

August 9, 2007

Mr. G. R. Peterson
Vice President
McGuire Nuclear Station
Duke Power Company LLC
12700 Hagers Ferry Road
Huntersville, NC 28078

SUBJECT: MCGUIRE NUCLEAR STATION, UNIT 1, REQUEST FOR RELIEF 06-MN-002,
FOR THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN
(TAC NO. MD3330)

Dear Mr. Peterson:

By letter dated August 31, 2006, Duke Power Company LLC (the licensee), submitted Relief Request No. 06-MN-002, for its Third 10-Year Interval Inservice Inspection (ISI) Program Plan for McGuire Nuclear Station, Unit 1. The licensee requested approval of proposed alternatives to the American Society of Mechanical Engineers (ASME), *Boiler and Pressure Vessel Code* (Code), 1998 with the 2000 addenda, for weld INV1FW53-51. The licensee submitted the relief request as a result of limited weld coverage following ISI examinations during refueling outage 17.

The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal and, based on the information provided, concludes that compliance with the specified ASME Code requirements for weld INV1FW53-51 is impractical and that the volumetric examinations performed during refueling outage 17 provide reasonable assurance of structural integrity of the subject welds. Therefore, relief is granted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(g)(6)(i) for the third 10-year ISI interval at McGuire Nuclear Station, Unit 1. The staff has determined that 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.

G. Peterson

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The enclosed Safety Evaluation contains the NRC staff's evaluation and conclusions.

Sincerely,

/RA/

Evangelos C. Marinos, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-369

Enclosure:
Safety Evaluation

cc w/encl: See next page

G. Peterson

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ADAMS Accession No. ML071970170

*memo dated February 7, 2007

NRR-028

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
OF THIRD 10-YEAR INTERVAL INSERVICE INSPECTION
REQUEST FOR RELIEF NO. 06-MN-002
DUKE POWER COMPANY, LLC
MCGUIRE NUCLEAR STATION, UNIT 1
DOCKET NO. 50-369

1.0 INTRODUCTION

By letter dated August 31, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML0625600123), Duke Power Company LLC, the licensee, submitted Request for Relief 06-MN-002 from requirements of the American Society of Mechanical Engineers (ASME), *Boiler and Pressure Vessel Code* (Code), Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components*, for McGuire Nuclear Station, Unit 1 (McGuire 1). The licensee submitted the relief request as a result of limited weld coverage following inservice inspection (ISI) examinations during refueling outage 17. The Nuclear Regulatory Commission (NRC) has reviewed and evaluated the information provided by the licensee.

2.0 REGULATORY REQUIREMENTS

Inservice inspection (ISI) of the ASME Code Class 1, 2, and 3 components is performed in accordance with Section XI of the Code and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(g), except where specific relief has been granted by the NRC pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(g)(6)(i) states that relief from the requirements of paragraph (g) may be granted by the NRC, if 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.

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

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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) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ASME Code of record for the McGuire 1 third 10-year interval inservice inspection program, which began on December 1, 2001, and will end on December 1, 2011, is the 1998 edition with the 2000 addenda of Section XI of the ASME Code.

3.0 EVALUATION

3.1 Component for which Relief is Requested

Weld ID Number 1NV1FW53-51, Chemical Volume and Control (NV) system pipe to tee. The subject weld is located in the Reactor Containment Building on a 3" tee downstream of throttle valve NV-454 outside the cranewall.

3.2 ASME Code Requirements from which Relief is Requested

Category R-A, WCAP-14572 Table 4.1-1, Item number R01.011. Figure number IWB-2500-8(c) of the ASME Code, Section XI requires examination of essentially 100 percent of the specified weld examination volume.

3.3 Proposed Alternative

None. The scheduled 10-year code examination was performed on the referenced area/weld and it resulted in the noted limited coverage of the require ultrasonic examination volume. No additional examinations are planned for the area/weld during the current inspection interval which ends on December 1, 2011.

3.4 Alternative

During the ultrasonic examination of weld R01.011, 100-percent coverage of the required examination volume could not be obtained. Coverage was limited because of the tee configuration which prevented scanning from four directions. The amount of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. The weld volume was scanned using 45-degree, 60-degree shear waves, and 70-degree shear wave.

The 45-degree beam covered 47.2 percent of the volume in two circumferential directions. The 60-degree beam covered 69.44 percent of the volume in an axial direction from the pipe side of the weld. The 70-degree shear wave covered 21.12 percent of the volume from one axial direction from the reducer side of the weld but was not included in the percent of coverage because of the requirements in 10 CFR 50.55a(b)(xv)(A)(2).

In order to achieve more coverage, the weld would have to be redesigned to allow scanning from both sides of the weld. The examination was performed using personnel, procedures and equipment qualified in accordance with ASME Code, Section XI, Appendix VIII, Supplement 2.

3.5 Justification for Relief

The subject weld is located in the Reactor Containment Building on a 3" tee downstream of INV-454 (manual 75gpm letdown throttle valve). The weld is located outside the cranewall, thus it is not subject to neutron fluence and the resultant material embrittlement concerns. Any leakage from this weld would be confined within the containment building, and it is readily isolable via two, series, fail closed, Class A isolation valves (INVIA and 2A). Additional isolation capability is afforded just upstream of the weld via Class B containment isolation valves (INV-457A, 458A and 35A). A leak at this weld location would constitute reactor coolant system (RCS) unidentified leakage. Early detection of a leak at this weld location would be assured by one or more means.

1. The Technical Specification for the RCS operational leakage (3.4.13), limits RCS unidentified leakage to less than 1 gallon per minute during operational modes 1 thru 4. The associated Technical Specification (TS) Surveillance (3.4.13.1) further requires performance of the RCS leakage calculation every 72 hours.
2. The TS for RCS leakage detection instrumentation (3.4.15) requires that diverse leakage detection instrumentation be operable during Modes 1 thru 4. Leakage from the subject weld would be readily detectable by either the containment floor and equipment sump level instrumentation, and/or the containment ventilation condensate drain tank level instrumentation.
3. Declining level trends and/or increased make-up frequency for the volume control tank.
4. A decrease in indicated letdown flow rates, and/or an increased mismatch between charging and letdown flow rates.

One additional non-destructive ultrasonic examination was performed on a 3-inch diameter, 0.438-inch wall thickness weld in the NV System. The result of this examination was acceptable with 100-percent coverage.

3.6 Nuclear Regulatory Commission (NRC) Staff's Evaluation

The NRC staff has reviewed relief request 06-MN-002 submitted by letter dated August 31, 2006, pursuant to 10 CFR 50.55a(g)(6)(i) pertaining to limited weld examination coverage at McGuire 1. The licensee sought relief from the examination requirements of ASME Code, Section XI because the required 100-percent examination coverage could not be achieved for weld R01.011. NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Accessibility, ASME Code, Section XI, Division 1," endorses ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds." Code Case N-460 defines that a weld may be accepted provided the reduction in coverage for that weld is less than 10 percent.

The licensee stated that during the ultrasonic examination of weld item R01.011, 100 percent of the required examination volume could not be obtained. The coverage was limited due to a tee configuration on a 3-inch tee downstream of the 1NV-454 throttle valve. The subject weld is located in the reactor containment building. As a result 47.2 percent of the volume was covered using a 45-degree beam in two circumferential directions, and 69.44 percent coverage was obtained using a 60-degree beam from one axial direction from the pipe side of the weld. The

ultrasonic examination was performed using personnel, procedures and equipment qualified in accordance with ASME Code, Section XI, Appendix VIII, Supplement 2.

The licensee also stated that the weld was outside the cranewall, which shielded the weld from being subjected to neutron fluence and material embrittlement concerns. Furthermore, in order to achieve full coverage the weld would need to be re-designed to allow scanning from both sides of the weld. This would result in undue hardship on the licensee. One additional ultrasonic examination was performed on a 3-inch diameter, 0.438-inch wall thickness weld in the NV system. The results of this examination were acceptable with 100-percent coverage.

The NRC staff finds that the examinations performed by the licensee provide reasonable assurance of the continued inservice structural integrity of the subject component. The decision is based on the fact that the subject weld has been examined to the extend practical, while achieving coverage of 47.2 percent of the required volume in two circumferential directions, and 69.44 percent of the required volume in one axial direction from the pipe side of the weld. Therefore, any existing pattern of significant degradation should have been detected by the examinations performed, and thus reasonable assurance of structural integrity has been provided.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and, based on the information provided, the NRC staff concludes that for weld compliance with the specified ASME Code requirements is impractical and that the volumetric examinations performed provide reasonable assurance of structural integrity of these welds. Therefore, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year ISI interval at McGuire 1 for the subject weld. The NRC staff has determined that 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.

All other requirements of ASME Code, Section XI for which relief has not been specifically requested remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

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Date:

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