Duke Energy®

BRUCE H HAMILTON
Vice President
McGuire Nuclear Station

Duke Energy Corporation
MG01VP / 12700 Hagers Ferry Road
Huntersville, NC 28078

704-875-5333
704-875-4809 fax
bhhamilton@duke-energy.com

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

Subject: Duke Energy Carolinas, LLC (Duke)
McGuire Nuclear Station, Unit 1; Docket No. 50-369
License Amendment Request Updating Leak-Before-Break Evaluation

In accordance with the provisions of 10 CFR 50.90, Duke is submitting a license amendment request (LAR) to update the leak-before-break (LBB) evaluation for McGuire Nuclear Station, Unit 1. This LAR is being submitted as a contingency related to the MRP-139 required inspection of the reactor vessel hot leg nozzle-to-safe-end welds in the fall 2008 refueling outage.

The McGuire Unit 1 LBB evaluation was originally approved by NRC letter dated May 8, 1986. At the time of original approval, it was not known that these welds may be susceptible to primary water stress corrosion cracking (PWSCC).

If unacceptable indications are found in these welds during this required inspection, this LAR along with a relief request submitted under separate cover letter, will allow mitigation of the weld(s) by applying a full structural weld overlay.

Attachment 1 provides Duke's evaluation which contains a description of the proposed changes, the technical evaluation, the determination that this LAR contains No Significant Hazards Consideration and the basis for the categorical exclusion from performing an Environmental Assessment/Impact Statement.

Attachment 2 contains the vendor report describing details of the LBB evaluation. This report contains information that is proprietary to Westinghouse. In accordance with 10 CFR 2.390, Duke requests that this information be withheld from public disclosure.

An affidavit from Westinghouse attesting to the proprietary nature of the information is provided as Enclosure 1. A non-proprietary version of this report will be submitted by a separate cover letter following NRC approval of this LAR.

The McGuire Updated Final Safety Analysis Report will be updated as necessary as required by 10 CFR 50.71(e).

Attachment 2 to this letter contains proprietary information
Withhold From Public Disclosure Under 10 CFR 2.390
Upon removal of the attachment, this letter is uncontrolled

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Duke requests approval of this LAR to support McGuire Unit 1 entering Mode 4 following completion of the fall 2008 refueling outage. Approval is needed prior to October 31, 2008.

In accordance with Duke administrative procedures and the Quality Assurance Program Topical Report, this LAR has been previously reviewed and approved by the McGuire Plant Operations Review Committee and by the Duke Nuclear Safety Review Board.

Pursuant to 10 CFR 50.91, a copy of this LAR has been forwarded to the appropriate State of North Carolina officials.

There are no regulatory commitments contained in this LAR.

The NRC project manager for McGuire will be kept informed of the status of these inspections during the outage.

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

Sincerely,

Bruce H. Hamilton

Attachments:

1. Licensee Evaluation
2. Leak-Before-Break Evaluation

Enclosures:

1. Notarized Affidavit from Westinghouse

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L. A. Reyes, Region II Administrator
U.S. Nuclear Regulatory Commission
Sam Nunn Atlanta Federal Center, 23 T85
61 Forsyth St., SW
Atlanta, GA 30303-8931

J. F. Stang, Jr., Senior Project Manager
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop 0-8G9A
Rockville, MD 20852-2738

J. B. Brady
NRC Senior Resident Inspector
McGuire Nuclear Station

B. O. Hall, Section Chief
Division of Environmental Health, Radiation Protection Section
North Carolina Department of Environment and Natural Resources
1645 Mail Service Center
Raleigh, NC 27699

Bruce H. Hamilton affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

Bruce Hamilton

Subscribed and sworn to me: September 17, 2008
Date

Lori C Dibby
Notary Public

My Commission Expires: July 1, 2012
Date

SEAL

Attachment 1

Licensee Evaluation

LICENSEE EVALUATION

Subject: License Amendment Request updating Leak-Before-Break Evaluation for McGuire Unit 1 reactor vessel hot leg nozzle-to-safe-end weld

LICENSEE EVALUATION

1.0 SUMMARY DESCRIPTION

This evaluation supports a request to amend the McGuire Unit 1 Leak-Before-Break (LBB) evaluation which was approved by the NRC by letter dated May 8, 1986. The original evaluation was determined to be adequate to show compliance with GDC 4. The amended LBB evaluation applies to the reactor vessel hot leg nozzles in the event that application of a full structural weld overlay (FSWOL) to the alloy 82/182 weld connecting the reactor vessel hot leg nozzle-to-safe-end is necessary.

2.0 DETAILED DESCRIPTION

The application of LBB evaluation as a method for meeting the requirements of GDC-4 was approved by NRC letter dated May 8, 1986 for McGuire Unit 1 (Ref. 1). At the time of approval, it was not recognized that these welds were susceptible to primary water stress corrosion cracking (PWSCC). Requirements in NUREG-1061, Vol. 3 and SRP 3.6.3, Rev. 0 would not allow application of LBB evaluation to a PWSCC susceptible material; however, SRP 3.6.3, Rev. 1 indicates that piping systems that are susceptible to PWSCC may qualify for application of LBB evaluation if treated with two mitigation methods and the piping contains no flaws larger than those permitted by ASME Section XI without repair (Ref. 2).

Duke intends to perform a Performance Demonstration Initiative (PDI) qualified volumetric inspection of the reactor vessel hot leg nozzle welds during the McGuire Unit 1 fall 2008 refueling outage. If indications are found that require repair, Duke will apply FSWOL to mitigate the affected weld(s) using a non-PWSCC susceptible material (Alloy 52).

In the event that a FSWOL is applied to a weld, the LBB evaluation needs to be updated to reflect the new configuration. The application of a FSWOL with Alloy 52/52M weld metal provides a PWSCC resistant barrier and also results in compressive stresses on the inner portion of the weld, thereby providing further protection against PWSCC. Thus, the application of a FSWOL provides two mitigation methods, in addition to providing a smooth surface that can enhance future non-destructive examination of the weld. The following is a summary of the LBB evaluation approach:

1. Review the methodology and margins in the currently approved LBB evaluation.

2. Address the effectiveness of PWSCC mitigation by application of the weld overlay and demonstrate that the post weld overlay crack growth (both PWSCC and fatigue) is within acceptable limits for balance of plant life. The post weld overlay inspections that will be performed to maintain the integrity of the repair are also addressed.

3. Determine critical through-wall flaw sizes with the application of the weld overlay at the dissimilar metal weld and the adjacent safe end to pipe weld. Consider the composite materials consisting of the original material and the weld overlay material.

4. Determine leakage through half the critical flaw size and show that it is greater than the detectable leakage (1 gpm) with a factor of 10. Address the PWSCC morphology in the determination of leakage.

5. Provide conclusions of the evaluations.

Proposed Update of LBB Evaluation

The proposed update of the McGuire Unit 1 LBB evaluation is provided as Attachment 2 "Leak-Before-Break Evaluation, Hot Leg Nozzle Weld Overlays for McGuire Unit 1."

Proposed Update of UFSAR

The McGuire Updated Final Safety Analysis Report will be updated as necessary as required by 10 CFR 50.71(e).

3.0 TECHNICAL EVALUATION

The proposed update of the McGuire Unit 1 LBB evaluation is provided as Attachment 2 "Leak-Before-Break Evaluation, Hot Leg Nozzle Weld Overlays for McGuire Unit 1".

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The applicable regulatory requirement for submitting the leak-before-break evaluation to exclude dynamic effects associated with postulated pipe ruptures from the design basis is specified in 10 CFR 50, Appendix A, Criterion 4. This LAR is submitted in accordance with 10 CFR 50.90.

4.2 Precedent

There is no precedent for LAR to update LBB evaluation due to application of full structural weld overlays.

4.3 Significant Hazards Consideration

The proposed amendment would update the McGuire Unit 1 LBB evaluation to include mitigation of the reactor vessel hot leg nozzle-to-safe-end welds by application of a FSWOL. The decision to mitigate the weld(s) will be made based on inspections performed during the fall 2008 refueling outage.

Duke has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The applicable accident is a large break loss of coolant accident (LBLOCA). Since application of a FSWOL will enhance the integrity of the Reactor Coolant System, the probability of a previously evaluated accident is not increased. The consequences of a LBLOCA have been previously evaluated and found to be acceptable. Application of a FSWOL to the weld will cause no change to the dose analysis associated with a LBLOCA, and therefore, does not affect the consequences.

For the above reasons, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed amendment will allow application of a FSWOL to mitigate potential PWSCC of the welds. These welds provide a primary pressure boundary function. This amendment does not change the function of the weld, or the way the plant is operated; it allows application of a FSWOL that will enhance the ability of the weld to perform the pressure boundary function. Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

Margin of safety is related to the ability of the fission product barriers to perform their design functions during and following accident conditions. These barriers include the fuel cladding, the reactor coolant system and the containment. This amendment does not involve a change to the fuel cladding or the containment. This amendment updates the LBB evaluation to account for application of a FSWOL to the reactor vessel hot leg nozzle-to-safe-end weld(s) for McGuire Unit 1.

The effect of applying a weld overlay repair has been evaluated with respect to the LBB evaluation at this location. This evaluation addresses mitigation of PWSCC in these welds. This evaluation allows application of a highly PWSCC resistant overlay that has the added benefit of producing inside surface compressive stresses. Crack growth evaluations performed as part of the evaluation indicate that no PWSCC is expected after the application of the overlay and fatigue crack growth is minimal. The effect of the adverse morphology due to PWSCC cracking was also evaluated. When considering the combined effects of flaw size, increased thickness and adverse morphology, the leakage was shown to be largely unaffected due to the offsetting effects of these factors.

The evaluation described above shows that these welds will perform as originally intended and that the adverse effects of PWSCC will be mitigated. Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the preceding discussion, Duke concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.22(b), an evaluation of this license amendment request has been performed to determine whether or not it meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) of the regulations. Implementation of this amendment will have no adverse impact upon McGuire Unit 1; neither will it contribute to any additional quantity or type of effluent being available for adverse environmental impact or personnel exposure.

It has been determined that there is:

1. No significant hazards consideration,
2. No significant change in the types or significant increase in the amounts of any effluents that may be released offsite, and
3. No significant increase in individual or cumulative occupational radiation exposure.

Therefore, this amendment request meets the criteria of 10 CFR 51.22(c)(9) for categorical exclusion from an environmental impact statement.

6.0 References

1. May 8, 1986 letter from B. J. Youngblood to H. B. Tucker, McGuire Nuclear Station, Elimination of Large Primary Loop Pipe Ruptures.

2. "Leak-Before-Break Evaluation, Hot Leg Nozzle Weld Overlays for McGuire Unit 1", Report No. 0800147.403, Structural Integrity Associates, Inc., September 2008.