June 12, 2002

Mr. H. B. Barron
Vice President, McGuire Site
Duke Energy Corporation
12700 Hagers Ferry Road
Huntersville, NC 28078-8985

SUBJECT: MCGUIRE NUCLEAR STATION, UNITS 1 AND 2 RE: REQUEST TO USE RISK INFORMED INSERVICE INSPECTION PROGRAM, RELIEF REQUESTS 01-005 AND 01-008 (TAC NOS. MB2375, MB2376, MB2377 AND MB2378)

Dear Mr. Barron:

By letter dated June 26, 2001, as supplemented by letters dated January 11 and March 15, 2002, you submitted Relief Request 01-005, "Application of Risk-Informed Methods to Piping ISI," requesting approval of a risk-informed inservice inspection (RI-ISI) program for Class 1 and Class 2 piping welds as an alternative to the current ISI program at the McGuire Nuclear Station, Units 1 and 2. Your proposed RI-ISI program was developed in accordance with Westinghouse Owners Group Topical Report WCAP-14572, Revision 1-NP-A, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report." The results of our review indicate that your proposed RI-ISI program is an acceptable alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI for ISI of Code Class 1 piping, Categories B-F and B-J welds, and Class 2 piping, Categories C-F-1 and C-F-2 welds. Therefore, your request for relief is authorized for the third 10-year ISI interval pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i) on the basis the alternative provides an acceptable level of quality and safety.

In addition, by your June 26, 2001 letter, you submitted Relief Request 01-008, "Volumetric Examination of Socket Welds," for McGuire Nuclear Station, Units 1 and 2, that requested performance of visual VT-2 examinations each refueling outage as an alternative to the volumetric examinations specified in Code Case N-577, "Risk-informed Requirements for Class 1, 2, or 3 Piping, Method A" and in WCAP-14572, Revision 1-NP-A, for those high safety significant ASME Code Class 1 and 2 socket welds identified in the RI-ISI program. The staff concurs that volumetric examination of socket welds is inconclusive and impractical due to the geometric limitations imposed by a socket weld. The staff also concurs that it is not necessary to perform the Code-required surface examination of socket welds in the absence of an environment that would cause outside surface-initiated flaws. The proposed alternative provides reasonable assurance of structural integrity. Therefore, your proposed alternative examination method is authorized for the third 10-year ISI interval pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that performing either the volumetric or the surface examinations of these socket welds would result in unusual difficulty without a compensatory increase in the level of quality and safety.

Our detailed evaluation and conclusions are documented in the enclosed Safety Evaluation, and we are closing TAC nos. MB2375, MB2376, MB2377, and MB2378.

Sincerely,
/RA/

John A. Nakoski, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosure: As stated

cc w/encl: See next page

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Docket Nos. 50-369 and 50-370

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RISK-INFORMED INSERVICE INSPECTION PROGRAM

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

DUKE ENERGY CORPORATION

DOCKET NOS. 50-369 AND 50-370

1.0 INTRODUCTION

By letter dated June 26, 2001, as supplemented by letters dated January 11 and March 15, 2002, (Refs. 1, 2, and 3) the Duke Energy Corporation (the licensee) submitted Relief Request 01-005, "Application of Risk-Informed Methods to Piping ISI," requesting approval of a risk-informed inservice inspection (RI-ISI) program for Class 1 and Class 2 piping welds as an alternative to the current ISI program at the McGuire Nuclear Station, Units 1 and 2. The scope of the RI-ISI program is limited to the American Society of Mechanical Engineers (ASME) Code Class 1 and Class 2 piping. The licensee's RI-ISI program was developed in accordance with the methodology contained in the Westinghouse Owners Group (WOG) Topical Report, WCAP-14572, Revision 1-NP-A (Ref. 4), that was previously reviewed and approved by the staff. The RI-ISI program proposed by the licensee was reviewed pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i). In addition, the licensee submitted Relief Request 01-008, "Volumetric Examinations of Socket Welds," that requested performance of visual VT-2 examinations each refueling outage as an alternative to the volumetric examinations specified in Code Case N-577 "Risk-informed Requirements for Class 1, 2, or 3 Piping, Method A" and in WCAP-14572, Revision 1-NP-A, for those high safety significant ASME Code Class 1 and 2 socket welds identified in the RI-ISI program. This relief request was reviewed pursuant to 10 CFR 50.55a(a)(3)(ii).

2.0 BACKGROUND

2.1 Applicable Requirements

10 CFR 50.55a(g) requires that ISI of the ASME Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code, "Rules for Inservice Inspection of Nuclear Power Plant Components" (hereinafter called Code) and applicable addenda, except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety or if the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Enclosure

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements set forth in the Code, to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The regulations require that ISI of components conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein.

The initial RI-ISI program will be implemented at the start of the third 10-year ISI interval for each unit. For McGuire, Units 1 and 2, the applicable editions of the Code for the third 10-year ISI interval will be the 1995 Edition through 1996 Addenda of ASME Section XI. Both units of McGuire are currently in the third period of the second 10-year ISI interval.

2.2 Summary of Proposed Approach

In the licensee's proposed RI-ISI program, piping failure potential estimates were determined using a software program contained in Supplement 1 to Reference 4, entitled "Westinghouse Structural Reliability and Risk Assessment (SRRA) Model for Piping Risk-Informed Inservice Inspection," that utilizes probabilistic fracture mechanics technology, industry piping failure history, plant-specific piping failure history, and other relevant information. Using the failure potential and supporting insights on piping failure consequences from the licensee's probabilistic risk assessment (PRA), safety significance ranking of piping segments were established to determine inspection locations. The RI-ISI program maintains the fundamental requirements of the Code, such as the examination technique, frequency, and acceptance criteria. However, the RI-ISI program is intended to reduce the number of required examination locations significantly while maintaining an acceptable level of quality and safety.

The licensee plans to implement the RI-ISI program by performing the examinations required under the program during the planned outages of the first inspection period of the third 10-year ISI interval. Other non-related portions of the Code requirements, as well as the ongoing augmented inspection programs at both units of McGuire, will remain unchanged. The RI-ISI program follows a previously approved methodology delineated in Reference 4.

3.0 EVALUATION

Pursuant to 10 CFR 50.55a(a)(3), the staff has reviewed and evaluated the licensee's proposed RI-ISI program, including those portions related to the applicable methodology and processes contained in Reference 4, based on guidance and acceptance criteria provided in Regulatory Guides (RGs) 1.174 (Ref. 5) and 1.178 (Ref. 6) and in Standard Review Plan (SRP) Chapter 3.9.8 (Ref. 7).

3.1 Proposed Changes to the ISI Program

The scope of the licensee's proposed RI-ISI program is limited to ASME Class 1 and Class 2 piping only, consisting of Category B-F and B-J welds, and Class 2 piping, Categories C-F-1 and C-F-2 welds. The RI-ISI program was proposed as an alternative to the existing ISI

program that is based on the requirements of the Code. A general description of the proposed changes to the ISI program was provided in Sections 3 and 5 of the licensee's submittal (Ref. 1).

In Tables 5-1 and 5-2 of Reference 1, a comparison of inspection location selection between the current ISI program and the proposed RI-ISI program is provided. The staff finds that the information submitted adequately defines the proposed changes resulting from the RI-ISI program.

3.2 Engineering Analysis

In accordance with the guidance provided in RGs 1.174 and 1.178 (Refs. 5 and 6), the licensee provided the results of an engineering analysis of the proposed changes, using a combination of traditional engineering analysis and PRA. The licensee stated that the results of the engineering analysis demonstrate that the proposed changes are consistent with the principle of defense-in-depth. This is accomplished by evaluating a location's susceptibility to each potential degradation mechanism that may be a precursor to leak or rupture and then performing an independent assessment of the consequence of a failure at that location. No changes to the evaluation of design basis accidents in the final safety analysis report are being made by the RI-ISI process. Therefore sufficient safety margins will be maintained.

The licensee stated that the applicable aspects of the ASME Code not affected by the proposed alternative RI-ISI program and the ongoing augmented inspection programs will be retained. This is consistent with the approved WCAP-14572, Revision 1-NP-A; therefore, it is acceptable.

The licensee submitted Relief Request 01-008 for McGuire, Units 1 and 2, that requested performing visual VT-2 examinations during each refueling outage as an alternative to the volumetric examinations specified in Code Case N-577 and in WCAP-14572, Revision 1-NP-A, for those high safety significant (HSS) ASME Code Class 1 and 2 socket welds identified in the RI-ISI program. The licensee indicated that Code Case N-577 has been revised to allow the substitution of the VT-2 examination method for all damage mechanisms on socket welds selected as HSS. This request is reasonable because the volumetric examination is inconclusive and impractical due to the geometric limitations imposed by a socket weld. However, the staff notes that Table IWB-2500-1 and Table IWC-2500-1 of the Code require surface examination, not volumetric examination, of the socket welds, and surface examination (i.e., liquid penetration examination) is an effective method for discovery of potential surface flaws on the outside surface, and specifically, flaws induced by low-cycle, high-bending stress thermal fatigue or by external chloride stress corrosion cracking. The licensee indicated that such flaws are prevented in Code Class 1 and 2 socket weld piping through piping design, selection and control of piping materials, control of welding processes and cleanliness requirements within the plant. Therefore, these conditions do not exist in the Code Class 1 and 2 piping at McGuire. As for a potential outside surface flaw caused by vibration-induced fatigue, such a flaw is likely to take a long period for initiation. After the initiation phase, the flaw will likely propagate rapidly and cause the pipe to leak. Hence, the staff concludes that performance of a VT-2 visual examination is sufficiently effective, and therefore, acceptable. The staff notes that the revised Code Case N-577 has neither been issued or been reviewed and approved by the NRC. Thus, the approval of this request is based on the technical soundness of applying VT-2 visual examination to specific conditions at McGuire, and should not be considered as an endorsement of the code case. Pursuant to 10 CFR 50.55a(a)(3)(ii),

the staff finds that performing volumetric or surface examinations of these socket welds would result in unusual difficulty without a compensating increase in the level of quality and safety. Therefore, the request to conduct VT-2 examinations as an alternative to the Code-required examinations during each refueling outage for Categories B-J, C-F-1, and C-F-2 socket welds is acceptable.

Piping systems within the scope of the proposed RI-ISI program were divided into piping segments. A pipe segment is defined as a portion of pipe length whose failure at any location within the segment will lead to the same consequence. Pipe segments are separated by flow splits and locations of pipe size changes, and include piping to a point at which a pipe break could be isolated. The licensee reported no deviations from the identification and definition of segments in WCAP-14572, Revision 1-NP-A, and their process is, therefore, acceptable.

During the course of its review, the staff reviewed the proposed RI-ISI program against the guidelines contained in previously approved WCAP-14572, Revision 1-NP-A, that states, in part, that the SRRA computer models are to be used to estimate the failure probabilities of the structural elements in each of the piping segments. In Reference 2, the licensee stated that the failure probabilities for McGuire piping segments were all derived using the SRRA software program where the SRRA program was applicable. This is consistent with the guidelines in WCAP-14572, Revision 1-NP-A, and in conformance with SRP 3.9.8. Piping failure mechanisms identified by the licensee include fatigue, stress corrosion cracking, thermal striping/stratification, erosion/corrosion/wastage, and vibratory fatigue.

The staff reviewed the qualifications, experience, and training of the users of the SRRA code on the capabilities and limitations of the code described in Reference 2 and finds them to be adequate. The licensee stated in Reference 2 that the effects of ISI of existing augmented programs are included to categorize the segments as described in the approved WCAP-14572, Revision 1-NP-A. The licensee stated in Reference 2 that when it uses the SRRA code to calculate failure probabilities for flow accelerated corrosion (FAC), the data is coordinated with the existing plant program. The FAC program representative obtained the wall thinning rates from the plant personnel responsible for the ongoing monitoring programs and the information provided was documented in the SRRA calculations. The licensee further stated in Reference 2 that they applied the SRRA code to standard piping geometry. Also, the licensee only used the code to calculate failure probabilities for the failure modes, materials, degradation mechanisms, input variables, and uncertainties it was programmed to consider as discussed in Supplement 1, Reference 4.

The licensee reported a deviation from the WCAP-14572, Revision 1-NP-A, methodology regarding credit taken for leak detection when calculating pipe failure probabilities. WCAP-14572, Revision 1-NP-A allows credit for detecting (and isolating, repairing, or otherwise terminating a potential accident sequence) a leak in the reactor coolant system (RCS) piping before it develops into a pipe break for piping inside of containment. This credit reflects the highly developed leak detection systems used to monitor leakage from the reactor coolant piping. In Reference 2, the licensee further stated that detection of a leak before break is plausible to any non-RCS segment located inside the containment that interfaces with the RCS by use of radiation and sump level monitors that can detect a leak in the segment as reliably as that of an RCS leak. Since the segments are subject to essentially the same leak detection capabilities as that of an RCS leak, the extension of credit for leak detection in these segments, is reasonable and acceptable. The licensee has developed the consequence of each segment

break based on the direct and indirect effects of the segment failure. The licensee has reported no deviations from the consequence characterization methodology in WCAP-14572, Revision 1-NP-A, and therefore, their analyses are acceptable.

3.3 Probabilistic Risk Assessment

The staff evaluation report for the Individual Plant Examination (IPE) dated June 30, 1994, noted that inadequate documentation of the Human Reliability Analysis (HRA) was a weakness. In Reference 2, the licensee stated that the HRA, and the documentation of the HRA, has been and will continue to be the subject of process improvement initiatives. A WOG peer review was conducted on the MCGuire PRA. The peer review identified some areas where the HRA documentation could be further improved, but the licensee stated that no peer review comments negatively impacted the analysis performed in support of the submittal.

The licensee used the Revision 2 of the PRA dated December 1997. The licensee stated that changes to McGuire are reviewed to ensure that the PRA model and supporting documentation accurately reflect the current plant configuration and operational practices consistent with the intended application. In Reference 2, the licensee clarified that during the time between December 1997 and January 2000 (when the RI-ISI program was initiated), there were no changes identified that would have had an adverse impact on the PRA with respect to the RI-ISI application. Reference 1 provides estimates of core damage frequency (CDF) and large early release frequency (LERF) of 3.8E-5/year and 2.2E-7E-6/year, respectively. The staff finds that the use of the Revision 2 PRA supported by the review of plant changes that might have impacted the RI-ISI evaluation at the time the submittal was initiated, is reasonable and acceptable.

The PRA used to develop the RI-ISI submittal included internal and external initiating events except seismic events. In Reference 3, the licensee stated that station black-out (SBO) sequences dominate the risk sequences caused by both the seismic and the tornado initiating events. The SBO risk caused by tornados is included in the RI-ISI analyses and is an insignificant contributor to the evaluation. The licensee stated that, even considering that the SBO risk caused by seismic events is about twice as high as that caused by tornados, the segment ranking as evaluated in the RI-ISI sequences would not be impacted by an explicit treatment of the seismic initiating event.

The staff did not review the PRA analysis to assess the accuracy of the quantitative estimates. Quantitative results of the PRA are used, in combination with a quantitative characterization of the pipe segment failure likelihood, to support the assignment of segments into broad safety significance categories reflecting the relative importance of pipe segment failures on CDF and LERF. Inaccuracies in the models or assumptions large enough to invalidate the broad categorizations developed to support the RI-ISI should have been identified in the licensee's or in the staff's review. Minor errors or inappropriate assumptions will only affect the consequence categorization of a few segments and will not invalidate the general results or conclusions. The continuous use and maintenance of the PRA provides further opportunities to identify inaccuracies and inappropriate assumptions, if any, in the PRA models. The staff finds that the quality of the PRA is sufficient to support the submittal.

The licensee stated in Reference 2 that the risk ranking and change in risk calculations were performed according to the guidance provided in Section 4.4.2 of WCAP-14572,

Revision 1-NP-A, aside from the one deviation discussed in Section 3.2 of this Safety Evaluation. The change in CDF for each unit is estimated to be about -3E-6/year with and -2E-4/year without operator action. The change in LERF for each unit is estimated to be about -5E-7/year with and -2E-6/yr without operator action. The operator actions credited in RI-ISI analyses are actions that the operators can take to mitigate the affects of segment ruptures. For example, loss of inventory and diversion of flow can be stopped following a rupture in some segments by closing an isolation valve upstream of the rupture. Because operator actions mitigate the effects of ruptures, the estimated CDFs and LERFs without crediting these actions are greater, and sometimes much greater, than the estimates that credit the action. Consequently, the absolute magnitude of the estimated changes in CDF and LERF due to the implementation of a RI-ISI program may be greater for the "without operator action estimates" than that of the "with operator action estimates."

The licensee did not submit estimates for the other risk change criteria in Section 4.4.2 of WCAP-14572, Revision 1-NP-A, but stated in Reference 2 that all the change in risk calculations were performed according to the guidance on page 213 of the WCAP-14572, Revision 1-NP-A (as applicable), and all four criteria for evaluating the results were applied. Based on the use of the approved methodology and on the reported results, the staff finds that any change in risk associated with the implementation of the RI-ISI program is small and consistent with the intent of the Commission's Policy Statement (Ref. 8) and, therefore, is consistent with RG 1.178.

3.4 Integrated Decisionmaking

The proposed RI-ISI program presents an integrated approach that considers in concert the traditional engineering analysis, the risk evaluation, and the implementation and the performance monitoring of piping. This is consistent with the guidelines of RG 1.178.

The selection of pipe segments to be inspected is described in Section 3.8 of Reference 1 using the results of the risk category rankings and other operational considerations. Table 5-1 of Reference 1 provides a summary table comparing the number of inspections required under the existing ASME, Section XI, ISI program at McGuire, Units 1 and 2, with the alternative RI-ISI program. The licensee stated that, in general, it used the methodology described in WCAP-14572, Revision 1-NP-A, to guide the selection of the number and the location of examination elements within the piping segments.

The WCAP-14572, Revision 1-NP-A, methodology defines segments as lengths of piping with identical consequences. Therefore, identifying and inspecting those welds with the highest likelihood of failure within a segment is identical to identifying and inspecting those welds with the highest safety significance. The statistical calculation is applied to determine the number of inspections required in the remaining population to satisfy the statistical criteria in the WCAP-14572, Revision 1-NP-A. This approach is consistent with the concept that, by focusing inspections on the most safety significant welds, the number of inspections can be reduced while at the same time maintaining public health and safety and, therefore, this approach is acceptable. The staff finds that the licensee's selection process uses "defense-in-depth" considerations and is consistent with the WCAP-14572, Revision 1-NP-A.

WCAP-14572, Revision 1-NP-A describes targeted examination volumes (typically associated with welds) and methods of examination based on the type(s) of degradation expected. The

staff has reviewed these guidelines and has determined that, if implemented as described, the RI-ISI examinations should result in improved discovery of service-related discontinuities over that currently provided by the Code.

The objective of ISI required by the Code is to identify conditions (i.e., flaw indications) that are precursors to leaks and ruptures in the pressure boundary that may impact plant safety. Therefore, the RI-ISI program must meet this objective to be found acceptable for use. Further, since the RI-ISI program is based on inspection for cause, element selection should target specific degradation mechanisms.

Section 4 of WCAP-14572, Revision 1-NP-A, provides guidelines for the areas and/or volumes to be inspected as well as the examination method, acceptance standard, and evaluation standard for each degradation mechanism. Based on a review of the cited portion of WCAP-14572, Revision 1-NP-A, the staff concludes that the examination methods are appropriate since they are selected based on specific degradation mechanisms, pipe sizes, and materials of concern. The licensee reported no deviations in this area from the WCAP-14572, Revision 1-NP-A, methodology; therefore, its evaluation is acceptable.

3.5 Implementation and Monitoring

Implementation and performance monitoring strategies require careful consideration by the licensee and are addressed in Element 3 of RG 1.178 and SRP 3.9.8. The objective of Element 3 is to assess performance of the affected piping systems under the proposed RI-ISI program by implementing monitoring strategies that confirm the assumptions and analyses used in the development of the RI-ISI program. To approve an alternative pursuant to 10 CFR 50.55a(a)(3)(i), implementation of the RI-ISI program, including inspection scope, examination methods, and methods of evaluation of examination results, must provide an adequate level of quality and safety.

In Reference 1, the licensee stated that upon approval of the RI-ISI program, procedures that comply with the WCAP-14572, Revision 1-NP-A, guidelines will be prepared to implement and monitor the RI-ISI program. The licensee confirmed that the applicable portions of the Code not affected by the change, such as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements, and quality control requirements would be retained.

The licensee stated in Section 4 of Reference 1 that the RI-ISI program is a living program and its implementation will require feedback of new relevant information to ensure the appropriate identification of HSS piping locations. Reference 1 also stated that as a minimum, risk ranking of piping segments will be reviewed and evaluated every ISI period and that significant changes may require more frequent adjustments as directed by any NRC Bulletin or Generic Letter or by industry and plant-specific feedback.

The proposed periodic reporting requirements meet existing ASME Code requirements and applicable regulations and, therefore, are considered acceptable. The staff finds that the proposed process for RI-ISI program updates meets the guidelines of RG 1.174 that risk-informed applications should include performance monitoring and feedback provisions; therefore, the process for program updates is acceptable.

4.0 CONCLUSION

10 CFR 50.55a(a)(3)(i) permits alternatives to regulatory requirements when authorized by the NRC if the applicant demonstrates that the alternative provides an acceptable level of quality and safety. In this case, the licensee's proposed alternative is to use the RI-ISI process described in the NRC-approved WCAP-14572, Revision 1-NP-A. As discussed in Section 3.0 above, the staff concludes that the licensee's proposed RI-ISI program, as described in the submittal, will provide an acceptable level of quality and safety with regard to the number of inspections, locations of inspections, and methods of inspection.

The staff finds that the results of different elements of the engineering analysis are considered in an integrated decision-making process. The impact of the proposed changes in the ISI program is founded on the adequacy of the engineering analysis and acceptable estimation of changes in plant risk in accordance with RG 1.174 and RG 1.178 guidelines.

The McGuire methodology also considers implementation and performance monitoring strategies. Inspection strategies ensure that failure mechanisms of concern have been addressed and there is adequate assurance of detecting damage before structural integrity is affected. The risk significance of piping segments is taken into account in defining the inspection scope for the RI-ISI program.

System pressure tests and visual examination of piping structural elements will continue to be performed on all Code Class 1and 2 systems in accordance with the ASME Code Section XI program. The RI-ISI program applies the same performance measurement strategies as existing ASME Code requirements.

The McGuire risk-informed methodology provides for conducting an analysis of the proposed changes using a combination of engineering analysis with supporting insights from a PRA. Defense-in-depth and quality are not degraded in that the methodology provides reasonable confidence that any reduction in existing inspections will not lead to degraded piping performance when compared to existing performance levels. Inspections are focused on locations with active degradation mechanisms as well as selected locations that monitor the performance of system piping.

In addition, the licensee submitted Relief Request 01-008 for McGuire, Units 1 and 2, that requested performance of visual VT-2 examinations each refueling outage as an alternative to the volumetric examinations specified in Code Case N-577 and in WCAP-14572, Revision 1-NP-A, for those HSS ASME Code Class 1 socket welds identified in the RI-ISI program. The staff finds that volumetric examination of socket welds is inconclusive and impractical due to the geometric limitations imposed by a socket weld. The staff also finds that performance of the Code-required surface examination of these socket welds is not useful due to the absence of an environment that would cause outside surface-initiated flaws. Therefore, the licensee's proposed alternative examination method is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that performing either volumetric or surface examinations of these socket welds would result in unusual difficulty without a compensating increase in the level of quality and safety, and that the licensee's proposed alternative provides reasonable assurance of structural integrity.

As discussed above, the staff's review of the licensee's proposed RI-ISI program concludes that the program is an acceptable alternative to the current ISI program, that is based on ASME Code, Section XI requirements for Code Class 1, Categories B-F and B-J welds, and for Code Class 2, Categories C-F-1 and C-F-2 welds. Therefore, the licensee's proposed RI-ISI program is authorized for the third 10-year ISI interval pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the request provides an acceptable level of quality and safety.

5.0 REFERENCES

1. Letter, dated June 26, 2001, H. B. Barron (Vice President, Duke Energy Corporation) to U. S. Nuclear Regulatory Commission, containing *McGuire Nuclear Station - Request for Approval of Relief Request 01-005, "Application of Risk-informed Methods to Piping ISI" and Relief Request 01-008, "Volumetric Examinations of Socket Welds", Third 10-year Inservice Inspection Interval.*

2. Letter, dated January 11, 2002, H. B. Barron (Vice President, Duke Energy Corporation) to U. S. Nuclear Regulatory Commission, containing *McGuire Nuclear Station - Response to Request for Additional Information (RAI) Regarding Relief Request 01-005, "Application of Risk-informed Methods to Piping ISI."*

3. Letter, dated March 15, 2002, H. B. Barron (Vice President, Duke Energy Corporation) to U. S. Nuclear Regulatory Commission, containing *McGuire Nuclear Station - Response to Request for Additional Information (RAI) Regarding Relief Request 01-005, "Application of Risk-informed Methods to Piping ISI."*

4. WCAP-14572, Revision 1-NP-A, *Westinghouse Owners Group Application of Risk-nformed Methods to Piping Inservice Inspection Topical Report*, February 1999.

5. NRC Regulatory Guide 1.174, *An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis*, July 1998.

6. NRC Regulatory Guide 1.178, *An Approach for Plant-Specific Risk-Informed Decision Making: Inservice Inspection of Piping*, September 1998.

7 NRC NUREG-0800, Chapter 3.9.8, *Standard Review Plan for Trial Use for the Review of Risk-Informed Inservice Inspection of Piping*, May 1998.

8. USNRC, "Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities; Final Policy Statement," *Federal Register*, Vol. 60, p. 42622, August 16, 1995.

Principal Contributors: S. Dinsmore
P. Patnaik

Date: June 12, 2002

cc:
Ms. Lisa F. Vaughn
Legal Department (PBO5E)
Duke Energy Corporation
422 South Church Street
Charlotte, North Carolina 28201-1006

County Manager of
Mecklenburg County
720 East Fourth Street
Charlotte, North Carolina 28202

Michael T. Cash
Regulatory Compliance Manager
Duke Energy Corporation
McGuire Nuclear Site
12700 Hagers Ferry Road
Huntersville, North Carolina 28078

Anne Cottingham, Esquire
Winston and Strawn
1400 L Street, NW.
Washington, DC 20005

Senior Resident Inspector
c/o U.S. Nuclear Regulatory Commission
12700 Hagers Ferry Road
Huntersville, North Carolina 28078

Dr. John M. Barry
Mecklenburg County
Department of Environmental
Protection
700 N. Tryon Street
Charlotte, North Carolina 28202

Mr. Peter R. Harden, IV
VP-Customer Relations and Sales
Westinghouse Electric Company
6000 Fairview Road
12th Floor
Charlotte, North Carolina 28210

Ms. Karen E. Long
Assistant Attorney General
North Carolina Department of
Justice
P. O. Box 629
Raleigh, North Carolina 27602

Mr. C. Jeffrey Thomas
Manager - Nuclear Regulatory
Licensing
Duke Energy Corporation
526 South Church Street
Charlotte, North Carolina 28201-1006

Elaine Wathen, Lead REP Planner
Division of Emergency Management
116 West Jones Street
Raleigh, North Carolina 27603-1335

Mr. Richard M. Fry, Director
Division of Radiation Protection
North Carolina Department of
Environment, Health and Natural
Resources
3825 Barrett Drive
Raleigh, North Carolina 27609-7721

Mr. T. Richard Puryear
Owners Group (NCEMC)
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745