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July 10, 2003

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Subject: Oconee Nuclear Station
Docket Numbers 50-269, 270, and 287
License Amendment Request for Removal of Obsolete Requirements Associated With the Completion of the AFIS Modification on Oconee Units 1, 2, and 3.
Technical Specification Change (TSC) Number 2003-08

Pursuant to Title 10, Code of Federal Regulations, Part 50, Section 90 (10 CFR 50.90), Duke Energy Corporation (Duke) proposes to amend Appendix A, Technical Specifications, for Facility Operating Licenses DPR-38, DPR-47 and DPR-55 for Oconee Nuclear Station (ONS), Units 1, 2, and 3. The proposed License Amendment Request (LAR) removes Technical Specification requirements that are no longer applicable to Oconee Nuclear Station due to the completion of Automatic Feedwater Isolation System (AFIS) modifications on Units 1, 2, and 3.

Duke installed the final AFIS modification on Oconee Unit 3 during the Spring 2003 Outage. Notification of completion is provided in accordance with the NRC request in letter dated September 26, 2001 that issued the AFIS license amendment.

The revised Technical Specification pages are included in Attachment 1. Attachment 2 contains the markup of the current Technical Specification pages.

The Technical Justification for the amendment request is included in Attachment 3. Attachments 4 and 5 contain the No Significant Hazards Consideration Evaluation and the Environmental Impact Analysis, respectively.

A001

This proposed change to the TS has been reviewed and approved by the Plant Operations Review Committee and Nuclear Safety Review Board.

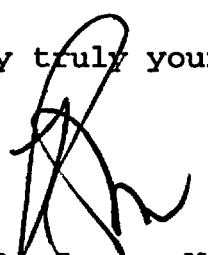
Implementation of these changes will not result in an undue risk to the health and safety of the public.

The Oconee Updated Final Safety Analysis Report has been reviewed and no further changes are required.

Pursuant to 10 CFR 50.91, a copy of this proposed amendment is being sent to the South Carolina Department of Health and Environmental Control for review, and as deemed necessary and appropriate, subsequent consultation with the NRC staff.

If there are any additional questions, please contact Boyd Shingleton at (864) 885-4716.

Very truly yours,



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R. A. Jones, being duly sworn, states that he is Vice President, Oconee Nuclear Site, Duke Energy Corporation, that he is authorized on the part of said Company to sign and file with the U. S. Nuclear Regulatory Commission this revision to the Renewed Facility Operating License Nos. DPR-38, DPR-47, DPR-55; and that all the statements and matters set forth herein are true and correct to the best of his knowledge.

R. A. Jones, Vice President
Oconee Nuclear Site

Subscribed and sworn to before me this 10th day of July, 2003

Notary Public

My Commission Expires:

6/12/2013

SEAL

bcc: w/attachments

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ATTACHMENT 1

TECHNICAL SPECIFICATION

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3.3 INSTRUMENTATION

3.3.11 Automatic Feedwater Isolation System (AFIS) Instrumentation

LCO 3.3.11 Four AFIS analog instrumentation channels per steam generator (SG) shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with main steam header pressure ≥ 700 psig.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One analog channel inoperable or tripped.	A.1 Place channel in bypass.	4 hours
B. Two analog channels inoperable. OR Required Action and associated Completion Time of Condition A not met.	B.1 Restore channel(s) to operable status.	72 hours

(continued)

3.3 INSTRUMENTATION

3.3.12 Automatic Feedwater Isolation System (AFIS) Manual Initiation

LCO 3.3.12 Two AFIS Manual Initiation switches per steam generator (SG) shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with main steam header pressure ≥ 700 psig.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One manual initiation switch per SG inoperable.	A.1 Restore manual initiation switch to OPERABLE status.	72 hours
B Two manual initiation switches per SG inoperable. OR Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Reduce main steam header pressure to < 700 psig.	12 hours 18 hours

3.3 INSTRUMENTATION

3.3.13 Automatic Feedwater Isolation System (AFIS) Digital Channels

LCO 3.3.13 Two AFIS digital channels per steam generator (SG) shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with main steam header pressure ≥ 700 psig.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One digital channel inoperable.	A.1 Restore digital channel to OPERABLE status.	72 hours
B. Two digital channels inoperable. OR Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Reduce main steam header pressure to 700 psig	12 hours 18 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.13.1	Perform CHANNEL FUNCTIONAL TEST.	18 months

3.3 INSTRUMENTATION

3.3.25 Not Used

3.3 INSTRUMENTATION

3.3.26 Not Used

3.3 INSTRUMENTATION

3.3.27 Not Used

B 3.3 INSTRUMENTATION

B 3.3.11 Automatic Feedwater Isolation System (AFIS) Instrumentation

BASES

BACKGROUND

A Main Steam Line Break (MSLB) can lead to containment overpressure, unacceptable thermal stresses to the steam generator tubes, and significant core overcooling. Main and Emergency Feedwater must be promptly isolated to limit the effects of a MSLB. The AFIS instrumentation is designed to provide automatic termination of feedwater flow to the affected steam generator. The AFIS instrumentation automatically terminates Main Feedwater (MFW) by tripping both MFW pumps and closing the affected steam generator's main and startup feedwater control valves and block valves. Although the main and startup feedwater block valves are automatically closed, their closure is not credited for mitigation of a MSLB. The AFIS instrumentation automatically terminates emergency feedwater (EFW) by stopping the turbine-driven emergency feedwater pump (TDEFWP) and tripping the motor-driven emergency feedwater pump (MDEFWP) aligned to the affected steam generator. Manual overrides for the TDEFWP and MDEFWP's are provided to allow the operator to subsequently start the EFW pumps if necessary for decay heat removal.

In addition, AFIS instrumentation provides runout protection for the EFW pumps in the event of a MSLB and certain large break MFW line breaks with the pump in the automatic mode of operation.

Main Steam header pressure is used as input signals to the AFIS circuitry. There are four pressure transmitters per steam generator with each feeding a steam pressure signal to an analog isolation module. The output of the analog isolation module provides an analog signal to a processor module that actuates isolation functions at desired setpoints. One pressure transmitter per steam generator, associated Integrated Control System (ICS) signal isolator(s) and analog isolation module inputs constitute an AFIS detection analog isolation channel.

The four AFIS analog channels per steam generator feed two redundant digital channels. Each digital channel provides independent circuit functions to isolate each steam generator. If the logic is satisfied, a trip output is energized. The use of an energized to trip processor module ensures that a loss of power to the digital channel will not result in an inadvertent feedwater isolation. If either digital channel is actuated, feedwater is isolated to the affected steam generator. Energizing the trip outputs results in closure of contacts in various control circuits for systems

BASES

BACKGROUND (continued)

and components used for the MSLB and feedwater line break mitigation. Therefore, when the trip outputs are actuated, the systems and components perform their isolation functions. Other features of the digital channels include a test/manual initiation pushbutton and an "enable" or "arming" switch. An AFIS digital channel is defined as an analog isolation module, two digital 2 out of 4 logic modules (a Trip Module and a Trip Confirm Module), the Enable/Disable pushbutton, the associated output relays, the trip relay outputs to the feedwater pumps, the redundant switchgear trips for the MDEFWP, the solenoid valves for the MFCV & SFCV, the trip solenoid valves for the feedwater pumps, and the TDEFWP trip function. There are two digital channels per steam generator. The two logic modules of each digital channel are configured in a two out of two logic arrangement. In this configuration a random failure of one of the logic modules will not result in a spurious actuation or preclude a valid AFIS actuation. In addition, a random failure of one of the logic modules will not preclude a valid AFIS actuation due to the redundant digital channel. While AFIS provides isolation of the feedwater block valves, this is not a credited function and is not a requirement for digital channel operability.

The AFIS digital channels are enabled and disabled administratively rather than automatically. Appropriate operating procedures contain provisions to enable/disable the digital channels.

APPLICABLE SAFETY ANALYSES

Based on the containment pressure response reanalysis, the containment design pressure would be exceeded for a MSLB inside containment without immediate operator or automatic action to isolate main feedwater to the affected steam generator.

In addition, prompt operator or automatic action would be required to isolate EFW to the affected steam generator to limit the resultant thermal stresses on the steam generator tubes following a MSLB.

Main Steam header pressure is used as input signals to the AFIS circuitry. When a MSLB is sensed, or upon manual actuation, main feedwater is terminated by tripping both MFW pumps and closing the affected steam generators main and startup feedwater control valves and block valves. Although the main and startup feedwater block valves are automatically closed, they are not credited for mitigation of a MSLB. In addition, EFW is terminated by stopping the TDEFWP and tripping the MDEFWP aligned to the affected steam generator. Manual overrides for the TDEFWP and MDEFWP are provided to allow the operator to subsequently start the EFW pumps if necessary for decay heat removal.

The AFIS Instrumentation satisfies Criterion 3 of 10 CFR 50.36 (Ref. 3).

BASES (continued)

LCO

This LCO requires that instrumentation necessary to initiate a MFW and EFW isolation shall be OPERABLE. Failure of any instrument renders the affected analog channel(s) inoperable and reduces the reliability of the Function.

Four analog channels per SG are required to be OPERABLE to ensure that no single failure prevents Feedwater isolation. Each AFIS analog channel includes the sensor, ICS signal isolator and an analog isolation module.

APPLICABILITY

The AFIS Function shall be OPERABLE in MODES 1 and 2, and MODE 3 with main steam header pressure $\geq$ 700 psig because the SG inventory can be at a high energy level and contribute significantly to the peak pressure with a secondary side break. Feedwater must be able to be isolated on each SG to limit mass and energy releases to the reactor building. Once the SG pressures have decreased below 700 psig, the AFIS Function can be bypassed to avoid actuation during normal unit cooldowns. In MODES 4, 5, and 6, the energy level is low and the secondary side feedwater flow rate is low or nonexistent. In MODES 4, 5, and 6, the primary system temperatures are too low to allow the SGs to effectively remove energy and AFIS instrumentation is not required to be OPERABLE.

ACTIONS

If a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or any of the transmitter or signal processing electronics, are found inoperable, then the Function provided by that channel must be declared inoperable and the unit must enter the appropriate Conditions.

A Note has been added to the ACTIONS indicating that a separate Condition entry is allowed for analog channels associated with each SG.

A.1

Condition A applies to failures of a single AFIS analog channel. With one channel inoperable or tripped, the channel(s) must be placed in bypass within 4 hours. Bypassing the affected channel places the Function in a two-out-of-three configuration. Operation in this configuration may continue indefinitely since the AFIS Function is capable of performing its isolation function in the presence of any single random failure. The Completion Time of 4 hours is adequate to perform Required Action A.1.

BASES

ACTIONS (continued)

B.1

With two channels inoperable or if the Required Action and associated Completion Time of Condition A can not be met, the channel(s) must be returned to service within 72 hours. An inoperable channel includes any channel bypassed by Condition A.

C.1 and C.2

With the Required Action and associated Completion Time of Condition B not met, the unit must be placed in MODE 3 within 12 hours and main steam header pressure must be reduced to less than 700 psig within 18 hours. The allowed Completion Time is reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.11.1

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 similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; therefore, it is key in verifying that the instrumentation continues to operate properly between each CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION.

Agreement criteria are based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the transmitter or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE. If the channels are normally off scale during times when surveillance is required, the CHANNEL CHECK will only verify that they are off scale in the same direction. Off scale low current loop channels are verified, where practical, to be reading at the bottom of the range and not failed downscale.

A continuous, automatic CHANNEL CHECK function is provided by Software. If a channel is outside the criteria, then an alarm is provided to the control room. Manual performance of the CHANNEL CHECK is acceptable.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.11.1 (continued)

The frequency, about once every shift, is based on operating experience that demonstrates channel failure is rare. Since the probability of two random failures in redundant channels in any 12 hour period is extremely low, the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but potentially more frequent, checks of channel OPERABILITY during normal operational use of the displays associated with the LCO required channels.

SR 3.3.11.2

A CHANNEL FUNCTIONAL TEST is performed by comparing the test input signal to the value transmitted to the Calibration and Test Computer. This enables verification of the voltage references and the signal commons. This will ensure the channel will perform its intended function.

The Frequency of 31 days is based on operating experience, with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel in any 31 day interval is a rare event.

SR 3.3.11.3

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The test verifies the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channels adjusted to account for instrument drift to ensure that the instrument channel remains operational between successive tests. CHANNEL CALIBRATION shall find that measurement errors and setpoint errors are within the assumptions of the setpoint analysis. CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the setpoint analysis.

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

REFERENCES

1. 10 CFR 50.36.

B 3.3 INSTRUMENTATION

B 3.3.12 Automatic Feedwater Isolation System (AFIS) Manual Initiation

BASES

BACKGROUND

The AFIS manual initiation capability provides the operator with the capability to actuate the isolation function from the control room. This Function is provided in the event the operator determines that the Function is needed and does not automatically actuate. This is a backup Function to the automatic Feedwater isolation.

The AFIS manual initiation circuitry satisfies the manual initiation and single-failure criterion requirements of IEEE-279-1971 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The Feedwater Isolation Function credited in the safety analysis is automatic. However, the manual initiation Function is required by design as backup to the automatic Function and allows operators to actuate Feedwater Isolation whenever the Function is needed. Furthermore, the manual initiation of Feedwater Isolation may be specified in unit operating procedures.

The AFIS manual initiation function satisfies Criterion 3 of 10 CFR 50.36 (Ref. 2).

LCO

Two manual initiation switches per steam generator are required to be OPERABLE. The Feedwater Isolation function has two actuation or "trip" digital channels, channels 1 and 2. Within each digital channel actuation logic there are two manual trip switches. When the manual switch is depressed, a full trip of actuation digital channel 1 or 2 occurs.

APPLICABILITY

The AFIS manual initiation Function shall be OPERABLE in MODES 1 and 2, and MODE 3 with main steam header pressure $\geq$ 700 psig because SG inventory can be at a sufficiently high energy level to contribute significantly to the peak containment pressure with a secondary side break. In MODES 4, 5, and 6, the SG energy level is low and secondary side feedwater flow rate is low or nonexistent.

BASES (continued)

ACTIONS

A Note has been added to the ACTIONS indicating that a separate Condition entry is allowed for manual initiation switches associated with each SG.

A.1

With one manual initiation switch per steam generator inoperable, the manual initiation switch must be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is based on unit operating experience and administrative controls, which provide alternative means of AFIS initiation via individual component controls. The 72 hour Completion Time is consistent with the allowed outage time for the components actuated by the AFIS.

B.1

With both manual initiation switches per steam generator inoperable or the Required Action and associated Completion Time of Condition A not met, the Unit must be placed in MODE 3 within 12 hours and the main steam header pressure reduced to less than 700 psig within 18 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required MODES from full power conditions in an orderly manner and without challenging Unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.12.1

This SR requires the performance of a digital CHANNEL FUNCTIONAL TEST to ensure that the channels can perform their intended functions. The Frequency of 18 months is based on engineering judgment and operating experience that determined testing on an 18 month interval provides reasonable assurance that the circuitry is available to perform its safety function, while the risks of testing during unit operation is avoided.

REFERENCES

1. IEEE-279-1971, April 1972.

2. 10 CFR 50.36.

B 3.3 INSTRUMENTATION

B 3.3.13 Automatic Feedwater Isolation System (AFIS) Digital Channels

BASES

BACKGROUND

The four AFIS analog channels per steam generator feed two redundant feedwater digital channels. Each digital channel provides independent circuit functions to isolate each steam generator. If the logic is satisfied, a trip output is energized. The use of an energized to trip processor module ensures that a loss of power to the digital channels will not result in an inadvertent feedwater isolation. If either digital channel is actuated, feedwater to the affected steam generator is isolated. Energizing the trip outputs results in actuation of contacts in various control circuits for systems and components used for the MSLB and feedwater line break mitigation. Therefore, when the trip outputs are actuated, the systems and components perform their isolation functions. An AFIS digital channel is defined as an analog isolation module, two digital 2 out of 4 logic modules (a Trip Module and a Trip Confirm Module), the Enable/Disable pushbutton, the associated output relays, the trip relay outputs to the feedwater pumps, the redundant switchgear trips for the MDEFWP, the solenoid valves for the MFCV & SFCV, the trip solenoid valves for the feedwater pumps, and the TDEFWP trip function. There are two digital channels per steam generator. The two logic modules of each digital channel are configured in a two out of two logic arrangement. In this configuration a random failure of one of the logic modules will not result in a spurious actuation or preclude a valid AFIS actuation. In addition, a random failure of one of the logic modules will not preclude a valid AFIS actuation due to the redundant digital channel. While AFIS provides isolation of the feedwater block valves, this is not a credited function and is not a requirement for digital channel operability.

Trip Setpoints and Allowable Values

Trip setpoints are the nominal values that are user defined in AFIS software. AFIS software is considered to be properly adjusted when the "as left" value is within the band for analog CHANNEL CALIBRATION accuracy.

The trip setpoints used in the AFIS software are selected such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment induced errors for AFIS channels that must function in harsh

BASES

BACKGROUND

Trip Setpoints and Allowable Values (continued)

environments as defined by 10 CFR 50.49, the Allowable Values specified are conservatively adjusted with respect to the analytical limits.

The actual nominal trip setpoint entered into the software for low MS pressure is 550 psig and the rate of depressurization setpoint will be 3 psi/sec. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

Setpoints, in accordance with the Allowable Values, ensure that the consequences of accidents will be acceptable, providing the unit is operated from within the LCOs at the onset of the accident and the equipment functions as designed.

Each analog channel can be tested online to verify that the setpoint accuracy is within the specified allowance requirements. The analog CHANNEL FUNCTIONAL TEST is performed by comparing the test input signal to the value transmitted to the Calibration and Test Computer. This enables verification of the voltage references and the signal commons to ensure the analog channel will perform its intended function. A continuous, automatic analog CHANNEL CHECK is provided by AFIS software. If the channel is outside acceptance criteria, an alarm is provided to the control room.

APPLICABLE SAFETY ANALYSES

AFIS circuitry is installed equipment necessary to automatically isolate main and emergency feedwater to the affected steam generator following a MSLB. The AFIS circuitry provides protection against exceeding containment design pressure for MSLB's inside containment and provides protection against exceeding allowable thermal stresses on the steam generator tubes following a MSLB.

Main Steam header pressure is used as input signals to the AFIS circuitry. When a MSLB is sensed, or upon manual actuation, MFW is terminated by tripping both MFW pumps and closing the affected steam generator's main and startup feedwater control valves and block valves. Although the main and startup feedwater block valves are automatically closed, they are not credited for mitigation of a MSLB. In addition, EFW is terminated by stopping the TDEFWP and tripping the MDEFWP aligned to the affected steam generator. Manual overrides for the TDEFWP and MDEFWP's are provided to allow the operator to subsequently start the emergency feedwater pumps if necessary for decay heat removal.

The AFIS logic channels satisfy Criterion 3 of 10 CFR 50.36 (Ref. 1).

BASES (continued)

LCO

Two AFIS digital channels per steam generator shall be OPERABLE. Both logic modules of a digital channel shall be in the untripped condition for the digital channel to be considered OPERABLE.

APPLICABILITY

The AFIS digital channels shall be OPERABLE in MODES 1 and 2, and MODE 3 with main steam header pressure $\geq$ 700 psig because SG inventory can be at a high energy level and can contribute significantly to the peak containment pressure during a secondary side line break. In MODES 4, 5, and 6, the energy level is low and the secondary side feedwater flow rate is low or nonexistent.

ACTIONS

A Note has been added to the ACTIONS indicating that a separate Condition entry is allowed for logic channels associated with each SG.

A.1

With one digital channel inoperable, the inoperable digital channel must be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is based on unit operating experience and administrative controls, which provide alternative means of AFIS initiation via individual component controls. The 72 hour Completion Time is consistent with the allowed outage time for the components actuated by AFIS.

B.1 and B.2

With both digital channels inoperable or the Required Action and associated Completion Time not met, the Unit must be placed in MODE 3 within 12 hours and the main steam header pressure must be reduced to less than 700 psig within 18 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required MODES from full power conditions in an orderly manner and without challenging Unit systems.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.13.1

This SR requires the performance of a CHANNEL FUNCTIONAL TEST to ensure that the digital channels can perform their intended functions. The Frequency of 18 months is based on engineering judgment and operating experience that determined testing on an 18 month interval provides reasonable assurance that the circuitry is available to perform its safety function, while the risks of testing during Unit operation is avoided.

REFERENCES

1. 10 CFR 50.36.

B 3.3 INSTRUMENTATION

B 3.3.25 Not Used

B 3.3 INSTRUMENTATION

B 3.3.26 Not Used

B 3.3 INSTRUMENTATION

B 3.3.27 Not Used

ATTACHMENT 2

MARKUP OF TECHNICAL SPECIFICATION

Not used

3.3 INSTRUMENTATION

3.3.11 Automatic Feedwater Isolation System (AFIS) Instrumentation

LCO 3.3.11 Four AFIS analog instrumentation channels per steam generator (SG) shall be OPERABLE.

---NOTE---
Not applicable on each Unit until after completion of the Automatic Feedwater Isolation System modification on the respective Unit.

APPLICABILITY: MODES 1 and 2,
MODE 3 with main steam header pressure ≥ 700 psig.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One analog channel inoperable or tripped.	A.1 Place channel in bypass.	4 hours
B. Two analog channels inoperable. OR Required Action and associated Completion Time of Condition A not met.	B.1 Restore channel(s) to operable status.	72 hours

(continued)

3.3 INSTRUMENTATION

3.3.12 Automatic Feedwater Isolation System (AFIS) Manual Initiation

LCO 3.3.12 Two AFIS Manual Initiation switches per steam generator (SG) shall be OPERABLE.

---NOTE---
Not applicable on each Unit until after completion of the Automatic Feedwater Isolation System modification on the respective Unit.

APPLICABILITY: MODES 1 and 2,
MODE 3 with main steam header pressure ≥ 700 psig.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One manual initiation switch per SG inoperable.	A.1 Restore manual initiation switch to OPERABLE status.	72 hours
B Two manual initiation switches per SG inoperable. OR Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Reduce main steam header pressure to < 700 psig.	12 hours 18 hours

3.3 INSTRUMENTATION

3.3.13 Automatic Feedwater Isolation System (AFIS) Digital Channels

LCO 3.3.13 Two AFIS digital channels per steam generator (SG) shall be OPERABLE.

---NOTE---
Not applicable on each Unit until after completion of the Automatic Feedwater Isolation System modification on the respective Unit.

APPLICABILITY: MODES 1 and 2,
MODE 3 with main steam header pressure ≥ 700 psig.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One digital channel inoperable.	A.1 Restore digital channel to OPERABLE status.	72 hours

(continued)

Not Used

3.3 INSTRUMENTATION

3.3.25 Main Steam Line Break (MSLB) Detection and Feedwater Isolation Instrumentation

LCO 3.3.25 Three MSLB Detection and Feedwater Isolation instrumentation channels per steam generator (SG) shall be OPERABLE.

---NOTE---
Applicable on each Unit until after completion of the Automatic Feedwater Isolation System modification on the respective Unit.

APPLICABILITY: MODES 1 and 2,
MODE 3 with main steam header pressure ≥ 700 psig except when all main feedwater control valves (MFCVs) and startup feedwater control valves (SFCVs) are closed.

ACTIONS

---NOTE---
Separate Condition entry is allowed for each SG (Feedwater Isolation Function).

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Feedwater Isolation Functions with one channel inoperable.	A.1 Place channel(s) in trip.	4 hours
B. One or more Feedwater Isolation Functions with two or more channels inoperable. OR Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2.1 Reduce main steam header pressure to < 700 psig. OR B.2.2 Close all MFCVs and SFCVs.	12 hours 18 hours 18 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.3.25.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.25.2	----------NOTE---------- Only applicable when modifications are implemented that allow online testing. ---------- Perform CHANNEL FUNCTIONAL TEST.	31 days
SR 3.3.25.3	Perform CHANNEL CALIBRATION.	18 months

Not Used

3.3 INSTRUMENTATION

3.3.26 Main Steam Line Break (MSLB) Detection and Feedwater Isolation Manual Initiation

LCO 3.3.26 Two MSLB Detection and Feedwater Isolation manual initiation switches shall be OPERABLE.

---NOTE---
Applicable on each Unit until after completion of the Automatic Feedwater Isolation System modification on the respective Unit.

APPLICABILITY: MODES 1 and 2,
MODE 3 with main steam header pressure ≥ 700 psig except when all main feedwater control valves (MFCVs) and startup feedwater control valves (SFCVs) are closed.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One manual initiation switch inoperable.	A.1 Restore manual initiation switch to OPERABLE status.	72 hours
B. Two manual initiation switches inoperable. OR Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2.1 Reduce main steam header pressure to < 700 psig. OR B.2.2 Close all MFCVs and SFCVs.	12 hours 18 hours 18 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.26.1	Perform CHANNEL FUNCTIONAL TEST.	18 months

Not Used

3.3 INSTRUMENTATION

3.3.27 Main Steam Line Break (MSLB) Detection and Feedwater Isolation Logic Channels

LCO 3.3.27 Two MSLB Detection and Feedwater Isolation Logic channels shall be OPERABLE.

---NOTE---
Applicable on each Unit until after completion of the Automatic Feedwater Isolation System modification on the respective Unit.

APPLICABILITY: MODES 1 and 2,
MODE 3 with main steam header pressure ≥ 700 psig except when all main feedwater control valves (MFCVs) and startup feedwater control valves (SFCVs) are closed.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One logic channel inoperable.	A.1 Restore channel to OPERABLE status.	72 hours
B. Two logic channels inoperable. OR Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2.1 Reduce main steam header pressure to < 700 psig. OR B.2.2 Close all MFCVs and SFCVs.	12 hours 18 hours 18 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.3.27.1	Perform CHANNEL FUNCTIONAL TEST.	18 months

B 3.3 INSTRUMENTATION

B 3.3.11 Automatic Feedwater Isolation System (AFIS) Instrumentation

BASES

BACKGROUND

A Main Steam Line Break (MSLB) can lead to containment overpressure, unacceptable thermal stresses to the steam generator tubes, and significant core overcooling. Main and Emergency Feedwater must be promptly isolated to limit the effects of a MSLB. The AFIS instrumentation is designed to provide automatic termination of feedwater flow to the affected steam generator. The AFIS instrumentation automatically terminates Main Feedwater (MFW) by tripping both MFW pumps and closing the affected steam generator's main and startup feedwater control valves and block valves. Although the main and startup feedwater block valves are automatically closed, their closure is not credited for mitigation of a MSLB. The AFIS instrumentation automatically terminates emergency feedwater (EFW) by stopping the turbine-driven emergency feedwater pump (TDEFWP) and tripping the motor-driven emergency feedwater pump (MDEFWP) aligned to the affected steam generator. Manual overrides for the TDEFWP and MDEFWP's are provided to allow the operator to subsequently start the EFW pumps if necessary for decay heat removal.

In addition, AFIS instrumentation provides runout protection for the EFW pumps in the event of a MSLB and certain large break MFW line breaks with the pump in the automatic mode of operation.

Main Steam header pressure is used as input signals to the AFIS circuitry. There are four pressure transmitters per steam generator with each feeding a steam pressure signal to an analog isolation module. The output of the analog isolation module provides an analog signal to a processor module that actuates isolation functions at desired setpoints. One pressure transmitter per steam generator, associated Integrated Control System (ICS) signal isolator(s) and analog isolation module inputs constitute an AFIS detection analog isolation channel.

The four AFIS analog channels per steam generator feed two redundant digital channels. Each digital channel provides independent circuit functions to isolate each steam generator. If the logic is satisfied, a trip output is energized. The use of an energized to trip processor module ensures that a loss of power to the digital channel will not result in an inadvertent feedwater isolation. If either digital channel is actuated, feedwater is isolated to the affected steam generator. Energizing the trip outputs results in closure of contacts in various control circuits for systems

BASES (continued)

BACKGROUND (continued)

and components used for the MSLB and feedwater line break mitigation. Therefore, when the trip outputs are actuated, the systems and components perform their isolation functions. Other features of the digital channels include a test/manual initiation pushbutton and an "enable" or "arming" switch. An AFIS digital channel is defined as an analog isolation module, two digital 2 out of 4 logic modules (a Trip Module and a Trip Confirm Module), the Enable/Disable pushbutton, the associated output relays, the trip relay outputs to the feedwater pumps, the redundant switchgear trips for the MDEFWP, the solenoid valves for the MFCV & SFCV, the trip solenoid valves for the feedwater pumps, and the TDEFWP trip function. There are two digital channels per steam generator. The two logic modules of each digital channel are configured in a two out of two logic arrangement. In this configuration a random failure of one of the logic modules will not result in a spurious actuation or preclude a valid AFIS actuation. In addition, a random failure of one of the logic modules will not preclude a valid AFIS actuation due to the redundant digital channel. While AFIS provides isolation of the feedwater block valves, this is not a credited function and is not a requirement for digital channel operability.

The AFIS digital channels are enabled and disabled administratively rather than automatically. Appropriate operating procedures contain provisions to enable/disable the digital channels.

APPLICABLE SAFETY ANALYSES

Based on the containment pressure response reanalysis, the containment design pressure would be exceeded for a MSLB inside containment without immediate operator or automatic action to isolate main feedwater to the affected steam generator.

In addition, prompt operator or automatic action would be required to isolate EFW to the affected steam generator to limit the resultant thermal stresses on the steam generator tubes following a MSLB.

Main Steam header pressure is used as input signals to the AFIS circuitry. When a MSLB is sensed, or upon manual actuation, main feedwater is terminated by tripping both MFW pumps and closing the affected steam generators main and startup feedwater control valves and block valves. Although the main and startup feedwater block valves are automatically closed, they are not credited for mitigation of a MSLB. In addition, EFW is terminated by stopping the TDEFWP and tripping the MDEFWP aligned to the affected steam generator. Manual overrides for the TDEFWP and MDEFWP are provided to allow the operator to subsequently start the EFW pumps if necessary for decay heat removal.

The AFIS Instrumentation satisfies Criterion 3 of 10 CFR 50.36 (Ref. 3).

BASES (continued)

LCO

This LCO requires that instrumentation necessary to initiate a MFW and EFW isolation shall be OPERABLE. Failure of any instrument renders the affected analog channel(s) inoperable and reduces the reliability of the Function.

Four analog channels per SG are required to be OPERABLE to ensure that no single failure prevents Feedwater isolation. Each AFIS analog channel includes the sensor, ICS signal isolator and an analog isolation module.

This LCO is modified by a Note which indicated the requirements are applicable to a Unit after completion of the AFIS modification on the respective unit. This is necessary since the specification is based on the Unit's design after implementation of the modification.

APPLICABILITY

The AFIS Function shall be OPERABLE in MODES 1 and 2, and MODE 3 with main steam header pressure ≥ 700 psig because the SG inventory can be at a high energy level and contribute significantly to the peak pressure with a secondary side break. Feedwater must be able to be isolated on each SG to limit mass and energy releases to the reactor building. Once the SG pressures have decreased below 700 psig, the AFIS Function can be bypassed to avoid actuation during normal unit cooldowns. In MODES 4, 5, and 6, the energy level is low and the secondary side feedwater flow rate is low or nonexistent. In MODES 4, 5, and 6, the primary system temperatures are too low to allow the SGs to effectively remove energy and AFIS instrumentation is not required to be OPERABLE.

ACTIONS

If a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or any of the transmitter or signal processing electronics, are found inoperable, then the Function provided by that channel must be declared inoperable and the unit must enter the appropriate Conditions.

A Note has been added to the ACTIONS indicating that a separate Condition entry is allowed for analog channels associated with each SG.

A.1

Condition A applies to failures of a single AFIS analog channel. With one channel inoperable or tripped, the channel(s) must be placed in bypass within 4 hours. Bypassing the affected channel places the Function in a two-out-of-three configuration. Operation in this configuration may continue indefinitely since the AFIS Function is capable of performing its

BASES

ACTIONS

A.1 (continued)

isolation function in the presence of any single random failure. The Completion Time of 4 hours is adequate to perform Required Action A.1.

B.1

With two channels inoperable or if the Required Action and associated Completion Time of Condition A can not be met, the channel(s) must be returned to service within 72 hours. An inoperable channel includes any channel bypassed by Condition A.

C.1 and C.2

With the Required Action and associated Completion Time of Condition B not met, the unit must be placed in MODE 3 within 12 hours and main steam header pressure must be reduced to less than 700 psig within 18 hours. The allowed Completion Time is reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.11.1

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 similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; therefore, it is key in verifying that the instrumentation continues to operate properly between each CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION.

Agreement criteria are based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the transmitter or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE. If the channels are normally off scale during times when surveillance is required, the CHANNEL CHECK will only verify that they are off scale in the same direction. Off scale low current loop channels are verified, where practical, to be reading at the bottom of the range and not failed downscale.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.11.1 (continued)

A continuous, automatic CHANNEL CHECK function is provided by Software. If a channel is outside the criteria, then an alarm is provided to the control room. Manual performance of the CHANNEL CHECK is acceptable.

The frequency, about once every shift, is based on operating experience that demonstrates channel failure is rare. Since the probability of two random failures in redundant channels in any 12 hour period is extremely low, the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but potentially more frequent, checks of channel OPERABILITY during normal operational use of the displays associated with the LCO required channels.

SR 3.3.11.2

A CHANNEL FUNCTIONAL TEST is performed by comparing the test input signal to the value transmitted to the Calibration and Test Computer. This enables verification of the voltage references and the signal commons. This will ensure the channel will perform its intended function.

The Frequency of 31 days is based on operating experience, with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel in any 31 day interval is a rare event.

SR 3.3.11.3

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The test verifies the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channels adjusted to account for instrument drift to ensure that the instrument channel remains operational between successive tests. CHANNEL CALIBRATION shall find that measurement errors and setpoint errors are within the assumptions of the setpoint analysis. CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the setpoint analysis.

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

REFERENCES

1. 10 CFR 50.36.

B 3.3 INSTRUMENTATION

B 3.3.12 Automatic Feedwater Isolation System (AFIS) Manual Initiation

BASES

BACKGROUND

The AFIS manual initiation capability provides the operator with the capability to actuate the isolation function from the control room. This Function is provided in the event the operator determines that the Function is needed and does not automatically actuate. This is a backup Function to the automatic Feedwater isolation.

The AFIS manual initiation circuitry satisfies the manual initiation and single-failure criterion requirements of IEEE-279-1971 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The Feedwater Isolation Function credited in the safety analysis is automatic. However, the manual initiation Function is required by design as backup to the automatic Function and allows operators to actuate Feedwater Isolation whenever the Function is needed. Furthermore, the manual initiation of Feedwater Isolation may be specified in unit operating procedures.

The AFIS manual initiation function satisfies Criterion 3 of 10 CFR 50.36 (Ref. 2).

LCO

Two manual initiation switches per steam generator are required to be OPERABLE. The Feedwater Isolation function has two actuation or "trip" digital channels, channels 1 and 2. Within each digital channel actuation logic there are two manual trip switches. When the manual switch is depressed, a full trip of actuation digital channel 1 or 2 occurs.

This LCO is modified by a Note which indicates the requirements are applicable to a Unit after completion of the AFIS modification on the respective Unit. This is necessary since the specification is based on the Unit's design after implementation of the modification.

APPLICABILITY

The AFIS manual initiation Function shall be OPERABLE in MODES 1 and 2, and MODE 3 with main steam header pressure ≥ 700 psig because SG inventory can be at a sufficiently high energy level to contribute significantly to the peak containment pressure with a secondary side break. In MODES 4, 5, and 6, the SG energy level is low and secondary side feedwater flow rate is low or nonexistent.

BASES (continued)

ACTIONS

A Note has been added to the ACTIONS indicating that a separate Condition entry is allowed for manual initiation switches associated with each SG.

A.1

With one manual initiation switch per steam generator inoperable, the manual initiation switch must be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is based on unit operating experience and administrative controls, which provide alternative means of AFIS initiation via individual component controls. The 72 hour Completion Time is consistent with the allowed outage time for the components actuated by the AFIS.

B.1

With both manual initiation switches per steam generator inoperable or the Required Action and associated Completion Time of Condition A not met, the Unit must be placed in MODE 3 within 12 hours and the main steam header pressure reduced to less than 700 psig within 18 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required MODES from full power conditions in an orderly manner and without challenging Unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.12.1

This SR requires the performance of a digital CHANNEL FUNCTIONAL TEST to ensure that the channels can perform their intended functions. The Frequency of 18 months is based on engineering judgment and operating experience that determined testing on an 18 month interval provides reasonable assurance that the circuitry is available to perform its safety function, while the risks of testing during unit operation is avoided.

REFERENCES

1. IEEE-279-1971, April 1972.

2. 10 CFR 50.36.

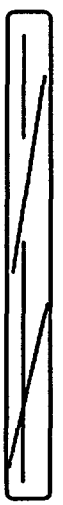
B 3.3 INSTRUMENTATION

B 3.3.13 Automatic Feedwater Isolation System (AFIS) Digital Channels

BASES

BACKGROUND

The four AFIS analog channels per steam generator feed two redundant feedwater digital channels. Each digital channel provides independent circuit functions to isolate each steam generator. If the logic is satisfied, a trip output is energized. The use of an energized to trip processor module ensures that a loss of power to the digital channels will not result in an inadvertent feedwater isolation. If either digital channel is actuated, feedwater to the affected steam generator is isolated. Energizing the trip outputs results in actuation of contacts in various control circuits for systems and components used for the MSLB and feedwater line break mitigation. Therefore, when the trip outputs are actuated, the systems and components perform their isolation functions. An AFIS digital channel is defined as an analog isolation module, two digital 2 out of 4 logic modules (a Trip Module and a Trip Confirm Module), the Enable/Disable pushbutton, the associated output relays, the trip relay outputs to the feedwater pumps, the redundant switchgear trips for the MDEFWP, the solenoid valves for the MFCV & SFCV, the trip solenoid valves for the feedwater pumps, and the TDEFWP trip function. There are two digital channels per steam generator. The two logic modules of each digital channel are configured in a two out of two logic arrangement. In this configuration a random failure of one of the logic modules will not result in a spurious actuation or preclude a valid AFIS actuation. In addition, a random failure of one of the logic modules will not preclude a valid AFIS actuation due to the redundant digital channel. While AFIS provides isolation of the feedwater block valves, this is not a credited function and is not a requirement for digital channel operability.



Trip Setpoints and Allowable Values

Trip setpoints are the nominal values that are user defined in AFIS software. AFIS software is considered to be properly adjusted when the "as left" value is within the band for analog CHANNEL CALIBRATION accuracy.

The trip setpoints used in the AFIS software are selected such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment induced errors for AFIS channels that must function in harsh

BASES

BACKGROUND

Trip Setpoints and Allowable Values (continued)

environments as defined by 10 CFR 50.49, the Allowable Values specified are conservatively adjusted with respect to the analytical limits.

The actual nominal trip setpoint entered into the software for low MS pressure is 550 psig and the rate of depressurization setpoint will be 3 psi/sec. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

Setpoints, in accordance with the Allowable Values, ensure that the consequences of accidents will be acceptable, providing the unit is operated from within the LCOs at the onset of the accident and the equipment functions as designed.

Each analog channel can be tested online to verify that the setpoint accuracy is within the specified allowance requirements. The analog CHANNEL FUNCTIONAL TEST is performed by comparing the test input signal to the value transmitted to the Calibration and Test Computer. This enables verification of the voltage references and the signal commons to ensure the analog channel will perform its intended function. A continuous, automatic analog CHANNEL CHECK is provided by AFIS software. If the channel is outside acceptance criteria, an alarm is provided to the control room.

APPLICABLE SAFETY ANALYSES

AFIS circuitry is installed equipment necessary to automatically isolate main and emergency feedwater to the affected steam generator following a MSLB. The AFIS circuitry provides protection against exceeding containment design pressure for MSLB's inside containment and provides protection against exceeding allowable thermal stresses on the steam generator tubes following a MSLB.

Main Steam header pressure is used as input signals to the AFIS circuitry. When a MSLB is sensed, or upon manual actuation, MFW is terminated by tripping both MFW pumps and closing the affected steam generator's main and startup feedwater control valves and block valves. Although the main and startup feedwater block valves are automatically closed, they are not credited for mitigation of a MSLB. In addition, EFW is terminated by stopping the TDEFWP and tripping the MDEFWP aligned to the affected steam generator. Manual overrides for the TDEFWP and MDEFWP's are provided to allow the operator to subsequently start the emergency feedwater pumps if necessary for decay heat removal.

The AFIS logic channels satisfy Criterion 3 of 10 CFR 50.36 (Ref. 1).

BASES (continued)

LCO

Two AFIS digital channels per steam generator shall be OPERABLE. Both logic modules of a digital channel shall be in the untripped condition for the digital channel to be considered OPERABLE.

This LCO is modified by a Note which indicates the requirements are applicable to a Unit after completion of the AFIS modification on the respective Unit. This is necessary since the specification is based on the Units design after implementation of the modification.

APPLICABILITY

The AFIS digital channels shall be OPERABLE in MODES 1 and 2, and MODE 3 with main steam header pressure ≥ 700 psig because SG inventory can be at a high energy level and can contribute significantly to the peak containment pressure during a secondary side line break. In MODES 4, 5, and 6, the energy level is low and the secondary side feedwater flow rate is low or nonexistent.

ACTIONS

A Note has been added to the ACTIONS indicating that a separate Condition entry is allowed for logic channels associated with each SG.

A.1

With one digital channel inoperable, the inoperable digital channel must be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is based on unit operating experience and administrative controls, which provide alternative means of AFIS initiation via individual component controls. The 72 hour Completion Time is consistent with the allowed outage time for the components actuated by AFIS.

B.1 and B.2

With both digital channels inoperable or the Required Action and associated Completion Time not met, the Unit must be placed in MODE 3 within 12 hours and the main steam header pressure must be reduced to less than 700 psig within 18 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required MODES from full power conditions in an orderly manner and without challenging Unit systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.13.1

This SR requires the performance of a CHANNEL FUNCTIONAL TEST to ensure that the digital channels can perform their intended functions. The Frequency of 18 months is based on engineering judgment and operating experience that determined testing on an 18 month interval provides reasonable assurance that the circuitry is available to perform its safety function, while the risks of testing during Unit operation is avoided.

REFERENCES

1. 10 CFR 50.36.

Not Used

B 3.3 INSTRUMENTATION

B 3.3.25 Main Steam Line Break (MSLB) Detection and Feedwater Isolation Instrumentation

BASES

BACKGROUND

The MSLB Detection and Feedwater Isolation instrumentation is designed to address containment overpressurization and steam generator tube load concerns by isolating main feedwater (MFW) and stopping the turbine-driven emergency feedwater pump (TDEFW) from delivering feedwater to both steam generators during an MSLB and to mitigate core overcooling concerns. In addition, the MSLB Detection and Feedwater Isolation instrumentation provides runout protection for the TDEFW pump in the event of a MSLB and certain large MFW line breaks with the pump in the automatic mode of operation.

Steam generator header pressure is used as input signals to the MSLB circuitry for detection and feedwater isolation. When a MSLB is sensed, or upon manual actuation, the main feedwater control valves (MFCVs) and startup feedwater control valves (SFCVs) will be closed to isolate the MFW flow paths to both steam generators. In addition, the MFW pumps are tripped. The TDEFW pump will be inhibited from auto-starting or will be auto-stopped if it has already started. A manual override for the TDEFW pump inhibit is provided to allow the operator to subsequently start the TDEFW pump if necessary for decay heat removal. These functions are credited for mitigating an MSLB. The function of closing the main and startup feedwater block valves is not credited in the MSLB analysis. However, the MSLB Detection and Feedwater Isolation circuitry performs this function.

There are three pressure transmitters per steam generator with each feeding a steam pressure signal to a signal isolator (when used) and bistable. These bistables are calibrated to provide an ON/OFF signal at the desired setpoint for actuation of the feedwater isolation circuitry. A pressure transmitter and its associated signal isolator(s) and bistable(s) constitute a MSLB detection analog channel.

The six MSLB detection analog channels feed two redundant feedwater isolation digital channels consisting of two single failure proof two-out-of-three logic circuits. If the logic is satisfied, a master relay coil is energized. The use of an energized master relay ensures that a loss of power to the

BASES

BACKGROUND (continued)

digital channels will not result in an in advertent feedwater isolation. If either digital channel is actuated, a feedwater isolation (i.e., MFW pumps trip, MFCVs and SFCVs close, and TDEFW pump inhibited from auto-starting or auto-stopped if running) will occur. Energizing the master relay results in closure of contacts in various control circuits for systems and components. Therefore, when the master relay is energized, the systems and components perform their isolation functions. Other features of the digital channels include a test/manual actuation pushbutton, a circuit seal-in after the master relay is energized, a 2 second time delay to prevent spurious actuation, and an "enable" or "arming" switch. The two two-out-of-three logic circuits, along with their associated enable switch, master relay, seal-in, time delay, and test/manual actuation pushbutton are considered a feedwater isolation digital channel.

The feedwater isolation digital channels are enabled and disabled administratively rather than automatically. Appropriate operating procedures contain provisions to enable/disable the digital channels.

APPLICABLE SAFETY ANALYSES

The MSLB Detection and Feedwater Isolation instrumentation is utilized to isolate main feedwater and stop the TDEFW pump from supplying feedwater to both steam generators in the event a MSLB occurs. This function is credited in the MSLB analyses regarding containment response and steam generator tube loads.

Steam generator header pressure is used as input to the MSLB circuitry for detection and feedwater isolation. When a MSLB is sensed, or upon manual actuation, the MFCVs and SFCVs are closed to isolate the MFW flow paths to both steam generators. In addition, the MFW pumps are tripped. The TDEFW pump will be inhibited from auto-starting or will be auto-stopped if it has already started. A manual override for the TDEFW pump inhibit is provided to allow the operator to subsequently start the TDEFW pump if necessary for decay heat removal. All of these functions are credited for mitigating a MSLB inside containment.

The MSLB Detection and Feedwater Isolation Instrumentation satisfies Criterion 3 of 10 CFR 50.36 (Ref. 1).

LCO

This LCO requires that instrumentation necessary to initiate a feedwater isolation (i.e., trip the MFW pumps, close the MFCVs and SFCVs, inhibit the auto-start of or auto-stop the TDEFW pump) shall be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the Function.

BASES

LCO (continued)

Three analog channels per SG are required to be OPERABLE to ensure that no single failure prevents actuation of the MSLB Detection and Feedwater Isolation instrumentation. Each MSLB Detection and Feedwater Isolation instrumentation channel includes the sensor and measurement channel.

This LCO is modified by a Note, which indicates the requirements are not applicable to a Unit after the completion of the Automatic Feedwater Isolation System Modification on the respective Unit. This is necessary since the specification is no longer based on the Unit's design after implementation of the modification.

APPLICABILITY

The MSLB Detection and Feedwater Isolation Function shall be OPERABLE in MODES 1 and 2, and MODE 3 with main steam header pressure ≥ 700 psig, because there is significant mass and energy in the RCS and steam generators. Once the steam header pressure has decreased below 700 psig, additional time is available for the operator to manually isolate main and emergency feedwater to the affected steam generator. Thus, the Feedwater Isolation Function can be bypassed to avoid actuation during normal unit cooldowns. Also during MODE 3, the Feedwater Isolation Function is not required to be OPERABLE when all main feedwater control valves (MFCVs) and startup feedwater control valves (SFCVs) are closed since the function of the instrumentation is already fulfilled. In MODE 3 when the turbine header pressure is < 885 psig, automatic actuation of the TDEFW pump is blocked. In MODES 4, 5, and 6, the energy level is low and the secondary side feedwater flow rate is low or nonexistent. In MODES 4, 5, and 6, the primary system temperatures are too low to allow the SGs to effectively remove energy and MSLB Detection and Feedwater Isolation instrumentation is not required to be OPERABLE.

ACTIONS

If a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or any of the transmitter or signal processing electronics, are found inoperable, then the Function provided by that channel must be declared inoperable and the unit must enter the appropriate Conditions.

A Note has been added to the ACTIONS indicating that a separate Condition entry is allowed for instrumentation channels associated with each SG (feedwater isolation function).

BASES

A.1

Condition A applies to failures of a single MSLB Detection and Feedwater Isolation instrumentation channel in one or more Feedwater Isolation Functions.

With one channel inoperable in one or more MSLB Detection and Feedwater Isolation Function, the channel(s) must be placed in trip within 4 hours. Tripping the affected channel places the Function in a one-out-of-two configuration. Operation in this configuration may continue indefinitely since the MSLB Detection and Feedwater Isolation Function is capable of actuating in the presence of any single random failure. The Completion Time of 4 hours is adequate to perform Required Action A.1.

B.1, B.2.1, and B.2.2

With two channels in one or more MSLB Detection and Feedwater Isolation Function inoperable or the Required Action and associated Completion Time of Condition A not met, the unit must be placed in MODE 3 within 12 hours and main steam header pressure must be reduced to less than 700 psig or all MFCVs and SFCVs must be closed within 18 hours. The allowed Completion Time is reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.25.1

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 similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; therefore, it is key in verifying that the instrumentation continues to operate properly between each CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION.

Agreement criteria are based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the transmitter or the signal processing equipment has drifted outside its limit. If the channels are

BASES

within the criteria, it is an indication that the channels are OPERABLE. If the channels are normally off scale during times when surveillance is required, the CHANNEL CHECK will only verify that they are off scale in the same direction. Off scale low current loop channels are verified, where practical, to be reading at the bottom of the range and not failed downscale.

The Frequency, about once every shift, is based on operating experience that demonstrates channel failure is rare. Since the probability of two random failures in redundant channels in any 12 hour period is extremely low, the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but potentially more frequent, checks of channel OPERABILITY during normal operational use of the displays associated with the LCO required channels.

SR 3.3.25.2

A CHANNEL FUNCTIONAL TEST is performed on each required instrumentation channel to ensure the channel will perform its intended function.

The Frequency of 31 days is based on operating experience, with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel in any 31 day interval is a rare event.

This SR is modified by a Note indicating that it is only applicable when modifications are implemented that allow online testing.

SR 3.3.25.3

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The test verifies the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channels adjusted to account for instrument drift to ensure that the instrument channel remains operational between successive tests. CHANNEL CALIBRATION shall find that measurement errors and bistable setpoint errors are within the assumptions of the setpoint analysis. CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the setpoint analysis.

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

BASES (continued)

REFERENCES

1. 10 CFR 50.36.
2. UFSAR Section 6.2.1.4.
3. UFSAR Section 5.2.3.4.

Not Used

B 3.3 INSTRUMENTATION

B 3.3.26 Main Steam Line Break (MSLB) Detection and Feedwater Isolation Manual Initiation

BASES

BACKGROUND

The MSLB Detection and Feedwater Isolation manual initiation capability provides the operator with the capability to actuate the isolation function from the control room. This Function is provided in the event the operator determines that the Function is needed and does not automatically actuate. This is a backup Function to the automatic Feedwater isolation.

The MSLB Detection and Feedwater Isolation manual initiation circuitry satisfies the manual initiation and single-failure criterion requirements of IEEE-279-1971 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The Feedwater Isolation Function credited in the safety analysis is automatic. However, the manual initiation Function is required by design as backup to the automatic Function and allows operators to actuate Feedwater Isolation whenever the Function is needed. Furthermore, the manual initiation of Feedwater Isolation may be specified in unit operating procedures.

The MSLB Detection and Feedwater Isolation manual initiation function satisfy Criterion 3 of 10 CFR 50.36 (Ref. 2).

LCO

One manual initiation switch per actuation channel (A and B) is required to be OPERABLE. The Feedwater Isolation function, has two actuation or "trip" channels, channels A and B. Within each channel actuation logic there is one manual trip switch. When the manual switch is depressed, a full trip of actuation channel A or B occurs.

This LCO is modified by a Note, which indicates the requirements are not applicable to a Unit after the completion of the Automatic Feedwater Isolation System Modification on the respective Unit. This is necessary since the specification is no longer based on the Unit's design after implementation of the modification.

APPLICABILITY

The Feedwater Isolation manual initiation Function shall be OPERABLE in MODES 1 and 2, and MODE 3 with main steam header pressure ≥ 700 psig because there is significant mass and energy in the RCS and steam

BASES

APPLICABILITY (continued)

generators. Once the steam header pressure has decreased below 700 psig, additional time is available for the operator to manually isolate main and emergency feedwater to the affected steam generator. Thus, the Feedwater Isolation Function can be bypassed to avoid actuation during normal unit cooldowns. During MODE 3, the Feedwater Isolation manual initiation Function is not required to be OPERABLE when all main feedwater control valves (MFCVs) and startup feedwater control valves (SFCVs) are closed since its function is already fulfilled. In MODE 3 when the turbine header pressure is < 885 psig, automatic actuation of the turbine-driven emergency feedwater pump is blocked. In MODES 4, 5, and 6, the SG energy level is low and secondary side feedwater flow rate is low or nonexistent.

ACTIONS

A.1

With one manual initiation switch inoperable, the manual initiation switch must be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is based on unit operating experience and administrative controls, which provide alternative means of MSLB Detection and Feedwater Isolation Function initiation via individual component controls. The 72 hour Completion Time is consistent with the allowed outage time for the components actuated by the MSLB Detection and Feedwater Isolation Function.

B.1

With both manual initiation switches inoperable or the Required Action and associated Completion Time of Condition A not met, the unit must be placed in MODE 3 within 12 hours and the main steam header pressure reduced to less than 700 psig or all MFCVs and SFCVs must be closed within 18 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required MODES from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.26.1

This SR requires the performance of a CHANNEL FUNCTIONAL TEST to ensure that the channels can perform their intended functions. The Frequency of 18 months is based on engineering judgment and operating experience that determined testing on an 18 month interval provides reasonable assurance that the circuitry is available to perform its safety function, while the risks of testing during unit operation is avoided.

BASES (continued)

REFERENCES

1. IEEE-279-1971, April 1972.
2. 10 CFR 50.36.
3. UFSAR Section 6.2.1.4.
4. UFSAR Section 5.2.3.4.

Not Used

B 3.3 INSTRUMENTATION

B 3.3.27 Main Steam Line Break (MSLB) Detection and Feedwater Isolation Logic Channels

BASES

BACKGROUND

The six MSLB detection analog channels feed two redundant feedwater isolation digital channels consisting of two single failure proof two-out-of-three logic circuits. If the logic is satisfied, a master relay coil is energized. The use of an energized master relay ensures that a loss of power to the digital channels will not result in an inadvertent feedwater isolation. If either digital channel is actuated, a Feedwater isolation will occur. Energizing the master relay results in closure of contacts in various control circuits for systems and components. Therefore, when the master relay is energized, the systems and components perform their isolation functions. Other features of the digital channels include a test/manual actuation pushbutton, a circuit seal-in after the master relay is energized, a 2 second time delay to prevent spurious actuation, and an "enable" or "arming" switch. Each of the two two-out-of-three logic circuits, along with their associated enable switch, master relay, seal-in, and time delay is considered a feedwater isolation digital channel.

APPLICABLE SAFETY ANALYSES

The MSLB Detection and Feedwater Isolation instrumentation is utilized to isolate main feedwater and stop the TDEFW pump from supplying feedwater to both steam generators in the event a MSLB occurs. This function is credited in the MSLB analyses regarding containment response and steam generator tube loads.

Steam generator outlet pressure is used as input to the MSLB circuitry for detection and feedwater isolation. When a MSLB is sensed, or upon manual actuation, the MFCVs and SFCVs will be closed to isolate the MFW flow paths to both steam generators. In addition, the MFW pumps are tripped. The TDEFW pump will be inhibited from auto-starting or will be auto-stopped if it has already started and the switch for MS-93 is in the AUTO position. A manual override for the TDEFW pump inhibit is provided to allow the operator to subsequently start the TDEFW pump if necessary for heat removal. All of these functions are credited for mitigating a MSLB inside containment.

The MSLB Detection and Feedwater Isolation logic channels satisfy Criterion 3 of 10 CFR 50.36 (Ref. 1).

BASES (continued)

LCO

Two channels of MSLB Detection and Feedwater Isolation automatic actuation logic shall be OPERABLE. There are only two channels of automatic actuation logic. Therefore, violation of this LCO could result in a complete loss of the automatic Function assuming a single failure of the other channel.

This LCO is modified by a Note, which indicates the requirements are not applicable to a Unit after the completion of the Automatic Feedwater Isolation System Modification on the respective Unit. This is necessary since the specification is no longer based on the Unit's design after implementation of the modification.

APPLICABILITY

The MSLB Detection and Feedwater Isolation automatic actuation logic channels shall be OPERABLE in MODES 1 and 2, and MODE 3 with main steam header pressure ≥ 700 psig because there is significant mass and energy in the RCS and steam generators. Once the steam header pressure has decreased below 700 psig, additional time is available for the operator to manually isolate main and emergency feedwater to the affected steam generator. Thus, the Feedwater Isolation Function can be bypassed to avoid actuation during normal unit cooldowns. Also, during MODE 3, the Feedwater Isolation function is not required to be OPERABLE when all main feedwater control valves (MFCVs) and startup feedwater control valves (SFCVs) are closed since its function is already fulfilled. In MODE 3 when the turbine header pressure is < 885 psig, automatic actuation of the TDEFW pump is blocked. In MODES 4, 5, and 6, the energy level is low and the secondary side feedwater flow rate is low or nonexistent.

ACTIONS

A.1

With one automatic actuation logic channel inoperable, the channel must be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is based on unit operating experience and administrative controls, which provide alternative means of MSLB Detection and Feedwater Isolation Function initiation via individual component controls. The 72 hour Completion Time is consistent with the allowed outage time for the components actuated by the MSLB Detection and Feedwater Isolation Function.

B.1, B.2.1, and B.2.2

With both logic channels inoperable or the Required Action and associated Completion Time not met, the unit must be placed in MODE 3 within 12 hours and the main steam header pressure must be reduced to less than

BASES (continued)

Actions

B.1, B.2.1, and B.2.2 (continued)

700 psig or all MFCVs and SFCVs must be closed within 18 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required MODES from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.27.1

This SR requires the performance of a CHANNEL FUNCTIONAL TEST to ensure that the channels can perform their intended functions. This test verifies Feedwater Isolation automatic actuation logics are functional. This test simulates the required inputs to the logic circuit and verifies successful operation of the automatic actuation logic. The Frequency of 18 months is based on engineering judgment and operating experience that determined testing on an 18 month interval provides reasonable assurance that the circuitry is available to perform its safety function, while the risks of testing during unit operation is avoided.

REFERENCES

1. 10 CFR 50.36.
2. UFSAR Section 6.2.1.4.
3. UFSAR Section 5.2.3.4

Attachment 3

Technical Justification

Background

Oconee Nuclear Station has common Technical Specifications for all three Oconee Units. Any differences in Technical Specification requirements between units due to design differences are handled by notes indicating the applicability of a Technical Specification requirement. Duke replaced the Main Steam Line Break (MSLB) detection circuitry with the Automatic Feedwater Isolation System (AFIS) on each unit during recent outages with the last replacement being completed in the recent Unit 3 outage. Prior to beginning implementation of the AFIS modification, NRC issued a Technical Specification change that retained the Technical Specifications for MSLB detection circuitry and added Technical Specifications for AFIS. The LCO for each new AFIS Technical Specification was modified with a Note indicating that the Limiting Condition for Operation (LCO) is not applicable on each Unit until after completion of the Automatic Feedwater Isolation System modification on the respective Unit. Each Technical Specification LCO for the MSLB detection circuitry was modified with a Note indicating that the LCO is applicable on each Unit until after completion of the AFIS modification on the respective Unit.

Description of the Technical Specification Change and Technical Justification

With the completion of the AFIS modification on all three Oconee Units, the MSLB detection circuitry Technical Specifications are no longer applicable and can be removed from Technical Specifications. Also, the AFIS Technical Specification LCO no longer needs to be modified by a note indicating that the LCO is not applicable on each Unit until after completion of the AFIS modification. Therefore, Duke proposes to eliminate these obsolete requirements.

1. Modify AFIS Technical Specifications

   LCOs 3.3.11, 3.3.12, and 3.3.13 are currently modified by the following Note:

"Not applicable on each Unit until after completion of the Automatic Feedwater Isolation System modification."

Duke proposes to delete the LCO 3.3.11, 3.3.12, and 3.3.13 notes. The AFIS modification has been completed on all three Oconee Units; therefore, the LCO Notes are no longer needed and can be removed. The associated TS Bases is revised accordingly. This change is administrative since no requirements are changed.

2. Delete MSLB Detection Circuitry Technical Specifications

LCOs 3.3.25, 3.3.26, and 3.3.27 are currently modified by the following Note:

"Applicable on each Unit until after completion of the Automatic Feedwater Isolation System modification on the respective Unit"

Duke proposes to delete the Technical Specifications 3.3.25, 3.3.26, and 3.3.27 for MSLB Detection Circuitry. The AFIS modification has been completed on all three Oconee Units; therefore, the Technical Specifications are no longer applicable and can be removed. The Technical Specification numbers are retained with "Not Used" placed after each since Oconee Technical Specification numbering continues after 3.3.27. The associated TS Bases is deleted and with the Technical Specification Bases numbers labeled "Not Used." This change is administrative since no requirements are changed.

Attachment 4
No Significant Hazards Consideration

Pursuant to 10 CFR 50.91, Duke Energy Corporation (Duke) has made the determination that this amendment request involves a No Significant Hazards Consideration by applying the standards established by the NRC regulations in 10 CFR 50.92. This ensures that operation of the facility in accordance with the proposed amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated:

The proposed change to the Oconee Technical Specifications removes obsolete requirements associated with the Main Steam Line Break (MSLB) detection circuitry that are no longer necessary because of the completion of the Automatic Feedwater Isolation System (AFIS) modification on all three Oconee Units. AFIS replaced the MSLB detection system. As such, the proposed change is administrative. No actual plant equipment, operating practices, or accident analyses are affected by this change. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

(2) Create the possibility of a new or different kind of accident from any kind of accident previously evaluated:

The proposed change to the Oconee Technical Specifications removes obsolete requirements associated with the MSLB detection circuitry that are no longer necessary because of the completion of the AFIS modification on all three Oconee Units. AFIS replaced the MSLB detection system. As such, the proposed change is administrative. No actual plant equipment, operating practices, or accident analyses are affected by this change. No new accident causal mechanisms are created as a result of this change. The proposed change does not impact any plant systems that are accident initiators; neither does it adversely impact any accident mitigating systems. Therefore, this change does

not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Involve a significant reduction in a margin of safety.

The proposed change does not adversely affect any plant safety limits, set points, or design parameters. The change also does not adversely affect the fuel, fuel cladding, Reactor Coolant System, or containment integrity. The proposed change eliminates obsolete requirements and is administrative in nature. Therefore, the proposed change does not involve a reduction in a margin of safety.

Duke has concluded, based on the above, that there are no significant hazards considerations involved in this amendment request.

ATTACHMENT 5
Environmental Assessment

Pursuant to 10 CFR 51.22(b), an evaluation of the license amendment request (LAR) has been performed to determine whether or not it meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c)9 of the regulations. The LAR does not involve:

1) A significant hazards consideration.

   This conclusion is supported by the determination of no significant hazards contained in Attachment 4.

2) A significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

   This LAR will not significantly change the types or amounts of any effluents that may be released offsite.

3) A significant increase in the individual or cumulative occupational radiation exposure.

   This LAR will not increase the individual or cumulative occupational radiation exposure.

In summary, this LAR meets the criteria set forth in 10 CFR 51.22 (c)9 of the regulations for categorical exclusion from an environmental impact statement.