

January 31, 2007

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

FROM: Richard B. Ennis, Senior Project Manager */RAI/*
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NO. 1,
DRAFT REQUEST FOR ADDITIONAL INFORMATION
(TAC NO. MD4034)

The attached draft request for information (RAI) was transmitted on January 31, 2007, to Mr. Jamie Mallon of PSEG Nuclear LLC (the licensee). This information was transmitted to facilitate an upcoming conference call in order to clarify the licensee's amendment request for Salem Nuclear Generating Station, Unit No. 1, dated January 18, 2007. The amendment request proposes a one-time change to the Technical Specifications (TSs) regarding the steam generator (SG) tube inspection and repair required for the portion of the SG tubes passing through the tubesheet region. Specifically, for Salem Unit No. 1 refueling outage 18 (planned for Spring 2007) and the subsequent operating cycle, the proposed TS changes would limit the required inspection (and repair if degradation is found) to the portions of the SG tubes passing through the upper 17 inches of the approximate 21-inch tubesheet region.

This memorandum and the attachment do not convey or represent an NRC staff position regarding the licensee's request.

Docket No. 50-272

Attachment: Draft RAI

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DRAFT REQUEST FOR ADDITIONAL INFORMATION
REGARDING PROPOSED LICENSE AMENDMENT
STEAM GENERATOR ALTERNATE REPAIR CRITERIA
SALEM NUCLEAR GENERATING STATION, UNIT NO. 1
DOCKET NO. 50-272

By letter dated January 18, 2007, PSEG Nuclear LLC (PSEG or the licensee) submitted an amendment request for Salem Nuclear Generating Station, Unit No. 1 (Salem). The amendment request proposes a one-time change to the Technical Specifications (TSs) regarding the steam generator (SG) tube inspection and repair required for the portion of the SG tubes passing through the tubesheet region. Specifically, for Salem Unit No. 1 refueling outage 18 (planned for Spring 2007) and the subsequent operating cycle, the proposed TS changes would limit the required inspection (and repair if degradation is found) to the portions of the SG tubes passing through the upper 17 inches of the approximate 21-inch tubesheet region.

The Nuclear Regulatory Commission (NRC) staff has reviewed the information the licensee provided that supports the proposed amendment and would like to discuss the following issues to clarify the submittal.

Background

Argonne National Laboratory (ANL), under contract to the NRC, is performing generic studies relating to the leakage behavior of SG tube-to-tubesheet joints (TS joints) under postulated severe accident conditions. As part of this work, ANL benchmarked its finite element model of the TS joint against pullout and leakage tests carried out by Westinghouse (WCAP-15932-P) on tube-to-collar joint specimens (to simulate tube-to-tubesheet joints) for Callaway. While performing this benchmarking study, ANL observed that the split in contact pressure (between the tube and tubesheet) between that due to differential thermal expansion effects and that due to the roll expansion process, calculated indirectly by Westinghouse based on the test results, is much different than that calculated by ANL. ANL states that this may be due to an incorrect choice of thermal expansion coefficients for the tubesheet collar specimens used in the Westinghouse tests. The test specimen collars were made from cold-worked 1018 steel instead of the actual tubesheet material which is A508 forging. Although the yield strengths of these two materials are comparable, their coefficients of thermal expansion are somewhat different. ANL believes that the difference between the ANL results and the Westinghouse results is because Westinghouse assumed thermal expansion properties of A508 rather than 1018 steel when analyzing their test results. ANL reported this finding to the NRC on December 29, 2006.

The Westinghouse tests for Callaway are similar to those performed in support of the October 2, 2006, and January 18, 2007, amendment requests for Salem Unit 1 relating to tubesheet inspections. The October 2, 2006, amendment request enclosed Westinghouse report WCAP-16640-P, "Steam Generator Alternate Repair Criteria for Tube Portion Within the Tubesheet at Salem Unit 1." The NRC staff notes that the pullout and leakage tests described

in this report also utilized collar specimens fabricated from 1018 steel compared to the SA-508 material from which the Salem Unit 1 tubesheets were actually fabricated.

Requested Information

Based on the above, the NRC staff is requesting the following information:

- 1) Please comment on ANL's observation regarding the possibility of an incorrect choice of thermal expansion coefficient for the tubesheet collar specimens used in the Westinghouse tests in terms of how it may apply to Salem Unit 1. If you disagree with the ANL observations pertaining to Callaway or if you believe the ANL observations not to be relevant to Salem, explain why.
- 2) If there is a problem with the assumed values of thermal expansion coefficient, please characterize the problem and provide any necessary corrections to Westinghouse report WCAP-16640-P. Of priority interest to the NRC staff, to support timely completion of the staff's review, are any needed revisions to Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4.
- 3) Provide any revisions or corrections to WCAP-16640-P to reflect any new Westinghouse crevice pressure test data and analyses which may be relevant to H* and B* applications at Salem Unit 1. Of priority interest to the NRC staff, to support timely completion of the staff's review, are any needed revisions to Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4.
- 4) WCAP-16640-P Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4 address the hot leg only. Provide similar information for the cold leg. Alternatively, provide your plans for revising the scope of the amendment to apply to the hot leg side only.