Entergy

Entergy Operations, Inc.
1340 Echelon Parkway
Jackson, Mississippi 39213-8298
Tel 601-368-5758

F. G. Burford
Acting Director
Nuclear Safety & Licensing

CNRO-2005-00041

August 2, 2005

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Request for Alternative ANO1-R&R-009
Request to Use Wire-Type Penetrameters as an Alternative to the 1992 Edition of ASME Section III, Tables NB-5111-1 and NC-5111-1

Arkansas Nuclear One, Unit 1
Docket No. 50-313
License No. DPR-51

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a(a)(3)(i) Entergy Operations, Inc., (Entergy) proposes alternatives to the nondestructive examination requirements applicable to ASME Class 1 and 2 welds and weld repairs as required by ASME Section XI Code Case N-416-2. Specifically, Entergy requests NRC approval to use "wire-type" penetrameters for performing radiographic examinations in accordance with Tables NB-5111-1 and NC-5111-1 of ASME Section III, 1992 Edition with 1993 Addenda as an alternative to the "hole-type" penetrameters permitted in the 1992 Edition of Section III. This request, contained in the enclosure as Request for Alternative ANO1-R&R-009, applies to Arkansas Nuclear One, Unit 1 (ANO-1).

The NRC staff has approved similar requests for Calvert Cliffs Nuclear Power Plant, Units 1 and 2 (TAC Nos. MB3073 and MB3074), and Indian Point Energy Center, Unit 2 (TAC No. MB0032).

Entergy requests that the staff approve the use of ANO1-R&R-009 on or before August 2, 2006. Should you have any questions regarding this submittal, please contact Guy Davant at (601) 368-5756.

This letter contains no commitments.

Very truly yours,

FGB/GHD/ghd
Enclosure: Request for Alternative ANO1-R&R-009

A047

cc: Mr. W. A. Eaton (ECH)
Mr. J. P. DeRoy (ECH)
Mr. J. S. Forbes (ANO)

Dr. Bruce S. Mallett
Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Arkansas Nuclear One
P. O. Box 310
London, AR 72847

U. S. Nuclear Regulatory Commission
Attn: Mr. M. C. Thadani (ANO-1)
MS O-7D1
Washington, DC 20555-0001

ENCLOSURE

CNRO-2005-00041

REQUEST FOR ALTERNATIVE
ANO1-R&R-009

ENTERGY OPERATIONS, INC.
ARKANSAS NUCLEAR ONE, UNIT 1
3RD 10-YEAR INTERVAL
REQUEST NO. ANO1-R&R-009

I. COMPONENTS

Component/Number:	Various ASME Class 1 and 2 Items
Description:	ASME Code Class 1 and 2 items with welds or repair welds requiring radiography
Code Class:	1 and 2
References:	1. ASME Section XI, 1992 Edition with portions of the 1993 Addenda as listed in Reference 5 2. ASME Section XI Code Case N-416-2, *Alternate Pressure Test Requirements for Welded Repairs, Fabrication Welds for Replacement Parts and Piping Subassemblies, or Installation of Replacement Items by Welding* 3. ASME Section III, Subsection NB, 1992 Edition 4. ASME Section III, Subsection NB, 1992 Edition, 1993 Addenda 5. CEP-ISI-002, *Arkansas Nuclear One Unit 1 Inservice Inspection Plan* 6. NRC Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1*
Unit:	Arkansas Nuclear One, Unit 1 (ANO-1)
Inspection Interval:	Third (3rd) 10-Year Interval

II. CODE REQUIREMENTS

Subarticle IWA-4170(b) of ASME Section XI, 1992 Edition states, "Repairs and installation of replacement items shall be performed in accordance with the Owner's Design Specification and the original Construction Code of the component or system. Later editions and addenda of the Construction Code or of Section III, either in their entirety or portions thereof, and Code Cases may be used."

IWA-4710(a) of ASME Section XI, 1992 Edition states, "After a welded repair on a pressure retaining boundary or the installation of a replacement by welding, a system hydrostatic test shall be performed in accordance with IWA-5000."

As an alternative to the hydrostatic test of IWA-4710(a), a system leakage test can be performed in accordance with ASME Section XI Code Case N-416-2. Code Case N-416-2 has been conditionally approved by the NRC in Regulatory Guide 1.147.

(Regarding Code Case N-416-2, Table 2, *Conditionally Acceptable Section XI Code Cases,* of Regulatory Guide 1.147 states, "The provisions of IWA-5213, 'Test Condition Holding Times,' 1989 Edition, are to be used." Entergy will meet this condition.)

Paragraph (a) of Code Case N-416-2 states, "NDE shall be performed on welded repairs and fabrication and installation joints in accordance with the methods and acceptance criteria of the applicable Subsection of the 1992 Edition of Section III."

Paragraphs NB-5111 (ASME Class 1) and NC-5111 (ASME Class 2) of ASME Section III, 1992 Edition contain the following requirements regarding the use of penetrameters (image quality indicators):

- NB-5111 states in part, "Radiographic examination shall be in accordance with Section V, Article 2, except that fluorescent screens are not permitted, the geometric unsharpness shall not exceed the limits of T-285, and the penetrameters of Table NB-5111-1 shall be used in lieu of those shown in Table T-276."

- NC-5111 states in part, "Radiographic examination shall be in accordance with Section V, Article 2, except that fluorescent screens are not permitted, the geometric unsharpness shall not exceed the limits of T-285, and the penetrameters of Table NC-5111-1 shall be used in lieu of those shown in Table T-276."

Tables NB-5111-1 and NC-5111-1 of the 1992 Edition of Section III permit the use of "hole-type" penetrameters only; "wire-type" penetrameters are not permitted.

III. PROPOSED ALTERNATIVE

A. Background

ANO-1 utilizes the alternative pressure testing provisions of Code Case N-416-2 when performing repair/replacement activities involving welding. When invoking Code Case N-416-2, the NDE of all welded joints and repairs must be performed in accordance with the applicable Subsection (i.e., NB, NC, or ND) of the 1992 Edition of ASME Section III.

Tables NB-5111-1 (ASME Class 1) and NC-5111-1 (ASME Class 2) of ASME Section III, 1992 Edition specify penetrameter requirements for performing radiography. Based on these tables, only "hole-type" (plaque-type) penetrameters can be used. The use of "wire-type" penetrameters is not permitted by the 1992 Edition of Section III. However, Tables NB-5111-1 and NC-5111-1 were revised to include wire-type penetrameter requirements in the 1992 Edition, 1993 Addenda of ASME Section III. Therefore, as of the 1993 Addenda of Section III, wire type penetrameters are acceptable for use when performing radiography.

In addition, the 1992 Edition of ASME Section III, Subsection ND permits the use of both hole-type and wire-type penetrameters for ASME Class 3 applications. According to paragraph ND-5111(a), "Radiographic examination shall be in accordance with Section V, Article 2, except that the geometric unsharpness shall not exceed the limits of T-285." ASME Section V has permitted the use of wire-type penetrameters since the 1986 Edition, 1987 Addenda. Therefore, by reference to Article 2 of ASME Section V, paragraph ND-5111(a) has simply invoked the penetrameter requirements of Section V.

B. Proposed Alternative

Pursuant to the provisions of 10 CFR 50.55a(a)(3)(i), Entergy proposes an alternative to the NDE requirements of ASME Section XI Code Case N-416-2, paragraph (a) when performing radiographic examination of ASME Class 1 and 2 welds and repair welds associated with the performance of ASME Section XI repair/replacement activities. More specifically, as an alternative to the penetrameter requirements of Tables NB-5111-1 (ASME Class 1) and NC-5111-1 (ASME Class 2) in the 1992 Edition of Section III for the performance of radiographic examinations, Entergy proposes to use wire-type penetrameters in accordance with Tables NB-5111-1 and NC-5111-1 of ASME Section III, 1992 Edition with 1993 Addenda.

This proposed alternative does not apply to ASME Class 3 items.

IV. BASIS FOR PROPOSED ALTERNATIVE

Hole-type penetrameters are difficult to use due to placement and shim requirements. Specifically, the use of hole-type penetrameters can be difficult because the essential "T" hole is often obscured or distorted due to specimen anomalies, part geometry, or film artifacts outside the area of interest. This creates a re-shoot condition that has a negative ALARA impact due to the additional radiation exposure to the radiography crew. These characteristics make hole-type penetrameters better suited for use on flat plate and objects with a geometry such that the penetrameter hole image is not distorted. Unfortunately, these simple configurations are not typical with many nuclear piping components.

For more complex configurations, the wire-type penetrameter is superior in that it is placed directly across the area of interest, thus encompassing the object's range of density and geometry. The one-inch minimum length of the essential penetrameter wire eliminates this problem. The wire-type penetrameter provides the same function as the hole-type penetrameter by indicating a change in thickness and spatial resolution of the image without the use of shim blocks and pipe standards.

Wire-type penetrameters have been shown to provide quality and sensitivity equivalent to hole-type penetrameters as documented in Table 4 of ASME Section V, Article 22, Standard SE-747. Because of the equivalent sensitivity, the wire-type penetrameter provides equivalent results to currently required hole-type penetrameter. Therefore, the quality of the examination and resulting safety of the plant based on examination results are not impacted by this proposed alternative.

The 1992 Edition with 1993 Addenda of ASME Section III, which includes the provision for use of equivalent wire-type penetrameters, has been endorsed by the NRC in 10 CFR 50.55a. Furthermore, the NRC staff has approved the use of wire-type penetrameters for Calvert Cliffs Nuclear Power Plant, Units 1 and 2, and Indian Point Energy Center, Unit 2.

In its approval of the use of wire-type penetrameters for Calvert Cliffs, the NRC staff compared performance of wire-type penetrameters to hole-type penetrameters. In its safety evaluation, the staff stated in part, "Based on the above comparison [performed by the staff] of commonly used industry references and the widespread use of wire penetrameters in industry, the staff believes that the wire penetrameters listed in Table

NB-5111-1 (NC-5111-1) to the 1992 Edition with 1993 Addenda of the ASME Code will provide an acceptable level of quality and safety."

V. 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 that the proposed alternative identified in Section III.B and discussed in Section IV above provides an acceptable level of quality and safety to the repair rules as stated in References 1 and 2 and as described in Section II of this request. Therefore, we request that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).