VogtlecolRAIsPEm Resource

From: McGovern, Denise
Sent: Friday, September 07, 2012 3:44 PM
To: VogtlecolRAIsPEm Resource
Subject: RAI LETTER NO. 01 RELATED TO LICENSE AMENDMENT REQUEST (LAR) 12-002 FOR THE VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4 COMBINED LICENSES
Attachments: VOG-LAR-12-002-RAI-LTR-001 rev2.docx

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September 7, 2012

Mr. B. L. Ivey
Vice President, Regulatory Affairs
Southern Nuclear Operating Company
P.O. Box 1295
Bin B022
Birmingham, AL 35201

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 01 RELATED TO LICENSE AMENDMENT REQUEST (LAR) 12-002 FOR THE VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4 COMBINED LICENSES

Dear Mr. Ivey:

In accordance with the provisions of 10 CFR 50.90, by letter dated April 6, 2012 and revised by letter dated February 24,2012 Southern Nuclear Operating Company (SNC), submitted a license amendment request (LAR) 12-002 to the U. S. Nuclear Regulatory Commission (NRC) for its Vogtle Electric Generating Plant (VEGP) Units 3 and 4 Combine licenses (Licenses Nos.NPF-91 and NPF-92, respectively). The NRC staff is performing a detailed review of this LAR to enable the staff to reach a conclusion on the safety of the proposed LAR.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

To support the review schedule, you are requested to respond within 30 days of the date of this letter. If changes are needed to the final safety analysis report, the staff requests that the RAI response include the proposed wording changes.

If you have any questions or comments concerning this matter, you may contact me at 301-415-6191 or ravindra.joshi@nrc.gov.

Sincerely,

/RA/

Ravindra G. Joshi, Senior Project Manager
Licensing Branch 4
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-025
52-026
eRAI Tracking No. 6545, 6592, 6714 and 6748

Enclosure:
Request for Additional Information

CC: see next page

If you have any questions or comments concerning this matter, you may contact me at 301-415-6191 or ravindra.joshi@nrc.gov.

Sincerely,

/RA/

Ravindra G. Joshi, Senior Project Manager
Licensing Branch 4
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-025
52-026
eRAI Tracking No. 6545, 6592, 6714 and 6748

Enclosure:
Request for Additional Information

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NRO-002

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DATE	9/5/12	9/6/12	N/A	9/6/12

*Approval captured electronically in the electronic RAI system.

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VEGP 3 and 4 LAR 12-002 Technical Specifications Upgrade
Southern Nuclear Operating Co.
Docket No. 52-025 and 52-026
Review Section: 16 - Technical Specifications
Application Section: TS Sections 3.1, 3.2, 3.4, 3.5, 3.6, 3.7, 3.8, 5.5 and 5.6

QUESTIONS:

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."

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

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 existing 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 new 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.

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

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.)

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.)

Issue 5: Not used

Issue 6: Not used

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.

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.

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 AND temperature of any RCS cold leg at or below 350 degrees F

AND

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

OR

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

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

16-17

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.

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.

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.

Issue 4: Not used

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 permissives 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.

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.

Issue 2: Not used

Issue 3: Not used

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.

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."

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.

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."

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.

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.

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?

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).

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

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.

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.

Issue 4: Not used

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.

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."

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

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.

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

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 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]
e. CMT Actuation references
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 amd 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 permissives. 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.

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

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."

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.

16-30

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."

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.

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.

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.

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.

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.

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.

16-33

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.

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.

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

Example 1: Including Supported ESFAS Protective Functions, Coincident Functions, and Interlock Status in New TS Table 3.3.8-1, "Engineered Safeguards Actuation System Instrumentation"

ESFAS INSTRUMENTATION FUNCTION AND INITIATED ESFAS PROTECTIVE FUNCTIONS *	REQUIRED ESFAS INTERLOCK STATUS **	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION
1. Containment Pressure – Low 2 – Containment Vacuum Relief Valve actuation	Not Applicable	1,2,3,4,5(a),6(a)	4	P
2. Containment Pressure – High 2 – Safeguards actuation >> actuate CMT >> actuate PRHR >> trip RCPs >> actuate Containment Isolation >> actuate main feedwater (MFW) isolation >> close MFW control valves >> trip MFW pumps >> close MFW isolation valves >> close MFW crossover valves – Steam Line Isolation actuation – Passive Containment Cooling (PCS) actuation	P-3 Logical 0 RTBs closed automatic unblock of safeguards actuation, steam line isolation, and PCS actuation on containment pressure high-2	1,2,3,4	4	H
3. Containment Radioactivity – High 1 – Containment Air Filtration System Isolation actuation	Not Applicable	1,2,3,4(b)	4	I
4. Containment Radioactivity – High 2 – Chemical Volume and Control System (CVS) Makeup Isolation actuation – Normal Residual Heat Removal System (RNS) Isolation actuation	Not Applicable	1,2,3	4	I
5. Pressurizer Pressure – Low – Safeguards actuation >> actuate CMT >> actuate PRHR >> trip RCPs >> actuate Containment Isolation >> actuate MFW isolation >> close MFW control valves >> trip MFW pumps >> close MFW isolation valves >> close MFW crossover valves	P-3 Logical 0 RTBs closed automatic unblock of safeguards actuation P-11 Logical 0 pressurizer pressure above P-11 setpoint automatic unblock of safeguards actuation on pressurizer pressure - low	1,2,3(c)	4	E
6. Pressurizer Water Level – Low 1 – Auxiliary Spray and Purification Line Isolation actuation	P-12 Logical 0 pressurizer water level above P-12 setpoint automatic unblock of auxiliary spray and purification line isolation on low-1 pressurizer water level	1,2	4	D

* The symbol " >> " stands for the phrase, "sends a signal to"

** An ESFAS interlock is OPERABLE when it has the capability to change its logic state output both by manual action and automatically, in accordance with its design, and supports the OPERABILITY of its specified ESFAS instrumentation function or ESFAS protective function when its output corresponds to the required logical state.

(a) Without an open containment air flow path ≥ 6 inches in diameter.

(b) With the RCS not being cooled by the RNS.

(c) Above the P-11 (Pressurizer Pressure) interlock, when the RCS boron concentration is below that necessary to meet the SDM requirements at an RCS temperature of 200°F.

Example 1: Including Supported ESFAS Protective Functions, Coincident Functions, and Permissive Status in New TS Table 3.3.8-1, "Engineered Safeguards Actuation System Instrumentation" (continued)

ESFAS INSTRUMENTATION FUNCTION AND INITIATED ESFAS PROTECTIVE FUNCTIONS *	REQUIRED ESFAS INTERLOCK STATUS **	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION
7. Pressurizer Water Level – Low 2 – Core Makeup Tank (CMT) actuation >> open CMT injection isolation valves >> open CMT cold leg balance line isolation valves (confirmatory) >> actuate PRHR >> open PRHR HX discharge valves >> close IRWST gutter Isolation valves >> open PRHR hot leg isolation valves (confirmatory) >> trip pressurizer heaters >> actuate ADS Stages 1, 2, & 3 if *Coincident with CMT Level – Low 1* >> trip all RCPs	P-12 Logical 0 pressurizer water level above P-12 setpoint automatic unblock of CMT actuation on pressurizer water level – low 2	1,2,3,4(b) 4(d),5(e)(f)	4 4	F J
8. Pressurizer Water Level – High 1 *Coincident with Unlatched Safeguards Actuation* – Chemical Volume and Control System (CVS) Makeup Isolation actuation	P-3 Logical 0 RTBs closed automatic unblock of safeguards actuation which enables CVS makeup isolation actuation on pressurizer water level – high 1 coincident with safeguards actuation	1,2,3	4	I
9. Pressurizer Water Level – High 2 – Chemical Volume and Control System (CVS) Makeup Isolation actuation	P-19 Logical 0 RCS hot leg pressure above P-19 setpoint automatic unblock of CVS makeup isolation on pressurizer water level – high 2	1,2,3,4(g)	4	I
10. Pressurizer Water Level – High 3 – PRHR HX actuation – Pressurizer Heater Trip actuation	P-19 Logical 0 RCS hot leg pressure above P-19 setpoint automatic unblock of PRHR actuation and pressurizer heater trip on pressurizer water level – high 3	1,2,3,4(g)	4	F

* The symbol " >> " stands for the phrase, "which sends a signal to"

** An ESFAS interlock is OPERABLE when it has the capability to change its logic state output both by manual action and automatically, in accordance with its design, and supports the OPERABILITY of its specified ESFAS instrumentation function or ESFAS protective function when its output corresponds to the required logical state.

(b) With the RCS not being cooled by the RNS.

(d) With the RCS being cooled by the RNS.

(e) With the RCS pressure boundary intact.

(f) With RCS not being cooled by the RNS and with pressurizer level ≥ 20%.

(g) Above the P-19 (RCS Pressure) interlock with the RCS not being cooled by RNS.

Example 1: Including Supported ESFAS Protective Functions, Coincident Functions, and Permissive Status in New TS Table 3.3.8-1, "Engineered Safeguards Actuation System Instrumentation" (continued)

ESFAS INSTRUMENTATION FUNCTION AND INITIATED ESFAS PROTECTIVE FUNCTIONS *	REQUIRED ESFAS INTERLOCK STATUS **	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION
11. RCS Cold Leg Temperature (T_{cold}) – Low – Safeguards actuation >> actuate CMT >> actuate PRHR >> actuate Containment Isolation >> trip RCPs >> actuate Main Feedwater (MFW) Isolation >> close MFW control valves >> trip MFW pumps >> close MFW isolation valves >> close MFW crossover valves – Startup Feedwater Isolation actuation	P-3 Logical 0 RTBs closed automatic unblock of safeguards actuation on reactor coolant inlet temperature – low P-11 Logical 0 pressurizer pressure above P-11 setpoint automatic unblock of safeguards actuation on reactor coolant inlet temperature – low	1,2,3(c)	4 per loop	E
12. Reactor Coolant Average Temperature (T_{avg}) -- Low 1 *Coincident with Reactor Trip P-4* – Main Feedwater (MFW) Isolation actuation >> close MFW control valves	P-4 Logical 1 reactor trip P-11 Logical 0 pressurizer pressure above P-11 setpoint automatic unblock of MFW isolation on T_{avg} – low 1 with reactor trip P-4	1,2	4	D
13. Reactor Coolant Average Temperature (T_{avg}) -- Low 2 *Coincident with Reactor Trip P-4* – Main Feedwater (MFW) Isolation actuation >> trip MFW pumps >> close MFW isolation valves >> close MFW crossover valves	P-4 Logical 1 reactor trip P-11 Logical 0 pressurizer pressure above P-11 setpoint automatic unblock of MFW isolation on T_{avg} – low 1 with reactor trip P-4	1,2	4	D
14. RCS Wide Range Pressure – Low *Coincident with ADS Stage 4 Manual Initiation Signal* – ADS Stage 4 initiation >> actuate IRWST Injection	Not Applicable	1,2,3,4 5 6(h)	4 4 4	H K L
15. CMT Level – Low 1 *Coincident with CMT Actuation* – ADS Stages 1, 2, & 3 >> actuate PRHR	Not Applicable	1,2,3,4 5(i)	4 per tank 4 per OPERABLE tank	H J

* The symbol " >> " stands for the phrase, "which sends a signal to"

** An ESFAS interlock is OPERABLE when it has the capability to change its logic state output both by manual action and automatically, in accordance with its design, and supports the OPERABILITY of its specified ESFAS instrumentation function or ESFAS protective function when its output corresponds to the required logical state.

(c) Above the P-11 (Pressurizer Pressure) interlock, when the RCS boron concentration is below that necessary to meet the SDM requirements at an RCS temperature of 200°F.

(h) With upper internals in place.

(i) With RCS pressure boundary intact and with pressurizer level ≥ 20%.

Example 1: Including Supported ESFAS Protective Functions, Coincident Functions, and Permissive Status in New TS Table 3.3.8-1, "Engineered Safeguards Actuation System Instrumentation" (continued)

ESFAS INSTRUMENTATION FUNCTION AND INITIATED ESFAS PROTECTIVE FUNCTIONS *	REQUIRED ESFAS INTERLOCK STATUS **	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION
16. CMT Level – Low 2 (either CMT) *Coincident with ADS Stage 3 actuation and RCS wide range pressure low*	Not Applicable	1,2,3,4	4 per tank	H
– ADS Stage 4 actuation >> actuate IRWST Injection		5	4 per OPERABLE tank	J
17. Source Range Neutron Flux Doubling	P-6 Logical 0 intermediate range neutron flux below P-6 setpoint automatic unblock of boron dilution block on source range neutron flux doubling	2(j),3(j),4	4	I
– Boron Dilution Block actuation >> close makeup isolation valves >> close demineralized water isolation valves		5	4	I
18. IRWST Level – Low 3 *Coincident with ADS Stage 4 Actuation Signal*	Not Applicable	1,2,3,4(b)	4	F
– IRWST Containment Recirculation Valve actuation		4(d),5	4	M
		6(h)	4	N
19. Reactor Coolant Pump Bearing Water Temperature – High – RCP Trip actuation – Component Cooling Water System Containment Isolation Valve Closure actuation	Not Applicable	1,2,3,4	4 per RCP	O
20. SG Narrow Range Water Level – Low (either SG) – PRHR actuation *if Coincident with Startup Feedwater Flow Low – same SG* >> close SG blowdown valves – SG Blowdown System Isolation actuation	Not Applicable	1,2,3,4(b)	4 per SG	F

* The symbol " >> " stands for the phrase, "which sends a signal to"

** An ESFAS interlock is OPERABLE when it has the capability to change its logic state output both by manual action and automatically, in accordance with its design, and supports the OPERABILITY of its specified ESFAS instrumentation function or ESFAS protective function when its output corresponds to the required logical state.

(b) With the RCS not being cooled by the RNS.

(d) With the RCS being cooled by the RNS.

(h) With upper internals in place.

(j) Not applicable when critical or during intentional approach to criticality.

Example 1: Including Supported ESFAS Protective Functions, Coincident Functions, and Permissive Status in New TS Table 3.3.8-1, "Engineered Safeguards Actuation System Instrumentation" (continued)

ESFAS INSTRUMENTATION FUNCTION AND INITIATED ESFAS PROTECTIVE FUNCTIONS *	REQUIRED ESFAS INTERLOCK STATUS **	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION
21. SG Wide Range Water Level – Low – PRHR HX actuation	Not Applicable	1,2,3,4(b)	4 per SG	F
22. SG Narrow Range Water Level High (either SG) *Coincident with Reactor Trip P-4* – Startup Feedwater Isolation actuation – CVS Makeup Isolation actuation	P-4 Logical 1 reactor trip	1,2,3,4	4 per SG	I
23. SG Narrow Range Water Level – High 2 – Turbine Trip actuation	Not Applicable	1,2	4 per SG	D
– MFW Control Valve Isolation actuation – MFW Pump Trip and Valve Isolation actuation – Startup Feedwater Isolation actuation – CVS Makeup Isolation actuation		3,4	4 per SG	I
24. Steam Line Pressure – Low (either SG) – Steam Line Isolation actuation – Safeguards actuation >> actuate CMT >> actuate PRHR HX >> actuate Containment Isolation >> trip RCPs – SG Power Operated Relief Valve (PORV) and Block Valve Isolation actuation	P-3 Logical 0 RTBs closed P-11 Logical 0 pressurizer pressure above P-11 setpoint automatic unblock of safeguards actuation	1,2,3,4(b)	4 per steam line	G
25. Steam Line Pressure – Negative Rate – High (either steam line) – Steam Line Isolation actuation	P-11 Logical 1 pressurizer pressure below P-11 setpoint *** [automatic] unblock of steam line isolation on steam line high negative pressure rate	3	4 per steam line	I

* The symbol " >> " stands for the phrase, "which sends a signal to"

** An ESFAS interlock is OPERABLE when it has the capability to change its logic state output both by manual action and automatically, in accordance with its design, and supports the OPERABILITY of its specified ESFAS instrumentation function or ESFAS protective function when its output corresponds to the required logical state.

*** Coincident with (1) manual block of steam line isolation on low reactor coolant inlet temperature; or (2) manual block of (A) steam line isolation on low compensated steam line pressure and (B) SG PORV block valve closure on low compensated steam line pressure.

(b) With the RCS not being cooled by the RNS.

Example 2: Including Supported ESFAS Protective Functions, Coincident Functions, and Permissive Status in New TS Table 3.3.9-1, "Engineered Safeguards Actuation System Instrumentation"

ESFAS INSTRUMENTATION FUNCTION AND INITIATED ESFAS PROTECTIVE FUNCTIONS *	REQUIRED ESFAS INTERLOCK STATUS **	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION
1. Safeguards Actuation – Manual Initiation	Not Applicable	1,2,3,4	2 switches	E
>> actuate CMT Injection				
>> actuate PRHR		5	2 switches	J
>> trip RCPs				
>> actuate Containment Isolation				
>> actuate Chemical Volume and Control System Makeup Isolation if coincident with Pressurizer Water Level – High 1				
2. Core Makeup Tank (CMT) Injection Actuation – Manual Initiation	Not Applicable	1,2,3,4(a)	2 switches	D
>> trip RCPs		4(b),5(c)	2 switches	G
>> actuate PRHR				
3. Containment Isolation – Manual Initiation	Not Applicable	1,2,3,4	2 switches	E
>>				
4. Steam Line Isolation – Manual Initiation	Not Applicable	1,2,3,4	2 switches	F
>>				
5. Main Feedwater Control Valve Isolation – Manual Initiation	Not Applicable	1,2,3,4	2 switches	F
>> actuate Turbine Trip				
>> actuate Startup Feedwater Isolation				
6. ADS Stages 1, 2 & 3 Actuation – Manual Initiation	Not Applicable	1,2,3,4	2 switch sets	E
>>		5(d)	2 switch sets	H
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	1,2,3,4	2 switch sets	E
		5	2 switch sets	H
>>		6(e)	2 switch sets	I

* The symbol " >> " stands for the phrase, "which sends a signal to"

(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.

Example 2: Including Supported ESFAS Protective Functions, Coincident Functions, and Permissive Status in New TS Table 3.3.9-1, "Engineered Safeguards Actuation System Instrumentation" (continued)

ESFAS INSTRUMENTATION FUNCTION AND INITIATED ESFAS PROTECTIVE FUNCTIONS *	REQUIRED ESFAS INTERLOCK STATUS **	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION
8. Passive Containment Cooling Actuation – Manual Initiation	Not Applicable	1,2,3,4	2 switches	E
>> actuate Containment Isolation		5(f)	2 switches	J
		6(f)	2 switches	K
9. Passive Residual Heat Removal Heat Exchanger Actuation – Manual Initiation	Not Applicable	1,2,3,4	2 switches	E
>> actuate SG Blowdown System Isolation		5(c)	2 switches	G
10. Chemical Volume and Control System Makeup Isolation – Manual Initiation	Not Applicable	1,2,3,4(a)	2 switches	F
>> actuate Auxiliary Spray and Purification line Isolation				
11. Normal Residual Heat Removal System Isolation – Manual Initiation	Not Applicable	1,2,3	2 switch sets	F
>>				
12. In-Containment Refueling Water Storage Tank (IRWST) Injection Line Valve Actuation – Manual Initiation	Not Applicable	1,2,3,4(a)	2 switch sets	D
>>		4(b),5	2 switch sets	J
		6	2 switch sets	K

* The symbol " >> " stands for the phrase, "sends a signal to"

(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.

(f) With decay heat > 6.0 MWt.

Example 2: Including Supported ESFAS Protective Functions, Coincident Functions, and Permissive Status in New TS Table 3.3.9-1, "Engineered Safeguards Actuation System Instrumentation" (continued)

ESFAS INSTRUMENTATION FUNCTION AND INITIATED ESFAS PROTECTIVE FUNCTIONS *	REQUIRED ESFAS INTERLOCK STATUS **	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION
13. IRWST Containment Recirculation Valve Actuation – Manual Initiation	Not Applicable	1,2,3,4(a)	2 switches	D
>>		4(b),5	2 switches	J
		6	2 switches	K
14. SG Power Operated Relief Valve and Block Valve Isolation – Manual Initiation	Not Applicable	1,2,3,4(a)	2 switches	D
>>				
15. Containment Vacuum Relief Valve Actuation – Manual Initiation	Not Applicable	1,2,3,4,5(g),6(g)	2 switches	L
>>				
16. Auxiliary Spray Isolation – Manual Initiation	**Not Applicable**	**1,2,3,4(a)**	**2 switches**	**F**

* The symbol " >> " stands for the phrase, "which sends a signal to"

(a) With the RCS not being cooled by the Normal Residual Heat Removal System (RNS).

(b) With the RCS being cooled by the RNS.

(g) Without an open containment air flow path ≥ 6 inches in diameter.