

FEB 26 2004

LR-N04-0034



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

**RELIEF REQUEST S1-RR-W02, PROPOSED ALTERNATIVE  
REPAIR METHOD FOR REACTOR VESSEL HEAD PENETRATIONS  
SALEM GENERATING STATION UNIT 1  
FACILITY OPERATING LICENSE NO. DPR-70  
DOCKET NO. 50-272**

PSEG Nuclear, LLC (PSEG) will conduct inspections of the reactor pressure vessel head penetrations (VHP) during the Salem Generating Station Unit 1 refueling outage 1R16 in accordance with NRC Order EA-03-009 dated February 11, 2003. To date no indications of flaws have been found on the outside diameter welds for the underside of the reactor vessel head.

Pursuant to 10 CFR 50.55a(a)(3)(i), PSEG is submitting Relief Request S1-RR-W02 to the requirements of Section XI of the ASME Code requesting authorization to use the embedded flaw repair technique. This technique would be used as an alternative to the requirements of the ASME Section XI Code that preclude welding over or embedding an existing flaw. This proposed alternative would allow use of an embedded flaw repair technique to repair flaws on the inside diameter (ID) and the outside diameter (OD) of the VHPs, including repair flaws on the J-groove attachment welds for the VHPs. PSEG will utilize the technique described in Westinghouse Topical Report WCAP-15987-NP Revision 2-NP-A, "Technical Basis for the Embedded Flaw Process for Repair of Reactor Vessel Head Penetrations" dated December 2003 as approved by the NRC in their July 3, 2003 Safety Evaluation. Attachment 1 provides the details of the relief request.

PSEG requests approval by the start of refueling outage 1R16, currently scheduled to begin March 31, 2004.

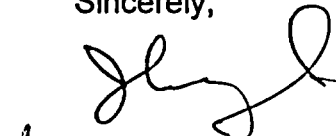
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No new commitments are identified in this letter. If you have any questions or require additional information, please contact Mr. Michael Mosier at (856) 339-5434.

Attachment

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Mannon', with a large loop at the end.

for Steven R. Mannon  
Manager – Nuclear Licensing

C: Mr. H. J. Miller, Administrator - Region I  
U. S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Mr. R. Fretz, Project Manager - Salem  
U. S. Nuclear Regulatory Commission  
Mail Stop 08B2  
Washington, DC 20555

USNRC Senior Resident Inspector - Salem (X24)

Mr. K. Tosch, Manager IV  
Bureau of Nuclear Engineering  
33 Arctic Parkway  
CN 415  
Trenton, NJ 08625

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**Proposed Alternative In Accordance with 50.55a(a)(3)(i)**

**-Alternative Provides Acceptable Level of Quality and Safety-**

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**1. ASME Code Components Affected**

Seventy-nine (79) reactor pressure vessel (RPV) head penetrations, Salem Generating Station Unit 1.

**2. Applicable Code Edition and Addenda**

The in-service inspection (ISI) code of record at the Salem Generating Station Unit 1 for the third 10-year interval is the 1995 Edition including 1996 Addenda of ASME Section XI. For the purpose of this proposed alternative, the use of the 1995 Edition, 1997 Addenda of ASME XI, Division 1 is to be employed for any required repairs.

**3. Applicable Code Requirement**

ASME Code, Section XI, IWA-4150, "REPAIR/REPLACEMENT PROGRAM AND PLAN", states in part:

(b) The Edition and Addenda of Section XI used for the Repair/Replacement Program shall correspond with the Edition and Addenda identified in the inservice inspection program applicable to the inspection interval. Alternatively, later Editions and Addenda of Section XI, or specific provisions within an Edition or Addenda later than those specified in the Owner's Inservice Inspection Program may be used. When provisions of later Editions and Addenda are used, all related requirements shall be met. The later Edition and Addenda shall have been accepted by the enforcement and regulatory authorities having jurisdiction at the plant site.

Regulatory Guide 1.147, Inservice Inspection Code Case Acceptability-ASME Section XI, Revision 13 dated June 2003 lists code cases approved for use by the NRC. ASME Code Case N389-1, Alternative Rules for Repairs, Replacements or Modifications, is listed in Table 1, Acceptable Section XI Code Cases. This code case allows the use of later editions of the Code and Addenda provided it has been reviewed and approved by the NRC. ASME Section XI 1995

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Edition, up to and including the 97 Addenda, makes provision for an alternative to the mechanical processing of thermally cut surfaces. IWA-4461.4, Alternative to Mechanical Processing, does not require mechanically processing provided a qualified thermal metal removal process as defined in paragraphs (a) thru (e) are followed. PSEG will use the qualified Embedded Flaw Process developed by Westinghouse and accepted by the NRC (reference 8.2) should, weld repair become necessary.

ASME Code, Section XI, IWA-4611.1, "METAL REMOVAL, General Requirements", states in part:

(a) "Defects shall be removed or reduced in size in accordance with this Paragraph."

ASME Code, Section XI, IWA-4611.2.2, "P-No. 8 and 43 Materials", states in part:

"If thermal removal processes are used on P-No. 8 and P-No. 43 materials, a minimum of 1/16 in. material shall be mechanically removed from the thermally processed area."

ASME Code, Section XI, subparagraphs IWA-4410 and IWA-4611 permit embedding the remains of a flaw, but do not address embedding an existing flaw by directly welding over a flaw open to the surface without partial removal.

**4. Reason for Request**

PSEG will be performing inspections of the vessel head penetrations (VHP) in accordance with Order EA-03-009. In the event that any of these inspections indicate flaws in these penetrations, it will be necessary to repair such flaws. PSEG proposes that any flaws requiring repair that are identified on the vessel head penetrations (VHP) and on the J-groove attachment welds will be embedded with a weld buildup.

ASME Code, Section XI, subparagraphs IWA-4150 and IWA-4611.1, 1995 Edition including 1996 Addenda do not permit embedding an existing flaw by

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directly welding over a flaw open to the surface without partial removal. This alternative is being proposed since the traditional repair method involves increased risk as the amount of structural deformation increases as the amount of deposited weld metal increases. Also, the traditional repair method is time consuming and would increase dose.

**5. Proposed Alternative and Basis for Use**

As an alternative to the rules contained in ASME Code Section XI, subarticles IWA-4150 and IWA-4611.1, 1995 Edition including 1996 Addenda do not allow welding over or embedding an existing flaw. PSEG proposes the use of the embedded flaw process outlined in Westinghouse Topical Report WCAP-15987-NP Revision 2-NP-A, "Technical Basis for the Embedded Flaw Process for Repair of Reactor Vessel Head Penetrations" dated December 2003.

On July 3, 2003 the Nuclear Regulatory Commission (NRC) issued a Safety Evaluation (SE) for Westinghouse Electric Company Topical Report WCAP-15987-P, Revision 2, (Alternative Repair Technique for Reactor Vessel Head Penetrations and Adjoining Welds, Project No. 700) allowing licensees to reference the SE and associated Topical Report as a proposed alternative to the 1989 Edition of Section III to ASME Code, NB-4453.1 for the repair of VHP nozzles and adjoining J-groove welds. The SE indicates the proposed repair alternative provides an acceptable level of safety and quality, subject to the following conditions:

1. Licensees must follow the NRC flaw evaluation guidelines (R. J. Barrett (NRC) letter to A. Marion (Nuclear Energy Institute), "Flaw Evaluation Guidelines," April 11, 2003).
2. The crack growth rate is not applicable to Alloy 600 or Alloy 690 weld material, i.e., Alloy 52, 82, 152, and 182 filler material.

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3. The NDE requirements listed in the Table below must be implemented for examinations of repairs made using the embedded flaw process.

Repair Location	Flaw Orientation	Repair Weld	Repair NDE	ISI NDE of the repair, Note 2
VHP Nozzle ID	Axial	Seal	UT and Surface	UT or Surface
VHP Nozzle ID	Circumferential	Note 1	Note 1	Note 1
VHP Nozzle OD above J-groove weld	Axial or Circumferential	Note 1	Note 1	Note 1
VHP Nozzle OD below J-groove weld	Axial or Circumferential	Seal	UT or Surface	UT or Surface
J-groove weld	Axial	Seal	UT and Surface Note 3	UT and Surface, Note 3
J-groove weld	Circumferential	Seal	UT and Surface Note 3	UT and Surface, Note 3

- Notes: 1. Repairs must be reviewed and approved separately by the NRC.
2. Inspection consistent with the NRC Order EA-03-009 dated February 11, 2003 and any subsequent changes.
3. Inspect with personnel and procedures qualified with UT performance-based criteria. Examine the accessible portion of the repaired region. The UT coverage plus surface coverage must equal 100 percent.

Section 2.0 of the NRC SE, Regulatory Evaluation, states, "The proposed seal weld repair process is based on, and compared to, the requirements of the 1989 Edition of ASME Section XI." The Evaluation requires licensees choosing to use other editions and addenda of the ASME Code must reconcile the Code requirements to those of the 1989 Edition of the ASME Code.

PSEG has performed a reconciliation in accordance with PSEGs ANSI/ASME Code Reconciliation for Materials/Parts/Components/Design Procedure and has concluded that the bases for Reference 8.1 are applicable to Salem Generating Station Unit 1.

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**6. Duration of Proposed Alternative**

The proposed alternative would apply only during the period in which NRC Order EA-03-009 is in effect for Salem Nuclear Generating Station, Unit 1.

**7. Precedents**

The NRC approved a similar alternative for Palo Verde Nuclear Generating Station, Units 1, 2, and 3 on September 25, 2003, Beaver Valley Station Units 1&2 on April 7, 2003 and North Anna Power Station, Unit 2, on January 23, 2003. Additionally, the NRC previously approved a similar alternative for D.C. Cook, Units 1 and 2, on April 9, 1996. Although the alternative was applied to the VHP tube base metal rather than VHP welds, both alternatives used an embedded flaw repair technique.

**8. References**

- 8.1. NRC letter dated July 3, 2003, "Acceptance for Referencing - Topical Report WCAP-15987-P, Revision 2, "Technical Basis for the Embedded Flaw Process for Repair of Reactor Vessel Head Penetrations," (TAC NO. MB8997).
- 8.2. Westinghouse Topical Report WCAP-15987-NP Revision 2-NP-A, "Technical Basis for the Embedded Flaw Process for Repair of Reactor Vessel Head Penetrations" dated December 2003.
- 8.3. R. J. Barrett (NRC) letter to A. Marion (Nuclear Energy Institute), "Flaw Evaluation Guidelines," April 11, 2003.