March 23, 2000

Mr. M. S. Tuckman
Executive Vice President
Nuclear Generation
526 South Church Street
P.O. Box 1006
Charlotte, NC 28201-1006

SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2, MCGUIRE NUCLEAR STATION, UNITS 1 AND 2, OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3, RE: 10-YEAR INTERVAL INSERVICE INSPECTION PLAN REQUEST FOR RELIEF 97-GO-001, REV 2 (TAC NOS. MA6938, MA6939, MA6940, MA6941, MA6942, MA6943, AND MA6944)

Dear Mr. Tuckman:

By letter dated October 21, 1999, Duke Energy Corporation proposed its 10-Year Interval Inservice Inspection Request for Relief 97-GO-001, Revision 2, for Catawba Nuclear Station, Units 1 and 2, McGuire Nuclear Station, Units 1 and 2, and Oconee Nuclear Station, Units 1, 2, and 3.

The staff's evaluation and conclusion are contained in the enclosed safety evaluation. The staff concludes that your proposed alternative to the requirements of the Subsection IWA-5250(a)(2) of the American Society of Mechanical Engineers (ASME) Code, Section XI is a conservative and technically sound engineering approach and will provide an acceptable level of quality and safety to ensure the integrity of bolted connections. Your proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

Sincerely,

/RA/

Richard L. Emch, Jr., Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, 50-287, 50-369,
50-370, 50-413, and 50-414

Enclosure: As stated

cc w/encl: See next page

March 23, 2000

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Executive Vice President
Nuclear Generation
526 South Church Street
P.O. Box 1006
Charlotte, NC 28201-1006

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SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2, MCGUIRE NUCLEAR STATION, UNITS 1 AND 2, OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3, RE: 10-YEAR INTERVAL INSERVICE INSPECTION PLAN REQUEST FOR RELIEF 97-GO-001, REV 2 (TAC NOS. MA6938, MA6939, MA6940, MA6941, MA6942, MA6943, AND MA6944)

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

10-YEAR INTERVAL INSERVICE INSPECTION PLAN

REQUEST FOR RELIEF 97-GO-001, REVISION 2

FOR

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

CATAWBA NUCLEAR STATION, UNITS 1 AND 2

DUKE ENERGY CORPORATION

DOCKET NOS. 50-269, 50-270, 50-287, 50-369, 50-370, 50-413, AND 50-414

1.0 INTRODUCTION

Inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g). Section 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (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 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 10-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) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for the second 10-year ISI interval for McGuire Nuclear Station, Units 1 and 2, and Catawba Nuclear Station, Units 1 and 2, and for the third 10-year interval for Oconee Nuclear Station, Units 1, 2, and 3, is the 1989 Edition.

2.0 EVALUATION

By letter dated October 21, 1999, Duke Energy Corporation (the licensee), submitted Request for Relief 97-GO-001, Revision 2, proposing an alternative to the requirements of the ASME Code, Section XI, for Oconee Nuclear Station Units 1, 2, and 3, McGuire Nuclear Station, Units 1 and 2, and Catawba Nuclear Station, Units 1 and 2. The staff has reviewed and evaluated the licensee's request for relief from the Code requirements as discussed below.

Request to Use a Proposed Alternative No. 97-GO-001, Revision 2

Section XI of the ASME Code, 1989 Edition with 1990 Addenda, which applies to Oconee, McGuire, and Catawba, Subsection IWA-5250(a)(2), states: "If leakage occurs at a bolted connection, one of the bolts shall be removed, VT-3 examined, and evaluated in accordance with IWA-3100. The bolt selected shall be the one closest to the source of leakage. When the removed bolt has evidence of degradation, all remaining bolting in the connection shall be removed, VT-3 examined, and evaluated in accordance with IWA-3100."

Licensee's Proposed Alternative Examination (as stated)

> When leakage is identified at bolted connections by Visual, VT-2 examination during system pressure testing, an evaluation will be performed to determine the susceptibility of the bolting to corrosion and assess the potential for failure. The evaluation will, at a minimum, consider the following factors:
>
> 1. Bolting materials
> 2. Corrosiveness of process fluid leaking
> 3. Leakage location
> 4. Leakage history at connection or other system components
> 5. Visual evidence of corrosion at connection (while connection is assembled)
> 6. Service age of bolting materials
>
> When the evaluation of the above variables is concluded and the evaluation determines that the leaking condition has not degraded the fasteners, then no further action is necessary. However, reasonable attempts to stop the leakage shall be taken.
>
> If the evaluations of the variables above indicate the need for further evaluation, or no evaluation is performed, then a bolt closest to the source of leakage shall be removed and VT-3 visually examined. When the removed bolting shows evidence of rejectable degradation, all remaining bolts in the connection shall be removed and VT-3 visually examined. If the leakage is identified when the bolted connection is in service or Technical Specifications require [it] to be operable, and the information in the evaluation is supportive, the removal of the bolt for VT-3 visual examination may be deferred to the next component/system outage of sufficient duration.

The licensee also proposed that it will use the acceptance criteria for visual, VT- 1 examination to assess the acceptability of the bolting.

<u>Licensee's Basis for the Proposed Alternative (as stated):</u>

> Removal of pressure retaining bolting at mechanical connections for visual, VT-3 examination and subsequent evaluation, in locations where leakage has been identified, is not always the most discerning course of action to determine the acceptability of the bolting. The Code requirement to remove, examine, and evaluate bolting in this situation does not allow the owner to consider other factors which may indicate the acceptability of mechanical joint bolting.
>
> Other factors which should be considered when evaluating bolting acceptability when leakage has been identified at a mechanical joint include, but are not limited to: joint bolting material, service age of joint bolting materials, location of the leakage, history of leakage at the joint, evidence of corrosion with the joint assembled, and corrosiveness of process fluid.
>
> Performance of the pressure test while the system is in service may identify leakage at a bolted connection that, upon evaluation, may conclude the integrity and pressure retaining ability of the joint is not challenged. It would not be prudent to negatively impact the availability of a safety system by removing the system from service to address a leak that does not challenge the system's ability to perform its safety function.
>
> A situation frequently encountered at Duke Energy Corporation is the complete replacement of bolting materials (studs, bolts, nuts, washers, etc.) at mechanical joints during plant outages. When the associated system piping is pressurized during plant start up, leakage may be identified at these joints. The root cause of this leakage is most often due to thermal expansion of the piping and bolting materials at the joint and subsequent fluid seepage at the joint gasket. Proper re-torquing of the joint bolting, in most cases, stops the leakage. Removal of the joint bolting to evaluate for corrosion would be unwarranted in this situation due to the new condition of the bolting materials.

<u>Staff's Findings</u>

The staff has reviewed the licensee's request and believes that the evaluation process proposed by the licensee provides a sound engineering approach for evaluating the acceptability for the continued service of bolting. This evaluation considers a number of factors, including bolting materials, the corrosiveness of the leaking fluid, the potential for corrosion, prior history, and visual evidence of corrosion with the bolting in place. This proposed alternative engineering evaluation considers all the factors necessary to identify degradation of the bolts in any leaking bolted connection. Accordingly, the use of this type of engineering evaluation is expected to result in the identification of such degradation, and in corrective actions, when appropriate, and to avoid unnecessary joint disassembly when the bolts are fit for service.

The licensee noted that if a bolt has to be removed it will perform a VT-3 examination and use VT-1 acceptance criteria. It is appropriate to apply the VT-1 acceptance criteria to bolting since there are no VT-3 acceptance criteria in the Code applicable to bolting. The staff recommends that the licensee consider applying VT-1 examination requirements corresponding to both the examinations and the acceptance criteria for bolting.

3.0 CONCLUSION

The staff concludes that the licensee's proposed alternative to the requirements of Subsection IWA-5250(a)(2) is a conservative and technically sound engineering approach and will provide an acceptable level of quality and safety to ensure the integrity of bolted connections. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

Principal Contributor: T. McLellan

Date: March 23, 2000

McGuire Nuclear Station
Catawba Nuclear Station

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

Mr. 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

Mr. Steven P. Shaver
Senior Sales Engineer
Westinghouse Electric Company
5929 Carnegie Blvd.
Suite 500
Charlotte, North Carolina 28209

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

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

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

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

McGuire Nuclear Station
Catawba Nuclear Station

cc:
Mr. Gary Gilbert
Regulatory Compliance Manager
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745

North Carolina Municipal Power
Agency Number 1
1427 Meadowwood Boulevard
P. O. Box 29513
Raleigh, North Carolina 27626-0513

County Manager of York County
York County Courthouse
York, South Carolina 29745

Piedmont Municipal Power Agency
121 Village Drive
Greer, South Carolina 29651

Saluda River Electric
P. O. Box 929
Laurens, South Carolina 29360

Virgil R. Autry, Director
Division of Radioactive Waste Management
Bureau of Solid and Hazardous Waste
Department of Health and Environmental
Control
2600 Bull Street
Columbia, South Carolina 29201

North Carolina Electric Membership
Corporation
P. O. Box 27306
Raleigh, North Carolina 27611

Senior Resident Inspector
4830 Concord Road
York, South Carolina 29745

Mr. G. R. Peterson
Site Vice President
Catawba Nuclear Station
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745

Mr. H. B. Barron
Vice President, McGuire Site
Duke Energy Corporation
12700 Hagers Ferry Road
Huntersville, North Carolina 28078

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

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

Mr. Rick N. Edwards
Framatome Technologies
Suite 525
1700 Rockville Pike
Rockville, Maryland 20852-1631

Manager, LIS
NUS Corporation
2650 McCormick Drive, 3rd Floor
Clearwater, Florida 34619-1035

Senior Resident Inspector
U. S. Nuclear Regulatory
Commission
7812B Rochester Highway
Seneca, South Carolina 29672

Virgil R. Autry, Director
Division of Radioactive Waste Management
Bureau of Land and Waste Management
Department of Health and Environmental
Control
2600 Bull Street
Columbia, South Carolina 29201-1708

Mr. L. E. Nicholson
Compliance Manager
Duke Energy Corporation
Oconee Nuclear Site
7800 Rochester Highway
Seneca, South Carolina 29672

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

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

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. Steven P. Shaver
Senior Sales Engineer
Westinghouse Electric Company
5929 Carnegie Blvd.
Suite 500
Charlotte, North Carolina 28209