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October 9, 2008

U. S. Nuclear Regulatory Commission
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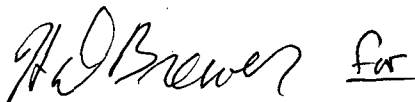
SUBJECT: Duke Energy Carolinas, LLC (Duke)
McGuire Nuclear Station Unit 1
Docket Number 50-369
Relief Request 08-MN-002
Response to Request for Additional Information

By letter dated September 18, 2008, Duke submitted contingency Relief Request 08-MN-002 to support application of a structural weld overlay to the reactor vessel hot leg nozzle-to-safe end weld(s) at McGuire Unit 1. On October 1, 2008, the NRC requested additional information.

Attachment 1 contains Duke's response to the NRC's questions. Attachment 2 contains Duke's revised commitments. Duke requests approval of this relief request prior to October 31, 2008 to support McGuire Unit 1 entering Mode 4 following completion of the fall 2008 refueling outage.

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

Sincerely,

 for

Bruce H. Hamilton

Enclosures

ADD
NRR

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MNS Master File MC-801.01 (MG02DM)
ELL

Attachment 1

Response to Request for Additional Information

REQUEST FOR ADDITIONAL INFORMATION
RELIEF REQUEST 08-MN-002
FULL STRUCTURAL WELD OVERLAY
MCGUIRE NUCLEAR STATION UNIT 1
DUKE ENERGY

By letter dated September 18, 2008, Duke Energy submitted for the NRC approval contingency Relief Request 08-MN-002 to apply a full structural weld overlay to the reactor vessel hot leg nozzle-to-safe end weld(s) at McGuire Unit 1. To continue its review, the staff requests the additional information as follows.

1. In Enclosure 1, page 8, the licensee stated that the NRC has accepted various versions of Code Case N-504 in Regulatory Guide (RG) 1.147 with no conditions and that Code Case N-638 was acceptable [by the NRC] for use in RG 1.147, Revision 13, with no conditions. Although the staff did not impose conditions on N-504-2 and N-638 in RG 1.147, Revision 13, the staff has imposed conditions on N-638-1 in RG 1.147, Revisions 14 and 15. The staff has imposed conditions on N-504-2 in RG 1.147, Revisions 14, and N-504-3 in Revision 15. Please clarify the statements made on page 8.

Response: The statements concerning Code Cases N-504 and N-638 on page 8 illustrate the evolution of conditions placed on the code cases by the NRC. Duke acknowledges the imposed conditions in Code Cases N-638-1 and N-504-3 and is meeting these applicable conditions in this relief request.

2. In Enclosure 1, Attachment 1, page 5, Section A1.3, the licensee stated that "...If 100% coverage of the required volume for axial flaws cannot be achieved, but essentially 100% coverage for circumferential flaws (100% of the susceptible volume) can be achieved, the examination for axial flaws shall be performed to achieve the maximum coverage practicable, with limitations noted in the examination report...." Clarify whether the above statement applies to the acceptance examinations in Section A1.3(a). The staff believes that the concept of the essentially 100% examination coverage does not apply to acceptance examinations of the weld overlay in Section A1.3(a) because it is not recognized by the construction code. However, the essentially 100% examination coverage is applicable to the pre-service and inservice inspections in Section A1.3(b) and A1.3(c), respectively.

Response: For this contingency relief request, an Inservice Inspection of the dissimilar metal weld will be performed. If the examination results indicate a FSWOL repair is necessary, Section XI is the governing Code for the repair. This relief proposes using the guidance from Code Case N-740-2 which incorporates the latest technology and compilation of necessary requirements from NRC conditionally approved Code Cases N-504-3 and N-638-1. The acceptance examination is defined in Section A1.3(a). This FSWOL volume is the minimum volume required to meet the structural design requirements contained within this relief request and is shown as Figure A1-1. The FSWOL is designed to accommodate exam geometry as well as minimum structural

requirements. Examination to assure adequate weld fusion to the base metal is possible for the FSWOL volume. Examination to detect welding flaws is possible from line A-D to line B-C on Figure A1.1, less a small right triangle opening from line B-C into the shaded area of interest with a hypotenuse created from B by the lowest qualified angle of the probe array. This small triangular area is inspectable from only one axial direction because the probe array loses contact beyond point B. The tapered end of the overlay is excluded from the FSWOL volume. The acceptance criteria for this volume shown in Figure A1-1 is described in subparagraphs (2), (3), and (4) to A1.3(a). These are the same requirements as contained in the NRC conditionally approved CC N-504-3 with one additional restriction in subparagraph (4)(a). These requirements acknowledge that some coverage may be reduced by less than 10% due to a lamination. This relief request includes this same requirement.

3. Paragraph A1.3(c)(6) states that "...If inservice examinations reveal planar flaw growth, or new planar flaws, meeting the acceptance standards of IWB-3514, IWB-3600, IWC-3600, or IWD-3600, the weld overlay examination volume shall be reexamined during the first or second refueling outage..." The above statement is confusing. Clarify whether the above statement implies that: "...If inservice examinations reveal planar flaw growth or new planar flaws that are evaluated under the acceptance standards of IWB-3514, IWB-3600, IWC-3600, or IWD-3600, the weld overlay examination volume shall be reexamined during the first or second refueling outage..." The staff interpretation is that if the existing flaw grew and if new planar flaws are detected, the weld overlay needs to be reexamined.

Response: Section A1.3(c) describes the Inservice Inspection requirements. These requirements document the volume of the inservice examination and the frequency. The volume is dictated by figure A1-2 and the frequency for re-inspection is documented in A1.3(c)(6). Duke concurs with the NRC staff interpretation, and a reexamination would be required for flaw growth or new flaws that are evaluated under the acceptance standards of IWB-3514 and found acceptable.

4. In Enclosure 2, Regulatory Commitments, the licensee stated that it will submit a summary of the results of the stress analyses demonstrating that the preemptive full structural weld overlay will not hinder the components from performing their design function 60 days after entry into Mode 4 start-up of McGuire Unit 1. The staff does not agree with the timing of the submittal. The staff requests that the summary of the results of the stress analysis be submitted prior to Mode 4 and the final stress report be submitted no later than 60 days after Mode 4. The purpose of the early submittal is to provide the reasonable assurance prior to the plant startup that the weld overlay will support the required design function. In addition, the staff requests that the stress report summary show the length of time before the postulated flaw size will reach the design flaw size (i.e., the 100% through wall flaw in the axial and circumferential direction). The summary shall also include results showing that the subject nozzles satisfy the requirements of ASME Code, Section III, NB-3000.

Response: A FSWOL will only be implemented on an emergent basis if the results of the planned inspections find indications that require repair. In the event an emergent repair is required, Duke will implement the contingency repair outlined in this Relief Request. The design of the FSWOL will be completed prior to installation. Duke will submit a design summary that will include a summary of the sizing calculation(s) prior to Mode 4 to demonstrate that the overlay will support the required design function. The sizing calculation(s) demonstrate that the overlay satisfies ASME Section XI flaw evaluation rules (and therefore ASME Section III primary stress limits, which are the basis for the Section XI flaw evaluation rules) in the presence of:

1. a 100% through-wall circumferential flaw for the entire circumference.
2. a 100% through-wall flaw with length of 1.5 in. (38 mm), or the combined width of the weld plus buttering plus any SCC-susceptible material, whichever is greater, in the axial direction.

These calculations demonstrate the adequacy of the overlay design for startup and a limited period of plant operation, and have been historically used as the basis for plant startup for emergent weld overlay repairs in BWRs and PWRs.

Detailed overlay design documentation involves a series of design calculations, including:

- A Weld Overlay Structural Sizing
- B Design Loads for Weld Overlay
- C Finite Element Model of Nozzle with Weld Overlay
- D Thermal and Mechanical Stress Analyses of Nozzle with Weld Overlay
- E Residual Stress Analysis of Nozzle with Weld Overlay
- F Section III Code Evaluation of Nozzle with Weld Overlay
- G Crack Growth Evaluation of Nozzle with Weld Overlay

Other than item A, which will be addressed in Duke's submittal prior to Mode 4, the function of the remainder of the calculations is to define the design life of the overlay, based on predicted crack growth under the overlay and Section III fatigue usage of the overlay remote from the crack location. For emergent overlay applications, a summary report describing these detailed calculations is typically submitted within 60 days following return of the plant to Mode 4.

Duke will submit no later than 60 days after Mode 4 a summary of the final stress report. This report summary will show the length of time before the postulated flaw size will reach the design flaw size (i.e. the 100% through wall flaw in the axial and circumferential direction). The summary will also include results showing that the hot leg nozzles satisfy the secondary stress and fatigue usage requirements of ASME Code, Section III, NB-3000.

Attachment 2

List of Regulatory Commitments

Regulatory Commitments

Commitment (to be completed only if FSWOL repair is performed)	Due Date
Duke will submit a design summary that will include a summary of the sizing calculation(s) to demonstrate that the overlay will support the required design function.	Prior to entry into Mode 4 start-up of McGuire Unit 1.
The following information will be submitted to the NRC. Also included in the results will be a discussion of any repairs to the overlay material and/or base metal and the reason for the repair. <ul style="list-style-type: none">• a listing of flaw indications detected,• the disposition of all indications using the standards of ASME Section XI, IWB-3514-2 and/or IWB-3514-3 criteria and, if possible,• the type and nature of the indications.	Fourteen days from completion of the final UT on McGuire Unit 1.
Duke will submit a summary of the final stress report. This summary will show the length of time before the postulated flaw size will reach the design flaw size (i.e. the 100% through wall flaw in the axial and circumferential direction). The summary will also include results showing that the hot leg nozzles satisfy the secondary stress and fatigue usage requirements of ASME Code, Section III, NB-3000.	Sixty days after Mode 4 start-up of McGuire Unit 1.