



**Duke Energy**

Oconee Nuclear Station  
7800 Rochester Highway  
Seneca, SC 29672

(864) 885-3107 OFFICE  
(864) 885-3564 FAX

W. R. McCollum, Jr.  
Vice President

September 5, 2001

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

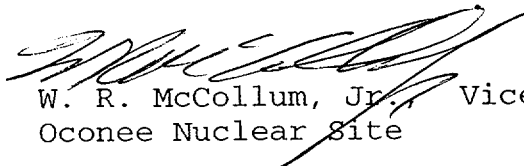
Attention: Document Control Desk

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 3  
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). During discussions with the staff during the week of August 27, 2001, we were informed that additional information was needed. Attachment 1 states the request for additional information and provides our response.

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

Very truly yours,



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

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

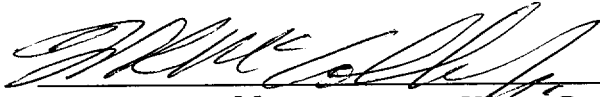
Mr. L. A. Reyes, Regional Administrator  
U. S. Nuclear Regulatory Commission - Region II  
Atlanta Federal Center  
61 Forsyth St., SW, Suite 23T85  
Atlanta, Georgia 30303

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

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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 5<sup>th</sup> day of  
SEPTEMBER, 2001

  
\_\_\_\_\_  
Notary Public

My Commission Expires:

AUGUST 13, 2001

SEAL

**Attachment 1**

**Response to Request for Additional Information  
TSC 99-10 - Supplement 3**

## **EEIB Request for Additional Information Regarding AFIS**

Please provide more detail regarding the electromagnetic interference/radio frequency interference (EMI/RFI) qualification of the AFIS STAR module.

### Response:

The first two paragraphs below are taken directly from the original submittal (at page 21 of Appendix 3) and are statements of the site-specific activities needed for EMI/RFI qualification. Following these is the additional detail needed to address the staff request for additional information.

The worst case levels of conducted and radiated emissions from equipment in the vicinity of AFIS shall be quantified. The method used to quantify these levels shall be by tests designed to map radiated levels at the front and back of the AFIS cabinets and measure the conducted levels on the system power supply leads. Analytical methods using comparisons to data obtained from tests of other installations may be used in lieu of testing provided that adequate similarity can be established between the proposed installation and the tested installations.

An analysis of the worst case EMI and RFI levels shall be performed to verify that they fall below the qualified levels for the STAR system components, or that measures are in place to prevent their effects from impacting the protection functions of AFIS.

As described in Section 4.2 of the BAW-10191P, Rev. 1 "Topical Report for STAR System Components for RPS Digital Upgrades" (September, 1994), Framatome/B&W performed EMI/RFI testing during qualification of the STAR system. The standards referenced for the EMI/RFI testing include IEEE 472-1974, SAMA PMC 33.1-1978, and MIL STD 461C Part 4, RS03.

The testing for radiated susceptibility was consistent with the high frequency radiated susceptibility requirements of EPRI TR-102323, Rev.1. The radiated emissions test concluded that the STAR components are qualified for operation in EMI/RFI field strengths of 10 V/m over a frequency range of 0.15 - 1000 Mhz. The low frequency radiated emissions tests referenced in the EPRI report are not justified due to installation of the STAR system in a metallic electrical enclosure and all external interfacing cables are grounded interlocked, armor. Major contributor to low frequency radiated emissions are welding and power equipment within one meter of the digital system. Administrative policies restrict welding in the cable rooms during power operation, and there is no power equipment within one meter of the AFIS

cabinets. The maximum radiated field strength in the proximity of the applicable electrical cabinets was measured to be less than 0.2 V/m. This data was collected during an Oak Ridge National Laboratory study conducted from November, 1994 to January, 1995. Therefore, the radiated emissions and susceptibility testing performed during STAR qualification adequately demonstrates the EMI immunity of the STAR system for application in the AFIS environment.

The STAR qualification testing for conducted EMI susceptibility utilized a test methodology that is different than the methodologies described in the EPRI report. The conducted noise qualification tests for STAR consisted of voltage surge withstand tests with higher magnitudes than continuous conducted noise tests required by EPRI TR-102323. The pulse component of the STAR surge test offers a valid demonstration of conducted EMI susceptibility for the AFIS application. Testing performed by ORNL in October to November, 1995 collected data for conducted emissions on the most heavily loaded vital 120VAC inverter at Oconee. Therefore, the EMI/RFI fields associated with the AFIS installation environment are well within the design limits of the STAR system.

Switching power supplies are the main source of continuous conducted EMI on the Oconee vital inverters. All power supplies interfacing with the AFIS circuits are low output noise Lambda LN and LD series which are qualified for conducted and radiated EMI per MIL STD 1-6181D. The Lambda power supplies are qualified for 5 mV peak-to-peak noise on the output loads. The power susceptibility specifications for STAR indicate that 5 mV p-p power noise is within the 15V  $\pm 10\%$  power requirements. The STAR modules were subjected to conducted emissions testing to determine a 5 mV p-p noise output generated by the STAR internal power circuits. The Lambda LN power supplies are designed to regulate constant output voltage in the presence of load noise emissions. Therefore, the continuous conducted EMI noise is attenuated by the Lambda power supplies without requiring additional testing of the AFIS STAR system.

The EPRI TR-102323 states that the primary EMI concerns involve conducted transients (surges) and high frequency radiated electromagnetic fields. The EMI qualification testing performed for STAR adequately demonstrates STAR system immunity from these concerns. The ORNL emissions testing at Oconee provides reasonable assurance that the STAR system is suitable for the AFIS installation environment. Therefore, technical justification is provided for the application of STAR in the AFIS design at Oconee.