Bases. The LAR change does not impact these details, nor the understanding of these details. The need to understand each interlock's required output

state and change of state in any given plant condition applies to the current TS detail as well as the LAR changes. The current and LAR revised Bases detail is consistent with industry standards and is not intended to encompass detailed logic design and training necessary to fully evaluate potential Operability impacts.

There are no changes to LAR-12-002 as a result of this RAI Response.

Table 16-01
ESF Protective Functions, Coincident Functions, and Interlock Status

FSAR Table 7.3-1 Function	ITS Reference	ESF Instrumentation Sensor and Initiated ESF Protective Functions (Note a)	ESF Interlock Logic (Ref. FSAR Table 7.3-1)	Sensors (Note b)
28.a	Table 3.3.8-1 Fn 1	Containment Pressure – Low 2 – Containment Vacuum Relief Valve actuation	Not Applicable	ESF only PCS-JE-PT005 (A) PCS-JE-PT006 (B) PCS-JE-PT007 (C) PCS-JE-PT008 (D)
1.d 6.a 5.a 2.a 18.a 4.a 14.c 19.a 8.b 10.b	Table 3.3.8-1 Fn 2	Containment Pressure – High 2 – Safeguards actuation >> actuate CMT >> trip RCPs >> actuate Containment Isolation >> actuate Containment Air Filtration isolation >> actuate Main Feedwater Isolation >> actuate CVS Makeup Isolation Coincident with Pressurizer Water Level High-1 >> actuate Normal Residual Heat Removal System Isolation – Steam Line Isolation actuation – Passive Containment Cooling System (PCS) actuation	Safeguards Can be manually blocked on presence of P-3 (RTBs open) Block automatically removed on absence of P-3 (RTBs closed) RNS Isolation (Note c) Manual block permitted below P-11 Automatically unblocked above P-11	ESF only PCS-JE-PT005 (A) PCS-JE-PT006 (B) PCS-JE-PT007 (C) PCS-JE-PT008 (D)
18.b	Table 3.3.8-1 Fn 3	Containment Radioactivity – High 1 – Containment Air Filtration System Isolation actuation	Not Applicable	ESF only PXS-JE-RE160 (A) PXS-JE-RE161 (B) PXS-JE-RE162 (C) PXS-JE-RE163 (D)
14.d 19.b	Table 3.3.8-1 Fn 4	Containment Radioactivity – High 2 – Chemical Volume and Control System (CVS) Makeup Isolation actuation – Normal Residual Heat Removal System (RNS) Isolation actuation	RNS Isolation (Note c) Manual block permitted below P-11 Automatically unblocked above P-11	ESF only PXS-JE-RE160 (A) PXS-JE-RE161 (B) PXS-JE-RE162 (C) PXS-JE-RE163 (D)
1.a 6.a 5.a 2.a 18.a 4.a 14.c 19.a	Table 3.3.8-1 Fn 5	Pressurizer Pressure – Low – Safeguards actuation >> actuate CMT >> trip RCPs >> actuate Containment Isolation >> actuate Containment Air Filtration isolation >> actuate Main Feedwater Isolation >> actuate CVS Makeup Isolation Coincident with Pressurizer Water Level High-1 >> actuate Normal Residual Heat Removal System Isolation	Safeguards Can be manually blocked on presence of P-3 (RTBs open) Block automatically removed on absence of P-3 (RTBs closed) Safeguards RNS Isolation (Note c) Manual block permitted below P-11 Automatically unblocked above P-11	RT & ESF RCS-JE-PT191ABCD

Table 16-01
ESF Protective Functions, Coincident Functions, and Interlock Status

FSAR Table 7.3-1 Function	ITS Reference	ESF Instrumentation Sensor and Initiated ESF Protective Functions (Note a)	ESF Interlock Logic (Ref. FSAR Table 7.3-1)	Sensors (Note b)
17.a	Table 3.3.8-1 Fn 6	Pressurizer Water Level – Low 1 – Auxiliary Spray and Purification Line Isolation actuation	Auxiliary Spray and Purification Line Isolation Manual block permitted below P-12 Automatically unblocked above P-12	RT & ESF RCS-JE-LT195ABCD
6.c 12.d 9.a 25.a 3.a 5.c	Table 3.3.8-1 Fn 7	Pressurizer Water Level – Low 2 – Core Makeup Tank (CMT) actuation >> actuate PRHR >> SG Blowdown System Isolation actuation >> trip pressurizer heaters >> actuate ADS Stages 1, 2, & 3 if Coincident with CMT Level – Low 1 – trip all RCPs	CMT actuation RCP Trip Manual block permitted below P-12 Automatically unblocked above P-12	RT & ESF RCS-JE-LT195ABCD
14.c	Table 3.3.8-1 Fn 8	Pressurizer Water Level – High 1 Coincident with Unlatched Safeguards Actuation – Chemical Volume and Control System (CVS) Makeup Isolation actuation	Safeguards Can be manually blocked on presence of P-3 (RTBs open) Block automatically removed on absence of P-3 (RTBs closed)	RT & ESF RCS-JE-LT195ABCD
14.a	Table 3.3.8-1 Fn 9	Pressurizer Water Level – High 2 – Chemical Volume and Control System (CVS) Makeup Isolation actuation	CVS Makup Isolation Automatically unblocked above P-19 Manual block permitted below P-19	RT & ESF RCS-JE-LT195ABCD
12.f 9.a 25.b	Table 3.3.8-1 Fn 10	Pressurizer Water Level – High 3 – PRHR actuation >> SG Blowdown System Isolation actuation – Pressurizer Heater Trip actuation	PRHR actuation Pressurizer Heater Trip actuation Manual block permitted below P-19 Automatically unblocked above P-19	RT & ESF RCS-JE-LT195ABCD
1.c 6.a 2.a 18.a 5.a 4.a 14.c 19.a 11.a 8.e	Table 3.3.8-1 Fn 11	RCS Cold Leg Temperature (T_{cold}) – Low – Safeguards actuation >> actuate CMT >> actuate Containment Isolation >> actuate Containment Air Filtration isolation >> trip RCPs >> actuate Main Feedwater Isolation >> actuate CVS Makeup Isolation Coincident with Pressurizer Water Level High-1 >> actuate Normal Residual Heat Removal System Isolation – Startup Feedwater Isolation actuation – Steam Line Isolation	Safeguards Can be manually blocked on presence of P-3 (RTBs open) Block automatically removed on absence of P-3 (RTBs closed) Safeguards RNS Isolation (Note c) Startup Feedwater Isolation Steam Line Isolation Manual block permitted below P-11 Automatically unblocked above P-11	RT & ESF RCS-JE-TE121ABCD RCS-JE-TE122ABCD RCS-JE-TE125 A1/B1/C1/D1

Table 16-01
ESF Protective Functions, Coincident Functions, and Interlock Status

FSAR Table 7.3-1 Function	ITS Reference	ESF Instrumentation Sensor and Initiated ESF Protective Functions (Note a)	ESF Interlock Logic (Ref. FSAR Table 7.3-1)	Sensors (Note b)
4.d	Table 3.3.8-1 Fn 12	Reactor Coolant Average Temperature (T_{avg}) -- Low 1 Coincident with Reactor Trip P-4 – actuate Main Feedwater Isolation	MFW Isolation Manual block permitted below P-11 Automatically unblocked above P-11	RT & ESF Cold leg RCS-JE-TE121AC RCS-JE-TE122BD RCS-JE-TE125 A1/B1/C1/D1 Hot leg RCS-JE-TE131ABCD RCS-JE-TE132ABCD RCS-JE-TE133ABCD
4.d	Table 3.3.8-1 Fn 13	Reactor Coolant Average Temperature (T_{avg}) -- Low 2 Coincident with Reactor Trip P-4 – actuate Main Feedwater Isolation	MFW Isolation Manual block permitted below P-11 Automatically unblocked above P-11	RT & ESF Cold leg RCS-JE-TE121AC RCS-JE-TE122BD RCS-JE-TE125 A1/B1/C1/D1 Hot leg RCS-JE-TE131ABCD RCS-JE-TE132ABCD RCS-JE-TE133ABCD
3.d 21.a 23.a	Table 3.3.8-1 Fn 14	RCS Wide Range Pressure – Low Coincident with ADS Stage 4 Manual Initiation Signal – ADS Stage 4 initiation >> actuate IRWST Injection >> open IRWST containment recirculation valves Coincident with IRWST Level Low-3	Not Applicable	ESF only RCS-JE-PT140A (A) RCS-JE-PT140B (B) RCS-JE-PT140C (C) RCS-JE-PT140D (D)
3.a 12.e 9.a 5.b 6.b	Table 3.3.8-1 Fn 15	CMT Level – Low 1 Coincident with CMT Actuation – ADS Stages 1, 2, & 3 >> actuate PRHR >> SG Blowdown System Isolation actuation >> RCP Trip actuation >> actuate CMT	Not Applicable	ESF only Tank A: PXS-LT011A (A) PXS-LT011B (B) PXS-LT011C (C) PXS-LT011D (D) Tank B: PXS-LT012A (A) PXS-LT012B (B) PXS-LT012C (C) PXS-LT012D (D)

Table 16-01
ESF Protective Functions, Coincident Functions, and Interlock Status

FSAR Table 7.3-1 Function	ITS Reference	ESF Instrumentation Sensor and Initiated ESF Protective Functions (Note a)	ESF Interlock Logic (Ref. FSAR Table 7.3-1)	Sensors (Note b)
3.e 21.a 23.a	Table 3.3.8-1 Fn 16	CMT Level – Low 2 (either CMT) Coincident with ADS Stage 1,2,3 actuation and RCS wide range pressure low – ADS Stage 4 actuation >> actuate IRWST Injection >> open IRWST containment recirculation valves Coincident with IRWST Level Low-3	Not Applicable	ESF only Tank A: PXS-LT013A (A) PXS-LT013B (B) PXS-LT013C (C) PXS-LT013D (D) Tank B: PXS-LT014A (A) PXS-LT014B (B) PXS-LT014C (C) PXS-LT014D (D)
13.a 14.f	Table 3.3.8-1 Fn 17	Source Range Neutron Flux Doubling – Boron Dilution Block actuation >> close demineralized water isolation valves – CVS Makeup Isolation actuation	Boron Dilution Block CVS Makeup Isolation Manual block permitted when critical or intentionally approaching criticality Automatically unblocked below P-6	RT & ESF RXS-JE-NE001ABCD
23.a	Table 3.3.8-1 Fn 18	IRWST Level – Low 3 Coincident with ADS Stage 4 Actuation Signal – IRWST Containment Recirculation Valve actuation	Not Applicable	ESF only PXS-LT045 (A) PXS-LT046 (B) PXS-LT047 (C) PXS-LT048 (D)
5.f 27.a	Table 3.3.8-1 Fn 19	Reactor Coolant Pump Bearing Water Temperature – High – RCP Trip actuation – Component Cooling Water System Containment Isolation Valve Closure actuation	Not Applicable	RT & ESF RCS-JE-TE211ABCD RCS-JE-TE212ABCD RCS-JE-TE213ABCD RCS-JE-TE214ABCD
12.b 9.a 9.b	Table 3.3.8-1 Fn 20	SG Narrow Range Water Level – Low (either SG) – PRHR actuation if Coincident with Startup Feedwater Flow Low – same SG >> SG Blowdown System Isolation actuation – SG Blowdown System Isolation actuation (corresponding SG)	Not Applicable	RT & ESF SG1: SGS-JE-LT001 (A) SGS-JE-LT002 (B) SGS-JE-LT003 (C) SGS-JE -LT004 (D) SG2: SGS-JE-LT005 (A) SGS-JE-LT006 (B) SGS-JE-LT007 (C) SGS-JE-LT008 (D)

Table 16-01
ESF Protective Functions, Coincident Functions, and Interlock Status

FSAR Table 7.3-1 Function	ITS Reference	ESF Instrumentation Sensor and Initiated ESF Protective Functions (Note a)	ESF Interlock Logic (Ref. FSAR Table 7.3-1)	Sensors (Note b)
12.c 9.a	Table 3.3.8-1 Fn 21	SG Wide Range Water Level – Low – PRHR actuation >> SG Blowdown System Isolation actuation	Not Applicable	ESF only SG1: SGS-JE-LT011 (A) SGS-JE-LT012 (B) SGS-JE-LT015 (C) SGS-JE-LT016 (D) SG2: SGS-JE-LT013 (A) SGS-JE-LT014 (B) SGS-JE-LT017 (C) SGS-JE-LT018 (D)
11.d 14.g	Table 3.3.8-1 Fn 22	SG Narrow Range Water Level High (either SG) Coincident with Reactor Trip P-4 – Startup Feedwater Isolation actuation – CVS Makeup Isolation actuation	Not Applicable	RT & ESF SG1: SGS-JE-LT001 (A) SGS-JE-LT002 (B) SGS-JE-LT003 (C) SGS-JE-LT004 (D) SG2: SGS-JE-LT005 (A) SGS-JE-LT006 (B) SGS-JE-LT007 (C) SGS-JE-LT008 (D)
7.c 4.c 11. 14.	Table 3.3.8-1 Fn 23	SG Narrow Range Water Level – High 2 – Turbine Trip actuation – actuate Main Feedwater Isolation – Startup Feedwater Isolation actuation – CVS Makeup Isolation actuation	Not Applicable	RT & ESF SG1: SGS-JE-LT001 (A) SGS-JE-LT002 (B) SGS-JE-LT003 (C) SGS-JE-LT004 (D) SG2: SGS-JE-LT005 (A) SGS-JE-LT006 (B) SGS-JE-LT007 (C) SGS-JE-LT008 (D)

Table 16-01
ESF Protective Functions, Coincident Functions, and Interlock Status

FSAR Table 7.3-1 Function	ITS Reference	ESF Instrumentation Sensor and Initiated ESF Protective Functions (Note a)	ESF Interlock Logic (Ref. FSAR Table 7.3-1)	Sensors (Note b)
8.c 1.b 6.a 2.a 18.a 5.a 4.a 14.c 19.a 26.b	Table 3.3.8-1 Fn 24	Steam Line Pressure – Low (either SG) – Steam Line Isolation actuation – Safeguards actuation >> actuate CMT >> actuate Containment Isolation >> actuate Containment Air Filtration isolation >> trip RCPs >> actuate Main Feedwater Isolation >> actuate CVS Makeup Isolation coincident with Pressurizer Water Level High-1 >> actuate Normal Residual Heat Removal System Isolation – Steam Generator Relief Valve Isolation actuation (corresponding SG)	Safeguards Can be manually blocked on presence of P-3 (RTBs open) Block automatically removed on absence of P-3 (RTBs closed) Steam Line Isolation Safeguards RNS Isolation (Note c) SG Relief Isolation Manual block permitted below P-11 Automatically unblocked above P-11	ESF only SG1: SGS-JE-PT030 (A) SGS-JE-PT031 (B) SGS-JE-PT032 (C) SGS-JE-PT033 (D) SG2: SGS-JE-PT034 (A) SGS-JE-PT035 (B) SGS-JE-PT036 (C) SGS-JE-PT037 (D)
8.d	Table 3.3.8-1 Fn 25	Steam Line Pressure – Negative Rate – High (either steam line) – Steam Line Isolation actuation	Steam Line Isolation Manual unblock permitted below P-11 Automatically blocked above P-11	ESF only SG1: SGS-JE-PT030 (A) SGS-JE-PT031 (B) SGS-JE-PT032 (C) SGS-JE-PT033 (D) SG2: SGS-JE-PT034 (A) SGS-JE-PT035 (B) SGS-JE-PT036 (C) SGS-JE-PT037 (D)
3.f 23.a	Table 3.3.10-1 Fn 1	Loop 1 Low-2 Hot Leg Level Coincident Loop 2 Low-2 Hot Leg Level (after delay) – ADS Stage 4 actuation >> open IRWST containment recirculation valves Coincident with IRWST Level Low-3	Manual unblock permitted below P-12 Automatically blocked above P-12	ESF only RCS-JE-LT160A (C)
3.f 23.a	Table 3.3.10-1 Fn 1	Loop 2 Low-2 Hot Leg Level Coincident Loop 1 Low-2 Hot Leg Level (after delay) – ADS Stage 4 actuation >> open IRWST containment recirculation valves Coincident with IRWST Level Low-3	Manual unblock permitted below P-12 Automatically blocked above P-12	ESF only RCS-JE-LT160B (B)
24.a	Table 3.3.8-10 Fn 2	Hot Leg Level - Low 1 – CVS Letdown Isolation	Manual block permitted above P-12 Automatically unblocked below P-12	ESF only RCS-JE-LT160A (C) RCS-JE-LT160B (B)

Table 16-01
ESF Protective Functions, Coincident Functions, and Interlock Status

FSAR Table 7.3-1 Function	ITS Reference	ESF Instrumentation Sensor and Initiated ESF Protective Functions (Note a)	ESF Interlock Logic (Ref. FSAR Table 7.3-1)	Sensors (Note b)
12.b 9.a	LCO 3.3.11	Low Startup Feedwater Flow Coincident with SG Narrow Range Water Level – Low – PRHR actuation >> SG Blowdown System Isolation actuation	Not Applicable	ESF only Divisions B & D only SG1: SGS-JE-FT055A (B) SGS-JE-FT055B (D) SG2: SGS-JE-FT056A (B) SGS-JE-FT056B (D)
7.b 4.d 4.d 11.d 13.c 14.g	LCO 3.3.12	Reactor Trip, P-4 – Turbine Trip – Main Feedwater Isolation Coincident with Reactor Coolant Average Temperature (T_{avg}) -- Low 1 – Main Feedwater Isolation Coincident with Reactor Coolant Average Temperature (T_{avg}) -- Low 2 – Startup Feedwater Isolation actuation Coincident with SG Narrow Range Water Level High (either SG) – Boron Dilution Block – CVS Makeup Isolation actuation Coincident with SG Narrow Range Water Level High (either SG)	Not Applicable	Not Applicable
16.a	LCO 3.3.13	Control Room Supply Air Radiation - High-2 – Main Control Room Isolation and Air Supply Initiation	Not Applicable	ESF only Divisions B & C only VBS-RE001A (B) VBS-RE002A (B) VBS-RE001B (C) VBS-RE002B (C)
20.a	LCO 3.3.14	Spent Fuel Pool Level - Low – Refueling Cavity Isolation	Not Applicable	ESF only Divisions A, B & C only SFS-LT019A (A) SFS-LT019B (B) SFS-LT019C (C)

Notes:

a. The symbol " >> " stands for the phrase, "sends a signal to".

b. Sensors specified as "RT & ESF" are shared and the sensor bistable status is utilized in both RT and ESF logic.

c: The RNS Isolation P-11 interlock logic shown on FSAR Figure 7.2-1, sheet 13 is not listed in FSAR Table 7.3-1.

Table 16-02
ESF Manual Functions, Coincident Functions, and Permissive Status

FSAR Table 7.3-1 Function	ITS 3.3.9	ESF Manual Function and Initiated ESF Protective Functions (Note a)	ESF Interlock Logic
1.e 6.a 2.a 18.a 5.a 4.a 14.c 19.a	Fn 1	Safeguards Actuation – Manual Initiation >> actuate CMT Injection >> actuate Containment Isolation >> actuate Containment Air Filtration isolation >> trip RCPs >> actuate Main Feedwater (MFW) Isolation >> actuate Chemical Volume and Control System Makeup Isolation if Coincident with Pressurizer Water Level – High 1 >> actuate Normal Residual Heat Removal System Isolation	Not Applicable
6.e 5.e 12.d 9.a	Fn 2	Core Makeup Tank (CMT) Injection Actuation – Manual Initiation >> trip RCPs >> actuate PRHR >> SG Blowdown System Isolation actuation	Not Applicable
2.b 18.a	Fn 3	Containment Isolation – Manual Initiation >> Containment Air Filtration System Isolation	Not Applicable
8.a	Fn 4	Steam Line Isolation – Manual Initiation	Not Applicable
4.b 7.a 11.c	Fn 5	Main Feedwater Isolation – Manual Initiation >> actuate Turbine Trip >> actuate Startup Feedwater Isolation	Not Applicable
3.c	Fn 6	ADS Stages 1, 2 & 3 Actuation – Manual Initiation	Not Applicable
3.d	Fn 7	ADS Stage 4 Actuation – Manual Initiation Coincident with ADS Stages 1, 2, & 3 actuation (or Coincident with RCS wide-range pressure low – see Table 3.3.8-1, Function 14)	Not Applicable
10.a 2.c 18.a	Fn 8	Passive Containment Cooling Actuation – Manual Initiation >> actuate Containment Isolation >> actuate Containment Air Filtration System Isolation	Not Applicable
12.a 9.a	Fn 9	Passive Residual Heat Removal Heat Exchanger Actuation – Manual Initiation >> actuate SG Blowdown System Isolation	Not Applicable
14.e 17.b	Fn 10	Chemical Volume and Control System Makeup Isolation – Manual Initiation >> actuate Auxiliary Spray and Purification line Isolation	Not Applicable
19.c	Fn 11	Normal Residual Heat Removal System Isolation – Manual Initiation	Not Applicable

Table 16-02
ESF Manual Functions, Coincident Functions, and Permissive Status

FSAR Table 7.3-1 Function	ITS 3.3.9	ESF Manual Function and Initiated ESF Protective Functions (Note a)	ESF Interlock Logic
21.b	Fn 12	In-Containment Refueling Water Storage Tank (IRWST) Injection Line Valve Actuation – Manual Initiation	Not Applicable
23.b	Fn 13	IRWST Containment Recirculation Valve Actuation – Manual Initiation	Not Applicable
26.a	Fn 14	Steam Generator Relief Isolation – Manual Initiation	Not Applicable
28.b	Fn 15	Containment Vacuum Relief Valve Actuation – Manual Initiation	Not Applicable
17.c	N/A	Auxiliary Spray Isolation – Manual Initiation	Not Applicable

Notes:

a. The symbol “ >> ” stands for the phrase, “sends a signal to.”

Table 16-03
RT Protective Functions and Interlock Status

ITS Reference	Reactor Trip Instrumentation Function	RT Interlock Logic (Ref. FSAR Table 7.2-3)	Sensors
Table 3.3.1-1 Fn 1.a	Power Range Neutron Flux - High Setpoint	Not Applicable	RXS-JE-NE003ABCD RXS-JE-NE004ABCD
Table 3.3.1-1 Fn 1.b	Power Range High Neutron Flux - Low Setpoint	Manual block permitted above P-10 Automatically unblocked below P-10	RXS-JE-NE003ABCD RXS-JE-NE004ABCD
Table 3.3.1-1 Fn 2	Power Range Neutron Flux High Positive Flux Rate	Not Applicable	RXS-JE-NE003ABCD RXS-JE-NE004ABCD
Table 3.3.1-1 Fn 3	Overtemperature ΔT	Not Applicable	See Note a
Table 3.3.1-1 Fn 4	Overpower ΔT	Not Applicable	See Note a
Table 3.3.1-1 Fn 5.a	Pressurizer Pressure – Low Setpoint	Automatically unblocked above P-10 Automatically blocks reactor trip below P-10	RCS-JE-PT191ABCD
Table 3.3.1-1 Fn 5.b	Pressurizer Pressure – High Setpoint	Not Applicable	RCS-JE-PT191ABCD
Table 3.3.1-1 Fn 6	Pressurizer Water Level – High-3	Automatically unblocked above P-10 Automatically blocks reactor trip below P-10	RCS-JE-LT195ABCD
Table 3.3.1-1 Fn 7	Reactor Coolant Flow - Low	Automatically unblocked above P-10 Automatically blocks reactor trip below P-10	RCS-JE-FT101ABCD RCS-JE-FT102ABCD
Table 3.3.1-1 Fn 8	Reactor Coolant Pump Bearing Water Temperature - High	Not Applicable	RCS-JE-TE211ABCD RCS-JE-TE212ABCD RCS-JE-TE213ABCD RCS-JE-TE214ABCD
Table 3.3.1-1 Fn 9	Reactor Coolant Pump Speed - Low	Automatically unblocked above P-10 Automatically blocks reactor trip below P-10	RCS-JE-ST281 (A) RCS-JE-ST282 (B) RCS-JE-ST283 (C) RCS-JE-ST284 (D)
Table 3.3.1-1 Fn 10	Steam Generator Water Level – Low	Not Applicable	SG1: SGS-JE-LT001 (A) SGS-JE-LT002 (B) SGS-JE-LT003 (C) SGS-JE -LT004 (D) SG2: SGS-JE-LT005 (A) SGS-JE-LT006 (B) SGS-JE-LT007 (C) SGS-JE-LT008 (D)

Table 16-03
RT Protective Functions and Interlock Status

ITS Reference	Reactor Trip Instrumentation Function	RT Interlock Logic (Ref. FSAR Table 7.2-3)	Sensors
Table 3.3.1-1 Fn 11	Steam Generator Water Level - High-2	Automatically unblocked above P-11 Manual block permitted below P-11	SG1: SGS-JE-LT001 (A) SGS-JE-LT002 (B) SGS-JE-LT003 (C) SGS-JE-LT004 (D) SG2: SGS-JE-LT005 (A) SGS-JE-LT006 (B) SGS-JE-LT007 (C) SGS-JE-LT008 (D)
Table 3.3.1-1 Fn 12	Passive Residual Heat Removal Actuation	Not Applicable	Not Applicable
LCO 3.3.2	Source Range Neutron Flux High Setpoint	Manual block permitted above P-6 Automatically unblocked below P-6 Automatically blocks above P-10 Permits manual reset below P-10	RXS-JE-NE001ABCD
LCO 3.3.3	Intermediate Range Neutron Flux High	Manual block permitted above P-10 Automatically unblocked below P-10	RXS-JE-NE002ABCD
Table 3.3.4-1 Fn 1	Automatic Safeguards Actuation	Not Applicable	Not Applicable
Table 3.3.4-1 Fn 2	Automatic Depressurization System Actuation	Not Applicable	Not Applicable
Table 3.3.4-1 Fn 3	Automatic Core Makeup Tank Injection	Not Applicable	Not Applicable
Table 3.3.5-1 Fn 1	Manual Reactor Trip	Not Applicable	Not Applicable
Table 3.3.5-1 Fn 2	Manual Safeguards Actuation	Not Applicable	Not Applicable
Table 3.3.5-1 Fn 3	Manual ADS Actuation	Not Applicable	Not Applicable
Table 3.3.5-1 Fn 4	Manual Core Makeup Tank Injection	Not Applicable	Not Applicable

Note

a. Sensor Tag Numbers Used in Overtemperature and Overpower Reactor Trip:

Cold Leg Temperature	Pressurizer Pressure
RCS-JE-TE121AC	RCS-PT191ABCD
RCS-JE-TE122BD	SG Steamline Pressure
RCS-JE-TE125A1/B1/C1/D1	SGS-PT030 (A)
Hot Leg Temperature	SGS-PT035 (B)
RCS-JE-TE131ABCD	SGS-PT032 (C)
RCS-JE-TE132ABCD	SGS-PT037 (D)

RCS-JE-TE133ABCD

Table 16-04
Interlock Logic States

Interlock/ Permissive	FSAR Fig. 7.2-1 Sheet	Logic States for Stated Plant Conditions (True (1) or False (0))	
		Below Setpoint	Above setpoint
Reactor Trip			
Intermediate Range Neutron Flux, P-6	3	False (0)	True (1)
Power Range Neutron Flux, P-10	4	False (0)	True (1)
Pressurizer Pressure, P-11	11	True (1)	False (0)
ESF			
Reactor Trip Breaker Open, P-3	2	Closed = False (0)	Open = True (1)
Intermediate Range Neutron Flux, P-6	3	False (0)	True (1)
Pressurizer Pressure, P-11	11	True (1)	False (0)
Pressurizer Level, P-12	12	True (1)	False (0)
RCS Pressure, P-19	6	True (1)	False (0)

Table 16-05
Interlock Location Table

Reactor Trip

Interlock/ Permissive	FSAR Fig. 7.2-1 Sheet(s)	FSAR	ITS	Interlocked Functions (CTS)	Interlock Applied in
a. Intermediate Range Neutron Flux, P-6	3	Table 7.2-2	LCO 3.3.2	5. Source Range Neutron Flux High Setpoint	BPL
b. Power Range Neutron Flux, P-10	3,4,5,6	Table 7.2-2	Table 3.3.1-1 Fn1.b LCO 3.3.3 LCO 3.3.2 Table 3.3.1-1 Fn 5.a Table 3.3.1-1 Fn 6 Table 3.3.1-1 Fn 7 Table 3.3.1-1 Fn 9	2. Power Range Neutron Flux b. Low Setpoint 4. Intermediate Range Neutron Flux 5. Source Range Neutron Flux High Setpoint 8. Pressurizer Pressure a. Low Setpoint 9. Pressurizer Water Level – High 3 10. Reactor Coolant Flow – Low 12. RCP Speed – Low	All BPL
c. Pressurizer Pressure, P-11	9,10,11	Table 7.2-2	Table 3.3.1-1 Fn 11	14. Steam Generator (SG) Narrow Range Water Level – High 2	BPL

Table 16-05 (continued)
Interlock Location Table

ESFAS

Interlock/ Permissive	DCD Fig. 7.2-1 Sheet(s)	DCD Table 7.3-1 Function	ITS	Interlocked Functions (CTS)	Interlock Applied in
a. Reactor Trip Breaker Open, P-3	2,11			1. Safeguards Actuation	All
		1.d	Table 3.3.8-1 Fn 1	b. Containment Pressure – High 2	LCL
		1.a	Table 3.3.8-1 Fn 5	c. Pressurizer Pressure – Low	
		1.b	Table 3.3.8-1 Fn 24	d. Steam Line Pressure – Low	
		1.c	Table 3.3.8-1 Fn 11	e. RCS Cold Leg Temperature (T_{cold}) – Low	
c. Intermediate Range Neutron Flux, P-6	3			15. Boron Dilution Block	All
		13.a	Table 3.3.8-1 Fn 17	a. Source Range Neutron Flux Doubling	BPL
				16. Chemical Volume and Control System Makeup Isolation	
		14.f	Table 3.3.8-1 Fn 17	f. Source Range Neutron Flux Doubling	
d. Pressurizer Pressure, P-11	9,10,11,13			1. Safeguards Actuation	
		1.a	Table 3.3.8-1 Fn 5	c. Pressurizer Pressure – Low	BPL
		1.b	Table 3.3.8-1 Fn 24	d. Steam Line Pressure – Low	BPL
		1.c	Table 3.3.8-1 Fn 11	e. RCS Cold Leg Temperature (T_{cold}) – Low	BPL
				4. Steam Line Isolation	
		8.c	Table 3.3.8-1 Fn 24	c.(1) Steam Line Pressure – Low	BPL
		8.d	Table 3.3.8-1 Fn 25	c.(2) Steam Line Pressure – Negative Rate – High	BPL
		8.e	Table 3.3.8-1 Fn 11	d. T_{cold} – Low	BPL
				6. Main Feedwater Control Valve Isolation	
		4.d	Table 3.3.8-1 Fn 13	d. Reactor Coolant Average Temperature (T_{avg}) – Low 1	BPL
				7. Main Feedwater Pump Trip and Valve Isolation	
		4.d	Table 3.3.8-1 Fn 13	d. Reactor Coolant Average Temperature (T_{avg}) – Low 2	BPL
				8. Startup Feedwater Isolation	
		11.a	Table 3.3.8-1 Fn 11	b. T_{cold} – Low	BPL
				17. Normal Residual Heat Removal System Isolation	LCL
		19.b	Table 3.3.8-1 Fn 4	a. Containment Radioactivity – High 2	LCL
		[Note (a)]	Table 3.3.8-1 Fns 2,5,11,24	b. Safeguards	
		26.b	Table 3.3.8-1 Fn 24	29. SG Power Operated Relief Valve and Block Valve Isolation	BPL
				b. Steam Line Pressure – Low	

Table 16-05 (continued)
Interlock Location Table

ESFAS

Interlock/ Permissive	DCD Fig. 7.2-1 Sheet(s)	DCD Table 7.3-1 Function	ITS	Interlocked Functions (CTS)	Interlock Applied in
e. Pressurizer Level, P-12	12, 16, 17	6.c	Table 3.3.8-1 Fn 7	2. Core Makeup Tank (CMT) Actuation b. Pressurizer Water Level – Low 2	BPL
		3.f	Table 3.3.10-1 Fns 1 & 2	10. ADS Stage 4 Actuation c. Coincident RCS Loop 1 and 2 Hot Leg Level – Low 2	BPL
		5.c	Table 3.3.8-1 Fn 7	11. Reactor Coolant Pump Trip d. Pressurizer Water Level – Low 2	BPL
		17.a	Table 3.3.8-1 Fn 7	21. Auxiliary Spray and Purification Line Isolation a. Pressurizer Water Level – Low 1	BPL
		24.a	Table 3.3.8-1 Fn 3	28. Chemical and Volume Control System Letdown Isolation a. Hot Leg Level – Low 1	BPL
f. RCS Pressure, P-19	6,	12.f	Table 3.3.8-1 Fn 10	13. Passive Residual Heat Removal Heat Exchanger Actuation f. Pressurizer Water Level, High 3	All BPL
		14.a	Table 3.3.8-1 Fn 9	16. Chemical Volume and Control System Makeup Isolation c. Pressurizer Water Level – High 2	
		25.b	Table 3.3.8-1 Fn 10	27. Pressurizer Heater Trip b. Pressurizer Water Level, High 3	

Notes:
a. Shown on FSAR Figure 7.2-1, sheet 13; this is not listed in FSAR Table 7.3-1.

Current SR 3.3.1.8 requires the same Surveillance as current SR 3.3.1.9; the differences being related to various Notes and Frequency differences. However, for new TS 3.3.2, all the Source Range instrumentation requirements are reformatted into new SR 3.3.2.2 by reformatting current SR 3.3.1.8 Note as new SR 3.3.2.2 Note 2~~3~~. There is no technical change in this administrative reformatting.

Current SR 3.3.1.9 is associated with three RTS Functions: Power Range Neutron Flux, Intermediate Range Neutron Flux, and Source Range Neutron Flux High Setpoint. However, only the Source Range Neutron Flux Function is retained in reformatted TS 3.3.2. Since the current SR 3.3.1.9 (renumbered for new TS 3.3.2 as SR 3.3.2.2) contains a Frequency applicable solely to the Power Range and Intermediate Range Neutron Flux, that Frequency is not required in new SR 3.3.2.2. ~~Current SR 3.3.1.9 also contains a provision in the Note applicable solely to the Intermediate Range Neutron Flux and Power Range Neutron Flux. Interlock P-10 is not applicable to the Source Range Instrumentation and therefore not stating this provision in new SR 3.3.2.2 is administrative.~~ Additionally, the editorial changes to new SR 3.3.2.2 to replace “Four” with “4” and delete “Every” corrects conventions for Frequency presentation consistent with TSTF-GG-05-01, subsections 3.3.3.a.3 and 4.1.7.a.

<u>New TS 3.3.3, Reactor Trip System (RTS) Intermediate Range Instrumentation</u>

The reformatting of current Table 3.3.1-1, Function 4, Intermediate Range Neutron Flux, into new TS 3.3.3 simplifies the Specification without utilizing a Table. Requirements for this Function currently in Table 3.3.1-1 (and not addressed with other Discussion of Changes) are reformatted into new TS 3.3.3. Details of the Function name and number of Required Channels are reformatted to the LCO Statement. The Function name is revised to be consistent with the description in FSAR Section 7.2.1.1.1. The Applicable Modes or Other Specified Conditions are reformatted into the Applicability statement. The current Function 4 Mode 2 Applicabilities (i.e., Mode 2 above the P-6 interlock and Mode 2 below the P-6 interlock) are combined to simply state "MODE 2." Actions Note is not applicable since this Specification is for only one Function and is therefore deleted.

Current TS 3.3.1 Action F contains Required Actions for bypassing and/or tripping one and two inoperable channels. This Action is presented in new TS 3.3.3 Actions A and B. This reformatting provides one Action for one inoperable channel (Action A) and a separate Action for two inoperable channels (Action B). Current Required Action F.1.2 contains two actions (i.e., bypass one channel and trip the other channel) not currently separated with the appropriate logical connector. The reformatting splits these Required Actions into New Required Action B.1 and B.2, which is based on the TSTF-GG-05-01, subsection 4.1.6.i.1, for separating discrete items within actions. The current TS 3.3.1 Required Actions F.2 and F.3 are reformatted as new TS 3.3.3 Required Actions A.2 and A.3, and repeated as new TS 3.3.3 Required Actions B.2 and B.3 due to splitting up of current TS 3.3.1 Action A as described earlier.

Current TS 3.3.1 Action G for three inoperable channels with thermal power between P-6 and P-10 is reformatted as new TS 3.3.3 Action D, as modified by DOC M02. Current TS 3.3.1 Action H is reformatted as new TS 3.3.3 Action C.

misleading.

These changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to provide for consistency. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

A026 **Detailed Description**

3.3.1-10 Current TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," current SR 3.3.1.9 Frequency Note stating “Only required when not performed within previous 92 days” is moved to the Surveillance column as a Note ~~2~~ stating "Only required to be performed when not performed within previous 92 days” (current Note is ~~renumbered as Note 1~~deleted per DOC L10).”

Technical Evaluation

As described TSTF-GG-05-01, subsection 4.1.7.e, Notes are not to be used in the Frequency column unless the Note is located directly above the last Frequency when there is more than one Frequency. As such, this Note is reformatted to the Surveillance column as a Note ~~2~~. As described in TSTF-GG-05-01, subsection 4.1.7.f, when a Surveillance is noted as "only required" or "not required" it must be accompanied by (in this circumstance) "to be performed."

These changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to provide clarification and for consistency with TSTF-GG-05-01. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

A027 **Detailed Description**

3.1.9-2
3.5.4-3 TS 3.1.9, “Chemical and Volume Control System (CVS) Demineralized Water Isolation Valves and Makeup Line Isolation Valves,” SR 3.1.9.1 is revised from “... ~~isolation valves~~ are OPERABLE by stroking the ~~valve closed~~” to “... ~~isolation valves~~ stroke ~~closed~~.”

TS 3.4.11, “Automatic Depressurization System (ADS) – Operating,” SR 3.4.11.2 is revised from “... is OPERABLE by stroking them” to “... strokes.”

TS 3.4.16, “Reactor Vessel Head Vent (RVHV),” SR 3.4.16.1 is revised from “... is OPERABLE by stroking it” to “... strokes.”

TS 3.5.2, “Core Makeup Tanks (CMTs) – Operating,” SR 3.5.2.7 is revised from “ is OPERABLE by stroking it” to “... strokes.”

TS 3.5.4, “Passive Residual Heat Removal Heat Exchanger (PRHR HX) – Operating,” current SR 3.5.4.5 is revised from “... valves are OPERABLE by stroking open the valves” to “... valves stroke open.”

TS 3.7.10, “Steam Generator (SG) Isolation Valves,” SR 3.7.10.1 is revised from

and bypass one channel and trip one channel for two inoperable Source Range Neutron Flux channels is consistent with the design and consistent with the intent as described in the TS Bases for these Functions. Based on the Completion Times for Action F, applicable to Intermediate Range Neutron Flux channels, bypassing and/or tripping within 2 hours is provided for the new TS 3.3.2, Actions A and B. Since RTS trip capability remains with one or two Source Range channels inoperable, the additional 2 hours allowed by Actions A and B do not have any significant impact on safety. The current action suspending all operations involving positive reactivity additions unless all four Source Range channels are Operable is overly restrictive given RTS trip capability remains and that the safety analyses do not take credit for the Source Range Neutron Flux trip Function (as stated in the Bases).

The change results in closer alignment with Actions for other automatic RTS Functions. The actions continue to assure operation within the assumptions of the safety analysis, i.e., preserving single-failure criterion for indefinite operations. As such there is no adverse impact to public health and safety. This change is designated as a less restrictive change because certain actions for inoperability of Source Range Neutron Flux channels in Mode 2 are made less restrictive.

L10 Detailed Description

3.1.8-1
3.3.1-5
3.3.1-10
3.3.1-14
3.3.2-2
3.3.2-3
3.3.2-23

TS 3.1.8 “PHYSICS TESTS Exceptions – MODE 2,” is revised to delete the listing of current Function 16.b for LCO 3.3.1, and correct the title for LCO 3.3.1 to “Reactor Trip System (RTS) Instrumentation.”

Current TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," Table 3.3.1-1, Function 16, Reactor Trip System Interlocks is removed from TS. Current TS 3.3.1 Action M is deleted. Current SR 3.3.1.9 Surveillance Note is deleted.

Current TS 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, Table 3.3.2-1, Function 18, ESFAS Interlocks, is removed, with the exception of Table 3.3.2-1, Function 18.b, Reactor Trip, P-4. Current TS 3.3.2 Action J is deleted.

Technical Evaluation

Reactor Trip System interlocks are provided to ensure reactor trips are in the correct configuration for the current plant status. They back up operator actions to ensure protection system Functions are not blocked during plant conditions under which the safety analysis assumes the Functions are Operable. Additionally, several interlocks are included as part of the ESFAS. These interlocks permit the operator to block some signals, automatically enable other signals, prevent some actions from occurring, and cause other actions to occur. The interlock Functions backup manual actions to ensure bypassable Functions are in operation under the conditions assumed in the safety analyses.

The interlocks, as separate RTS and ESFAS Functions (except for Table 3.3.2-1, Function 18.b, Reactor Trip, P-4; refer to new TS 3.3.12, "Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation," for requirements related to retaining the Reactor Trip, P-4 “interlock” as an ESFAS actuation

Function), are removed from the TS and the associated Actions are deleted. Interlock Operability is adequately addressed by each related Function's requirement to be Operable and the requirement for actuation logic operability. For these ~~TS~~ RTS trip and ESFAS actuation Functions to be Operable, the associated RTS and ESFAS interlock Functions would have to be in the required state as a support feature for operability. These RTS and ESFAS interlock functions do not directly trip the reactor or ~~initiate~~ actuate ~~an~~ ESFAS ~~function~~, and as such are removed from the actuation instrumentation listing in TS. The role of the interlocks, and their ~~operability relationship to~~ support~~ed~~ for the operability of ~~TS~~ RTS trip and ESFAS actuation Functions, ~~is retained~~ are described in the TS Bases, as well as ~~being described~~ in Final Safety Analysis Report (FSAR) Chapter 7, Instrumentation and Controls.

Furthermore, ~~the supported actuation Function's specified Applicability is tied to operation above or below (as applicable) the various associated interlocks. As such, the TS required actuation Functions transition into various specified conditions of Applicability when the interlock function would be backing up the operator actions to assure the functions are not blocked when they are required to be Operable.~~ each RTS trip and ESFAS actuation Function is required operable during the stated TS Applicability. The Applicability for certain trip or actuation Functions is based on transitioning above or below an interlock; while other Functions are not directly supported by an interlock. For Functions supported by an interlock, while operating within the TS required Applicability for that Function, its associated supporting interlock is not required to automatically change state. The interlock status must be established in conjunction with assuring supported Function's operability prior to entering the required Applicability. In addition, LCO 3.0.4 requires the operators to ~~assure actuation~~ ensure RTS trip and ESFAS operability prior to entering their Applicability. These TS requirements remain in effect and impose the necessary operability requirements related to the removed interlock Functions. As such, interlocks are adequately addressed by each related Function's requirement to be operable and the requirement for actuation logic operability.

Current TS 3.1.8 lists Functions of LCO 3.3.1 where the number of required channels is allowed to be reduced to three. Function 16.b is no longer included since this Function is removed as described above.

Current SR 3.3.1.9 Surveillance Note provides details of performing a Channel Operational Test (COT) and is deleted. The requirement for verification that interlocks P-6 and P-10 are in their required state for existing unit conditions is unchanged and is appropriately summarized in the Bases, as referred to below.

If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate operability evaluations performed for the affected Function(s), which would evaluate potential operability impact on individual instrument Function channels and/or the coincident logic subsystem channel. Adverse impacts to operability could be evaluated to affect individual instrumentation channels, or may be evaluated to impact the divisional coincident logic. In either outcome, the appropriate actions are provided by the affected supported feature(s).

Certain Actions being deleted for inoperable interlock functions (current TS 3.3.1 Required Action M.1 for RTS interlocks and current TS 3.3.2 Required Action J.1 for ESFAS interlocks) provide an optional allowance: "Verify the interlocks are in the required state for the existing plant conditions" within "1 hour." This verification is essentially the operability evaluation for the supported functions. If interlocks are not in the required state for the existing plant conditions, then the affected supported Functions would be inoperable and their Actions would apply. The current 1 hour allowance provides time for the operator to manually place the interlock in the state that accomplishes the interlock function necessary to support RTS and ESFAS actuation Function operability. Once this Required Action is completed, unlimited operation is allowed. As such, the provision provides an acceptable alternative to reliance on the automatic interlock function – allowing the operator to manually assure the required interlock state. With this action deleted, the determination of supported function operability is immediate and the actions for any inoperable supported Functions are immediately entered; thereby making this portion of the change more restrictive.

Instrument channel Functions with interlocks implicitly required to support the Function's operability, are also addressed by the Channel Operational Test (COT) and Channel Calibration Surveillance ~~r~~Requirements. Actuation logic with interlocks implicitly required to support operability of the logic is also addressed by the Actuation Logic Test Surveillance Requirements. The applicable COT, ~~and~~ Channel Calibration, and Actuation Logic Test Bases will include the following discussion supporting this change ("CHANNEL CALIBRATION" is replaced with "COT" or "ACTUATION LOGIC TEST" as appropriate):

> "~~Functions with i~~Interlocks implicitly required to support the Function's OPERABILITY~~,~~ are also addressed by this CHANNEL CALIBRATION. This portion of the CHANNEL CALIBRATION ensures the associated Function~~(s) are~~ is not bypassed when required to be enabled~~within the required interlock power level~~. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected ~~or the~~ Function's OPERABILITY can be met if the interlock is manually ~~tripped~~ enforced to properly enable the affected Function~~s~~. When an interlock is ~~inoperable not functional~~not supporting ~~such that~~ the associated Function's OPERABILITY ~~is not enabled~~ at the ~~proper unit~~existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken."

Related actions being deleted (current TS 3.3.1 Action M.2.1, M.2.2, and M.3 for RTS interlocks and current TS 3.3.2 Action J.2.1 and J.2.2 for ESFAS interlocks; which are to trip and/or bypass inoperable channels) also have the additional 1-hour greater allowance than specified for associated inoperable actuation Functions. Therefore, removal of these actions is also a more restrictive portion of the change.

The remaining actions referenced for current TS interlocks supporting ESFAS actuation Functions being removed (i.e., TS 3.3.2, Actions D, L, M, N, Y, and BB) are equivalent to, or more restrictive than the existing actions for inoperable supported ESFAS Functions as detailed below.

- Current TS 3.3.2, Reactor Trip Breaker Open, P-3: Actions D and M

  The Reactor Trip Breaker Open, P-3 interlock is provided to permit the block of automatic Safeguards Actuation after a predetermined time interval following automatic Safeguards Actuation. ~~This Function~~The P-3 interlock supports operability of all automatic Safeguards Actuations at the Engineered Safety Features (ESF) coincident logic subsystem, i.e., current Table 3.3.2-1, Function 25. The current Actions specified for Function 25 include Actions D and O. The first Action (Action D) is consistent with the Actions for inoperable P-3. The second Action (Action O) requires completing a plant shutdown to Mode 5, while the Actions for inoperable P-3 (Action M) only require completion of the plant shutdown to Mode 4. Therefore, deleting the P-3 Function results in equivalent or more restrictive Actions.

- Intermediate Range Neutron Flux, P-6: Action L

  The Intermediate Range Neutron Flux, P-6 interlock is actuated when the respective NIS intermediate range channel increases to approximately one decade above the channel lower range limit. The~~is~~ source range flux doubling signal that actuates to block boron dilution may be manually blocked to permit plant startup and normal power operation. It is automatically reinstated when reactor power is decreased below the P-6 power level during shutdown. Failure of ~~T~~the P-6 ~~Function~~ interlock to support~~s~~ operability of ~~this automatic Safeguards Actuations at the Engineered Safety Features (ESF)~~ the source range flux doubling instrument channels could impact operability of the coincident logic subsystem, i.e., current Table 3.3.2-1, Function 25. The current Actions specified for Function 25 include Actions D and O. The first Action (Action D) is more restrictive than Action J as discussed previously. The second Action (Action O) requires completing a plant shutdown to Mode 5, while the Actions for inoperable P-6 (Action L) only require completion of the plant shutdown to Mode 3. Therefore, deleting the P-6 Function results in equivalent or more restrictive Actions.

- Pressurizer Pressure, P-11: Action M

  The Pressurizer Pressure, P-11 interlock permits a normal unit cooldown and depressurization without Safeguards Actuation or main steam line and feedwater isolation. ~~With pressurizer pressure channels greater than equal to the P-11 setpoint, the~~The P-11 interlock supports the following ESFAS actuation Functions:

  - Containment Pressure – High 2;
  - Containment Radioactivity – High 2;
  - Pressurizer Pressure – Low;~~,~~

- RCS Cold Leg Temperature T_{cold} – Low; ~~Safeguards Actuation signals and the~~
- Reactor Coolant Average Temperature (T_{avg}) – Low 1;
- Reactor Coolant Average Temperature (T_{avg}) – Low 2;
- Steam Line Pressure – Low; and
- Steam Line Pressure – Negative Rate – High.

~~Steam Line Pressure Low and T_{cold} – Low steam line isolation signals are automatically enabled. The feedwater isolation signals on T_{cold} – Low, T_{avg} – Low 1 and Low 2 are also automatically enabled above P-11.~~ Failure of ~~T~~the P-11 ~~Function~~ interlock to support~~s~~ operability of ~~these automatic Safeguards Actuations at the the above listed Engineered Safety Features (ESF)~~these instrument channels could impact operability of the coincident logic subsystem, i.e., current Table 3.3.2-1, Function 25. The current Actions specified for Function 25 include Actions D and O. The first Action (Action D) is more restrictive than Action J as discussed previously. The second Action (Action O) requires completing a plant shutdown to Mode 5, while the Actions for inoperable P-11 (Action M) only require completion of the plant shutdown to Mode 4. Therefore, deleting the P-11 Function results in equivalent or more restrictive Actions.

- Pressurizer Level, P-12: Actions M, BB, and Y

~~In Modes 1, 2, and 3, with pressurizer level above the P-12 setpoint, several system logics are prevented from being blocked; for example this interlock prevents manual block of~~The P-12 interlock supports the following ESFAS actuation Functions:

- Pressurizer Water Level – Low 1 actuation of auxiliary spray and purification line isolation (Applicable in Modes 1, 2, 3, and portion of Mode 4);
- Pressurizer Water Level – Low 2 actuation of reactor coolant pump trip and core makeup tank actuation (Applicable in Modes 1, 2, 3, and portion of Mode 4);
- Hot Leg Level - Low 1 actuation of CVS Letdown Isolation (Applicable in portions of Modes 4, 5, and 6); and
- Hot Leg Loop 1 Level - Low 2 and Hot Leg Loop 2 Level - Low 2 actuation of ADS Stage 4 (Applicable in portions of Modes 4, 5, and 6). ~~on low pressurizer level (refer to FSAR Table 7.3-2 for complete listing).~~

Failure of ~~T~~the P-12 Function to support~~s~~ operability of these ~~automatic Safeguards Actuations at the Engineered Safety Features (ESF)~~ instrument channels could impact operability of the coincident logic subsystem, i.e., current Table 3.3.2-1, Function 25. The current Actions specified for Function 25 in Modes 1, 2, 3, and ~~3~~4, include Actions D and O. The first Action (Action D) is more restrictive than Action J as discussed previously. The second Action (Action O) requires completing a plant shutdown to Mode 5. This is more restrictive than ~~, while~~ the Actions for inoperable

P-12. For inoperable P-12 in Modes 1, 2, and 3, ~~(~~Action M~~), only~~ requires completion of the plant shutdown to Mode 4. Once in Mode 4, the actions for inoperable P-12 transition to Actions "BB,Y," which allow for continued operation in Mode 4 with the inoperable channel bypassed (Action BB) or alternately, the suspension of positive reactivity additions and completing a plant shutdown to Mode 5 (Action Y). While the Completion Time for achieving Mode 5 may be longer in certain cases for the current Function 25 Action (e.g., not bypassing a channel as allowed in Action BB), that less restrictive aspect is offset by not allowing continued operation if the channel is bypassed. In removing the interlocks and relying on the current actions for inoperability of the coincident logic subsystem, appropriately conservative Actions result.

~~In Modes 4, 5, and 6, the P-12 interlock is provided to permit midloop operation without core makeup tank actuation, reactor coolant pump trip, CVS letdown isolation, or purification line isolation. With pressurizer level channels less than the P-12 setpoint, the operator can manually block low pressurizer level signal used for these actuations. Concurrent with blocking CMT actuation on low pressurizer level, ADS 4th Stage actuation on Low 2 RCS hot leg level (i.e., current TS Table 3.3.2-1, Function 10.c) is enabled. Therefore, the P-12 Function supports operability of Function 10.c, which currently requires Actions BB and Y. Actions BB and Y are equivalent to the Actions for inoperable P-12 interlock in Modes 4, 5, and 6.~~ The current Actions specified for Function 25 in Modes 5 and 6 include Actions G and W. The first Action (Action G) requires restoration to operable. This is more restrictive than the first Action for inoperable P-12 in Mode 5 and 6 (Action BB), which allows for continued operation in Mode 5 or Mode 6 with the inoperable channel bypassed. The second Action (Action W) in Mode 5 requires establishing ≥ 20% pressurizer level and for Mode 6 establishing water level ≥ 23 feet above the top of the reactor vessel flange; similar to the Actions for inoperable P-12 in Modes 5 and 6 (Action Y).

Therefore, deleting the P-12 Function results in appropriately conservative Actions.

- <u>RCS Pressure, P-19: Action N</u>

~~With RCS pressure above the P-19 setpoint system logics for Functions 13.b, 16.c, and 27.b are prevented from being blocked.~~ The P-19 interlock supports the following ESFAS actuation Functions:

- Pressurizer Water Level – High 2; and
- Pressurizer Water Level – High 3.

Failure of the P-19 interlock to support operability of these instrument channels could impact operability of the coincident logic subsystem, i.e., current Table 3.3.2-1, Function 25. The current Actions specified for Function 25 include Actions D and O. The first Action (Action D) is more restrictive than Action J as discussed previously. The second Action (Action O) requires completing a plant shutdown to Mode 5, while the Actions for inoperable P-19 (Action N) only require completion of the plant

shutdown to Mode 4 with the Reactor Coolant System (RCS) cooling provided by the Normal Residual Heat Removal System (RNS). Therefore, deleting the P-19 Function results in equivalent or more restrictive Actions.

~~Therefore, the P-19 Function supports operability of these Functions, which currently requires the following:~~

- ~~Function 13.b currently requires Actions B and N. Action B is more restrictive than Action J as discussed previously, while Action N is the same Action required for inoperable P-19 interlock. Therefore, deleting the P-19 Function results in equivalent or more restrictive Actions.~~
- ~~Function 16.c currently requires Actions B and T. Action B is more restrictive than Action J as discussed previously. Action T is revised as addressed in DOC L12. Both the current Action N and the revisions from DOC L12 require Mode 3 in 6 hours. DOC L12 provides the basis for the remaining differences.~~
- ~~Function 27.b currently requires Actions B and N. Action B is more restrictive than Action J as discussed previously, while Action N is the same Action required for inoperable P-19 interlock. Therefore, deleting the P-19 Function results in equivalent or more restrictive Actions.~~

While the effect of this change results in certain more restrictive Actions, this change is deemed a less restrictive change since explicit requirements related to the RTS and ESFAS interlocks and explicit surveillance requirements are being removed from TS, which results in implicit requirements associated with Operability and Channel Calibrations.

L11 **Detailed Description**

3.3.1-6
3.3.1-12

Current TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," is revised to delete:

- Current Table 3.3.1-1, Function 5, Source Range Neutron Flux High Setpoint, Third row for that Function including Applicability set "$3^{(e)}$,$4^{(e)}$,$5^{(e)}$" and associated references to Required Channel, Condition, and SRs;
- Current Table 3.3.1-1, Footnote (e); and
- Current Action R.

Technical Evaluation

The Source Range Neutron Flux Function in Modes 3, 4, and 5 with RTBs open, is not related to the Reactor Trip System, but involves indication only as stated in the current Applicability Footnote (e), and only requires one channel to be providing indication. The associated Bases also state that in Mode 3, 4, or 5 with the RTBs open, the LCO does not require the Source Range Neutron Flux channels for reactor trip functions to be Operable. As such, this requirement is inappropriately placed in the Specification requiring Reactor Trip System operability.

Source Range Neutron Flux channels are also required to be Operable by current TS 3.3.2, Engineered Safeguards Actuation System (ESFAS) Instrumentation,

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR ~~3.3.1.9~~ 3.3.1.7	---------- **- NOTE -** L10 ~~This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions.~~ ---------- Perform ~~RT~~COT in accordance with Setpoint Program.	~~- NOTE -~~ to be performed Only required when not performed within previous 92 days A026 Prior to reactor startup M01 AND 4 ~~Four~~ hours after reducing power below P-10 ~~for power and intermediate instrumentation~~ ~~AND~~ ~~Four hours after reducing power below P-6 for source range instrumentation~~ AND ~~Every~~ 92 days thereafter
SR ~~3.3.1.10~~ 3.3.1.8	---------- **- NOTE -** This Surveillance shall include verification that the time constants are adjusted to ~~the prescribed values~~ within limits. ---------- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	A025 24 months

A024

Source Range

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR ~~3.3.1.9~~ 3.3.2.2	S L10 **- NOTE -** ~~This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions.~~ 1. Perform ~~RT~~COT in accordance with Setpoint Program. 2. Not required to be performed prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3.	~~- NOTE -~~ to be performed Only required when not performed within previous 92 days A026 Prior to reactor startup M01 ~~AND~~ ~~Four hours after reducing power below P-10 for power and intermediate instrumentation~~ AND 4 ~~Four~~ hours after reducing power below P-6 ~~for source range instrumentation~~ AND ~~Every~~ 92 days thereafter
~~SR 3.3.1.10~~	~~- NOTE -~~ ~~This Surveillance shall include verification that the time constants are adjusted to the prescribed values.~~ ~~Perform CHANNEL CALIBRATION in accordance with Setpoint Program.~~	~~24 months~~

A024 Intermediate Range 3.3.3

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR ~~3.3.1.9~~ 3.3.3.2	---------- L10 **- NOTE -** ~~This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions.~~ ---------- Perform ~~RT~~COT in accordance with Setpoint Program.	~~----------~~ to be performed ~~**- NOTE -**~~ Only required when not performed within previous 92 days A026 ~~----------~~ Prior to reactor startup M01 AND 4 ~~Four~~ hours after reducing power below P-10 ~~for power and intermediate instrumentation~~ ~~AND~~ ~~Four hours after reducing power below P-6 for source range instrumentation~~ AND ~~Every~~ 92 days thereafter
~~SR 3.3.1.10~~	~~----------~~ ~~**- NOTE -**~~ ~~This Surveillance shall include verification that the time constants are adjusted to the prescribed values.~~ ~~----------~~ ~~Perform CHANNEL CALIBRATION in accordance with Setpoint Program.~~	~~24 months~~

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.6	Perform COT in accordance with Setpoint Program.	92 days
SR 3.3.1.7	---------- **- NOTE -** Only required to be performed when not performed within previous 92 days. ---------- Perform COT in accordance with Setpoint Program.	Prior to reactor startup <u>AND</u> 4 hours after reducing power below P-10 <u>AND</u> 92 days thereafter
SR 3.3.1.8	---------- **- NOTE -** This Surveillance shall include verification that the time constants are adjusted to within limits. ---------- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.1.9	---------- **- NOTE -** Neutron detectors are excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.2	---------- **- NOTES -** 1. Only required to be performed when not performed within previous 92 days. 2. Not required to be performed prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3. ---------- Perform COT in accordance with Setpoint Program.	Prior to reactor startup <u>AND</u> 4 hours after reducing power below P-6 <u>AND</u> 92 days thereafter
SR 3.3.2.3	---------- **- NOTE -** Neutron detectors are excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.2.4	---------- **- NOTE -** Neutron detectors are excluded from response time testing. ---------- Verify RTS RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.3.2	---------- **- NOTE -** Only required to be performed when not performed within previous 92 days. ---------- Perform COT in accordance with Setpoint Program.	Prior to reactor startup <u>AND</u> 4 hours after reducing power below P-10 <u>AND</u> 92 days thereafter
SR 3.3.3.3	---------- **- NOTE -** Neutron detectors are excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.3.4	---------- **- NOTE -** Neutron detectors are excluded from response time testing. ---------- Verify RTS RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

BASES

SURVEILLANCE REQUIREMENTS (continued)

If the COT cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the COT can be performed using portable test equipment.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this COT. This portion of the COT ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

This test frequency of 92 days is justified based on Reference 6 (which refers to this test as "RTCOT") and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the Protection and Safety Monitoring System cabinets to the operator within 10 minutes of a detectable failure.

During the COT, the Protection and Safety Monitoring System cabinets in the division under test may be placed in bypass.

SR 3.3.1.7

SR 3.3.1.7 is the performance of a COT as described in SR 3.3.1.6 (note that Reference 6 refers to this test as an "RTCOT"), except it is modified by a Note that allows this surveillance to be satisfied if it has been performed within the previous 92 days. The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable. This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel's response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this COT. This portion of the COT ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

The Frequency of "prior to reactor startup" ensures this surveillance is performed prior to critical operations and applies to the source, intermediate and power range low instrument channels. The Frequency of "4 hours after reducing power below P-10" allows a normal shutdown to be completed and the unit removed from the MODE of Applicability for this surveillance without a delay to perform the testing required by this surveillance. The Frequency of every 92 days thereafter applies if the plant remains in the MODE of Applicability after the initial performances of prior to reactor startup and four hours after reducing power below P-10. The MODE of Applicability for this surveillance is < P-10 for the power range low channels. Once the unit is in MODE 3, this surveillance is no longer required. If power is to be maintained < P-10 for more than 4 hours, then the testing required by this surveillance must be performed prior to the expiration of the 4 hour limit. Four hours is a reasonable time to complete the required testing or place the unit in a MODE where this surveillance is no longer required. This test ensures that the NIS power range low channels are OPERABLE prior to taking the reactor critical and after reducing power into the applicable MODE (< P-10) for periods > 4 hours.

SR 3.3.1.8

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable. This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation. Transmitter calibration must be performed consistent with the assumptions of the setpoint methodology. The differences between the current as-found values and the previous as-left values must be consistent with the transmitter drift allowance used in the setpoint methodology.

The setpoint methodology requires that 30 months drift be used (1.25 times the surveillance calibration interval, 24 months).

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this CHANNEL CALIBRATION. This portion of the CHANNEL CALIBRATION ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function’s OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function’s OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

SR 3.3.1.8 is modified by a Note stating that this test shall include verification that the time constants are adjusted to within limits where applicable.

SR 3.3.1.9

SR 3.3.1.9 is the performance of a CHANNEL CALIBRATION every 24 months. This SR is modified by a Note stating that neutron detectors are excluded from the CHANNEL CALIBRATION. The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable.

BASES

SURVEILLANCE REQUIREMENTS (continued)

This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel's response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation.

The CHANNEL CALIBRATION for the power range neutron detectors consists of a normalization of the detectors based on a power calorimetric and flux map performed above 20% RTP. Below 20% RTP, the design of the incore detector system, low core power density, and detector accuracy make use of the incore detectors inadequate for use as a reference standard for comparison to the excore channels. This Surveillance is not required for the power range detectors for entry into MODES 2 and 1 because the plant must be in at least MODE 1 to perform the test.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this CHANNEL CALIBRATION. This portion of the CHANNEL CALIBRATION ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

The 24 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 these components usually pass the Surveillance when performed on the 24 month Frequency.

SR 3.3.1.10

SR 3.3.1.10 is the performance of a TADOT of the Passive Residual Heat Removal Actuation. This TADOT is performed every 24 months.

BASES

SURVEILLANCE REQUIREMENTS (continued)

To the extent possible, protection and safety monitoring system functional testing is accomplished with continuous system self-checking features and the continuous functional testing features. The COT shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the COT cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the COT can be performed using portable test equipment.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this COT. This portion of the COT ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

This test frequency of 92 days is justified based on Reference 2 (which refers to this test as "RTCOT") and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the protection and safety monitoring system cabinets to the operator within 10 minutes of a detectable failure.

SR 3.3.2.2 is modified by two Notes. The first Note allows this surveillance to be satisfied if it has been performed within the previous 92 days. The second Note provides a 4 hour delay in the requirement to perform this Surveillance when entering MODE 3 from MODE 2. This note allows a normal shutdown to proceed without a delay for testing in MODE 2 and for a short time in MODE 3 until the RTBs are open and SR 3.3.2.2 is no longer required to be performed. If the unit is to be in MODE 3 with the RTBs closed for a time greater than 4 hours, this Surveillance must be performed prior to 4 hours after entry into MODE 3.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this CHANNEL CALIBRATION. This portion of the CHANNEL CALIBRATION ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

The 24 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 these components usually pass the Surveillance when performed on the 24 month Frequency.

SR 3.3.2.4

This SR 3.3.2.4 verifies that the individual channel actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response Time testing criteria are included in Reference 1.

For channels that include dynamic transfer Functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer Function set to one, with the resulting measured response time compared to the appropriate DCD Chapter 7 response time. Alternately, the response time test can be performed with the time constants set to their nominal value, provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Since software does not degrade, software functional testing involves verifying that the software code has not changed and that the software code is executing.

To the extent possible, protection and safety monitoring system functional testing is accomplished with continuous system self-checking features and the continuous functional testing features. The COT shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the COT cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the COT can be performed using portable test equipment.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this COT. This portion of the COT ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

This test frequency of 92 days is justified based on Reference 2 (which refers to this test as "RTCOT") and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the protection and safety monitoring system cabinets to the operator within 10 minutes of a detectable failure.

SR 3.3.3.2 is modified by a Note. The Note allows this surveillance to be satisfied if it has been performed within 92 days of the Frequencies prior to reactor startup and four hours after reducing power below P-10. The Frequency of "prior to reactor startup" ensures this surveillance is performed prior to critical operations and applies to the source, intermediate and power range low instrument channels. The Frequency of "4 hours after reducing power below P-10" allows a normal shutdown to be completed and the unit removed from the MODE of Applicability for this surveillance without a delay to perform the testing required by this

BASES

SURVEILLANCE REQUIREMENTS (continued)

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this CHANNEL CALIBRATION. This portion of the CHANNEL CALIBRATION ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

The 24 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 these components usually pass the Surveillance when performed on the 24 month Frequency.

SR 3.3.3.4

This SR 3.3.3.4 verifies that the individual channel actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response Time testing criteria are included in Reference 1.

For channels that include dynamic transfer Functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer Function set to one, with the resulting measured response time compared to the appropriate DCD Chapter 7 response time. Alternately, the response time test can be performed with the time constants set to their nominal value, provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

The reactor trip breaker position switches that provide input to the P-4 interlock only function to energize or de-energize or open or close contacts. Therefore, this interlock has no adjustable trip setpoint.

Intermediate Range Neutron Flux, P-6

The Intermediate Range Neutron Flux, P-6 interlock is actuated when the respective NIS intermediate range channel increases to approximately one decade above the channel lower range limit. Below the setpoint, the P-6 interlock automatically unblocks the flux doubling function, permitting the block of boron dilution. Normally, this Function is blocked by the main control room operator during reactor startup.

Pressurizer Pressure, P-11

The P-11 interlock permits a normal unit cooldown and depressurization without Safeguards Actuation or main steam line and feedwater isolation. With pressurizer pressure channels less than the P-11 setpoint, the operator can manually block the Pressurizer pressure – Low, Steam Line Pressure – Low, and T_{cold} – Low Safeguards Actuation signals and the Steam Line Pressure – Low and T_{cold} – Low steam line isolation signals. When the Steam Line Pressure – Low is manually blocked, a main steam isolation signal on Steam Line Pressure-Negative Rate – High is enabled. This provides protection for an SLB by closure of the main steam isolation valves. Manual block of feedwater isolation on T_{avg} – Low 1, Low 2, and T_{cold} – Low is also permitted below P-11. With pressurizer pressure channels ≥ P-11 setpoint, the Pressurizer Pressure – Low, Steam Line Pressure – Low, and T_{cold} – Low Safeguards Actuation signals and the Steam Line Pressure Low and T_{cold} – Low steam line isolation signals are automatically enabled. The feedwater isolation signals on T_{cold} – Low, T_{avg} – Low 1 and Low 2 are also automatically enabled above P-11. The operator can also enable these signals by use of the respective manual reset buttons. When the Steam Line Pressure – Low and T_{cold} – Low steam line isolation signals are enabled, the main steam isolation on Steam Line Pressure-Negative Rate – High is disabled. The Containment Pressure – High 2 and Containment Radioactivity – High 2 channels are automatically unblocked above the P-11 interlock, with manual block permitted below P-11. The Setpoint reflects only steady state instrument uncertainties.

Pressurizer Level, P-12

The P-12 interlock is provided to permit midloop operation without core makeup tank actuation, reactor coolant pump trip, CVS letdown isolation, or purification line isolation. With pressurizer level channels less than the

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

P-12 setpoint, the operator can manually block Pressurizer Water Level – Low 1 and Pressurizer Water Level – Low 2 signals used for these actuations. Concurrent with blocking CMT actuation on Pressurizer Water Level – Low 2, ADS 4th Stage actuation on Low 2 RCS hot leg level is enabled. Also CVS letdown isolation on Low 1 RCS hot leg level is enabled. When the pressurizer level is above the P-12 setpoint, the Pressurizer Water Level – Low 2 signal is automatically enabled and a confirmatory open signal is issued to the isolation valves on the CMT cold leg balance lines.

RCS Pressure, P-19

The P-19 interlock is provided to permit water solid conditions (i.e., when the pressurizer water level is > 92%) in lower MODES without automatic isolation of the CVS makeup pumps. With RCS pressure below the P-19 setpoint, the operator can manually block CVS isolation on High 2 pressurizer water level, and block Passive RHR actuation and Pressurizer Heater Trip on High 3 pressurizer water level. When RCS pressure is above the P-19 setpoint, these Functions are automatically unblocked.

The LCO generally requires OPERABILITY of four channels in each instrumentation/logic Function and two devices for each manual initiation Function. The two-out-of-four configurations allow one channel to be bypassed during maintenance or testing without causing an ESFAS initiation. Two manual initiation channels are required to ensure no single random failure disables the ESFAS.

The required channels of ESFAS instrumentation provide plant protection in the event of any of the analyzed accidents. ESFAS protective functions are as follows:

Safeguards Actuation

The Safeguards Actuation signal actuates the alignment of the Core Makeup Tank (CMT) valves for passive injection to the RCS. The Safeguards Actuation signal provides two primary Functions:

- Primary side water addition to ensure maintenance or recovery of reactor vessel water level (coverage of the active fuel for heat removal and clad integrity, peak clad temperature < 2200°F); and

- Boration to ensure recovery and maintenance of SHUTDOWN MARGIN (k_{eff} < 1.0).

These Functions are necessary to mitigate the effects of high energy line breaks (HELBs) both inside and outside of containment. The Safeguards

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

- Close Main Feedwater Control Valves;
- Trip Main Feedwater Pumps and Closure of Isolation and Crossover Valves; and
- Reactor Coolant Pump Trip.

These other Functions ensure:

- Isolation of nonessential systems through containment penetrations;
- Trip of the turbine and reactor to limit power generation;
- Isolation of main feedwater to limit secondary side mass losses;
- Trip of the reactor coolant pumps to ensure proper CMT actuation; and
- Enabling automatic depressurization of the RCS on CMT Level – Low 1 to ensure continued safeguards actuated injection.

Safeguards Actuation is initiated by the following signals:

- Containment Pressure – High 2;
- Pressurizer Pressure – Low;
- RCS Cold Leg Temperature (T_{cold}) – Low;
- Steam Line Pressure – Low; and
- Safeguards Actuation – Manual Initiation.

Core Makeup Tank (CMT) Actuation

CMT Actuation provides the passive injection of borated water into the RCS. Injection provides RCS makeup water and boration during transients or accidents when the normal makeup supply from the Chemical and Volume Control System (CVS) is lost or insufficient. Two tanks are available to provide passive injection of borated water. CMT injection mitigates the effects of high energy line breaks by adding primary side water to ensure maintenance or recovery of reactor vessel water level following a LOCA, and by borating to ensure recovery or maintenance of SHUTDOWN MARGIN following a steam line break.

Several ESFAS System Actuation discussions are reordered; however this reordering is not shown with highlighted changes (applicable thru pg. B 3.3.8 - 24)

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

CMT Valve Actuation is initiated by the following signals:

- Safeguards Actuation;
- Pressurizer Water Level – Low 2;
- ADS Stages 1, 2, and 3 Actuation; and
- CMT Injection Actuation – Manual Initiation.

Containment Vacuum Relief Valve Actuation

The purpose of the vacuum relief lines is to protect the containment vessel against damage due to a negative pressure (i.e., a lower pressure inside than outside). Containment Vacuum Relief Valve Actuation is actuated by the following signals

- Containment Pressure – Low 2; and
- Containment Vacuum Relief Valve Actuation – Manual Initiation.

Containment Isolation

Containment Isolation provides isolation of the containment atmosphere and selected process systems which penetrate containment from the environment. This Function is necessary to prevent or limit the release of radioactivity to the environment in the event of a large break LOCA.

Containment Isolation is actuated by the following signals:

- Safeguards Actuation;
- Passive Containment Cooling Actuation – Manual Initiation; and
- Containment Isolation – Manual Initiation.

Containment Air Filtration System Isolation

Some DBAs such as a LOCA may release radioactivity into the containment where the potential would exist for the radioactivity to be released to the atmosphere and exceed the acceptable site dose limits. Isolation of the Containment Air Filtration System provides protection to prevent radioactivity inside containment from being released to the atmosphere.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

Containment Air Filtration System Isolation is actuated on the following signals:

- Containment Radioactivity – High 1; and
- Containment Isolation Actuation.

Steam Line Isolation

Isolation of the main steam lines provides protection in the event of an SLB inside or outside containment. Rapid isolation of the steam lines will limit the steam break accident to the blowdown from one steam generator (SG) at most. For an SLB upstream of the isolation valves, inside or outside of containment, closure of the isolation valves limits the accident to the blowdown from only the affected SG. For a SLB downstream of the isolation valves, closure of the isolation valves terminates the accident as soon as the steam lines depressurize.

Closure of the turbine stop and control valves and the main steam branch isolation valves is initiated by this Function. Closure of these valves limits the accidental depressurization of the main steam system associated with an inadvertent opening of a single steam dump, relief, safety valve, or a rupture of a main steam line. Closure of these valves also supports a steam generator tube rupture event by isolating the faulted steam generator.

Steam Line Isolation is actuated by the following signals:

- Containment Pressure – High 2;
- RCS Cold Leg Temperature (T_{cold}) – Low;
- Steam Line Pressure – Low;
- Steam Line Pressure – Negative Rate – High; and
- Steam Line Isolation – Manual Initiation.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

SG Power Operated Relief Valve and Block Valve Isolation

The Function of the SG Power Operated Relief Valve and Block Valve Isolation is to ensure that the SG PORV flow paths can be isolated during a SG tube rupture (SGTR) event. The PORV flow paths must be isolated following a SGTR to minimize radiological releases from the ruptured steam generator into the atmosphere. The PORV flow path is assumed to open due to high secondary side pressure, during the SGTR. Dose analyses take credit for subsequent isolation of the PORV flow path by the PORV and/or the block valve which receive a close signal on low steam line pressure. Additionally, the PORV flow path can be isolated manually.

SG Power Operated Relief Valve and Block Valve Isolation is actuated by the following signals:

- Steam Line Pressure – Low; and
- SG Power Operated Relief Valve and Block Valve Isolation – Manual Initiation.

Steam Generator Blowdown Isolation

The primary Function of the steam generator blowdown isolation is to ensure that sufficient water inventory is present in the steam generators to remove the excess heat being generated until the decay heat has decreased to within the PRHR HX capability.

Steam Generator Blowdown Isolation is actuated on the following signals:

- PRHR HX Actuation; and
- SG Narrow Range Water Level – Low.

Turbine Trip

The primary Function of the Turbine Trip is to prevent damage to the turbine due to water in the steam lines. This Function is necessary in MODES 1 and 2, and 3 above P-11 to mitigate the effects of a large SLB or a large feedwater line break (FLB). Failure to trip the turbine following a SLB or FLB can lead to additional mass and energy being delivered to the steam generators, resulting in excessive cooldown and additional mass and energy release in containment.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

Turbine Trip is actuated by the following signals:

- SG Narrow Range Water Level – High 2;
- Reactor Trip Signal (P-4); and
- Feedwater Isolation – Manual Initiation.

Main Feedwater Control Valve Isolation

The primary Function of Main Feedwater Control Valve Isolation is to prevent damage to the turbine due to water in the steam lines and to stop the excessive flow of feedwater into the SGs.

Main Feedwater Control Valve Isolation is actuated by the following signals:

- SG Narrow Range Water Level – High 2;
- Safeguards Actuation;
- Reactor Coolant Average Temperature (T_{avg}) – Low 1 coincident with Reactor Trip Signal (P-4); and
- Main Feedwater Control Valve Isolation – Manual Initiation.

Main Feedwater Pump Trip and Valve Isolation

The primary function of the Main Feedwater Pump Trip and Isolation is to prevent damage to the turbine due to water in the steam lines and to stop the excessive flow of feedwater into the SGs. Valve isolation includes closing the main feedwater isolation and crossover valves. Isolation of main feedwater is necessary to prevent an increase in heat removal from the reactor coolant system in the event of a feedwater system malfunction. Addition of excessive feedwater causes an increase in core power by decreasing reactor coolant temperature.

Main Feedwater Pump Trip and Valve Isolation is actuated by the following signals:

- SG Narrow Range Water Level – High 2;
- Safeguards Actuation;

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APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

- Reactor Coolant Average Temperature (T_{avg}) – Low 2 coincident with Reactor Trip Signal (P-4); and
- Main Feedwater Control Valve Isolation – Manual Initiation.

Startup Feedwater Isolation

The primary Function of the Startup Feedwater Isolation is to stop the excessive flow of feedwater into the SGs. This Function is necessary in MODES 1, 2, 3, and 4 to mitigate the effects of a large SLB or a large FLB. Failure to isolate the startup feedwater system following a SLB or FLB can lead to additional mass and energy being delivered to the steam generators, resulting in excessive cooldown and additional mass and energy release in containment.

Startup Feedwater Isolation is actuated by the following signals:

- SG Narrow Range Water Level – High 2;
- RCS Cold Leg Temperature (T_{cold}) – Low;
- SG Narrow Range Water Level – High coincident with Reactor Trip Signal (P-4); and
- Main Feedwater Control Valve Isolation – Manual Initiation.

ADS Stages 1, 2, & 3 Actuation

The Automatic Depressurization System (ADS) provides a sequenced depressurization of the reactor coolant system to allow passive injection from the CMTs, accumulators, and the in-containment refueling water storage tank (IRWST) to mitigate the effects of a LOCA. The depressurization is accomplished in four stages, with the first three stages discharging into the IRWST and the last stage discharging into containment. Each of the first three stages consists of two parallel paths with each path containing an isolation valve and a depressurization valve.

The first stage isolation valves open on any ADS Stages 1, 2, and 3 actuation. The first stage depressurization valves are opened following a preset time delay after the actuation of the isolation valves. The second stage isolation valves are opened following a preset time delay after actuation of the first stage depressurization valves open. The second stage depressurization valves are opened following a preset time delay after the second stage isolation valves are actuated, similar to stage one. Similar to the second stage, the third stage isolation valves are opened

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APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

following a preset time delay after the actuation of the second stage depressurization valves. The third stage depressurization valves are opened following a preset time delay after the third stage isolation valves are actuated.

ADS Stages 1, 2, & 3 is actuated on the following signals:

- CMT Level – Low 1 coincident with CMT Actuation; and
- ADS Stages 1, 2 & 3 Actuation – Manual Initiation.

ADS Stage 4 Actuation

The ADS provides a sequenced depressurization of the reactor coolant system to allow passive injection from the CMTs, accumulators, and the IRWST to mitigate the effects of a LOCA. The depressurization is accomplished in four stages, with the first three stages discharging into the IRWST and the fourth stage discharging into containment.

The fourth stage of the ADS consists of four parallel paths. Each of these paths consists of a normally open isolation valve and a depressurization valve. The four paths are divided into two groups with two paths in each group. Within each group, one path is designated to be substage A and the second path is designated to be substage B.

The substage A depressurization valves are opened following a preset time delay after the substage A isolation valve confirmatory open signal. The sequence is continued with substage B. A confirmatory open signal is provided to the substage B isolation valves following a preset time delay after the substage A depressurization valve has been opened. The signal to open the substage B depressurization valve is provided following a preset time delay after the substage B isolation valves confirmatory open signal.

ADS Stage 4 is actuated on the following signals:

- CMT Level – Low 2 coincident with both ADS Stage 1, 2, & 3 Actuation and RCS Wide Range Pressure – Low;
- Hot Leg Loop 1 Level Low – 2 coincident with Hot Leg Loop 2 Level Low – 2;
- ADS Stage 4 Actuation – Manual Initiation coincident with ADS Stages 1, 2, & 3 Actuation; and

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APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

- ADS Stage 4 Actuation – Manual Initiation coincident with RCS Wide Range Pressure – Low.

Reactor Coolant Pump Trip

Reactor Coolant Pump (RCP) Trip allows the passive injection of borated water into the RCS. Injection provides RCS makeup water and boration during transients or accidents when the normal makeup supply from the CVS is lost or insufficient. Two tanks provide passive injection of borated water by gravity when the reactor coolant pumps are tripped. CMT injection mitigates the effects of high energy line breaks by adding primary side water to ensure maintenance or recovery of reactor vessel water level following a LOCA, and by borating to ensure recovery or maintenance of SHUTDOWN MARGIN following a steam line break. RCP trip on high bearing water temperature protects the RCP coast down.

RCP trip is actuated on the following signals:

- Safeguards Actuation;
- ADS Stages 1, 2, & 3 Actuation;
- Reactor Coolant Pump Bearing Water Temperature – High;
- Pressurizer Water Level – Low 2; and
- CMT Injection Actuation – Manual Initiation.

Component Cooling Water System Containment Isolation Valve Closure

The function of the Component Cooling Water System (CCS) containment isolation valve closure is to ensure that the CCS flow paths can be isolated during an RCP heat exchanger tube rupture event. The CCS flow paths must be isolated following an RCP heat exchanger tube rupture event to minimize radiological releases from the ruptured tube into the turbine building. CCS Isolation Valve Closure is actuated by Reactor Coolant Pump Bearing Water Temperature – High.

Passive Containment Cooling Actuation

The Passive Containment Cooling System (PCS) transfers heat from the reactor containment to the environment. This Function is necessary to prevent the containment design pressure and temperature from being exceeded following any postulated DBA (such as LOCA or SLB).

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

Chemical Volume and Control System Makeup Isolation

The CVS makeup line is isolated following certain events to prevent overfilling of the RCS. In addition, this line is isolated on High 2 containment radioactivity to provide containment isolation following an accident. This line is not isolated on a containment isolation signal, to allow the CVS makeup pumps to perform their defense-in-depth functions. However, if very high containment radioactivity exists (above the High 2 setpoint) this line is isolated.

Chemical Volume and Control System Makeup Line Isolation is actuated on the following signals:

- Containment Radioactivity – High 2;
- Pressurizer Water Level – High 2;
- Pressurizer Water Level – High 1 coincident with unlatched Safeguards Actuation;
- Source Range Neutron Flux Doubling;
- SG Narrow Range Water Level – High 2;
- SG Narrow Range Water Level – High coincident with Reactor Trip Signal (P-4); and
- Chemical Volume and Control System Makeup Isolation – Manual Initiation.

Chemical and Volume Control System Letdown Isolation

The CVS provides letdown to the liquid radwaste system to maintain the pressurizer level. To help maintain RCS inventory in the event of a LOCA, the CVS Letdown Isolation is actuated on Hot Leg Level – Low 1.

Auxiliary Spray and Purification Line Isolation

The CVS maintains the RCS fluid purity and activity level within acceptable limits. The CVS purification line receives flow from the discharge of the RCPs. The CVS also provides auxiliary spray to the pressurizer. To preserve the reactor coolant pressure in the event of a break in the CVS loop piping, the purification line and the auxiliary spray line are isolated to help maintain reactor coolant system inventory.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

Auxiliary Spray and Purification Line Isolation is actuated on the following signals:

- Pressurizer Water Level – Low 1; and
- Chemical Volume and Control System Makeup Isolation – Manual Initiation.

Pressurizer Heater Trip

Pressurizer heaters are automatically tripped to reduce the potential for steam generator overfill and automatic ADS Stages 1, 2, and 3 actuation for a steam generator tube rupture event. Automatically tripping the pressurizer heaters reduces the pressurizer level swell for certain non-LOCA events such as loss of normal feedwater, inadvertent CMT operation, and CVS malfunction resulting in an increase in RCS inventory. For small break LOCA analysis, tripping the pressurizer heaters supports depressurization of the RCS following actuation of the CMTs.

Pressurizer Heater Trip is actuated on the following signals:

- CMT Actuation; and
- Pressurizer Water Level – High 3.

Normal Residual Heat Removal System (RNS) Isolation

The RNS suction line is isolated by closing the containment isolation valves on High 2 containment radioactivity to provide containment isolation following an accident. This line is isolated on a safeguards actuation signal. However, the valves may be reset to permit the RNS pumps to perform their defense-in-depth functions post-accident. Should a high containment radiation signal (above the High 2 setpoint) develop following the containment isolation signal, the RNS valves would re-close. A high containment radiation signal is indicative of a high RCS source term and the valves would re-close to assure offsite doses do not exceed regulatory limits.

RNS Isolation is actuated on the following signals:

- Containment Radioactivity – High 2;
- Safeguards Actuation; and
- Normal Residual Heat Removal System Isolation – Manual Initiation.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

A Passive Containment Cooling Actuation signal initiates water flow by gravity by opening the isolation valves. The water flows onto the containment dome, wetting the outer surface. The path for natural circulation of air along the outside walls of the containment structure is always open.

Passive Containment Cooling is actuated on the following signals:

- Containment Pressure – High 2; and
- Passive Containment Cooling Actuation – Manual Initiation.

Passive Residual Heat Removal (PRHR) Heat Exchanger Actuation

The PRHR Heat Exchanger (HX) provides emergency core decay heat removal when the Startup Feedwater System is not available to provide a heat sink.

PRHR is actuated on the following signals:

- SG Narrow Range Water Level – Low coincident with Startup Feedwater Flow – Low;
- SG Wide Range Water Level – Low;
- ADS Stages 1, 2, & 3 Actuation;
- CMT Actuation;
- Pressurizer Water Level – High 3; and
- PRHR Heat Exchanger Actuation – Manual Initiation.

Boron Dilution Block

The block of boron dilution is accomplished by closing the CVS suction valves to demineralized water storage tanks, and aligning the boric acid tank to the CVS makeup pumps.

Boron Dilution Block is actuated on the following signals:

- Source Range Neutron Flux Doubling; and
- Reactor Trip Signal (P-4).

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

IRWST Injection Line Valve Actuation

The PXS provides core cooling by gravity injection and recirculation for decay heat removal following an accident. The IRWST has two injection flow paths. Each injection path includes a normally open motor operated isolation valve and two parallel lines, each isolated by one check valve and one squib valve in series.

IRWST Injection Line Valve Actuation is actuated on the following signals:

- ADS Stage 4 Actuation; and
- IRWST Injection Line Valve Actuation – Manual Initiation.

IRWST Containment Recirculation Valve Actuation

The PXS provides core cooling by gravity injection and recirculation for decay heat removal following an accident. The PXS has two containment recirculation flow paths. Each path contains two parallel flow paths, one path is isolated by a motor operated valve in series with a squib valve and one path is isolated by a check valve in series with a squib valve.

IRWST Containment Recirculation Valve Actuation is actuated on the following signals:

- ADS Stage 4 Actuation coincident with IRWST Level – Low 3 level; and
- IRWST Containment Recirculation Valve Actuation – Manual Initiation.

Main Control Room Isolation and Air Supply Initiation

Isolation of the main control room and initiation of the air supply provides a protected environment from which operators can control the plant following an uncontrolled release of radioactivity. Main Control Room Isolation and Air Supply Initiation is actuated on a Control Room Air Supply Radiation – High signal.

Refueling Cavity Isolation

The containment isolation valves in the lines between the refueling cavity and the Spent Fuel Pool Cooling System are isolated on Spent Fuel Pool Level – Low signal.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

ESF Logic

LCO 3.3.15 and LCO 3.3.16 require four sets of ESF coincidence logic, each set with one battery backed logic group OPERABLE to support automatic actuation. These logic groups are implemented as processor based actuation subsystems. The ESF coincidence logic provides the system level logic interfaces for the divisions.

ESF Actuation

LCO 3.3.15 and LCO 3.3.16 require that for each division of ESF actuation, one battery backed logic group be OPERABLE to support both automatic and manual actuation. The ESF actuation subsystems provide the logic and power interfaces for the actuated components.

The following are descriptions of the individual instrument Functions required by this LCO as presented in Table 3.3.8-1. Each Function also provides the ESFAS protective functions actuated by the instrumentation.

1. Containment Pressure – Low 2

   This signal provides protection against a negative pressure in containment due to loss of ac power or inadvertent actuation of containment cooling and a low outside ambient air temperature in combination with limited containment heating that reduces the atmospheric temperature (and hence pressure) inside containment. Four channels are provided to permit one channel to be in trip or bypass indefinitely and still ensure no single random failure will disable this trip Function.

   The Containment Vacuum Relief Valve Actuation ESFAS protective function is actuated by Containment Pressure – Low 2.

   Automatic Containment Vacuum Relief Valve actuation must be OPERABLE in MODES 1 through 4 and in MODES 5 and 6 without an open containment air flow path ≥ 6 inches in diameter. With a 6 inch diameter or equivalent containment air flow path, the vacuum relief function is not needed to mitigate a low pressure event.

2. Containment Pressure – High 2

   This signal provides protection against the following accidents:

   - SLB inside containment;
   - LOCA; and

BASES

SURVEILLANCE REQUIREMENTS (continued)

If the COT cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the COT can be performed using portable test equipment.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this COT. This portion of the COT ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

The 92 day Frequency is based on Reference 5 and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the integrated protection cabinets to the operator.

During the COT, the protection and safety monitoring system cabinets in the division under test may be placed in bypass.

SR 3.3.8.3

SR 3.3.8.3 is the performance of a CHANNEL CALIBRATION every 24 months or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor and the IPC. The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable. This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel's response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation. Transmitter calibration

BASES

SURVEILLANCE REQUIREMENTS (continued)

must be performed consistent with the assumptions of the setpoint methodology. The difference between the current as-found values and the previous as-left values must be consistent with the transmitter drift allowance used in the setpoint methodology.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this CHANNEL CALIBRATION. This portion of the CHANNEL CALIBRATION ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

The setpoint methodology requires that 30 months drift be used (1.25 times the surveillance calibration interval, 24 months).

The Frequency is based on operating experience and consistency with the refueling cycle.

This Surveillance Requirement is modified by a Note. The Note states that this test should include verification that the time constants are adjusted to within limits where applicable.

SR 3.3.8.4

This SR ensures the individual channel ESF RESPONSE TIME is less than or equal to the maximum value assumed in the accident analysis. Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the NTS value at the sensor, to the point at which the equipment reaches the required functional state (e.g., valves in full open or closed position).

B 3.3 INSTRUMENTATION

B 3.3.10 Engineered Safety Feature Actuation System (ESFAS) Reactor Coolant System (RCS) Hot Leg Level Instrumentation

BASES

BACKGROUND

A description of the ESFAS Instrumentation is provided in the Bases for LCO 3.3.8, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation."

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY

The required channels of ESFAS instrumentation provide plant protection in the event of any of the analyzed accidents. A description of ESFAS P-12 interlocks is provided in the Bases for LCO 3.3.8. ESFAS protective functions include:

ADS Stage 4 Actuation

A description of the ADS Stage 4 Actuation is provided in the Bases for LCO 3.3.8.

Chemical and Volume Control System (CVS) Letdown Isolation

A description of the Chemical and Volume Control System (CVS) Letdown Isolation is provided in the Bases for LCO 3.3.8.

The following are descriptions of the individual instrument Functions required by this LCO as presented in Table 3.3.10-1. Each Function also provides the ESFAS protective functions actuated by the instrumentation.

1. Hot Leg Level – Low 2

   A signal to automatically open the ADS Stage 4 is generated when coincident loop 1 and 2 reactor coolant system hot leg level indication decreases below an established setpoint for a duration exceeding an adjustable time delay. The ADS provides a sequenced depressurization of the reactor coolant system to allow passive injection from the Core Makeup Tanks (CMTs), accumulators, and the IRWST to mitigate the effects of a LOCA. This Function is required to be OPERABLE in MODE 4 with the RCS being cooled by the RNS. This Function is also required to be OPERABLE in MODE 5, and in MODE 6 with the upper internals in place.

BASES

SURVEILLANCE REQUIREMENTS (continued)

A test subsystem is provided with the protection and safety monitoring system to aid the plant staff in performing the COT. The test subsystem is designed to allow for complete functional testing by using a combination of system self-checking features, functional testing features, and other testing features. Successful functional testing consists of verifying that the capability of the system to perform the safety function has not failed or degraded.

For hardware functions this would involve verifying that the hardware components and connections have not failed or degraded. Generally this verification includes a comparison of the outputs from two or more redundant subsystems or channels.

Since software does not degrade, software functional testing involves verifying that the software code has not changed and that the software code is executing.

To the extent possible, protection and safety monitoring system functional testing is accomplished with continuous system self-checking features and the continuous functional testing features. The COT shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the COT cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the COT can be performed using portable test equipment.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this COT. This portion of the COT ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function’s OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function’s OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The 92 day Frequency is based on Reference 3 and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the integrated protection cabinets to the operator.

During the COT, the protection and safety monitoring system cabinets in the division under test may be placed in bypass.

SR 3.3.10.3

SR 3.3.10.3 is the performance of a CHANNEL CALIBRATION every 24 months or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor and the IPC. The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable. This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel's response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation. Transmitter calibration must be performed consistent with the assumptions of the setpoint methodology. The difference between the current as-found values and the previous as-left values must be consistent with the transmitter drift allowance used in the setpoint methodology.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this CHANNEL CALIBRATION. This portion of the CHANNEL CALIBRATION ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this ACTUATION LOGIC TEST. This portion of the ACTUATION LOGIC TEST ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function's OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

The Frequency of every 92 days on a STAGGERED TEST BASIS provides a complete test of all four divisions once per year. This frequency is adequate based on the inherent high reliability of the solid state devices which comprise this equipment; the additional reliability provided by the redundant subsystems; and the use of continuous diagnostic test features, such as deadman timers, memory checks, numeric coprocessor checks, cross-check of redundant subsystems, and tests of timers, counters, and crystal time basis, which will report a failure within these cabinets to the operator.

SR 3.3.15.2

SR 3.3.15.2 demonstrates that the pressurizer heater circuit breakers trip open in response to an actual or simulated actuation signal. The ACTUATION LOGIC TEST overlaps this Surveillance to provide complete testing of the assumed safety function. The OPERABILITY of these breakers is checked by opening these breakers using the Plant Control System.

The Frequency of 24 months is based on the need to perform this surveillance during periods in which the plant is shutdown for refueling to prevent any upsets of plant operation. This Frequency is adequate based on the use of multiple circuit breakers to prevent the failure of any single circuit breaker from disabling the function and that all circuit breakers are tested.

This Surveillance Requirement is modified by a Note that states that the SR is only required to be met in MODE 4 above the P-19 (RCS Pressure) interlock with the RCS not being cooled by the Normal Residual Heat Removal System (RNS).

BASES

SURVEILLANCE REQUIREMENTS (continued)

Since software does not degrade, software functional testing involves verifying that the software code has not changed and that the software code is executing.

To the extent possible, Protection and Safety Monitoring System functional testing is accomplished with continuous system self-checking features and the continuous functional testing features. The ACTUATION LOGIC TEST shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the ACTUATION LOGIC TEST cannot be completed using the built-in test subsystem, either because of failures in the test subsystem or failures in redundant channel hardware used for functional testing, the ACTUATION LOGIC TEST can be performed using portable test equipment.

Interlocks implicitly required to support the Function's OPERABILITY are also addressed by this ACTUATION LOGIC TEST. This portion of the ACTUATION LOGIC TEST ensures the associated Function is not bypassed when required to be enabled. This can be accomplished by ensuring the interlocks are calibrated properly in accordance with the SP. If the interlock is not automatically functioning as designed, the condition is entered into the Corrective Action Program and appropriate OPERABILITY evaluations performed for the affected Function. The affected Function’s OPERABILITY can be met if the interlock is manually enforced to properly enable the affected Function. When an interlock is not supporting the associated Function’s OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

The Frequency of every 92 days on a STAGGERED TEST BASIS provides a complete test of all four divisions once per year. This frequency is adequate based on the inherent high reliability of the solid state devices which comprise this equipment; the additional reliability provided by the redundant subsystems; and the use of continuous diagnostic test features, such as deadman timers, memory checks, numeric coprocessor checks, cross-check of redundant subsystems, and tests of timers, counters, and crystal time basis, which will report a failure within these cabinets to the operator.