October 7, 2002

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

SUBJECT: SALEM NUCLEAR POWER STATION, UNIT 1 - ASME CODE, SECTION XI, INSERVICE INSPECTION PROGRAM REQUIREMENTS RELATED TO PRESSURE TESTING OF CLASS 3 COMPONENTS, RELIEF REQUEST S1-RR-A03 (TAC NO. MB6088)

Dear Mr. Keiser:

By letter dated July 8, 2001, PSEG Nuclear LLC (PSEG), submitted twelve proposed alternatives to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, concerning the Third 10-year Interval Inservice Inspection (ISI) Program. This evaluation addresses PSEG's request to use the provisions of the American Society of Mechanical Engineers (ASME) Code Case N-498-1, "Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems," for Salem Nuclear Generating Station (Salem), Unit 1. Specifically, PSEG requested approval for use, as an alternative, a system leakage test in lieu of a system hydrostatic test for Salem Unit 1, Class 3, Category D-B, pressure-retaining components subject to IWD-2500 hydrostatic testing.

In its letter dated July 8, 2002, PSEG requested approval in accordance with 10 CFR 50.55a(a)(3)(i) on the basis that the proposed alternative provides an acceptable level of quality and safety. However, based on its review, the NRC staff has determined that compliance with ASME Code hydrostatic testing requirements for Class 3 systems would result in a hardship without a compensating increase in the level of quality and safety. PSEG's proposed alternative to use Code Case N-498-1 provides reasonable assurance of the structural integrity of Salem's Class 3 pressure boundary components. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the use of the proposed alternative for the Third 10-year Interval ISI Program at Salem.

Sincerely,

/RA/

James W. Andersen, Acting 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 ASME CLASS 3 COMPONENTS PRESSURE TESTING REQUIREMENTS

IN ACCORDANCE WITH RELIEF REQUEST S1-RR-A03

PSEG NUCLEAR LLC

SALEM NUCLEAR GENERATING STATION, UNIT 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 for the Salem Nuclear Generating Station (Salem), Unit 1. Specifically, in Relief Request S1-RR-A03, PSEG requested approval for the implementation of the alternative rules of ASME, Section XI, Code Case N-498-1, for the hydrostatic testing of Salem's Class 3 components.

Relief was requested for Salem Unit 1 for the Third 10-year Interval Inservice Inspection (ISI) scheduled for the fall 2002 refueling outage.

2.0 BACKGROUND

Regulatory Requirements

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 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 U.S. Nuclear Regulatory Commission (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 inservice examination 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 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 Commission approval.

3.0 RELIEF REQUEST

In its letter dated July 8, 2002, PSEG provided its basis for requesting relief (as stated):

3.1 Component Description

Pressure Testing of all pressure retaining Class 3 components

3.2 ASME Code Examination Requirement for which Relief is Requested

Paragraph IWD-2500, and Table IWD-2500-1, Category D-B, Item Nos. D2.20, D2.40, D2.60 & D2.80 of the 1995 Edition, including the 1996 Addenda of Section Xl, require performance of a system hydrostatic tests each inspection interval.

Additionally, Paragraph IWA-2441 (b) of the 1995 Edition, including the 1996 Addenda of Section Xl requires that Code Cases be applicable to the Edition and Addenda specified in the Inspection Plan.

3.3 PSEG's Proposed Alternative to ASME Code

PSEG proposes to fully implement the alternative requirements of ASME Code Case N-498-1.

3.4 PSEG's Basis for the Proposed Alternative

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 proposes to use Code Case N-498-1, titled '*Alternative Rules for 10-Year Hydrostatic Testing for Class 1, 2, and 3 Systems, Section Xl, Division 1*,' for Class 3 components.

The NRC has approved the concept of performing pressure tests at nominal operating pressure in lieu of hydrostatic test pressure. ASME Code Case N-498-1 has been approved for use in NRC Regulatory Guide 1.147, without any additional conditions.

However, the Applicability Index found within Supplement 12 of the 1998 Edition of Nuclear Code Cases, limits the applicability of this case to the 1992 Edition, including the 1993 Addenda. The basis for the applicability limitation was the issuance of subsequent revisions to the case.

Considerable effort in time and radiation exposure is incurred while conducting hydrostatic pressure tests. A significant effort is necessary (depending on the system and plant configuration) to temporarily remove or disable code safety and/or relief valves to meet test pressure requirements. The safety assurance provided by a slight increase in pressure during a system hydrostatic pressure test are offset or negated by having to gag or remove Code safety and/or relief valves, placing the system in an off normal state, erecting temporary supports, possible extension of refueling outages, and resource requirements to set up testing with special equipment and gages.

Leakage in Class 3 systems is generally due to Flow Accelerated Corrosion (FAC), microbiological-induced corrosion (MIC), and general corrosion. PSEG Nuclear has sufficient programs in place for the prevention, detection, and evaluation of [erosion-corrosion (EC)] and MIC. Leakage from general corrosion is readily apparent to inspectors when performing VT-2 visual examinations during system pressure tests.

PSEG Nuclear experience has demonstrated that previously identified leaks are typically not discovered as a result of hydrostatic test pressure propagating a pre-existing flaw through wall. Leaks in most cases are found when the system is at nominal operating pressure.

Relief has been previously granted to utilize Code Case N-498-1 at Salem Generating Station, Units 1 & 2, as well as for Hope Creek Generating Station. Reference NRC Safety Evaluation for Inservice Inspection Requests for Relief, TAC Nos: M91036, M91037 & M91038, respectively.

Based on the information above and the approval of a similar Relief Request (RR-8) during the Salem, Unit 1 Second Ten-Year ISI Program, there is reasonable assurance that the structural integrity and an acceptable level of quality and safety will be maintained during the ISI Program Third Ten-Year Inspection Interval.

4.0 EVALUATION

The ASME Code requires that a system hydrostatic test be performed once per interval to include all Class 3 components in support of the following functions:

(a) reactor shutdown
(b) emergency core cooling
(c) containment heat removal
(d) atmosphere clean up
(e) reactor residual heat removal
(f) residual heat removal from spent fuel storage pool

PSEG has proposed, as an alternative to ASME Code requirements for the Class 3 systems, to use ASME Code Case N-498-1. Approval of PSEG's alternative requirements would allow a Class 3 system leakage test to be conducted in lieu of the Class 3 system hydrostatic test.

Hardships are generally encountered with the performance of hydrostatic testing in accordance with the Code. Hydrostatic pressure testing frequently requires a significant effort to set up and perform due to the need to use special equipment, such as temporary attachment of test pumps and gages, and the need for unique valve lineups. Hydrostatic testing only subjects the piping components to a small increase in pressure over the design pressure and, therefore, does not present a significant challenge to pressure boundary integrity. Accordingly, hydrostatic pressure testing is primarily regarded as a means to enhance leak detection during the examination of components under pressure, rather than as a measure of the structural integrity of the components.

Considering that the hydrostatic pressure tests rarely result in pressure boundary leaks that would not occur during system leakage tests, the staff believes that the increased assurance of the integrity of Class 3 systems that could be achieved by the performance of a hydrostatic test is not commensurate with the hardship of performing such a test. The staff also considers that the added assurance provided by a hydrostatic test of Class 3 welds over that provided by a system pressure test is not commensurate with the hardship of hydrostatic testing. Accordingly, Code Case N-498-1 has been approved for use in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1."

5.0 CONCLUSION

In its July 8, 2002, letter, PSEG requested approval in accordance with 10 CFR 50.55a(a)(3)(i) on the basis that the proposed alternative provides an acceptable level of quality and safety. However, based on its review, the NRC staff has determined that compliance with ASME Code hydrostatic testing requirements for Class 3 systems would result in a hardship without a compensating increase in the level of quality and safety. PSEG's proposed alternative to use Code Case N-498-1 provides reasonable assurance of the structural integrity of Salem's Class 3 pressure boundary components. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the use of the proposed alternative for the Third 10-year Interval ISI Program at Salem.

Principal Contributors: R. Fretz
S. Wall

Date: October 7, 2002