June 20, 2005

Mr. Ronald A. Jones
Vice President, Oconee Site
Duke Energy Corporation
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION, UNIT 2 - THIRD 10-YEAR INSERVICE INSPECTION INTERVAL, REQUEST FOR RELIEF NO. 04-ON-014 (TAC NO. MC5253)

Dear Mr. Jones:

By letter dated November 30, 2004, you submitted Request for Relief (RR) No. 04-ON-014, seeking relief from American Society of Mechanical Engineers Boiler (ASME) and Pressure Vessel inservice inspection (ISI) requirements of certain welds at Oconee Nuclear Station, Unit 2.

The Nuclear Regulatory Commission (NRC) staff has concluded that your proposed alternative provides reasonable assurance of the structural integrity of the subject welds and that compliance with the ASME Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes RR No. 04-ON-014 (Appendix III of the 1989 Edition of Section XI of the ASME Code) for the examination of the subject B-J welds for the third 10-year ISI interval that ended September 9, 2004. The NRC staff's evaluation and conclusions are contained in the enclosed Safety Evaluation.

Although we have found your request to be technically acceptable, I want to bring to your attention that you did not submit this request in the proper or timely manner. In addition, the two relief requests submitted by letters dated December 21, 2004, (RR Nos. 04-ON-012 and 04-ON-013) also were not submitted in the proper or timely manner.

Pursuant 10 CFR 50.55a(a)(3), alternatives must be approved by the NRC prior to implementation. In the case of RR No. 04-ON-014, you performed the "alternative" examinations in November 2002 and sought NRC approval two years later. In addition, 10 CFR 50.55a(g)(6)(ii) required that supplements 2 and 3 of Appendix VIII of Section XI, Division 1, 1995 Edition with 1996 Addenda of the Code be implemented by May 22, 2000. You should have known in advance of the November 2002 outage if compliance with the Code requirements would not be possible. Because you did not seek regulatory relief at that time, this untimely relief request constitutes a violation of 10 CFR 50.5a(a)(3). However, the

violation is considered to be of minor significance, it has been entered into your corrective action program and, in accordance with the NRC's Enforcement Policy, it is not subject to enforcement action.

/RA/

Evangelos C. Marinos, Section Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No: 50-270

Enclosure: As stated

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/RA/

Evangelos C. Marinos, Section Chief, Section 1
Project Directorate II
Division of Licensing Project Management
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INSERVICE INSPECTION INTERVAL

REQUEST FOR RELIEF NO. 04-ON-014

DUKE ENERGY CORPORATION

OCONEE NUCLEAR STATION, UNIT 2

DOCKET NUMBER 50-270

1.0 INTRODUCTION

By letter dated November 30, 2004, (Agencywide Documents Access and Management System, Accession No. ML04340444) Duke Energy Corporation, the licensee, submitted Requests for Relief No. 04-ON-014, seeking relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) inservice inspection (ISI) requirements for certain welds at Oconee Nuclear Station, Unit 2. Specifically, the licensee requested using prescriptive-based ultrasonic testing (UT) techniques for examinations performed from the inside pipe surface in lieu of the Code-required, performance-based UT that can be performed on the outside pipe surface. The third 10-year ISI interval began December16, 1994 and ended September 9, 2004.

2.0 REGULATORY EVALUATION

The ISI of the ASME Code Class 1, Class 2, and Class 3 components is to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the Nuclear Regulatory Commission (NRC), if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The Code of Record for Oconee Nuclear Station,

Unit 2 for the third 10-year ISI interval is the 1989 Edition of Section XI of the ASME Code, with no addenda. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

3.0 TECHNICAL EVALUATION OF RR NO. 04-ON-014

3.1 COMPONENTS FOR WHICH RELIEF IS REQUESTED

The components affected by this request for relief are taken from the licensee's letter dated November 30, 2004.

IWB 2500-1 Examination Category	Item Number	Weld No.	Description
B-J	B09.011.011	2-53A-8-63	Core Flood Safe End to Pipe at 0E
B-J	B09.011.013	2-53A-8-64	Core Flood Safe End to Pipe at 180E
B-J	B09.011.019	2-PHA-1	Outlet Nozzle to Pipe Z axis
B-J	B09.011.021	2-PHB-1	Outlet Nozzle to Pipe X axis
B-J	B09.011.032	2-PDA1-8	Inlet Nozzle to Pipe Z-W axis
B-J	B09.011.033	2-PDA2-8	Inlet Nozzle to Pipe Y-Z axis
B-J	B09.011.034	2-PDB1-8	Inlet Nozzle to Pipe W-X axis
B-J	B09.011.035	2-PDB2-8	Inlet Nozzle to Pipe X-Y axis

3.2 CODE REQUIREMENTS

For the ISI of ferritic and austenitic pipe welds, 10 CFR 50.55a(g)(6)(ii)(C) requires that the 1995 Edition with the 1996 Addenda of Supplements 2 and 3 of Appendix VIII of Section XI of the ASME Code be used beginning May 22, 2000. When applying Supplements 2 and 3 to Appendix VIII, the scanning requirement contained in 10 CFR 50.55a(b)(2)(xv)(A) must be used.

3.3 PROPOSED ALTERNATIVE

The licensee proposed alternative is to use the requirements of the 1989 Edition of ASME Code, Section XI, Appendix III for UT examination performed from the inside pipe surface.

3.4 LICENSEE BASIS FOR THE ALTERNATIVE

The concept of personnel performance demonstrations for UT examinations qualifications was introduced to the nuclear industry in the 1989 Edition with 1989 Addenda of Section XI. The

Performance Demonstration Initiative (PDI) was formed in 1991 to implement the requirements of Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems." Qualifications for piping examinations from the outside surface were initiated in 1994. When the PDI proposed an alternative implementation schedule for Appendix VIII supplements, the inside surface examination of Category B-J welds was not considered and did not come up during the public comment period on the proposed rule. Qualification specimens for the one or two B-J welds past the reactor pressure vessel (RPV) nozzle were not available at the time the examinations were performed for Oconee Nuclear Station, Unit 2. Specimens that existed prior to November 2002 were not suitable for an inside examination and qualification. Only outside access was considered when designing the specimens. Therefore, the required geometric and limited scanning surface conditions were not appropriate for examinations from the inside surface and, since this qualification requires a population of large diameter heavy wall specimens, the qualification specimen sets available at the time did not contain the required flaw orientations and distribution. Additionally, implementation issues such as the requirement that the specimen inside surface be concealed from the candidate had to be addressed. The design, fabrication, and acquisition of specimens; the development of the appropriate protocol and procedures; the verification of flaw dimensions in each specimen; and the training of personnel were not in place prior to the Oconee Nuclear Station's performance of the examinations of the subject welds. Therefore, examinations of the subject welds were performed from the inside surface using automated UT equipment in accordance with the requirements of ASME Section XI, Appendix I and Appendix III, 1989 Edition with no addenda.

The outside surfaces of the subject welds could have been made accessible for UT examination at a high cost in personnel exposure. Approximately 40 person-hours would be required to prepare each weld for examination. The preparation would involve removing the refueling channel seal plate, shielding bricks, shielding supports, and insulation. The radiation dose rate in the nozzle areas was estimated as 0.51 Rem per hour (R/hr). An alternative approach was to enter the area at the bottom of the vessel and build scaffolding, approximately 30 feet high, to reach the nozzles. The alternative approach would require approximately 80 person-hours, of which 40 hours are in a 0.51 R/hr radiation field and the another 40 hours are in a 1-2 R/hr field at the bottom of the RPV. The total anticipated exposure was estimated between 80 to 140 Person-Rems. Shielding is considered impractical in this area. The dose information noted in this paragraph was the reason RR ONS-001 (approved in NRC safety evaluation dated November 15, 1995) was submitted to perform UT examinations from the inside surface in lieu the outside surface of the core flood nozzle-to-safe-end welds.

3.5 EVALUATION

In 1991, licensees created the PDI to implement the performance demonstration requirements of Appendix VIII to Section XI of the ASME Code for UT examination systems. The PDI began qualifying personnel and procedures to Appendix VIII, Supplements 2 and 3 in 1994. These qualifications were applicable for UT examinations conducted from the outside surface of the pipe-to-pipe welds. By the time the proposed rule was published for public comment in the *Federal Register* (62 FR 63892) on December 3, 1997, the NRC staff and the PDI believed that a sufficient number of UT personnel were qualified to Supplements 2 and 3 requirements to satisfy the licensees' needs. The NRC staff established the accelerated implementation schedule for Supplements 2 and 3 based on this availability of qualified personnel. The final rule was published in the *Federal Register* (64 FR 51370) on September 22, 1999, which has since been reflected in the regulations.

Shortly after publishing the final rule, the PDI realized that its program could not support Supplements 2 and 3 performance demonstrations conducted from the inside surface. For example, the existing test specimens were designed for performance demonstrations performed on the outside surface. The specimens contained flaws that were visible from the inside surface, and the specimens did not model geometric limitations or scanning conditions that would be encountered during an examinations performed from the inside surface. To support performance demonstrations from the inside pipe surface, the PDI had to design, fabricate, and acquire new test specimens; develop the appropriate protocol and procedures; "fingerprint" the specimens; develop inspection procedures; and train personnel. The PDI has submitted a proposed Code Change to Supplements 2 and 3 that provides criteria for examinations that are performed from the inside pipe surface.

The licensee has determined that examinations performed from the outside surface of the subject welds would subject the plant personnel to high radiation dose that is estimated between 80 to 140 Man-Rems. In lieu of examining from the outside surface, the licensee proposed examinations performed from the inside surface. These examinations would be according to the criteria from the 1989 Edition of the ASME Code, Section XI, Appendix III. The alternative consists of automated UT equipment and remote scanning that is controlled away from the high radiation fields; thus, personnel are exposed to minimal radiation.

Appendix III, Paragraph III-2200(b) requires personnel to demonstrate proficiently in discriminating between flaws and geometric indications. This requirement is not as rigorous as an Appendix VIII performance demonstration; however, the required demonstration establishes the ability to detect flaws. The detection of flaws from the inside surface is considered by the industry to be easier than through-wall from the outside surface because the transducer is closer to the examination volume; thus, the signal-to-noise effects from the pipe material are less. The NRC staff has determined the proposed alternative will provide reasonable assurance of the structural integrity of these welds and the Code requirements for examinations from the outside surface would result in hardship without a compensating increase in the level of safety.

4.0 CONCLUSION

Based on the above evaluation, the NRC staff concludes that the licensee's proposed alternative (RR No. 04-ON-014) provides reasonable assurance of the structural integrity of the subject welds and that compliance with the ASME Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the RR No. 04-ON-014 (Appendix III of the 1989 Edition of Section XI of the ASME Code) for the examination of the subject B-J welds for the third 10-year ISI interval that ended September 9, 2004. All other requirements of the ASME Code requirements for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Reviewer: D. Naujock

Date: June 20, 2005

Oconee Nuclear Station, Units 1, 2, and 3

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