

W. R. McCollum, Jr. Vice President Oconee Nuclear Station 7800 Rochester Highway Seneca, SC 29672 (864) 885-3107 OFFICE (864) 885-3564 FAX

June 7, 2001

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 Automatic Feedwater Isolation System Modification affecting Technical Specifications 3.3.11, 3.3.12, 3.3.13 - Main Steam Line Break Detection and Main Feedwater Isolation Circuitry - Supplement 1 Technical Specification Change (TSC) Number 99-10

On July 18, 2000, Duke Energy (Duke) submitted a proposed change to the Technical Specifications (TS) that will implement the Automatic Feedwater Isolation System (AFIS). On April 16, 2001, a Request for Additional Information was sent to us electronically. Attachment 1 restates the questions and provides our response.

During an internal review of our submittal a minor editorial error was identified as follows. The title and header on proposed revised TS Bases pages for section B3.3.13 reads "AFIS Logic Channels" and should read "AFIS Digital Channels" to be consistent with the nomenclature used in TS 3.3.13. Attachment 2 provides corrected pages.

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If there are any questions regarding this submittal, please contact Eric Johnson at (864) 885-4716.

Very truly yours,

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W. R. McCollum, Jr. Vice President Oconee Nuclear Size

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cc: Mr. D. E. LaBarge, Project Manager Office of Nuclear Reactor Regulation U. S. Nuclear Regulatory Commission Mail Stop 0-14 H25 Washington, D. C. 20555

> Mr. L. A. Reyes, Regional Administrator U. S. Nuclear Regulatory Commission - Region II Atlanta Federal Center 61 Forsyth St., SW, Suite 23T85 Atlanta, Georgia 30303

Mr. M. C. Shannon Senior Resident Inspector Oconee Nuclear Station

Mr. Virgil R. Autry, Director Division of Radioactive Waste Management Bureau of Land and Waste Management Department of Health & Environmental Control 2600 Bull Street Columbia, SC 29201 U. S. Nuclear Regulatory Commission June 7, 2001 Page 4

W. R. McCollum, Jr., 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 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.

W. R. McCollum, Jr., Vice President Oconee Nuclear Site

Subscribed and sworn to before me this $\underline{140}$ day of inl, 2001

Preasale Notary Public

My Commission Expires:

2-12-03

Attachment 1

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Response to Request for Additional Information TSC 99-10 - Supplement 1

Additional Information

Automatic Feedwater Isolation System

1. The Technical Specification changes identify some new controls, but provide no description of them. They are:

Two AFIS Manual Initiation switches per SG Manual Overides for the MDEFWPs.

What type of controls?

RESPONSE

Each SG is provided with a pushbutton on the main control board for manual initiation of AFIS. These pushbuttons replace existing MSLB circuitry pushbuttons. The manual initiation pushbuttons are designed with separate contact blocks for each digital channel and energize the trip relay outputs independent of the digital controls. The trip relays are alarmed on a control room annunciator panel and on the plant computer.

Each SG is provided with a dual function pushbutton on the main control board to enable and disable the trip relay outputs. These pushbuttons replace existing MSLB circuitry Enable/Disable control switches. The Enable/Off pushbuttons are configured to de-energize the trip relay outputs which inhibit the outputs of the digital controls. The OFF position is alarmed on a control room annunciator panel.

The EFW pump override of AFIS is performed using the existing pump control switches. A contact from the switch in the RUN position is designed to inhibit the AFIS function. There are no operational or physical changes to the switches.

A simulation of the AFIS will be programmed on the

Part-Task Simulator before installation of the first AFIS modification. The simulation software will be modified to reflect the effects of the AFIS project on plant operation. The Full-Scope plant simulator will be modified to match the Unit 1 control room after final installation.

Operator training on new controls?

RESPONSE

In accordance with training directives, training and evaluation will be conducted for all licensed operators before they can assume control of the new components. Other personnel designated for training will receive training within 60 days following completion of the above training.

Since the replacement pushbuttons are similar to those already in use for the MSLB circuitry, the training will focus on the AFIS circuitry, actuation of AFIS, the controls and components affected, and bypassing of the circuitry.

What changes need to be made to procedures?

RESPONSE

The installation of AFIS will change the EOP/APs that contain the required operator actions for dealing with a main steam line break or loss of feedwater only to account for the header-specific nature of AFIS. The current train-specific MSLB circuitry nomenclature will be replaced with header-specific AFIS nomenclature and the required operator actions will be adjusted accordingly.

2. Page B3.3.11-2, "Applicable Safety Analysis" states the following:

a. MSLB inside containment requires "immediate" operator action if automatic action fails to isolate

main feedwater to the affected SG.

Please describe what "immediate" means. How much time is available? Describe required actions. How much time does it take the operator to accomplish the required actions? What are the consequences if not done in time? How does the operator know to isolate? Which SG? Where are the controls? Operator training? What procedure changes are necessary?

RESPONSE

In a supplemental response to IEB 80-04 dated August 19, 1993, Duke indicated that containment overpressurization from a MSLB was possible unless there was reliance on the ICS and operator action. Presented in that response were various combinations of equipment response and the resultant time required for operator action to isolate all feedwater flow to the affected SG. These included among other scenarios:

- Automatic feedwater control (ICS) and operator action are available. Operator action was required to be initiated at 170 seconds to assure peak containment pressure remained below design.
- Without credit for automatic feedwater control, operator action was required to be initiated at 25-30 seconds to limit peak containment pressure to less than the design value.

The above scenarios suggest the meaning of the term "immediate operator action."

In order to eliminate the need for operator action, the automatic isolation of feedwater on a MSLB was proposed in the same response. This system was installed over the next several years and TS requirements for it were proposed in a Duke letter dated July 15, 1997. In a letter dated June 16, 1998, in response to Request for Additional Information #3, Duke provided the results of an analysis that assumed that feedwater would continue to be added to the faulted SG for ten minutes (the delay time for operator action to isolate feedwater). The results of the analysis demonstrated that although containment peak pressure would exceed design pressure, ultimate containment strength would not be threatened.

The EOP for Main Steam Line Break Actions contains steps to ensure that operators will confirm feedwater isolation on a MSLB and take manual action where required. The operator will actuate the AFIS Initiate button and then perform some of the actions manually that it performs automatically (ie. trip the MFDW pump, close startup and main block valves on the affected header, secure affected MDEFDW Pump, etc). In addition, the EFDW control valve on the affected header will be closed (FDW-315 or FDW-316). These required actions will not change with the installation of AFIS because AFIS incorporates the features of the current MSLB circuitry with the addition of automatic MDEFW isolation to the affected SG and header-specific isolation of feedwater flow. The methods by which isolation of main feedwater and TDEFW flow occur will not be changed from those under the current MSLB circuitry.

For large MSLB events, the recognition of the failed steam line is based on MS pressure indications or AFIS alarms. For small MSLB events that do not trip the main turbine, the turbine may require manual trip before recognizing the failed steam header as both SGs will depressurize together. Operator training emphasizes the need to manually trip the reactor and turbine generator upon recognition of a significant decrease in MS pressure. Once the turbine has been tripped, the affected SG is readily apparent as it continues to depressurize and the unaffected SG repressurizes. SG pressure is monitored on safety grade instrumentation on the main control board.

Scenarios involving main steam line break are included as part of routine simulator training for operators. As part of the EOP development process, a validation of the time required to complete operator actions was conducted. Results of training and validation scenarios indicate that manual isolation of SG feed is typically completed in under 3 minutes.

b. "Prompt" operator action required to isolate EFW to the affected steam generator to limit the resultant thermal stresses.

(Same questions as above)

RESPONSE

In a letter to the NRC dated May 15, 2000, Duke submitted a revised MSLB SG tube stress analysis. This submittal was approved as Amendments 315. In this submittal, Duke provided an analysis to demonstrate that prompt operator action (within 10 minutes) to isolate MDEFW to the affected SG in conjunction with the MSLB circuitry would limit tube stresses to allowable values.

AFIS will replace this required operator action with an automatic isolation of MDEFW flow to the affected SG in a much shorter time. This will reduce the thermal stress on SG tubes and permit a slight relaxation of the acceptance criteria for SG tube indications during inspections.

AFIS is a safety grade protection system with regard to the isolation of EFW. No active operator actions will be required for break sizes that exceed the AFIS rate of depressurization setpoint. For breaks that are too small to reach the AFIS rate of depressurization setpoint, operator action is required within 10 minutes

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to manually isolate MDEFW flow to the affected SG. This operator action time is consistent with the submittal approved as Amendments 315. As noted in the response to question 1 above, minimal changes to the existing Emergency Procedures for MSLB will be required as a result of the installation of AFIS. The required operator actions will consist of observing that AFIS has initiated the required trips and manually isolating MDEFW flow to the affected SG if necessary. Specifically the operator will follow up the initiation of AFIS by actuating the AFIS Initiate button and then performing some of the actions manually that AFIS performs automatically (ie. trip the MFDW pump, close the startup and main block valves on the affected header, secure affected MDEFDW Pump, etc). Tn addition, the EFDW control valve on the affected header will be closed (FDW-315 or FDW-316).

Operator training is addressed in response to question 2.a. above.

c. Describe "manual actuation" conditions and all actions to trip MFW pump, close affected SG main and startup feedwater control valves and block valves, stopping TDEFWP and MDEFWPs.

(Same questions as above)

RESPONSE

This portion of the TS bases was intended to indicate what actions would result from the automatic or manual actuation of AFIS. It is Duke's operational philosophy that when an event occurs that would lead to the actuation of an automatic safety feature, operators should take anticipatory manual action. This is accomplished with the Manual Initiation Switch. When this switch is activated, AFIS initiates all required trips and closures exactly as if the digital channel had tripped.

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ATTACHMENT 2 REVISED TECHNICAL SPECIFICATION BASES PAGES

<u>Remove Bases Page</u>

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<u>Insert Bases Page</u>

B3.3.13-1	B3.3.13-1
B3.3.13-2	B3.3.13-2
B3.3.13-3	B3.3.13-3
B3.3.13-4	B3.3.13-4

B 3.3 INSTRUMENTATION

B 3.3.13 Automatic Feedwater Isolation System (AFIS) Digital Channels

BASES

The four AFIS analog channels per steam generator feed two redundant BACKGROUND 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. The AFIS digital channel is defined as the analog isolation modules, the digital 2 out of 4 logic modules, 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. 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 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 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 (continued)

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Amendment Nos.

BASES (continued)	
BACKGROUND	<u>Trip Setpoints and Allowable Values</u> (continued) 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 channel can be tested online to verify that the setpoint accuracy is within the specified allowance requirements. The 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 channel will perform its intended function. A continuous, automatic 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).
LCO	Two digital channels of AFIS logic shall be OPERABLE. There are two redundant digital channels of automatic actuation logic. 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.

B 3.3.13-2

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OCONEE UNITS 1, 2, & 3

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BASES (continued)

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.

<u>A.1</u>

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)	00.0		
REQUIR	EMENTS	This S ensure Freque experi reasor functio	R requires the performance of a CHANNEL FUNCTIONAL TEST to that the digital channels can perform their intended functions. The ency of 18 months is based on engineering judgment and operating ence that determined testing on an 18 month interval provides hable assurance that the circuitry is available to perform its safety on, while the risks of testing during Unit operation is avoided.	
REFERE	NCES	1.	10 CFR 50.36.	

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