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

Title: Changes Related to LCO 3.3.7, Reactor Trip System (RTS) Trip Actuation Devices

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-411-A, Rev 1, Surveillance Test Interval Extensions for Components of the
Reactor Protection System (WCAP-15376-P)
TSTF-418-A, Rev 2, RPS and ESFAS Test Times and Completion Times
(WCAP-14333)
TSTF-519-T, Rev 0, Increase Standardization in Condition and Required Action Notes

STS NUREGs Affected:

TSTF-411-A, Rev 1: NUREG 1431
TSTF-418-A, Rev 2: NUREG 1431
TSTF-519-T, Rev 0: NUREG 1430 and 1431

NRC Approval Date:

TSTF-411-A, Rev 1: 30-Aug-02
TSTF-418-A, Rev 2: 02-Apr-03
TSTF-519-T, Rev 0: 16-Oct-09 (TSTF Review)

TSTF Classification:

TSTF-411-A, Rev 1: Technical Change
TSTF-418-A, Rev 2: 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 3.3.1.

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to GTS 3.3.1.

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 A024: Reformat of GTS 3.3.1 into Seven Parts; 3.3.1 through 3.3.7; note that this maps GTS 3.3.1 requirements into interim A024-modified TS (MTS) Subsection 3.3.7, to which the other changes are applied.
VEGP LAR DOC M02: Provision for Two or More Inoperable Divisions or Channels
VEGP LAR DOC L07: Certain TS Required Actions Requiring the Reactor Trip Breakers (RTBs) to be Opened Are Revised into Two Required Actions
VEGP LAR DOC D01: RTB Revisions

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-411-A, Rev.1 provides justification to (1) increase the required action completion time and the bypass test time allowance for the reactor trip breakers and (2) increase the surveillance test intervals for the reactor trip breakers, master relays, logic cabinets, and analog channels based on analysis provided in WCAP-15376-P, Rev. 0, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times." WCAP-15376-P, Rev. 0 did not specifically consider the AP1000 design. The AP1000 GTS completion times and surveillance frequencies for instrumentation functions and reactor trip breakers were justified by APP-GW-GSC-020 (WCAP-16787), which is listed as Reference 6 in the GTS Subsection 3.3.2 Bases. Therefore, TSTF-411-A is not applicable to the AP1000 STS, and is not discussed further in this GTST.

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-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)

Editorial changes are made throughout the Bases to provide consistent instrumentation terminology. Additional minor editorial changes are also implemented throughout the Bases to correct grammar, provide consistency between sections, and improve clarity.

Identify all acronyms at the first occurrence in the Bases discussion.

Added appropriate reference.

Condition B uses the phrase “One or more Functions”; this is changed to “One of both Functions” to be consistent with the other Condition statements.

APOG Recommended Changes to Improve the Bases

For added clarity, revise the opening sentence of the “ASA, LCO, and Applicability” section of the Bases for STS Subsections 3.3.1 through 3.3.7 to state:

The RTS functions to maintain **compliance with** the SLs during all AOOs and mitigates the consequences of DBAs in all MODES in which the **reactor trip breakers (RTBs)** are closed.

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 3.3.7, Reactor Trip System (RTS) Trip Actuation Devices

Changes to the Generic Technical Specifications and Bases:

GTS 3.3.1, "Reactor Trip System (RTS) Instrumentation," is reformatted by DOC A024 into multiple Specifications including interim A024-modified TS (MTS) 3.3.7, "Reactor Trip System (RTS) Trip Actuation Devices." The reformatting relocates GTS 3.3.1 Function 17, "Reactor Trip Breakers," and Function 18, "Reactor Trip Breaker (RTB) Undervoltage and Shunt Trip Mechanisms," into MTS 3.3.7 as part of the LCO statement. 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 reactor trip system instrumentation.

MTS 3.3.7 LCO Title

GTS 3.3.1 Function(s)

Reactor Trip System (RTS)
Trip Actuation Devices

17. Reactor Trip Breakers
18. Reactor Trip Breaker (RTB) Undervoltage
and Shunt Trip Mechanisms

References 2, 3, and 6 provide details showing the correspondence of GTS 3.3.1 Functions and STS 3.3.1 through 3.3.7 Functions.

GTS 3.3.1 Conditions N and O are reordered and relabeled as AP1000 MTS 3.3.7 Conditions A, B, C, and D. No Function Table is required. (DOC A024)

GTS Table 3.3.1-1 footnote (a), "With Reactor Trip Breakers (RTBs) closed and Plant Control System capable of rod withdrawal," applies to operation in MODEs 3, 4, and 5 for RTS Trip Actuation Devices. GTS Table 3.3.1-1 footnote (a) is incorporated into the MTS 3.3.7 LCO Applicability statement for MODEs 3, 4, and 5. (DOC A024)

In addition, the Applicability Statement for MODEs 3, 4, and 5 (derived from GTS Table 3.3.1-1 footnote (a)) is revised to "Plant Control System capable of rod withdrawal or one or more rods not fully inserted." This avoids undesirable plant secondary effects due to interlock actuation. (DOC L07)

GTS SR 3.3.1.6 is retained and renumbered as MTS SR 3.3.7.1. (DOC A024)

MTS 3.3.7 Conditions C and D are revised by adding a second condition statement for the condition "one or both Functions within three or more divisions inoperable." 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 requirement to open RTBs associated with MTS 3.3.7 Condition D is replaced by two Actions to "initiate action to fully insert all rods" and "place the Plant Control System in a condition incapable of rod withdrawal." This provides flexibility to avoid potentially undesirable effects of opening RTBs and initiating certain interlocks. (DOC L07)

MTS SR 3.3.7.1 is rewritten to move the Note stating “This Surveillance must be performed on both reactor trip breakers associated with a single division,” into the Surveillance text to state “Perform TADOT on both reactor trip breakers in one division.” (DOC D01)

The Bases are revised to reflect these changes.

The following tables are provided as an aid to tracking the various changes to GTS 3.3.1 Conditions, Required Actions, Functions, Applicability Footnotes, and Surveillance Requirements that result in interim A024-modified TS (MTS) 3.3.7 and as further changed, STS 3.3.7.

Changes to Conditions

<u>GTS 3.3.1 Condition</u>	<u>MTS 3.3.7 Condition</u>	<u>STS 3.3.7 Condition</u>	<u>Other STS Subsections Addressing the Listed Condition</u>	<u>Additional DOC Changes</u>
A	→	→	3.3.1	---
B	→	→	3.3.5	---
C	→	→	3.3.5	---
D	→	→	3.3.1	---
E	→	→	3.3.1	---
F	→	→	3.3.3	---
G	→	→	3.3.3	---
H	→	→	3.3.3	---
I	→	→	3.3.2	---
J	→	→	3.3.2	---
K	→	→	3.3.1	---
L	→	→	3.3.4, 3.3.6	---
M	→	→	3.3.1	---
N	A	A	GTS Condition N split into 3 Conditions	---
N	C	C	---	M02
N	D	D	---	M02 L07
O	B	B	---	L07
P	→	→	3.3.4, 3.3.6	---
Q	→	→	3.3.2	---
R	→	→	3.3.2	---

Changes to Functions

<u>GTS 3.3.1</u>	<u>Function [Modes(footnote)]</u>	<u>STS 3.3.7</u>	<u>STS 3.3.7 Conditions</u>	<u>Other STS Subsections and Additional Changes</u>	<u>Additional DOC Changes</u>
17 [1,2,3(a),4(a),5(a)]	MTS 3.3.7 LCO 3.3.7	STS 3.3.7 LCO 3.3.7	A, B, C	---	D01
18 [1,2,3(a),4(a),5(a)]	LCO 3.3.7	LCO 3.3.7	A, B, D	---	D01

Changes to Applicability Footnotes

<u>GTS 3.3.1 Footnote</u>	<u>MTS 3.3.7 Footnote</u>	<u>STS 3.3.7 Footnote</u>	<u>STS 3.3.7 Function</u>	<u>STS Subsections Also Addressing Listed footnote</u>	<u>Additional Changes DOC Number</u>
a	-----LCO Applicability-----	---	---	3.3.2, 3.3.4, 3.3.5, 3.3.6	L07

Changes to Surveillance Requirements

<u>GTS 3.3.1 SR</u>	<u>MTS 3.3.7 SR</u>	<u>STS 3.3.7 SR</u>	<u>STS Subsections Also Addressing the Listed SR</u>	<u>Example Surveillance No. Surveillance Description</u>
3.3.1.1	→	→	3.3.1, 3.3.2, 3.3.3	3.3.1.1 CHANNEL CHECK
3.3.1.2	→	→	3.3.1	3.3.1.2 Compare calorimetric heat balance to NI channel output
3.3.1.3	→	→	3.3.1	3.3.1.3 Compare calorimetric heat balance to delta-T power calculation
3.3.1.4	→	→	3.3.1	3.3.1.4 Compare incore detector measurement to NI AXIAL FLUX DIFFERENCE
3.3.1.5	→	→	3.3.1	3.3.1.5 Calibrate excore channels

<u>GTS 3.3.1</u> <u>SR</u>	<u>MTS 3.3.7</u> <u>SR</u>	<u>STS 3.3.7</u> <u>SR</u>	<u>STS Subsections Also</u> <u>Addressing the Listed SR</u>	<u>Example Surveillance No.</u> <u>Surveillance Description</u>
3.3.1.6	3.3.7.1	3.3.7.1	---	3.3.7.1 Perform TADOT
3.3.1.7	→	→	3.3.4, 3.3.6	3.3.4.1 ACTUATION LOGIC TEST
3.3.1.8	→	→	3.3.1, 3.3.2	3.3.1.6 Perform COT
3.3.1.9	→	→	3.3.1, 3.3.2, 3.3.3	3.3.1.7 Perform COT
3.3.1.10	→	→	3.3.1	3.3.1.8 CHANNEL CALIBRATION
3.3.1.11	→	→	3.3.1, 3.3.2, 3.3.3	3.3.1.9 CHANNEL CALIBRATION
3.3.1.12	→	→	3.3.1, 3.3.5	3.3.1.10 Perform TADOT
3.3.1.13	→	→	3.3.1, 3.3.2, 3.3.3	3.3.1.11 Verify RTS RESPONSE TIME within limits

The opening sentence of the “ASA, LCO, and Applicability” section of the Bases for STS Subsections 3.3.1 through 3.3.7 is revised to provide additional clarity. (APOG 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 24 (DOC A024) reformats PTS 3.3.1 into multiple Specifications as follows:

- 3.3.1, "Reactor Trip System (RTS) Instrumentation";
- 3.3.2, "Reactor Trip System (RTS) Source Range Instrumentation";
- 3.3.3, "Reactor Trip System (RTS) Intermediate Range Instrumentation";
- 3.3.4, "Reactor Trip System (RTS) Engineered Safety Feature Actuation
- 3.3.5, "Reactor Trip System (RTS) Manual Actuation";
- 3.3.6, "Reactor Trip System (RTS) Automatic Trip Logic"; and
- 3.3.7, "Reactor Trip System (RTS) Trip Actuation Devices.

Since PTS 3.3.1, "Reactor Trip System (RTS) Instrumentation," is identical to GTS 3.3.1, it is appropriate for this GTST to consider the proposed changes to PTS 3.3.1 as changes to GTS 3.3.1 for incorporation in AP1000 STS 3.3.7. DOC A024 is extensive, but retains the intention of PTS 3.3.1 while improving operational use of the TS. The numerous Functions, Conditions and extensive bases discussion associated with PTS 3.3.1 are repackaged into seven smaller parts. Therefore, the changes implemented by DOC A024 are presented in the attached Subsection 3.3.7 markup, in Section XI of this GTST, as the "clean" starting point for this GTST and are identified as interim A024-modified TS (MTS) 3.3.7. The specific details of the reformatting for MTS 3.3.7 can be found in VEGP TSU LAR (Reference 2), in Enclosure 2 (markup) and Enclosure 4 (clean). The NRC staff safety evaluation regarding DOC A024 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 3.3.7, "Reactor Trip System (RTS) Trip Actuation Devices," does not specify Actions for inoperability of more than two channels. This results in entry into LCO 3.0.3 when three or more channels are inoperable.

DOC L07 revises the single action step to "open the RTBs" into a two-step process to "initiate action to fully insert all rods," and "place the Plant Control System in a condition incapable of rod withdrawal."

DOC D01 revises the MTS SR 3.3.7.1 Note from “This Surveillance must be performed on both reactor trip breakers associated with a single division,” to “Perform TADOT on both reactor trip breakers in one division.”

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 A024, 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.

When the RTBs are opened, certain other interlocks can be initiated. The initiation of the associated interlocks may have an undesirable secondary effect on the ease of operation of the plant such as the initiation of the P-4 interlock, which, in the event of low Reactor Coolant System (RCS) temperature, can result in isolation of main feedwater to the steam generators. DOC L07 provides additional operator flexibility to achieve the same intent as opening the RTBs.

DOC D01 allows that specific design details are not necessary for assuring operability or compliance with TS Actions. Removal of the channel design detail is consistent with PTS Conditions N and O that are based on “division” Operability, not individual component Operability.

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

All acronyms are identified at the first occurrence in the Bases discussion.

The opening sentence of the “ASA, LCO, and Applicability” section of the Bases for STS Subsections 3.3.1 through 3.3.7 is revised to state:

The RTS functions to maintain **compliance with** the SLs during all AOOs and mitigates the consequences of DBAs in all MODES in which the **reactor trip breakers (RTBs)** are closed. (APOG Comment)

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 opening sentence of the “ASA, LCO, and Applicability” section of the Bases for STS Subsections 3.3.1 through 3.3.7 is revised for additional clarity.

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:

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 MODES 1, 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 3.3.7, Condition C leads to a new default action to be in Mode 3 in 6 hours (from Mode 1 or 2), which is more restrictive than the time allowed by LCO 3.0.3. Further default actions of Condition D require initiating action to fully insert all rods within 1 hour and placing the Plant Control System in a condition incapable of rod withdrawal within 1 hour (from MODE 3, 4, or 5), which are actions not required by 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.

DOC L07 revises the Action to open the RTBs into a two-step process to “initiate action to fully insert all rods,” and “place the Plant Control System in a condition incapable of rod withdrawal.” Each of the PTS 3.3.1 required actions to open the reactor trip breakers (RTBs) is intended to ensure that control rods cannot be withdrawn thereby eliminating the possibility for control rod related positive reactivity additions and associated heat input into the reactor coolant. Additionally, all control rods are inserted by opening the RTBs. Therefore, replacing each required action to open RTBs with the two actions, which require initiating action to fully insert all rods and placing the Plant Control System in a condition incapable of rod withdrawal, maintains the intent of the existing PTS action requirements. DOC L07 replaces the specific method of precluding rod withdrawal and ensuring all rods are inserted while maintaining the requirement for establishing the plant conditions equivalent to opening the RTBs. The revised actions still ensure rod withdrawal is precluded and all rods are inserted; therefore, the detail to open the RTBs is not required to be in the TS to provide adequate protection of the public health and safety.

To ensure that when the revised required actions are taken the unit is removed from the operational modes or other specified conditions in the Specification’s Applicability, conforming revisions to the Applicability statements are made. The equivalent condition to the PTS Applicability statements that include “RTBs closed” is the condition of Plant Control System capable of rod withdrawal. However, since rods could have been withdrawn prior to making the Plant Control System incapable of rod withdrawal, the revised Specifications include the additional condition of “or one or more rods not fully inserted.” This change also aligns with the required actions to both “fully insert all rods” and “place the Plant Control System in a condition incapable of rod withdrawal.” The equivalent condition to the PTS Applicability statements that include “RTBs open” is the condition of “Plant Control System capable of rod withdrawal and all rods fully inserted.”

Removing the specific method of precluding rod withdrawal and establishing all rods inserted, and defining this condition solely in terms of the RTB status, from the TS is acceptable because this type of information is not necessary to be included to provide adequate protection of public health and safety. STS 3.3.5 retains requirements to ensure that control rod withdrawal is prohibited and all rods are inserted, when required.

DOC D01 rewrites the MTS 3.3.7 SR 3.3.7.1 Note stating “This Surveillance must be performed on both reactor trip breakers associated with a single division,” into the Surveillance text to state “Perform TADOT on both reactor trip breakers in one division.” The design provides eight reactor trip breakers (RTBs) arranged in four divisions with two RTBs per division. Each RTB is equipped with an undervoltage trip attachment and a shunt trip device. PTS 3.3.1 Conditions N and O, which become Conditions A and B in MTS 3.3.7, for inoperability of these Functions references inoperable “divisions.” Any breaker or trip device inoperability will result in entry into the Actions. The specific design details are not necessary for assuring operability or compliance with TS Actions. Removal of the channel design detail is consistent with PTS 3.3.1 Conditions N and O that are based on “division” operability, not individual component operability.

GTS SR 3.3.1.6 is performed on a Staggered Test Basis, based on the number of divisions. Testing the two reactor trip breakers in the division for each surveillance interval is currently stated in the PTS Note. However, Surveillance Notes typically (refer to Improved TS Writer’s

Guide, TSTF GG 05 01, subsection 4.1.7.d [Reference 4]) allow a limited exception to the Surveillance Requirement acceptance criteria or requirement to perform. In this case, the Note is stating expected attributes of each test and that is better presented within the Surveillance text. Rewriting the Note into the MTS SR 3.3.7.1 still retains the requirement for performing the Trip Actuating Device Operational Test (TADOT) on both reactor trip breakers within the division.

DOC D01 is acceptable because these types of design and procedural details are adequately controlled in the FSAR and TS Bases.

The remaining changes, including those made by DOC A024, 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 3.3.7 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) In GTST for Subsection 3.3.7, 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 A028. This DOC is for changes to ESFAS TS and does not affect Subsection 3.3.7. Note that it is not mentioned anywhere else in this Subsection. This is also stated in Subsections 3.3.1 through 3.3.6. Change "DOCs A024 and A028" to "DOC A024" in GTST 3.3.1 through GTST 3.3.7. This is resolved by making the recommended change.
5. (Internal # 126) In the "ASA, LCO, and Applicability" section of the Bases for STS Subsections 3.3.1 through 3.3.7, revise the opening sentence to state:

The RTS functions to maintain **compliance with** the SLs during all AOOs and mitigates the consequences of DBAs in all MODES in which the **reactor trip breakers (RTBs)** are closed.

This provides additional clarity. This is resolved by making the recommended change.

6. (Internal # 162) In GTST Section VII under the heading "GTST Safety Evaluation" the sixth paragraph, first sentence incorrectly cites both Conditions B and C. The correct citation is to only "Condition C." The second sentence appropriately deals with Condition D. Also, the second sentence states that the default actions require fully inserting all rods and placing the Plant Control System in a condition incapable of rod withdrawal must be done in 6 hours. The time for these Actions is actually 1 hour. In addition, the first action is not to require "fully inserting" all rods, but to "initiating action to fully insert" all rods. Replace the sixth paragraph with the following:

STS 3.3.7, Condition C leads to a new default action to be in Mode 3 in 6 hours (from Mode 1 or 2), which is more restrictive than the time allowed by LCO 3.0.3. Further default actions of Condition D require initiating action to fully insert all rods within 1 hour and placing the Plant Control System in a condition incapable of rod withdrawal within 1 hour (from MODE 3, 4, or 5), which are actions not required by LCO 3.0.3.

This is resolved by making the recommended change.

NRC Final Approval Date: 12/14/2015

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

3.3.7 Reactor Trip System (RTS) Trip Actuation Devices

LCO 3.3.7 Four divisions of RTS trip actuation devices for the following Functions shall be OPERABLE:

- a. Reactor Trip Breakers (RTBs); and
- b. RTB Undervoltage and Shunt Trip Mechanisms.

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

ACTIONS

-----NOTE-----

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or both Functions within one division inoperable.	A.1 Open RTBs in inoperable division.	8 hours
B. One or more both Functions within two divisions inoperable.	B.1 Restore one division to OPERABLE status.	1 hour

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A or B not met in MODE 1 or 2.</p> <p><u>OR</u></p> <p>One or both Functions within three or more divisions inoperable in MODE 1 or 2.</p>	<p>C.1 Be in MODE 3.</p>	<p>6 hours</p>
<p>D. Required Action and associated Completion Time of Condition A or B not met in MODE 3, 4, or 5.</p> <p><u>OR</u></p> <p>One or both Functions within three or more divisions inoperable in MODE 3, 4, or 5.</p>	<p>D.1 Initiate action to fully insert all rodsOpen RTBs.</p> <p><u>AND</u></p> <p>D.2 Place the Plant Control System in a condition incapable of rod withdrawal.</p>	<p>6 hours</p> <p>6 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<div data-bbox="207 449 354 478">SR 3.3.7.1</div> <div data-bbox="428 449 1110 550">NOTE This Surveillance must be performed on both reactor trip breakers associated with a single division.</div> <div data-bbox="428 617 1081 680">Perform TADOT on both reactor trip breakers in one division.</div>	92 days on a STAGGERED TEST BASIS

B 3.3 INSTRUMENTATION

B 3.3.7 Reactor Trip System (RTS) Trip Actuation Devices

BASES

BACKGROUND	A description of the RTS Instrumentation is provided in the Bases for LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."
APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY	<p>The RTS functions to maintain compliance with the SLs during all AOOs and mitigates the consequences of DBAs in all MODES in which the reactor trip breakers (RTBs) are closed (Ref. 1).</p> <p>The RTS Trip Actuation devices are required to ensure RTS Automatic and Manual Functions can provide the necessary protection.</p> <p>The LCO requires OPERABILITY of four RTS divisions with two reactor trip breakers (RTBs) per division, and one undervoltage and shunt trip mechanism per RTB.</p> <p>The safety analyses and OPERABILITY requirements applicable to the RTS Trip Actuation Devices are discussed below:</p> <ol style="list-style-type: none"> 1. <u>Reactor Trip Breakers</u> <p>This trip Function applies to the RTBs exclusive of individual trip mechanisms. There are eight reactor trip breakers with two breakers in each division. The reactor trip circuit breakers are arranged in a two-out-of-four logic configuration, such that the tripping of the two circuit breakers associated with one division does not cause a reactor trip. This circuit breaker arrangement is illustrated in FSAR DCD Figure 7.1-7. The LCO requires four divisions of the Reactor Trip Switchgear to be OPERABLE with two trip breakers associated with each required division. This logic is required to meet the safety function assuming a single failure.</p> <p>This trip Function must be OPERABLE in MODES 1 and or 2 when the reactor is critical. In MODES 3, 4, and or 5, this RTS trip Function must be OPERABLE when the RTBs are closed, and the Plant Control System (PLS) is capable of rod withdrawal or when one or more rods are not fully inserted.</p>

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms

The LCO requires both the Undervoltage and Shunt Trip Mechanisms to be OPERABLE for each RTB that is in service. The trip mechanisms are not required to be OPERABLE for trip breakers that are open, racked out, incapable of supplying power to the PLS, or declared inoperable under Function 1 above. OPERABILITY of both trip mechanisms on each breaker ensures that no single trip mechanism failure will prevent opening the breakers on a valid signal.

This trip Function must be OPERABLE in MODES 1 and 2 ~~when the reactor is critical~~. In MODES 3, 4, and 5, this RTS trip Function must be OPERABLE when the ~~RTBs are closed, and the Plant Control System (PLS)~~ is capable of rod withdrawal **or when one or more rods are not fully inserted**.

The RTS Trip Actuation Devices satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed **in LCO 3.3.7** ~~on Table 3.3.7-1~~.

A.1

Condition A addresses the situation where one or both RTS Trip Actuation **Device** functions within one division are inoperable. With one division inoperable, the Required Action is to open the RTBs in the inoperable division within 8 hours. The 8 hour Completion Time is considered reasonable since the protective function will still function.

B.1

Condition B addresses the situation where one or both RTS Trip Actuation **Device** functions within two divisions are inoperable. With two divisions inoperable, the Required Action is to restore one division to OPERABLE status within 1 hour. The 1 hour Completion Time is considered reasonable since the protective function will still function.

BASES

ACTIONS (continued)

C.1

Condition C addresses the situation where the Required Action and associated Completion Time of Condition A or B are not met in MODE 1 or 2, **or there are one or both RTS Trip Actuation Device functions within three or more divisions inoperable in MODE 1 or MODE 2.**

Required Action C.1 directs that the plant must be placed in MODE 3 within 6 hours. The allowed Completion Times for Required Action C.1 is reasonable, based on operating experience, to reach the specified condition from full power conditions in an orderly manner and without challenging plant systems.

D.1 and D.2

Condition D addresses the situation where the Required Action and associated Completion Time of Condition A or B are not met in MODE 3, 4, or 5, **or there are one or both RTS Trip Actuation Device functions within three or more divisions inoperable in MODE 3, 4, or 5.**

Required Action D.1 requires **initiating action to fully insert all control rods** ~~the RTBs to be opened~~ within 6 hours, **and Required Action D.2 requires that the Plant Control System be placed in a condition incapable of rod withdrawal within 6 hours.** The allowed Completion Times ~~are is~~ reasonable, based on operating experience, to reach the specified condition in an orderly manner and without challenging plant systems.

SURVEILLANCE
REQUIREMENTSSR 3.3.7.1

SR 3.3.7.1 is the performance of a TADOT **on both reactor trip breakers associated with a single division** every 92 days on a STAGGERED TEST BASIS **for four divisions.** This test shall verify OPERABILITY by actuation of the end devices.

The **reactor trip breaker** ~~Reactor Trip Breaker~~ (RTB) test shall include separate verification of the undervoltage and shunt trip mechanisms. Each RTB in a division shall be tested separately in order to minimize the possibility of an inadvertent trip. Both breakers in a single division are tested during each STAGGERED TEST.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Frequency of every 92 days on a STAGGERED TEST BASIS is adequate based on industry operating experience, considering instrument reliability and operating history data. In addition, the ~~AP1000~~ design provides additional breakers to enhance reliability.

~~The SR is modified by a Note to clarify that both breakers in a single division are to be tested during each STAGGERED TEST.~~

REFERENCES

1. ~~FSAR~~ Chapter 15.0, "Accident ~~Analyses~~ ~~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

3.3.7 Reactor Trip System (RTS) Trip Actuation Devices

LCO 3.3.7 Four divisions of RTS trip actuation devices for the following Functions shall be OPERABLE:

- a. Reactor Trip Breakers (RTBs); and
- b. RTB Undervoltage and Shunt Trip Mechanisms.

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

ACTIONS

-----NOTE-----

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or both Functions within one division inoperable.	A.1 Open RTBs in inoperable division.	8 hours
B. One or both Functions within two divisions inoperable.	B.1 Restore one division to OPERABLE status.	1 hour

RTS Trip Actuation Devices
3.3.7

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A or B not met in MODE 1 or 2.</p> <p><u>OR</u></p> <p>One or both Functions within three or more divisions inoperable in MODE 1 or 2.</p>	<p>C.1 Be in MODE 3.</p>	6 hours
<p>D. Required Action and associated Completion Time of Condition A or B not met in MODE 3, 4, or 5.</p> <p><u>OR</u></p> <p>One or both Functions within three or more divisions inoperable in MODE 3, 4, or 5.</p>	<p>D.1 Initiate action to fully insert all rods.</p> <p><u>AND</u></p> <p>D.2 Place the Plant Control System in a condition incapable of rod withdrawal.</p>	<p>6 hours</p> <p>6 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.3.7.1 Perform TADOT on both reactor trip breakers in one division.</p>	92 days on a STAGGERED TEST BASIS

B 3.3 INSTRUMENTATION

B 3.3.7 Reactor Trip System (RTS) Trip Actuation Devices

BASES

BACKGROUND	A description of the RTS Instrumentation is provided in the Bases for LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."
APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY	<p>The RTS functions to maintain compliance with the SLs during all AOOs and mitigates the consequences of DBAs in all MODES in which the reactor trip breakers (RTBs) are closed (Ref. 1).</p> <p>The RTS Trip Actuation devices are required to ensure RTS Automatic and Manual Functions can provide the necessary protection.</p> <p>The LCO requires OPERABILITY of four RTS divisions with two RTBs per division, and one undervoltage and shunt trip mechanism per RTB.</p> <p>The safety analyses and OPERABILITY requirements applicable to the RTS Trip Actuation Devices are discussed below:</p> <ol style="list-style-type: none"> 1. <u>Reactor Trip Breakers</u> <p>This trip Function applies to the RTBs exclusive of individual trip mechanisms. There are eight reactor trip breakers with two breakers in each division. The reactor trip circuit breakers are arranged in a two-out-of-four logic configuration, such that the tripping of the two circuit breakers associated with one division does not cause a reactor trip. This circuit breaker arrangement is illustrated in FSAR Figure 7.1-7. The LCO requires four divisions of the Reactor Trip Switchgear to be OPERABLE with two trip breakers associated with each required division. This logic is required to meet the safety function assuming a single failure.</p> <p>This trip Function must be OPERABLE in MODES 1 and 2. In MODES 3, 4, and 5, this RTS trip Function must be OPERABLE when the Plant Control System (PLS) is capable of rod withdrawal or when one or more rods are not fully inserted.</p>

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms

The LCO requires both the Undervoltage and Shunt Trip Mechanisms to be OPERABLE for each RTB that is in service. The trip mechanisms are not required to be OPERABLE for trip breakers that are open, racked out, incapable of supplying power to the PLS, or declared inoperable under Function 1 above. OPERABILITY of both trip mechanisms on each breaker ensures that no single trip mechanism failure will prevent opening the breakers on a valid signal.

This trip Function must be OPERABLE in MODES 1 and 2. In MODES 3, 4, and 5, this RTS trip Function must be OPERABLE when the Plant Control System (PLS) is capable of rod withdrawal or when one or more rods are not fully inserted.

The RTS Trip Actuation Devices satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in LCO 3.3.7.

A.1

Condition A addresses the situation where one or both RTS Trip Actuation Device functions within one division are inoperable. With one division inoperable, the Required Action is to open the RTBs in the inoperable division within 8 hours. The 8 hour Completion Time is considered reasonable since the protective function will still function.

B.1

Condition B addresses the situation where one or both RTS Trip Actuation Device functions within two divisions are inoperable. With two divisions inoperable, the Required Action is to restore one division to OPERABLE status within 1 hour. The 1 hour Completion Time is considered reasonable since the protective function will still function.

BASES

ACTIONS (continued)

C.1

Condition C addresses the situation where the Required Action and associated Completion Time of Condition A or B are not met in MODE 1 or 2, or there are one or both RTS Trip Actuation Device functions within three or more divisions inoperable in MODE 1 or MODE 2. Required Action C.1 directs that the plant must be placed in MODE 3 within 6 hours. The allowed Completion Times for Required Action C.1 is reasonable, based on operating experience, to reach the specified condition from full power conditions in an orderly manner and without challenging plant systems.

D.1 and D.2

Condition D addresses the situation where the Required Action and associated Completion Time of Condition A or B are not met in MODE 3, 4, or 5, or there are one or both RTS Trip Actuation Device functions within three or more divisions inoperable in MODE 3, 4, or 5. Required Action D.1 requires initiating action to fully insert all control rods within 6 hours, and Required Action D.2 requires that the Plant Control System be placed in a condition incapable of rod withdrawal within 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the specified condition in an orderly manner and without challenging plant systems.

SURVEILLANCE
REQUIREMENTSSR 3.3.7.1

SR 3.3.7.1 is the performance of a TADOT on both reactor trip breakers associated with a single division every 92 days on a STAGGERED TEST BASIS for four divisions. This test shall verify OPERABILITY by actuation of the end devices.

The reactor trip breaker (RTB) test shall include separate verification of the undervoltage and shunt trip mechanisms. Each RTB in a division shall be tested separately in order to minimize the possibility of an inadvertent trip. Both breakers in a single division are tested during each STAGGERED TEST.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Frequency of every 92 days on a STAGGERED TEST BASIS is adequate based on industry operating experience, considering instrument reliability and operating history data. In addition, the design provides additional breakers to enhance reliability.

REFERENCES

1.	FSAR Chapter 15.0, "Accident Analyses."
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