



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

June 14, 2006  
NOC-AE-06002031  
File No.: G25  
10 CFR 50.55a

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
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South Texas Project  
Units 1 and 2  
Docket No. STN 50-498, STN 50-499  
Request for Relief from ASME Boiler and Pressure Vessel Code, Section XI  
Requirements for Use of Penetrameters in Radiographic Examinations  
(Relief Request RR-ENG-2-45)

Pursuant to 10 CFR 50.55a(a)(3)(i), STP Nuclear Operating Company (STPNOC) proposes an alternative to the nondestructive examination requirements applicable to ASME Classes 1, 2, and 3 welds and weld repairs. Approval will allow "wire-type" penetrameters to be used in 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 addressed in the 1992 Edition, no addenda, of Section III. The proposed alternative will provide an acceptable level of quality and safety.

The NRC staff has approved similar requests for:

- Calvert Cliffs, Units 1 and 2; and
- Indian Point, Unit 2

STPNOC requests that the staff approve the use of RR-ENG-2-45 by August 2, 2006, to support scheduling for the Unit 1 refueling outage in October 2006.

This letter contains no commitments.

If there are any questions, please contact either Mr. P. L. Walker at (361) 972-8392 or me at (361) 972-7030.

  
M. J. Berg  
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PLW  
Attachment: Relief Request for Application of Penetrameters in Radiographic Examinations  
(Relief Request RR-ENG-2-45)

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**SOUTH TEXAS PROJECT  
UNITS 1 AND 2  
RELIEF REQUEST FOR APPLICATION OF  
PENETRIMETERS IN RADIOGRAPHIC EXAMINATIONS  
(RELIEF REQUEST RR-ENG-2-45)**

**1.0 ASME Code Components Affected**

Description: Components with welded repairs and replacement components with fabrication welds or installed by welding

Class: ASME Code Classes 1, 2, and 3

Function: Multiple, depends on the specific application

**2.0 Applicable Code Edition and Addenda**

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition, No Addenda

ASME Boiler and Pressure Vessel Code, Section III, 1992 Edition, No Addenda

**3.0 Applicable Code Requirements**

As noted in IWA-4120, ASME Section XI, 1989 Edition:

Repairs 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.

In accordance with the provisions of 10CFR50.55a(a)(3)(i), STPNOC has been approved to use a system leakage test to detect leakage from welded repairs, fabrication welds for replacement parts and piping subassemblies, and welds for installation of replacement items in accordance with Code Case N-416-2 as an alternative to system hydrostatic testing required by IWA-4700. For a system leakage test to be used, Code Case N-416-2 requires performance of non-destructive examination in accordance with the methods and acceptance criteria of the applicable Subsection of the 1992 Edition of Section III, no Addenda.

ASME Section III, 1992 Edition includes the following:

- Paragraph NB-5111 (ASME Class 1)

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. [ASME Section V]

Table NB-5111-1 only refers to use of hole-type penetrameters; use of wire-type penetrameters is not addressed.

- Paragraph NC-5111 (ASME Class 2) of ASME Section III, 1992 Edition

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. [ASME Section V]

Table NC-5111-1 only refers to use of hole-type penetrameters; use of wire-type penetrameters is not addressed.

#### **4.0 Reason for Request**

Hole-type penetrameters can be difficult to use due to their physical placement during radiography and their radiograph characteristics. The recorded radiographic characteristics are often obscured or distorted due to specimen anomalies, part geometry, or film artifacts outside the area of interest. These difficulties may result in re-shoots, and re-shoots have potential for additional radiation exposure to the radiography crew. Additionally, use of hole-type penetrameters, with their associated stringent placement and shim requirements, has a direct ALARA impact when performing radiography in a nuclear power environment. This impact is created by the extended time spent in the radiation field for set-up of shim blocks and pipe standards. When a hole-type penetrameter does not have a good fit adjacent to or across the area of interest, movement of the inspection media can occur. Movement renders the exposure useless, making it necessary to set-up again and re-shoot the weld view.

#### **5.0 Proposed Alternative**

Pursuant to the provisions of 10 CFR 50.55a(a)(3)(i), STP proposes an alternative to the hole-type penetrameter selection of Tables NB-5111-1 (ASME Class 1) and NC-5111-1 (ASME Class 2) in the ASME Section III, 1992 Edition, no addenda. Wire-type penetrameters as referenced in Tables NB-5111-1 and NC-5111-1 of ASME Section III, 1992 Edition, 1993 Addenda, are proposed used for performing radiographic examinations. Although not specified in the 1993 Addenda, wire-type penetrameters are also to be an alternative to hole-type penetrameters in ASME Class 3 applications.

#### **6.0 Basis for Use**

Wire-type penetrameters provide the same function as hole-type penetrameters by indicating changes in thickness and spatial resolution of the image. The one-inch minimum length of the wire eliminates the problem of indicator loss due to distortion, anomalies, and part geometry that is commonly found with the target hole in plaque type penetrameters. For more complex configurations, wire-type penetrameters are superior in that placement is directly across the area of interest, encompassing the object's range of density and geometry without using shim blocks and pipe standards.

Wire-type penetrameters have shown sensitivity equivalent to that of hole-type penetrameters as documented in Table 4 of ASME Section V, Article 22, Standard SE-747. Because of its equivalent sensitivity, a wire-type penetrameter will provide results equivalent to those of a hole-type penetrameter. Therefore, the proposed alternative will maintain the quality of the examination results.

Penetrameter requirements for performing radiography are specified by Tables NB-5111-1 (ASME Class 1) and NC-5111-1 (ASME Class 2) of ASME Section III, 1992 Edition. Based on these tables, only hole-type penetrameters can be used. Wire-type penetrameters are not included in the 1992 Edition of Section III. However, Tables NB-5111-1 and NC-5111-1 were revised in the 1992 Edition, 1993 Addenda of ASME Section III to include wire-type penetrameter requirements. The 1992 Edition with 1993 Addenda of ASME Section III, which includes the provision for use of equivalent wire-type penetrameters, is endorsed by the NRC in 10 CFR 50.55a. Consequently, as of the 1993 Addenda to Section III, wire-type penetrameters are acceptable for use when performing radiography.

The proposed alternative to use wire-type image quality indicators for radiography examinations as provided for in ASME Section III, 1992 Edition with 1993 Addenda, provides an acceptable level of quality and safety. Therefore, STPNOC requests that application of the proposed alternative at the South Texas Project be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

**7.0 Duration of Proposed Alternative**

STPNOC requests that the staff approve the use of RR-ENG-2-45 by August 2, 2006, to support scheduling for the Unit 1 refueling outage in October 2006. Once approved, this alternative will be available for use for the duration of the second inspection interval. The second inservice inspection interval for the South Texas Project commenced on September 25, 2000, for Unit 1, and October 19, 2000, for Unit 2.

**8.0 Precedents**

The NRC staff has approved wire-type penetrameters for use at Calvert Cliffs Nuclear Power Plant, Units 1 and 2, and Indian Point Energy Center, Unit 2. Approvals of their applications were provided as follows:

- Calvert Cliffs, Units 1 and 2  
Submitted: September 27, 2001  
Approved: December 19, 2001  
TAC Nos. MB3073 and MB3074
- Indian Point, Unit 2  
Submitted: September 20, 2000  
Approved: November 28, 2000  
TAC No. MB0032