

December 12, 2002

Mr. H. B. Barron
Vice President, McGuire Site
Duke Energy Corporation
12700 Hagers Ferry Road
Huntersville, NC 28078-8985

SUBJECT: MCGUIRE NUCLEAR STATION, UNIT 2 RE: REQUEST FOR RELIEF
NO. 01-009 (TAC NO. MB3908)

Dear Mr. Barron:

By letter dated January 10, 2002, Duke Energy Corporation requested the Nuclear Regulatory Commission (NRC) staff to grant relief from certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code inservice inspection requirements for the McGuire Nuclear Station, Unit 2.

The NRC staff has reviewed the information provided in the licensee's letter dated January 10, 2002. The staff's evaluation and conclusions are contained in the Enclosure. Based on the information provided in the requests for relief from the requirements of the ASME Code, Section XI, 1989 Edition, Table IWB-2500, regarding the volumetric examination coverage requirements for examination categories B-J, C-B, and C-F-1 welds, the staff concludes that the examinations conducted provide reasonable assurance of the structural integrity of the welds. Based on the impracticality of complying with the Code and the burden on the licensee if those requirements were imposed, relief is granted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g)(6)(i), during the second 10-year inservice inspection interval until such time that qualified procedures for examination of single-sided welds are available. Granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The staff considers this matter resolved and is closing out TAC NO. MB3908.

Sincerely,

/RA by GEdison for/

John A. Nakoski, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-370

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SECOND 10-YEAR INSERVICE INSPECTION INTERVAL

REQUEST FOR RELIEF NO. 01-009

DUKE ENERGY CORPORATION

MCGUIRE NUCLEAR STATION, UNIT 2

DOCKET NO. 50-370

1.0 INTRODUCTION

The inservice inspection of American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (Code) and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). In accordance with 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the 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 ASME Code, Section XI, "Rules for Inservice Inspection 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 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 applicable edition of Section XI of the ASME Code for the second 10-year interval for McGuire Nuclear Station (McGuire), Unit 2 is the 1989 Edition of the Code.

By the letter dated January 10, 2002, Duke Energy Corporation, the licensee for McGuire, Unit 2, submitted a request for relief (No. 01-009) from the requirements of the ASME Code, Section XI, 1989 Edition, Table IWB-2500, regarding the volumetric examination coverage requirements for examination categories B-J, C-B, and C-F-1 welds.

2.0 INSERVICE INSPECTION PROGRAM RELIEF REQUEST 01-009, VOLUMETRIC EXAMINATION LIMITATIONS FOR CODE CATEGORY B-J, C-B, AND C-F-1 WELDS

2.1 Code Requirements for which Relief is Requested

ASME Section XI, Table IWB-2500, lists the following figures by Code Category to assure 100-percent of the volume is scanned: Figure IWB-2500-8(c) indicates the examination volume for Category B-J welds. Figure IWC-2500-4(a) indicates the examination volume for Category C-B welds. Figure IWC-2500-7(a) indicates the examination volume for Category C-F-1 welds. The licensee is seeking relief from the 100-percent coverage requirement for the volumes specified by the figures.

2.2 Licensee's Proposed Alternative to Code

None. The licensee stated they would continue to use the most effective ultrasonic techniques available to obtain maximum coverage for future examinations of these welds.

2.3 Licensee's Basis for Relief

The licensee has determined that conformance to the volumetric coverage requirements for the welds listed below is impractical. The welds were fabricated in a manner that prevented two-sided examination of the subject welds. In order to achieve more coverage, the licensee stated the welds would have to be redesigned to allow scanning from both sides. The welds where limited examination volume was achieved and the reasons for the limitations are listed below:

Weld	Category	Item	Limitation	Coverage
2NC2FW53-25	B-J	B9.11	one-sided examination due to flange	60.3%
2NC2FW53-37	B-J	B9.11	one-sided examination due to flange	60.3%
2NI2F471	B-J	B9.11	one-sided examination due to valve	59.7%
2NI1F494	B-J	B9.11	one-sided examination due to valve	59.6%
2SGC-W259	C-B	C2.21	one-sided examination due to nozzle	74.4%
2NI2F493	C-F-1	C5.11	one-sided examination due to valve	59.8%
2RCPA-TE	C-F-1	C5.21	one-sided examination due to tee	58.1%

Code Category B-J Welds

The licensee stated that the subject welds were examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). The Category B-J welds were examined with PDI procedures, personnel and equipment using ultrasonic shear and refracted longitudinal wave techniques. The design limitations forced the licensee to perform a single-sided examination but the licensee could not claim 100-percent coverage of

these austenitic stainless steel welds. Single-sided techniques are not qualified under PDI for austenitic materials due to its highly attenuative properties.

The licensee indicated that the B-J welds had preservice dye penetrant (PT) and radiography (RT) performed on the welds prior to placing them in service and that if failure were to occur, the reactor coolant leakage system, containment radiation monitors, containment sump level monitors, containment humidity instruments and the ventilation unit's condensate drain tank level monitors would provide early indication of weld leakage. Furthermore, the Category B-J welds are not in areas of high neutron flux, so failure due to Irradiation Assisted Stress Corrosion Cracking (IASCC) is not likely to occur.

Code Category C-B Weld

The Category C-B weld is a ferritic weld examined with PDI procedures, personnel and equipment. The licensee stated that the Supplement 3 qualification was conducted with access to both sides of the weld, but since field examination of weld 2SGC-W259 was limited to one side of this weld, full volume credit was not claimed. If failure of this weld were to occur, containment humidity monitors, steam generator enclosure temperature monitors, and ventilation unit condensate drain tank parameters are continuously monitored and would provide early indications of leakage. The licensee stated that the consequences of a leak would result in a portion of the flow bypassing the steam generator, making it difficult to maintain water level. Very small leaks would have no discernible effect and leaks that approach 5 gallons per minute would need to be evaluated by the licensee's Operations staff for system operability effects. The McGuire plant has specific safety analyses for accidents where minor and major main feedwater system pipe breaks are postulated. The licensee stated these safety analyses demonstrate compliance with the requirements of 10 CFR Part 100.

Code Category C-F-1 Welds

The Category C-F-1 welds were examined with PDI procedures, personnel and equipment using ultrasonic shear and refracted longitudinal wave techniques. The design limitations forced the licensee to perform a single-sided examination but they could not claim 100-percent coverage of these austenitic stainless steel welds. Single-sided techniques are not qualified under PDI for austenitic materials due to its highly attenuative properties. The licensee stated that the welds were examined using PT and RT prior to placing them in service and they are not subject to the high fluence levels that cause IASCC. Leakage from these welds would likely be indicated by the containment floor and equipment sump level monitors that are alarmed in the control room.

All Code Category Welds

For all three Code Categories, the licensee stated that in order to obtain 100-percent volumetric coverage, redesign of the weldments would be required, which is impractical. They also stated that the extent of coverage obtained for the welds provides an acceptable level of quality and integrity.

2.4 Staff Evaluation

The 1989 Edition of ASME Code Section XI, Figures IWB-2500-8(c), IWC-2500-4(a) and IWC-2500-7(a) define the volume of Code Category B-J, C-B and C-F-1 welds that require ultrasonic scanning to obtain 100-percent coverage. A review of the submitted nondestructive testing data reports indicate all the examinations were limited to either one side or one side with partial coverage on the other side, thereby limiting 100-percent scanning of the required volume. In the case of the austenitic welds, single-sided examinations are not qualified under PDI due to the weld metal attenuative properties, thereby preventing 100-percent coverage. In the case of the ferritic weld, though the weld metal is not highly attenuative and 100-percent coverage of the volume may be obtained from one side, the licensee did not qualify a single-sided ferritic examination under PDI.

Redesigning the welds to obtain coverage from both sides would involve significant expenditure in welding, replacement, preservice examination and dose accumulation. On this basis, the staff considers it impractical to redesign the subject welds in order to complete a two-sided examination because there would not be a significant increase in the level of quality and safety commensurate with the cost and dose.

The performance of preservice inspection nondestructive testing and the leakage monitoring of the structural integrity of the welds by leakage monitoring systems provides reasonable assurance of the welds' structural integrity. The performance of limited volumetric examinations on each weld also provides reasonable assurance that any active degradation mechanism would be identified if it existed. Therefore, the staff concludes the volumetric coverage obtained provides reasonable assurance of structural integrity.

3.0 STAFF CONCLUSION

The McGuire, Unit 2, Request for Relief 01-009, seeking relief from certain ASME Code inspection requirements associated with the volumetric examination coverage requirements for examination categories B-J, C-B, and C-F-1 welds has been reviewed by the staff. The staff concludes that requiring the licensee to redesign weldments to obtain 100-percent coverage would result in a significant burden. The licensee's commitment to obtain the maximum volumetric coverage using the most effective ultrasonic techniques available under Relief Request 01-009, at McGuire, Unit 2, provides an acceptable alternative. For each component identified, the staff has determined that compliance with the requirements of the Code is impractical, and grants relief from the specified ASME Code requirement, pursuant to 10 CFR 50.55a(g)(6)(i), during the second 10-year inservice inspection interval until such time that qualified procedures for examination of single-sided welds are available. Granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

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Date: December 12, 2002

McGuire Nuclear Station

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