Industry/TSTF Standard Technical Specification Change Traveler

RPS and ESFAS Test Times and Completion Times (WCAP-14333)

NUREGs Affected: ☐ 1430 ☑ 1431 ☐ 1432 ☐ 1433 ☐ 1434

Classification 1) Technical Change Recommended for CLIIP?: Yes

Priority: 1)High

Simple or Complex Change: Complex Correction or Improvement: Improvement

Industry Contact: Wideman, Steve (620) 364-4037 stwidem@wcnoc.com

See Attached.
See Attached.

Revision History

OG Revision 0 Revision Status: Closed

Revision Proposed by: WOG

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 18-Jul-01

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 18-Jul-01

TSTF Review Information

TSTF Received Date: 22-Aug-01 Date Distributed for Review 22-Aug-01

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:
WOG only.

TSTF Resolution: Approved Date: 22-Aug-01

NRC Review Information

NRC Received Date: 31-Aug-01

NRC Comments:
7/26/2002 Letter from NRC:

The staff recommendations are as follows: for TSTF-411, revise the allowed bypass time for reactor trip breaker testing and for maintenance on the undervoltage or shunt trip mechanisms, and the surveillance test frequencies for performing neutron flux channel operational tests; for TSTF-418 revise Reviewers Notes, and the allowed bypass times for testing other channels when one reactor coolant pump breaker position channel is inoperable. In addition, the staff recommends several Bases changes for both TSTFs. These changes to TSTF-411 and TSTF-418 will establish STS that are consistent with the analysis, as accepted by the staff in safety evaluations for WCAP-15376-P, Rev. 0 (Proprietary) and WCAP-15377-NP, Rev. 0 (Non-Proprietary), both entitled "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times" and in WCAP-14333-P, (Proprietary),

OG Revision 0 Revision Status: Closed

and WCAP-14334-NP, (Non-Proprietary), both entitled "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," respectfully.

In addition, TSTFs 41 1 and 418 propose different TS requirements for one RTB train inoperable (NUREG-1431, Condition 0). For Condition 0 Required Actions, TSTF-418 adds a 4 hour surveillance test bypass time allowance as a third note whereas, TSTS-411 modifies note 1 and deletes note 2 but does not address any note 3 changes. Therefore, the staff requests the TSTF include the appropriate notations with the next revisions to TSTFs 411 and 418 to show how individual licensees can prepare TS amendment requests that adopt either or both TSTFs without deviating from the TS approved by the staff.

Final Resolution: Superceded by Revision Final Resolution Date: 26-Jul-02

TSTF Revision 1 Revision Status: Active Next Action: NRC

Revision Proposed by: WOG

Revision Description:
NRC letter dated July 26, 2002 provided recommendations concerning TSTF-418. Based on subsequent discussions with the NRC reviewer, provided below is a summary of the changes being incorporated into Rev. 1:

1. Insert 4 is revised consistent with the resolution of Insert 5 of TSTF-411. Additionally, the Reviewer's Note on page B 3.3.1-34 was retained consistent with the resolution of comments from TSTF-411 that retained a similar Reviewer's Note in TS 3.3.2. Also, the Reviewer's Note on page B 3.3.1-44 was retained consistent with the resolution of comments on TSTF-411.

2. Insert 14 is revised consistent with the resolution of Insert 7 of TSTF-411. Additionally, the Reviewer's Note on page B 3.3.2-37 was retained consistent with the resolution of comments from TSTF-411 that retained this Reviewer's Note in TS 3.3.2.

3. Insert 19 is revised consistent with the resolution of Insert 7 of TSTF-411.

4. TS 3.3.1, Condition L - the Completion Times and the 4 hours in the Note are bracketed to indicate that plant specific times are to be specified since WCAP-14333 did not generically evaluate these times. Additionally, Insert 4 to the Bases specifically identifies the need for a plant specific evaluation since Functions 11.a and 11.b were not included in the generic evaluations approved in WCAP-14333.

Bases page B 3.3.1-41 is modified to include the use of the brackets.

5. Bases page B 3.3.1-36 is modified to correct the time allowed to reduce thermal power consistent with the original Rev. 0 markups.

6. Bases page B 3.3.1-42 is modified to show the insertion of Insert 12 (this was inadvertently omitted in the Rev. 0 markups).

7. TS 3.3.2, Condition K - the original Completion Times and the bypass time for surveillance testing are bracketed to indicate that plant specific times are to be specified since WCAP-14333 did not generically evaluate these times. Additionally, Insert 4 to the Bases specifically identifies the need for a plant specific evaluation since Functions 11.a and 11.b were not included in the generic evaluations approved in WCAP-14333. Additionally, Insert 14 to the Bases specifically identifies the need for a plant specific evaluation since Functions 7.b and 7.c were not included in the generic evaluations approved in WCAP-14333.

Bases page B 3.3.2-45 is modified to include the use of the brackets

8. Bases page B 3.3.2-44 is modified to correctly specify a Completion Time of 78 hours instead of 72 hours for

the discussion of Required Action I.2. The sentence "The 72 hour Completion Time is justified in Reference 9." is deleted as this is duplicative of the information added by Insert 16. In the last sentence, Reference 8 is retained as the time is justified in WCAP-14333 which is Reference 8.

9. Bases page B 3.3.2-46, the Reviewer's Note is retained consistent with resolution of comments on TSTF-411 and earlier comments.

In previous discussions with the NRC reviewer around August 20, 2002 it was questioned whether the change in the Completion Time from 12 hours to 78 hours for Required Action D.1.2 was appropriate because of the ties to QPTR. The following response was provided to this question:

The risk analysis performed in support of WCAP-14333 evaluated the acceptability of having one Power Range channel unavailable at power for 78 hours (72 hours to place the channel in trip, and 6 hours to be in Mode 3). Therefore, if having the channel unavailable at power for 72 hours is acceptable, then the additional 6 hours to reduce power to < 75% would also be acceptable, since the additional 6 hours to reduce power to < 75% was previously contained in the Completion Time for Required Action D.1.2. Additionally, some other event would have to occur during the 72 hour time period prior to placing the channel in trip that would induce an unacceptable radial power distribution, i.e., a dropped rod. If this were to occur, the power range channel's input to QPTR would still be available (or Required Actions D.2.1 and D.2.2 would be followed). As discussed in the SR 3.2.4.1 Bases, for those causes of quadrant power tilt that occur quickly, there are typically other indications of abnormality that prompt a verification of core power tilt.

If the power range channel's input to QPTR is inoperable, Required Actions D.2.1 and D.2.2 would be performed. Required Action D.2.2 requires the performance of SR 3.2.4.2 once per 12 hours. Therefore, the QPTR would be verified within 12 hours of the power range channel's input to QPTR being inoperable, and every 12 hours thereafter, if these Required Actions were followed. Performance of SR 3.2.4.2 every 12 hours would ensure that no unacceptable radial power distribution exists.

Additionally, the Note to SR 3.2.4.2 states that it is not required to be performed until 12 hours after the input from one or more power range channels are inoperable and Thermal Power is > 75%.

The Bases discussion for the 7 day Frequency for calculating QPTR with one power range channel inoperable and Thermal Power < 75% is acceptable due to other information and alarms available to the operator in the control room.

In summary, some event that would cause a perturbation to the radial power distribution would have to occur during the 72 hour period, and if so, the QPTR input from the inoperable power range channel would still be available to detect it, or if the power range channel input to QPTR was inoperable, the performance of SR 3.2.4.2 would provide assurance that the radial power distribution is within acceptable limits.

Additionally, this change has been approved for at least two plants.

Subsequent to the discussions with the NRC reviewer, during the development of the markups for Revision 1 to this TSTF, it was identified that a new Condition was necessary for Function 11.b, Reactor Coolant Pump Breaker Position, Two Loops, since this Function was not evaluated generically in WCAP-14333 and current Condition K is not appropriate for this Function. As such, INSERT 3A created a new Condition M for Function 11.b and the subsequent Conditions were renumbered.

TSTF Review Information

TSTF Received Date: 12-Oct-02 Date Distributed for Review 18-Oct-02

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Revision 1 **Revision Status: Active** **Next Action: NRC**

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 21-Oct-02

NRC Review Information

NRC Received Date: 30-Oct-02

Affected Technical Specifications

LCO 3.3.1 Bases	RTS Instrumentation	
	Change Description:	Table 3.3.1-1
Action 3.3.1 Bases	RTS Instrumentation	
SR 3.3.1 Bases	RTS Instrumentation	
Ref. 3.3.1 Bases	RTS Instrumentation	
Action 3.3.1.D	RTS Instrumentation	
Action 3.3.1.D Bases	RTS Instrumentation	
Action 3.3.1.E	RTS Instrumentation	
Action 3.3.1.E Bases	RTS Instrumentation	
Action 3.3.1.K	RTS Instrumentation	
Action 3.3.1.K Bases	RTS Instrumentation	
Action 3.3.1.L	RTS Instrumentation	
Action 3.3.1.L Bases	RTS Instrumentation	
Action 3.3.1.M	RTS Instrumentation	
	Change Description:	New
Action 3.3.1.M	RTS Instrumentation	
	Change Description:	Renamed N
Action 3.3.1.M Bases	RTS Instrumentation	
	Change Description:	New
Action 3.3.1.M Bases	RTS Instrumentation	
	Change Description:	Renamed N

Action 3.3.1.N	RTS Instrumentation	
	Change Description:	Renamed O
Action 3.3.1.N Bases	RTS Instrumentation	
	Change Description:	Renamed O
Action 3.3.1.O	RTS Instrumentation	
	Change Description:	Renamed P
Action 3.3.1.O Bases	RTS Instrumentation	
	Change Description:	Renamed P
Action 3.3.1.P	RTS Instrumentation	
	Change Description:	Renamed Q
Action 3.3.1.P Bases	RTS Instrumentation	
	Change Description:	Renamed Q
Action 3.3.1.Q	RTS Instrumentation	
	Change Description:	Renamed R
Action 3.3.1.Q Bases	RTS Instrumentation	
	Change Description:	Renamed R
Action 3.3.1.R	RTS Instrumentation	
	Change Description:	Renamed S
Action 3.3.1.R Bases	RTS Instrumentation	
	Change Description:	Renamed S
SR 3.3.1.7 Bases	RTS Instrumentation	
SR 3.3.1.9 Bases	RTS Instrumentation	
SR 3.3.1.16 Bases	RTS Instrumentation	
Action 3.3.2 Bases	ESFAS Instrumentation	
SR 3.3.2 Bases	ESFAS Instrumentation	
Ref. 3.3.2 Bases	ESFAS Instrumentation	
Action 3.3.2.C	ESFAS Instrumentation	
Action 3.3.2.C Bases	ESFAS Instrumentation	
Action 3.3.2.D	ESFAS Instrumentation	
Action 3.3.2.D Bases	ESFAS Instrumentation	
Action 3.3.2.E	ESFAS Instrumentation	
Action 3.3.2.E Bases	ESFAS Instrumentation	
Action 3.3.2.G	ESFAS Instrumentation	

Action 3.3.2.G Bases	ESFAS Instrumentation
Action 3.3.2.H	ESFAS Instrumentation
Action 3.3.2.H Bases	ESFAS Instrumentation
Action 3.3.2.I	ESFAS Instrumentation
Action 3.3.2.I Bases	ESFAS Instrumentation
Action 3.3.2.J Bases	ESFAS Instrumentation
Action 3.3.2.K	ESFAS Instrumentation
Action 3.3.2.K Bases	ESFAS Instrumentation
SR 3.3.2.4 Bases	ESFAS Instrumentation
SR 3.3.2.5 Bases	ESFAS Instrumentation
SR 3.3.2.10 Bases	ESFAS Instrumentation
Action 3.3.5 Bases	LOP DG Start Instrumentation

1.0 Description

WCAP-14333-P (Proprietary) and WCAP-14334-NP (Non-Proprietary), both entitled "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," were submitted to the NRC on June 20, 1995. WCAP-14333 provides the justification for increasing the bypass times for testing and the Completion Times in the Reactor Protection System (RPS) instrumentation and Engineered Safety Features Actuation System (ESFAS) instrumentation Technical Specifications. The NRC issued a Safety Evaluation on July 15, 1998 approving WCAP-14333.

This traveler proposes to revise the Improved Standard Technical Specifications to permit relaxation of allowed bypass test times and Completion Times for Specifications 3.3.1, Reactor Trip System (RTS) Instrumentation and 3.3.2, Engineered Safety Features Actuation System (ESFAS) Instrumentation. Specifically, the proposed changes would allow:

- Completion Times of 72 hours for inoperable instruments
- Bypass times of 12 hours for surveillance testing
- Completion Times of 24 hours for an inoperable logic cabinet or master and slave relays

In order to apply the various relaxations justified in WCAP-10271 and WCAP-14333 to plant specific Functions not evaluated generically, a plant specific evaluation of those Functions and any additional plant specific Functions not listed in NUREG-1431 Rev. 1 but contained in the plant specific SSPS or RPS design must be performed. A Reviewers Note is added to the Bases for Sections 3.3.1, 3.3.2, and 3.3.5 indicating that certain Functions may require plant specific evaluation is added.

2.0 Proposed Change

TS Section 3.3.1:

1. The time to restore an inoperable analog channel is increased to 72 hours.
2. The time allowed for analog channel testing in bypass is increased from 4 hours to 12 hours.
3. The time allowed to restore an inoperable logic train is increased to 24 hours.
4. An explanation is added to the Bases for new Required Actions O and P to allow the use of the 4 hour test time for logic to be used for breaker testing also when logic and breakers are tested concurrently. For independent breaker testing, the 2 hour time limit in new Required Action P applies.
5. In addition to the Note addressing testing in bypass in the current version of the NUREG (no bypass test capability) an alternate version of the Note is given for plants with installed bypass test capability.
6. A new Condition M is created for Function 11.b, Reactor Coolant Pump Breaker Position (Two Loops), since this Function was not evaluated generically in WCAP-14333 and current Condition K is not appropriate for this Function. The subsequent Conditions are relettered. Table 3.3.1-1 is revised to reflect the relettering of the subsequent Conditions. The TS Bases are appropriately modified.
7. For Condition L and new Condition M (applicable to Functions 11.a and 11.b) the existing Completion Time and bypass time are maintained and brackets added since these Functions were not generically evaluated in WCAP-14333. In order to apply the various relaxations justified in WCAP-10271 and WCAP-14333 to plant specific Functions not evaluated generically, a plant specific evaluation of those Functions and any additional plant specific Functions not listed in NUREG-1431 Rev. 1 but contained in the plant specific SSPS or RPS design must be performed. A Reviewers Note indicating that certain Functions may require plant specific evaluation is added.

TS Section 3.3.2:

1. The time to restore an inoperable analog channel is increased to 72 hours.
2. The time allowed for analog channel testing in bypass is increased from 4 hours to 12 hours.
3. The time allowed to restore an inoperable logic train is increased to 24 hours.
4. In addition to the Note addressing testing in bypass in the current version of the NUREG (no bypass test capability) an alternate version of the Note is given for plants with installed bypass test capability.
5. For Condition K (applicable to Functions 7.b and 7.c) the existing Completion Time and bypass time are maintained and brackets added since these Functions were not generically evaluated in WCAP-14333. In order to apply the various relaxations justified in WCAP-10271 and WCAP-14333 to plant specific Functions not evaluated generically, a plant specific evaluation of those Functions and any additional plant specific Functions not listed in NUREG-1431 Rev. 1 but contained in the plant specific SSPS or RPS design must be performed. A Reviewers Note indicating that certain Functions may require plant specific evaluation is added.

TS Section 3.3.5:

1. In order to apply the various relaxations justified in WCAP-10271 and WCAP-14333 to plant specific Functions not evaluated generically, a plant specific evaluation of those Functions and any additional plant specific Functions not listed in NUREG-1431 Rev. 1 but contained in the plant specific SSPS or RPS design must be performed. A Reviewers Note indicating that certain Functions may require plant specific evaluation is added.

3.0 Background

WCAP-14333 provides the justification for increasing the bypass times for testing and the Completion Times in the Reactor Protection System (RPS) instrumentation and Engineered Safety Features Actuation System (ESFAS) instrumentation Technical Specifications. The NRC issued a Safety Evaluation on July 15, 1998 approving WCAP-14333.

These improvements will allow additional time to perform maintenance and test activities, enhance safety, provide additional operational flexibility, and reduce the potential for forced outages related to compliance with the RPS and ESFAS instrumentation Technical Specifications. Industry information has shown that a significant number of trips that have occurred are related to instrumentation test and maintenance activities, indicating that these activities should be completed with caution and sufficient time should be available to complete these activities in an orderly and effective manner.

Southern Nuclear Operating Company submitted a License Amendment Request on October 13, 1999 for the Vogtle Electric Generating Plant Unit 1 and 2 to adopt the relaxations that were generically approved in WCAP-14333. As a result of the staff review of this application, incremental conditional large early release probability (ICLERP) values for all Completion Times and bypass test time changes proposed in the WCAP were develop generically for all WOG plants. Amendments 116 and 94 were issued for Vogtle approving the changes proposed in WCAP-14333.

These improvements will allow additional time to perform maintenance and test activities, enhance safety, provide additional operational flexibility, and reduce the potential for forced outages related to compliance with the RPS and ESFAS instrumentation Technical Specifications. Industry information has shown that a significant number of trips that have occurred are related to instrumentation test and maintenance activities, indicating that these activities should be completed with caution and sufficient time should be available to complete these activities in an orderly and effective manner.

4.0 Technical Analysis

The Westinghouse Owners Group Technical Specification Optimization Program (WOG TOP) evaluated changes to surveillance test intervals and allowed outage times for the analog channels, logic cabinets, master and slave relays, and reactor trip breakers. The NRC approved increasing the surveillance test intervals (STI), bypass test times, and AOTs for the analog channels, as well as the AOTs for the logic cabinets, master relays, and slave relays. A probabilistic risk assessment approach was used in these analyses which included assessing the impact of the changes on signal availability and plant safety. The justification for the acceptability of the changes was the small impact the changes had on plant safety. It was also demonstrated that increasing the surveillance test intervals for the analog channels leads to a decrease in inadvertent reactor trips since fewer test activities will be performed with a channel in trip. This provides a safety benefit.

The approach used in this program and presented in this WCAP is consistent with the approach established by WOG TOP. This includes the fault tree models, signals, component reliability database, and most of the test and maintenance assumptions. Several changes in modeling were implemented to enhance the approach or to remove unnecessary conservatisms, such as, the common cause modeling approach for analog channels and the frequency of maintenance activities. The plant specific model used for the risk analysis was also changed. The WOG TOP work used the Indian Point Unit 2 and the Millstone Unit 3 models that were available in the early 80's. The work done in WCAP-14333 uses a plant specific PRA model that was completed to meet the Individual Plant Examination requirement (Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities").

Important to understanding the analysis and approach is a basic understanding of the RPS and ESFAS designs, and also the performance of test and maintenance activities on these systems. This information is contained in WCAP-14333.

A survey was provided to all WOG members to determine their needs with respect to instrumentation test times, maintenance times, and maintenance frequencies, in addition to information regarding plant operation, such as, reactor trip and spurious safety injection events. This is also discussed in WCAP-14333. From this information the Technical Specification changes that were evaluated were identified. The probabilistic risk analysis, benefits of the program and conclusions, and the relationship of the Technical Specification changes to the analysis are discussed in WCAP-14333.

To model these Completion Times in the fault trees to determine the impact of the changes on signal unavailabilities, several parameters need to be specified for component test and maintenance unavailabilities. These are the test and maintenance frequencies, and the time to complete the test and maintenance activities. These are discussed in more detail in the following paragraphs.

Test Frequencies and Durations

The test frequencies evaluated are contained in Tables 1.1 and 1.2 for the SSPS and Relay Protection System, respectively. The only control over the length of tests is provided by the Completion Times in the Technical Specifications or by the length of time the component is allowed to be in a bypassed state, also as specified in the Technical Specifications. For logic cabinets, master relays, and slave relays, the Completion Time is the maximum time the cabinet can be unavailable or bypassed. For analog channels, the Completion Time is the maximum length of time the channel can be unavailable or bypassed prior to being required to place it in the trip state. Plants that do not have installed channel bypass capability (most plants) cannot take advantage of this feature for testing. Due to these hardware limitations, testing of analog channels in most plants is performed with the channel in the tripped state.

The logic cabinet AOT and bypass time also apply to the master and slave relays, so a 4 hour bypass or test time will also be used for the master and slave relays. The test times are summarized in Tables 1.1 and 1.2.

Maintenance Frequencies and Durations

Preventive maintenance is usually completed on analog channels and logic cabinets during refueling outages. Corrective maintenance is done at-power when required. There is no set interval. Any maintenance activity that causes a channel or cabinet to be unavailable while at-power is of interest in this analysis. The previous WOG TOP study assumed that channel and logic cabinet maintenance occurred while the plant was at-power once per year. The results of the survey indicate at-power maintenance occurs significantly less frequent than this. Typically 10% or less of the tests lead to maintenance; so if the test interval is 3 months, then maintenance activities would typically be done every 30 months, which assumes that the majority of component failures are usually found via tests. WOG TOP assumed that maintenance activities that render the component unavailable while at-power occur once per year. This is a conservative assumption that leads to conservative results, which may be misleading; it provides an unrealistically large increase in risk. The maintenance intervals, or frequencies, in this study will be based on the following:

<u>Slave Relays</u>: Maintenance activities will be performed when the relay is found to be inoperable, following a test or an event that would cause an actuation. Preventive maintenance is not performed on these relays at power. Therefore, the maintenance interval is related to the probability of a slave relay failing on demand. The calculation for maintenance unavailability is based on the relay failure rate. This value is significantly less than the maintenance unavailability based on a maintenance frequency of once per year indicating the relays fail significantly less than once per year. This is supported by the reliability assessment of AR and MDR relays used in the SSPS provided in WCAP-13877 and WCAP-14117. Section 9 of WCAP-13877 shows there have been only 6 relay actuation failures in approximately 43,000 demands for AR relays. Section 9 of WCAP-14117 shows there have been only 4 relay actuation failures in approximately 50,000 demands for MDR relays.

<u>Master relays</u>: Maintenance activities will be performed when the relay is found to be inoperable, following a test or an event that would cause an actuation. Preventive maintenance is not performed on these relays at power. Therefore, the maintenance interval is related to the probability of a master relay failing on demand. The calculation for maintenance unavailability is based on the relay failure rate. This value is significantly less than the maintenance unavailability based on a maintenance frequency of once per year indicating the relays fail significantly less than once per year. Although detailed data collection on the master relays has not been performed, their failure history is not expected to vary greatly from the slave relay experience.

Logic cabinets: Maintenance activities will be performed when the cabinet or a portion of the cabinet is found to be failed, following a test or an event that would cause an actuation, which leads to a repair activity that requires the cabinet to be declared inoperable. Therefore, the maintenance interval is related to the probability of a component in the cabinet failing to function when demanded. A detailed data collection has not been performed on the cabinets and no similar data is available to easily justify an alternate maintenance frequency. The frequency of maintenance is reported to be at most once every two years based on the limited information available. The survey results reported that 10% or less of the tests on the instrumentation systems lead to maintenance activities. Since the logic cabinets are tested every two months, a failure would be expected approximately every 20 months per cabinet based on the percentage of tests that lead to maintenance activities. For this analysis, the maintenance interval will be 18 months.

Analog channels: Maintenance activities will be performed when a channel is found to be inoperable, following a test or an event that would cause an actuation. Therefore, the maintenance interval is related to the probability of a channel failing to function on demand. A detailed data collection has not been performed on the channels and no similar data is available to easily justify an alternate maintenance frequency. The frequency of maintenance is reported to vary from once every two years to once every 5 years based on the limited information available. The survey results reported that 10% or less of tests on the instrumentation systems lead to maintenance activities. Since analog channels are tested every three months, a failure would be expected approximately every 30 months per channel based on the percentage of tests that lead to maintenance activities. For this analysis, the maintenance interval will be two years.

The maximum time allowed for maintenance activities, in which the component is unavailable or prior to being placed in a tripped state, is limited by the Technical Specification Completion Times. The actual time in most cases is significantly less than the AOT value. The survey results confirmed this. In addition, with increased Completion Times, utilities responded in the survey that the time to complete maintenance activities is not expected to increase, although a minority indicated the times may increase as much as 50%. But, for the purposes of conservatism and since utilities may change maintenance practices/philosophies once the longer Completion Times are implemented, it will be assumed the total Completion Time will be used for maintenance activities. Therefore, the analog channel Completion Time will be 72 hours and the AOTs for the logic cabinets, master relays, and slave relays will be 24 hours.

From the survey, several of the utilities indicated that completing channel calibrations at-power would be useful. These are required on an 18 month interval and require approximately 4 hours to complete. An additional 4 hour unavailability every 18 months will be added to the test unavailability value to account for this testing.

Tables 1.1 and 1.2 provide summaries of the Completion Times and STIs for pre-TOPs, WOG TOP, and for the values being evaluated in this assessment for Solid State Protection Systems and Relay Protection Systems. The values used for the SSPS and Relay Protection System differ due to the different test and maintenance approaches required for each type of system.

Table 1.1 - Summary of AOTs and STIs for the RPS and ESFAS (Solid State Protection System)

Component	Pre-TOP	TOP	Proposed
Analog Channels			
- Maint. Time[1]	1 hour	6+6 hours	72+6 hours
- Maint. Interval	2 years	2 years	2 years
- Test (bypass) Time	2 hours	4 hours	12 hours
- Test Interval	1 month	3 months	3 months
- Calibration Interval	NEAP[3]	NEAP[3]	18 months
- Calibration Time	NEAP[3]	NEAP[3]	4 hours
Logic Cabinets			
- Maint. Time[1]	2 hours	6+6 hours	24+6 hours
- Maint. Interval	18 months	18 months	18 months
- Test (bypass) Time	1.5 hours	4 hours	4 hours
- Test Interval	2 months	2 months	2 months
Master Relays			
- Maint. Time[1]	2 hours	6+6 hours	24+6 hours
- Maint. Interval	see Note 2	see Note 2	see Note 2
- Test (bypass) Time	1.5 hours	4 hours	4 hours
- Test Interval	2 months	2 months	2 months
Slave Relays			
- Maint. Time[1]	2 hours	6+6 hours	24+6 hours
- Maint. Interval	see Note 2	see Note 2	see Note 2
- Test (bypass) Time	4 hours	4 hours	4 hours
- Test Interval	3 months	3 months	3 months
Reactor Trip Breakers			
- Maint. Time	6 hours	6 hours	6 hours
- Maint. Interval	1 year	1 year	1 year
- Test Time	2 hours	2 hours	2 hours
- Test Interval	2 months	2 months	2 months

Notes:

1- The "6 hr" is the time provided in Tech Spec to enter the specified Mode if the component is not returned to Operable status.

2 - Maintenance interval is based on the component failure rate.

3 - Not Evaluated At-Power (NEAP), in the past this activity has typically be done while shutdown.

Table 1.2 - Summary of AOTs and STIs for the RPS and ESFAS (Relay Protection System)

Component	Pre-TOP	TOP	Proposed
Analog Channels			
- Maint. Time[1]	1 hour	6+6 hours	72+6 hours
- Maint. Interval	2 years	2 years	2 years
- Test (bypass) Time	2 hours	4 hours	12 hours
- Test Interval	1 month	3 months	3 months
- Calibration Interval	NEAP[3]	NEAP[3]	18 months
- Calibration Time	NEAP[3]	NEAP[3]	4 hours
Logic Cabinets			
- Maint. Time[1]	2 hours	6+6 hours	24+6 hours
- Maint. Interval	1 year	1 year	1 year
- Test (bypass) Time	3 hours	8 hours	8 hours
- Test Interval	1 month	1 month	1 month
Master Relays			
- Maint. Time[1]	6 hours	6+6 hours	24+6 hours
- Maint. Interval	see Note 2	see Note 2	see Note 2
- Test (bypass) Time	3 hours	8 hours	8 hours
- Test Interval	1 month	1 month	1 month
Slave Relays			
- Maint. Time[1]	6 hours	6+6 hours	24+6 hours
- Maint. Interval	see Note 2	see Note 2	see Note 2
- Test (bypass) Time	6 hours	12 hours	12 hours
- Test Interval	3 months	3 months	3 months
Reactor Trip Breakers			
- Maint. Time	6 hours	6 hours	6 hours
- Maint. Interval	1 year	1 year	1 year
- Test Time	2 hours	2 hours	2 hours
- Test Interval	2 months	2 months	2 months

Notes:

1- The "6 hr" is the time provided in Tech Spec to enter the specified Mode if the component is not returned to Operable status.
2 - Maintenance interval is based on the component failure rate.
3 - Not Evaluated At-Power (NEAP), in the past this activity has typically be done while shutdown.

Risk Evaluation of the Proposed Changes

The changes being considered in this analysis were evaluated consistent with the three tiered approach currently defined in Regulatory Guide 1.177. The first tier addresses PSA insights and includes the risk analyses and sensitivity analyses to support the completion time and bypass test time changes. The second tier addresses avoidance of risk-significant plant configurations. The third tier addresses risk-informed plant configuration control and management.

Tier 1 Assessment

WCAP-14333 originally only provided the impact of the changes on core damage frequency (CDF). In response to NRC's requests for additional information (OG-96-100), the WOG also provided the impact of the changes on large early release frequency (LERF) and the increment conditional core damage probability (ICCDP) values for each change under consideration. Finally, in response to an NRC request for additional information during their review of SNC's LAR implementing these changes for the Vogtle Electric Generating Plant, incremental conditional large early release probabilities (ICLEFP) for each change were also calculated and provided. The impact of the proposed changes on CDF and LERF are provided on Table 1.3 and Table 1.4, respectively. The CDF and LERF are provided for the surveillance test intervals, completion times, and bypass times for pre-TOP, TOP, and the WCAP-14333 proposed changes. The impact on the CDF and LERF values are also provided referenced to pre-TOP and TOP conditions. The results of a sensitivity assessment are

also provided that credits a reduction in reactor trip frequency due to the fewer analog channel tests associated with the channel test interval increase. The CDF and LERF values are provided for both 2 of 4 and 2 of 3 combinational logic. The ICCDP and ICLERP values are provided on Table 1.5. These values are provided only for 2 of 3 combinational logic, but the results envelop 2 of 4 logic.

Based on this information and several independent assessments using a different Westinghouse plant PRA model than used in the WOG effort, the NRC concluded that the risk analysis supports the proposed Tech Spec changes and is acceptable, subject to the following conditions which must be addressed in referencing licensee's plant specific license amendment requests:

- Confirm the applicability of the WCAP-14333P analyses for their plant.
- Address Tier 2 and Tier 3 analyses including the CRMP insights, by confirming that these insights are incorporated into the referencing licensee's decision making process before taking equipment out of service.

The WOG developed an implementation guideline that can be used to demonstrate that the WCAP-14333 analyses are applicable to individual plants.

Tier 2 Assessment

As noted above, the Staff's safety evaluation requires Tier 2 requirements, avoidance of risk-significant plant configurations, to be addressed on a plant specific basis. Based on their evaluations, the staff concluded that certain equipment removed from service during the proposed AOT extensions may result in a risk significant configuration on a plant specific basis. As an example, the staff identified that simultaneous outages of a train of the reactor protection system along with certain other components increased risk significantly. Therefore, per the safety evaluation "each licensee referencing WCAP-14333P must , therefore, examine the need for and place necessary restrictions on concurrent equipment outages when entering the proposed AOTs in order to avoid risk significant configurations."

Tier 3 Assessment

As noted above, the Staff's safety evaluation also requires Tier 3 requirements, risk-informed plant configuration control and management, to be addressed on a plant specific basis. This will be addressed on a utility specific basis when the changes in WCAP-14333P are implemented at each plant and will be addressed through each plant's Maintenance Rule Program (A.4 requirement).

Table 1.3
Summary of the Impact of the AOT and Test Time Changes on CDF

Case	2/4 Logic			2/3 Logic		
	CDF (per yr)	Change: Referenced to Pre-TOP	Change: Referenced to TOP	CDF (per yr)	Change: Referenced to Pre-TOP	Change: Referenced to TOP
Pre-TOP	5.706E-05	--	--	5.717E-05	--	--
TOP	5.800E-05	9.4E-07	--	5.832E-05	1.2E-06	--
Proposed	5.835E-05	1.3E-06	3.5E-07	5.893E-05	1.8E-06	6.1E-07
TOP: Sens.	5.651E-05	-5.5E-07	--	5.683E-05	-3.4E-07	--
Proposed: Sens.	5.683E-05	-2.3E-07	3.2E-07	5.741E-05	2.4E-07	5.8E-07

Table 1.4
Summary of the Impact of the AOT and Test Time Changes on LERF

Case	2/4 Logic			2/3 Logic		
	CDF (per yr)	Change: Referenced to Pre-TOP	Change: Referenced to TOP	CDF (per yr)	Change: Referenced to Pre-TOP	Change: Referenced to TOP
Pre-TOP	2.242E-06	--	--	2.243E-06	--	--
TOP	2.308E-06	6.6E-08	--	2.311E-06	6.8E-08	--
Proposed	2.328E-06	8.6E-08	2.0E-08	2.333E-06	9.0E-08	2.2E-08
TOP: Sens.	2.308E-06	6.6E-08	--	2.310E-06	6.7E-08	--
Proposed: Sens.	2.327E-06	8.5E-08	1.9E-08	2.333E-06	9.0E-08	2.3E-08

Table 1.5
Summary of Incremental Conditional Core Damage Probabilities and Incremental Conditional Large Early Release Probabilities

Case	AOT or Test Time	ICCDP	ICLERP
Analog channel: PZR pressure channel in test	12 hrs	8.8E-09	3.6E-09
Analog channel: PZR pressure channel in maintenance	72 + 6 hrs	5.7E-08	2.3E-08
Analog channel: SG level channel in test	12 hrs	5.5E-10	1.1E-11
Analog channel: SG level channel in maintenance	72 + 6 hrs	3.6E-09	7.3E-11
Logic cabinet in maintenance	24 + 6 hrs	4.4E-07	3.0E-08
Master relay in maintenance	24 + 6 hrs	1.1E-08	3.8E-10
Slave relay in maintenance	24 + 6 hrs	6.8E-09	2.0E-10

PLANT SPECIFIC EVALUATIONS FOR FUNCTIONS NOT EVALUATED GENERICALLY

WCAP-10271 and WCAP-14333 provided the technical justification for relaxing various Reactor Trip System (RTS) and Engineered Safety Features Actuation System (ESFAS) Instrumentation bypass test times, Completion Times and Surveillance Frequencies. The specific RTS and ESFAS Functions evaluated in these two WCAPs are contained in Table 3.2-2 (Solid State Protection System (SSPS)) and Table 3.2-3 (Relay Protection System (RPS)) of WCAP-10271, Supplement 1-P-A, and Table 3.1-3 (SSPS) and Table 3.1-2 (RPS) in WCAP-10271-P-A, Supplement 2, Rev. 1.

The RTS and ESFAS Functions that were evaluated in these WCAPs were the Functions that were generic to all SSPS and RPS plant protection system designs. Plant specific RTS and ESFAS Functions that are not contained in the tables identified above, were not evaluated generically in the technical justifications supporting WCAP-10271 and WCAP-14333. A review of NUREG-1431, Rev. 1, specifically identified the following Functions that were not evaluated in WCAP-10271:

TS 3.3.1	Function 11a and b:	Reactor Coolant Pump Breaker Position (Single Loop and Two Loops)
TS 3.3.2	Function 7 b and c:	Automatic Switchover to Containment Sump (RWST Level - Low Low Coincident with Safety Injection and RWST Level - Low Low Coincident with Safety Injection and Coincident with Containment Sump Level - High)
TS 3.3.5	Loss of Power Function	

In order to apply the various relaxations justified in WCAP-10271 and WCAP-14333 to plant specific Functions not evaluated generically, a plant specific evaluation of those Functions and any additional plant specific Functions not listed in NUREG-1431 Rev. 1 but contained in the plant specific SSPS or RPS design must be performed. The ISTS is revised to reflect the relaxations for Functions evaluated generically by WCAP-10271 and WCAP-14333 and a Reviewers Note is provided in the Bases indicating that certain Functions may require plant specific evaluation.

Several utilities have completed plant specific evaluations to demonstrate that the changes in WCAP-10271 and its supplements are applicable to functions not generically evaluated. The changes in WCAP-14333 are also applicable to these plant specific functions and additional plant specific evaluations to demonstrate the changes in WCAP-14333 are applicable are not required. This only applies to plants that have actually performed the analyses to demonstrate the applicability of WCAP-10271 to plant specific functions.

5.0 Regulatory Analysis

5.1 No Significant Hazards Consideration

The proposed changes to the Improved Standard Technical Specifications (ISTS) will revise Technical Specifications 3.3.1, 3.3.2, and associated Bases, and 3.3.5 Bases. the proposed changes would allow:

- Completion Times of 72 hours for inoperable instruments
- Bypass times of 12 hours for surveillance testing
- Completion Times of 24 hours for an inoperable logic cabinet or master and slave relays

In accordance with the criteria set forth in 10 CFR 50.92, the proposed changes to NUREG-1431 have been evaluated and determined they do not represent a significant hazards consideration. The following is provided in support of this conclusion:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed changes to the Completion Times and bypass test time reduce the potential for inadvertent reactor trips and spurious actuations, and therefore do not increase the probability of any accident previously evaluated. The proposed changes to the Completion Times and bypass test time do not change the response of the plant to any accidents and have

an insignificant impact on the reliability of the reactor trip system and engineered safety feature actuation system (RTS and ESFAS) signals. The RTS and ESFAS will remain highly reliable and the proposed changes will not result in a significant increase in the risk of plant operation. This is demonstrated by showing that the impact on plant safety as measured by core damage frequency (CDF) is less than 1.0E-06 per year and the impact on large early release frequency (LERF) is less than 1.0E-07 per year. In addition, for the Completion Time change, the incremental conditional core damage probabilities (ICCDP) and incremental conditional large early release probabilities (ICLERP) are less than 5.0E-7 and 5.0E-08, respectively. These changes meet the acceptance criteria in Regulatory Guides 1.174 and 1.177. Therefore, since the RTS and ESFAS will continue to perform their functions with high reliability as originally assumed, and the increase in risk as measured by CDF, LERF, ICCDP, ICLERP is within the acceptance criteria of existing regulatory guidance, there will not be a significant increase in the consequences of any accidents.

The proposed changes do not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, or configuration of the facility or the manner in which the plant is operated and maintained. The proposed changes do not alter or prevent the ability of structures, systems, and components (SSCs) from performing their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits. The proposed changes do not affect the source term, containment isolation, or radiological release assumptions used in evaluating the radiological consequences of an accident previously evaluated. Further, the proposed changes do not increase the types or amounts of radioactive effluent that may be released offsite, nor significantly increase individual or cumulative occupational/public radiation exposures. The proposed changes are consistent with safety analysis assumptions and resultant consequences.

Therefore, this change does not increase the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any previously evaluated?

Response: No

The proposed changes do not result in a change in the manner in which the RTS and ESFAS provide plant protection. The RTS and ESFAS will continue to have the same setpoints after the proposed changes are implemented. There are no design changes associated with the license amendment. The changes to Completion Times and bypass test time do not change any existing accident scenarios, nor create any new or different accident scenarios.

The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. In addition, the changes do not impose any new or different requirements or eliminate any existing requirements. The changes do not alter assumptions made in the safety analysis. The proposed changes are consistent with the safety analysis assumptions and current plant operating practice.

Therefore, this changes does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in the margin of safety?

Response: No

The proposed changes do not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not impacted by these changes. Redundant RTS and ESFAS trains are maintained, and diversity with regard to the signals that provide reactor trip and engineered safety features actuation is also maintained. All signals credited as primary or secondary, and all operator actions credited in the accident analyses will remain the same. The proposed changes will not result in plant operation in a configuration outside the design basis. The calculated impact on risk is insignificant and meets the acceptance criteria contained in Regulatory Guides 1.174 and 1.177. Although there was no attempt to quantify any positive human factors benefit due to increased Completion Times and bypass test time, it is expected that there would be a net benefit due to a reduced potential for spurious reactor trips and actuations associated with testing.

Therefore, this change does not involve a significant reduction in the margin of safety.

5.2 Applicable Regulatory Requirements/Criteria

The regulatory bases and guidance documents associated with the systems discussed in this traveler include:

GDC-13 requires that instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems.

GDC-20 requires that the protection system(s) shall be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences and (2) to sense accident conditions and to initiate the operation of systems and components important to safety.

GDC-21 requires that the protection system(s) shall be designed for high functional reliability and testability.

GDC-22 through GDC-25 and GDC-29 require various design attributes for the protection system(s), including independence, safe failure modes, separation from control systems, requirements for reactivity control malfunctions, and protection against anticipated operational occurrences.

Regulatory Guide 1.22 discusses an acceptable method of satisfying GDC-20 and GDC-21 regarding the periodic testing of protection system actuation functions. These periodic tests should duplicate, as closely as practicable, the performance that is required of the actuation devices in the event of an accident.

10CFR50.55a(h) requires that the protection systems meet IEEE 279-1971. Sections 4.9 - 4.11 of IEEE 279-1971 discuss testing provisions for protection systems.

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 Environmental Consideration

A review has determined that the proposed change would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed amendment is not required.

7.0 References

1. WCAP-14333-P-A, Revision 1, “Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times,” October 1998

2. NRC letter dated July 15, 1998, “Review of Westinghouse Owners Group Topical Reports WCAP-14333P and WCAP-14334NP, dated May 1995, “Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times (TAC NO. M92782)”

INSERTS

INSERT 1

Reviewer's Note

The below NOTE should be used for plants with installed bypass test capability:

- NOTE -

One channel may be bypassed for up to 12 hours for surveillance testing and set point adjustment.

INSERT 2

Reviewer's Note

The below NOTE should be used for plants with installed bypass test capability:

- NOTE -

One channel may be bypassed for up to 12 hours for surveillance testing.

INSERT 3

3. One RTB train may be bypassed for up to [4] hours for concurrent surveillance testing of the RTB and automatic trip logic, provided the other train is OPERABLE.

INSERT 3A

M. One Reactor Coolant Pump Breaker Position (Two Loops) channel inoperable.		--- NOTE The inoperable channel may be bypassed for up to [4] hours for surveillance testing of other channels. ---	
	M.1	Place the channel in trip.	[6] hours
	OR		
	M.2	Reduce THERMAL POWER to < P-7.	[12] hours

INSERT 4

- Reviewers Note -

In Table 3.3.1-1, Functions 11.a and 11.b were not included in the generic evaluations approved in either WCAP-10271, as supplemented, or WCAP-14333. In order to apply the WCAP-10271, as supplemented, and WCAP-14333 TS relaxations to plant specific Functions not evaluated generically, licensees must submit plant specific evaluations for NRC review and approval.

INSERT 5

The 78 hour Completion Time includes 72 hours for channel corrective maintenance, and an additional 6 hours for the MODE reduction as required by Required Action D.3.

INSERT 6

- Reviewers Note -

The below text should be used for plants with installed bypass test capability:

The Required Actions are modified by a Note that allows placing one channel in bypass for 12 hours while performing routine surveillance testing, and setpoint adjustments when a setpoint reduction is required by other Technical Specifications. The 12 hour time limit is justified in Reference 7.

INSERT 7

- Reviewers Note -

The below text should be used for plants with installed bypass test capability:

The Required Actions are modified by a Note that allows placing one channel in bypass for up to 12 hours while performing routine surveillance testing. The 12 hour time limit is justified in Reference 7.

INSERT 8

and Reference 9 for Function 11. b., Reactor Coolant Pump (RCP) Breaker Position-Two Loops.

INSERT 9

- Reviewers Note -

The below text should be used for plants with installed bypass test capability:

The Required Actions are modified by a Note that allows placing one channel in bypass for up to 12 hours while performing routine surveillance testing. The 12 hour time limit is justified in References 7 and 9.

INSERT 10

The 24 hours allowed to restore the inoperable RTS Automatic Trip Logic train to OPERABLE status is justified in Reference 7.

INSERT 11

The [4] hour time limit for testing the RTS Automatic Trip Logic train may include testing the RTB also, if both the Logic test and RTB test are conducted within the [4] hour time limit. The [4] hour time limit is justified in Reference 7.

The [4] hour time limit for the RTS Automatic Trip Logic train testing is greater than the 2 hour time limit for the RTBs, which the Logic train supports. The longer time limit for the Logic train ([4] hours) is acceptable based on Reference 10.

INSERT 12

Note 1 applies to RTB testing that is performed independently from the corresponding Logic train testing. For simultaneous testing of the Logic and RTBs, the [4] hour test time limit of Condition O applies.

INSERT 13

Note 3 applies to RTB testing that is performed concurrently with the corresponding Logic train testing. For concurrent testing of the Logic and RTB, the [4] hour test time limit of Condition Oapplies. The [4] hour time limit is justified in Reference 7.

INSERT 14

- Reviewers Note -

In Table 3.3.2-1, Functions 7.b and 7.c were not included in the generic evaluations approved in either WCAP-10271, as supplemented, or WCAP-14333. In order to apply the WCAP-10271, as supplemented, and WCAP-14333 TS relaxations to plant specific Functions not evaluated generically, licensees must submit plant specific evaluations for NRC review and approval.

INSERT 15

The 24 hours allowed for restoring the inoperable train to OPERABLE status is justified in Reference 8.

INSERT 16

The 72 hours allowed to restore the channel to OPERABLE status or to place it in the tripped condition is justified in Reference 8.

INSERT 17

- Reviewers Note -

The below text should be used for plants with installed bypass test capability:

The Required Actions are modified by a Note that allows placing one channel in bypass for up to 12 hours while performing routine surveillance testing. The 12 hour time limit is justified in Reference 8.

INSERT 18

- Reviewers Note -

The below text should be used for plants with installed bypass test capability:

The Required Actions are modified by a Note that allows placing one channel in bypass for up to 12 hours while performing routine surveillance testing. The channel to be tested can be tested in bypass with the inoperable channel also in bypass. The 12 hour time limit is justified in Reference 8.

INSERT 19

----------Reviewers Note----------

In TS 3.3.5, “Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation,” the loss of power function was not included in the generic evaluations approved in either WCAP-10271, as supplemented, or WCAP-14333. In order to apply the WCAP-10271, as supplemented, or WCAP-14333 TS relaxations to plant specific Functions not evaluated generically, licensees must submit plant specific evaluations for NRC review and approval.

INSERT 20

M.1 and M.2

Condition M applies to the RCP Breaker Position (Two Loops) reactor trip Function. There is one breaker position device per RCP breaker. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within [6] hours. If the channel cannot be restored to OPERABLE status within the [6] hours, then THERMAL POWER must be reduced below the P-7 setpoint within the next 4 hours.

This places the unit in a MODE where the LCO is no longer applicable.
This Function does not have to be OPERABLE below the P-7 setpoint because other RTS Functions provide core protection below the P-7 setpoint. The [6] hours allowed to restore the channel to OPERABLE status and the 4 additional hours allowed to reduce THERMAL POWER to below the P-7 setpoint are justified in Reference 9.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to [4] hours while performing routine surveillance testing of the other channels. The [4] hour time limit is justified in Reference 9.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux - High channel inoperable.	[**- NOTE -** The inoperable channel may be bypassed for up to ~~4~~ 12 hours for surveillance testing and setpoint adjustment of other channels.]	
INSERT 1	D.1.1 Place channel in trip.	~~6~~ 72 hours
	AND	
	D.1.2 Reduce THERMAL POWER to ≤ 75% RTP.	~~12~~ 78 hours
	OR	
	D.2.1 Place channel in trip.	~~6~~ 72 hours
	AND	
	D.2.2 **- NOTE -** Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable.	
	Perform SR 3.2.4.2.	Once per 12 hours
	OR	
	D.3 Be in MODE 3.	~~12~~ 78 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. One channel inoperable.	[**- NOTE -** The inoperable channel may be bypassed for up to ~~4~~ 12 hours for surveillance testing of other channels.		
INSERT 2	E.1	Place channel in trip.]	~~8~~ 72 hours
	OR		
	E.2	Be in MODE 3.	~~12~~ 78 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1	Reduce THERMAL POWER to < P-6.	24 hours
	OR		
	F.2	Increase THERMAL POWER to > P -10.	24 hours
G. Two Intermediate Range Neutron Flux channels inoperable.		**- NOTE -** Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM.	
	G.1	Suspend operations involving positive reactivity additions.	Immediately
	AND		
	G.2	Reduce THERMAL POWER to < P-6.	2 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
H. One Source Range Neutron Flux channel inoperable.		- NOTE - Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM.	
	H.1	Suspend operations involving positive reactivity additions.	Immediately
I. Two Source Range Neutron Flux channels inoperable.	I.1	Open Reactor Trip Breakers (RTBs).	Immediately
J. One Source Range Neutron Flux channel inoperable.	J.1	Restore channel to OPERABLE status.	48 hours
	OR		
	J.2.1	Initiate action to fully insert all rods.	48 hours
	AND		
	J.2.2	Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
K. One channel inoperable.		[- NOTE - The inoperable channel may be bypassed for up to 12 ~~4~~ hours for surveillance testing of other channels.	
INSERT 2	K.1	Place channel in trip.]	72 ~~6~~ hours
	OR		

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	K.2 Reduce THERMAL POWER to < P-7.	~~12~~ 78 hours
L. One Reactor Coolant Pump Breaker Position channel inoperable. (Single Loop)	---------- **- NOTE -** The inoperable channel may be bypassed for up to ~~4~~ [4] hours for surveillance testing of other channels. ----------	
	L.1 Restore channel to OPERABLE status.	~~8~~ [6] hours
	OR	
INSERT 3A	L.2 Reduce THERMAL POWER to < P-8.	~~10~~ [10] hours
~~M.~~ N. One Turbine Trip channel inoperable.	[---------- **- NOTE -** The inoperable channel may be bypassed for up to ~~4~~ 12 hours for surveillance testing of other channels. ----------]	
INSERT 2	~~M.~~ N.1 Place channel in trip.	~~16~~ 72 hours
	OR	
	~~M.~~ N.2 Reduce THERMAL POWER to < [P-9].	~~18~~ 76 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~N.~~ O. One train inoperable.	---------- **- NOTE -** One train may be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE. ----------	
	~~N.~~ O. 1 Restore train to OPERABLE status.	~~8~~ 24 hours
	OR	
	~~N.~~ O. 2 Be in MODE 3.	~~12~~ 30 hours
~~O.~~ P. One RTB train inoperable.	---------- **- NOTE -** 1. One train may be bypassed for up to 2 hours for surveillance testing, provided the other train is OPERABLE. 2. One RTB may be bypassed for up to 2 hours for maintenance on undervoltage or shunt trip mechanisms, provided the other train is OPERABLE. INSERT 3 ----------	
	~~O.~~ P. 1 Restore train to OPERABLE status.	1 hour
	OR	
	~~O.~~ P. 2 Be in MODE 3.	7 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
Q. ~~P.~~ One or more channels inoperable.	Q. ~~P.~~1 Verify interlock is in required state for existing unit conditions.	1 hour
	OR	
	Q. ~~P.~~2 Be in MODE 3.	7 hours
R. ~~Q.~~ One or more channels inoperable.	R. ~~Q.~~1 Verify interlock is in required state for existing unit conditions.	1 hour
	OR	
	R. ~~Q.~~2 Be in MODE 2.	7 hours
S. ~~R.~~ One trip mechanism inoperable for one RTB.	S. ~~R.~~1 Restore inoperable trip mechanism to OPERABLE status.	48 hours
	OR	
	S. ~~R.~~2 Be in MODE 3.	54 hours

SURVEILLANCE REQUIREMENTS

- NOTE -

Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE		FREQUENCY
SR 3.3.1.1	Perform CHANNEL CHECK.	12 hours

Table 3.3.1-1 (page 2 of 6)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
6. Overtemperature ΔT	1,2	[4]	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.12 SR 3.3.1.16	Refer to Note 1 (Page 3.3.1-16)	Refer to Note 1 (Page 3.3.1-16)
7. Overpower ΔT	1,2	[4]	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.12 SR 3.3.1.16	Refer to Note 2 (Page 3.3.1-17)	Refer to Note 2 (Page 3.3.1-17)
8. Pressurizer Pressure						
a. Low	1[f]	[4]	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ [1886] psig	[1900] psig
b. High	1,2	[4]	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≤ [2396] psig	[2385] psig
9. Pressurizer Water Level - High	1[e]	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ [93.8]%	[92]%
10. Reactor Coolant Flow - Low	1[f]	3 per loop	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ [89.2]%	[90]%
11. Reactor Coolant Pump (RCP) Breaker Position						
a. Single Loop	1[f]	1 per RCP	L	SR 3.3.1.14	NA	NA
b. Two Loops	1[g]	1 per RCP M	~~E~~	SR 3.3.1.14	NA	NA

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(f) Above the P-8 (Power Range Neutron Flux) interlock.

(g) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) Interlock

Table 3.3.1-1 (page 3 of 6)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
12. Undervoltage RCPs	1[e]	[3] per bus	K	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16	≥ [4760] V	[4830] V
13. Underfrequency RCPs	1[e]	[3] per bus	K	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16	≥ [57.1] Hz	[57.5] Hz
14. Steam Generator (SG) Water Level - Low Low	1,2	[4 per SG]	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ [30.4]%	[32.3]%
15. SG Water Level - Low	1,2	2 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ [30.4]%	[32.3]%
Coincident with Steam Flow/ Feedwater Flow Mismatch	1,2	2 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≤ [42.5]% full steam flow at RTP	[40]% full steam flow at RTP
16. Turbine Trip						
a. Low Fluid Oil Pressure	1[h]	3	N	SR 3.3.1.10 SR 3.3.1.15	≥ [750] psig	[800] psig
b. Turbine Stop Valve Closure	1[h]	4		SR 3.3.1.10 SR 3.3.1.15	≥ [1]% open	[1]% open
17. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	O	SR 3.3.1.14	NA	NA

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(h) Above the P-9 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 4 of 6)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL[a] TRIP SETPOINT
18. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	2[d]	2	Q	SR 3.3.1.11 SR 3.3.1.13	≥ [6E-11] amp	[1E-10] amp
b. Low Power Reactor Trips Block, P-7	1	1 per train		SR 3.3.1.5	NA	NA
c. Power Range Neutron Flux, P-8	1	4	R	SR 3.3.1.11 SR 3.3.1.13	≤ [50.2]% RTP	[48]% RTP
d. Power Range Neutron Flux, P-9	1	4		SR 3.3.1.11 SR 3.3.1.13	≤ [52.2]% RTP	[50]% RTP
e. Power Range Neutron Flux, P-10	1,2	4	Q	SR 3.3.1.11 SR 3.3.1.13	≥ [7.8]% RTP and ≤ [12.2]% RTP	[10]% RTP
f. Turbine Impulse Pressure, P-13	1	2	R	[SR 3.3.1.1] SR 3.3.1.10 SR 3.3.1.13	≤ [12.2]% turbine power	[10]% turbine power
19. Reactor Trip Breakers[i] (RTBs)	1,2	2 trains	P	SR 3.3.1.4	NA	NA
	3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.4	NA	NA
20. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms	1,2	1 each per RTB	S	SR 3.3.1.4	NA	NA
	3[b], 4[b], 5[b]	1 each per RTB	C	SR 3.3.1.4	NA	NA
21. Automatic Trip Logic	1,2	2 trains	O	SR 3.3.1.5	NA	NA
	3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.5	NA	NA

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

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(i) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

- REVIEWER'S NOTE -

(a) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

that no single trip mechanism failure will prevent opening any breaker on a valid signal.

These trip Functions must be OPERABLE in MODE 1 or 2 when the reactor is critical. In MODE 3, 4, or 5, these RTS trip Functions must be OPERABLE when the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

21. Automatic Trip Logic

The LCO requirement for the RTBs (Functions 19 and 20) and Automatic Trip Logic (Function 21) ensures that means are provided to interrupt the power to allow the rods to fall into the reactor core. Each RTB is equipped with an undervoltage coil and a shunt trip coil to trip the breaker open when needed. Each RTB is equipped with a bypass breaker to allow testing of the trip breaker while the unit is at power. The reactor trip signals generated by the RTS Automatic Trip Logic cause the RTBs and associated bypass breakers to open and shut down the reactor.

The LCO requires two trains of RTS Automatic Trip Logic to be OPERABLE. Having two OPERABLE channels ensures that random failure of a single logic channel will not prevent reactor trip.

These trip Functions must be OPERABLE in MODE 1 or 2 when the reactor is critical. In MODE 3, 4, or 5, these RTS trip Functions must be OPERABLE when the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

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

ACTIONS

INSERT 4

A Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.1-1.

In the event a channel's Trip Setpoint is found nonconservative with respect to the Allowable Value, or the transmitter, instrument loop, signal processing electronics, or bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition(s) entered for the protection Function(s) affected.

When the number of inoperable channels in a trip Function exceed those specified in one or other related Conditions associated with a trip

BASES

ACTIONS (continued)

C.1, C.2.1, and C.2.2

Condition C applies to the following reactor trip Functions in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted:

- Manual Reactor Trip,
- RTBs,
- RTB Undervoltage and Shunt Trip Mechanisms, and
- Automatic Trip Logic.

This action addresses the train orientation of the SSPS for these Functions. With one channel or train inoperable, the inoperable channel or train must be restored to OPERABLE status within 48 hours. If the affected Function(s) cannot be restored to OPERABLE status within the allowed 48 hour Completion Time, the unit must be placed in a MODE in which the requirement does not apply. To achieve this status, action must be initiated within the same 48 hours to ensure that all rods are fully inserted, and the Rod Control System must be placed in a condition incapable of rod withdrawal within the next hour. The additional hour provides sufficient time to accomplish the action in an orderly manner. With rods fully inserted and the Rod Control System incapable of rod withdrawal, these Functions are no longer required.

The Completion Time is reasonable considering that in this Condition, the remaining OPERABLE train is adequate to perform the safety function, and given the low probability of an event occurring during this interval.

D.1.1, D.1.2, D.2.1, D.2.2, and D.3

Condition D applies to the Power Range Neutron Flux - High Function.

The NIS power range detectors provide input to the Rod Control System and the SG Water Level Control System and, therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The ~~8~~ 72 hours allowed to place the inoperable channel in the tripped condition is justified in WCAP-~~10271-P-A~~ 14333-P-A (Ref. 7).

BASES

ACTIONS (continued)

In addition to placing the inoperable channel in the tripped condition, THERMAL POWER must be reduced to ≤ 75% RTP within 12 hours. Reducing the power level prevents operation of the core with radial power distributions beyond the design limits. With one of the NIS power range detectors inoperable, 1/4 of the radial power distribution monitoring capability is lost.

As an alternative to the above actions, the inoperable channel can be placed in the tripped condition within 6 hours and the QPTR monitored once every 12 hours as per SR 3.2.4.2, QPTR verification. Calculating QPTR every 12 hours compensates for the lost monitoring capability due to the inoperable NIS power range channel and allows continued unit operation at power levels ≥ 75% RTP. The 6 hour Completion Time and the 12 hour Frequency are consistent with LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)."

As an alternative to the above Actions, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Twelve hours are allowed to place the plant in MODE 3. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. If Required Actions cannot be completed within their allowed Completion Times, LCO 3.0.3 must be entered.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypass condition for up to 4 hours while performing routine surveillance testing of other channels. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the setpoint in accordance with other Technical Specifications. The 4 hour time limit is justified in Reference 7.

Required Action D.2.2 has been modified by a Note which only requires SR 3.2.4.2 to be performed if the Power Range Neutron Flux input to QPTR becomes inoperable. Failure of a component in the Power Range Neutron Flux Channel which renders the High Flux Trip Function inoperable may not affect the capability to monitor QPTR. As such, determining QPTR using this movable incore detectors once per 12 hours may not be necessary.

BASES

ACTIONS (continued)

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux - Low,
- Overtemperature ΔT,
- Overpower ΔT,
- Power Range Neutron Flux - High Positive Rate,
- Power Range Neutron Flux - High Negative Rate,
- Pressurizer Pressure - High,
- SG Water Level - Low Low, and
- SG Water Level - Low coincident with Steam Flow/Feedwater Flow Mismatch.

72 A known inoperable channel must be placed in the tripped condition within 6 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of 72 the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 6 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 7.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the unit in MODE 3. Six hours is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging unit systems.

[The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 4 hours while 12 performing routine surveillance testing of the other channels. The 4 hour time limit is justified in Reference 7.]

INSERT 7

BASES

ACTIONS (continued)

an OPERABLE status, action must be initiated within the same 48 hours to ensure that all rods are fully inserted, and the Rod Control System must be placed in a condition incapable of rod withdrawal within the next hour. The allowance of 48 hours to restore the channel to OPERABLE status, and the additional hour, are justified in Reference 7. 8.

K.1 and K.2

Condition K applies to the following reactor trip Functions:

- Pressurizer Pressure - Low,
- Pressurizer Water Level - High,
- Reactor Coolant Flow - Low
- RCP Breaker Position,
- Undervoltage RCPs, and
- Underfrequency RCPs.

72 With one channel inoperable, the inoperable channel must be placed in the tripped condition within 6 hours. For the Pressurizer Pressure - Low, Pressurizer Water Level - High, Undervoltage RCPs, and Underfrequency RCPs trip Functions, placing the channel in the tripped condition when above the P-7 setpoint results in a partial trip condition requiring only one additional channel to initiate a reactor trip. For the Reactor Coolant Flow - Low and RCP Breaker Position (Two Loops) trip Functions, placing the channel in the tripped condition when above the P-8 setpoint results in a partial trip condition requiring only one additional channel in the same loop to initiate a reactor trip. For the latter two trip Functions, two tripped channels in two RCS loops are required to initiate a reactor trip when below the P-8 setpoint and above the P-7 setpoint. These Functions do not have to be OPERABLE below the P-7 setpoint because there are no loss of flow trips below the P-7 setpoint. There is insufficient heat production to generate DNB conditions below the P-7 setpoint. The 6 hours allowed to place the channel in the tripped condition is justified in Reference 7. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time. 72 INSERT 3

BASES

ACTIONS (continued)

Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the Functions associated with Condition K.

[The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels. The 4 hour time limit is justified in Reference 7.] (12) (INSERT 8) (INSERT 9)

L.1 and L.2

Condition L applies to the RCP Breaker Position (Single Loop) reactor trip Function. There is one breaker position device per RCP breaker. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 6 hours. If the channel cannot be restored to OPERABLE status within the 6 hours, then THERMAL POWER must be reduced below the P-8 setpoint within the next 4 hours. [6]

This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-8 setpoint because other RTS Functions provide core protection below the P-8 setpoint. The 6 hours allowed to restore the channel to OPERABLE status and the 4 additional hours allowed to reduce THERMAL POWER to below the P-8 setpoint are justified in Reference 12. (9.) [6]

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels. The 4 hour time limit is justified in Reference 7. (9) [4] (routine) (INSERT 20)

M.1 and M.2 (N.) (N)

Condition M applies to Turbine Trip on Low Fluid Oil Pressure or on Turbine Stop Valve Closure. With one channel inoperable, the inoperable channel must be placed in the trip condition within 6 hours. If placed in the tripped condition, this results in a partial trip condition requiring only one additional channel to initiate a reactor trip. If the channel cannot be restored to OPERABLE status or placed in the trip condition, then power must be reduced below the P-9 setpoint within the next 4 hours. The 6 hours allowed to place the inoperable channel in the (72) (72)

BASES

ACTIONS (continued)

tripped condition and the 4 hours allowed for reducing power are justified in Reference 7.

[The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels. The 4 hour time limit is justified in Reference 7.]

INSERT 7

O.

~~M~~.1 and ~~M~~.2

O

Condition ~~M~~ applies to the SI Input from ESFAS reactor trip and the RTS Automatic Trip Logic in MODES 1 and 2. These actions address the train orientation of the RTS for these Functions. With one train inoperable, ~~6~~ hours are allowed to restore the train to OPERABLE status (Required Action N.1) or the unit must be placed in MODE 3 within the next 6 hours. The Completion Time of ~~6~~ hours (Required Action ~~M~~.1) is reasonable considering that in this Condition, the remaining OPERABLE train is adequate to perform the safety function and given the low probability of an event during this interval. The Completion Time of 6 hours (Required Action ~~M~~.2) is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging unit systems.

24

O.

INSERT 10

O.

The Required Actions have been modified by a Note that allows bypassing one train up to [4] hours for surveillance testing, provided the other train is OPERABLE.

INSERT 11

P.

~~O~~.1 and ~~O~~.2

P

Condition ~~O~~ applies to the RTBs in MODES 1 and 2. These actions address the train orientation of the RTS for the RTBs. With one train inoperable, 1 hour is allowed to restore the train to OPERABLE status or the unit must be placed in MODE 3 within the next 6 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging unit systems. The 1 hour and 6 hour Completion Times are equal to the time allowed by LCO 3.0.3 for shutdown actions in the event of a complete loss of RTS Function. Placing the unit in MODE 3 results in ACTION C entry while RTB(s) are inoperable.

The Required Actions have been modified by ~~two~~ three Notes. Note 1 allows one channel to be bypassed for up to 2 hours for surveillance testing, provided the other channel is OPERABLE. Note 2 allows one RTB to be

INSERT 12

BASES

ACTIONS (continued)

bypassed for up to 2 hours for maintenance if the other RTB train is OPERABLE. The 2 hour time limit is justified in Reference ~~7~~ B. INSERT 13

Q. ~~P.~~1 and ~~P.~~2 Q

Condition ~~P~~ applies to the P-6 and P-10 interlocks. With one or more channels inoperable for one-out-of-two or two-out-of-four coincidence logic, the associated interlock must be verified to be in its required state for the existing unit condition within 1 hour or the unit must be placed in MODE 3 within the next 6 hours. Verifying the interlock status manually accomplishes the interlock's Function. The Completion Time of 1 hour is based on operating experience and the minimum amount of time allowed for manual operator actions. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging unit systems. The 1 hour and 6 hour Completion Times are equal to the time allowed by LCO 3.0.3 for shutdown actions in the event of a complete loss of RTS Function.

R. ~~Q.~~1 and ~~Q.~~2 R

Condition ~~Q~~ applies to the P-7, P-8, P-9, and P-13 interlocks. With one or more channels inoperable for one-out-of-two or two-out-of-four coincidence logic, the associated interlock must be verified to be in its required state for the existing unit condition within 1 hour or the unit must be placed in MODE 2 within the next 6 hours. These actions are conservative for the case where power level is being raised. Verifying the interlock status manually accomplishes the interlock's Function. The Completion Time of 1 hour is based on operating experience and the minimum amount of time allowed for manual operator actions. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 2 from full power in an orderly manner and without challenging unit systems.

S. ~~R.~~1, and ~~R.~~2 S

Condition ~~R~~ applies to the RTB Undervoltage and Shunt Trip Mechanisms, or diverse trip features, in MODES 1 and 2. With one of the diverse trip features inoperable, it must be restored to an OPERABLE status within 48 hours or the unit must be placed in a MODE where the requirement does not apply. This is accomplished by placing the unit in MODE 3 within the next 6 hours (54 hours total time). The Completion Time of 6 hours is a reasonable time, based on operating experience, to

BASES

ACTIONS (continued)

reach MODE 3 from full power in an orderly manner and without challenging unit systems. With the unit in MODE 3, ACTION C would apply to any inoperable RTB trip mechanism. The affected RTB shall not be bypassed while one of the diverse features is inoperable except for the time required to perform maintenance to one of the diverse features. The allowable time for performing maintenance of the diverse features is 2 hours for the reasons stated under Condition P.

The Completion Time of 48 hours for Required Action S. is reasonable considering that in this Condition there is one remaining diverse feature for the affected RTB, and one OPERABLE RTB capable of performing the safety function and given the low probability of an event occurring during this interval.

SURVEILLANCE REQUIREMENTS

INSERT 4

The SRs for each RTS Function are identified by the SRs column of Table 3.3.1-1 for that Function.

A Note has been added to the SR Table stating that Table 3.3.1-1 determines which SRs apply to which RTS Functions.

Note that each channel of process protection supplies both trains of the RTS. When testing Channel I, Train A and Train B must be examined. Similarly, Train A and Train B must be examined when testing Channel II, Channel III, and Channel IV (if applicable). The CHANNEL CALIBRATION and COTs are performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies.

- REVIEWER'S NOTE -

Certain Frequencies are based on approval topical reports. In order for a licensee to use these times, the licensee must justify the Frequencies as required by the staff SER for the topical report.

SR 3.3.1.1

Performance of the CHANNEL CHECK once every 12 hours ensures that gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally 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

BASES

SURVEILLANCE REQUIREMENTS (continued)

relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

Setpoints must be within the Allowable Values specified in Table 3.3.1-1.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint methodology.

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of Reference ~~7~~ 8.

SR 3.3.1.7 is modified by a Note that provides a 4 hours delay in the requirement to perform this Surveillance for source range instrumentation when entering MODE 3 from MODE 2. This Note allows a normal shutdown to proceed without a delay for testing in MODE 2 and for a short time in MODE 3 until the RTBs are open and SR 3.3.1.7 is no longer required to be performed. If the unit is to be in MODE 3 with the RTBs closed for > 4 hours this Surveillance must be performed prior to 4 hours after entry into MODE 3.

The Frequency of [92] days is justified in Reference ~~7~~ 8.

SR 3.3.1.8

SR 3.3.1.8 is the performance of a COT as described in SR 3.3.1.7, except it is modified by a Note that this test shall include verification that the P-6 and P-10 interlocks are in their required state for the existing unit condition. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. The Frequency is modified by a Note that allows this surveillance to be satisfied if it has been performed within [92] days of the Frequencies prior to reactor startup and four hours after reducing power below P-10 and P-6. The Frequency of "prior to startup" ensures this surveillance is performed prior to critical operations and applies to the source, intermediate and power range low instrument channels. The Frequency of [12] hours after reducing power

BASES

SURVEILLANCE REQUIREMENTS (continued)

below P-10 (applicable to intermediate and power range low channels) and 4 hours after reducing power below P-6 (applicable to source range channels) allows a normal shutdown to be completed and the unit removed from the MODE of Applicability for this surveillance without a delay to perform the testing required by this surveillance. The Frequency of every 92 days thereafter applies if the plant remains in the MODE of Applicability after the initial performances of prior to reactor startup and [12] and four hours after reducing power below P-10 or P-6, respectively. The MODE of Applicability for this surveillance is < P-10 for the power range low and intermediate range channels and < P-6 for the source range channels. Once the unit is in MODE 3, this surveillance is no longer required. If power is to be maintained < P-10 for more than [12] hours or < P-6 for more than 4 hours, then the testing required by this surveillance must be performed prior to the expiration of the time limit. [Twelve] hours and four hours are reasonable times to complete the required testing or place the unit in a MODE where this surveillance is no longer required. This test ensures that the NIS source, intermediate, and power range low channels are OPERABLE prior to taking the reactor critical and after reducing power into the applicable MODE (< P-10 or < P-6) for periods > [12] and 4 hours, respectively.

SR 3.3.1.9

SR 3.3.1.9 is the performance of a TADOT and is performed every [92] days, as justified in Reference 8. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

The SR is modified by a Note that excludes verification of setpoints from the TADOT. Since this SR applies to RCP undervoltage and underfrequency relays, setpoint verification requires elaborate bench calibration and is accomplished during the CHANNEL CALIBRATION.

SR 3.3.1.10

A CHANNEL CALIBRATION is performed every [18] months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test

BASES

SURVEILLANCE REQUIREMENTS (continued)

Manual Reactor Trip Function for the Reactor Trip Breakers and Reactor Trip Bypass Breakers. The Reactor Trip Bypass Breaker test shall include testing of the automatic undervoltage trip.

The Frequency is based on the known reliability of the Functions and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

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

SR 3.3.1.15

SR 3.3.1.15 is the performance of a TADOT of Turbine Trip Functions. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. This TADOT is as described in SR 3.3.1.4, except that this test is performed prior to exceeding the [P-9] interlock whenever the unit has been in MODE 3. This Surveillance is not required if it has been performed within the previous 31 days. Verification of the Trip Setpoint does not have to be performed for this Surveillance. Performance of this test will ensure that the turbine trip Function is OPERABLE prior to exceeding the [P-9] interlock.

SR 3.3.1.16

SR 3.3.1.16 verifies that the individual channel/train actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response time testing acceptance criteria are included in Technical Requirements Manual, Section 15 (Ref. 8). 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 trip setpoint value at the sensor to the point at which the equipment reaches the required functional state (i.e., control and shutdown rods fully inserted in the reactor core).

BASES

SURVEILLANCE REQUIREMENTS (continued)

As appropriate, each channel's response must be verified every [18] months on a STAGGERED TEST BASIS. Testing of the final actuation devices is included in the testing. Response times cannot be determined during unit operation because equipment operation is required to measure response times. Experience has shown that these components usually pass this surveillance when performed at the 18 months Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.3.1.16 is modified by a Note stating that neutron detectors are excluded from RTS RESPONSE TIME testing. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

REFERENCES

1. FSAR, Chapter [7].

2. FSAR, Chapter [6].

3. FSAR, Chapter [15].

4. IEEE-279-1971.

5. 10 CFR 50.49.

6. RTS/ESFAS Setpoint Methodology Study.

7. WCAP-14333-P-A, Rev. 1, October 1998.

8. ~~7.~~ WCAP-10271-P-A, Supplement ~~2, Rev. 1, June 1990.~~ 1, May 1986.

11. ~~8.~~ Technical Requirements Manual, Section 15, "Response Times."

12. [~~9.~~ WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," January 1996.]

13. [~~10.~~ WCAP-14036-P, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," December 1995.]

9. [Plant specific evaluation reference].

10. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One train inoperable.	**- NOTE -** One train may be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE.	
	C.1 Restore train to OPERABLE status.	~~[6]~~ 24 hours
	OR	
	C.2.1 Be in MODE 3.	~~[12]~~ 30 hours
	AND	
	C.2.2 Be in MODE 5.	~~[32]~~ 60 hours
D. One channel inoperable.	L **- NOTE -** The inoperable channel may be bypassed for up to ~~[9]~~ 12 hours for surveillance testing of other channels. J	
INSERT 2	D.1 Place channel in trip.	~~[6]~~ 72 hours
	OR	
	D.2.1 Be in MODE 3.	~~[12]~~ 78 hours
	AND	
	D.2.2 Be in MODE 4.	~~[18]~~ 84 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Containment Pressure channel inoperable.	[---------- **- NOTE -** One additional channel may be bypassed for up to 12 hours for surveillance testing. ----------]	
	INSERT 2 → E.1 Place channel in bypass.	72 ~~6~~ hours
	OR	
	E.2.1 Be in MODE 3.	78 ~~12~~ hours
	AND	
	E.2.2 Be in MODE 4.	84 ~~18~~ hours
F. One channel or train inoperable.	F.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	F.2.1 Be in MODE 3.	54 hours
	AND	
	F.2.2 Be in MODE 4.	60 hours
G. One train inoperable.	---------- **- NOTE -** One train may be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE. ----------	
	G.1 Restore train to OPERABLE status.	24 ~~6~~ hours
	OR	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	G.2.1 Be in MODE 3. AND G.2.2 Be in MODE 4.	~~12~~ 30 hours ~~18~~ 36 hours
H. One train inoperable.	---------- **- NOTE -** One train may be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE. ---------- H.1 Restore train to OPERABLE status. OR H.2 Be in MODE 3.	~~6~~ 24 hours ~~12~~ 30 hours
I. One channel inoperable. INSERT 2	t ---------- **- NOTE -** The inoperable channel may be bypassed for up to ~~[4]~~ 12 hours for surveillance testing of other channels. ---------- I.1 Place channel in trip. J OR I.2 Be in MODE 3.	~~6~~ 72 hours ~~12~~ 78 hours
J. One Main Feedwater Pumps trip channel inoperable.	J.1 Restore channel to OPERABLE status. OR J.2 Be in MODE 3.	48 hours 54 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. One channel inoperable.	[**- NOTE -** One additional channel may be bypassed for up to [4] hours for surveillance testing.]	
INSERT 2	K.1 Place channel in bypass.	[6] ~~8~~ hours
	OR	
	K.2.1 Be in MODE 3.	[12] ~~12~~ hours
	AND	
	K.2.2 Be in MODE 5.	[42] ~~42~~ hours
L. One or more channels inoperable.	L.1 Verify interlock is in required state for existing unit condition.	1 hour
	OR	
	L.2.1 Be in MODE 3.	7 hours
	AND	
	L.2.2 Be in MODE 4.	13 hours

SURVEILLANCE REQUIREMENTS

- NOTE -
Refer to Table 3.3.2-1 to determine which SRs apply for each ESFAS Function.

SURVEILLANCE		FREQUENCY
SR 3.3.2.1	Perform CHANNEL CHECK.	12 hours

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

This Function must be OPERABLE in MODES 1, 2, and 3 when a secondary side break or stuck open valve could result in the rapid depressurization of the steam lines. This Function does not have to be OPERABLE in MODE 4, 5, or 6 because there is insufficient energy in the secondary side of the unit to have an accident.

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

ACTIONS

INSERT 14

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.2-1.

In the event a channel's Trip Setpoint is found nonconservative with respect to the Allowable Value, or the transmitter, instrument Loop, signal processing electronics, or bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition(s) entered for the protection Function(s) affected. When the Required Channels in Table 3.3.2-1 are specified (e.g., on a per steam line, per loop, per SG, etc., basis), then the Condition may be entered separately for each steam line, loop, SG, etc., as appropriate.

When the number of inoperable channels in a trip function exceed those specified in one or other related Conditions associated with a trip function, then the unit is outside the safety analysis. Therefore, LCO 3.0.3 should be immediately entered if applicable in the current MODE of operation.

- REVIEWER'S NOTE -

Certain LCO Completion Times are based on approved topical reports. In order for a licensee to use these times, the licensee must justify the Completion Times as required by the staff Safety Evaluation Report (SER) for the topical report.

A.1

Condition A applies to all ESFAS protection functions.

Condition A addresses the situation where one or more channels or trains for one or more Functions are inoperable at the same time. The Required Action is to refer to Table 3.3.2-1 and to take the Required

BASES

ACTIONS (continued)

- Phase B Isolation, and
- Automatic Switchover to Containment Sump.

This action addresses the train orientation of the SSPS and the master and slave relays. If one train is inoperable, 8 hours are allowed to restore the train to OPERABLE status. The specified Completion Time is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (12 hours total time) and in MODE 5 within an additional 30 hours (42 hours total time). The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

INSERT 15

24

30

60

The Required Actions are modified by a Note that allows one train to be bypassed for up to [4] hours for surveillance testing, provided the other train is OPERABLE. This allowance is based on the reliability analysis assumption of WCAP-10271-P-A (Ref. 8) that 4 hours is the average time required to perform ~~channel~~ train surveillance.

9

D.1, D.2.1, and D.2.2

Condition D applies to:

- Containment Pressure - High 1,
- Pressurizer Pressure - Low (two, three, and four loop units),
- Steam Line Pressure - Low,
- Steam Line Differential Pressure - High,
- High Steam Flow in Two Steam Lines Coincident With T_{avg} - Low Low or Coincident With Steam Line Pressure - Low,
- Containment Pressure - High 2,
- Steam Line Pressure - Negative Rate - High,

BASES

ACTIONS (continued)

- High Steam Flow Coincident With Safety Injection Coincident With T_{avg} - Low Low,
- High High Steam Flow Coincident With Safety Injection,
- High Steam Flow in Two Steam Lines Coincident With T_{avg} - Low Low,
- SG Water level - Low Low (two, three, and four loop units), and
- [SG Water level - High High (P-14) (two, three, and four loop units).]

If one channel is inoperable, ~~6~~ 72 hours are allowed to restore the channel to OPERABLE status or to place it in the tripped condition. Generally this Condition applies to functions that operate on two-out-of-three logic. Therefore, failure of one channel places the Function in a two-out-of-two configuration. One channel must be tripped to place the Function in a one-out-of-three configuration that satisfies redundancy requirements. INSERT 16

72 Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within ~~6~~ 72 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, these Functions are no longer required OPERABLE.

[The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to [4] 12 hours for surveillance testing of other channels. ~~The 6 hours allowed to restore the channel to OPERABLE status or to place the inoperable channel in the tripped condition, and the 4 hours allowed for testing, are justified in Reference 8.~~] The 12

INSERT 17

E.1, E.2.1, and E.2.2

Condition E applies to:

- Containment Spray Containment Pressure - High 3 (High, High) (two, three, and four loop units), and

BASES

ACTIONS (continued)

- Containment Phase B Isolation Containment Pressure - High 3 (High, High).

None of these signals has input to a control function. Thus, two-out-of-three logic is necessary to meet acceptable protective requirements. However, a two-out-of-three design would require tripping a failed channel. This is undesirable because a single failure would then cause spurious containment spray initiation. Spurious spray actuation is undesirable because of the cleanup problems presented. Therefore, these channels are designed with two-out-of-four logic so that a failed channel may be bypassed rather than tripped. Note that one channel may be bypassed and still satisfy the single failure criterion. Furthermore, with one channel bypassed, a single instrumentation channel failure will not spuriously initiate containment spray.

To avoid the inadvertent actuation of containment spray and Phase B containment isolation, the inoperable channel should not be placed in the tripped condition. Instead it is bypassed. Restoring the channel to OPERABLE status, or placing the inoperable channel in the bypass condition within 6 hours, is sufficient to assure that the Function remains OPERABLE and minimizes the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed high). The Completion Time is further justified based on the low probability of an event occurring during this interval. Failure to restore the inoperable channel to OPERABLE status, or place it in the bypassed condition within 6 hours, requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows one additional channel to be bypassed for up to [6] hours for surveillance testing. Placing a second channel in the bypass condition for up to 4 hours for testing purposes is acceptable based on the results of Reference 8.

INSERT 17

F.1, F.2.1, and F.2.2

Condition F applies to:

- Manual Initiation of Steam Line Isolation,

BASES

ACTIONS (continued)

- Loss of Offsite Power,
- Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low, and
- P-4 Interlock.

For the Manual Initiation and the P-4 Interlock Functions, this action addresses the train orientation of the SSPS. For the Loss of Offsite Power Function, this action recognizes the lack of manual trip provision for a failed channel. For the AFW System pump suction transfer channels, this action recognizes that placing a failed channel in trip during operation is not necessarily a conservative action. Spurious trip of this function could align the AFW System to a source that is not immediately capable of supporting pump suction. If a train or channel is inoperable, 48 hours is allowed to return it to OPERABLE status. The specified Completion Time is reasonable considering the nature of these Functions, the available redundancy, and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. In MODE 4, the unit does not have any analyzed transients or conditions that require the explicit use of the protection functions noted above.

G.1, G.2.1 and G.2.2

Condition G applies to the automatic actuation logic and actuation relays for the Steam Line Isolation [,Turbine Trip and Feedwater Isolation,] and AFW actuation Functions.

The action addresses the train orientation of the SSPS and the master and slave relays for these functions. If one train is inoperable, ~~6~~ 24 hours are allowed to restore the train to OPERABLE status. INSERT 15 The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be returned to OPERABLE status, the unit must be brought to MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly

BASES

ACTIONS (continued)

manner and without challenging unit systems. Placing the unit in MODE 4 removes all requirements for OPERABILITY of the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 8) assumption that 4 hours is the average time required to perform channel surveillance. 9

[H.1 and H.2

Condition H applies to the automatic actuation logic and actuation relays for the Turbine Trip and Feedwater Isolation Function.

This action addresses the train orientation of the SSPS and the master and slave relays for this Function. If one train is inoperable, 8 hours are allowed to restore the train to OPERABLE status or the unit must be placed in MODE 3 within the following 6 hours. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. These Functions are no longer required in MODE 3. Placing the unit in MODE 3 removes all requirements for OPERABILITY of the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above. 24 INSERT 15

The Required Actions are modified by a Note that allows one train to be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 8) assumption that 4 hours is the average time required to perform channel surveillance.] 9

I.1 and I.2

Condition I applies to:

BASES

ACTIONS (continued)

[• SG Water Level - High High (P-14) (two, three, and four loop units), and]

• Undervoltage Reactor Coolant Pump.

If one channel is inoperable, ~~6~~ 72 hours are allowed to restore one channel to OPERABLE status or to place it in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition where one-out-of-two or one-out-of-three logic will result in actuation. ~~The~~ INSERT 16 ~~6 hour Completion Time is justified in Reference 8.~~ Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within ~~6~~ 72 hours requires the unit to be placed in MODE 3 within the following 6 hours. The allowed Completion Time of ~~6~~ 78 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, these Functions are no longer required OPERABLE.

[The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to ~~4~~ [12] hours for surveillance testing of other channels. The ~~6~~ 72 hours allowed to place the inoperable channel in the tripped condition, and the ~~4~~ 12 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 8.] INSERT 17

J.1 and J.2

Condition J applies to the AFW pump start on trip of all MFW pumps.

This action addresses the train orientation of the SSPS for the auto start function of the AFW System on loss of all MFW pumps. The OPERABILITY of the AFW System must be assured by allowing automatic start of the AFW System pumps. If a channel is inoperable, 48 hours are allowed to return it to an OPERABLE status. If the function cannot be returned to an OPERABLE status, 6 hours are allowed to place the unit in MODE 3. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above. The allowance of 48 hours to return the train to an OPERABLE status is justified in Reference ~~8.~~ 9.

BASES

ACTIONS (continued)

K.1, K.2.1 and K.2.2

Condition K applies to:

- RWST Level - Low Low Coincident with Safety Injection, and
- RWST Level - Low Low Coincident with Safety Injection and Coincident with Containment Sump Level - High.

RWST Level - Low Low Coincident With SI and Coincident With Containment Sump Level - High provides actuation of switchover to the containment sump. Note that this Function requires the bistables to energize to perform their required action. The failure of up to two channels will not prevent the operation of this Function. However, placing a failed channel in the tripped condition could result in a premature switchover to the sump, prior to the injection of the minimum volume from the RWST. Placing the inoperable channel in bypass results in a two-out-of-three logic configuration, which satisfies the requirement to allow another failure without disabling actuation of the switchover when required. Restoring the channel to OPERABLE status or placing the inoperable channel in the bypass condition within 6 hours is sufficient to ensure that the Function remains OPERABLE, and minimizes the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed high). The 6 hour Completion Time is justified in Reference 8. If the channel cannot be returned to OPERABLE status or placed in the bypass condition within 6 hours, the unit must be brought to MODE 3 within the following 6 hours and MODE 5 within the next 30 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 5, the unit does not have any analyzed transients or conditions that require the explicit use of the protection functions noted above.

[6] [6] 10. [6]

[The Required Actions are modified by a Note that allows placing a second channel in the bypass condition for up to [4] hours for surveillance testing. The total of 12 hours to reach MODE 3 and 6 hours for a second channel to be bypassed is acceptable based on the results of Reference 8.]

[12] [4] 10. INSERT 18

BASES

ACTIONS (continued)

L.1, L.2.1 and L.2.2

Condition L applies to the P-11 and P-12 [and P-14] interlocks.

With one or more channels inoperable, the operator must verify that the interlock is in the required state for the existing unit condition. This action manually accomplishes the function of the interlock. Determination must be made within 1 hour. The 1 hour Completion Time is equal to the time allowed by LCO 3.0.3 to initiate shutdown actions in the event of a complete loss of ESFAS function. If the interlock is not in the required state (or placed in the required state) for the existing unit condition, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. Placing the unit in MODE 4 removes all requirements for OPERABILITY of these interlocks.

SURVEILLANCE REQUIREMENTS

INSERT 14

The SRs for each ESFAS Function are identified by the SRs column of Table 3.3.2-1.

A Note has been added to the SR Table to clarify that Table 3.3.2-1 determines which SRs apply to which ESFAS Functions.

Note that each channel of process protection supplies both trains of the ESFAS. When testing channel I, train A and train B must be examined. Similarly, train A and train B must be examined when testing channel II, channel III, and channel IV (if applicable). The CHANNEL CALIBRATION and COTs are performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies.

- REVIEWER'S NOTE -

Certain Frequencies are based on approved topical reports. In order for a licensee to use these times, the licensee must justify the Frequencies as required by the staff SER for the topical report.

SR 3.3.2.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a

BASES

SURVEILLANCE REQUIREMENTS (continued)

performed every 31 days on a STAGGERED TEST BASIS. The Frequency is adequate based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.4

SR 3.3.2.4 is the performance of a MASTER RELAY TEST. The MASTER RELAY TEST is the energizing of the master relay, verifying contact operation and a low voltage continuity check of the slave relay coil. Upon master relay contact operation, a low voltage is injected to the slave relay coil. This voltage is insufficient to pick up the slave relay, but large enough to demonstrate signal path continuity. This test is performed every 31 days on a STAGGERED TEST BASIS. The time allowed for the testing (4 hours) and the surveillance interval are justified in Reference ~~8~~ 9.

SR 3.3.2.5

SR 3.3.2.5 is the performance of a COT.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.1-1. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint methodology.

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis (Ref. ~~8~~ 9) when applicable.

The Frequency of 92 days is justified in Reference ~~8~~ 9.

BASES

SURVEILLANCE REQUIREMENTS (continued)

the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.). The Frequency is adequate, based on industry operating experience and is consistent with the typical refueling cycle. The SR is modified by a Note that excludes verification of setpoints during the TADOT for manual initiation Functions. The manual initiation Functions have no associated setpoints.

SR 3.3.2.9

SR 3.3.2.9 is the performance of a CHANNEL CALIBRATION.

A CHANNEL CALIBRATION is performed every [18] months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology. The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology.

The Frequency of [18] months is based on the assumption of an [18] month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

This SR is modified by a Note stating that this test should include verification that the time constants are adjusted to the prescribed values where applicable.

SR 3.3.2.10

This SR ensures the individual channel ESF RESPONSE TIMES are less than or equal to the maximum values assumed in the accident analysis. Response Time testing acceptance criteria are included in the Technical Requirements Manual, Section 15 (Ref. 9). 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

BASES

REFERENCES (continued)

5. 10 CFR 50.49.

6. Plant-specific setpoint methodology study.

7. NUREG-1218, April 1988.

8. WCAP-14333-P-A, Rev. 1, October 1998.

9. ~~8.~~ WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

11. ~~9.~~ Technical Requirements Manual, Section 15, "Response Times."

12. ~~10.~~ Regulatory Guide 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation."

13. [~~11.~~ WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," January 1996.]

14. [~~12.~~ WCAP-14036-P, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," December 1995.]

10. [Plant specific evaluation reference.]

APPLICABLE SAFETY ANALYSES (continued)

Instrumentation," include the appropriate DG loading and sequencing delay.

The LOP DG start instrumentation channels satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO for LOP DG start instrumentation requires that [three] channels per bus of both the loss of voltage and degraded voltage Functions shall be OPERABLE in MODES 1, 2, 3, and 4 when the LOP DG start instrumentation supports safety systems associated with the ESFAS. In MODES 5 and 6, the [three] channels must be OPERABLE whenever the associated DG is required to be OPERABLE to ensure that the automatic start of the DG is available when needed. A channel is OPERABLE with a trip setpoint value outside its calibration tolerance band provided the trip setpoint "as-found" value does not exceed its associated Allowable Value and provided the trip setpoint "as-left" value is adjusted to a value within the "as-left" calibration tolerance band of the Nominal Trip Setpoint. A trip setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions. Loss of the LOP DG Start Instrumentation Function could result in the delay of safety systems initiation when required. This could lead to unacceptable consequences during accidents. During the loss of offsite power the DG powers the motor driven auxiliary feedwater pumps. Failure of these pumps to start would leave only one turbine driven pump, as well as an increased potential for a loss of decay heat removal through the secondary system.

APPLICABILITY

The LOP DG Start Instrumentation Functions are required in MODES 1, 2, 3, and 4 because ESF Functions are designed to provide protection in these MODES. Actuation in MODE 5 or 6 is required whenever the required DG must be OPERABLE so that it can perform its function on an LOP or degraded power to the vital bus.

ACTIONS

INSERT 19

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the channel is found inoperable, then the function that channel provides must be declared inoperable and the LCO Condition entered for the particular protection function affected.

Because the required channels are specified on a per bus basis, the Condition may be entered separately for each bus as appropriate.

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be