

November 27, 2002

Mr. Harold W. Keiser  
Chief Nuclear Officer & President  
PSEG Nuclear LLC - X04  
Post Office Box 236  
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2,  
EVALUATION OF RELIEF REQUEST SC-RR-A01 (TAC NOS. MB5569 AND  
MB5570)

Dear Mr. Keiser:

By letter dated July 8, 2002, PSEG Nuclear LLC (PSEG) submitted 12 requests for relief from Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) in accordance with 10 CFR 50.55a(a)(3)(i). The enclosed safety evaluation refers to 1 of these 12 requests; specifically, it refers to Relief Request SC-RR-A01 regarding the use of ASME Code Case N-533-1 alternatives to certain requirements of IWA-5242 regarding VT-2 visual examinations. By letter dated October 10, 2002, PSEG resubmitted Relief Request SC-RR-A01 including information that had not been contained in the July 8, 2002, submittal.

Based on its review, the Nuclear Regulatory Commission (NRC) staff concludes that the proposed alternative to use ASME Code Case N-533-1 provides an acceptable level of quality and safety. Therefore, the NRC staff authorizes PSEG to use the proposed alternative pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year Inservice Inspection (ISI) interval for Salem, Unit No. 1, and for the second 10-year ISI interval for Salem Unit No. 2. The use of Code Case N-533-1 is authorized until such time as the code case is published in a revision to Regulatory Guide (RG) 1.147. If, at that time, PSEG intends to continue to implement Code Case N-533-1, PSEG must follow all provisions of this code case within the limitations stated in RG 1.147, if any.

The NRC staff's safety evaluation is enclosed. If you have any questions, please contact Robert Fretz, at 301-415-1324.

Sincerely,

*/RA/*

James W. Andersen, Acting Chief, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-272 and 50-311

Enclosure: As stated

cc w/encl: See next page

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PSEG Nuclear LLC

Salem Nuclear Generating Station,  
Unit Nos. 1 and 2

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE USE OF ASME CODE CASE N-533-1

IN ACCORDANCE WITH RELIEF REQUEST SC-RR-A01

SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2

PSEG NUCLEAR LLC

DOCKET NOS. 50-272 AND 50-311

1.0 INTRODUCTION

By letter dated July 8, 2002, PSEG Nuclear LLC (PSEG or the licensee) submitted 12 requests for relief from Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code) for the Salem Nuclear Generating Station, Unit Nos. 1 and 2 (Salem). Relief Request SC-RR-A01 requested approval to use ASME Code Case N-533-1, "Alternative Requirements for VT-2 Visual Examination of Class 1, 2, and 3 Insulated Pressure-Retaining Bolted Connections Section XI, Division 1," as an alternative to certain requirements of ASME Code Section IWA-5242 for the detection and evaluation of leakage located at bolted connections. By letter dated October 10, 2002, the licensee revised and resubmitted the original Relief Request SC-RR-A01 in its entirety. The U.S. Nuclear Regulatory Commission (NRC) staff is documenting its review of the other relief requests contained in PSEG's July 8, 2002, letter under separate cover.

2.0 BACKGROUND

The inservice inspection (ISI) of ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable addenda as required by 10 CFR 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). As stated in 10 CFR 50.55a(a)(3) alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

3.0 EVALUATION

3.1 Licensee's Request (As stated):

**Component Description**

Insulated, Pressure Retaining Bolted Connections on ASME Class 1, 2, and 3 systems bolated for the purpose of controlling reactivity.

**ASME Section XI Class** 1, 2, and 3

ENCLOSURE

### **Code Requirement**

Paragraph IWA-5242 of the 1995 Edition, including the 1996 Addenda of Section XI, requires in part that insulation shall be removed from pressure-retaining bolted connections for VT-2 visual examination of systems borted for the purpose of controlling reactivity.

Similarly, Paragraph IWA-5242 of the 1986 Edition (without Addenda) of Section XI requires in part, that, insulation shall be removed from pressure-retaining bolted connections for visual examination VT-2 of systems borted for the purpose of controlling reactivity.

### **Basis for Relief**

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested on the basis that the proposed alternative provides an acceptable level of quality and safety.

PSEG Nuclear, LLC requests relief to incorporate the alternative examination requirements of ASME Code Case N-533-1, titled 'Alternative Requirements, for VT-2 Visual Examination of Class 1, 2, and 3 Insulated Pressure Retaining Bolted Connections', for Salem Generating Station, Units 1 and 2.

### **For Class 1 Systems:**

- Salem Generating Station, Unit 1 Technical Specification 3.4.9.1 does not allow pressurization of the Reactor Coolant System to nominal operating pressure without a heat up.
- Similarly, Salem Generating Station, Unit 2 Technical Specification 3.4.10.1 does not allow pressurization of the Reactor Coolant System to nominal operating pressure without a heat up.
- Re-installation of insulation requires exposing personnel to the safety hazards of higher radiation dose, additional personnel support, and elevated temperatures (550 degrees F) and a pressure of 2235 PSI, which constitute a heat stress environment.
- The activities will be conducted at the end of the outage and will have the effect of extending the refueling outage durations by a minimum of 2 days.
- Boric acid leakage, leaves boric acid crystalline residue when evaporated, therefore it is not necessary to examine for boric acid leakage in conjunction with a pressure test.

### **For Class 2 & 3 Systems:**

- Re-installation of insulation requires exposing personnel to the

safety hazard at elevated temperatures, which includes a heat stress environment.

- Boric acid leakage, leaves boric acid crystalline residue when evaporated, therefore it is not necessary to examine for boric acid leakage in conjunction with a pressure test.

A similar relief was evaluated and previously granted for Salem Generating Station, Unit 2 for Insulated Pressure Retaining Bolted Connections on Class 1 systems borated for the purpose of controlling reactivity RERERENCE: NRC Safety Evaluation for Relief From ASME Code on VT-2 Visual Inspection of Bolted Connections, Salem Nuclear Generating Station, Unit 2 (TAC No. M86246).

This relief will permit application of the alternative rules from Code Case N-533-1 for Unit 1, and extend the application of the alternative rules to Class 2 and 3 systems at Unit 2.

Based on the alternative requirements of Code Case N-533-1 and the approval of a similar Relief Request [for] Salem Generating Station, Unit 2, there is reasonable assurance that structural integrity will be assured, and an acceptable level of quality and safety will be maintained during the Third Ten-Year Inspection Interval.

### **Alternative Requirements**

PSEG Nuclear, LLC proposes to fully implement the alternative requirements of Code Case N-533-1. This case requires that as an alternative to the requirements of IWA-5245(a) to remove insulation from Class 1, 2, and 3 pressure-retaining bolted connections to perform VT-2 visual examinations, the following requirements shall be met:

(a) A system pressure test and VT-2 visual examination shall be performed each refueling outage for Class 1 connections and each period for Class 2 and 3 connections without removal of insulation. The affected insulated system shall have been at operating conditions for a minimum of 4 hours prior to commencement of the VT-2 visual examination.

(b) The insulation shall be removed from the bolted connection, each refueling outage for Class 1 connections and each period for Class 2 and 3 connections, and a VT-2 visual examination shall be performed. The connection is not required to be pressurized. Any evidence of leakage shall be evaluated in accordance with IWA-5250.

### **Applicability**

This Relief Request is applicable to the following:

Salem, Unit 1 - Third Ten-Year Inservice Inspection Interval.

## Salem, Unit 2 - Second Ten-Year Inservice Inspection Interval.

### 3.2 NRC Staff's Evaluation

The ASME Code requires the removal of all insulation from pressure-retaining bolted connections in systems borated for the purpose of controlling reactivity when performing VT-2 visual examinations during system pressure tests. For Class 1 systems, the Code requires VT-2 examinations each refueling outage. Class 2 and 3 systems are required to receive these examinations each ISI inspection period. As an alternative to the Code requirements, the licensee has proposed to use Code Case N-533-1, "Alternative Requirements for VT-2 Visual Examination of Class 1, 2 and 3 Insulated Pressure Retaining Bolted Connections," for borated Class 1, 2 and 3 systems at Salem 1 and 2.

Code Case N-533-1 provides for system pressure tests and VT-2 visual examinations during each ISI inspection period for Class 2 and 3 systems, and during each outage for Class 1 systems. In addition, the code case requires a minimum 4-hour hold time for the system pressure test. The 4-hour hold time will allow any leakage to penetrate the insulation, thus providing a means of detecting any significant leakage with the insulation in place. By removing the insulation each outage for Class 1 systems and each inspection period for Class 2 and 3 systems, the licensee will be able to detect minor leakage indicated by the presence of boric acid crystals or residue. The staff finds that this two-step approach provides reasonable assurance of the structural and leak-tight integrity for pressure-retaining bolted connections in Class 1, 2 and 3 systems containing borated water. Therefore, the NRC staff finds that the proposed alternative to use ASME Code Case N-533-1 provides an acceptable level of quality and safety, and is acceptable.

### 4.0 CONCLUSION

Based on its review, the NRC staff finds that the proposed alternative stated in PSEG's Relief Request SC-RR-A01 will provide reasonable assurance of integrity for pressure-retaining bolted connections in Class 1, 2 and 3 systems containing borated water. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR50.55a(a)(3)(i) for the third 10-year ISI interval at Salem, Unit No. 1, and for the second ISI interval at Salem, Unit No. 2, or until such time that Code Case N-533-1 is published in a future revision of Regulatory Guide (RG) 1.147. At that time, if the licensee intends to continue to implement Code Case N-533-1, PSEG must follow all the provisions of Code Case N-533-1 within the limitations set forth in RG 1.147, if any.

Principal Contributor: G. Wunder

Date: November 27, 2002