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October 7, 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-005

Pursuant to 10 CFR 50.55a(a)(3)(i), Duke hereby submits Relief Request 08-MN-005 for the use of an alternative to the weld repair requirements of ASME Section XI, IWA-4400. This request supports the application of a weld overlay to reactor control rod drive mechanism (CRDM) intermediate canopy seal welds during the current Unit 1 fall 2008 and subsequent refueling outages of the third inservice inspection interval. The proposed alternative provides for an acceptable level of quality and safety, consistent with 10 CFR 50.55a(a)(3)(i).

The CRDM intermediate canopy seal welds are located above the reactor vessel head and below the horizontal missile shields in an area that is not accessible during power operations. Also, each CRDM intermediate canopy seal weld is covered by the Digital Rod Position Indication (DRPI) coil stack and cannot be directly observed unless the coil stack is removed. Observation of a white residue on the CRDM latch housing located just below the DRPI coil stack on CRDM No. F-8 during pressure boundary inspections early in the current refueling outage prompted further investigations that led to raising the coil stack so the weld could be inspected. The inspection found boron deposited on and around the intermediate canopy seal weld indicating that the canopy seal weld had leaked. Subsequent liquid penetrant examination identified a defect in the weld that necessitates repair. Approval of this request is needed to support immediate repairs that are to be completed during this refueling outage.

Enclosure 1 contains this relief request. Duke requests approval of this relief request prior to October 23, 2008. Approval is needed prior to McGuire Unit 1 entering Mode 4 following completion of the current fall 2008 refueling outage.

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

Sincerely,

A handwritten signature in cursive script that reads "Bruce H. Hamilton" followed by a horizontal line underneath the name.

Bruce H. Hamilton

Enclosure

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xc:

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Enclosure 1

**Duke Energy Corporation
McGuire Nuclear Station
Unit 1
Relief Request Serial #08-MN-005**

**Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(i)
*--Alternative Provides Acceptable Level of Quality and Safety--***

1. ASME Code Component(s) Affected

Reactor control rod drive mechanism intermediate canopy seal welds - Class 1 appurtenance to the reactor vessel.

2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, Division 1, 1998 Edition through the 2000 Addenda.

3. Applicable Code Requirements

IWA-4410 requires that welding, brazing, defect removal, and installation activities be performed in accordance with IWA-4420.

IWA-4422 specifies requirements for defect removal and examination.

Relief is requested from the requirement of IWA-4400 that the defect be removed from the CRDM canopy seal weld prior to performing a repair/replacement activity by welding.

4. Reason for Request

During refueling outage 1EOC19, boric acid deposits were observed on the F-8 CRDM housing in the vicinity of the intermediate canopy seal weld on Unit 1. This condition was attributed to a leak of the intermediate canopy seal weld. The CRDM canopy seal welds are located above the Reactor Vessel Closure Head, which is highly congested and subject to high radiation levels. The Code-required repair method would involve excavation of the defect and restoration to the original configuration.

The alternative repair/replacement method proposed in this request will facilitate immediate repair efforts during the current Unit 1 refueling outage (1EOC19), and will facilitate possible future repairs that may be needed if evidence of leakage is detected on other canopy seal welds when examined during subsequent Unit 1 refueling outages.

Due to the nature of the flaw, the excavation required to remove the defect would create a cavity that opens to the threaded region of the CRDM. Due to this weld geometry, the resulting cavity would prevent the establishment and maintenance of an adequate back-purge during the welding process and would further reduce the quality of the repaired weld.

Industry experience with failure analyses performed on leaking canopy seal welds removed from service at other plants has attributed the majority of the cases to transgranular stress corrosion cracking (SCC). The SCC results from exposure of a susceptible material to residual stress, which is often concentrated by weld discontinuities, and to a corrosive environment. A corrosive environment can form with water being trapped in the cavity behind the seal weld that is mixed with air initially in the cavity, resulting in a higher oxygen content than in the bulk primary coolant.

5. Proposed Alternative and Basis for Use

As an alternative to the requirement of IWA-4400 to remove the defect prior to performing weld repair, Duke Energy proposes to increase the weld thickness of the canopy seal weld by overlaying the existing weld with Alloy 52M weld filler material.

This alternative weld overlay repair/replacement activity is similar to that utilized successfully by many other plants. The weld overlay buildup is designed based on meeting the requirements of ASME Section XI, IWB-3640 and the NRC requirements outlined in NUREG-0313, Rev. 2 for the repair of SCC flaws and uses Alloy 52M material for the buildup. In order to provide SCC resistance, the repair weld material was selected as Alloy 52M, which will be applied using the GTAW weld process. The overlay design also satisfies the ASME Code Section XI requirement (for structural reinforcement) that no flaw be deeper than 75% of the pipe wall.

The suitability of the replacement material has been evaluated, is compatible with the existing component, and will provide an acceptable leakage barrier for the remainder of the intended life of the CRDM. For this reason, the proposed alternative provides an acceptable level of quality and safety, and Duke requests authorization to use this alternative, pursuant to 10CFR50.55a(a)(3)(i).

6. Duration of Proposed Alternative

Approval of the proposed alternative is requested for repair/replacement activities associated with the Unit 1 CRDM intermediate canopy seal weld on reactor pressure vessel closure head penetration no. F-8 during the current refueling outage 1EOC19, and for similar repair/replacement activities that could be necessary as a result of evidence of leakage that may be detected on other CRDM canopy seal welds on Unit 1 during the remainder of the 3rd inservice inspection interval, currently scheduled to end on December 1, 2011.

7. Precedents

- 7.1 Letter from Thomas G. Hiltz (NRC) to M. R. Blevins (Luminant Generation Company LLC) dated March 10, 2008; Subject: Request for Relief (TAC No. MD7528)
- 7.2 Letter from Darrell J. Roberts (NRC) to Mark E. Warner (Seabrook Station) dated March 21, 2005; Subject: Request for Relief (TAC No. MC5091)
- 7.3 Letter from Anthony Mendiola (NRC) to John L. Skolds (Exelon Nuclear) dated September 16, 2003; Subject: Request for Relief (TAC Nos. MB8494, MB8495, MB8492, and MB8493)
- 7.4 Letter from Robert A. Gramm (NRC) to William T. Cottle (STP Nuclear Operating Company) dated November 5, 2002; Subject: Request for Relief (TAC No. MB6576 and MB6577)
- 7.5 Letter from Richard P. Correia (NRC) to J. A. Scalice (Tennessee Valley Authority) dated September 12, 2000; Subject: Request for Relief (TAC No. MA9095)