

July 16, 2003

Mr. Roy A. Anderson  
President & Chief Nuclear Officer  
PSEG Nuclear, LLC - X04  
Post Office Box 236  
Hancocks Bridge, NJ 08036

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NO. 1 - RELIEF FROM ASME  
CODE REQUIREMENTS RELATED TO THE INSERVICE INSPECTION  
PROGRAM, THIRD 10-YEAR INTERVAL, RELIEF REQUEST S1-RR-B02  
(TAC NO. MB6095)

Dear Mr. Anderson:

By letter dated July 8, 2002, PSEG Nuclear, LLC (PSEG) submitted a request for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code), Section XI requirements to allow the use of Code Case N-623 for deferral of inspections of the reactor pressure vessel shell-to-flange weld. Relief was requested for the third 10-year inservice inspection interval for the Salem Nuclear Generating Station (Salem), Unit No. 1.

Based on its review, the U.S. Nuclear Regulatory Commission (NRC) staff concludes that your proposal to use ASME Code Case N-623, as described in Relief Request S1-RR-B02, provides an acceptable level of quality and safety. Therefore, the NRC staff authorizes you to use the proposed alternatives pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55a(a)(3)(i) for the third 10-year interval at Salem, Unit No. 1. Use of Code Case N-623 is authorized until such time as the Code Case is approved for general use by reference in Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1." At that time, if PSEG intends to continue to implement Code Case N-623, the licensee must follow any conditions specified in the RG.

The NRC staff's Safety Evaluation is enclosed. If you have any questions, please contact your Project Manager, Robert Fretz, at 301-415-1324.

Sincerely,

*/RA/*

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

Docket No. 50-272

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE USE OF ASME CODE CASE N-623

IN ACCORDANCE WITH RELIEF REQUEST S1-RR-B02

PSEG NUCLEAR, LLC

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

DOCKET NO. 50-272

1.0 INTRODUCTION

By letter dated July 8, 2002, PSEG Nuclear, LLC (PSEG) submitted a request for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code), Section XI requirements to allow the use of Code Case N-623, "Deferral of Inspections of Shell-to-Flange and Head-to-Flange Welds of a Reactor Vessel," for inspection of the reactor pressure vessel (RPV) shell-to-flange weld. Relief was requested for the third 10-year inservice inspection (ISI) interval for Salem, Unit No. 1.

2.0 REGULATORY EVALUATION

The ISI of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific written relief has been granted by the U.S. Nuclear Regulatory Commission (NRC or the Commission) pursuant to 10 CFR 50.55a(g)(6)(i). Pursuant to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, Director of the Office of Nuclear Reactor Regulation, 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.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that the ISI of components and system pressure tests conducted during the first 10-year interval, and subsequent intervals, comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b), 12 months prior to the start of the 120-month interval, subject to the

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limitations and modifications listed therein. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed therein and subject to the Commission's approval.

The Salem, Unit No. 1, Code of record for the third ISI interval is the 1995 Edition, including the 1996 Addenda, of the ASME Code, Section XI.

### 3.0 LICENSEE'S RELIEF REQUEST (As stated)

#### Component Description

Reactor Pressure Vessel Shell-to-Flange weld (Weld Id.: 1-RPV-7042, Summary Nos. 002000 & 002001)

#### Code Requirement

Table IWB-2500, Category B-A, Note 3 of the 1995 Edition, including the 1996 Addenda of Section XI requires that: When using Inspection Program B, the shell-to-flange weld examination may be performed during the first and third periods, in which case 50% of the shell- to- flange weld shall be examined by the end of the first period, and the remainder by the end of third period. During the first period, the examination need only be performed from the flange face, provided this same portion is examined from the shell during the third period.'

#### 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 the use of Code Case N-623, titled 'Deferral of Inspections of Shell-to-flange and Head-to-flange Welds of a Reactor Vessel, Section XI, Division 1' to permit deferral of the shell-to-flange weld partial examination from the flange surface during the Third Inspection Interval.

This weld was examined in April, 2001 [during the second ISI interval] in accordance with Appendix VIII, Supplements 4 and 6 of the 1995 Edition, including 1996 Addenda of Section XI as supplemented and amended by the requirements of 10 CFR 50.55a, and authorized by NRC approval of Relief Request RR-B11.

This examination was conducted from the Reactor Vessel shell using a multiple transducer head using 45° longitudinal wave and 45° shear wave angles. Additionally, a 70° longitudinal wave was used for examination of the near surface region.

The examination was performed by scanning from four opposing beam directions such that all of the angle beams passed through the weld metal from each direction. The adjacent base metal was scanned from one direction

perpendicular to the weld and two directions parallel to the weld. A total of 10 sub-surface indications were detected, which were all oriented parallel to the weld. All ten indications were evaluated as acceptable to the Acceptance Standards of IWB-3510.

Code Case N-623 permits deferral of the shell-to-flange weld examination to the end of the interval without conducting the partial examinations from the flange face provided the following conditions are met:

- (a) No welded repair/replacement activities have ever been performed on the shell-to-flange or head-to-flange weld.
- (b) Neither the shell-to-flange weld nor head-to-flange weld contains identified flaws or relevant conditions that currently require successive inspections in accordance with IWB-2420(b).
- (c) The vessel is not in the first inspection interval.

The Salem Unit 1 reactor vessel shell-to-flange weld meets all the Code Case N-623 conditions, therefore continued performance of the partial examination from the flange face during the first inspection period will require the expenditure of resources and incur radiation dose that is considered by the industry to be unnecessary without a commensurate increase [in] the level of safety and quality.

Based on the alternative requirements of Code Case N-623 and the previous acceptable examination history, there is reasonable assurance of continued structural integrity, and an acceptable level of quality and safety will be maintained during the Third Inspection Interval.

#### Alternate Requirements

PSEG Nuclear LLC proposes to implement the alternative requirements of Code Case N-623 for the Reactor Pressure Vessel Shell-to-Flange weld.

#### Applicability

This Relief Request is applicable to the following:

Salem, Unit 1 - Third Ten-Year Inservice Inspection

## 4.0 TECHNICAL EVALUATION

PSEG requested relief from the requirement to perform a partial examination of the reactor vessel shell-to-flange weld by the end of the first period in accordance with the 1995 Edition, including the 1996 Addenda, of the ASME Code, Section XI, and approval to defer this examination to the end of the third 10-year inspection interval.

Table IWB-2500-1 of the ASME Code, Examination Category B-A, Item B1.30, "Shell-to-Flange Weld," requires a 100% volumetric examination to be performed in accordance with Figure IWB-2500-4. The footnotes to Table IWB-2500-1 provide partial deferrals for both of these welds. Footnote (3) specifies that during the first and second period, the examination may be performed from the flange face, and the remaining volumetric examinations required to be conducted from the vessel wall may be performed at, or near, the end of the inspection interval. Footnote (4) allows deferral of the shell-to-flange welds stating that the examinations may be performed during the first and third periods, provided at least 50% of the shell-to-flange welds are examined by the end of the first period, and the remainder by the end of the third inspection period.

The licensee proposes to follow the requirements of Code Case N-623, "Deferral of Inspections of Shell-to-Flange and Head-to-Flange Welds of a Reactor Vessel." The NRC staff finds that the licensee meets the requirements listed in Code Case N-623, and that deferral of the weld examinations to the end of the inspection interval is supported by the operating history of the industry. Industry experience, to date, indicates that examinations performed on RPV shell-to-flange welds have not identified any detrimental flaws or relevant conditions, and that changing the schedule for examining these welds to the end of the licensee's third 10-year ISI interval will provide a suitable frequency for verifying the integrity of the weld. The RPV shell-to-flange weld will still receive the same examinations that have been required by the ASME Code, Section XI, since the reactor was placed in commercial service. The only change is that the RPV shell-to-flange weld examinations will be deferred to the end of the inspection interval without conducting partial examinations from the flange face earlier in the inspection interval. No changes are being made to the volumes or areas of material that are examined, nor to the nondestructive examination (NDE) personnel qualifications. This relief request does not involve changes to NDE methods or acceptance criteria.

#### 4.1 Conclusion

The NRC staff concludes that the licensee's proposed alternative to use the provisions of Code Case N-623 in lieu of the Code requirement to perform partial examination of the RPV shell-to-flange weld by the end of the first inspection period provides an acceptable level of quality and safety. Therefore, the use of Code Case N-623 is authorized pursuant to 10 CFR 50.55a(a)(3)(i) at Salem, Unit No. 1, for the third 10-year ISI interval, or until such time as the Code Case is approved for general use by reference in Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1." At that time, if PSEG intends to continue to implement Code Case N-623, the licensee must follow the conditions specified in the RG, if any. All other requirements of the ASME Code, Sections III and XI, for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: R. Fretz

Date: July 16, 2003