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

Title: Changes Related to LCO 3.3.4, Reactor Trip System (RTS) Engineered Safety Feature Actuation System (ESFAS) Instrumentation

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-425-A, Rev 3,	Relocate Surveillance Frequencies to Licensee Control - RITSTF Initiative 5b
TSTF-519-T, Rev 0,	Increase Standardization in Condition and Required Action Notes

STS NUREGs Affected:

TSTF-418-A, Rev 2:	NUREG 1431
TSTF-425-A, Rev 3:	NUREGs 1430, 1431, 1432, 1433, and 1434
TSTF-519-T, Rev 0:	NUREG 1430 and 1431

NRC Approval Date:

TSTF-418-A, Rev 2:	02-Apr-03
TSTF-425-A, Rev. 3:	06-Jul-09
TSTF-519-T, Rev 0:	16-Oct-09 (TSTF Review)

TSTF Classification:

TSTF-418-A, Rev 2:	Technical Change
TSTF-425-A, Rev 3:	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 3.3.4, to which the other changes are applied.
VEGP LAR DOC M01:	Deletion of Reactor Trip Channel Operational Test (RTCOT) Definition
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

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-425-A deferred for future consideration.

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)

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 RTBs are closed.

In the "ASA, LCO, and Applicability" section of the Bases for STS 3.3.4, there is no statement concerning what criterion of 10 CFR 50.36 is met. Add the following statement to the end of this Bases section:

> **The RTS ESFAS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).**

V. Applicability

Affected Generic Technical Specifications and Bases:

Section 3.3.4, Reactor Trip System (RTS) Engineered Safety Feature Actuation System (ESFAS) Instrumentation

Changes to the Generic Technical Specifications and Bases:

GTS 3.3.1, “Reactor Trip System (RTS) Instrumentation,” is reformatted by VEGP DOC {LAR A024 into multiple Specifications including interim A024-modified TS (MTS) 3.3.4, “Reactor Trip System (RTS) Engineered Safety Feature Actuation (ESFAS) Instrumentation.” The reformatting relocates GTS 3.3.1 Functions 15.b, 20.b, and 21.b into MTS Table 3.3.4-1 as Functions 1, 2, and 3. The MTS format is depicted in Section XI of this GTST as the reference case in the markup of the GTS instrumentation requirements for ESFAS instrumentation.

MTS 3.3.4 Function No. & STS Title	GTS 3.3.1 Function(s)
1. Safeguards Actuation Input from Engineered Safety Feature Actuation System - Automatic	15. Safeguards Actuation Input from Engineered Safety Feature Actuation System b. Automatic
2. ADS Stages 1, 2, and 3 Actuation Input from Engineered Safety Feature Actuation System - Automatic	20. ADS Stages 1, 2, and 3 Actuation Input from Engineered Safety Feature Actuation System b. Automatic
3. Core Makeup Tank Actuation Input from Engineered Safety Feature Actuation System - Automatic	21. Core Makeup Tank Actuation Input from Engineered Safety Feature Actuation System b. Automatic

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 L and P are reordered and relabeled as AP1000 MTS 3.3.4 Conditions A, B and C. (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 ESFAS instrumentation. GTS Table 3.3.1-1 footnote (a) is incorporated into the MTS Table 3.3.4-1 as footnote (a) MODEs 3, 4, and 5. (DOC A024)

MTS Table 3.3.4-1 footnote (a)) is further 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)

MTS 3.3.4 Conditions B and D are revised by adding a second condition statement for the condition “one or more Functions with three or more channels 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 3.3.4 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)

GTS SR 3.3.1.7 is retained and renumbered as MTS SR 3.3.4.1. (DOC A024)

MTS SR 3.3.4.1 is revised from “Perform RTCOT” to “Perform ACTUATION LOGIC TEST.” The definition of RTCOT does not explicitly require adjustments of required alarm, interlock, and trip setpoints required for channel OPERABILITY such that the setpoints are within the necessary range and accuracy. NUREG-1431 specifies the Actuation Logic Test for similar Functions. (DOC M01)

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) 3.3.4 and as further changed, STS 3.3.4.

Changes to Conditions

GTS 3.3.1 Condition	MTS 3.3.4 Condition	STS 3.3.4 Condition	Other STS Subsections Addressing the Listed Condition	Additional DOC Changes
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	A	A	GTS Condition L is split into 2 Conditions	---
L	B	B	3.3.6	M02
M	→	→	3.3.1	---
N	→	→	3.3.7	---
O	→	→	3.3.7	---
P	C	C	GTS Condition P is split into 2 Conditions	---
P	D	D	3.3.6	L07
Q	→	→	3.3.2	---
R	→	→	3.3.2	---

Changes to Functions

----------	Function [Modes(footnote)]	----------	STS 3.3.4	Other STS Subsections	Additional
GTS 3.3.1	MTS 3.3.4	STS 3.3.4	Conditions	and Additional Changes	DOC Changes
15.b [1,2]	1 [1,2]	1 [1,2]	A, B	---	---
20.b [1,2]	2 [1,2]	2 [1,2]	A, B	---	---
20.b [3(a),4(a),5(a)]	2 [3(a),4(a),5(a)]	2 [3(a),4(a),5(a)]	C, D	---	---
21.b [1,2]	2 [1,2]	2 [1,2]	A, B	---	---
21.b [3(a),4(a),5(a)]	2 [3(a),4(a),5(a)]	2 [3(a),4(a),5(a)]	C, D	---	---

Changes to Applicability Footnotes

GTS 3.3.1 Footnote	MTS 3.3.4 Footnote	STS 3.3.4 Footnote	STS 3.3.4 Function	STS Subsections Also Addressing Listed footnote	Additional Changes DOC Number
a	a	a	2,3	3.3.2, 3.3.5, 3.3.6, 3.3.7	L07

Changes to Surveillance Requirements

GTS 3.3.1 SR	MTS 3.3.4 SR	STS 3.3.4 SR	STS Subsections Also Addressing the Listed SR	Example Surveillance No. Surveillance Description
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
3.3.1.6	→	→	3.3.7	3.3.7.1 Perform TADOT
3.3.1.7	3.3.4.1	3.3.4.1	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)

A statement concerning what criterion of 10 CFR 50.36 is met is added to the “ASA, LCO, and Applicability” section of the Bases for STS 3.3.4 for clarity and consistency.

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 3.3.4. VEGP LAR 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 3.3.4 markup, in Section XI of this GTST, as the “clean” starting point for this GTST and are identified as interim A024-modified TS (MTS) 3.3.4. The specific details of the reformatting for MTS 3.3.4 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.

VEGP LAR DOC M02 addresses the fact that MTS 3.3.4, “Reactor Trip System (RTS) Engineered Safety Feature Actuation System (ESFAS) Instrumentation,” does not specify Actions for one or more Functions with three or more channels inoperable. This results in entry into LCO 3.0.3 when three or more channels are inoperable.

VEGP LAR 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.”

VEGP LAR DOC M01 revises MTS SR 3.3.4.1 to “Perform ACTUATION LOGIC TEST” in place of “Perform RTCOT.”

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 VEGP LAR 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 current 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.

VEGP LAR 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. VEGP LAR DOC L07 provides additional operator flexibility to achieve the same intent as opening the RTBs.

The definition of RTCOT does not explicitly require that the test provide overlap with the actuated device, as does the definition of Actuation Logic Test. Therefore, VEGP LAR DOC M01 replaces the performance of a RTCOT with an ACTUATION LOGIC TEST. This is consistent with similar testing specified in NUREG-1431.

Description of 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 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 RTBs are closed. (APOG Comment)

The following statement is added to the end of the “ASA, LCO, and Applicability” section of the Bases for STS 3.3.4:

> **The RTS ESFAS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).** (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.

The statement added to the end of this Bases the “ASA, LCO, and Applicability” section of the Bases for STS 3.3.4 provides clarity and consistency.

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 VEGP LAR 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 VEGP LAR 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 3.3.4, Condition B 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 VEGP LAR DOC M02 do not introduce any adverse impact on public health and safety.

VEGP LAR 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. VEGP LAR 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 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 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.

VEGP LAR DOC M01 revises MTS SR 3.3.4.1 to state “Perform ACTUATION LOGIC TEST” in place of “Perform RTCOT.” GTS Section 1.1 defines an RTCOT as “A RTCOT shall be the injection of a simulated or actual signal into the reactor trip channel as close to the sensor as practicable to verify OPERABILITY of the required interlock and/or trip functions. The RTCOT may be performed by means of a series of sequential, overlapping, or total channel steps so that the entire channel is tested from the signal conditioner through the trip logic.”

The STS Section 1.1 definition for Actuation Logic Test per Reference 2 VEGP LAR DOC A001 and DOC L01, states “An ACTUATION LOGIC TEST shall be the application of various simulated or actual input combinations in conjunction with each possible interlock logic state required for OPERABILITY of a logic circuit and the verification of the required logic output. The ACTUATION LOGIC TEST shall be conducted such that it provides component overlap with the actuated device.”

MTS 3.3.4 SR 3.3.4.1 requires an RTCOT to be performed on RTS Automatic Trip Logic and on actuation inputs from the Engineered Safety Feature Actuation System. These Functions are logic functions, as described in the associated Bases. However, NUREG-1431 specifies the Actuation Logic Test for similar Functions. In addition, use of Actuation Logic Test is consistent with testing performed on other trip logic in PTS, such as the ESFAS Actuation Logic (MTS SR 3.3.15.1 and MTS 3.3.16.1). The definition of RTCOT requires testing the channel through the trip logic; however, it does not explicitly require that the test provide overlap with the actuated device, as does the definition of Actuation Logic Test. Therefore, per VEGP LAR DOC M01, reference to RTCOT is replaced with Actuation Logic Test in STS SR 3.3.4.1. This change is more restrictive than the GTS because an Actuation Logic Test explicitly requires overlap with the actuated device.

The remaining changes, including VEGP LAR 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 3.3.4 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

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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 # 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.

2. (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.

3. (Internal #13) Many GTSTs evaluated TSTF-425 with the following note: Risk-informed TS changes will be considered at a later time for application to the AP1000 STS.

   The NRC approval of TSTF-425, and model safety evaluation provided in the CLIIP for TSTF-425, are generically applicable to any design's Technical Specifications. As such, the replacement of certain Frequencies with a Surveillance Frequency Control Program should be included in the GTST for AP1000 STS NUREG.

   However, implementation in the AP1000 STS should not reflect optional (i.e., bracketed) material showing retention of fixed Surveillance Frequencies where relocation to a Surveillance Frequency Control Program is acceptable. Since each represented AP1000 Utility is committed to maintaining standardization, there is no rationale for an AP1000 STS that includes bracketed options.

   Consistent with TSTF-425 criteria, replace applicable Surveillance Frequencies with "In accordance with the Surveillance Frequency control Program" and add that Program as new AP1000 STS Specification 5.5.15.

   NRC Staff disagreed with implementing TSTF-425 in the initial version of the STS. Although the APOG thinks the analysis supporting this traveler is general enough to be

applicable to AP1000, staff thinks an AP1000-specific proposal from APOG is needed to identify any GTS SRs that should be excluded. Also, with the adoption of a Surveillance Frequency Control Program (SFCP) in the AP1000 STS, bracketed Frequencies, which provide a choice between the GTS Frequency and the SFCP Frequency, are needed because the NRC will use the AP1000 STS as a reference, and to be consistent with NUREG-1431, Rev. 4. APOG was requested to consider proposing an AP1000 version of TSTF-425 for a subsequent revision of the STS.

4. (Internal # 116) In GTST for Subsection 3.3.4, 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 3.3.4. Note that it is not mentioned anywhere else in this Subsection. This is also stated in Subsections 3.3.1 through 3.3.3 and Subsections 3.3.5 through 3.3.7. 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 RTBs are closed

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

6. (Internal # 154 and 155) In GTST Section VII under the heading "GTST Safety Evaluation" the sixth paragraph, first line repeats the phrase "Conditions B and D"; however, the correct phrase is to include only "Condition B." The second sentence appropriately deals with Condition D. 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 1 hour. In addition, the first action is not to require "fully inserting" all rods, but to "initiating action to fully insert" all rods. This sentence should also clarify that the default action being discussed is Condition D. Replace the sixth paragraph with the following:

   > STS 3.3.4, Condition B 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.

7. (Internal # 156) Table 3.3.4-1 is incorrectly numbered "(page 0 of 1)." Change Page numbering to "(page 1 of 1)." This is resolved by making the recommended change.

8. (Internal # 157) In the "ASA, LCO, and Applicability" section of the Bases for STS 3.3.4, there is no statement concerning what criterion of 10 CFR 50.36 is met. Add the following statement to the end of this Bases section:

   > **The RTS ESFAS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).**

   This is resolved by making the recommended change.

NRC Final Approval Date: 5/1/2015

NRC Contact:

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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).

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

3.3.4 Reactor Trip System (RTS) Engineered Safety Feature Actuation System (ESFAS) Instrumentation

LCO 3.3.4 The RTS ESFAS instrumentation for each Function in Table 3.3.4-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.4-1.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or two channels inoperable in MODE 1 or 2.	A.1 Restore three of four channels to OPERABLE status.	6 hours
B. Required Action and associated Completion Time of Condition A not met. **OR** **One or more Functions with three or more channels inoperable in MODE 1 or 2.**	B.1 Be in MODE 3.	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with one or two channels inoperable in MODE 3, 4 or 5.	C.1 Restore three of four channels to OPERABLE status. ~~OR~~ ~~C.2 Open RTBs~~	48 hours ~~49 hours~~
D. Required Action and associated Completion Time of Condition C not met. **OR** **One or more Functions with three or more channels inoperable in MODE 3, 4 or 5.**	**D.1 Initiate action to fully insert all rods.** **AND** **D.2 Place the Plant Control System in a condition incapable of rod withdrawal.**	**1 hour** **1 hour**

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.4.1	Perform **ACTUATION LOGIC TEST** ~~RTCOT~~.	92 days

Table 3.3.4-1 (page 1 of 1)
Reactor Trip System Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS
1. Safeguards Actuation Input from Engineered Safety Feature Actuation System - Automatic	1,2	4
2. ADS Stages 1, 2, and 3 Actuation Input from Engineered Safety Feature Actuation System - Automatic	1,2,3[(a)],4[(a)],5[(a)]	4
3. Core Makeup Tank Actuation Input from Engineered Safety Feature Actuation System - Automatic	1,2,3[(a)],4[(a)],5[(a)]	4

(a) With ~~Reactor Trip Breakers (RTBs) closed and~~ Plant Control System capable of rod withdrawal **or one or more rods not fully inserted**.

B 3.3 INSTRUMENTATION

B 3.3.4 Reactor Trip System (RTS) Engineered Safety Feature Actuation System (ESFAS) Instrumentation

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

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

This LCO provides requirements for the automatic inputs from the Engineered Safety Feature Actuation System (ESFAS) to the RTS. The safety analyses and OPERABILITY requirements applicable to the RTS ESFAS Instrumentation Functions are discussed below:

1. Safeguards Actuation Input from Engineered Safety Feature Actuation System - Automatic

   The Safeguards Actuation Input from ESFAS - Automatic ensures that if a reactor trip has not already been generated by the RTS, the ESFAS automatic actuation logic will initiate a reactor trip upon any signal which initiates the Safeguards Actuation signal. This is a condition of acceptability for the Loss of Coolant Accident (LOCA). However, other transients and accidents take credit for varying levels of ESFAS performance and rely upon rod insertion, except for the most reactive rod which is assumed to be fully withdrawn, to ensure reactor shutdown.

   The LCO requires four automatic channels of Safeguards Actuation Signal Input from ESFAS to be OPERABLE in MODES 1 and 2. Four automatic channels are provided to permit one channel to be in bypass indefinitely and still ensure no single random failure will disable this trip Function.

   A reactor trip is initiated every time a Safeguards Actuation signal is present. Therefore, this trip Function must be OPERABLE in MODES 1 and 2, when the reactor is critical, and must be shutdown in the event of an accident. In MODE 3, 4, 5, or 6, the reactor is not critical.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2. ADS Stages 1, 2 and 3 Actuation Input from Engineered Safety Feature Actuation System - Automatic

The LCO requirement for this Function provides a reactor trip for any event that may initiate depressurization of the reactor.

The LCO requires four automatic channels of the ADS Stages 1, 2, and 3 Actuation Input from ESFAS Function to be OPERABLE. Four OPERABLE channels are provided to ensure that a random failure of a single logic channel will not prevent reactor trip.

This trip Function must be OPERABLE in MODE 1 or 2 when the reactor is critical. In MODE 3, 4, 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 one or more rods are not fully inserted**.

3. Core Makeup Tank (CMT) Actuation Input from Engineered Safety Feature Actuation System - Automatic

The LCO requirement for this Function provides a reactor trip for any event that may initiate CMT injection.

The LCO requires four channels of the CMT Actuation Input from ESFAS Function to be OPERABLE. Four OPERABLE channels are provided to ensure that random failure of a single logic channel will not prevent reactor trip.

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

The RTS ESFAS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.4-1.

A.1

Condition A addresses the situation where one or more Functions have one or two channels inoperable in MODE 1 or MODE 2. With one or two channels inoperable, three of four channels must be restored to OPERABLE status within 6 hours. Restoring all channels but one to OPERABLE status ensures that a single failure will neither cause nor prevent the protective function. The Completion Time takes into consideration the redundant capability provided by the remaining redundant OPERABLE channels and the low probability of occurrence of an event during this period that may require the protection afforded by this Function. The 6 hour Completion Time is considered reasonable since the protective function will still function.

B.1

Condition B addresses the situation where the Required Action and associated Completion Time of Condition A is not met, or there are one or more Functions with three or more channels inoperable in MODE 1 or MODE 2. Required Action B.1 directs that the plant must be placed in MODE 3 within 6 hours. The allowed Completion Time for Required Action B.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. ~~If Required Actions described above cannot be met within the specified Completion Times, the unit must be placed in a MODE where this Function is no longer required to be OPERABLE. A Completion Time of an additional 6 hours is allowed to place the unit in MODE 3. The Completion Time is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. Allowance of this time interval takes into consideration the redundant capability provided by the remaining two redundant OPERABLE channels/divisions and the low probability of occurrence of an event during this period that may require the protection afforded by this Function.~~

BASES

ACTIONS (continued)

C.1 ~~and C.2~~

Condition C addresses the situation where one or more Functions have one or two channels inoperable in MODE 3, 4 or 5. With one or two channels inoperable, three of the four channels must be restored to OPERABLE status in 48 hours. Restoring all channels but one to OPERABLE status ensures that a single failure will neither cause nor prevent the protective function. The 48 hour Completion Time is considered reasonable since the protective function will still function.

~~If Required Actions described above cannot be met within the specified Completion Times, the unit must be placed in a MODE where this Function is no longer required to be OPERABLE. A Completion Time of an additional 1 hour is allowed to open the RTBs. With RTBs open, these Functions are no longer required.~~

D.1 and D.2

Condition D addresses the situation where the Required Action and associated Completion Time of Condition C is not met, or there are one or more Functions with three or more channels inoperable in MODE 3, 4, or 5. Required Action D.1 requires initiating action to fully insert all rods within 1 hour, and Required Action D.2 requires that the Plant Control System be placed in a condition incapable of rod withdrawal within 1 hour. The allowed Completion Times are reasonable, based on operating experience, to reach the specified condition in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.4.1

SR 3.3.4.1 is the performance of a**n ACTUATION LOGIC TEST** ~~REACTOR TRIP CHANNEL OPERATIONAL TEST (RTCOT)~~ every 92 days.

A**n ACTUATION LOGIC TEST** ~~RTCOT~~ is performed on each required channel to provide reasonable assurance that the entire channel will perform the intended Function.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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

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

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

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

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

This test frequency of 92 days is justified based on Reference 1 **(which refers to this test as an "RTCOT")** and the use of continuous diagnostic test features, such as deadman timers, cross-check of redundant channels, memory checks, numeric coprocessor checks, and tests of timers, counters and crystal time bases, which will report a failure within the protection and safety monitoring system cabinets to the operator within 10 minutes of a detectable failure. During performance of the **ACTUATION LOGIC TEST** ~~RTCOT~~, the protection and safety monitoring system cabinets in the division under test may be placed in bypass.

BASES

REFERENCES 1. APP-GW-GSC-020, “Technical Specification Completion Time and Surveillance Frequency Justification.”

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

3.3.4 Reactor Trip System (RTS) Engineered Safety Feature Actuation System (ESFAS) Instrumentation

LCO 3.3.4 The RTS ESFAS instrumentation for each Function in Table 3.3.4-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.4-1.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or two channels inoperable in MODE 1 or 2.	A.1 Restore three of four channels to OPERABLE status.	6 hours
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> One or more Functions with three or more channels inoperable in MODE 1 or 2.	B.1 Be in MODE 3.	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with one or two channels inoperable in MODE 3, 4 or 5.	C.1 Restore three of four channels to OPERABLE status.	48 hours
D. Required Action and associated Completion Time of Condition C not met. OR One or more Functions with three or more channels inoperable in MODE 3, 4 or 5.	D.1 Initiate action to fully insert all rods. AND D.2 Place the Plant Control System in a condition incapable of rod withdrawal.	1 hour 1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.4.1	Perform ACTUATION LOGIC TEST.	92 days

Table 3.3.4-1 (page 1 of 1)
Reactor Trip System Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS
1. Safeguards Actuation Input from Engineered Safety Feature Actuation System - Automatic	1,2	4
2. ADS Stages 1, 2, and 3 Actuation Input from Engineered Safety Feature Actuation System - Automatic	1,2,3[(a)],4[(a)],5[(a)]	4
3. Core Makeup Tank Actuation Input from Engineered Safety Feature Actuation System - Automatic	1,2,3[(a)],4[(a)],5[(a)]	4

(a) With Plant Control System capable of rod withdrawal or one or more rods not fully inserted.

B 3.3 INSTRUMENTATION

B 3.3.4 Reactor Trip System (RTS) Engineered Safety Feature Actuation System (ESFAS) Instrumentation

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

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

This LCO provides requirements for the automatic inputs from the Engineered Safety Feature Actuation System (ESFAS) to the RTS. The safety analyses and OPERABILITY requirements applicable to the RTS ESFAS Instrumentation Functions are discussed below:

1. Safeguards Actuation Input from Engineered Safety Feature Actuation System - Automatic

   The Safeguards Actuation Input from ESFAS - Automatic ensures that if a reactor trip has not already been generated by the RTS, the ESFAS automatic actuation logic will initiate a reactor trip upon any signal which initiates the Safeguards Actuation signal. This is a condition of acceptability for the Loss of Coolant Accident (LOCA). However, other transients and accidents take credit for varying levels of ESFAS performance and rely upon rod insertion, except for the most reactive rod which is assumed to be fully withdrawn, to ensure reactor shutdown.

   The LCO requires four automatic channels of Safeguards Actuation Signal Input from ESFAS to be OPERABLE in MODES 1 and 2. Four automatic channels are provided to permit one channel to be in bypass indefinitely and still ensure no single random failure will disable this trip Function.

   A reactor trip is initiated every time a Safeguards Actuation signal is present. Therefore, this trip Function must be OPERABLE in MODES 1 and 2, when the reactor is critical, and must be shutdown in the event of an accident. In MODE 3, 4, 5, or 6, the reactor is not critical.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2. ADS Stages 1, 2 and 3 Actuation Input from Engineered Safety Feature Actuation System - Automatic

   The LCO requirement for this Function provides a reactor trip for any event that may initiate depressurization of the reactor.

   The LCO requires four automatic channels of the ADS Stages 1, 2, and 3 Actuation Input from ESFAS Function to be OPERABLE. Four OPERABLE channels are provided to ensure that a random failure of a single logic channel will not prevent reactor trip.

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

3. Core Makeup Tank (CMT) Actuation Input from Engineered Safety Feature Actuation System - Automatic

   The LCO requirement for this Function provides a reactor trip for any event that may initiate CMT injection.

   The LCO requires four channels of the CMT Actuation Input from ESFAS Function to be OPERABLE. Four OPERABLE channels are provided to ensure that random failure of a single logic channel will not prevent reactor trip.

   This trip Function must be OPERABLE in MODES 1 and 2 when the reactor is critical. In MODE 3, 4, and 5 this RTS trip Functions must be OPERABLE when the PLS is capable of rod withdrawal or one or more rods are not fully inserted.

The RTS ESFAS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.4-1.

A.1

Condition A addresses the situation where one or more Functions have one or two channels inoperable in MODE 1 or MODE 2. With one or two channels inoperable, three of four channels must be restored to OPERABLE status within 6 hours. Restoring all channels but one to OPERABLE status ensures that a single failure will neither cause nor prevent the protective function. The Completion Time takes into consideration the redundant capability provided by the remaining redundant OPERABLE channels and the low probability of occurrence of an event during this period that may require the protection afforded by this Function. The 6 hour Completion Time is considered reasonable since the protective function will still function.

B.1

Condition B addresses the situation where the Required Action and associated Completion Time of Condition A is not met, or there are one or more Functions with three or more channels inoperable in MODE 1 or MODE 2. Required Action B.1 directs that the plant must be placed in MODE 3 within 6 hours. The allowed Completion Time for Required Action B.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.

C.1

Condition C addresses the situation where one or more Functions have one or two channels inoperable in MODE 3, 4 or 5. With one or two channels inoperable, three of the four channels must be restored to OPERABLE status in 48 hours. Restoring all channels but one to OPERABLE status ensures that a single failure will neither cause nor prevent the protective function. The 48 hour Completion Time is considered reasonable since the protective function will still function.

BASES

ACTIONS (continued)

D.1 and D.2

Condition D addresses the situation where the Required Action and associated Completion Time of Condition C is not met, or there are one or more Functions with three or more channels inoperable in MODE 3, 4, or 5. Required Action D.1 requires initiating action to fully insert all rods within 1 hour, and Required Action D.2 requires that the Plant Control System be placed in a condition incapable of rod withdrawal within 1 hour. The allowed Completion Times are reasonable, based on operating experience, to reach the specified condition in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.4.1

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

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

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

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

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

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

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

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

REFERENCES

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