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

Title: Changes Related to LCO 3.3.14, Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level 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-411-A, Rev 1,	Surveillance Test Interval Extensions for Components of the Reactor Protection System (WCAP-15376-P)
TSTF-418-A, Rev 2,	RPS and ESFAS Test Times and Completion Times (WCAP-14333)
TSTF-519-T, Rev 0,	Increase Standardization in Condition and Required Action Notes

STS NUREGs Affected:

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

NRC Approval Date:

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

TSTF Classification:

TSTF-411-A, Rev 1:	Technical Change
TSTF-418-A, Rev 2:	Technical Change
TSTF-519-T, Rev 0:	NUREG Only Change

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

RCOL Std. Dep. Number and Title:

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

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to GTS 3.3.2.

RCOL PTS Change Number and Title:

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

VEGP LAR DOC A028:	Reformat of GTS 3.3.2 into Nine Parts; 3.3.8 through 3.3.16; note that this maps GTS 3.3.2 requirements into interim A028-modified TS (MTS) Subsection 3.3.14, to which the other changes are applied.
VEGP LAR DOC A025:	SR text phrase change from “the prescribed values” to “within limits.”
VEGP LAR DOC M02:	Provision for Two or More Inoperable Divisions or Channels

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

This section discusses changes: (1) that were applicable to previous designs, but are not to the current design; (2) that are already incorporated in the GTS; and (3) that are superseded by another change.

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

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

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

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

In the MTS 3.3.14 “Actions” section of the Bases, the phrase “...then all affected Functions provided by that channel must be declared inoperable...” is revised to “...then all affected protection Functions supported by or dependent on that channel must be declared inoperable...”

Minor corrections were made to correct grammatical errors in the bases.

V. Applicability

Affected Generic Technical Specifications and Bases:

Section 3.3.14 Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation

Changes to the Generic Technical Specifications and Bases:

GTS 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," is reformatted by VEGP LAR DOC A028 into multiple Specifications including interim A028-modified TS (MTS) 3.3.14, "Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation." The reformatting relocates GTS 3.3.2 Function 24.a, "Spent Fuel Pool Level - Low," into MTS 3.3.14 as part of the LCO statement. The MTS format is depicted in Section XI of this GTST as the reference case in the markup of the GTST instrumentation requirements for spent fuel pool level instrumentation.

MTS 3.3.14 LCO Title	GTS 3.3.2 Function
Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation	24. Refueling Cavity Isolation a. Spent Fuel Pool Level - Low

References 2, 3, and 6 provide details showing the correspondence of GTS 3.3.2 Functions and STS 3.3.8 through 3.3.16 Functions.

GTS 3.3.2 Conditions H and P are reordered and relabeled as AP1000 MTS 3.3.14 Conditions A and B. (DOC A028)

GTS SR 3.3.2.1, SR 3.3.2.4, SR 3.3.2.5, SR 3.3.2.6 are retained and renumbered as MTS SR 3.3.14.1, SR 3.3.14.3, SR 3.3.14.2, and SR 3.3.14.4, respectively. (DOC A028)

MTS 3.3.14 Condition B is revised by adding a second condition statement for inoperability of two or more channels. 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)

MTS SR 3.3.14.3 Note is revised from "...adjusted to the prescribed values." to "... adjusted to within limits." This change is made for clarity and consistency. (DOC A025)

The following tables are provided as an aid to tracking the various changes to GTS 3.3.2 Conditions, Required Actions, Functions, Applicability Footnotes, and Surveillance Requirements that result in interim A028-modified TS (MTS) 3.3.14 and as further changed, STS 3.3.14.

Changes to Conditions

GTS 3.3.2 Condition	MTS 3.3.14 Condition	STS 3.3.14 Condition	Other STS Subsections Addressing the Listed Condition	Additional DOC Changes
A	→	→	3.3.8, 3.3.9, 3.3.10	---
B	→	→	3.3.8	---
C	→	→	3.3.10	---
D	→	→	3.3.12, 3.3.15	---
E	→	→	3.3.9	---

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

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

---------- Function [Modes(footnote)] ----------			STS 3.3.14	Other STS Subsections	Additional
GTS 3.3.2	MTS 3.3.14	STS 3.3.14	Conditions	and Additional Changes	DOC Changes
24.a [6]	LCO 3.3.14	LCO 3.3.14	A, B	---	---

Changes to Applicability Footnotes

None

Changes to Surveillance Requirements

GTS 3.3.2 SR	MTS 3.3.14 SR	STS 3.3.14 SR	STS Subsections Also Addressing the Listed SR	Example Surveillance No. Surveillance Description
3.3.2.1	3.3.14.1	3.3.14.1	3.3.8, 3.3.10, 3.3.11, 3.3.13	3.3.8.1 CHANNEL CHECK
3.3.2.2	→	→	3.3.15, 3.3.16	3.3.15.1 ACTUATION LOGIC TEST
3.3.2.3	→	→	3.3.9, 3.3.12	3.3.9.1 TRIP ACTUATING DEVICE OPERATIONAL TEST
3.3.2.4	3.3.14.3	3.3.14.3	3.3.8, 3.3.10, 3.3.11, 3.3.13	3.3.8.3 CHANNEL CALIBRATION
3.3.2.5	3.3.14.2	3.3.14.2	3.3.8, 3.3.10, 3.3.11, 3.3.13	3.3.8.2 CHANNEL OPERATIONAL TEST
3.3.2.6	3.3.14.4	3.3.14.4	3.3.8, 3.3.10, 3.3.11, 3.3.13	3.3.8.4 ESF RESPONSE TIME
3.3.2.7	→	→	3.3.8, 3.1.9, 3.5.2, 3.5.4, 3.5.6, 3.6.10, 3.7.7	ACTUATION DEVICE TEST*
3.3.2.8	→	→	3.3.8, 3.4.11, 3.4.13	Squib Valve ACTUATION DEVICE TEST
3.3.2.9	→	→	3.3.15, 3.3.16	Pressurizer Heater ACTUATION DEVICE TEST

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

VI. Traveler Information

Description of TSTF changes:

Not Applicable

Rationale for TSTF changes:

Not Applicable

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

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

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

Since current TS 3.3.2, “Engineered Safety Feature Actuation System (ESFAS) Instrumentation,” is identical to GTS 3.3.2, it is appropriate for this GTST to consider the proposed changes to current TS 3.3.2 as changes to GTS 3.3.2 for incorporation in AP1000 STS 3.3.14. VEGP LAR DOC A028 is extensive, but retains the intention of current TS 3.3.2 while improving operational use of the TS. The numerous Functions, Conditions and extensive bases discussion associated with PTS 3.3.2 are repackaged into nine smaller parts. Therefore, the changes implemented by DOC A028 are presented in the attached Subsection 3.3.14 markup, in Section XI of this GTST, as the “clean” starting point and are identified as interim A028-modified TS (MTS) 3.3.14. The specific details of the reformatting for MTS 3.3.14 can be found in VEGP TSU LAR (Reference 2), in Enclosure 2 (markup) and Enclosure 4 (clean). The NRC staff safety evaluation regarding DOC A028 can be found in Reference 3, VEGP LAR SER. The VEGP TSU LAR was modified in response to NRC staff RAIs in Reference 5 and the Southern Nuclear Operating Company RAI Response in Reference 6.

VEGP LAR DOC A025 revises MTS 3.3.14 SR 3.3.14.3 Note to change the phrase “the prescribed values” to “within limits.”

VEGP LAR DOC M02 addresses the fact that MTS 3.3.14, “Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation,” does not specify Actions for inoperability of two or more channels.

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 DOCs A024 and A028, except where addressed in other DOCs, addresses inconsistencies in formatting and approach between current TS 3.3.1 and current TS 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 A025 is consistent with similar requirements elsewhere in the AP1000 GTS and STS (NUREG-1431).

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.

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

In the second paragraph of the MTS 3.3.14 “Actions” section of the Bases, the phrase “...then all affected Functions provided by that channel must be declared inoperable...” is revised to “...then all affected protection Functions supported by or dependent on that channel must be declared inoperable...”

Dashes were added to time descriptors such as “the 72-hour completion time is acceptable…” in the Actions section of the bases.

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

This change was requested by NRC staff RAIs in Reference 5. Southern Nuclear Operating Company declined to make the change in its plant TS as documented in its RAI Response, Reference 6, because the wording is part of the original AP1000 GTS. However, the change is made to the AP1000 STS to provide clarity.

Additional changes are to correct grammatical errors in the bases.

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 3.3.14 is only applicable in MODE 6 and LCO 3.0.3 does not apply. However, Condition B provides actions in the event that two or more level channels may be inoperable to be consistent with other LCOs in this section.

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.

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

References to Previous NRC Safety Evaluation Reports (SERs):

VEGP TSU LAR SER (Reference 3)

VIII. Review Information

Evaluator Comments:

None

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

Review Information:

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on Thursday, May 29, 2014.

NRC Final Approval Date:

NRC Contact:

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

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

The database does not yet recognize non-breaking hyphens or spaces. For Rev. 0 of this GTST, it was necessary to manually insert (1) non-breaking hyphens as necessary to interlock designations such as P-10 to avoid breaking across the end of a line; and (2) non-breaking spaces as necessary to (a) keep symbols such as “≥” with the subsequent value; and (b) avoid stranding a number value on a subsequent line, such as MODE 5.

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)

XI. MARKUP of the Applicable GTS Section 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

3.3.14 Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation

LCO 3.3.14 Three channels of ESFAS Spent Fuel Pool Level – Low instrumentation shall be OPERABLE.

APPLICABILITY: MODES 6

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Place channel in trip.	6 hours
B. Required Action and associated Completion Time of Condition A not met. **OR** **Two or more channels inoperable.**	----------NOTE---------- Flow path(s) may be unisolated intermittently under administrative controls. ---------- B.1 Isolate the affected flow path(s). AND B.2.1 Isolate the affected flow path(s) by use of at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. OR B.2.2 Verify the affected flow path is isolated.	 24 hours 7 days Once per 7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.14.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.14.2	Perform CHANNEL OPERATIONAL TEST (COT) in accordance with Setpoint Program.	92 days
SR 3.3.14.3	----------NOTE---------- This surveillance shall include verification that the time constants are adjusted to **within limits** ~~the prescribed values~~. ---------- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	 24 months
SR 3.3.14.4	Verify ESF RESPONSE TIME is within limit.	24 months on a STAGGERED TEST BASIS

B 3.3 INSTRUMENTATION

B 3.3.14 Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The required channels of ESFAS instrumentation provide plant protection in the event of any of the analyzed accidents. ESFAS protective functions include the Refueling Cavity Isolation.

The instrument Function required by this LCO is the Spent Fuel Pool Level - Low.

In the event of a leak in the non-safety Spent Fuel Pool Cooling System, closure of the containment isolation valves on low spent fuel pool level in two of three channels will terminate draining of the refueling cavity. Since the transfer canal is open in MODE 6, the spent fuel pool level is the same as the refueling cavity.

Draining of the spent fuel pool, directly, through a leaking Spent Fuel Pool Cooling System is limited by the location of the suction piping, which is near the top of the pool. Therefore, closure of the containment isolation valves between the refueling cavity and the Spent Fuel Pool Cooling System is sufficient to terminate refueling cavity and spent fuel pool leakage through the Spent Fuel Pool Cooling System. Three channels of ESFAS Spent Fuel Pool Level - Low Function are required to be OPERABLE in MODE 6 to maintain water inventory in the refueling cavity.

ESFAS Spent Fuel Pool Level instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

ACTIONS

n the event a channel's as-found condition is outside the as-found tolerance described in the Setpoint Program, or the channel is not functioning as required, or the transmitter, or the Protection and Safety Monitoring System Division, associated with a specific Function is found inoperable, then all affected **protection** Functions ~~provided~~ **supported** by **or dependent on** that channel must be declared inoperable and the LCO Condition(s) entered for the particular protection Function(s) affected.

A.1

Condition A addresses the situation where one channel is inoperable. With one spent fuel pool level channel inoperable, the inoperable channel must be placed in a trip condition within 6 hours. If one of the three spent fuel pool level channels is tripped, the logic becomes one-out-of-two, while still meeting the single failure criterion. The specified Completion Time is reasonable considering the time required to complete this action.

B.1 and B.2

If the Required Action and associated Completion Time of Condition A is not met, **or two or more channels are inoperable,** the plant must be placed in a condition where the instrumentation Function for valve isolation is no longer applicable. To achieve this, the affected flow path(s) must be isolated within 24 hours.

Additionally, to assure that the flow path remains closed, the flow path shall be isolated by the use of one of the specified means (Required Action B.2.1) or the flow path shall be verified to be isolated (Required Action B.2.2). A means of isolating the affected flow path(s) includes at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured within 7 days. If one of the Required Action B.2.1 specified isolation means is not used, the affected flow path shall be verified to be isolated once per 7 days.

This action is modified by a Note allowing the flow path(s) to be unisolated intermittently under administrative control. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. In this way the flow path can be rapidly isolated when a need for flow path isolation is indicated.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.14.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or even something more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the match criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside their corresponding limits.

The Surveillance Frequency is based on operating experience that demonstrates that channel failure is rare. Automated operator aids may be used to facilitate performance of the CHANNEL CHECK.

SR 3.3.14.2

SR 3.3.14.2 is the performance of a CHANNEL OPERATIONAL TEST (COT) every 92 days. The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable. This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel's response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation.

A COT is performed on each required channel to provide reasonable assurance that the entire channel will perform the intended ESF Function.

SURVEILLANCE REQUIREMENTS (continued)

A test subsystem is provided with the protection and safety monitoring system to aid the plant staff in performing the COT. 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 COT shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the COT 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 COT can be performed using portable test equipment.

The 92-day Frequency is based on Reference 2 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 integrated protection cabinets to the operator.

During the COT, the protection and safety monitoring system cabinets in the division under test may be placed in bypass.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.14.3

SR 3.3.14.3 is the performance of a CHANNEL CALIBRATION every 24 months or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor and the IPC. The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable. This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel's response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation. Transmitter calibration must be performed consistent with the assumptions of the setpoint methodology. The difference between the current as-found values and the previous as-left values must be consistent with the transmitter drift allowance used in the setpoint methodology.

The setpoint methodology requires that 30 months drift be used (1.25 times the surveillance calibration interval, 24 months).

The Frequency is based on operating experience and consistency with the refueling cycle.

This Surveillance Requirement is modified by a Note. The Note states that this test should include verification that the time constants are adjusted to within limits.

SR 3.3.14.4

This SR ensures the individual channel ESF RESPONSE TIME is less than or equal to the maximum value assumed in the accident analysis. Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the NTS value at the sensor, to the point at which the equipment reaches the required functional state (e.g., valves in full open or closed position).

SURVEILLANCE REQUIREMENTS (continued)

For channels that include dynamic transfer functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer functions set to one with the resulting measured response time compared to the appropriate Chapter 7 (Ref. 2) response time. Alternately, the response time test can be performed with the time constants set to their nominal value provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A, Revision 2, “Elimination of Pressure Sensor Response Time Testing Requirements” (Ref. 4), provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. Response time verification for other sensor types must be demonstrated by test.

ESF RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS. Testing of the devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every 24 months. The 24-month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

BASES

REFERENCES

1. Chapter 15.0, “Accident Analysis.”

2. Chapter 7.0, “Instrumentation and Controls.”

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

4. WCAP-13632-P-A (Proprietary) and WCAP-13787-A (Non Proprietary), Revision 2, “Elimination of Pressure Sensor Response Time Testing Requirements,” January 1996.

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

3.3.14 Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation

LCO 3.3.14 Three channels of ESFAS Spent Fuel Pool Level – Low instrumentation shall be OPERABLE.

APPLICABILITY: MODES 6

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Place channel in trip.	6 hours
B. Required Action and associated Completion Time of Condition A not met. OR Two or more channels inoperable.	----------NOTE---------- Flow path(s) may be unisolated intermittently under administrative controls. ---------- B.1 Isolate the affected flow path(s). AND B.2.1 Isolate the affected flow path(s) by use of at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. OR B.2.2 Verify the affected flow path is isolated.	 24 hours 7 days Once per 7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.14.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.14.2	Perform CHANNEL OPERATIONAL TEST (COT) in accordance with Setpoint Program.	92 days
SR 3.3.14.3	----------NOTE---------- This surveillance shall include verification that the time constants are adjusted to within limits. ---------- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.14.4	Verify ESF RESPONSE TIME is within limit.	24 months on a STAGGERED TEST BASIS

B 3.3 INSTRUMENTATION

B 3.3.14 Engineered Safety Feature Actuation System (ESFAS) Spent Fuel Pool Level Instrumentation

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The required channels of ESFAS instrumentation provide plant protection in the event of any of the analyzed accidents. ESFAS protective functions include the Refueling Cavity Isolation.

The instrument Function required by this LCO is the Spent Fuel Pool Level - Low.

In the event of a leak in the non-safety Spent Fuel Pool Cooling System, closure of the containment isolation valves on low spent fuel pool level in two of three channels will terminate draining of the refueling cavity. Since the transfer canal is open in MODE 6, the spent fuel pool level is the same as the refueling cavity.

Draining of the spent fuel pool, directly, through a leaking Spent Fuel Pool Cooling System is limited by the location of the suction piping, which is near the top of the pool. Therefore, closure of the containment isolation valves between the refueling cavity and the Spent Fuel Pool Cooling System is sufficient to terminate refueling cavity and spent fuel pool leakage through the Spent Fuel Pool Cooling System. Three channels of ESFAS Spent Fuel Pool Level - Low Function are required to be OPERABLE in MODE 6 to maintain water inventory in the refueling cavity.

ESFAS Spent Fuel Pool Level instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

ACTIONS

n the event a channel's as-found condition is outside the as-found tolerance described in the Setpoint Program, or the channel is not functioning as required, or the transmitter, or the Protection and Safety Monitoring System Division, associated with a specific Function is found inoperable, then all affected protection Functions supported by or dependent on that channel must be declared inoperable and the LCO Condition(s) entered for the particular protection Function(s) affected.

A.1

Condition A addresses the situation where one channel is inoperable. With one spent fuel pool level channel inoperable, the inoperable channel must be placed in a trip condition within 6 hours. If one of the three spent fuel pool level channels is tripped, the logic becomes one-out-of-two, while still meeting the single failure criterion. The specified Completion Time is reasonable considering the time required to complete this action.

B.1 and B.2

If the Required Action and associated Completion Time of Condition A is not met, or two or more channels are inoperable, the plant must be placed in a condition where the instrumentation Function for valve isolation is no longer applicable. To achieve this, the affected flow path(s) must be isolated within 24 hours.

Additionally, to assure that the flow path remains closed, the flow path shall be isolated by the use of one of the specified means (Required Action B.2.1) or the flow path shall be verified to be isolated (Required Action B.2.2). A means of isolating the affected flow path(s) includes at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured within 7 days. If one of the Required Action B.2.1 specified isolation means is not used, the affected flow path shall be verified to be isolated once per 7 days.

This action is modified by a Note allowing the flow path(s) to be unisolated intermittently under administrative control. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. In this way the flow path can be rapidly isolated when a need for flow path isolation is indicated.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.14.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or even something more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the match criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside their corresponding limits.

The Surveillance Frequency is based on operating experience that demonstrates that channel failure is rare. Automated operator aids may be used to facilitate performance of the CHANNEL CHECK.

SR 3.3.14.2

SR 3.3.14.2 is the performance of a CHANNEL OPERATIONAL TEST (COT) every 92 days. The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable. This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel's response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation.

A COT is performed on each required channel to provide reasonable assurance that the entire channel will perform the intended ESF 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 COT. 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 COT shall include a review of the operation of the test subsystem to verify the completeness and adequacy of the results.

If the COT 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 COT can be performed using portable test equipment.

The 92-day Frequency is based on Reference 2 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 integrated protection cabinets to the operator.

During the COT, the protection and safety monitoring system cabinets in the division under test may be placed in bypass.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.14.3

SR 3.3.14.3 is the performance of a CHANNEL CALIBRATION every 24 months or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor and the IPC. The test is performed in accordance with the SP. If the actual setting of the channel is found to be outside the as-found tolerance, the channel is considered inoperable. This condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the NTS (within the allowed tolerance), and evaluating the channel's response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation. Transmitter calibration must be performed consistent with the assumptions of the setpoint methodology. The difference between the current as-found values and the previous as-left values must be consistent with the transmitter drift allowance used in the setpoint methodology.

The setpoint methodology requires that 30 months drift be used (1.25 times the surveillance calibration interval, 24 months).

The Frequency is based on operating experience and consistency with the refueling cycle.

This Surveillance Requirement is modified by a Note. The Note states that this test should include verification that the time constants are adjusted to within limits.

SR 3.3.14.4

This SR ensures the individual channel ESF RESPONSE TIME is less than or equal to the maximum value assumed in the accident analysis. Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the NTS value at the sensor, to the point at which the equipment reaches the required functional state (e.g., valves in full open or closed position).

BASES

SURVEILLANCE REQUIREMENTS (continued)

For channels that include dynamic transfer functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer functions set to one with the resulting measured response time compared to the appropriate Chapter 7 (Ref. 2) response time. Alternately, the response time test can be performed with the time constants set to their nominal value provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A, Revision 2, “Elimination of Pressure Sensor Response Time Testing Requirements” (Ref. 4), provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. Response time verification for other sensor types must be demonstrated by test.

ESF RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS. Testing of the devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every 24 months. The 24-month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

BASES

REFERENCES

1. Chapter 15.0, “Accident Analysis.”

2. Chapter 7.0, “Instrumentation and Controls.”

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

4. WCAP-13632-P-A (Proprietary) and WCAP-13787-A (Non Proprietary), Revision 2, “Elimination of Pressure Sensor Response Time Testing Requirements,” January 1996.