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July 1, 2003

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

ATTENTION: Document Control Desk

SUBJECT: Duke Energy Corporation  
Oconee Nuclear Station, Unit 3  
Docket No. 50-287  
McGuire Nuclear Station, Unit 2  
Docket No. 50-370  
Catawba Nuclear Station, Units 1 & 2  
Docket Nos. 50-413, 50-414

Relief Request for Alternative to ASME Section XI  
Relief Request 03-GO-011

Pursuant to 10 CFR 50.55a (a) (3) (i), Duke Energy Corporation (Duke) requests the use of an alternative to the requirements of ASME Boiler and Pressure Vessel Code, Section XI, Appendix VIII 1995 Edition through 1996 Addenda for the remainder of the third inspection interval of Oconee Unit 3, and the remainder of the second inspection interval of McGuire Unit 2 and Catawba Units 1 and 2.

Specifically, Duke proposes an alternative to the requirements of ASME Section XI, Appendix VIII Supplements 2 and 3 for the qualification of personnel, procedures and equipment used for the ultrasonic examination of Category B-J Pressure Retaining piping welds from the inside surface of pressurized water reactors. The proposed alternative would permit a reduced number of flaws to be used for Supplement 2 and 3 qualifications if personnel, procedures and equipment are already qualified under the requirements of Supplement 10. The alternative for Supplement 10 implementation program has been proposed by Duke in Relief Request 03-GO-009 submitted to the staff in a letter dated July 1, 2003. A detailed description of the proposed alternative and justification is included as an attachment to this letter.

This relief is being sought in order to implement the requirements of 10 CFR 50.55a(b)(2)(xv)(A)(2) and the guidance of RIS 03-001, *NRC Regulatory Issue Summary 2003-01, Examination of Dissimilar Metal Welds, Supplement 10 to Appendix VIII of Section XI of the ASME Code*. Duke is also taking action to qualify vendors to perform inspections in accordance with the Performance Demonstration Initiative (PDI). Duke intends to implement this program during the Catawba Unit 1 outage scheduled for November 8, 2003, if vendors qualify. In this case, Duke is requesting approval of this request by October 31, 2003, to support implementation during that outage. If vendors fail to qualify for the fall Catawba outage, then Duke will defer these examinations to the next outage. If this occurs, then approval of this relief request would be needed for the October 2004 Oconee Unit 3 outage.

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Questions regarding this request may be directed to R. K. Nader at 704-382-0979.

Very truly yours,



W. R. McCollum, Jr.  
Senior Vice President, Nuclear Support

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**Attachment**

**xc w/att: L. A. Reyes, Regional Administrator  
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J. B. Brady, NRC Senior Resident Inspector (MNS)**

**Duke Energy Corporation  
OCONEE UNIT 3  
CATAWBA UNITS 1 AND 2  
MCGUIRE UNIT 2  
REQUEST FOR RELIEF No. 03-GO-011**

Pursuant to 10 CFR 50.55a (a) (3) (i), Duke Energy Corporation proposes an alternative to the requirements of ASME Section XI, Appendix VIII 1995 Edition through the 1996 Addenda.

**I SYSTEM/COMPONENT (S) FOR WHICH RELIEF IS REQUESTED:**

Duke Energy Corporation proposes an alternative to the requirements of ASME Section XI, Appendix VIII Supplements 2 and 3 for the qualification of personnel, procedures and equipment used for the ultrasonic examination of Category B-J Pressure Retaining piping welds from the inside surface of pressurized water reactors. The proposed alternative would permit a reduced number of flaws to be used for Supplement 2 and 3 qualifications if personnel, procedures and equipment are already qualified under the requirements of Supplement 10.

**II CODE REQUIREMENTS:**

Duke Energy Corporation proposes an alternative to the requirements of ASME Section XI, Appendix VIII, Table VIII-3110-1, Component Qualification Supplements, Supplement 2 and Supplement 3, 1995 Edition through the 1996 Addenda.

**III CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED:**

Relief is requested from the qualification requirements for piping welds contained in Table VIII-3110-1 of Appendix VIII to ASME Section XI for:

A - Supplement 2 for Wrought Austenitic Piping Welds,  
and

B - Supplement 3 for Ferritic Piping Welds.

Relief is requested to use the attached proposed alternative for implementation of Appendix VIII,

Supplements 2 and 3 as coordinated with the proposed alternative for the Supplement 10 implementation program (reference Duke Energy Corporation Relief Request 03-GO-009). The Performance Demonstration Initiative (PDI) will administer the alternative program.

#### **IV BASIS FOR RELIEF:**

Depending upon the particular design, the nozzle to main coolant piping may be fabricated using ferritic, austenitic, or cast stainless components and assembled using ferritic, austenitic, or dissimilar metal welds. Additionally, differing combinations of these assemblies are close proximity, which typically means the same ultrasonic essential variables are used for each weld and the most challenging ultrasonic examination process is employed (e.g., the ultrasonic examination process associated with a dissimilar metal weld would be applied to a ferritic or austenitic weld).

Separate qualifications to Supplements 2, 3, and 10 are redundant when performed in accordance with the PDI Program. For example, during a personnel qualification to the PDI Program, the candidate would be exposed to a minimum of 10 flawed grading units for each individual supplement. Personnel qualification to Supplements 2, 3, and 10 would therefore require a total of 30 flawed grading units. Test sets this large and tests of this duration are unworkable. Additionally, a full procedure qualification (i.e. 3 personnel qualifications) to the PDI Program requirements would require 90 flawed grading units. This is particularly burdensome for a procedure that will use the same essential variables or the same criteria for selecting essential variables for all 3 supplements.

To resolve these issues, the PDI Program recognizes the Supplement 10 qualification as the most stringent and technically challenging ultrasonic application. The essential variables used for the examination of Supplements 2, 3, and 10 are the same. A coordinated add-on implementation would be sufficiently stringent to qualify Supplements 2 and 3 if the requirements used to qualify Supplement 10 are satisfied as a prerequisite. The basis for this conclusion is the fact that the majority of the flaws in Supplement 10 are located wholly in austenitic weld material. This con-

figuration is known to be challenging for ultrasonic techniques due to the variable dendritic structure of the weld material. Conversely, flaws in Supplements 2 and 3 initiate in fine-grained base materials.

Additionally, the proposed alternative is more stringent than current Code requirements for a detection and length sizing qualification. For example, the current Code would allow a detection procedure, personnel, and equipment to be qualified to Supplement 10 with 5 flaws, Supplement 2 with 5 flaws, and Supplement 3 with 5 flaws, a total of only 15 flaws. The proposed alternative of qualifying Supplement 10 using 10 flaws and adding on Supplement 2 with 5 flaws and Supplement 3 with 3 flaws results in a total of 18 flaws which will be multiplied by a factor of 3 for the procedure qualification.

Based on the above, the use of a limited number of Supplement 2 or 3 flaws is sufficient to assess the capabilities of procedures and personnel who have already satisfied Supplement 10 requirements. The statistical basis used for screening personnel and procedures is still maintained at the same level with competent personnel being successful and less skilled personnel being unsuccessful. The proposed alternative is consistent with other coordinated qualifications currently contained in Appendix VIII.

The proposed alternate program is attached and is identified as Supplement 14. It has been submitted to the ASME Code Committee for consideration as new Supplement 14 to Appendix VIII and was approved by Subcommittee on Nuclear Inservice Inspection in February 2003.

#### **V ALTERNATIVE EXAMINATION:**

In lieu of the requirements of ASME Section XI, 1995 Edition, 1996 Addenda, Appendix VIII, Table VIII-3110-1, the Performance Demonstration Initiative (PDI) Program for implementation of Appendix VIII, Supplement 2 and 3, as coordinated with the alternative PDI Supplement 10 implementation program as referenced in Duke Energy Corporation Relief Request 03-GO-009 shall be used. The PDI Program alternative is described in the attached enclosure (Supplement 14).

**VI JUSTIFICATION FOR GRANTING RELIEF:**

Approval is requested to use the proposed alternatives described above in lieu of the ASME Section XI, Appendix VIII, Supplement 2 and 3 requirements. Compliance with the proposed alternatives will provide an adequate level of quality and safety for examination of the affected welds.

**VII IMPLEMENTATION SCHEDULE:**

Duke Energy Corporation will perform ultrasonic examinations of Category B-J similar metal piping welds from the inside surface during the 10 year reactor pressure vessel examinations for the remainder of the 3<sup>rd</sup> 10-year Inspection Interval for Oconee Unit 3 and the remainder of the 2<sup>nd</sup> 10-year Inspection Interval for McGuire Unit 2 and Catawba Units 1 and 2.

Sponsored By: James J. McQuillan III Date: 5-29-03

Approved By: C. W. Alley Date: 6/16/03

**SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 10, 2 AND 3 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE**

Proposed Requirements	Technical Basis
<p><b>1.0 SCOPE</b></p> <p>This Supplement is applicable to wrought austenitic, ferritic and dissimilar metal piping welds examined from the inside surface. This Supplement provides for expansion of Supplement 10 qualifications to permit coordinated qualification for Supplements 2 and 3.</p>	<p>There is currently no available Code action allowing for a coordinated implementation of the fundamental qualifications required for the typical examinations performed from the ID of PWR nozzles. Without this Code Case/Change, qualifications would require an excessive amount of flawed and unflawed grading units. This proposed supplement uses the more technically stringent Supplement 10 qualification as a base and then incorporates a limited number of Supplement 2 and Supplement 3 samples. This proposal is consistent with the philosophy of Supplement 12, the proposed changes to Supplement 10, and the approved changes to Supplement 2 and 11.</p>
<p><b>2.0 SPECIMEN REQUIREMENTS</b></p> <p>Qualification test specimens shall meet the requirements listed herein, unless a set of specimens is designed to accommodate specific limitations stated in the scope of the examination procedure (e.g., pipe size, access limitations). The same specimens may be used to demonstrate both detection and sizing qualification.</p>	
<p><b>2.1 General</b> The specimen set shall conform to the following requirements.</p>	
<p>(a) Specimens shall have sufficient volume to minimize spurious reflections that may interfere with the interpretation process.</p>	
<p>(b) The specimen set shall include the minimum and maximum pipe diameters and thicknesses for which the examination procedure is applicable. Applicable tolerances are provided in Supplements 2, 3, and 10.</p>	<p>Tolerances are from the applicable Supplements because Supplement 2 and 3 dimensions and tolerances are typically based on wrought nominal pipe size that is not appropriate for DM welds that are typically associated with forged and machined safe ends.</p>

**SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 10, 2 AND 3 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE**

Proposed Requirements	Technical Basis
<p>(c) The specimen set shall include examples of the following fabrication conditions:</p> <p>(1) geometric and material conditions that normally require discrimination from flaws (e.g., counterbore or weld root conditions, cladding, weld buttering, remnants of previous welds, adjacent welds in close proximity, and weld repair areas);</p> <p>(2) typical limited scanning surface conditions (e.g., internal tapers, exposed weld roots, and cladding conditions).</p>	
<p><b>2.2 Supplement 2 Flaws</b></p> <p>(a) At least 70% of the flaws shall be cracks; the remainder shall be alternative flaws.</p> <p>(b) Specimens with IGSCC shall be used when available.</p> <p>(c) Alternative flaws, if used, shall provide crack-like reflective characteristics and shall comply with the following:</p> <p>(1) Alternative flaws shall be used only when implantation of cracks produces spurious reflectors that are uncharacteristic of service-induced flaws.</p> <p>(2) Alternative flaws shall have a tip width of less than or equal to 0.002 in. (0.05 mm).</p>	
<p><b>2.3 Supplement 3 Flaws</b></p> <p>Supplement 3 flaws shall be mechanical or thermal fatigue cracks.</p>	
<p><b>2.4 Distribution</b></p> <p>The specimen set shall contain a representative distribution of flaws. Flawed and unflawed grading units shall be randomly mixed.</p>	<p>Since the number of flaws will be limited words such as "uniform distribution" could lead to testmanship and are considered inappropriate.</p>
<p><b>3.0 PERFORMANCE DEMONSTRATION</b></p>	
<p>Personnel and procedure performance demonstration tests shall be conducted according to the following requirements.</p>	

**SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 10, 2 AND 3 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE**

Proposed Requirements	Technical Basis
<p>(a) The same essential variable values, or, when appropriate, the same criteria for selecting values as demonstrated in Supplement 10 shall be used.</p> <p>(b) The flaw location and specimen identification shall be obscured to maintain a "blind test".</p> <p>(c) All examinations shall be completed prior to grading the results and presenting the results to the candidate. Divulgence of particular specimen results or candidate viewing of unmasked specimens after the performance demonstration is prohibited.</p>	
<b>3.1 Detection Test</b>	
<p>(a) The specimen set for Supplement 2 qualification shall include at least five flawed grading units and ten unflawed grading units in austenitic piping. A maximum of one flaw shall be oriented axially.</p>	
<p>(b) The specimen set for Supplement 3 qualification shall include at least three flawed grading units and six unflawed grading units in ferritic piping. A maximum of one flaw shall be oriented axially.</p>	
<p>(c) Specimens shall be divided into grading units.</p> <p>(1) Each grading unit shall include at least 3 in. (76 mm) of weld length.</p> <p>(2) The end of each flaw shall be separated from an unflawed grading unit by at least 1 in. (25 mm) of unflawed material. A flaw may be less than 3 in. (76 mm) in length.</p> <p>(3) The segment of weld length used in one grading unit shall not be used in another grading unit.</p> <p>(4) Grading units need not be uniformly spaced around the pipe specimen.</p>	
<p>(d) All grading units shall be correctly</p>	

**SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 10, 2 AND 3 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE**

Proposed Requirements	Technical Basis
identified as being either flawed or unflawed.	
<b>3.2 Length-sizing Test</b>	
(a) The coordinated implementation shall include the following requirements for personnel length sizing qualification.	
(b) The specimen set for Supplement 2 qualification shall include at least four flaws in austenitic material.	Axial flaws are not length sized in Supplement 2.
(c) The specimen set for Supplement 3 qualification shall include at least three flaws in ferritic material.	
(d) Each reported circumferential flaw in the detection test shall be length sized. When only length-sizing is being tested, the regions of each specimen containing a flaw to be sized may be identified to the candidate. The candidate shall determine the length of the flaw in each region.	
(e) Supplement 2 or Supplement 3 examination procedures, equipment, and personnel are qualified for length-sizing when the flaw lengths estimated by ultrasonics, as compared with the true lengths, do not exceed 0.75 in. (19 mm) RMS, when they are combined with a successful Supplement 10 qualification.	
<b>3.3 Depth-sizing Test</b>	
The coordinated implementation shall include the following requirements for personnel depth-sizing qualification.	
(a) The specimen set for Supplement 2 qualification shall include at least four circumferentially oriented flaws in austenitic material.	Axial flaws are not depth sized in Supplement 2.
(b) The specimen set for Supplement 3 qualification shall include at least three flaws in ferritic material.	
(c) For a separate depth-sizing test, the	

**SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 10, 2 AND 3 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE**

Proposed Requirements	Technical Basis
<p>regions of each specimen containing a flaw to be sized may be identified to the candidate. The candidate shall determine the depth of the flaw in each region.</p>	
<p>(d) Supplement 2 or Supplement 3 examination procedures, equipment, and personnel are qualified for depth-sizing when the flaw depths estimated by ultrasonics, as compared with the true depths, do not exceed 0.125 in. (3 mm) RMS, when they are combined with a successful Supplement 10 qualification.</p>	
<p><b>4.0 PROCEDURE QUALIFICATION</b></p>	
<p>Procedure qualifications shall include the following additional requirements.</p> <p>(a) The specimen set shall include the equivalent of at least three personnel performance demonstration test sets. Successful personnel performance demonstrations may be combined to satisfy these requirements.</p> <p>(b) Detectability of all flaws in the procedure qualification test set that are within the scope of the procedure shall be demonstrated. Length and depth sizing shall meet the requirements of 3.1, 3.2, and 3.3.</p> <p>(c) At least one successful personnel demonstration shall be performed.</p> <p>(d) To qualify new values of essential variables, at least one personnel performance demonstration is required. The acceptance criteria of 4.0(b) shall be met.</p>	