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CNRO-2003-00065

November 21, 2003

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: ASME Section XI, Appendix VIII, Relief Request

Arkansas Nuclear One, Unit 1 Docket No. 50-313 License No.DPR-51	Arkansas Nuclear One, Unit 2 Docket No. 50-368 License No. NPF-6
Grand Gulf Nuclear Station, Unit 1 Docket No. 50-416 NPF-29	River Bend Station, Unit 1 Docket No. 50-458 NPF-47
Waterford Steam Electric Station, Unit 3 Docket No. 50-382 NPF-38	

Dear Sir or Madam:

10 CFR 50.55a(g)(6)(ii)(C), requires the implementation of Appendix VIII and the supplements to Appendix VIII to Section XI, Division 1, 1995 Edition with the 1996 Addenda of the ASME Boiler and Pressure Vessel Code (Code). Pursuant to the provisions of 10 CFR 50.55a(a)(3)(i), Entergy requests relief from the requirements of Appendix VIII, Supplement 10, *Qualification Requirements for Dissimilar Metal Piping Welds*, of the Code. Relief Request CEP-ISI-008 (Attachment 1) proposes alternative requirements to parts of Supplement 10.

This request applies to Arkansas Nuclear One, Units 1 & 2, Grand Gulf Nuclear Station, Unit 1, River Bend Station, Unit 1, and Waterford Steam Electric Station, Unit 3.

This request is similar to the generic relief request, developed by the Performance Demonstration Initiative, to provide an alternative to the requirements of Supplement 10 of the Code.

This letter contains no new commitments.

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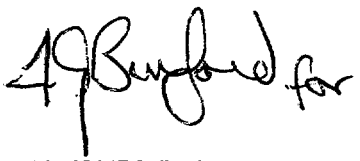
If you have any questions or require additional information, please contact Bill Brice at 601-433-5076.

Sincerely,



MAK/WBB/bal

Attachment: Relief Request, CEP-ISI-008

cc: Mr. W. A. Eaton (ECH)
Mr. J. S. Forbes (ANO)
Mr. P. D. Hinnenkamp (RBS)
Mr. B. S. Mallett, Administrator, Region IV
Mr. J. E. Venable (W-3)
Mr. G. A. Williams (GGNS)

Mr. T. W. Alexion, Project Manager (ANO-2)
Mr. N. Kalyanam, Project Manager (W-3)
Mr. J. L. Minns, Project Manager (ANO-1)
Mr. B. K. Vaidya, Project Manager (GGNS)
Mr. M. K. Webb, Project Manager (RBS)

Mr. P. J. Alter, RBS Sr. Resident Inspector
Mr. R. W. Deese, ANO Sr. Resident Inspector
Mr. M. C. Hay, W-3 Sr. Resident Inspector
Mr. T. L. Hoeg, GGNS Sr. Resident Inspector

Attachment 1

CNRO-2003-00065

RELIEF REQUEST

CEP-ISI-008

ENTERGY OPERATIONS, INC.
RELIEF REQUEST
CEP-ISI-008, Rev. 0

I. ASME COMPONENTS AFFECTED

Components/Numbers:	Dissimilar metal piping welds subject to examination using procedures, personnel, and equipment qualified to ASME Section XI, Appendix VIII, Supplement 10 criteria.
Code Classes:	1 and 2
Examination Category:	B-J, B-F, C-F-1
Item Number:	B5.10, B5.40, B5.70, B5.100, B9.10, B9.30, C5.10, C5.20
Unit / Inspection Interval Applicability:	ANO-1 – Third (3rd) 10-year interval ANO-2 – Third (3rd) 10-year interval GGNS – Second (2nd) 10-year interval RBS – Second (2nd) 10-year interval Waterford 3– Second (2nd) 10-year interval

II. PROPOSED ALTERNATIVES AND TECHNICAL BASIS FOR RELIEF FROM ASME CODE REQUIREMENTS

10 CFR 50.55a(g)(6)(ii)(C), requires the implementation of Appendix VIII and the supplements to Appendix VIII to Section XI, Division 1, 1995 Edition with the 1996 Addenda of the ASME Boiler and Pressure Vessel Code (Code). The following paragraphs and Table from Supplement 10, *Qualification Requirements for Dissimilar Metal Piping Welds*, specify the requirements for which relief is requested. Pursuant to 10 CFR 50.55a(a)(3)(i), in lieu of these requirements, Entergy Operations, Inc. (Entergy), proposes the following alternatives:

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.

In lieu of Paragraph 1.1(b), Entergy proposes:

> 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 within 1/2 inch of the nominal diameter 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, *Wrought Austenitic Piping*.

Paragraph 1.1(d) states:

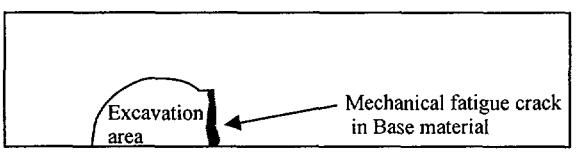
> All flaws in the specimen set shall be cracks.

In lieu of Paragraph 1.1(d), Entergy proposes:

> At least 60% of the flaws shall be cracks, the remainder shall be alternative flaws. Specimens with Intergranular Stress Corrosion Cracking shall be used when available. Alternative flaws, if used, shall provide crack-like reflective characteristics and shall be limited to the case where implantation of cracks produces spurious reflectors that are uncharacteristic of actual flaws. Alternative flaw mechanisms shall have a tip width of less than or equal to 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. To avoid confusion, the proposed alternative modifies instances of the term "cracks" or "cracking" to the term "flaws" because of the use of alternative flaw mechanisms.



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.

In lieu of Paragraph 1.1(d)(1), Entergy proposes:

> 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 Code, as few as 25% of the flaws are contained in austenitic weld or buttering material. 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 Code.

Paragraph 1.2(b) states:

> Detection sets shall be selected from Table VIII-S10-1. The number of unflawed grading units shall be at least twice the number of flawed grading units.

In lieu of Paragraph 1.2(b), Entergy proposes:

> Detection sets shall be selected from (new) Table VIII-S10-1. The number of unflawed grading units shall be at least 1-1/2 times the number of flawed grading units.

Technical Basis:

New Table VIII-S10-1 provides a statistically based ratio between the number of unflawed grading units and the number of flawed grading units. Based on information provided by the Performance Demonstration Initiative, the proposed alternative reduces the ratio to 1.5 times to reduce the number of test samples to a more reasonable number. 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 New Table VIII-S10-1.

Paragraph 1.2(c)(1) and 1.3(c) state in part:

> At least l/3 of the flaws, rounded to the next higher whole number, shall have depths between 10% and 30% of the nominal pipe wall thickness.

Entergy's proposed alternative to the flaw distribution requirement 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.

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

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.

Paragraph 2.0 first sentence states:

> The specimen inside surface and identification shall be concealed from the candidate.

In lieu of Paragraph 2.0, first sentence, Entergy proposes:

> For qualifications from the outside surface, the specimen inside surface and 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 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 ID and OD scanning surfaces, requires that they be conducted separately, and requires that flaws be concealed from the candidate.

Paragraph 2.2(b) states in part:

> The regions containing a flaw to be sized shall be identified to the candidate.

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.

In lieu of the sentence in Paragraph 2.2(b), Entergy proposes:

> The regions containing a flaw to be sized may be identified to the candidate.

In lieu of the sentence in Paragraph 2.2(c), Entergy proposes:

> For a separate length sizing test, the regions of each specimen containing a flaw to be sized may be identified to the candidate.

Technical Basis:

The current 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 "shall" to a "may" to allow the test administrator the option of not identifying specifically where a flaw is located.

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.

In lieu of Paragraph 2.3(a), Entergy proposes:

> The depth-sizing may be conducted separately or in conjunction with the detection test. For a separate depth-sizing test, the regions of each specimen containing a flaw to be sized may be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region.

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.

In lieu of Paragraphs 2.3(a) and 2.3(b), Entergy proposes:

> When the depth-sizing test is conducted in conjunction with the detection test, and less than ten flaws are detected, additional specimens shall be provided to the candidate such that at least ten flaws are sized. The regions of each specimen containing a flaw to be sized may be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region.

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.

Table VIII-S2-1, Performance Demonstration Detection Test Acceptance Criteria, provides the false call criteria when the number of unflawed grading units is at least twice the number of flawed grading units.

In lieu of Table VIII-S2-1, Entergy proposes to modify the acceptance criteria as follows:

TABLE VIII-S10-1
PERFORMANCE DEMONSTRATION DETECTION TEST
ACCEPTANCE CRITERIA

Detection Test Acceptance Criteria		False Call Test Acceptance Criteria	
No. of Flawed Grading Units	Minimum Detection Criteria	No. of Unflawed Grading Units	Maximum Number Of False Calls
~~5~~	~~5~~	~~10~~	~~0~~
~~6~~	~~6~~	~~12~~	~~1~~
~~7~~	~~6~~	~~14~~	~~1~~
~~8~~	~~7~~	~~16~~	~~2~~
~~9~~	~~7~~	~~18~~	~~2~~
10	8	~~20~~ 15	~~3~~ 2
11	9	~~22~~ 17	~~3~~ 3
12	9	~~24~~ 18	~~3~~ 3
13	10	~~26~~ 20	~~4~~ 3
14	10	~~28~~ 21	~~5~~ 3
15	11	~~30~~ 23	~~5~~ 3
16	12	~~32~~ 24	~~6~~ 4
17	12	~~34~~ 26	~~6~~ 4
18	13	~~36~~ 27	~~7~~ 4
19	13	~~38~~ 29	~~7~~ 4
20	14	~~40~~ 30	~~8~~ 5

Technical Basis:

The proposed alternative is identified as Table VIII-S10-1 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 PDI, as part of ongoing Code activities, Pacific Northwest National Laboratories has reviewed the statistical significance to this new Table VIII-S10-1.

III. Conclusion

10 CFR 50.55a(a)(3) states:

> Proposed alternatives to the requirements of (c), (d), (e), (f), (g), and (h) of this section or portions thereof may be used when authorized by the Director of the Office of Nuclear Reactor Regulation. The applicant shall demonstrate that:
>
> (i) The proposed alternatives would provide an acceptable level of quality and safety, or
>
> (ii) Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Entergy believes this alternative provides an acceptable level of quality and safety consistent with the Code requirements. Therefore, Entergy requests the NRC to authorize the proposed alternative in accordance with 10 CFR 50.55a(a)(3)(i).