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

Title: Changes Related to LCO 3.3.19, Diverse Actuation System (DAS) Manual Controls

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:

None

STS NUREGs Affected:

Not Applicable

NRC Approval Date:

Not Applicable

TSTF Classification:

Not Applicable

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 3.3.5.

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to GTS 3.3.5.

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
VEGP LAR DOC A028: Reformat of GTS 3.3.2 into Nine Parts; 3.3.8 through 3.3.16
VEGP LAR DOC A039: Corrections to Table 3.3.18-1
VEGP LAR DOC L14: Correction to Table 3.3.18-1 Footnote (b)

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(1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

None

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)

Define “PRA” in the first paragraph of the “Background” section of the Bases for STS Subsection 3.3.19 as “Probabilistic Risk Assessment (PRA).” (NRC Staff Comment)

APOG Recommended Changes to Improve the Bases

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 3.3.19, Diverse Actuation System (DAS) Manual Controls

Changes to the Generic Technical Specifications and Bases:

GTS 3.3.1, “Reactor Trip System (RTS) Instrumentation,” is reformatted by DOC A024 into seven Specifications; interim A024-modified TS (MTS) 3.3.1 through MTS 3.3.7. The AP1000 GTS 3.3.2, “Engineered Safety Feature Actuation System (ESFAS) Instrumentation,” is reformatted by DOC A028 into nine Specifications; MTS 3.3.8 through MTS 3.3.16. As a result of the reformatting, GTS 3.3.5, “Diverse Actuation System (DAS) Manual Controls,” is renumbered as MTS 3.3.19. The MTS format is depicted in Section XI of this GTST as the reference case in the markup of the GTST instrumentation requirements for DAS manual controls.

MTS Table 3.3.19-1, Footnote (c) is revised from “In MODE 6 with reactor internals in place,” to “With reactor internals in place.” Footnote references in the Table body are superscripted. “In MODE 6” is redundant and superscripted footnote references are consistent with other Tables. (DOC A039)

MTS Table 3.3.19-1, Footnote (b) is revised from “With the calculated reactor decay heat > 6.0 MWt,” to “With the reactor decay heat > 6.0 MWt.” The use of “calculated” is a method of determination that is not required to be included in the TS to properly interpret the applicability requirement. (DOC L14)

The first paragraph of the “Background” section of the Bases is revised for clarity. (NRC Staff Comment)

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

VI. Traveler Information

Description of TSTF changes:

Not Applicable

Rationale for TSTF changes:

Not Applicable

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

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

As detailed in VEGP TSU LAR Enclosure 1, DOC A028 reformats PTS 3.3.2 into multiple Specifications as follows:

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

As a result, GTS 3.3.5 is renumbered as MTS 3.3.19. The specific details of the reformatting for the MTS 3.3.1 through MTS 3.3.16 can be found in Reference 2, VEGP TSU LAR in Enclosure 2 (markup) and Enclosure 4 (clean). The NRC staff safety evaluation regarding DOC A024 and DOC A028 can be found in Reference 3, VEGP LAR SER. The VEGP TSU LAR

was modified in response to NRC staff RAIs in Reference 5 and the Southern Nuclear Operating Company RAI Response in Reference 6.

DOC A039 revises footnote (c) from “In MODE 6 with reactor internals in place,” to “With reactor internals in place.” Applicable Modes or Other Specified Conditions for Functions 2, 3, 4, 5, 6, 7, and 10 are revised to superscript the footnotes associated with Mode 5 and Mode 6, as applicable.

DOC L14 revises footnote (b) from “With the calculated reactor decay heat > 6.0 MWt,” to “With the reactor decay heat > 6.0 MWt.”

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 and DOC A028, except where addressed in other Discussion of Changes, 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.

DOC A039 notes that because Mode 6 is specified in the Applicable Modes or Other Specified Conditions column of PTS Table 3.3.5-1 for Function 7, including “MODE 6” in the footnote is an extraneous detail. Also, footnotes associated with Modes and Other Specified Conditions in other TS tables, such as Table 3.3.1-1, “Reactor Trip System Instrumentation,” are formatted as superscript text.

DOC L14 notes that the use of “calculated” is a method of determination that is not required to be included in the TS to properly interpret the applicability requirement.

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

“PRA” is defined in the first paragraph of the “Background” section of the Bases as “Probabilistic Risk Assessment (PRA).” (NRC Staff Comment)

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

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

The non-technical change to the first paragraph of the “Background” section of the Bases provides 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:

The affected specifications ensure that the appropriate structures, systems, and components are operable and that the appropriate testing is performed when reactor decay heat or fuel storage pool decay heat are above specified values, as applicable. The requirement in footnote (b) that reactor decay heat be “calculated” specifies a method of determination that is not required to be included in the STS to properly interpret the applicability requirement. Therefore, the removal of the direction to calculate reactor decay heat from STS Table 3.3.19-1 footnote (b) is not necessary to be included in the STS to provide adequate protection of public health and safety. The proposed STS retain the necessary requirements to ensure the required structures, systems, and components are operable. Also, this change is acceptable because it is consistent with how decay heat is used to modify requirements stated in GTS Table 1.1-1, “MODES,” footnote (a), and in GTS Table 3.3.2-1, “Engineered Safeguards Actuation System Instrumentation,” footnote (f).

The remaining changes 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 3.3.19 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 # 3, 215, and 216) 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. An additional edit for added clarity is noted. In the first paragraph, define “PRA” as “Probabilistic Risk Assessment (PRA).”

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 # 214) The LCO 3.3.19 statement ends with a colon. The statement should end with a period. Revise the LCO 3.3.19 statement to end with a period. This is resolved by making the recommended change with an additional edit to correct an additional typographical error. Replace the Required Action C.1 statement so that it states: “Perform SR 3.3.15.1 and SR 3.3.16.1, as applicable.”

5. (Internal # 217) In the “Actions” section of the Bases for STS Subsection 3.3.19 under the heading “B.1 and B.2” the second paragraph states “Required Action B.1 requires SR 3.3.1.6...” This should be SR 3.3.7.1, as specified in TS 3.3.19, Required Action B.1. Change “3.3.1.6” to “3.3.7.1” This is resolved by making the recommended change.

NRC Final Approval Date: 12/14/2015

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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

3.3.19 Diverse Actuation System (DAS) Manual Controls

LCO 3.3.19 The DAS Manual Controls for each function in Table 3.3.19-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.19-1.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more manual DAS controls inoperable.	A.1	Restore DAS manual controls to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met for inoperable DAS manual reactor trip control.	B.1	Perform SR 3.3.7.1.	Once per 31 days on a STAGGERED TEST BASIS
	AND		
	B.2	Restore all controls to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry
C. Required Action and associated Completion Time of Condition A not met for inoperable DAS manual actuation control other than reactor trip.	C.1	Perform SR 3.3.15.1 and SR 3.3.16.1, as applicable.	Once per 31 days on a STAGGERED TEST BASIS
	AND		
	C.2	Restore all controls to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition B not met. OR Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.19.1	----------NOTE---------- Verification of setpoint not required. ----------	
	Perform TRIP ACTUATION DEVICE OPERATIONAL TEST (TADOT).	24 months

Table 3.3.19-1 (page 1 of 1)
DAS Manual Controls

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CONTROLS
1. Reactor trip manual controls	1,2	2 switches
2. Passive Residual Heat Removal Heat Exchanger (PRHR HX) control and In-Containment Refueling Water Storage Tank (IRWST) gutter control valves	1,2,3,4,**5[(a)]** ~~5(a)~~	2 switches
3. Core Makeup Tank (CMT) isolation valves	1,2,3,4,**5[(a)]** ~~5(a)~~	2 switches
4. Automatic Depressurization System (ADS) stage 1 valves	1,2,3,4,**5[(a)]** ~~5(a)~~	2 switches
5. ADS stage 2 valves	1,2,3,4,**5[(a)]** ~~5(a)~~	2 switches
6. ADS stage 3 valves	1,2,3,4,**5[(a)]** ~~5(a)~~	2 switches
7. ADS stage 4 valves	1,2,3,4,5,**6[(c)]** ~~6(c)~~	2 switches
8. IRWST injection squib valves	1,2,3,4,5,6	2 switches
9. Containment recirculation valves	1,2,3,4,5,6	2 switches
10. Passive containment cooling drain valves	1,2,3,4,**5[(b)],6[(b)]** ~~5(b),6(b)~~	2 switches
11. Selected containment isolation valves	1,2,3,4,5,6	2 switches

(a) With Reactor Coolant System (RCS) pressure boundary intact.

(b) With the ~~calculated~~ reactor decay heat > 6.0 MWt.

(c) **With** ~~In MODE 6 with~~ reactor internals in place.

B 3.3 INSTRUMENTATION

B 3.3.19 Diverse Actuation System (DAS) Manual Controls

BASES

BACKGROUND

The Diverse Actuation System (DAS) manual controls provide non-Class 1E backup controls in case of common-mode failure of the Protection and Safety Monitoring System (PMS) automatic and manual actuations evaluated in the ~~AP1000~~ **probabilistic risk assessment (**PRA**) (Ref. 1)**. These DAS manual controls are not credited for mitigating accidents in the **FSAR** ~~DCD~~ Chapter 15 analyses.

The specific DAS controls were selected based on PRA risk importance as discussed in Reference **2**~~1~~. As noted in Reference **2**~~1~~, electrical power for these controls and instrument indications need not be covered by Technical Specifications. The rationale is that these controls use the same nonsafety-related power supply used by the plant control system. This power is required to be available to support normal operation of the plant. With offsite power available, there are several sources to provide this power including AC power to non-Class 1E battery chargers, AC power to rectifiers, and non-Class 1E batteries. As a result, with offsite power available it is very likely that power will be available for these DAS controls. If offsite power is not available, then there is still the likelihood that the non-1E batteries or the non-1E diesel generators will be available. Even if these sources are unavailable, the desired actions will occur without operator action for the more probable events. The rods will insert automatically on loss of offsite power. The passive residual heat removal heat exchanger (PRHR HX), core makeup tanks (CMT), passive containment cooling system (PCS), and containment isolation features are initiated by operation of fail-safe, air-operated valves. If all offsite and onsite AC power is lost, the instrument air system will depressurize by the time these functions are needed in the 1~~-~~hour time frame.

Instrument readouts are expected to be available even in case of complete failure of the PMS due to common cause failure. These instruments include both DAS and PLS instruments. They are powered by DC sources for 24 or 72 hours following a loss of AC power, as described in **FSAR** ~~DCD~~ Section 8.3.2. As discussed above, it is expected that AC power will be available to power the instruments. Even if the operators have no instrument indications, they are expected to actuate the controls most likely to be needed (PRHR HX, CMT, PCS, and containment isolation). If all AC power fails, then the rods will drop and the air-operated valves will go to their fail-safe positions.

BASES

BACKGROUND (continued)

The DAS uses equipment from sensor output to the final actuated device that is diverse from the PMS to automatically initiate a reactor trip, or to manually actuate the identified safety-related equipment. **FSAR** ~~DCD~~ Section 7.7.1.11 (Ref. **3**~~2~~) provides a description of the DAS.

APPLICABLE SAFETY ANALYSES

The DAS manual controls are required to provide a diverse capability to manually trip the reactor and actuate the specified safety-related equipment, based on risk importance in the ~~AP1000~~ PRA.

The DAS manual controls are not credited for mitigating accidents in the **FSAR** ~~DCD~~ Chapter 15 safety analyses.

The PRA, Appendix A, provides additional information, including the thermal and hydraulic analyses of success sequences used in the ~~AP1000~~ PRA.

The DAS manual controls satisfy Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

The DAS LCO provides the requirements for the OPERABILITY of the DAS manual trip and actuation controls necessary to place the reactor in a shutdown condition and to remove decay heat in the event that the PMS automatic actuation and manual controls are inoperable.

APPLICABILITY

The DAS manual controls are required to be OPERABLE in the MODES specified in Table 3.3.19-1.

The manual DAS reactor trip control is required to be OPERABLE in MODES 1 and 2 to mitigate the effects of an ATWS event occurring during power operation.

The other manual DAS actuation controls are required to be available in the plant MODES specified, based on the need for operator action to actuate the specified components during events that may occur in these various plant conditions, as identified in the ~~AP1000~~ PRA.

BASES

ACTIONS

A.1

Condition A applies when one or more DAS manual controls are inoperable.

The Required Action A.1 to restore the inoperable DAS manual control(s) to OPERABLE status within 30 days is reasonable because the DAS is a separate and diverse non-safety backup system for the manual reactor trip and manual safety-related equipment actuation controls. The 30 day Completion Time allows sufficient time to repair an inoperable manual DAS control but ensures the control is repaired to provide backup protection.

B.1 and B.2

Condition B applies when Required Action A cannot be completed for the DAS manual reactor trip control within the required completion time of 30 days.

Required Action B.1 requires SR 3.3.7.1, “Perform TADOT” for the reactor trip breakers, to be performed once per 31 days, instead of once every 92 days. Condition A of Example 1.3-6 illustrates the use of the Completion Time for Required Action B.1. The initial performance of SR 3.3.7.1 on the first division (since it is performed on a STAGGERED TEST BASIS) must be completed within 31 days of entering Condition B. The normal surveillance test frequency requirements for SR 3.3.7.1 must still be satisfied while performing SR 3.3.7.1 for Required Action B.1. The predominant failure requiring the DAS manual reactor trip control is common-mode failure of the reactor trip breakers. This change in surveillance frequency for testing the reactor trip breakers increases the likelihood that a common-mode failure of the reactor trip breakers would be detected while the DAS manual reactor trip control is inoperable. This reduces the likelihood that a diverse manual reactor trip is required. It is not required to perform a TADOT for the manual actuation control. The manual reactor trip control is very simple, highly reliable, and does not use software in the circuitry. Although the DAS manual controls are non-Class 1E, they have been shown to be PRA risk important as discussed in Reference **2**~~1~~. The impact of an inoperable DAS manual control is compensated for by increasing the reactor trip breaker surveillance frequency from once every 92 days to once every 31 days.

BASES

ACTIONS (continued)

Action B.2 requires that the inoperable DAS manual reactor trip control be restored to OPERABLE status prior to entering MODE 2 following any plant shutdown to MODE 5 while the control is inoperable. This ACTION is provided to ensure that all DAS manual controls are restored to OPERABLE status following the next plant shutdown.

C.1 and C.2

Condition C applies when Required Action A cannot be completed for any DAS manual actuation control (other than reactor trip) within the required completion time of 30 days.

Required Action C.1 requires SR 3.3.15.1, "Perform ACTUATION LOGIC TEST," and SR 3.3.16.1, "Perform ACTUATION LOGIC TEST," as applicable, to be performed once per 31 days, instead of once every 92 days. Condition A of Example 1.3-6 illustrates the use of the Completion Time for Required Action C.1. The initial performance of SR 3.3.15.1 and SR 3.3.16.1 on the first division (since it is performed on a STAGGERED TEST BASIS) must be completed within 31 days of entering Condition C. The normal surveillance test frequency requirements for SR 3.3.15.1 and SR 3.3.16.1 must still be satisfied while performing SR 3.3.15.1 and SR 3.3.16.1 for Required Action C.1. The predominant failure requiring the DAS manual actuation control is common-mode failure of the PMS actuation logic software or hardware. This change in surveillance frequency for actuation logic testing increases the likelihood that a common-mode failure of the PMS actuation logic from either cause would be detected while any DAS manual actuation control is inoperable. This reduces the likelihood that a diverse component actuation is required. It is not required to perform a TADOT for the manual actuation control device since the manual actuation control devices are very simple and highly reliable. Although the DAS manual controls are non-Class 1E, they have been shown to be PRA risk important as discussed in Reference **2**~~1~~. The impact of an inoperable DAS manual control is compensated for by increasing the automatic actuation surveillance frequency from once every 92 days to once every 31 days.

Action C.2 requires that the inoperable DAS manual actuation control(s) be restored to OPERABLE status prior to entering MODE 2 following any plant shutdown to MODE 5 while the control is inoperable. This ACTION is provided to ensure that all DAS manual controls are restored to OPERABLE status following the next plant shutdown.

BASES

ACTIONS (continued)

D.1 and D.2

Condition D is entered if the Required Action associated with Condition B or C is not met within the required Completion Time.

Required Actions D.1 and D.2 ensure that the plant is placed in a condition where the probability and consequences of an event are minimized. The allowed Completion Times are reasonable based on plant operating experience, for reaching the required plant conditions from full power conditions in an orderly manner, without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.19.1

SR 3.3.19.1 is the performance of a TADOT of the DAS manual trip and actuation controls for the specified safety-related equipment. This TADOT is performed every 24 months.

The Frequency is based on the known reliability of the DAS functions and has been shown to be acceptable through operating experience.

The SR is modified by a Note that excludes verification of the setpoints from the TADOT. The functions have no setpoints associated with them.

REFERENCES

1. **FSAR Chapter 19, "Probabilistic Risk Assessment."**
2. ~~1~~. WCAP-15985, "AP1000 Implementation of the Regulatory Treatment of Nonsafety-Related Systems Process," Revision 2, dated August 2003.
3. ~~2~~. **FSAR** ~~DCD,~~ Section 7.7.1.11.

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

3.3.19 Diverse Actuation System (DAS) Manual Controls

LCO 3.3.19 The DAS Manual Controls for each function in Table 3.3.19-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.19-1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more manual DAS controls inoperable.	A.1 Restore DAS manual controls to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met for inoperable DAS manual reactor trip control.	B.1 Perform SR 3.3.7.1. AND B.2 Restore all controls to OPERABLE status.	Once per 31 days on a STAGGERED TEST BASIS Prior to entering MODE 2 following next MODE 5 entry
C. Required Action and associated Completion Time of Condition A not met for inoperable DAS manual actuation control other than reactor trip.	C.1 Perform SR 3.3.15.1 and SR 3.3.16.1, as applicable. AND C.2 Restore all controls to OPERABLE status.	Once per 31 days on a STAGGERED TEST BASIS Prior to entering MODE 2 following next MODE 5 entry

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition B not met. OR Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.19.1	----------NOTE---------- Verification of setpoint not required. ----------	
	Perform TRIP ACTUATION DEVICE OPERATIONAL TEST (TADOT).	24 months

Table 3.3.19-1 (page 1 of 1)
DAS Manual Controls

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CONTROLS
1. Reactor trip manual controls	1,2	2 switches
2. Passive Residual Heat Removal Heat Exchanger (PRHR HX) control and In-Containment Refueling Water Storage Tank (IRWST) gutter control valves	1,2,3,4,5[(a)]	2 switches
3. Core Makeup Tank (CMT) isolation valves	1,2,3,4,5[(a)]	2 switches
4. Automatic Depressurization System (ADS) stage 1 valves	1,2,3,4,5[(a)]	2 switches
5. ADS stage 2 valves	1,2,3,4,5[(a)]	2 switches
6. ADS stage 3 valves	1,2,3,4,5[(a)]	2 switches
7. ADS stage 4 valves	1,2,3,4,5,6[(c)]	2 switches
8. IRWST injection squib valves	1,2,3,4,5,6	2 switches
9. Containment recirculation valves	1,2,3,4,5,6	2 switches
10. Passive containment cooling drain valves	1,2,3,4,5[(b)],6[(b)]	2 switches
11. Selected containment isolation valves	1,2,3,4,5,6	2 switches

(a) With Reactor Coolant System (RCS) pressure boundary intact.

(b) With the reactor decay heat > 6.0 MWt.

(c) With reactor internals in place.

B 3.3 INSTRUMENTATION

B 3.3.19 Diverse Actuation System (DAS) Manual Controls

BASES

BACKGROUND

The Diverse Actuation System (DAS) manual controls provide non-Class 1E backup controls in case of common-mode failure of the Protection and Safety Monitoring System (PMS) automatic and manual actuations evaluated in the probabilistic risk assessment (PRA) (Ref. 1). These DAS manual controls are not credited for mitigating accidents in the FSAR Chapter 15 analyses.

The specific DAS controls were selected based on PRA risk importance as discussed in Reference 2. As noted in Reference 2, electrical power for these controls and instrument indications need not be covered by Technical Specifications. The rationale is that these controls use the same nonsafety-related power supply used by the plant control system. This power is required to be available to support normal operation of the plant. With offsite power available, there are several sources to provide this power including AC power to non-Class 1E battery chargers, AC power to rectifiers, and non-Class 1E batteries. As a result, with offsite power available it is very likely that power will be available for these DAS controls. If offsite power is not available, then there is still the likelihood that the non-1E batteries or the non-1E diesel generators will be available. Even if these sources are unavailable, the desired actions will occur without operator action for the more probable events. The rods will insert automatically on loss of offsite power. The passive residual heat removal heat exchanger (PRHR HX), core makeup tanks (CMT), passive containment cooling system (PCS), and containment isolation features are initiated by operation of fail-safe, air-operated valves. If all offsite and onsite AC power is lost, the instrument air system will depressurize by the time these functions are needed in the 1 hour time frame.

Instrument readouts are expected to be available even in case of complete failure of the PMS due to common cause failure. These instruments include both DAS and PLS instruments. They are powered by DC sources for 24 or 72 hours following a loss of AC power, as described in FSAR Section 8.3.2. As discussed above, it is expected that AC power will be available to power the instruments. Even if the operators have no instrument indications, they are expected to actuate the controls most likely to be needed (PRHR HX, CMT, PCS, and containment isolation). If all AC power fails, then the rods will drop and the air-operated valves will go to their fail-safe positions.

BASES

BACKGROUND (continued)

The DAS uses equipment from sensor output to the final actuated device that is diverse from the PMS to automatically initiate a reactor trip, or to manually actuate the identified safety-related equipment. FSAR Section 7.7.1.11 (Ref. 3) provides a description of the DAS.

APPLICABLE SAFETY ANALYSES

The DAS manual controls are required to provide a diverse capability to manually trip the reactor and actuate the specified safety-related equipment, based on risk importance in the PRA.

The DAS manual controls are not credited for mitigating accidents in the FSAR Chapter 15 safety analyses.

The PRA, Appendix A, provides additional information, including the thermal and hydraulic analyses of success sequences used in the PRA.

The DAS manual controls satisfy Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

The DAS LCO provides the requirements for the OPERABILITY of the DAS manual trip and actuation controls necessary to place the reactor in a shutdown condition and to remove decay heat in the event that the PMS automatic actuation and manual controls are inoperable.

APPLICABILITY

The DAS manual controls are required to be OPERABLE in the MODES specified in Table 3.3.19-1.

The manual DAS reactor trip control is required to be OPERABLE in MODES 1 and 2 to mitigate the effects of an ATWS event occurring during power operation.

The other manual DAS actuation controls are required to be available in the plant MODES specified, based on the need for operator action to actuate the specified components during events that may occur in these various plant conditions, as identified in the PRA.

BASES

ACTIONS

A.1

Condition A applies when one or more DAS manual controls are inoperable.

The Required Action A.1 to restore the inoperable DAS manual control(s) to OPERABLE status within 30 days is reasonable because the DAS is a separate and diverse non-safety backup system for the manual reactor trip and manual safety-related equipment actuation controls. The 30 day Completion Time allows sufficient time to repair an inoperable manual DAS control but ensures the control is repaired to provide backup protection.

B.1 and B.2

Condition B applies when Required Action A cannot be completed for the DAS manual reactor trip control within the required completion time of 30 days.

Required Action B.1 requires SR 3.3.7.1, “Perform TADOT” for the reactor trip breakers, to be performed once per 31 days, instead of once every 92 days. Condition A of Example 1.3-6 illustrates the use of the Completion Time for Required Action B.1. The initial performance of SR 3.3.7.1 on the first division (since it is performed on a STAGGERED TEST BASIS) must be completed within 31 days of entering Condition B. The normal surveillance test frequency requirements for SR 3.3.7.1 must still be satisfied while performing SR 3.3.7.1 for Required Action B.1. The predominant failure requiring the DAS manual reactor trip control is common-mode failure of the reactor trip breakers. This change in surveillance frequency for testing the reactor trip breakers increases the likelihood that a common-mode failure of the reactor trip breakers would be detected while the DAS manual reactor trip control is inoperable. This reduces the likelihood that a diverse manual reactor trip is required. It is not required to perform a TADOT for the manual actuation control. The manual reactor trip control is very simple, highly reliable, and does not use software in the circuitry. Although the DAS manual controls are non-Class 1E, they have been shown to be PRA risk important as discussed in Reference 2. The impact of an inoperable DAS manual control is compensated for by increasing the reactor trip breaker surveillance frequency from once every 92 days to once every 31 days.

BASES

ACTIONS (continued)

Action B.2 requires that the inoperable DAS manual reactor trip control be restored to OPERABLE status prior to entering MODE 2 following any plant shutdown to MODE 5 while the control is inoperable. This ACTION is provided to ensure that all DAS manual controls are restored to OPERABLE status following the next plant shutdown.

C.1 and C.2

Condition C applies when Required Action A cannot be completed for any DAS manual actuation control (other than reactor trip) within the required completion time of 30 days.

Required Action C.1 requires SR 3.3.15.1, “Perform ACTUATION LOGIC TEST,” and SR 3.3.16.1, “Perform ACTUATION LOGIC TEST,” as applicable, to be performed once per 31 days, instead of once every 92 days. Condition A of Example 1.3-6 illustrates the use of the Completion Time for Required Action C.1. The initial performance of SR 3.3.15.1 and SR 3.3.16.1 on the first division (since it is performed on a STAGGERED TEST BASIS) must be completed within 31 days of entering Condition C. The normal surveillance test frequency requirements for SR 3.3.15.1 and SR 3.3.16.1 must still be satisfied while performing SR 3.3.15.1 and SR 3.3.16.1 for Required Action C.1. The predominant failure requiring the DAS manual actuation control is common-mode failure of the PMS actuation logic software or hardware. This change in surveillance frequency for actuation logic testing increases the likelihood that a common-mode failure of the PMS actuation logic from either cause would be detected while any DAS manual actuation control is inoperable. This reduces the likelihood that a diverse component actuation is required. It is not required to perform a TADOT for the manual actuation control device since the manual actuation control devices are very simple and highly reliable. Although the DAS manual controls are non-Class 1E, they have been shown to be PRA risk important as discussed in Reference 2. The impact of an inoperable DAS manual control is compensated for by increasing the automatic actuation surveillance frequency from once every 92 days to once every 31 days.

Action C.2 requires that the inoperable DAS manual actuation control(s) be restored to OPERABLE status prior to entering MODE 2 following any plant shutdown to MODE 5 while the control is inoperable. This ACTION is provided to ensure that all DAS manual controls are restored to OPERABLE status following the next plant shutdown.

BASES

ACTIONS (continued)

D.1 and D.2

Condition D is entered if the Required Action associated with Condition B or C is not met within the required Completion Time.

Required Actions D.1 and D.2 ensure that the plant is placed in a condition where the probability and consequences of an event are minimized. The allowed Completion Times are reasonable based on plant operating experience, for reaching the required plant conditions from full power conditions in an orderly manner, without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.19.1

SR 3.3.19.1 is the performance of a TADOT of the DAS manual trip and actuation controls for the specified safety-related equipment. This TADOT is performed every 24 months.

The Frequency is based on the known reliability of the DAS functions and has been shown to be acceptable through operating experience.

The SR is modified by a Note that excludes verification of the setpoints from the TADOT. The functions have no setpoints associated with them.

REFERENCES

1. FSAR Chapter 19, “Probabilistic Risk Assessment.”

2. WCAP-15985, “AP1000 Implementation of the Regulatory Treatment of Nonsafety-Related Systems Process,” Revision 2, dated August 2003.

3. FSAR Section 7.7.1.11.