



**Constellation**  
Nuclear

**Calvert Cliffs**  
**Nuclear Power Plant**

*A Member of the  
Constellation Energy Group*

September 27, 2001

U. S. Nuclear Regulatory Commission  
Washington, DC 20555

**ATTENTION:** Document Control Desk

**SUBJECT:** Calvert Cliffs Nuclear Power Plant  
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318  
Relief Request to Use Wire Type Image Quality Indicators as an Alternative to  
ASME Section III, 1992, No Addenda Code Requirements

- REFERENCES:**
- (a) Letter from Ms. M. Gamberoni (NRC) to Mr. C. H. Cruse (BGE), dated April 5, 2000, Safety Evaluation of Proposed Alternate American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Section XI, 1998 Edition for the Third 10-Year Inspection Interval – Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (TAC Nos. MA4647 and MA 4648
  - (b) Letter from Mr. S. S. Bajwa (NRC) to Mr. C. H. Cruse (BGE), dated April 7, 1998, Request to Use ASME Section XI, Code Case N-416-1, Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (TAC Nos. MA1007 and MA 1008)
  - (c) Regulatory 1.147, Revision 12, dated May 1999, Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1

Pursuant to 10 CFR 50.55a(a)(3)(i), Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP) hereby proposes an alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) requirement concerning the Calvert Cliffs Nuclear Power Plant Repair/Replacement of Code Class 1, 2, and 3 components for the Third Ten-Year Inservice Inspection (ISI) interval. Calvert Cliffs Technical Specification 4.0.5 states in part, "Inservice inspection of ASME Code Class 1, 2, and 3 components ... shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50, Section 50.55a(g) ..." Paragraph 50.55a(a)(3)(i) allows the use of alternatives to the requirements of Paragraph 50.55a(g), that provide an acceptable level of quality and safety, when authorized by the Director of the Office of Nuclear Reactor Regulation.

The Third Ten-Year ISI Program Plan for Calvert Cliffs Units 1 and 2 meets the requirements of the 1998 Edition, no Addenda of Section XI of the ASME Code (except for Subsections IWE and IWL), as

A047

approved by Nuclear Regulatory Commission (NRC) letter dated April 5, 2000 (Reference a). Subsection IWA in Section XI describes the general requirements for repairs and replacements, including examination and pressure testing. As an alternative to the hydrostatic pressure testing requirements of IWA-4000, CCNPP sought and received NRC approval to use ASME Section XI Code Case N-416-1, which provides alternative pressure testing requirements for welded repairs or installation of replacements by welding for Class 1, 2, and 3 components (Reference b). The use of Code Case N-416-1 was subsequently endorsed by the NRC in Revision 12 of Regulatory Guide 1.147 (Reference c).

American Society of Mechanical Engineers Code Case N-416-1 invokes the 1992 Edition, no Addenda, of the ASME Code, Section III in the performance of nondestructive examination of welded repairs or installation of replacement components by welding. American Society of Mechanical Engineers, Section III, Articles NB-5111 and NC-5111, require that "...Radiographic examination shall be in accordance with Section V, Article 2, except that ... the penetrameters of Table NB-5111-1 (NC-5111-1) shall be used in lieu of those shown in Table T-276" (of ASME Section V). Tables NB-5111-1 and NC-5111-1 specify only plaque type penetrameters. They do not specifically address the equivalency or use of wire type Image Quality Indicators (IQIs). However, equivalent wire type IQIs were incorporated into these tables in the 1993 Addenda of the 1992 Edition of the ASME Section III Code.

#### **COMPONENT FOR WHICH RELIEF IS REQUESTED**

- ◆ Class 1, 2, and 3 components with welded repairs or replacements installed by welding.

#### **CODE REQUIREMENTS FOR WHICH RELIEF IS REQUESTED**

American Society of Mechanical Engineers Code, Section III, 1992 Edition, no Addenda, Articles NB-5111 and NC-5111, require that "...Radiographic examination shall be in accordance with Section V, Article 2, except that ... the penetrameters of Table NB-5111-1 (NC-5111-1) shall be used in lieu of those shown in Table T-276" (of ASME Section V). Tables NB-5111-1 and NC-5111-1 specify only plaque type penetrameters.

#### **PROPOSED ALTERNATIVE**

Use of wire type IQIs as incorporated into Tables NB-5111-1 and NC-5111 in the 1993 Addenda of the 1992 Edition of the ASME Section III Code.

#### **SUPPORTING INFORMATION**

Plaque type penetrameters are difficult to use due to placement and shim requirements. Plaque type penetrameters are suited for use on flat plate and on objects with a geometry such that the penetrameter hole image is not distorted. This is not the case in many nuclear piping components. In these instances the wire type IQIs are superior in that they are placed directly across the area of interest, thus encompassing the object's range of density and geometry. Use of plaque 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 and requires the radiography crew to reenter the radiation area and thus receive extra dose. The one inch minimum length of the essential IQI 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. The wire type IQIs provide the same function as the plaque type penetrameters by indicating a change in thickness and spatial resolution of the image without the use of shim blocks and pipe standards often required for the plaque type penetrameters.

Wire type IQIs have been shown to provide quality and sensitivity equivalent to plaque type penetrameters as documented in Table 4 of American Society for Testing and Materials E747-87. Additionally, use of plaque 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 due to the set-up time associated with the use of shim blocks or pipe standards. When the plaque type penetrameters do not have a good fit adjacent to or across the area of interest, movement of the shim or plaque can occur. Movement renders the exposure useless, making it necessary to set-up again and re-shoot a weld view. This has a negative ALARA impact on the radiography crew.

In addition, the use of wire type IQIs eliminates re-shoots due to density variations in the area of interest due to thickness changes in the part because the wires extend across areas of density variations, providing information across a larger area of the radiograph.

Equivalent sensitivity has been demonstrated in ASME Section V, Article 22, Standard SE-747. Because of the equivalent sensitivity, the proposed testing alternative (wire type IQIs) provides equivalent testing results to the current testing method (plaque type penetrameters). Therefore, the quality of the inspection and resulting safety of the plant, based on the inspection results, are not impacted by the proposed relief request. This relief request is consistent with similar requests that received approval from the NRC including Indian Point 2, which received approval on November 28, 2000.

Therefore, CCNPP requests permission of the Director of the Office of Nuclear Reactor Regulation to use the wire type IQIs as an alternative to plaque penetrameters under the provision of 10 CFR 50.55a(a)(3)(i).

#### SAFETY COMMITTEE REVIEW

The proposed relief request has been reviewed by our Plant Operations and Safety Review Committee, and they have concluded that the proposed alternative provides an acceptable level of quality and safety.

#### SCHEDULE

During planning for the upcoming Calvert Cliffs Unit 1 spring 2002 steam generator replacement and refueling outage (scheduled to begin in February 2002), we have identified several jobs that would require wire IQIs. We request that the NRC review and approve our proposed alternative for use during this outage.

Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,



CHC/GT/bjd

cc: R. S. Fleishman, Esquire  
J. E. Silberg, Esquire  
Director, Project Directorate I-1, NRC  
D. M. Skay, NRC

H. J. Miller, NRC  
Resident Inspector, NRC  
R. I. McLean, DNR