

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

Title: Changes Related to LCO 3.3.12, Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation

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

TSTF Number and Title:

TSTF-418-A, Rev 2, RPS and ESFAS Test Times and Completion Times (WCAP-14333)
TSTF-444-T, Rev 1, ESFAS Interlocks P-4, P-11 & P-12 LCO Actions and Surveillance Requirements Revisions
TSTF-519-T, Rev 0, Increase Standardization in Condition and Required Action Notes

STS NUREGs Affected:

TSTF-418-A, Rev 2: NUREG 1431
TSTF-444-T, Rev 1: NUREG 1431
TSTF-519-T, Rev 0: NUREG 1430 and 1431

NRC Approval Date:

TSTF-418-A, Rev 2: 02-Apr-03
TSTF-444-T, Rev 1: 15-Oct-03 TSTF Approved for Use
TSTF-519-T, Rev 0: 16-Oct-09 (TSTF Review)

TSTF Classification:

TSTF-418-A, Rev 2: Technical Change
TSTF-444-T, Rev 1: Technical Change
TSTF-519-T, Rev 0: NUREG Only Change

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

RCOL Std. Dep. Number and Title:

There are no Vogtle Electric Generating Plant Units 3 and 4 (Vogtle or VEGP) departures applicable to GTS 3.3.2.

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to GTS 3.3.2.

RCOL PTS Change Number and Title:

The VEGP License Amendment Request (LAR) proposed the following changes to the initial version of the PTS (referred to as the current TS by the VEGP LAR). These changes include Administrative Changes (A), Detail Removed Changes (D), Less Restrictive Changes (L), and More Restrictive Changes (M). These changes are discussed in Sections VI and VII of this GTST.

VEGP LAR DOC A028: Reformat of GTS 3.3.2 into Nine Parts; 3.3.8 through 3.3.16; note that this maps GTS 3.3.2 requirements into interim A028-modified TS (MTS) Subsection 3.3.12, to which the other changes are applied.

VEGP LAR DOC M02: Provision for Two or More Inoperable Divisions or Channels

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

This section discusses the considered changes that are: (1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

TSTF-418-A adjusts the WOG STS (NUREG-1431) required action completion times for the conventional Westinghouse Plant Protection System instrumentation design for which the WOG STS instrumentation requirements are applicable. The changes in TSTF-418 are based on the analysis in WCAP-14333-P, which did not consider the AP1000 protection and safety monitoring system (PMS) instrumentation design. The AP1000 GTS required action completion times (and surveillance frequencies) for the PMS were justified by APP-GW-GSC-020 (WCAP-16787), which is listed as Reference 6 in the GTS Subsection 3.3.2 Bases. APP-GW-GSC-020 does not reference WCAP-14333-P, but notes, "the AP1000 protection and safety monitoring system (PMS) redundancy is as good as or better than that of the conventional Westinghouse Plant Protection System. Although the PMS equipment reliability is considered to be equivalent to or better than that of the conventional Westinghouse Plant Protection System, a common basis for comparison to the digital portion of the PMS is not readily available."

TSTF-444-T is not applicable to the AP1000 GTS. The AP1000 design for the P-4, P-11, and P-12 interlocks is different than the NUREG-1431 design regarding the number of required channels and the implementation hardware. TSTF-444-T provides for elimination of an SR to perform a TADOT on the P-11 and P-12 interlocks. The AP1000 GTS do not require a TADOT for the P-11 and P-12 interlocks. Therefore, TSTF-444-T is not applicable to the AP1000 STS.

TSTF-519-T has already been incorporated into the AP1000 GTS regarding the Writer's Guide for Improved Standard Technical Specifications (Reference 4) placement of Notes in TS Actions tables.

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

Revised “APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY” section of the Bases for Specification 3.3.12 to enhance and clarify the description of the functions performed by or that require an enabling coincident input signal from the reactor trip, P-4, interlock.

In the “Surveillance Requirements” section of the Bases for STS Subsection 3.3.12 under the heading “SR 3.3.12.1,” the next to last paragraph, last line uses the acronym “IPC,” which has not been previously identified in this TS subsection. This should be changed to “integrated protection cabinets (IPCs)” for consistency with similar changes applied to Section 3.3.8 (SR 3.3.8.2), Section 3.3.10 (SR 3.3.10.2), Section 3.3.11 (SR 3.3.11.2), Section 3.3.13 (SR 3.3.13.2), and Section 3.3.14 (SR 3.3.14.2).

APOG Recommended Changes to Improve the Bases

The “SRs” section of the Bases under the heading “SR 3.3.12.1,” uses the term “ESF.” ESF - Engineered Safety Features - has not been previously defined. Change “ESF” to “Engineered Safety Features (ESF).”

Throughout the Bases, references to Sections and Chapters of the FSAR do not include the “FSAR” clarifier. Since these Section and Chapter references are to an external document, it is appropriate to include the “FSAR” modifier. (DOC A003)

V. Applicability

Affected Generic Technical Specifications and Bases:

Section 3.3.12, Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation

Changes to the Generic Technical Specifications and Bases:

GTS 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," is reformatted by DOC A028 into multiple Specifications including interim A028-modified TS (MTS) 3.3.12, "Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation." The reformatting relocates GTS 3.3.2 Function 18.b, "ESFAS Interlocks - Reactor Trip, P-4," and the P-4 dependent ESFAS functions into MTS 3.3.12 as part of the LCO statement, which collectively refers to the P-4 initiated ESFAS functions and the P-4 enabling function as ESFAS reactor trip (P-4) initiation. The MTS format is depicted in Section XI of this GTST as the reference case in the markup of the GTS instrumentation requirements for the P-4 interlock.

The P-4 initiated ESFAS functions relocated to MTS 3.3.12 are the following:

- 5.c, Turbine Trip on Reactor Trip, which trips the main turbine if any one P-4 division indicates a reactor trip has occurred or has been initiated. (Reference: AP1000 DCD, Rev. 19, Section 7.3.1.2.8 and Figure 7.2-1, sheet 14)
- 15.b, Boron Dilution Block on Reactor Trip, which closes the two isolation valves in the demineralized water system supply line to the makeup pump suction control valve, if any one P-4 division indicates a reactor trip has occurred or has been initiated. (Reference: AP1000 DCD, Rev. 19, Subsection 7.3.1.2.14 and Figure 7.2-1, sheets 3 and 15)

The P-4 function that enables other ESFAS functions is also relocated to MTS 3.3.12; the enabled ESFAS functions are the following:

- 6.d, Main Feedwater Control Valve Isolation on two of four channels of Reactor Coolant Average Temperature (T_{avg}) - Low 1 (MTS/STS 3.3.8 Function 12; requires P-11 permissive [pressurizer pressure \geq P-11 setpoint]) tripped Coincident with Reactor Trip (Refer to Function 18.b) both in the two divisions supporting the tripped channels, which closes the main feedwater control valves, if any one P-4 division indicates a reactor trip has occurred or has been initiated. (Reference: AP1000 DCD, Rev. 19, Subsection 7.3.1.2.13 and Figure 7.2-1, sheets 9 and 10)
- 7.d, Main Feedwater Pump Trip and Valve Isolation on two of four channels of Reactor Coolant Average Temperature T_{avg} - Low 2 (MTS/STS 3.3.8 Function 13; requires P-11 permissive [pressurizer pressure \geq P-11 setpoint]) tripped Coincident with Reactor Trip (Refer to Function 18.b) both in the two divisions supporting the tripped channels, which closes the main feedwater isolation and crossover valves, and trips the main feedwater pumps, if any one P-4 division indicates a reactor trip has occurred or has been initiated. (Reference: AP1000 DCD, Rev. 19, Subsection 7.3.1.2.13 and Figure 7.2-1, sheets 9 and 10)

- 8.d, Startup Feedwater Isolation on two of four channels of SG Narrow Range Water Level High [either SG] (MTS/STS 3.3.8 Function 22) tripped Coincident with Reactor Trip (P-4) (Refer to Function 18.b) both in the two divisions supporting the tripped channels, which closes the startup feedwater isolation and control valves, and trips the startup feedwater pumps, if any one P-4 division indicates a reactor trip has occurred or has been initiated. (Reference: AP1000 DCD, Rev. 19, Section 7.3.1.2.13 and Figure 7.2-1, sheets 9 and 10)
- 16.g, Chemical Volume and Control System Makeup Isolation on two of four channels of SG Narrow Range Water Level High [either SG] (MTS/STS 3.3.8 Function 22) tripped Coincident with Reactor Trip (P-4) (Refer to Function 18.b) both in the two divisions supporting the tripped channels, which closes the two CVS makeup line containment isolation valves, if any one P-4 division indicates a reactor trip has occurred or has been initiated. (Reference: AP1000 DCD, Rev. 19, Section 7.3.1.2.15 and Figure 7.2-1, sheets 6, 10, and 11)

The “coincident with” design detail of these enabled ESFAS functions is removed as described by DOC A033 and GTST AP1000-O61-3.3.8. In general, such instrumentation actuation logic design details are included in the TS Bases and in the ESFAS Actuation function descriptions in the AP1000 DCD, Rev 19, Section 7.3.

Note that the P-4 enabling coincidence logic in each ESFAS actuation division is also required to be operable by LCO 3.3.15.a (“Four divisions with one subsystem for each of the following Functions shall be OPERABLE: a. ESF Coincidence Logic;”) of MTS/STS Specification 3.3.15, “ESFAS Actuation Logic - Operating,” and is tested by SR 3.3.15.1, which requires an Actuation Logic Test every 92 days on a Staggered Test Basis. Although GTS 3.3.2 and MTS/STS 3.3.12 require just three P-4 ESFAS reactor trip initiation divisions to be operable, the reactor is normally operated in MODES 1 and 2 with all four P-4 divisions operable. The 92-day Staggered Test Basis surveillance performance interval for each division is therefore based on the four divisions of the AP1000 instrumentation design. On average, the actuation logic of each P-4 division is tested every 12 months with one division tested on average every 92 days.

The above description of the application of the defined term, Staggered Test Basis, in the surveillance frequency of the AP1000 Actuation Logic Test is provided to highlight that in other cases where an LCO requires one less than the design number of instrumentation channels or divisions, e.g., 3 of 4 divisions, the NRC staff has taken the position that a surveillance with a staggered test frequency should base the surveillance performance test interval on the number of divisions required to be operable, rather than the number of divisions in the plant design (e.g., see NRC safety evaluation of the GTS in the application by General Electric-Hitachi for NRC to approve and certify the design of the Economical Simplified Boiling Water Reactor [ESBWR]).

In addition, GTS Specification 3.7.3, “Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Control Valves (MFCVs),” specifies SR 3.7.3.1, which states (as revised according to DOC D09), “Verify the closure time of each MFIV and MFCV is within limits on an actual or simulated actuation signal.” with a Frequency of “In accordance with the Inservice Testing Program”. Since GTS/STS SR 3.7.3.1 overlaps GTS SR 3.3.2.2 (STS SR 3.3.15.1), testing of the ESFAS actuation instrumentation for closing the MFIVs and MFCVs to isolate main feedwater is fully specified. However, in accordance with DOC L01 (removal of the defined term, Actuation Device Test, from Specification 1.1), specifying complete testing of the ESFAS actuation instrumentation for tripping the main feedwater pumps and startup feedwater pumps requires adding a surveillance to overlap the Actuation Logic Test of STS SR 3.3.15.1. Therefore, STS 3.3.15 specifies SR 3.3.15.5, which states, “Verify main feedwater and startup feedwater pump breakers trip open on an actual or simulated actuation signal.” with a Frequency of “24 months”.

GTS 3.3.2 Conditions D and M are reordered and relabeled as MTS 3.3.12 Conditions A and B.

GTS SR 3.3.2.3, as it pertains to the P-4 interlock and the ESFAS functions (listed above), which it supports, is retained as MTS/STS SR 3.3.12.1, which states, "Perform TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT)." with a Frequency of "24 months".

MTS 3.3.12 Condition B is revised to add a second condition statement concerning the inoperability of two or more required ESFAS reactor trip initiation instrumentation divisions. Otherwise, LCO 3.0.3 would apply when the LCO is not met and the associated Actions are not met or an associated Action is not provided. (DOC M02)

The following tables are provided as an aid to tracking the various changes to GTS 3.3.2 Conditions, Required Actions, Functions, Applicability Footnotes, and Surveillance Requirements that result in interim A028-modified TS (MTS) 3.3.12 and as further changed, STS 3.3.12.

Changes to Conditions

<u>GTS 3.3.2 Condition</u>	<u>MTS 3.3.12 Condition</u>	<u>STS 3.3.12 Condition</u>	<u>Other STS Subsections Addressing the Listed Condition</u>	<u>Additional DOC Changes</u>
A	→	→	3.3.8, 3.3.9, 3.3.10	---
B	→	→	3.3.8	---
C	→	→	3.3.10	---
D	A	A	3.3.15	---
E	→	→	3.3.9	---
F	→	→	3.3.13	---
G	→	→	3.3.9, 3.3.13, 3.3.16	---
H	→	→	3.3.11, 3.3.14	---
I	→	→	3.3.8	---
J	→	→	3.3.8	---
K	→	→	3.3.13	---
L	→	→	3.3.8	---
M	B	B	3.3.8	M02
N	→	→	3.3.8, 3.3.9, 3.3.11	---
O	→	→	3.3.8, 3.3.9, 3.3.13, 3.3.15	---
P	→	→	3.3.8, 3.3.14	---
Q	→	→	3.3.8, 3.3.9	---
R	→	→	3.3.8, 3.3.9	---
S	→	→	3.3.8, 3.3.9	---
T	→	→	3.3.8	---
U	→	→	3.3.9	---
V	→	→	3.3.8	---
W	→	→	3.3.16	---
X	→	→	3.3.8, 3.3.9	---
Y	→	→	3.3.8, 3.3.9, 3.3.10	---
Z	→	→	3.3.8	---
AA	→	→	3.3.10	---
BB	→	→	3.3.10	---
CC	→	→	3.3.8, 3.3.9	---

Changes to Functions (a complete function list appears in GTST AP1000-O61-3.3.8)

<u>GTS 3.3.2</u>	<u>Function [Modes(footnote)]</u>	<u>STS 3.3.12</u>	<u>Other STS Subsections</u>	<u>Additional</u>
<u>5.c [1,2]</u>	<u>MTS 3.3.12</u>	<u>STS 3.3.12</u>	<u>Conditions</u>	<u>DOC Changes</u>
5.c [1,2]	LCO 3.3.12	LCO 3.3.12	A, B	A033
6.d [Function 18.b]	---	---	Deleted	A033
7.d [Function 18.b]	---	---	Deleted	A033
8.d [Function 18.b]	---	---	Deleted	A033
15.b [Function 18.b]	---	---	Deleted	A033
16.g [Function 18.b]	---	---	Deleted	A033

Changes to Applicability Footnotes

None

Changes to Surveillance Requirements

GTS 3.3.2 SR	MTS 3.3.12 SR	STS 3.3.12 SR	STS Subsections Also Addressing the Listed SR	Example Surveillance No. Surveillance Description
3.3.2.1	→	→	3.3.8, 3.3.10, 3.3.11, 3.3.13, 3.3.14	3.3.8.1 CHANNEL CHECK
3.3.2.2	→	→	3.3.15, 3.3.16	3.3.15.1 ACTUATION LOGIC TEST
3.3.2.3	3.3.12.1	3.3.12.1	3.3.9	3.3.9.1 TRIP ACTUATING DEVICE OPERATIONAL TEST
3.3.2.4	→	→	3.3.8, 3.3.10, 3.3.11, 3.3.13, 3.3.14	3.3.8.3 CHANNEL CALIBRATION
3.3.2.5	→	→	3.3.8, 3.3.10, 3.3.11, 3.3.13, 3.3.14	3.3.8.2 CHANNEL OPERATIONAL TEST
3.3.2.6	→	→	3.3.8, 3.3.10, 3.3.11, 3.3.13, 3.3.14	3.3.8.4 ESF RESPONSE TIME
3.3.2.7	→	→	3.3.8, 3.1.9, 3.5.2, 3.5.4, 3.5.6, 3.6.10, 3.7.7	ACTUATION DEVICE TEST*
3.3.2.8	→	→	3.3.8, 3.4.11, 3.4.13	Squib Valve ACTUATION DEVICE TEST
3.3.2.9	→	→	3.3.15, 3.3.16	Pressurizer Heater ACTUATION DEVICE TEST

* Typically, the associated STS system specification or STS 3.3.15 or 3.3.16 will include a SR for the actuation device, as follows: "Verify [tested required component] actuates to the [required position or state] on an actual or simulated actuation signal." Such SRs overlap with the Actuation Logic Test for complete testing of the actuation device. (DOC L01)

The "Surveillance Requirements" section of the Bases for STS Subsection 3.3.12 under the heading "SR 3.3.12.1," is revised to provide consistency. (APOG Comment and NRC Staff Comment)

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

VI. Traveler Information

Description of TSTF changes:

Not Applicable

Rationale for TSTF changes:

Not Applicable

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

The Vogtle Electric Generating Plant Units 3 and 4 (VEGP) technical specifications upgrade (TSU) License Amendment Request (VEGP TSU LAR) (Reference 2) proposed changes to the initial version of the VEGP PTS (referred to as the current TS by the VEGP TSU LAR). As detailed in VEGP TSU LAR Enclosure 1, administrative change number 28 (DOC A028) reformats PTS 3.3.2 into multiple Specifications as follows:

- 3.3.8, “Engineered Safety Feature Actuation System (ESFAS) Instrumentation,”
- 3.3.9, “Engineered Safety Feature Actuation System (ESFAS) Manual Initiation,”
- 3.3.10, “Engineered Safety Feature Actuation System (ESFAS) Reactor Coolant System (RCS) Hot Leg Level Instrumentation,”
- 3.3.11, “Engineered Safety Feature Actuation System (ESFAS) Startup Feedwater Flow Instrumentation,”
- 3.3.12, “Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation,”
- 3.3.13, “Engineered Safety Feature Actuation System (ESFAS) Control Room Air Supply Radiation Instrumentation,”
- 3.3.14, “Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation,”
- 3.3.15, “Engineered Safety Feature Actuation System (ESFAS) Actuation Logic - Operating,” and
- 3.3.16, “Engineered Safety Feature Actuation System (ESFAS) Actuation Logic - Shutdown.”

Since PTS 3.3.2, “Engineered Safety Feature Actuation System (ESFAS) Instrumentation,” is identical to GTS 3.3.2, it is appropriate for this GTST to consider the proposed changes to PTS 3.3.2 as changes to GTS 3.3.2 for incorporation in AP1000 STS 3.3.12. DOC A028 is extensive, but retains the intention of PTS 3.3.2 while improving operational use of the TS. The numerous Functions, Conditions and extensive bases discussion associated with PTS 3.3.2 are repackaged into nine smaller parts. Therefore, the changes implemented by DOC A028 are presented in the attached Subsection 3.3.12 markup, in Section XI of this GTST, as the “clean” starting point and are identified as interim A028-modified TS (MTS) 3.3.12. The specific details of the reformatting for MTS 3.3.12 can be found in VEGP TSU LAR (Reference 2), in Enclosure 2 (markup) and Enclosure 4 (clean). The NRC staff safety evaluation regarding DOC A028 can be found in Reference 3, VEGP LAR SER. The VEGP TSU LAR was modified in response to NRC staff RAIs in Reference 5 and the Southern Nuclear Operating Company RAI Response in Reference 6.

DOC M02 addresses the fact that MTS 3.3.12, "Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation," does not specify Actions for inoperability of two or more inoperable reactor trip divisions. This results in entry into LCO 3.0.3.

A more detailed description of the changes by each of the above DOCs can be found in Reference 2, VEGP TSU LAR in Enclosure 1; the NRC staff safety evaluation can be found in Reference 3, VEGP LAR SER. The VEGP TSU LAR was modified in response to NRC staff RAIs (Reference 5) by Southern Nuclear Operating Company's RAI Response in Reference 6.

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

The reformatting per DOC A028, except where addressed in other DOCs, addresses inconsistencies in formatting and approach between PTS 3.3.1 and PTS 3.3.2, respectively. Simplification and clarification are proposed for each Specification. In breaking down each PTS Specification into specific subsets of the Protection and Safety Monitoring System (PMS) function, improved human factored operator usability results.

These improvements also reflect the general approach currently in use in the Improved Standard Technical Specifications (STS) for Babcock and Wilcox Plants, NUREG-1430, Rev. 4. That is to separate the functions for [sensor] instrumentation, Manual Actuation, Trip/Actuation Logic, and Trip Actuation Devices (e.g., Reactor Trip Breakers (RTBs)) into separate Specification subsections. Furthermore, the Actions for some ESFAS Functions generally involve a more complex presentation than needed for other Functions, such that simple common Actions are not reasonable. Such Functions are also provided with separate Specification subsections.

When TS instrument function tables are utilized to reference Actions, the generally preferred format of the Actions for an instrumentation Specification in NUREG-1430 is to provide the initial Actions that would be common to all of the specified functions (typically for bypassing and/or tripping one or two inoperable channels), then the "default" Action would direct consulting the function table for follow-on Actions applicable to the specific affected function. These follow-up Actions generally reflect the actions to exit the Applicability for that function.

This format also allows splitting the default Actions from the initial preferred actions. This general approach is the standard format for other Specifications and for Instrumentation Specifications for other vendors' Improved STS.

DOC M02 directly provides for the default Actions of LCO 3.0.3 without allowing for the additional hour that LCO 3.0.3 permits prior to initiating shutdown. This provides clarity for the operator and is more restrictive than LCO 3.0.3.

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

In the "Surveillance Requirements" section of the Bases for STS Subsection 3.3.12 under the heading "SR 3.3.12.1," the next to last paragraph, the acronym "IPC," is revised to "integrated protection cabinets (IPCs)." (NRC Staff Comment)

The acronym "ESF" in the "SRs" section of the Bases under the heading "SR 3.3.12.1," is revised to "Engineered Safety Features (ESF)." (APOG Comment and NRC Staff Edit)

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

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

The non-technical changes to the “Surveillance Requirements” section of the Bases for STS Subsection 3.3.12 under the heading “SR 3.3.12.1,” provide consistency with similar changes applied to Subsection 3.3.8 (SR 3.3.8.2), Subsection 3.3.10 (SR 3.3.10.2), Subsection 3.3.11 (SR 3.3.11.2), Subsection 3.3.13 (SR 3.3.13.2), and Subsection 3.3.14 (SR 3.3.14.2).

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

VII. GTST Safety Evaluation

Technical Analysis:

AP1000 GTS LCO 3.0.3 is only applicable in MODES 1, 2, 3, and 4, and states:

When an LCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable,

- a. MODE 3 within 7 hours; and
- b. MODE 4 within 13 hours; and
- c. MODE 5 within 37 hours.

GTS 3.3.1 and 3.3.2 Functions with applicability statements that include MODE 1, 2, 3, or 4, generally have no Actions specified for addressing a loss of function condition, such as when all required channels are inoperable. Upon discovery of such a condition, LCO 3.0.3 would apply. The intent of LCO 3.0.3 (as stated in the TS Bases) is to “impose time limits for placing the unit in a safe MODE or other specified condition when operation cannot be maintained within the limits for safe operation as defined by the LCO and its ACTIONS.”

The Actions for inoperable RTS and ESFAS instrumentation provide restoration time and/or compensatory action allowances (e.g., place the inoperable channel in trip); but only for inoperability of some of the channels (e.g., 1 or 2 out of 4 required channels, typically). If these restoration and/or compensatory actions cannot be met in the required time, “default” actions are provided, which are designed to place the unit in a safe MODE or other specified condition - typically, actions that result in exiting the Applicability for that Function.

The shutdown actions of LCO 3.0.3 are typical of “default” actions throughout the TS that direct plant shutdown to exit the Applicability, with the exception that LCO 3.0.3 includes an additional 1 hour before the shutdown is required to be initiated.

The revisions described in DOC M02 address multiple-channel inoperability. The revisions will immediately impose the “default” Actions for that Function - without allowance for the 1 hour delay that is provided in LCO 3.0.3. Furthermore, the Function-specific “default” actions (currently, or proposed to be, specified for some Functions) impose requirements intended to establish safe operation that are not necessarily required by LCO 3.0.3. Since each Function-specific default action is specifically considering that Function’s safety-basis, such default actions necessarily result in more appropriate actions than the general default actions of LCO 3.0.3. Specifically, the Actions for each new Condition associated with DOC M02 for RTS and ESFAS Functions applicable in MODES1, 2, 3, or 4, are compared to LCO 3.0.3, and in each case, the new Actions are equivalent to or more restrictive than the actions of LCO 3.0.3.

STS 3.3.12, Condition B (Required Action and associated Completion Time of Condition A [One required division inoperable.] not met.

OR Two or three required divisions inoperable.) specifies Actions that require placing the unit in Mode 3 in 6 hours and Mode 4 in 12 hours, which is more restrictive than LCO 3.0.3.

GTS 3.3.1 and 3.3.2 actions do not specify conditions that explicitly address multiple inoperable channels (that is, more than two inoperable channels or divisions, in most cases), and therefore default to LCO 3.0.3. In each instance, the proposed actions to address these conditions are more restrictive than the LCO 3.0.3 actions because completion times for reaching lower operational modes are shorter by 1 hour. In addition, Function-specific actions, where specified, are more appropriate for the affected Function than the unit-shutdown actions of LCO 3.0.3 alone. Therefore, the changes specified by DOC M02 do not introduce any adverse impact on public health and safety.

The remaining changes, including those made by DOC A028, are editorial, clarifying, grammatical, or otherwise considered administrative. These changes do not affect the technical content, but improve the readability, implementation, and understanding of the requirements, and are therefore acceptable.

Having found that this GTST's proposed changes to the GTS and Bases are acceptable, the NRC staff concludes that AP1000 STS Subsection 3.3.12 is an acceptable model Specification for the AP1000 standard reactor design.

References to Previous NRC Safety Evaluation Reports (SERs):

None

VIII. Review Information

Evaluator Comments:

None

Randy Belles
Oak Ridge National Laboratory
865-574-0388
bellesrj@ornl.gov

Review Information:

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on 5/29/2014.

APOG Comments (Ref. 7) and Resolutions:

1. (Internal # 3) Throughout the Bases, references to Sections and Chapters of the FSAR do not include the "FSAR" clarifier. Since these Section and Chapter references are to an external document, it is appropriate (DOC A003) to include the "FSAR" modifier. This is resolved by adding the FSAR modifier as appropriate.
2. (Internal # 6) The GTST sections often repeat VEGP LAR DOCs, which reference "existing" and "current" requirements. The inclusion in the GTST of references to "existing" and "current," are not always valid in the context of the GTS. Each occurrence of "existing" and "current" should be revised to be clear and specific to GTS, MTS, or VEGP COL TS (or other), as appropriate. Noted ambiguities are corrected in the GTST body.
3. (Internal # 7) Section VII, GTST Safety Evaluation, inconsistently completes the subsection "References to Previous NRC Safety Evaluation Reports (SERs)" by citing the associated SE for VEGP 3&4 COL Amendment 13. It is not clear whether there is a substantive intended difference when omitting the SE citation. This is resolved by removing the SE citation in Section VII of the GTST and ensuring that appropriate references to the consistent citation of this reference in Section X of the GTST are made.
4. (Internal # 116 and 165) In GTST for Subsection 3.3.8, Section VI, under the heading "Rationale for changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes," the first paragraph mentions DOC A024. This DOC is for changes to RTS Instrumentation and does not affect Subsection 3.3.8. Note that it is not mentioned anywhere else in this Subsection. This is also stated in Subsections 3.3.9 through 3.3.16. Change "DOCs A024 and A028" to "DOC A028" in GTST 3.3.8 through GTST 3.3.16. This is resolved by making the recommended change. Note that comment # 116 is actually directed at removing DOC A028 in Subsections 3.3.1 through 3.3.7, but the opposite is true for DOC A024 in Subsections 3.3.8 through 3.3.16 as stated above.
5. (Internal # 178) In the "Surveillance Requirements" section of the Bases for STS Subsection 3.3.12 under the heading "SR 3.3.12.1," the next to last paragraph, last line uses the acronym "IPC," which has not been previously identified in this TS subsection. This should be changed to "integrated protection cabinets (IPCs)" for consistency with similar changes applied to Subsections 3.3.8 (SR 3.3.8.2), 3.3.10 (SR 3.3.10.2), 3.3.11

(SR 3.3.11.2), 3.3.13 (SR 3.3.13.2), and 3.3.14 (SR 3.3.14.2). This is resolved by making the recommended change.

6. (Internal # 192) In GTST for Subsection 3.3.12, Section V, under the heading “Changes to the Generic Technical Specifications and Bases,” the seventh paragraph discusses changes to GTS Specification 3.7.3, SR 3.7.3.1. Specifically, the discussion incorrectly quotes SR 3.7.3.1, as revised according to DOC D09, (i.e., “Verify the closure time of each MFIV and MFCV is ≤ 5 seconds within limits on an actual or simulated actuation signal”). However, SR 3.7.3.1, as revised by DOC D09 actually reads “Verify closure time of each MFIV and MFCV is within limits on an actual or simulated actuation signal.” Correct the quote of SR 3.7.3.1. This is resolved by making the recommended change.
7. (Internal # 193) The “SRs” section of the Bases under the heading “SR 3.3.12.2,” uses the term “ESF.” ESF - Engineered Safety Features - has not been previously defined. Change “ESF” to “Engineered Safety Features (ESF).” This is resolved by making the recommended change to SR 3.3.12.1 (SR 3.3.12.2 does not exist).

NRC Final Approval Date: 6/29/15

NRC Contact:

C. Craig Harbuck
United States Nuclear Regulatory Commission
301-415-3140
Craig.Harbuck@nrc.gov

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

None

X. References Used in GTST

1. AP1000 DCD, Revision 19, Section 16, "Technical Specifications," June 2011 (ML11171A500).
2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Technical Specifications Upgrade License Amendment Request, February 24, 2011 (ML12065A057).
3. NRC Safety Evaluation (SE) for Amendment No. 13 to Combined License (COL) No. NPF-91 for Vogtle Electric Generating Plant (VEGP) Unit 3, and Amendment No. 13 to COL No. NPF-92 for VEGP Unit 4, September 9, 2013, ADAMS Package Accession No. ML13238A337, which contains:

ML13238A355 Cover Letter - Issuance of License Amendment No. 13 for Vogtle Units 3 and 4 (LAR 12-002).

ML13238A359 Enclosure 1 - Amendment No. 13 to COL No. NPF-91

ML13239A256 Enclosure 2 - Amendment No. 13 to COL No. NPF-92

ML13239A284 Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13)

ML13239A287 Enclosure 4 - Safety Evaluation (SE), and Attachment 1 - Acronyms

ML13239A288 SE Attachment 2 - Table A - Administrative Changes

ML13239A319 SE Attachment 3 - Table M - More Restrictive Changes

ML13239A333 SE Attachment 4 - Table R - Relocated Specifications

ML13239A331 SE Attachment 5 - Table D - Detail Removed Changes

ML13239A316 SE Attachment 6 - Table L - Less Restrictive Changes

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

- ML13277A616 Letter - Correction To The Attachment (Replacement Pages) - Vogtle Electric Generating Plant Units 3 and 4-Issuance of Amendment Re: Technical Specifications Upgrade (LAR 12-002) (TAC No. RP9402)
- ML13277A637 Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13) (corrected)
4. TSTF-GG-05-01, "Writer's Guide for Plant-Specific Improved Technical Specifications," June 2005.
 5. RAI Letter No. 01 Related to License Amendment Request (LAR) 12-002 for the Vogtle Electric Generating Plant Units 3 and 4 Combined Licenses, September 7, 2012 (ML12251A355).
 6. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Response to Request for Additional Information Letter No. 01 Related to License Amendment Request LAR-12-002, ND-12-2015, October 04, 2012 (ML12286A363 and ML12286A360)

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

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

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

3.3 INSTRUMENTATION

3.3.12 Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation

LCO 3.3.12 Three ESFAS Reactor Trip (P-4) divisions shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required division inoperable.	A.1 Restore required division to OPERABLE status.	6 hours
B. Required Action and associated Completion Time of Condition A not met. OR Two or three required divisions inoperable.	B.1 Declare affected isolation valve(s) inoperable. <u>AND</u> B.2 Be in MODE 3. <u>AND</u> B.3 Be in MODE 4.	Immediately 6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.3.12.1 Perform TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT).	24 months

B 3.3 INSTRUMENTATION

B 3.3.12 Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation

BASES

BACKGROUND A description of the ESFAS Instrumentation is provided in the Bases for LCO 3.3.8, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation."

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY The required channels of ESFAS instrumentation provide plant protection in the event of any of the analyzed accidents. ESFAS protective functions include the ESFAS Reactor Trip Initiation (P-4) function.

There are eight reactor trip breakers with two breakers in each division. The P-4 interlock is enabled when the breakers in two-out-of-four divisions are open. Additionally, the P-4 interlock is enabled by all Automatic Reactor Trip Actuations. **Once enabled, the P-4 interlock initiates the following actions:**

- **Main turbine trip**
- **Boron dilution block (closes the two isolation valves in the demineralized water system supply line to the makeup pump suction control valve)**
- **CVS makeup isolation (closes the two makeup line containment isolation motor-operated valves) if coincident with a high-steam generator (SG) narrow range water level high voting logic output signal (Table 3.3.8-1, Function 22-21) for either SG to limit primary-to-secondary leakage prevent adding makeup water to the affected SG following a SGTR event.**
- **Startup feedwater isolation (closes control and isolation valves and trips startup feedwater pump) if coincident with a high-SG narrow range water level high voting logic output signal (Table 3.3.8-1, Function 22-21) for either SG**
- **Isolate main feedwater coincident with a low-reactor coolant system average temperature - Low 2 voting logic output signal (Table 3.3.8-1, Function 13) (Even though this function is not assumed in safety analysis therefore, it is not included in the technical specifications.)**

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The reactor trip breaker position switches that provide input to the P-4 interlock only function to energize or de-energize or open or close contacts. Therefore, this **RTB position switch interlock Function** has no adjustable trip setpoint.

Three divisions of this **interlock Function** must be OPERABLE **and in the correct (disabled) state** in MODES 1, 2, 3, and 4 when the reactor may be critical or approaching criticality. This ensures that a single failure will not cause an actuation or prevent an actuation. These MODES (MODES 1, 2, 3, and 4) are also consistent with the Applicability of the various ESFAS Instrument Functions to which the P-4 interlock provides input. This Function does not have to be OPERABLE in MODE 5 or 6 to trip the main turbine, because the main turbine is not in operation.

The P-4 Function does not have to be OPERABLE in MODE 4 or 5 to block boron dilution, because Table 3.3.8-1, Function **17-46**, Source Range Neutron Flux Doubling, provides the required block. In MODE 6, the P-4 interlock with the Boron Dilution Block Function is not required, since the unborated water source flow path isolation valves are locked closed in accordance with LCO 3.9.2.

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

ACTIONS**A.1**

With one required division inoperable, the affected division must be restored to OPERABLE status within 6 hours.

Condition A applies to one inoperable required division of the P-4 Interlock. With one required division inoperable, the two remaining OPERABLE divisions are capable of providing the required interlock function, but without a single failure. The P-4 Interlock is enabled when RTBs in two divisions are detected as open. The status of the other inoperable, non-required P-4 division is not significant, since P-4 divisions cannot be tripped or bypassed. In order to provide single failure tolerance, three required divisions must be OPERABLE.

The 6 hours allowed to restore the inoperable division is reasonable based on the capability of the remaining OPERABLE divisions to mitigate all DBAs and the low probability of an event occurring during this interval.

BASES

ACTIONS (continued)B.1, B.2, and B.3

If the Required Action and associated Completion Time Condition A is not met, **or if two or three required divisions are inoperable**, the plant must be placed in a MODE in which the LCO does not apply. This is accomplished by placing the plant in MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner without challenging plant systems.

Additionally, under these circumstances, the affected isolation valve(s) must be declared inoperable immediately, per Required Action B.1. Declaring the affected isolation valve inoperable allows the supported system Actions (i.e., for inoperable valves) to dictate the required measures. The respective isolation valve LCO provides appropriate actions for the inoperable components. This action is in accordance with LCO 3.0.6, which requires that the applicable Conditions and Required Actions for the isolation valves declared inoperable shall be entered in accordance with LCO 3.0.2.

**SURVEILLANCE
REQUIREMENTS**SR 3.3.12.1

SR 3.3.12.1 is the performance of a TADOT of the blocks for the reactor trip (P-4) input from the **integrated protection cabinets (IPCs)**. This TADOT is performed every 24 months.

The Frequency is based on the known reliability of the **Engineered Safety Features (ESF)** Function and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

REFERENCES

1. **FSAR** Chapter 15.0, "Accident Analysis."
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XII. Applicable STS Subsection After Incorporation of this GTST's Modifications

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

3.3 INSTRUMENTATION

3.3.12 Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation

LCO 3.3.12 Three ESFAS Reactor Trip (P-4) divisions shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required division inoperable.	A.1 Restore required division to OPERABLE status.	6 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Declare affected isolation valve(s) inoperable.	Immediately
<u>OR</u>	<u>AND</u>	
Two or three required divisions inoperable.	B.2 Be in MODE 3.	6 hours
	<u>AND</u>	
	B.3 Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.3.12.1 Perform TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT).	24 months

B 3.3 INSTRUMENTATION

B 3.3.12 Engineered Safety Feature Actuation System (ESFAS) Reactor Trip Initiation

BASES

BACKGROUND A description of the ESFAS Instrumentation is provided in the Bases for LCO 3.3.8, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation."

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY The required channels of ESFAS instrumentation provide plant protection in the event of any of the analyzed accidents. ESFAS protective functions include the ESFAS Reactor Trip Initiation (P-4) function.

There are eight reactor trip breakers with two breakers in each division. The P-4 interlock is enabled when the breakers in two-out-of-four divisions are open. Additionally, the P-4 interlock is enabled by all Automatic Reactor Trip Actuations. Once enabled, the P-4 interlock initiates the following actions:

- Main turbine trip
 - Boron dilution block (closes the two isolation valves in the demineralized water system supply line to the makeup pump suction control valve)
 - CVS makeup isolation (closes the two makeup line containment isolation motor-operated valves) if coincident with a steam generator (SG) narrow range water level high voting logic output signal (Table 3.3.8-1, Function 22) for either SG to limit primary-to-secondary leakage to the affected SG following a SGTR event
 - Startup feedwater isolation (closes control and isolation valves and trips startup feedwater pump) if coincident with a SG narrow range water level high voting logic output signal (Table 3.3.8-1, Function 22) for either SG
 - Isolate main feedwater coincident with a reactor coolant system average temperature - Low 2 voting logic output signal (Table 3.3.8-1, Function 13) (Even though this function is not assumed in safety analysis, it is included in the technical specifications.)
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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The reactor trip breaker position switches that provide input to the P-4 interlock only function to energize or de-energize or open or close contacts. Therefore, this RTB position switch interlock has no adjustable trip setpoint.

Three divisions of this interlock must be OPERABLE and in the correct (disabled) state in MODES 1, 2, 3, and 4 when the reactor may be critical or approaching criticality. This ensures that a single failure will not cause an actuation or prevent an actuation. These MODES (MODES 1, 2, 3, and 4) are also consistent with the Applicability of the various ESFAS Instrument Functions to which the P-4 interlock provides input. This Function does not have to be OPERABLE in MODE 5 or 6 to trip the main turbine, because the main turbine is not in operation.

The P-4 Function does not have to be OPERABLE in MODE 4 or 5 to block boron dilution, because Table 3.3.8-1, Function 17, Source Range Neutron Flux Doubling, provides the required block. In MODE 6, the P-4 interlock with the Boron Dilution Block Function is not required, since the unborated water source flow path isolation valves are locked closed in accordance with LCO 3.9.2.

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

ACTIONS**A.1**

With one required division inoperable, the affected division must be restored to OPERABLE status within 6 hours.

Condition A applies to one inoperable required division of the P-4 Interlock. With one required division inoperable, the two remaining OPERABLE divisions are capable of providing the required interlock function, but without a single failure. The P-4 Interlock is enabled when RTBs in two divisions are detected as open. The status of the other inoperable, non-required P-4 division is not significant, since P-4 divisions cannot be tripped or bypassed. In order to provide single failure tolerance, three required divisions must be OPERABLE.

The 6 hours allowed to restore the inoperable division is reasonable based on the capability of the remaining OPERABLE divisions to mitigate all DBAs and the low probability of an event occurring during this interval.

BASES

ACTIONS (continued)B.1, B.2, and B.3

If the Required Action and associated Completion Time Condition A is not met, or if two or three required divisions are inoperable, the plant must be placed in a MODE in which the LCO does not apply. This is accomplished by placing the plant in MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner without challenging plant systems.

Additionally, under these circumstances, the affected isolation valve(s) must be declared inoperable immediately, per Required Action B.1. Declaring the affected isolation valve inoperable allows the supported system Actions (i.e., for inoperable valves) to dictate the required measures. The respective isolation valve LCO provides appropriate actions for the inoperable components. This action is in accordance with LCO 3.0.6, which requires that the applicable Conditions and Required Actions for the isolation valves declared inoperable shall be entered in accordance with LCO 3.0.2.

**SURVEILLANCE
REQUIREMENTS**SR 3.3.12.1

SR 3.3.12.1 is the performance of a TADOT of the blocks for the reactor trip (P-4) input from the integrated protection cabinets (IPCs). This TADOT is performed every 24 months.

The Frequency is based on the known reliability of the Engineered Safety Features (ESF) Function and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

REFERENCES

1. FSAR Chapter 15.0, "Accident Analysis."
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