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Docket Number 50-346

10 CFR 50.55a

License Number NPF-3

Serial Number 3141

June 6, 2005

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

Subject: Davis-Besse Nuclear Power Station
10 CFR 50.55a Request Regarding Inservice Inspection Requirements
Third Ten-Year Interval (RR-A28)

Ladies and Gentlemen:

Pursuant to 10 CFR 50.55a(a)(3)(i), the FirstEnergy Nuclear Operation Company (FENOC) hereby requests NRC approval of Request RR-A28 (Enclosure 1) regarding American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI inservice inspection requirements for the third ten-year interval for the Davis-Besse Nuclear Power Station (DBNPS).

Supplement 10 to Appendix VIII of Section XI of the ASME Code contains the qualification requirements for dissimilar metal piping welds. Request RR-A28 proposes to allow the use of alternatives to these requirements based on ASME Code Case N-695.

Approval of Request RR-A28 is requested by February 1, 2006, to support the upcoming Fourteenth Refueling Outage.

A list of regulatory commitments made in this letter is included in Enclosure 2.

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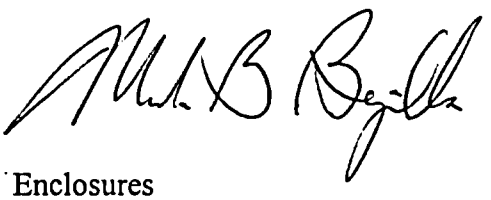
If you have any questions or comments, please contact Mr. Henry H. Hegrat, Supervisor – Fleet Licensing, at (330) 315-6944.

Very truly yours,



Enclosures

cc: Regional Administrator, NRC Region III
W. A. Macon, NRC/NRR Senior Project Manager
C. S. Thomas, NRC Region III, DB-1 Senior Resident Inspector
Utility Radiological Safety Board

FIRST ENERGY NUCLEAR OPERATING COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
THIRD 10-YEAR INTERVAL REQUEST RR-A28

PROPOSED ALTERNATIVE IN ACCORDANCE WITH 10 CFR 50.55a(a)(3)(i)

1. **ASME Code Components Affected**

Pressure retaining piping welds subject to examination using procedures, personnel, and equipment qualified to ASME Section XI, Appendix VIII, Supplement 10.

2. **Applicable Code Edition and Addenda**

Appendix VIII, Supplement 10 of the 1995 Edition through the 1996 Addenda of ASME Section XI provides qualification requirements for dissimilar metal piping welds.

3. **Applicable Code Requirements**

The following paragraphs or statements are from the 1995 Edition through the 1996 Addenda of ASME Section XI, Appendix VIII, Supplement 10 and identify the specific requirements that are included in this request.

Item 1 - Paragraph 1.1(b) states in part - Pipe diameters within a range of 0.9 to 1.5 times a nominal diameter shall be considered equivalent.

Item 2 - Paragraph 1.1(d) states - All flaws in the specimen set shall be cracks.

Item 3 - Paragraph 1.1(d)(1) states - At least 50% of the cracks shall be in austenitic material. At least 50% of the cracks in austenitic material shall be contained wholly in weld or buttering material. At least 10% of the cracks shall be in ferritic material. The remainder of the cracks may be in either austenitic or ferritic material.

Item 4 - Paragraph 1.2(b) states in part - The number of unflawed grading units shall be at least twice the number of flawed grading units.

Item 5 - Paragraph 1.2(c)(1) and 1.3(c) state in part - At least 1/3 of the flaws, rounded to the next higher whole number, shall have depths between 10% and 30% of the nominal pipe wall thickness.

Paragraph 1.4(b) distribution table requires 20% of the flaws to have depths between 10% and 30%.

Item 6 - Paragraph 2.0 first sentence states - The specimen inside surface and identification shall be concealed from the candidate.

Item 7 - Paragraph 2.2(b) states in part - The regions containing a flaw to be sized shall be identified to the candidate.

Item 8 - Paragraph 2.2(c) states in part - For a separate length sizing test, the regions of each specimen containing a flaw to be sized shall be identified to the candidate.

Item 9 - Paragraph 2.3(a) states - For the depth sizing test, 80% of the flaws shall be sized at a specific location on the surface of the specimen identified to the candidate.

Item 10 - Paragraph 2.3(b) states - For the remaining flaws, the regions of each specimen containing a flaw to be sized shall be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region.

Item 11 - Table VIII-S2-1 provides the false call criteria when the number of unflawed grading units is at least twice the number of flawed grading units.

4. Reason for Request

ASME Code Case N-695 provides desirable alternatives to ASME Section XI, Appendix VIII, Supplement 10 regarding qualification requirements for dissimilar metal piping welds.

5. Proposed Alternatives and Basis for Use

The requirements of ASME Code Case N-695 will be used as alternatives to the requirements of ASME Section XI, Appendix VIII, Supplement 10.

The technical basis for use of the proposed alternatives is provided below for each of the items listed in Section 3 above.

Item 1 - The proposed alternative to Paragraph 1.1(b) states: (Refer to Code Case N-695 paragraph 2.1(c))

"The specimen set shall include the minimum and maximum pipe diameters and thicknesses for which the examination procedure is applicable. Pipe diameters within 1/2 in. (13 mm) of the nominal diameter shall be considered equivalent. Pipe diameters larger than 24 in. (610 mm) shall be considered to be flat. When a range of thicknesses is to be examined, a thickness tolerance of ±25% is acceptable."

Technical Basis - The change in the minimum pipe diameter tolerance from 0.9 times the diameter to the nominal diameter minus 0.5 inch provides tolerances more in line with industry practice. Though the alternative is less stringent for small pipe diameters, they typically have a thinner wall thickness than larger diameter piping. A thinner wall thickness results in shorter sound path distances that reduce the detrimental effects of the curvature. This change maintains consistency between Supplement 10 and the recent revision to Supplement 2.

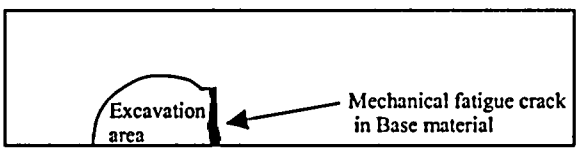
Item 2 - The proposed alternative to Paragraph 1.1(d) states: (Refer to Code Case N-695 paragraph 2.3(a))

"At least 60% of the flaws shall be cracks, and the remainder shall be alternative flaws. Specimens with IGSCC shall be used when available. Alternative flaws shall meet the following requirements:

(1) Alternative flaws, if used, shall provide crack-like reflective characteristics and shall only be used when implantation of cracks would produce spurious reflectors that are uncharacteristic of service-induced flaws.

(2) Alternative flaws shall have a tip width no more than 0.002 in. (.05 mm)."

Technical Basis - As illustrated below, implanting a crack requires excavation of the base material on at least one side of the flaw. While this may be satisfactory for ferritic materials, it does not produce a useable axial flaw in austenitic materials because the sound beam, which normally passes only through base material, must now travel through weld material on at least one side, producing an unrealistic flaw response. In addition, it is important to preserve the dendritic structure present in field welds that would otherwise be destroyed by the implantation process. To resolve these issues, the proposed alternative allows the use of up to 40% fabricated flaws as an alternative flaw mechanism under controlled conditions. The fabricated flaws are isostatically compressed which produces ultrasonic reflective characteristics similar to tight cracks.



Item 3 - The proposed alternative to Paragraph 1.1(d)(1) states: (Refer to Code Case N-695 paragraph 2.2)

"At least 80% of the flaws shall be contained wholly in weld or buttering material. At least one and no more than 10% of the flaws shall be in ferritic base material. At least one and no more than 10% of the flaws shall be in austenitic base material."

Technical Basis - Under the current ASME Code requirement, as few as 25% of the flaws are contained in austenitic weld or buttering material. Recent experience has indicated that flaws contained within the weld are the likely scenarios. The metallurgical structure of austenitic weld material is ultrasonically more challenging than either ferritic or austenitic base material. The proposed alternative is therefore more challenging than the current ASME Code.

Item 4 - The proposed alternative to Paragraph 1.2(b) states: (Refer to Code Case N-695 paragraph 3.1(a)(2))

"Personnel performance demonstration detection test sets shall be selected from Table 1. The number of unflawed grading units shall be at least 1½ times the number of flawed grading units."

Technical Basis – Code Case N-695 Table 1 provides a statistically-based ratio between the number of unflawed grading units and the number of flawed grading units. The proposed alternative reduces the ratio to 1.5 times to reduce the number of test samples to a more reasonable number from the human factors perspective. However, 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 acceptance criteria for the statistical basis are in Table 1.

Item 5 - The proposed alternative to the flaw distribution requirements of Paragraph 1.2(c)(1) (detection) and 1.3(c) (length) is to use the Paragraph 1.4(b)

(depth) distribution table (see below) for all qualifications: (Refer to Code Case N-695 paragraph 2.4)

Flaw Depth (% Wall Thickness)	*Minimum Number of Flaws*
10-30%	*20%*
31-60%	*20%*
61-100%	*20%*

At least 75% of the flaws shall be in the range of 10 to 60% of wall thickness.

Technical Basis - The proposed alternative uses the depth sizing distribution for both detection and depth sizing because it provides for a better distribution of flaw sizes within the test set. This distribution allows candidates to perform detection, length, and depth sizing demonstrations simultaneously utilizing the same test set. The requirement that at least 75% of the flaws shall be in the range of 10 to 60% of wall thickness provides an overall distribution tolerance yet the distribution uncertainty decreases the possibilities for testmanship that would be inherent to a uniform distribution. It must be noted that it is possible to achieve the same distribution utilizing the present requirements, but it is preferable to make the criteria consistent.

Item 6 - The proposed alternative to Paragraph 2.0 first sentence states: (Refer to Code Case N-695 paragraph 3(a))

"For qualifications from the outside surface, the specimen inside surface and specimen identification shall be concealed from the candidate. When qualifications are performed from the inside surface, the flaw location and specimen identification shall be obscured to maintain a "blind test"."

Technical Basis - The current ASME Code requires that the inside surface be concealed from the candidate. This makes qualifications conducted from the inside of the pipe (e.g., PWR nozzle to safe end welds) impractical. The proposed alternative differentiates between inside diameter (ID) and outside diameter (OD) scanning surfaces, requires that they be conducted separately, and requires that flaws be concealed from the candidate.

Items 7 and 8 - The proposed alternatives to Paragraph 2.2(b) and 2.2(c) state: (Refer to Code Case N-695 paragraphs 3.2(b))

"... containing a flaw to be sized may be identified to the candidate."

Technical Basis - The current ASME Code requires that the regions of each specimen containing a flaw to be length sized shall be identified to the candidate. The candidate shall determine the length of the flaw in each region. Note, that length and depth sizing use the term "regions" while detection uses the term "grading units" - the two terms define different concepts and are not intended to be equal or interchangeable. To ensure security of the samples, the proposed alternative modifies the first "shall" to a "may" to allow the test administrator the option of not identifying specifically where a flaw is located. This is consistent with the recent revision to Supplement 2.

Items 9 and 10 - The proposed alternative to Paragraph 2.3(a) and 2.3(b) state: (Refer to Code Case N-695 paragraphs 3.2(b))

"... regions of each specimen containing a flaw to be sized may be identified to the candidate."

Technical Basis - The current Code requires that a large number of flaws be sized at a specific location. The proposed alternative changes the "shall" to a "may" which modifies this from a specific area to a more generalized region to ensure security of samples. This is consistent with the recent revision to Supplement 2. It also incorporates terminology from length sizing for additional clarity.

Item 11 - The proposed alternative modifies the acceptance criteria of Table VIII-S2-1 as follows: (Refer to Code Case N-695 Table 1)

TABLE 1
PERSONNEL PERFORMANCE DEMONSTRATION DETECTION TEST ACCEPTANCE CRITERIA

Detection Test Acceptance Criteria		False Call Acceptance Criteria	
No. of Flawed Grading Units	Minimum Detection Criteria	No. of Unflawed Grading Units	Maximum No. of False Calls
10	8	15	2
11	9	17	3
12	9	18	3
13	10	20	3
14	10	21	3
15	11	23	3
16	12	24	4
17	12	26	4
18	13	27	4
19	13	29	4
20	14	30	5

Technical Basis - The proposed alternative adds new Table 1 above. It is a modified version of Table VIII-S2-1 to reflect the reduced number of unflawed grading units and allowable false calls. As provided by the EPRI Performance Demonstration Initiative (PDI) as a part of ongoing Code activities, Pacific Northwest National Laboratories has reviewed the statistical significance of these revisions and offered the revised Table 1.

Summary - Compliance with the proposed alternatives will provide an acceptable level of quality and safety for ultrasonic examination of the affected welds.

6. Duration of Proposed Alternatives

Code Case N-695 will be used as an alternative to ASME Section XI, Appendix VIII, Supplement 10 requirements for the examination of dissimilar metal welds during the remainder of the current 10-Year ISI Interval or until Code Case N-695 is published in a future revision of RG 1.147. At that time, the provisions of Code Case N-695 with the limitations or conditions listed in RG 1.147, if any, will apply.

7. Precedents

The following safety evaluations have been issued by the NRC, approving similar requests:

1) Safety Evaluation dated July 16, 2003 (Accession No. ML031970111) for Exelon Generation Company, LLC, and AmerGen Energy Company, LLC (TAC Nos. MB8142, MB8143, MB8144, MB8145, MB8146, MB8147, MB8148, MB8149, MB8150, MB8151, MB8152, MB8153, MB8154, MB8155, and MB8156).

2) Safety Evaluation dated February 20, 2004 (Accession No. ML040270030) for FirstEnergy Nuclear Operating Company, Beaver Valley Power Station (TAC No. MC0602 and MC0603).

3) Safety Evaluation dated February 2, 2005 (Accession No. ML050210222) for FirstEnergy Nuclear Operating Company, Perry Nuclear Power Plant (TAC No. MC3169).

Docket Number 50-346
License Number NPF-3
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Enclosure 2

COMMITMENT LIST

THE FOLLOWING LIST IDENTIFIES THOSE ACTIONS COMMITTED TO BY THE DAVIS-BESSE NUCLEAR POWER STATION (DBNPS) IN THIS DOCUMENT. ANY OTHER ACTIONS DISCUSSED IN THE SUBMITTAL REPRESENT INTENDED OR PLANNED ACTIONS BY THE DBNPS. THEY ARE DESCRIBED ONLY FOR INFORMATION AND ARE NOT REGULATORY COMMITMENTS. PLEASE NOTIFY HENRY L. HEGRAT, SUPERVISOR – FLEET LICENSING (330-315-6944) OF ANY QUESTIONS REGARDING THIS DOCUMENT OR ANY ASSOCIATED REGULATORY COMMITMENTS.

COMMITMENTS	DUE DATE
None.	N/A