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September 9, 2008

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Duke Energy Carolinas, LLC (Duke)
McGuire Nuclear Station Unit 1
Docket Number 50-369
Relief Request 08-MN-003

Pursuant to 10 CFR 50.55a(a)(3)(i), Duke hereby submits Relief Request 08-MN-003 for the use of an alternative to the examination requirements of ASME Code, Section XI. This request supports the examination of reactor vessel hot leg nozzle to safe-end and safe-end to pipe welds performed from the inside surface during the upcoming McGuire Unit 1 fall 2008 refueling outage. The proposed alternative provides for an acceptable level of quality and safety, consistent with 10 CFR 50.55a(a)(3)(i).

Attachment 1 contains this relief request. Duke requests approval of this relief request by October 9, 2008 to support the inspection of these welds.

If you have any questions or require additional information, please contact P. T. Vu at (704) 875-4302.

Sincerely,

Bruce H. Hamilton

Attachment 1

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xc:

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Attachment 1

McGuire Unit 1 Relief Request for Alternate Depth Sizing Criteria



ENGINEERING INFORMATION RECORD

Document Identifier 51 - 9090152 - 000

Title McGuire, Unit 1 Relief Request for Alternate Depth Sizing Criteria

PREPARED BY:

REVIEWED BY:

Name M. G. Hacker

Name M. W. Key

Signature *M. G. Hacker* Date 8/29/08

Signature *M. W. Key* Date 8/29/08

Technical Manager Statement: Initials

BAI

Reviewer is Independent.

Remarks:

This document contains a relief request drafted to address the use of an alternate depth sizing criteria for sizing cracks. This document was prepared for Duke Energy and is applicable to the ultrasonic examination of the McGuire, Unit 1 hot leg RPV nozzle to safe-end and safe-end to pipe welds during the September 2008 outage.

ALTERNATIVE DEPTH SIZING CRITERIA

**Duke Energy
McGuire Unit 1**

ALTERNATIVE DEPTH SIZING CRITERIA

*Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)*

-Alternative Provides Acceptable Level of Quality and Safety -

Background

Duke Energy is submitting a request for the use of an alternative to the examination requirements of ASME Code, Section XI, at McGuire Nuclear Station (MNS) Unit 1. This request supports the examination of reactor vessel outlet nozzle to safe-end (dissimilar metal) and safe-end to pipe (similar metal) welds performed from the inside surface during the next scheduled outage. Duke Energy has determined the proposed alternative provides for an acceptable level of quality and safety, consistent with 10 CFR 50.55a(a)(3)(i).

1.0 Applicable Code Edition and Addenda

MNS 1 is currently in the third 10-year ISI interval that began on 12/01/2001 and is scheduled to end on 11/30/2011. The ASME Boiler and Pressure Vessel Code (ASME Code) of record for the current period of the third 10-year ISI interval is the 1998 Edition of Section XI of the ASME Code, 2000 addendum. Section XI Code Case N-695 (Qualification Requirements for Dissimilar Metal Piping Welds) and Code Case N-696 (Qualification Requirements for Appendix VIII Piping Examinations Conducted From the Inside Surface) are referenced in the ISI program. These Code Cases are listed in Reg. Guide 1.147, Rev. 15, Table 1-“Acceptable Section XI Code Cases”.

2.0 Applicable Code Requirement

ASME Section XI, Table IWB-2500-1, Category B-F, Item B5.10, Reactor Vessel Nozzle to Safe-end Butt Welds, specifies volumetric examination for the dissimilar metal welds. The safe-end to pipe welds are part of the Risk-Informed program and will also be volumetrically examined due to the close proximity to the dissimilar metal weld. The volumetric examinations are to be conducted in accordance with ASME Section XI, Appendix VIII, Supplements 2 and 10, 1998 Edition with 2000 Addenda. Code Cases N-695 and N-696 are acceptable alternatives to Appendix VIII, Supplements 2 and 10.

The specific Code Case requirements for which relief is requested pertains to the depth sizing qualification requirements for performance demonstration of ultrasonic examination systems for dissimilar and similar metal piping welds as listed below. These same requirements exist in ASME Section XI, 1995 Edition with 1996 Addenda and later editions.

- **3 PERFORMANCE DEMONSTRATION,**

- Code Case N-695
 - 3.3 Depth-Sizing test:
“(c) Examination procedures, equipment, and personnel are qualified for depth-sizing when the RMS error of the flaw depth measurements, as compared to the true flaw depths, do not exceed 0.125 in. (3 mm).”
- Code Case N-696
 - 3.3 Depth-Sizing test:
“(d) Supplement 2 or Supplement 3 examination procedures, equipment, and personnel are qualified for depth-sizing when the flaw depths estimated by ultrasonics, as compared to the true depths, do not exceed 0.125 in. (3 mm) RMS when they are combined with a successful Supplement 10 qualification.

3.0 Alternative

Duke Energy proposes to use the Supplement 10 demonstrated value of 0.224 in. for dissimilar metal welds or the Supplement 2 demonstrated value of 0.222 in. for similar metal welds, as applicable, instead of the 0.125 in. value specified for depth sizing. In the event an indication is detected that requires depth sizing, the difference between the required RMSE and the demonstrated RMSE (0.099 in. or the 0.097 in., as applicable) will be added to the measured through-wall extent for comparison with applicable acceptance criteria. If the examination vendor demonstrates an improved depth sizing RMSE prior to the examination, the excess of that improved RMSE over the 0.125 in. RMSE requirement, if any, will be added to the measured value for comparison with applicable acceptance criteria.

Consequently, Duke Energy proposes to use an alternative through-wall depth sizing criteria for similar and dissimilar metal welds that are examined from the inside surface. Examinations of these components will be performed during the next scheduled refueling outage at MNS 1 scheduled for September, 2008.

4.0 Basis for Relief

To date, although qualified for detection and length sizing on these welds, the examination vendors have not met the established root mean square error (RMSE) requirement for depth sizing (0.125 in.) when examining from the ID. Duke Energy's examination vendor has demonstrated ability to meet the depth sizing qualification requirement with an RMSE of 0.224 in. (dissimilar metal weld) and 0.222 in. (similar metal weld) instead of the required 0.125 in.. EPRI has published under their Policy/Procedure Directives the criteria of error in the RMS which has utility approval.

Duke Energy has determined that the alternative in this request will result in an acceptable level of quality and safety, pursuant to the provisions of 10 CFR 50.55a(a)(3)(i). The proposed alternative assures that the subject welds will be

fully examined by procedures, personnel and equipment qualified by demonstration in all aspects except depth sizing. For depth sizing, the proposed addition of the difference between the qualified and demonstrated sizing tolerance to any flaw that is required to be sized compensates for the potential variation and likewise assures an acceptable level of quality and safety.

5.0 ASME Code Components Affected

Category and System Details:

Code Class: Class 1

System Welds: Reactor Coolant System

Examination Categories:

Category B-F for dissimilar metal welds to reactor vessel nozzle

Category R-A* for stainless steel safe end to pipe welds

Code Item Numbers:

B 5.10 for dissimilar metal welds to reactor vessel nozzle

R 1.11* for stainless steel safe end to pipe welds

*Welds are included in the Risk Informed Inservice Inspection Program

McGuire Unit 1	Description	Size	DM Weld Number	SS Weld Number	Comment
NC Pipe	Hot leg safe-end to RV Nozzle-A Loop	Nominal 29"ID with 2 5/8" wall	1RPV3-445E-SE	1NC1F1-1	LAS nozzle/Alloy 82-182 weld/SS safe end/SS weld
NC Pipe	Hot leg safe-end to RV Nozzle-B Loop	Nominal 29"ID with 2 5/8" wall	1RPV3-445F-SE	1NC1F2-1	LAS nozzle/Alloy 82-182 weld/SS safe end/SS weld
NC Pipe	Hot leg safe-end to RV Nozzle-C Loop	Nominal 29"ID with 2 5/8" wall	1RPV3-445G-SE	1NC1F3-1	LAS nozzle/Alloy 82-182 weld/SS safe end/SS weld
NC Pipe	Hot leg safe-end to RV Nozzle-D Loop	Nominal 29"ID with 2 5/8" wall	1RPV3-445H-SE	1NC1F4-1	LAS nozzle/Alloy 82-182 weld/SS safe end/SS weld

Component Materials:

1. LAS nozzles are SA-508 Class 2 Low Alloy Steel (P-3).
2. SS safe ends are SA-182 Type 316 austenitic stainless steel (P-8).
3. Welds are Alloy 82/182 (F-43).

6.0 Duration of Proposed Alternative

The proposed alternative to the ASME Code is applicable for the remainder of the third 10-year inservice inspection (ISI) interval at MNS 1.

7.0 Precedents

A similar alternative request has been approved for use at the V.C. Summer Station in an NRC letter, dated February 3, 2004 (ADAMS Accession No. ML040340450) and for use at Diablo Canyon, Units 1 and 2 in an NRC letter dated October 26, 2005 (ADAMS Accession No. ML052660331)

8.0 References

- (1) 1998 Edition, ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 2000 Addenda.
- (2) 1995 Edition, ASME Code, Section XI, with the 1996 Addenda, Appendix VIII, Supplements 2 and 10.
- (3) Code Case N-695, Qualification Requirements for Dissimilar Metal Piping Welds, Section XI, Division 1.
- (4) Code Case N-696, Qualification Requirements for Appendix VIII Piping Examinations Conducted From the Inside Surface, Section XI, Division 1.
- (5) EPRI Policy/Procedure Directives