



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

April 2, 2009

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

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NO. 2 - EVALUATION OF  
RELIEF REQUEST V-07 (TAC NO. ME0784)

Dear Mr. Joyce:

By letter dated March 5, 2009, PSEG Nuclear LLC (PSEG) submitted relief request V-07 which proposed an alternative to certain inservice testing (IST) requirements of Section XI of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* and the *Code for Operation and Maintenance of Nuclear Power Plants* for Salem Nuclear Generating Station (Salem), Unit No. 2. The relief request applies to the end of the current third 10-year IST interval and to the start of the fourth 10-year IST interval. The third interval will end on August 30, 2009, and the fourth interval will begin on August 31, 2009. The subject relief request involves an extension to the test intervals for certain pressure relief valves in the chemical and volume control system.

The U.S. Nuclear Regulatory Commission staff has completed its review of the subject relief request as documented in the enclosed Safety Evaluation (SE). Our SE concludes that: (1) compliance with the specified IST requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety; and (2) the proposed alternative provides reasonable assurance of the operational readiness of the relief valves. Therefore, pursuant to Section 50.55a(a)(3)(ii) of Title 10 of the *Code of Federal Regulations*, the proposed alternative is authorized for Salem Unit No. 2.

The proposed alternative is authorized until restart after refueling outage 2R17, which is currently scheduled to begin in October 2009.

T. Joyce

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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". The signature is fluid and cursive, with a large, sweeping flourish at the end.

Harold K. Chernoff, Chief  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-311

Enclosure:  
Safety Evaluation

cc w/encl: Distribution via Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST V-07 FOR THE

THIRD AND FOURTH 10-YEAR INTERVAL OF THE INSERVICE TESTING PROGRAM

PSEG NUCLEAR LLC

SALEM NUCLEAR GENERATING STATION, UNIT NO 2

DOCKET NO. 50-311

1.0 INTRODUCTION

By letter dated March 5, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090790206), PSEG Nuclear LLC (PSEG or the licensee) submitted relief request V-07 which proposed an alternative to certain inservice testing (IST) requirements of Section XI of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code) and the ASME *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) for Salem Nuclear Generating Station (Salem), Unit No. 2. The relief request applies to the end of the current third 10-year IST interval and to the start of the fourth 10-year IST interval. The subject relief request involves an extension to the test intervals for certain pressure relief valves in the chemical and volume control (CVC) system.

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

Enclosure

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."

The third 10-year interval of the Salem IST program 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. Section XI of the 1989 ASME Code references ASME *Operation and Maintenance of Nuclear Power Plants* (OM) Standard Part 1 (OM-1), Part 6 (OM-6), and Part 10 (OM-10) for its IST requirements. The fourth interval of the Salem IST program is being developed in accordance with the requirements in the ASME OM Code, 2001 Edition through 2003 Addenda. The fourth interval begins on August 31, 2009.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Valve Relief Request RV-07

##### 3.1.1 Code Requirements and Components Affected

The ASME Code, Section XI, and the ASME OM Code require that a minimum of 20 percent of the class 2 and 3 relief valves from each group be tested within any 48-month interval and that the test interval for any individual valve shall not exceed 10 years.

The licensee requested to extend the 48-month test interval for the CVC system relief valve sample group (which consists of relief valves 2CV241, 2CV6, 2CV43, 2CV115, 2CV141, and 2WR191) and the 10-year test interval for CVC system relief valve 2CV241.

##### 3.1.2 Licensee's Basis for Requesting Relief

The licensee's letter dated March 5, 2009, provided the following (with edits by the NRC staff shown in brackets) regarding the reason and basis for the request:

During a review of the Salem IST program in late-2008, PSEG identified discrepancies in the scheduling of periodic relief valve testing. For the CVC valve sample group, the OM Code requirement to test at least 20% of the pressure relief devices of each type and manufacture within any 48 months was not correctly incorporated into the schedule for relief valve testing. In addition, the schedule for testing 2CV241 incorrectly applied a 25% extension to the ten year test interval. As a result, 2CV241 was not tested during 2R16. PSEG documented the scheduling discrepancies in the corrective action program and performed a review to confirm the extent of condition for relief valve testing issues for both Salem Units 1 and 2.

To meet the applicable ASME OM Code requirements, 2CV241 is required to be tested no later than April 20, 2009. In accordance with 10 CFR 50.55a(a)(3)(ii),

PSEG requests relief from the applicable ASME OM Code requirements for 2CV241 and for the CVC system relief valve sample group until restart from Salem Unit 2 refueling outage 2R17, which is scheduled to begin in October 2009. The 48-month and 10-year test intervals would be extended by approximately 6.5 months.

NUREG-1482, [Revision] 1, Section 2.5, "Relief Requests and Proposed Alternatives," states that nuclear power plant licensees may also propose alternatives to ASME Code requirements if compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The NRC staff has interpreted "hardship" to mean a high degree of difficulty or an adverse impact on plant operation, as illustrated by examples, including:

- having to enter multiple [Technical Specification] limiting conditions for operation
- raising [as low as reasonably achievable] concerns
- replacing equipment or in-line components

2CV241 provides overpressure protection for the volume control tank (VCT) and relieves to the [CVC system] holdup tanks. Removal and testing of 2CV241 is performed when the VCT is isolated and depressurized. The VCT is required for operation of the CVC system charging, letdown and reactor coolant pump (RCP) seal water functions. The VCT is required to be in service in Modes 1, 2 and 3 to satisfy Technical Specification requirements for reactor coolant loop operation ([limiting conditions for operation] 3.4.1.1 and 3.4.1.2.a).

Removal and testing of the 2CV241 is normally performed during a refueling outage with the plant shutdown and the reactor core off loaded to the spent fuel pool. This plant condition is required because removal and testing of this component requires the Reactor Coolant System (RCS) and CVC System to be degassed and the VCT to be isolated and removed from service. This will isolate all the plant charging pumps thereby taking away the normal boration flow path and normal method for maintaining reactor vessel inventory control. A plant shutdown and defueling to test 2CV241 would result in an estimated 10 [roentgen equivalent man (rem)] of additional personnel exposure.

Testing 2CV241 during plant shutdown in Mode 5 (i.e., without defueling) has been reviewed against the Outage Risk Management System (ORAM) and would place the plant in a higher risk shutdown safety status Orange condition. There are currently no plant operating procedures that support plant operations in an operating Mode other than defueled to support removal of reactor inventory control and normal boration flow path. A plant shutdown without defueling to test 2CV241 would result in an estimated 150 mrem of additional personnel exposure.

Additionally, testing requires removal of the valve from the system and PSEG considers it prudent to have a spare valve on hand prior to removal of the installed valve. A spare valve is currently on order but is not projected to be delivered until just prior to the scheduled refueling outage in the Fall 2009.

Testing 2CV241 before refueling outage 2R17 would constitute a hardship due to the unnecessary additional personnel radiation exposure. In addition, testing 2CV241 before refueling outage 2R17 can only be accomplished with unusual difficulty[.] Specifically, the unusual difficulty consists in performing a plant shutdown and defueling to test the valve; or testing the valve during a plant shutdown without defueling, which would require entry into shutdown safety status Orange, due to the system alignment required to remove the VCT from service.

A review of the test history was performed for both the Salem Unit 1 and 2 valves to understand the test history of these valves. The CVC valve group consists of 6 valves manufactured by Crosby Valve Company per Salem unit. The test history search consisted of reviewing the test data for the valves within this group over the 3rd IST test interval. In addition, for Unit 2 the 2CVC241 valve test history was also reviewed back to testing performed on this component in the IST 2nd Test Interval. In addition, the test history for the equivalent Unit 1 - 1CV241 valve was also researched to see how this particular valve performed on Salem Unit 1.

The review of the test history of the six Unit 2 CVC system relief valves showed that all of the valves within this grouping, with the exception of the 2CV241, were successfully as-found lift set surveillance tested during the IST 3rd Test Interval with no signs of external leakage.

The history of testing on the 2CV241 was verified back to the 2nd IST Test Interval to verify how this valve has tested previously. This valve was last tested satisfactorily on 4/21/1999 with no evidence of leakage. 2CV241 was also tested previous to this in January 1992 with lift set pressures that were slightly higher (3 [pounds per square inch (psi)] above the cold set pressure) than the setpoint tolerance of +3%. A minor adjustment was made and the valve was successfully as-left tested.

Test results for 1CV241, the Unit 1 equivalent of 2CV241, were also reviewed. 1CV241 is the same make and model as 2CV241, with the same setpoint and operating conditions. During the IST 3rd Test Interval, this valve was successfully lift set tested on three different occasions. The most recent test was in October 2008, and the previous test was performed in April 2001. For both of these tests no signs of leakage were noted. 1CV241 was also tested satisfactorily in October 1999.

The setpoint of 2CV241 (75 psig) is equal to the VCT design pressure. During normal system operation, VCT pressure varies with level in the tank and is normally less than 50 psig. 2CV241 is not subjected to frequent challenges during normal system operation that would cause accelerated degradation.

Based on review of industry operating experience, significant degradation in operational readiness would not be expected during the proposed extended test interval.

Based on the review of plant specific and industry operating experience described above, PSEG has concluded that the proposed alternative provides reasonable assurance of the operational readiness of the CVC system relief valve group.

### 3.1.3 Licensee's Proposed Alternative Testing

PSEG proposes to extend the 48-month interval for the CVC system relief valve group and the 10-year interval for valve 2CV241 until the restart after refueling outage 2R17, currently scheduled to begin in October 2009.

### 3.1.4 Evaluation of Relief Request RV-07

The ASME Code requires that all Class 2 and 3 relief valves of each type and manufacture be tested within each subsequent 10-year period, with a minimum of 20% of the valves being tested within any 48 months. During a review of the Salem IST program in late 2008, PSEG identified discrepancies in the scheduling of periodic relief valve testing. For the CVC sample group, the ASME Code requirement to test at least 20% of the pressure relief devices of each type and manufacture within any 48 months was not correctly incorporated into the schedule for relief valve testing. In addition, the schedule for testing 2CV241 incorrectly applied a 25% extension to the 10-year test interval. PSEG documented the scheduling discrepancies in the corrective action program and performed a review to confirm the extent of condition for relief valve testing issues for both Salem Units 1 and 2.

To meet the applicable ASME Code requirements, relief valve 2CV241 is required to be tested no later than April 20, 2009. PSEG requests relief from the applicable ASME Code requirements for 2CV241 and for the CVC system relief valve sample group until restart from Salem Unit 2 refueling outage 2R17, which is scheduled to begin in October 2009.

The NRC staff has reviewed the licensee's basis for relief to determine if it is acceptable to extend the test interval for the CVC system relief valve group and relief valve 2CV241 beyond the interval specified in the ASME Code. The test interval will be extended, on a one-time basis, until the restart from refueling outage 2R17 (approximately 6.5 months). Based on the testing history of the CVC system valves and industry operating experience, significant degradation in operational readiness would not be expected during the proposed extended test interval. Therefore, the NRC staff finds that the proposed alternative to extend the test interval beyond the ASME test requirement is acceptable on a one-time basis. Compliance with the ASME Code requirements would result in hardship or unusual difficulty without a compensating increase in quality and safety due to unnecessary challenges to safety systems, unnecessary cycling of equipment, and an unnecessary plant shutdown.

### 3.1.5 Conclusion

Based on the above evaluation the NRC staff concludes that: (1) compliance with the specified IST requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety; and (2) the proposed alternative provides reasonable assurance of the operational readiness of the relief valves. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative is authorized for Salem Unit No. 2.

The proposed alternative is authorized until restart after refueling outage 2R17, which is currently scheduled to begin in October 2009.

Principal Contributor: W. Poertner

Date: April 2, 2009

T. Joyce

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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,

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Harold K. Chernoff, Chief  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-311

Enclosure:  
Safety Evaluation

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