

May 17, 2001

Mr. M. S. Tuckman
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SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2, MCGUIRE NUCLEAR STATION, UNITS 1 AND 2, AND OCONEE NUCLEAR STATION UNITS 1,2, AND 3 RE: RELIEF REQUEST NO. 00-GO-001 (TAC NOS. MB0712, MB0713, MB0714, MB0715, MB0716, MB0717, AND MB0718)

Dear Mr. Tuckman:

By letter dated November 21, 2000, Duke Energy Corporation (the licensee), requested that the U.S. Nuclear Regulatory Commission staff grant relief from certain requirements of the American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section XI, Subsection IWE for containment inspection at 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 the information provided for this relief request. The staff's evaluation and conclusion are provided in the Enclosure. Based on the information provided in the relief request, the staff concludes that your proposed alternative will provide an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i) for the first inspection interval for inservice inspection at each of the facilities.

Sincerely,

/RA/

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

Docket Nos. 50-413, 50-414, 50-269, 50-270,
50-287, 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

REQUEST FOR RELIEF FROM ASME SECTION XI REQUIREMENTS

FOR CONTAINMENT INSPECTION

DUKE ENERGY CORPORATION

CATAWBA NUCLEAR STATION, UNITS 1 AND 2
MCGUIRE NUCLEAR STATION, UNITS 1 AND 2
OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3

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

1.0 INTRODUCTION

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the U.S. Nuclear Regulatory Commission (NRC) amended its regulations to incorporate by reference the 1992 Edition with 1992 Addenda of Subsections IWE and IWL of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Subsections IWE and IWL provide the requirements for inservice inspection (ISI) of Class CC (concrete containment) and Class MC (metallic containment) containments for light-water cooled nuclear power plants respectively. The effective date for the amended rule was September 9, 1996, and it requires the licensees to incorporate the new requirements into their ISI plans and to complete the first containment inspection by September 9, 2001. However, a licensee may propose alternatives to or submit a request for relief from the requirements of the regulation pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i) and 10 CFR 50.55a(g)(5).

By letter dated November 21, 2000, Duke Energy Corporation (the licensee), proposed an alternative to the requirements of Subsection IWE of Section XI of the ASME Code 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 NRC's findings for the proposed request are discussed below.

2.0 EVALUATION

2.1 Code Requirements

ASME Code, Subsection IWE, Paragraph IWE-5240 specifies that " the requirements of IWA-5246 for visual examinations are applicable," following repair, replacement, or modification. Due to an inadvertant misnumbering within the Code, paragraph IWA-5246 does not exist. The 1993 Edition of the Code was changed to address this and thus have IWE-5240 correctly invoke the requirements of IWA-5240. Paragraph IWA-5240 specifies requirements

Enclosure

for VT-2 visual examinations that are conducted to detect evidence of leakage from pressure retaining components during a system pressure test.

2.2 Proposed Alternative

In lieu of the requirements of IWE-5240, the following alternative is proposed:

1. Applicable nondestructive examination shall be performed in accordance with Construction Code and IWA-4000; and
2. A leakage test shall be performed in accordance with IWE-5221; and
3. A visual, VT-1 examination shall be performed on affected surface areas following repair, replacements, or modifications. For repairs, replacements, or modifications other than those minor repairs or modifications identified in IWE-5222, this visual, VT-1 examination shall be performed either during or upon completion of the pneumatic leakage test required by IWE-5221.

2.3 Licensee's Justification for Using the Proposed Alternative

Paragraph IWE-5221 requires a pneumatic leakage test to be performed in accordance with Title 10, Part 50 of the Code of Federal Regulations, Appendix J following repairs, replacements, and modifications to the primary reactor containment boundary. Qualified personnel perform these leakage rate tests using calibrated equipment capable of measuring extremely small component leakage rates. 10 CFR Part 50, Appendix J provides requirements for testing as well as acceptable leakage criteria.

Even the most stringent VT-2 visual examination may not be capable of detecting a very small leak during the pneumatic leakage test. As a result, the VT-2 examination cannot always determine whether components affected by repair, replacement, or modification are leak-tight. Furthermore, a VT-2 visual examination cannot quantify leakage rates, even if leakage is detected. For these reasons, the VT-2 visual examination provides little or no additional assurance that the component is leak-tight.

For repairs, replacements, or modifications performed under the ASME Code, Section XI, applicable nondestructive examinations (NDE) are performed in accordance with the Construction Code and IWA-4000. Section XI Preservice Examinations are performed in accordance with IWE-2200 to verify the acceptability of component surfaces following repairs, replacements, or modifications. These preservice examinations, along with applicable nondestructive examinations and the VT-1 visual examinations in the proposed alternative, provide additional assurance that areas affected by repair, replacement or modification are sound and leak-tight. Leakage rate tests required by IWE-5221 are performed to verify that measured leakage (if any) does not exceed allowable limits.

The proposed alternative does not require visual, VT-1 examinations to be performed either during or upon completion of leakage tests that have been deferred following minor repairs or modifications listed in IWE-5222 for the following reasons:

1. 10 CFR 50, Appendix J, Option B allows the establishment of a performance-based schedule for Type A tests. As much as ten years may elapse between successive Type A tests under this Option. If a minor repair or modification is made immediately following a scheduled Type A test, the required pneumatic leakage test and visual examination (IWE-5240) could be deferred for as long as ten years. A visual examination that can be deferred for this length of time provides little value.
2. IWA-4710(b) exempts Class 1, 2 and 3 components from pressure testing following minor repairs or modifications similar to those described in IWE-5222. A VT-2 visual examination would also not be required. Therefore, IWE-5240 imposes examination requirements that are stricter than for Class 1.

Containment metallic surfaces are required to be visually examined in accordance with Table IWE-2500-1, Examination Category E-A, Item E1.11 prior to each Type A test, and during each Inservice Inspection Period (as required by 10 CFR 50.55a(b)(2)(ix)(E)). In addition to visual examinations required by Table IWE-2500-1, Examination Category E-A, Item E1.11, VT-3 visual examinations are performed on 100% of accessible surface areas (including areas affected by repairs, replacements and modifications) once every ten years in accordance with Table IWE-2500-1, Examination Category E-A, Item E1.12. These visual examinations are performed on surface areas that include those affected by repairs, replacements, and modifications and would identify any structural degradation that could contribute to, or result in, leakage.

During the pressure test following repairs, replacements, or modifications to metallic shell and penetration liners of concrete containment, a VT-2 visual examination is required to be performed from the component exterior in accordance with IWA-5240. Because the exterior surface of pressure-retaining metallic liner is not accessible for visual examination, IWA-5241(b) requires only that the surrounding exterior area be examined for evidence of leakage. Leakage that could occur during a pneumatic test following repairs to the metallic shell liner may be extremely difficult to detect during the VT-2 visual examination because the leak path could channel the leakage away from the location on the exterior of the concrete containment where the examination is performed. For this reason, the VT-2 visual examination provides little additional assurance of the containment leak-tightness.

The Quality and Safety Provided by the Proposed Alternative

The purpose of the VT-2 visual examination required by IWE-5240 is to ensure that there is no detectable leakage from surface areas affected by repairs, replacements, or modifications. The proposed alternative (including pneumatic leakage tests, applicable

NDE and VT-1 visual examinations on the affected surface areas) provides adequate assurance that the repairs, replacements, or modifications are sound and leak-tight.

2.4 Staff Evaluation of Relief Request

In lieu of the requirements of IWE-5240 for the VT-2 visual examination to be performed following repair, replacement or modification, the licensee proposed an alternative as follows: (1) applicable nondestructive examination shall be performed in accordance with construction code and IWA-4000; (2) a leakage test shall be performed in accordance with IWE-5221; and (3) a VT-1 visual examination shall be performed on affected surface areas following repair, replacements or modifications.

For repairs, replacements or modifications that are performed under ASME Code, Section XI, the applicable construction/installation code NDE is required to be performed and must meet the acceptance criteria of the construction/installation code. In addition to the construction code NDE, applicable ASME Code, Section XI pre-service NDE is performed. The construction code and Section XI pre-service NDE requirements provide additional assurance that the repairs, replacements or modifications are sound and leak-tight. Also, 10 CFR Part 50, Appendix J provides requirements for testing including acceptable leakage criteria which are performed by qualified personnel using calibrated equipment capable of measuring extremely small component leakage rates. In addition, 10 CFR 50.55a(b)(2)(x)(E) requires a general visual examination of the containment each period that would identify any structural degradation that may contribute to leakage. Moreover, the licensee committed to perform an IWE VT-1 visual examination on the repaired or replaced areas. Furthermore, the requirements to perform VT-2 visual examinations was removed from IWE-5240 of ASME Code, Section IWE, 1998 Edition. For items (minor repairs, replacements or modifications) identified in IWE-5222, the licensee committed to perform a VT-1 examination on the affected areas following repairs, replacements or modifications. The licensee's commitment meets the requirements of IWE-5222.

Based on the above discussion, the staff finds that the licensee's proposed alternative, together with the NDE performed for repairs, replacements or modifications, provides an acceptable level of quality and safety. Therefore, the alternative proposed by the licensee is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the first inspection interval for ISI at each of the facilities.

Principal Contributor: T. Cheng

Date: May 17, 2001