

April 1, 2005

Mr. William Levis
Senior Vice President & Chief Nuclear Officer
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Post Office Box 236
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SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NO. 2, EXTENSION OF
RISK-INFORMED INSERVICE INSPECTION APPLICABILITY (TAC
NO. MC3854)

Dear Mr. Levis:

By letter dated July 12, 2004, and supplemented by letter dated February 7, 2005, PSEG Nuclear, LLC (PSEG) requested Nuclear Regulatory Commission (NRC) authorization to extend the risk-informed inservice inspection (RI-ISI) program plan for Salem Nuclear Generating Station, Unit No. 2 (Salem 2) to the third 10-year inservice inspection (ISI) interval. The Salem 2 RI-ISI program was initially submitted to the NRC by letter dated July 1, 2003, and was approved by the NRC for use in the second 10-year ISI interval by letter dated October 1, 2003.

Accordingly, the NRC staff has completed its review of PSEG's request to extend applicability of the RI-ISI program plan to Salem 2's third 10-year ISI interval. As described in the enclosed safety evaluation, the NRC staff has authorized application of the RI-ISI program plan to Salem 2's third 10-year ISI interval pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55a(a)(3)(i) based on a determination that the proposed alternative provides an acceptable level of quality and safety.

If you have any questions regarding this evaluation, please contact the Salem Project Manager, Daniel Collins at (301) 415-1427.

Sincerely,

/RA by Victor Nerses for/

Darrell J. Roberts, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-311

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST TO EXTEND RISK-INFORMED INSERVICE INSPECTION INTERVAL

PSEG NUCLEAR, LLC

SALEM GENERATING STATION, UNIT NO. 2

DOCKET NO. 50-311

1.0 INTRODUCTION

By letter dated July 12, 2004 (Reference 1), and supplemented by a letter dated February 7, 2005 (Reference 2), PSEG Nuclear, LLC (PSEG or the licensee) submitted a request to extend the Risk-Informed Inservice Inspection (RI-ISI) Program Plan for Salem Nuclear Generating Station, Unit No. 2 (Salem 2) to the third 10-year inservice inspection (ISI) interval. The Salem 2 RI-ISI program was initially submitted to the Nuclear Regulatory Commission (NRC or the Commission) staff in a letter dated January 21, 2003 (Reference 3), during the third period of the second 10-year ISI interval, and supplemented by a letter dated July 1, 2003 (Reference 4). The Salem 2 RI-ISI program was reviewed and approved by the NRC for use in the second 10-year ISI interval in a letter dated October 1, 2003 (Reference 5).

The licensee's current submittal proposes to extend the same RI-ISI program, as originally submitted in Reference 3 for the second 10-year ISI interval, to the third 10-year ISI interval.

2.0 REGULATORY EVALUATION

Title 10 of the Code of Federal Regulations (10 CFR), Section 50.55a(g) specifies that ISI of nuclear power plant components shall be performed in accordance with the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i) or alternatives are authorized pursuant to 10 CFR 50.55a(a)(3). Section 50.55a(a)(3) of 10 CFR states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC if: (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.

The licensee's RI-ISI program, as outlined in References 3 and 4, was developed in accordance with the methodology contained in the Electric Power Research Institute's (EPRI's) report EPRI TR-112657, Rev. B-A (Reference 6) which was reviewed and approved by the NRC staff. The Salem 2 RI-ISI program is an alternative pursuant to 10 CFR 50.55a(a)(3)(i). In Reference 1, the licensee requests NRC authorization to utilize the same RI-ISI program,

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previously approved for use in the second interval, for use in the third ISI interval at Salem 2. The scope of the RI-ISI program is limited to the inspection of ASME Code Class 1 and 2 piping (Categories B-F, B-J, C-F-A, and C-F-2 welds).

2.0 TECHNICAL EVALUATION

The licensee is requesting relief to use the proposed RI-ISI program plan in the third 10-year ISI interval instead of the ASME Code Section XI program. An acceptable RI-ISI program plan is expected to meet the five key principles discussed in Regulatory Guide (RG) 1.178 (Reference 7), Standard Review Plan (SRP) 3.9.8 (Reference 8) and the EPRI TR-112657 (Reference 5), as stated below.

1. The proposed change meets the current regulations unless it is explicitly related to a requested exemption or rule change.
2. The proposed change is consistent with the defense-in-depth philosophy.
3. The proposed change maintains sufficient safety margins.
4. When proposed changes result in an increase in core damage frequency or risk, the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.
5. The impact of the proposed change should be monitored by using performance measurement strategies.

The first principle is met in this relief request because an alternative ISI program may be authorized pursuant to 10 CFR 50.55a(3)(i) and, therefore, an exemption request is not required. The second and third principles require assurance that the alternative program is consistent with the defense-in-depth philosophy and that sufficient safety margins are maintained, respectively. Assurance that the second and third principles are met is based on the application of the approved methodology and not on the particular inspection locations selected. The methodology used to develop the third 10-year RI-ISI interval program is unchanged from the methodology approved for use in the second 10-year RI-ISI interval program and, therefore the second and third principles are met. The fourth principle requires an estimate of the change in risk, and the change in risk is dependent on the location of inspections in the proposed ISI program compared to the location of inspections that would be inspected using the requirements of ASME Code Section XI.

In Reference 2, the licensee stated that the only changes in inspection locations between the second 10-year RI-ISI interval program and the third 10-year RI-ISI interval program involve exchange of approximately nine Class 1 or Class 2 welds to similar welds within the same risk matrix classification. These welds were exchanged due to accessibility issues. PSEG reported that, since the welds chosen for examination were classified alike using the same criteria as those originally selected in Reference 3, exchanging these welds did not result in any difference in the change in risk between the RI-ISI program proposed for implementation in the third 10-year ISI interval and ASME Code Section XI requirements, and the change in risk between the RI-ISI program used in the second 10-year ISI interval. Furthermore, the licensee reported that the total number of welds between the second 10-year RI-ISI interval program and the third 10-year RI-ISI interval program did not change and that no inspections were discontinued from the second 10-

year RI-ISI interval program to the third 10-year RI-ISI interval program.

Relief was granted in Reference 5 from selected requirements in the ASME Code, 1983 Edition through the 1983 Addenda of Section XI, the licensee's code of record when relief was requested. The licensee stated in Reference 2 that the Salem 2 current code of record is the ASME Code Section XI 1998 Edition, up through and including 2000 Addenda. Although the code of record edition has changed, the accuracy of the change in risk calculations do not warrant recalculating the ASME Section XI risk analysis with the current code of record. The staff finds the comparison of the risk estimate between the current code of record and the code of record from which relief was granted in Reference 5 appropriate and acceptable. The licensee reported in Reference 2 that the total change in risk and system level change in risk estimates for the proposed third 10-year RI-ISI interval program are within acceptance guidelines in the EPRI TR-112657. The staff finds that the change in risk estimate is appropriate and the results provide assurance that the fourth key principle is met.

The licensee stated that the third 10-year RI-ISI interval program is conducted in accordance with Nuclear Energy Institute's (NEI) NEI-04-05, "Living Program Guidance To Maintain Risk-Informed Inservice Inspection Programs For Nuclear Plant Piping Systems" (Reference 9), and thus continues to be a living program. Maintenance of a living program is also unaffected by the relocation of inspections and, therefore, the fifth key principle is met.

Section 3.6.6.1 of EPRI TR-112657 states, in part, that the service history and susceptibility review and ongoing industry events reviews assure that industry trends are being monitored to assure that if an unexpected or new mechanism is identified, or a new component is identified as susceptible to an existing degradation mechanism, the RI-ISI program will be updated to reflect that change. The program update will incorporate any additional inspections mandated by the NRC as well as those inspections deemed appropriate by the industry groups addressing the specific issues.

As a result of recent and ongoing issues related to degradation due to primary water stress corrosion cracking in components that contain alloy 600/82/182, the staff requested that the licensee provide information related to welds containing alloy 82/182 and describe the level of inspection in the Salem 2 RI-ISI program. The applicant responded by letter dated February 7, 2005 and indicated that it has taken the aforementioned issue into account and is complying with industry guidance and intends to continue to follow industry guidance in the future. The applicant stated that during the Salem 2 fall 2003 outage, it conducted ultrasonic and liquid penetrant exams of the eight total hot and cold leg nozzle to safe-end welds. In addition, an augmented EVT-1 visual examination was also conducted of the inner diameter. The licensee reported that completed non-destructive examinations of these welds found no evidence of component degradation.

Based on the above discussion, the staff finds that the five key principles of risk-informed decision making are ensured by the licensee's proposed third 10-year RI-ISI interval program plan and, therefore, the proposed program for the third 10-year ISI inspection interval is acceptable.

3.0 CONCLUSIONS

Based on the information provided in the licensee's submittals, the NRC staff has determined that

the proposed alternative provides an acceptable level of quality and safety. Therefore, it is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval at Salem 2.

4.0 REFERENCES

6. Letter from David Garchow, PSEG, dated July 12, 2004, to the NRC, "Extension of Risk-Informed Inservice Inspection Applicability Salem Generating Station Unit 2, Docket No. 50-311."
7. Letter from Christina L. Perino, PSEG, dated February 7, 2005, to the NRC, "Response to Request for Additional Information Regarding Approval to Extend the Risk-Informed Inservice Inspection Program Salem Nuclear Generating Station, Unit No. 2, Facility Operating License No. DPR-75, Docket No. 50-311."
8. Letter from John Carlin, PSEG, dated January 21, 2003, to the NRC, "Request for Authorization to Use a Risk-Informed Inservice Inspection Alternative to the ASME Boiler and Pressure Vessel Code Section XI Requirements for Class 1 and 2 Piping, Salem Generating Station Unit Nos. 1 and 2, Docket Nos. 50-272 and 50-311."
9. Letter from John Carlin, PSEG, dated July 1, 2003, to the NRC, "Response to NRC Request for Additional Information Regarding Risk-Informed Inservice Inspection Submittal, Salem Generating Station Unit Nos. 1 and 2, Docket Nos. 50-272 and 50-311."
10. Letter from James W. Clifford, NRC, dated October 1, 2003, to Roy A. Anderson (PSEG), "Salem Nuclear Generating Station, Unit Nos. 1 and 2- Risk-Informed Inservice Inspection Program (TAC Nos. MB7537 and MB7538)."
11. EPRI TR-112657, Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure, Final Report," December 1999.
12. NRC RG 1.178, "An Approach for Plant-Specific Risk-Informed Decision Making: Inservice Inspection of Piping," September 1998.
13. NRC NUREG-0800, Chapter 3.9.8, "Standard Review Plan for Trial Use for the Review of Risk-Informed Inservice Inspection of Piping," September 1998.
14. NEI 04-05, "Living Program Guidance To Maintain Risk-Informed Inservice Inspection Programs For Nuclear Plant Piping Systems," April 2004.

Principal Contributors: R. Davis
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Dated: April 1, 2005