December 10, 2001

Mr. M. S. Tuckman
Executive Vice President
Nuclear Generation
Duke Energy Corporation
526 South Church St
Charlotte, NC 28201

SUBJECT: MCGUIRE NUCLEAR STATION, UNIT 1 RE: SAFETY EVALUATION OF RELIEF REQUEST NO. 01-002, REVISION 1, USE OF SYSTEM LEAKAGE TEST FOR CLASS 3 COMPONENTS (TAC NO. MB2069)

Dear Mr. Tuckman:

By letter dated July 23, 2001, you submitted Relief Request No. 01-002, Revision I, for the McGuire Nuclear Station, Unit 1, Third 10-Year Interval Inservice Inspection Program Plan, which proposed an alternative to certain requirements of Section XI of The American Society of Mechanical Engineers Code. Specifically, you requested approval to use, as an alternative, a system leakage test in lieu of a system hydrostatic test for all McGuire Unit 1, Class 3, Category D-B, pressure-retaining components subject to IWD-5222 hydrostatic testing .

The NRC staff has reviewed Relief Request 01-002, Revision 1, as documented in the enclosed Safety Evaluation. Based on our review, the staff concludes that compliance with the Code requirements would result in a hardship without a compensating increase in the level of quality and safety, and that your proposed alternative will provide reasonable assurance of pressure boundary integrity of the subject components. Accordingly, the NRC staff authorizes the use of the alternative pursuant to 10 CFR 50.55a(a)(3)(ii) for the Third 10-Year inservice inspection interval.

Sincerely,

/RA/

Richard Laufer, Acting Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-369

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION

REQUEST FOR RELIEF NO. 01-002, REVISION 1

MCGUIRE NUCLEAR STATION, UNIT 1

DUKE ENERGY CORPORATION

DOCKET NO. 50-369

1.0 INTRODUCTION

Inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable addenda as required by 10 CFR 50.55a(g), 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 that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first ten-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The Code of record for the McGuire Nuclear Station, Unit 1, third 10-year ISI interval is the 1995 Edition through the 1996 Addenda of the ASME B&PV Code.

2.0 EVALUATION

The NRC staff has reviewed the information concerning Third 10-year ISI program Request for Relief No. 01-002, Revision 1, for McGuire Nuclear Station, Unit 1, provided by Duke Energy Corporation (the licensee) letter dated July 23, 2001. The information provided by the licensee in support of the request for relief from Code requirements has been evaluated and the basis for disposition is documented below.

2.1 Request for Relief No. 01-002, Revision 1

Code Requirements:
Section XI, Table IWD-2500-1, of the ASME Code, 1995 Edition with 1996 Addenda, requires a system leakage test each inspection period for Class 3 pressure-retaining components. Additionally, Table IWD-2500-1 requires a system hydrostatic test each inspection interval for these same Class 3 pressure-retaining components.

System/Components(s) for Which Relief is Requested: (as stated in licensee's request for relief dated July 23, 2001)
All McGuire Unit 1, Class 3, Category D-B, pressure-retaining components subject to IWD-5222 hydrostatic testing.

Licensee's Code Relief Request: (as stated in licensee's request for relief dated July 23, 2001)
Pursuant to 10 CFR 50.55a(a)(3)(i), Duke Power Company requests the use of an alternative to the ASME Boiler and Pressure Vessel Code, Section XI, 1995 Edition with the 1996 Addenda.

Specifically, Duke Power Company requests approval to use, as an alternate, a system leakage test in lieu of a system hydrostatic test. A Code change removing the hydrostatic test requirement was incorporated in the 1995 Edition with the 1996 Addenda for Class 1 and Class 2 pressure-retaining components, but was not incorporated for Class 3 components.

Licensee's Proposed Alternative: (as stated in licensee's request for relief dated July 23, 2001)
Duke Energy Corporation requests that a Class 3 system leakage test (IWD-5221) be conducted in lieu of the Class 3 system hydrostatic test (IWD-5222).

Licensee's Basis for Requesting Relief: (as stated in licensee's request for relief dated July 23, 2001)
Consistent with the philosophy of ASME Code Case N-498-1, this request is based on performing the VT-2 visual examinations at nominal operating pressure in lieu of the interval hydrostatic pressure tests. A review of all Class 3 interval hydrostatic pressure tests performed at McGuire Nuclear Station to date has shown that a leak has never occurred in the base metal or in an existing weld. All leaks that have occurred have been in mechanical joints such as packing glands and body-to-bonnet connections. Additionally, the ASME Boiler & Pressure Vessel Code, Section XI Committee has determined that a hydrostatic test only increases the leakage rate from that of a leakage test run at nominal operating pressure. That is, raising the test pressure from operating pressure to hydrostatic pressure has not identified any new leakage. Therefore, performing a VT-2 visual examination at nominal operating pressure provides reasonable assurance of system integrity.

The ASME Code Committee and the Nuclear Regulatory Commission has endorsed the use of a leakage test in lieu of a hydrostatic test for Class 1 and

Class 2 pressure-retaining components in the 1995 Edition through the 1996 Addenda of the Boiler & Pressure Vessel Code, Section XI. Therefore, the system leakage test is sufficient to determine the leakage integrity of Class 3 pressure-retaining components at an acceptable level of quality and safety also.

NRC Evaluation:
The Code requires that a system hydrostatic test be performed once per interval to include all Class 3 components within the reactor coolant system boundary. The licensee has proposed an alternative to the Code requirements for the Class 3 systems. The licensee requested that a Class 3 system leakage test be conducted in lieu of the Class 3 system hydrostatic test.

Hardships are generally encountered with the performance of hydrostatic testing in accordance with the Code. Hydrostatic pressure testing frequently requires a significant effort to set up and perform due to the need to use special equipment, such as temporary attachment of test pumps and gages, and the need for unique valve lineups. Hydrostatic testing only subjects the piping components to a small increase in pressure over the design pressure and, therefore, does not present a significant challenge to pressure boundary integrity. Accordingly, hydrostatic pressure testing is primarily regarded as a means to enhance leak detection during the examination of components under pressure, rather than as a measure of the structural integrity of the components.

Considering that the hydrostatic pressure tests rarely result in pressure boundary leaks that would not occur during system leakage tests, the staff believes that the increased assurance of the integrity of Class 3 systems that could be achieved by the performance of a hydrostatic test is not commensurate with the hardship of performing such a test. It is also believed that the added assurance provided by a hydrostatic test of Class 3 welds over that provided by a system pressure test is not commensurate with the hardship of hydrostatic testing.

3.0 CONCLUSION

Based on the above evaluation, the staff concludes that compliance with Code hydrostatic testing requirements for Class 3 systems would result in a hardship without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance of pressure boundary integrity of the subject components. Pursuant to 10 CFR 50.55a(a)(3)(ii), the staff authorizes the use of the proposed alternative for the McGuire Nuclear Station, Unit 1 for the third 10-year ISI interval.

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Date: December 10, 2001

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