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Generic Letter 2004-02

LR-N08-0139

United States. Nuclear Regulatory Commission
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Salem Generating Station – Unit 1 and Unit 2
Facility Operating License Nos. DPR-70 and DPR-75
NRC Docket Nos. 50-272 and 50-311

Subject: **REQUEST FOR EXTENSION TO COMPLETE GENERIC LETTER 2004-02 TESTING**

References: (1) Letter from PSEG to NRC: "90-Day Response to Generic Letter 2004-02 Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors, Salem Nuclear Generating Station, Units 1 and 2, Facility Operating Licenses DPR-70 and DPR-75, Docket Nos. 50-272 and 50-311", dated March 4, 2005.

(2) Letter from PSEG to NRC: "Response to Generic Letter 2004-02 Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors, Salem Nuclear Generating Station, Units 1 and 2, Facility Operating Licenses DPR-70 and DPR-75, Docket Nos. 50-272 and 50-311", dated September 1, 2005.

(3) Letter from NRC to Mr. William Levis: "Salem Nuclear Generating Station, Units 1 & 2 Request for Additional Information Re: Response to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design-Basis Accidents at Pressurized-Water Reactors." (TAC Nos. MC4712 and MC4713), dated February 9, 2006.

(4) Supplemental Response to NRC Generic Letter (GL) 2004-02 "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized Water Reactors Dated February 29, 2008.

On September 13, 2004 the NRC issued Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors." GL 2004-02 requested that each plant perform an evaluation of the Emergency Core Cooling System and Containment Spray System recirculation functions in light of the information provided in the Generic Letter and, if appropriate, take additional actions to ensure system function.

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The response to GL 2004-02 was provided in three (3) sections: (1) a 90-day response from the date of the safety evaluation (Reference 1), (2) additional information to be provided by September 1, 2005. (Reference 2) and (3) supplemental response on February 29, 2008, (Reference 4)

PSEG is fully committed to resolving the containment sump issues. Currently, PSEG is performing a series of tests in a Multi Function Test Loop (MFTL) at CCI vendor facility. The test uses the WCAP-16530-NP chemical precipitates surrogates and debris loading in a proto typical configuration. PSEG considers the test in this MFTL to model the Salem post-accident scenario. PSEG expects the results of the tests will establish a basis for sump strainer available NPSH and structural margin, including the effects of post-accident sump chemistry. Testing is on-going and PSEG expects the test to be successfully completed by the end of 2008. Therefore, PSEG respectfully requests an extension to December 31, 2008 to complete the testing. PSEG will revise its GL 2004-02 response within 90 days following the completion of the testing.

Attachment 1 to this letter contains a detail description of the extension request and the basis and justification for the request.

Should you have any questions regarding this submittal, please contact Mr. Enrique Villar at 856-339-5456.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 6/26/08
(Date)

Sincerely,

Robert C. Braun
Site Vice President
Salem Generating Station

Attachments (1)

C Mr. S. Collins, Administrator – Region I
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Attachment 1

Bases for Request for Extension of Completion Dates for Salem Units 1 and 2 Corrective Actions Required by Generic Letter 2004-02

Background

Generic Letter (GL) 2004-02 was issued on September 13, 2004 and required that licensees provide a description and implementation schedule for all corrective actions, including any plant modifications that were identified in responding to the GL. The GL further requested that licensees complete all required corrective actions by December 31, 2007, or provide justification for continued operation until those actions were completed.

On March 4 and September 1, 2005, PSEG submitted a listing of the actions it was taking to address GL 2004-02 and updated the status of those actions in its letter of June 7, 2006.

On February 9, 2006, the Commission issued Request for Additional Information (RAIs) to the site to be answered within 60 days.

On January 4, 2007, the Commission issued a letter stating that it would allow licensees to include the RAI response in the final GL response for closure of all of the GSI-191 issues no later than December 31, 2007.

On August 15, 2007, the Commission issued a copy of the "Content Guide for Generic Letter GL 2004-02 Responses," which was sent to NEI for distribution to all licensees.

On June 7, 2006, PSEG submitted an extension request for Salem Unit 2 steam generator insulation replacement until the end of Spring 2008, refueling outage. On August 11, 2006 NRC approved the extension request.

On August 15, 2007, PSEG submitted a Licensing Amendment Request for revision to the licensing basis for the Net Positive Suction Head available (NPSHa) for Emergency Core Cooling System (ECCS) and Containment Heat Removal System pumps as described in the Appendix 3A of the Salem Updated Final Safety Evaluation Report (UFSAR). On November 15 2007, NRC approved the license amendment request.

During the week of October 1, 2007, NRC performed an audit at Salem Generating Station. Based on the audit, NRC issued open items. NRC also provided additional open items following the audit. PSEG has addressed some of the open audit items in the February 29, 2008 Generic Letter response. The remaining open items will be responded to with the final generic letter response.

On December 10, 2007, PSEG requested an extension to complete actions related to Generic Letter 2004-02. On December 21, 2007, the NRC approved the December 10, 2007 request for extension until June 30, 2008.

On February 29, 2008 PSEG provided Supplemental Response to NRC Generic Letter (GL) 2004-02 "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized Water Reactors.

Requested Extension and Basis for the Proposed Extension

SECY-06-0078, "Status of Resolution of GSI-191, "Assessment of [Effect of] Debris Accumulation on PWR Sump Performance," dated March 31, 2006, specifies two criteria for short duration Generic Letter 2004-02 extensions, limited to several months. These two criteria are listed below.

Criterion 1: The licensee has a plant-specific technical/experimental plan with milestones and schedule to address outstanding technical issues with enough margins to account for uncertainties.

Criterion 2: The licensee identifies mitigative measures to be put in place prior to December 31, 2007, and adequately describes how these mitigative measures will minimize the risk of degraded ECCS and CSS functions during the extended period.

Salem is requesting an extension for the following two outstanding technical issues.

1. Completion and evaluation of the final chemical head loss tests performed by CCI,
2. Incorporation of the head loss test results into the strainer head loss and NPSH.

Currently, PSEG is performing a series of tests in a Multi Function Test Loop (MFTL) at the vendor (CCI) facility. These tests use the WCAP-16530-NP chemical precipitate surrogates and debris loading in a proto typical configuration. PSEG considers these tests to model the Salem post-accident scenario. PSEG expects the results of these tests will establish a basis for sump strainer available NPSH and structural margin, including the effects of post-accident sump chemistry.

Upon completion of the testing, the test report and associated calculations will be completed. In order to complete the MFTL testing and documentation, this submittal requests that the date to complete all corrective actions required by GL 2004-02 be extended to December 31, 2008.

Following is the detailed information on the two items associated with Criterion 1 of SECY-06-0078.

1. Completion and evaluation of the final chemical head loss tests performed by CCI

   The Salem Units 1 and 2 MFTL testing will be performed at the vendor (CCI) facility using representative ECCS sump pool chemistry, postulated strainer debris loading, and chemicals.

   The Salem Units 1 and 2 testing will include the debris determined from the associated debris transport calculation.

To date, PSEG has performed a series of chemical tests in the MFTL. These tests are being repeated to provide a proto typical test configuration and to resolve some concerns from the NRC regarding testing methodology. The NRC has observed some of the testing at the CCI location.

In addition to the MFTL tests at the CCI facility, PSEG is planning to perform a series of bench top tests to show that the formation of chemical precipitates will not occur until after sub cooling of the containment sump water. This condition will provide adequate NPSH margin for addressing chemical effects. The work includes preparation of a test plan; performance of the tests, analyses of results, and preparation of the final test report. The complete task is anticipated to take 14 weeks. The anticipated completion is last week of October 2008.

2. Incorporation of the head loss test results into the strainer head loss and NPSH calculations

Calculations and the supporting analyses and certifications will be revised to incorporate the results from the MFTL and bench top testing. The results from the MFTL and bench top tests will be incorporated into the head loss calculation. Subsequently, the NPSH calculation will be generated utilizing the head loss information. The expected completion date is end of December 2008.

The following mitigative measures and compensatory actions have been implemented to minimize the risk of degraded ECCS and CSS functions during the requested extension period thus providing the required information for Criterion 2 of SECY-06-0078.

A. ECCS Design

At Salem Unit 1 and 2 new ECCS containment sump strainer modules have been installed. The new surface area is 4,854 sq ft. Originally, the containment sump strainer area was 85 sq ft. At Salem Unit 2 the new containment sump strainer surface area is 4,656 sq ft compared to the original surface area of 85 sq ft. In addition to providing a significant increase in strainer surface area, the new design in both Units incorporates a reduction in strainer hole size from 1/8" inch nominal (original strainer) to 1/12" inch nominal (new strainer).

In addition, a trash rack has been installed in front of the strainer modules to block debris. Two new level switches have been installed with greater accuracy (+/- ½") to provide the containment level. The previous level transmitters had an accuracy of +/- 10½".

B. Insulation Replacement:

At Salem Units 1 and 2, all the calcium silicate insulation within the Zone of Influence (ZOI) has been replaced with reflective metallic insulation. The Salem Unit 2 steam generators were replaced during Spring 2008. The new steam generators have been insulated with metallic reflective insulation. Additionally, PSEG replaced Min K (wherever accessible) insulation with reflective metallic insulation. In some cases, NUKON insulation was used

due to accessibility concerns. In such cases, the added NUKON insulation was accounted for, in the debris generation calculation.

C. Programmatic Controls to Reduce Debris in Containment

Salem has provided programmatic controls to ensure that potential sources of debris that may be introduced into containment will be assessed for adverse effects on the ECCS and Containment Spray System recirculation functions. These programmatic controls include requirements related to coatings, containment housekeeping, materiel condition, and modifications. Typical programmatic controls are described below:

Salem has a containment coating program. The majority of the coatings inside of containment were procured and applied as qualified coatings. Qualified coatings are controlled under site procedures. The majority of unqualified coatings inside of containment are component Original Equipment Manufacturer coatings. New or replacement equipment are evaluated for the potential of unqualified coatings. During every refueling outage, a containment walk down is performed in accordance with the associated technical standard to determine the condition of the coatings and take corrective actions as necessary.

At the end of an outage, a formal containment walk down is performed utilizing the containment closeout surveillance procedure. The walk down is performed to ensure that loose materials are removed and will not affect the ECCS including the sump. Loose items not removed require a documented evaluation to provide the basis for concluding that the item is acceptable to remain in containment. As part of containment closeout, each ECCS train containment sump and sump screens are inspected for damage and debris. Also, refueling canal drains are verified to be unobstructed and that there is no potential debris sources in the refueling canal area that could obstruct the drains.

As part of the newly installed containment sump and strainers, the design procedures have been revised to control the introduction of material in the Reactor Containment that has a potential to have a negative impact on the sump performance. These procedures direct that engineering changes be evaluated for system interactions. As part of this evaluation, there is direction to include consideration of any potential adverse effect with regard to debris sources and/or debris transport paths associated with the containment sump.

Qualitative Risk Assessment

Salem Units 1 and 2 have completed the ECCS strainer modifications. The installed strainer surface area of 4,854 sq ft at Salem Unit 1 and 4,656 sq ft at Salem Unit 2 is substantially greater than original strainer surface area of 85 sq ft at both Salem Units. The sump strainer design has been sized to accommodate the maximum transportable debris (fibrous insulation, dirt, paint chips and other particulates, and latent debris) from the limiting break location.

Additionally, as a result of the ECCS strainer modification, design procedures are being revised to enhance the controls for introducing material in the Reactor Containment, and therefore

minimizing any potential adverse effect with regard to debris sources and/or debris transport paths associated with the containment sump. The only remaining items to be completed are the chemical testing and revision of associated calculations.

The Debris Generation and Transport calculations are complete. The NRC examined these calculations during the October 1, 2007 audit. Latent Debris Evaluation is complete. The containment walk down showed the latent debris amount much less than 200 pounds. However, for conservatism, 200 pounds was used in the calculation. Chemical Effects evaluation has been completed in accordance with WCAP 16530-NP.

The downstream effect calculation in accordance with WCAP 16406-P Revision 1 has been completed. NRC had examined the draft evaluation during the October 1, 2007 audit. The in-vessel evaluation based on WCAP 16793-NP is also complete.

Therefore, it is concluded that the risk impacts of granting the extension to complete testing and the completion of the associated calculations are very small.

Conclusion

PSEG has provided a response to Generic Letter 2004-02; however, an extension is requested for the two items described above.

An extension of the Salem Unit 1 and Unit 2 dates for the completion of all corrective actions required by Generic Letter 2004-02 is acceptable due to the fact that:

- Salem has performed extensive debris generation and transport calculations to determine the amount of debris that could be transported to the containment sump. Based on this debris load and impacted chemicals, the maximum number of strainer modules (based on the plant layout) have been installed to ensure high level of ECCS sump performance.

- Salem has completed the downstream effect calculation in accordance with WCAP 16406-P Revision 1. The NRC examined the draft evaluation of this calculation during the October 1, 2007 audit. In addition the in-vessel evaluation based on WCAP 16793-NP Revision 0 is also completed

- Salem has made procedural changes to control the introduction of any material that has negative impact on the containment sump performance. Also, at Salem Units there are currently procedures in place that ensure containment cleanliness.

- Salem has already performed some chemical testing in the MFTL at the vendor facility. In order to provide a better proto typical layout, additional testing is being performed. The test configuration is designed to provide a highly representative post-accident sump environment and sump strainer challenge for the Salem Units.

The requested period of this extension is required to allow the bench top and MFTL Test results to be fully evaluated, properly documented and reviewed, and finally incorporated into the formal head loss and NPSH calculation for Salem Units 1 and 2.

Additionally, the Salem Unit 1 and 2 ECCS Sump Strainer modifications are complete. Given these factors, and the fact that PSEG endeavors to provide an accurate and complete response commensurate with the significance of GSI 191, granting the extension request is prudent.

List of Commitments
Salem Generating Station Units 1 and 2

The following table identifies those actions committed to by PSEG. Any other statements in this letter are provided for information purposes and are not considered regulatory commitments.

COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (YES/NO)	PROGRAM-MATIC (YES/NO)
Salem is requesting extension for the following two outstanding technical issues: 1. Completion and evaluation of Salem's final chemical head loss test in the vendor's Multi- Functional Test Loop (MFTL), 2. Incorporation of the test results from the MFTL into the head loss and NPSH calculations,	December 31, 2008	Yes	No
PSEG will revise its GL 2004-02 response within 90 days following the completion of the items above.	Prior to March 31, 2009	Yes	No