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SUBJECT: Requests use of alternative to requirements of ASME Boiler & Pressure Vessel Code, Section XI, Subsection IWE, 1992 Edition w/1992 Addenda, allowing for direct & remote visual exam of Class MC & CC components.

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May 28, 1998

U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

ATTENTION: Document Control Desk

SUBJECT: Duke Energy Corporation

Oconee Nuclear Station - Units 1, 2, & 3  
Docket Nos. 50-269, 50-270, and 50-287

McGuire Nuclear Station - Units 1 & 2  
Docket Nos. 50-369 and 50-370

Catawba Nuclear Station - Units 1 & 2  
Docket Nos. 50-413 and 50-414

Request to use an Alternative to the ASME Boiler  
and Pressure Vessel Code, Section XI in accordance  
with 10 CFR 50.55a (a) (3) (i).

Duke Energy Corporation Serial Number 98-GO-004

Pursuant to 10 CFR 50.55a (a) (3) (i), Duke Energy  
Corporation requests the use of an alternative to the  
requirements of the ASME Boiler and Pressure Vessel Code,  
Section XI, Subsection IWE, 1992 Edition with the 1992  
Addenda for Oconee Units 1, 2 and 3, McGuire Units 1 and 2,  
and Catawba Units 1 and 2.

This request is to allow an alternative to the requirements  
of IWA-2210 and IWL-2310(a) and (b) for direct and remote  
visual examination of Class MC and Class CC components. Duke  
has determined that the proposed alternative will provide an  
acceptable level of quality and safety.

A detailed description of this proposed alternative,  
including a background discussion and justification is  
included as an attachment to this letter. Duke Energy  
Corporation requests timely NRC review and approval of this  
request so that Containment Inservice Inspection Plans,

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which are under development, can be completed to support the implementation of Containment Inservice Inspections during plant refueling outages starting in September, 1998. A NRC response is requested by August 10, 1998, in order to allow sufficient time to amend the Duke Plans and procedures that will implement this request. Questions regarding this request should be directed to J. S. Warren at (704) 382-4986.

Very truly yours,



M. S. Tuckman

MST/JSW

Attachment

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Attachment

DUKE ENERGY CORPORATION  
Oconee Nuclear Station Units 1, 2 and 3  
McGuire Nuclear Station Units 1 and 2  
Catawba Nuclear Station Units 1 and 2

Request for Alternative to the Requirements of the ASME  
Boiler and Pressure Vessel Code, Section XI

**Background:**

The ASME Boiler and Pressure Vessel Code, Section XI, Division 1, 1992 Edition with the 1992 Addenda, IWA-2210 requires that direct visual examinations be demonstrated by procedure to resolve the selected test chart characters of Table IWA-2210-1 at the maximum examination distance using minimum illumination levels specified in Table IWA-2210-1. Remote visual examinations are required to be demonstrated by procedure to resolve the selected test chart characters specified in Table IWA-2210-1 using the minimum illumination levels specified in Table IWA-2210-1, regardless of examination distance. These requirements are excessive for remote visual examination of containments which may be performed at considerable distances from the examination surfaces. Also, the criteria requiring resolution of lower case characters of the size specified in Table IWA-2210-1 is overly prescriptive for examinations which are performed to detect the types of conditions required by Subsections IWE and IWL. Relevant indications on containment surfaces can be detected using criteria which is less stringent than that specified in IWA-2210. The proposed alternative is sufficient to ensure that examination procedures are capable of detecting conditions for which the examinations are performed.

IWA-2210 also specifies requirements for use of portable lighting and measurement of illumination levels on examination surfaces. Illumination levels are required to be examined on each examination surface, except when the same portable lighting source is used. If battery powered portable lights are used, the illumination levels are required to be checked before and after each examination or series of examinations, but shall not exceed 4 hours between checks. While sufficient illumination is necessary to perform an adequate examination, measurement of illumination levels on all examination surfaces will be difficult for

those surfaces which are at considerable distance and are not readily accessible. Also, due to the extent of required examinations, the 4 hour limitation on use of battery powered light sources will require suspending examinations solely to recheck illumination levels, and may impact ALARA goals. This provision is unnecessary if it can be demonstrated that illumination levels of lighting are adequate during the performance of examinations, regardless of the length of time the portable lighting source is used.

IWL-2310(a) and (b) also specify that the minimum illumination, maximum direct examination distance, and maximum procedure demonstration lower case character height shall be as specified in IWA-2210 for VT-1C and VT-3C visual examinations. In addition to the proposed alternative to IWA-2210, this request also proposes an alternative to these requirements.

The above requirements create a hardship or unusual difficulty without a compensating increase in the level of quality and safety. The proposed alternative provides a reasonable, appropriate alternative to the Code requirements. Procedures for visual examination shall be required to demonstrate that indications can be detected, providing an acceptable level of quality and safety to that obtainable by IWA-2210 and IWL-2310(a) and (b). A detailed description of these concerns is provided below.

**I. System/Component(s) for Which Alternative is Requested:**

All components subject to visual, VT-1, VT-1C, VT-2, VT-3, and VT-3C examination in accordance with the requirements of the ASME Code, Section XI, Subsections IWE and IWL, 1992 Edition with the 1992 Addenda.

**II. Code Requirement(s):**

The ASME Code, Section XI, 1992 Edition with the 1992 Addenda, IWA-2210, Visual Examinations, specifies minimum illumination and maximum examination distances for direct VT-1, VT-2, and VT-3 visual examinations. IWA-2210 allows remote visual examination in lieu of direct visual examination, but requires that the remote examination procedure be demonstrated to resolve the selected test chart characters. IWA-2210 also requires that illumination levels be measured on each examination surface, unless the same portable light

source or similar installed lighting equipment is demonstrated to provide the specified illumination at the maximum examination distance. Illumination levels from battery powered portable lights shall be checked before and after each examination or series of examinations, not to exceed 4 hours between checks. The ASME Code, Section XI, 1992 Edition with the 1992 Addenda, IWL-2310(a) and (b) specify that for VT-1C and VT-3C visual examinations, the minimum illumination, maximum direct examination distance, and maximum procedure demonstration lower case character height shall be as specified in IWA-2210 for VT-1 and VT-3 visual examinations.

**III. Requirement from which Alternative is Requested:**

An alternative is requested to the requirements of Paragraph IWA-2210, Visual Examination, and IWL-2310(a) and (b) for direct and remote visual examination of Class MC and CC components. The specific requirements from which an alternative is requested are:

1. The requirement of IWA-2210 to demonstrate by procedure that direct visual examinations can resolve the specified lower case characters at minimum illumination levels specified in Table IWA-2210-1.
2. The requirement of IWA-2210 to measure illumination levels on examination surfaces.
3. The requirement of IWA-2210 to measure illumination levels from battery powered portable lights at an interval not exceeding 4 hours.
4. The requirement of IWA-2210 to check the illumination levels of battery powered portable lights before and after each examination or series of examinations.
5. The requirement of IWL-2310(a) and (b) that for VT-1C and VT-3C visual examinations, the minimum illumination, maximum direct examination distance, and maximum procedure demonstration lower case character height shall be as specified in IWA-2210 for VT-1 and VT-3 visual examinations.

**IV. Basis for Requesting Alternative:**

10CFR50.55a(b)(2)(x)(B) allows an alternative to the minimum illumination and maximum examination distance requirements of Table IWA-2210-1 for remote visual examinations performed in accordance with IWE only. As a result, remote visual examinations of concrete containments under IWL must be demonstrated to meet the requirements of IWA-2210. Compliance with this requirement to resolve the specified test chart characters at typical examination distances needed for concrete surface examinations may be difficult and is excessive when the VT-3C examination can be demonstrated by procedure to be able to detect conditions for which the examination is performed.

For direct visual examination of Class MC and Class CC components, the requirements of IWA-2210 and IWL-2310(a) and (b) are unnecessary, provided the direct visual examination can also be demonstrated by procedure to be capable of detecting conditions for which these examinations are performed.

For Class MC applications, it is anticipated that most surfaces will require remote visual examination because of structural geometry which make access within the Table IWA-2210-1 distances difficult. Because 10CFR50.55a(b)(2)(x)(B) allows the maximum remote examination distance to be extended and the minimum illumination decreased, compliance with lighting and examination distance requirements of Table IWA-2210-1 need not be met for remote VT-3 visual examinations conducted at distances exceeding 4 feet. It is unnecessary to require that a direct visual examination performed on a surface at a distance less than 4 feet comply with the requirements of Table IWA-2210-1 when a remote visual examination of that same surface is permitted to be performed using lower illumination levels at distances exceeding 4 feet, provided the illumination is sufficient and the resolution adequate to detect conditions for which the examination is performed.

The requirement of IWA-2210 to check illumination levels from battery powered portable lights at intervals not exceeding 4 hours is excessive and unnecessary. Because of the length of time it typically requires to access certain containment

surfaces and perform examinations, it is a hardship to require that illumination levels be checked at this frequency. The imposition of an arbitrary 4 hour limit is inappropriate when it can be otherwise demonstrated that sufficient illumination is provided during the examination or series of examinations. Compliance with the 4 hour limitation will increase the amount of time required to perform examinations and will result in additional personnel radiological exposure, without any increase in the level of quality of the examinations. Also, if a portable lighting source becomes contaminated during the course of an examination, it may be difficult to transport the lighting source to a location where the illumination level on this equipment can be checked within the maximum 4 hour limit.

The requirement of IWA-2210 to check illumination levels of battery powered light sources before and after each examination or series of examinations is unnecessary, provided it can be demonstrated by procedure that the battery powered lighting sources can provide the required illumination levels on examination surfaces at maximum examination distances for the duration of the specified examination or series of examinations.

**V. Alternate Examination(s):**

The alternative below provides more appropriate requirements for direct and remote visual examination of Class MC and Class CC components.

In lieu of the requirements of IWA-2210 and IWL-2310, the following alternative is proposed:

**IWA-2210 VISUAL EXAMINATIONS**

**IWA-2211 VT-1 and VT-1C Examinations**

(a) VT-1 examinations are conducted to detect discontinuities and imperfections on the surfaces of components, including such conditions as cracks, wear, corrosion, erosion, physical damage or degradation, and conditions identified in IWE-3500. VT-1C examinations are conducted in accordance with IWL-2310(a).

(b) Direct VT-1 and VT-1C examinations may be conducted when access is sufficient to place the eye within 24 in. of the surface to be examined and at an angle not less than 30 deg. to the surface. Mirrors



may be used to improve the angle of vision. The examination, using natural or artificial lighting, shall be sufficient to resolve a 1/64 in. black line on an 18% neutral gray card, or shall be demonstrated by procedure to be capable of detecting indications for which the visual examination is performed.

(c) Remote VT-1 and VT-1C examinations may be substituted for direct examination. Remote examination may use aids, such as telescopes, borescopes, fiber optics, cameras, or other suitable instruments, provided such systems have a resolution capability at least equivalent to that attainable by direct visual examination, or are demonstrated by procedure to be capable of detecting indications for which the direct visual examination is performed.

#### **IWA-2212 VT-2 Examination**

(a) VT-2 examinations are conducted to detect evidence of leakage from pressure retaining components, with or without leakage collection systems, as required during the conduct of system pressure tests.

(b) VT-2 examinations shall be conducted in accordance with IWA-5000. The examination, using natural or artificial lighting, shall be sufficient to resolve a 1/32 in. black line on an 18% neutral gray card, or shall be demonstrated by procedure to be capable of detecting indications for which the visual examination is performed.

#### **IWA-2213 VT-3 and VT-3C Examinations**

(a) VT-3 examinations are conducted to determine the general mechanical and structural condition of components and their supports by verifying parameters such as clearances, settings, and physical displacements; and to detect discontinuities and imperfections, such as loss of integrity at bolted or welded connections, loose or missing parts, debris, corrosion, wear, erosion, or other degradation, and conditions identified in IWE-3500. VT-3C examinations are conducted in accordance with IWL-2310(b).

(b) VT-3 includes examinations for conditions that could affect operability or functional adequacy of snubbers and constant load and spring type supports.

(c) VT-3 and VT-3C examinations may be performed directly or remotely, and may use aids, such as

telescopes, borescopes, fiber optics, cameras, or other suitable instruments. The examination, using natural or artificial lighting, shall be sufficient to resolve a 1/32 in. black line on an 18% neutral gray card, or shall be demonstrated by procedure to be capable of detecting indications for which the visual examination is performed.

#### **IWA-2215 Replication**

Surface replication methods may be used for VT-1, VT-1C, VT-3, and VT-3C examinations when the surface resolution is at least equivalent to that of direct visual observation.

#### **IWL-2310 VISUAL EXAMINATION AND PERSONNEL QUALIFICATION**

(a) VT-1C visual examinations are conducted to determine concrete deterioration and distress for suspect areas detected by VT-3C, and conditions (e.g., cracks, wear, or corrosion) of tendon anchorage and wires or strands.

(b) VT-3C visual examinations are conducted to determine the general structural condition of concrete surfaces by identifying areas of concrete deterioration and distress, such as defined in ACI 201.1.

(c) The Owner's written practice shall define qualification requirements for concrete examination personnel in accordance with IWA-2300. Limited certification in accordance with IWA-2350 may be used for examiners limited to concrete.

#### **VI. Justification for the Granting of Alternative:**

The purpose of IWA-2210 and IWL-2310(a) and (b) is to ensure that visual examinations are performed in a consistent manner that is capable of detecting the conditions for which the examination is performed. The proposed alternative has been determined to satisfy this purpose, but eliminates requirements that are either inappropriate or unnecessary for visual examination of Class MC and Class CC components. This alternative requires that visual examination procedures demonstrate that direct and remote visual examinations be capable of detecting conditions for which the examinations are conducted. Resolution of a 1/64 in.

or 1/32 in. black line on an 18% neutral gray card as specified in this alternative provides one acceptable method for demonstrating direct and remote visual examination procedures, without requiring measurement of lighting illumination levels. The use of this alternative will allow direct visual examinations to be performed at distances which exceed those specified in Table IWA-2210-1, but which are practical for containment examination. This alternative will also help to minimize radiological exposure to examination personnel.

**VII. Implementation Schedule**

Four weeks prior to the start of the first inspection intervals for IWE and IWL, to allow for development of implementing procedures. The first IWE inspection intervals are tentatively scheduled to begin during outage EOC17 on September 10, 1998 for Oconee Unit 3, and during outage EOC9 on October 3, 1998 for Catawba Unit 2.

Evaluated By: *John J. Felt*  
Date: 5-19-98

Reviewed By: *D.E. Dell*  
Date: 5-19-98