



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

October 10, 2008

Mr. William Levis
President and Chief Nuclear Officer
PSEG Nuclear LLC
80 Park Plaza, T4B
Newark, NJ 07101

SUBJECT: SAFETY EVALUATION OF RELIEF REQUESTS FOR THE THIRD 10-YEAR INTERVAL OF THE INSERVICE TESTING PROGRAM FOR SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 (TAC NOS. MD8166, MD8167, MD8168, MD8169, MD8170 AND MD8171)

Dear Mr. Levis:

By letter dated February 25, 2008, PSEG Nuclear LLC submitted relief requests P01, V03, and V04 which proposed alternatives to certain requirements of Section XI of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code) for Salem Nuclear Generating Station (Salem), Unit Nos. 1 and 2. The subject relief requests are for the third 10-year interval of the inservice testing (IST) program at Salem.

The U.S. Nuclear Regulatory Commission staff has completed its review of the subject relief requests as documented in the enclosed Safety Evaluation (SE). Our SE concludes the following.

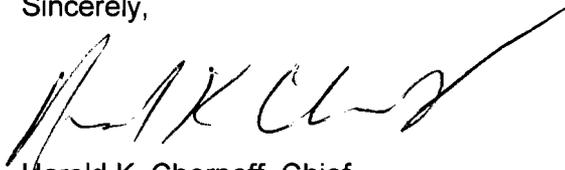
- 1) With respect to relief request P01, the proposed alternative will provide an acceptable level of quality and safety. Therefore, pursuant to Section 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations* (10 CFR), the proposed alternative is authorized for the third 10-year IST interval at Salem.
- 2) With respect to relief request V03, compliance with the specified Code requirements is impractical. The proposed alternative testing provides reasonable assurance of the operational readiness of the components. Therefore, pursuant to 10 CFR 50.55a(f)(6)(i), relief is granted for the third 10-year IST interval at Salem. Granting relief pursuant to 10 CFR 50.55a(f)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.
- 3) With respect to relief request V04, imposition of the code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety. The proposed alternative provides reasonable assurance of the operational readiness of the components. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative is authorized for the third 10-year IST interval at Salem.

W. Levis

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If you have any questions concerning this matter, please contact the Salem Project Manager, Mr. Richard Ennis, at (301) 415-1420.

Sincerely,

A handwritten signature in black ink, appearing to read "H. K. Chernoff", with a long, sweeping horizontal stroke extending to the right.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUESTS FOR THE

THIRD 10-YEAR INTERVAL OF THE INSERVICE TESTING PROGRAM

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 25, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML080720068), PSEG Nuclear LLC (PSEG or the licensee) submitted relief requests P01, V03, and V04 which proposed alternatives to certain requirements of Section XI of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code) for Salem Nuclear Generating Station (Salem), Unit Nos. 1 and 2. The subject relief requests are for the third 10-year interval of the inservice testing (IST) program at Salem.

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 pumps and valves be performed at 120-month (10-year) IST program intervals in accordance with the specified ASME 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 pumps and valves 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

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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."

The third 10-year interval for the IST program at Salem Unit Nos. 1 and 2 began on August 31, 1999, and will end on August 30, 2009. The program was developed in accordance with the 1989 Edition of the ASME Code, Section XI. The 1989 ASME Code, Section XI, references ASME Operations and Maintenance of Nuclear Power Plants (OM) Standards Part 1 (OM-1), Part 6 (OM-6), and Part 10 (OM-10) for its IST requirements.

3.0 TECHNICAL EVALUATION

The NRC's evaluation of relief requests P01, V03, and V04 is provided in Safety Evaluation (SE) Sections 3.1, 3.2, and 3.3, respectively.

3.1 Pump Relief Request P01

3.1.1 Code Requirements

The licensee requested relief from OM-6, Paragraph 6.1 which requires that if deviations fall within the required action range of Table 3, the pump shall be declared inoperable until the cause of the deviation has been determined and the condition corrected. Relief was requested for all ASME Class 2 and 3 pumps.

3.1.2 Licensee's Basis for Requesting Relief

The licensee provided the following basis for relief request P01:

The 1983 ASME Section XI Code, Subsection IWP-3230(c) stated that,

"Corrective actions shall be either replacement or repair per IWP-3111, or shall be an analysis to demonstrate that the condition does not impair pump operability and that the pump will fulfill its function. A new set of reference values shall be established after such analysis."

The OMc - 1994 Addenda (ISTB 6.2.2) and the OM 1995 Edition (ISTB 6.2.2) both state that,

"If the measured test parameter values fall within the required action range of Table 5.2.1-1, Table 5.2.2-1, or Table 5.2.3-1, as applicable, the pump shall be declared inoperable until either the cause of the deviation has been determined and the condition corrected, or an analysis of the pump is performed and new reference values are established in accordance with ISTB 4.6."

The Code applicable for the second interval IST program and the latest issued Code both provide for analysis of pump test data in lieu of repair or replacement of the pump if the test parameters fall within the required action range. The OMa Code - 1988 Edition did not include such provisions. Communications with

members of the OM Committee indicate that this was an oversight and that it was never intended to delete the ability to analyze the test data and determine if the pump is still capable of performing its intended safety function.

3.1.3 Licensee's Proposed Alternative Testing

The licensee proposed the following alternative testing:

Should pump test parameters fall within the required action range of Table 3 (OMa Code 1988 Edition), then the OM Code 1995 Edition, subsection ISTB 6.2.2 will be utilized. Since subsection ISTB 4.6 in the 1995 Code Edition references ISTB 6.2.2, subsection ISTB 4.6 from the OM Code 1995 Edition will also be applied.

3.1.4 NRC Staff Evaluation of Relief Request P01

OM-6, paragraph 6.1, specifies actions required to be taken if any of the measured pump parameters fall within the alert or required action ranges. For test results in the alert range, the test frequency is required to be doubled until the cause of the deviation is determined and the condition is corrected. For test results in the required action range, the pump shall be declared inoperable until the cause of the deviation has been determined and the condition corrected. The licensee requests relief from the requirements of OM-6, paragraph 6.1, for all pumps in the IST program. The licensee proposes to use ISTB 6.2.2 and ISTB 4.6 of the 1995 Edition of the OM Code in lieu of the corrective action requirements of OM-6.

ISTB 6.2.2 of the 1995 OM Code allows that if the measured test parameters fall within the required action range, the pump shall be declared inoperable until either the cause of the deviation has been determined and the condition corrected, or an analysis of the pump is performed and new reference values are established in accordance with ISTB 4.6. ISTB 4.6 allows establishment of a new set of reference values if supported by an analysis. The analysis shall include verification of the pump's operational readiness. The analysis shall include both a pump level and a system level evaluation of operational readiness, the cause of the change in pump performance, and an evaluation of all trends indicated by available data.

The 1995 Edition of the OM Code has been incorporated by reference into 10 CFR 50.55a. As discussed in 10 CFR 50.55a(f)(4)(iv), portions of editions or addenda may be used provided all related requirements are met, subject to the limitations and modifications listed in 10 CFR 50.55a(b), and subject to Commission approval. Comprehensive pump testing is a related requirement associated with the 1995 OM Code and the licensee has not proposed comprehensive pump testing of all pumps in its IST program. However, in GL 91-18, the staff indicates that in cases where the required action range limit is more conservative than its corresponding technical specification limit, the corrective action may not be limited to replacement or repair. The corrective action may consist of an analysis to demonstrate that the specific pump performance degradation does not impair operability and that the pump will still fulfill its function. A new required action range may be established after such an analysis which would then allow a new determination of operability. Because GL 91-18 allows licensees to perform an analysis to determine operability, the NRC staff has approved the use of ISTB 6.2.2 for pumps in the required action range. The licensee's proposed alternative is consistent with

the guidance as specified in GL 91-18, therefore, the staff concludes that the licensee's alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the proposed alternative provides an acceptable level of quality and safety.

3.1.5 Conclusion

Based on the above evaluation, the proposed alternative to utilize ISTB 6.2.2 and ISTB 4.6 when test parameters fall within the required action range of Table 3, is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that that the proposed alternative provides an acceptable level of quality and safety. The proposed alternative is authorized for the third 10-year IST interval.

3.2 Valve Relief Request V03

3.2.1 Code Requirements

The licensee requested relief from OM-10, Paragraph 4.2 which requires that the stroke time of all power operated valves be measured and that the stroke time be evaluated and corrective actions taken if required. Relief was requested for the following diesel starting air valves:

11DA13A	11DA13B	11DA13C	21DA13A	21DA13B	21DA13C
12DA13A	12DA13B	12DA13C	22DA13A	22DA13B	22DA13C
11DA14A	11DA14B	11DA14C	21DA14A	21DA14B	21DA14C
12DA14A	12DA14B	12DA14C	22DA14A	22DA14B	22DA14C

The licensee relief request stated that "[t]hese solenoid operated globe valves are located in the air supply lines to the diesel generator starting air motors from the starting air receivers and are skid-mounted. These valves perform an active safety function in the open position. The valves must be capable of opening when the associated engine receives a start signal to provide a flow path for starting air to the engine."

3.2.2 Licensee's Basis for Requesting Relief

The licensee provided the following basis for relief request V03:

These valves are maintained in the closed position and are not provided with position indication to facilitate individual valve exercise and stroke time testing. There are four (4) solenoid valves per generator, which are exercised together during monthly diesel generator start testing. On a quarterly basis the diesel generator is started from one starting air bank to demonstrate design capability of the diesel to start using a pair of starter motors. Stroke time and exercise testing of these solenoid valves is considered satisfactory if the diesel achieves Technical Specification voltage and frequency in ≤ 13 seconds during monthly diesel testing when the diesel is started on a single air bank. Individual valve stroke timing is not possible during the diesel start process since this skid-mounted system was not designed to include features for inservice testing. NUREG 1482, Revision 0, Section 3.4 identifies that for skid-mounted

components, testing of the major component is an acceptable means for verifying component subassembly operational readiness.

3.2.3 Licensee's Proposed Alternative Testing

The licensee proposed the following alternative testing:

Quarterly open stroke time and exercise testing shall be considered satisfactory if the diesel achieves Technical Specification voltage and frequency in ≤ 13 seconds when started from one air bank during monthly diesel testing per Technical Specification 4.8.1.1.2.

3.2.4 NRC Staff Evaluation of Relief Request V03

The identified solenoid operated valves are in the diesel generator starting air lines to the diesel air start motors and open to initiate a diesel generator start. The valves are not equipped with position indication devices to allow individual valve exercise and stroke time testing and the valves are considered skid-mounted components. Requiring these valves to meet the Code exercise and stroke testing requirements is impractical and a burden on the licensee due to the modifications that would be required to the system to meet the Code requirements.

NUREG 1482, Section 3.4 states that testing of the major component is an acceptable means of verifying the operational readiness of skid-mounted component subassemblies. The licensee's alternative to exercise the valves during technical specification required diesel generator testing and to consider valve testing satisfactory if the diesel achieves voltage and frequency in less than or equal to 13 seconds when started from one air bank during monthly diesel testing provides reasonable assurance of the operational readiness of the diesel air start valves.

3.2.5 Conclusion

Based on the above evaluation, relief is granted pursuant to 10 CFR 50.55a(f)(6)(i) on the basis that meeting the Code requirements is impractical. The licensee's proposed alternative to exercise the air start valves during technical specification required diesel generator testing and to consider valve testing satisfactory if the diesel achieves voltage and frequency in less than or equal to 13 seconds when started from one air bank during monthly diesel testing provides reasonable assurance of the operational readiness of the diesel air start valves. Granting relief pursuant to 10 CFR 50.55a(f)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. The relief request is granted for the third 10-year IST interval.

3.3 Valve Relief Request V04

3.3.1 Code Requirements

The licensee requested relief from OM-10, Paragraph 4.1 which requires that valves with remote position indication be observed at least once every 2 years to verify that valve operation is

accurately indicated. Relief was requested for the following emergency core cooling system (ECCS) valves:

11SJ44 12SJ44 21SJ44 22SJ44

3.3.2 Licensee's Basis for Requesting Relief

The licensee provided the following basis for relief request V04:

These valves are located in separate compartments in the containment. The compartments are accessible from outside the containment through four-foot diameter manways which must be unbolted and manually removed for entry. These manways are sealed by gaskets on the flange surface to which they are bolted. The proper sealing of this surface is necessary to ensure containment integrity. If the valves are verified for proper remote position indication (RPI) every two years, hatch removal would be required for RPI verification only. In order to minimize the potential for damage to flange surfaces and gaskets, the valves should be verified for RPI accuracy when other scheduled maintenance/inspection activities are performed. It is impractical to open these compartments to verify remote position indication by direct observation every two years.

3.3.3 Licensee's Proposed Alternative Testing

The licensee proposed that remote position indication will be verified once every other refueling concurrent with environmental qualification inspections or at any other time the manways are removed, but in no case more often than once every 2 years.

3.3.4 NRC Staff Evaluation of Relief Request V04

The ASME Code requires that valves with remote position indication be observed locally at least once every 2 years to verify that valve operation is adequately indicated. In lieu of the 2-year test, the licensee proposes to verify the remote position indication locally once every other refueling concurrent with environmental qualification inspections, or at any other time the manways are removed, but in no case more often than once every 2 years.

The licensee's relief request provided the following information regarding the function of the valves:

These motor operated valves are located in the supply lines from the containment sump to the respective residual heat removal pump suction. The valves perform an active safety function in the open position. The valves must be capable of opening to align the containment sump to the ECCS subsystems during the recirculation phase of emergency core cooling. The valves perform a passive safety function in the closed position to properly align ECCS subsystems to the RWST [reactor water storage tank] during the injection phase of emergency core cooling, and to prevent the RWST inventory from back flowing to the containment sump.

As discussed above, the valves are located in separate compartments in the containment. The compartments are accessible from outside the containment through 4-foot diameter manways which must be unbolted and manually removed for entry. These manways are sealed by gaskets on the flange surface to which they are bolted. The proper sealing of this surface is necessary to ensure containment integrity. If the valves are verified for proper remote position indication every 2 years, hatch removal would be required for remote position indication verification only. The additional activities associated with local observation of the valves are time consuming and performed in a radiation area. The NRC staff finds that requiring disassembly of the valve enclosures every 2 years just for the purpose of local verification of the valve position indication would result in a hardship without a compensating increase in the level of quality and safety. The additional time beyond that required by the ASME Code should not impair the valves operational readiness.

The licensee's proposed alternative to verify remote position indication locally once every other refueling concurrent with environmental qualification inspections, or at any other time the manways are removed, but in no case more often than once every 2 years provides reasonable assurance that valve operation is accurately indicated.

3.3.5 Conclusion

Based on the above evaluation, the proposed alternative to verify remote position indication once every other refueling concurrent with environmental qualification inspections, or at any other time the manways are removed, but in no case more often than once every 2 years, is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the Code requirements would result in hardship or unusual difficulty without a compensating increase in quality and safety. The proposed alternative provides reasonable assurance of the operational readiness of the valves. The proposed alternative is authorized for the third 10-year IST interval.

4.0 CONCLUSION

The following summarizes the NRC staff conclusions based on the technical evaluation discussed above in SE Section 3.1 through 3.3.

With respect to relief request P01, the proposed alternative will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is authorized for the third 10-year IST interval at Salem.

With respect to relief request V03, compliance with the specified Code requirements is impractical. The proposed alternative testing provides reasonable assurance of the operational readiness of the components. Therefore, pursuant to 10 CFR 50.55a(f)(6)(i), relief is granted for the third 10-year IST interval at Salem. Granting relief pursuant to 10 CFR 50.55a(f)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

With respect to relief request V04, imposition of the code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety. The

proposed alternative provides reasonable assurance of the operational readiness of the components. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative is authorized for the third 10-year IST interval at Salem.

Principal Contributor: W. Poertner

Date: October 10, 2008

W. Levis

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If you have any questions concerning this matter, please contact the Salem Project Manager, Mr. Richard Ennis, at (301) 415-1420.

Sincerely,

/ra/

Harold K. Chernoff, 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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