UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 11, 2012

Mr. Thomas Joyce
President and Chief Nuclear Officer
PSEG Nuclear LLC
P.O. Box 236, N09
Hancocks Bridge, NJ 08038

SUBJECT: SAFETY EVALUATION OF RELIEF REQUEST REGARDING INSERVICE PUMP TESTING - SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 (TAC NOS. ME7938 AND ME7939)

Dear Mr. Joyce:

By letter dated February 7, 2012 (Agencywide Documents and Access Management System Accession No. ML112039A070), PSEG Nuclear LLC (PSEG) submitted relief request P-03 for Salem Nuclear Generating Station (Salem), Unit Nos. 1 and 2. The proposed relief would allow PSEG to use alternative pump testing requirements in lieu of the Comprehensive Pump Test required by American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code). The licensee proposes to use ASME Code Case OMN-18 with additional limitations on the upper end differential pressure test value and the pressure instrumentation accuracy.

The NRC staff has completed its review of this relief request. The details of the NRC staff's review are included in the enclosed safety evaluation (SE). The NRC staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the licensee-proposed alternative to use Code Case OMN-18 of the ASME Code for Operation and Maintenance of Nuclear Power Plants (OM Code), with modifications, for certain pumps in the inservice testing (IST) program at Salem. The alternative is authorized for the remainder of the Salem Unit Nos. 1 and 2 fourth 10-year IST program interval.

Use of ASME Code Case OMN-18 is authorized until such time as ASME Code Case OMN-18 is published in a future version of Regulatory Guide (RG) 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," and incorporated by reference in 10 CFR 50.55a(b). At that time, if the licensee intends to continue implementing this ASME Code Case, it must follow all provisions of ASME Code Case OMN-18 with conditions as specified in RG 1.192 and limitations as specified in 10 CFR 50.55a(b)(4), (b)(5), and (b)(6), if any, in addition to the modifications described in the attached SE.

All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

If you have any questions concerning this matter, please contact the Salem Project Manager, Mr. John Hughey, at (301) 415-3204.

Sincerely,

Meena Khanna, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-272 and 50-311

Enclosure: Safety Evaluation

cc w/encl: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST ALTERNATIVE P-03

PSEG NUCLEAR LLC

SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-272 AND 50-311

1.0 INTRODUCTION

By letter dated February 7, 2012 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML112039A070), PSEG Nuclear LLC (PSEG), the licensee, submitted alternative request P-03 to the Nuclear Regulatory Commission (NRC). The licensee proposed an alternative testing method and acceptance criteria described in the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) Code Case OMN-18, for the pumps listed in Table 3.1 of this safety evaluation (SE).

The proposed alternative would be used in lieu of the current pump testing methods and acceptance criteria described in the ASME OM Code for the Salem Generating Station (Salem) Unit Nos. 1 and 2. Specifically, pursuant to Title 10 of the *Code of Federal Regulations (*10 CFR) 50.55a(a)(3)(i), the licensee requested to use the proposed alternative on the basis that the alternative provides an acceptable level of quality and safety. Relief Request P-03 is applicable to the fourth 10-year inservice testing (IST) program intervals for Salem Unit Nos. 1 & 2.

2.0 REGULATORY EVALUATION

Section 50.55a of Title 10 of the *Code of Federal Regulations* (10 CFR), requires that IST of certain ASME Code Class 1, 2, and 3 components, including pumps, be performed at 120-month (10-year) IST program intervals in accordance with the specified ASME *Boiler and Pressure Vessel* Code (Code) and applicable addenda incorporated by reference in the regulations, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Nuclear Regulatory Commission (NRC or the Commission) pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In accordance with 10 CFR 50.55a(f)(4)(ii), licensees are required to comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in the regulations 12 months prior to the start of each 120-month IST program interval. In accordance with 10 CFR 50.55a(f)(4)(iv), IST of certain components, including pumps, may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to NRC approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions and addenda are met.

In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for the facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provides alternatives to ASME Code requirements which are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidance for Inservice Testing at Nuclear Power Plants."

Relief Request P-03 was submitted for the fourth 10-year IST interval at Salem Units 1 and 2. The fourth 10-year IST interval began on August 31, 2009,[1] and the applicable ASME OM Code edition and addenda for Salem Units 1 and 2 is the 2001 Edition through the 2003 Addenda.

The NRC's findings with respect to authorizing the alternative, P-03, are given below:

3.0 TECHNICAL EVALUATION

3.1 Licensee's Alternative Request P-03

ISTB-3300, "Reference Values," specifies that, reference values be established within ±20 percent of pump design flow rate for the comprehensive test, and that reference values be established within ±20 percent of pump design flow for the Group A and Group B tests, if practicable.

Table ISTB-3400-1, "Inservice Test Frequency," specifies that a Group A Test be performed quarterly for Group A pumps and a Comprehensive Test be performed biennially for Group A and Group B pumps.

Table ISTB-3500-1, "Required Instrument Accuracy," specifies the instrument accuracies for Group A and Comprehensive Tests.

Table ISTB-5100-1, "Centrifugal Pump Test Acceptance Criteria," provides, in part, the acceptance criteria for Group A and Comprehensive Tests for centrifugal pumps.

ISTB-5123, "Comprehensive Test Procedure," provides the specific requirements for the comprehensive test for centrifugal pumps (except vertical line shaft centrifugal pumps).

ASME OM Code Case OMN-18, "Alternate Testing Requirements for Pumps Tested Quarterly Within ±20% of Design Flow," provides an alternative set of requirements regarding testing and acceptance criteria for centrifugal pumps.

The applicable ASME OM Code edition and addenda for Salem Unit Nos. 1 and 2 is the 2001 Edition through the 2003 Addenda.

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[1] Per licensee letter dated December 31, 2008; ADAMS Accession No. ML090130525.

Alternative testing was requested for the following centrifugal pumps:

Table 3.1

Pump	Description	Class	Category	Unit
S1CVC-1CVE4	11 Boric Acid Transfer Pump	3	Group A	1
S1CVC-1CVE5	12 Boric Acid Transfer Pump	3	Group A	1
S2CVC-2CVE4	21 Boric Acid Transfer Pump	3	Group A	2
S2CVC-2CVE5	22 Boric Acid Transfer Pump	3	Group A	2
S1CC-1CCE2	11 Component Cooling Pump	3	Group A	1
S1CC-1CCE4	12 Component Cooling Pump	3	Group A	1
S1CC-1CCE3	13 Component Cooling Pump	3	Group A	1
S2CC-2CCE2	21 Component Cooling Pump	3	Group A	2
S2CC-2CCE4	22 Component Cooling Pump	3	Group A	2
S2CC-2CCE3	23 Component Cooling Pump	3	Group A	2
S1CH-1CHE5	11 Chilled Water Pump	3	Group A	1
S1CH-1CHE6	12 Chilled Water Pump	3	Group A	1
S2CH-2CHE6	21 Chilled Water Pump	3	Group A	2
S2CH-2CHE7	22 Chilled Water Pump	3	Group A	2
S1SF-1SFE5	11 Spent Fuel Cooling Pump	3	Group A	1
S1SF-1SFE6	12 Spent Fuel Cooling Pump	3	Group A	1
S2SF-2SFE5	21 Spent Fuel Cooling Pump	3	Group A	2
S2SF-2SFE6	22 Spent Fuel Cooling Pump	3	Group A	2

Reason for Request: (as stated by licensee)

Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (a)(3), relief is requested from the requirements of ASME OM Code ISTB-5123, Table ISTB-3400-1 and Table ISTB-5100-1. The basis for the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

The ASME OM Code Committee has approved Code Case OMN-18, "Alternative Testing Requirements for Pumps Tested Quarterly within +/- 20% of Design Flow," which allows owners to perform a Group A test in lieu of the Comprehensive Pump Test (CPT) if the Group A test is conducted at +/- 20% of the design flow rate and uses pressure instruments that meet the CPT accuracy requirements (+/-1/2%). This Code Case was not reviewed for approval in Regulatory Guide 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code", June 2003.

The basis for this change is that a quarterly Group A pump test, performed at the CPT flow rate provides more consistent data for trending than a Group A test in conjunction with a biennial CPT. The increased requirements imposed by the proposed alternative on the parameters to be monitored during every quarterly pump test and the more accurate instruments that must consistently be used during quarterly testing of pumps classified as Group A, allow PSEG to perform better trending of pump performance data due to the more consistent requirements for each of the quarterly tests.

Due to the increased requirements on the parameters imposed by the proposed alternative during all quarterly tests there is no added value in performing the biennial Comprehensive Test.

Proposed Alternative and Basis for Use: (as stated by licensee)

PSEG proposes that in lieu of the CPT requirements of Table ISTB-3400-1, Group A tests will be performed quarterly within ± 20 percent of the pump design flow rate, with pressure measuring instrumentation meeting the (+/-1/2%) instrument accuracy requirements of Table ISTB-3500-1 specified for the biennial Comprehensive Test. In addition, PSEG has elected to restrict the upper limit for differential pressure to 6%, which is more conservative than the 10% upper limit established in Table ISTB-5100-1 for Group A tests as this limit provides needed margin while maintaining an acceptable level of quality and safety, and is consistent with the limit authorized by NRC in similar relief requests. This proposed change to the acceptance range is more restrictive than specified in the current Code Case (OMN-18).

Vibration testing will continue to be performed under the proposed modified Group A test and the acceptance criteria for vibration will be the same as required for Group A tests as shown in Table ISTB-5100-1.

Using the provisions of this relief request as an alternative to those specified in ISTB-5123 will provide adequate indication of pump performance, permit consistent detection of component degradation, and continue to provide an acceptable level of quality and safety.

Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), PSEG requests relief from the specific ISTB requirements identified in this request.

3.2 NRC Staff Evaluation

The licensee is proposing to perform a quarterly IST for all pumps listed in Table 3.1 in accordance with a modified Group A test procedure, in lieu of quarterly Group A tests and a CPT every two years.

The ASME OM Code requires that for Group A pumps, a Group A test be performed every quarter, and a CPT be performed biennially. The Group A test is performed within ±20% of the pump design flow rate and the pressure instrument accuracy is ±2%, and the upper limit for the "Acceptable Range" and "Required Action Range" for flow rate and differential pressure is 110% of the reference values. The CPT is performed within ±20% of the pump design flow rate, the pressure instrument accuracy is ±1/2%, and the upper limit of the "Acceptable Range" and "Required Action Range" for flow rate and differential pressure is 103% of the reference values. Vibration monitoring is performed during both the Group A tests and the CPTs.

The licensee proposes that for the pumps listed in Table 3.1, a modified Group A quarterly test will be performed using ASME OM Code Case OMN-18, with modified "Acceptable" and "Required Action" ranges, and the biennial comprehensive test will not be performed. The modified Group A quarterly test would be performed within ±20% of the pump design flow rate,

using more accurate pressure instrumentation that is required for a comprehensive test (±1/2% instead of ±2%). The licensee will use a more limiting upper bound differential pressure (ΔP) value of 106% for the "Acceptable Range" in lieu of 110% that is normally required by the ASME OM Code for Group A tests. However, the upper bound 106% is greater than the upper bound value of 103% for the biennial CPT. Using more accurate pressure gauges and a more limiting "Acceptable Range" during the modified quarterly Group A test compensates for the elimination of the CPT with its more limiting "Acceptable Range" upper bound value of 103%.

OMN-18 was published in the 2009 Edition of the ASME OM Code. This edition of the ASME OM Code has not been incorporated by reference into 10 CFR 50.55a, and OMN-18 has not been incorporated into Regulatory Guide (RG) 1.192. However, the NRC staff has reviewed OMN-18, and currently has no concerns with its usage, providing that the upper end values of the Group A test "Acceptable Ranges" for flow (Q) and differential pressure (ΔP) are $106\%Q_r$ and $106\%\Delta P_r$, respectively, and the high values of the "Required Action Ranges" for flow and differential pressure are greater than $106\%Q_r$ and $106\%\Delta P_r$, respectively. The NRC staff considers the proposed alternative acceptable because all of the tests will be performed with pressure gauges with ±1/2% accuracy. The elimination of the CPT, with its more limiting "Acceptable Range" upper bound of $103\%\Delta P_r$, is compensated for by using more accurate pressure gauges on every quarterly test. Regular testing with more accurate instrumentation and tighter acceptance criteria will provide for better trending of pump performance. Therefore, the NRC finds that the proposed alternative provides an acceptable level of quality and safety for testing and acceptance criteria for the pumps listed in Table 3.1

4.0 CONCLUSION

As set forth above, the NRC staff finds that the proposed alternative described in alternative request P-03 provides an acceptable level of quality and safety for the pumps listed in Table 3.1. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(i), and is in compliance with the ASME OM Code requirements. All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject request remain applicable.

Use of ASME Code Case OMN-18 is authorized until such time as ASME Code Case OMN-18 is published in a future version of Regulatory Guide (RG) 1.192 and incorporated by reference in 10 CFR 50.55a(b). At that time, if the licensee intends to continue implementing this ASME Code Case, it must follow all provisions of ASME Code Case OMN-18 with conditions as specified in RG 1.192 and limitations as specified in 10 CFR 50.55a(b)(4), (b)(5), and (b)(6), if any, in addition to the modifications described in the attached SE.

Therefore, the NRC staff authorizes the alternative described in request P-03 for the remainder of Salem Generating Station Unit Nos. 1 and 2 fourth 10-year IST program interval, which began on August 31, 2009.

Principle Contributor: Michael Farnan, NRR

Date: July 11, 2012

If you have any questions concerning this matter, please contact the Salem Project Manager, Mr. John Hughey, at (301) 415-3204.

Sincerely,

/ra/

Meena Khanna, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-272 and 50-311

Enclosure: Safety Evaluation

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