

Public Service
Electric and Gas
Company

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Vice President - Nuclear Operations

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United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

NRC BULLETIN 88-11
PROPOSED ALTERNATIVE SCHEDULE FOR EVALUATION
OF PRESSURIZER SURGE LINE THERMAL STRATIFICATION
SALEM GENERATING STATION
UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311

Public Service Electric and Gas Company (PSE&G) is in receipt of the subject NRC Bulletin regarding the potential threat to pressurizer surge line integrity due to thermal stratification. Action Item 1.b of the bulletin requires that licensees demonstrate that the pressurizer surge line meets applicable design codes (including fatigue analysis) and other FSAR and regulatory commitments for the licensed life of the plant. For plants in operation over 10 years (Salem 1), this evaluation is required to be provided within 4 months of the date of receipt of the bulletin. For plants in operation for less than 10 years (Salem 2) this evaluation is required to be provided within one year of the date of receipt of the bulletin.

PSE&G believes that these time requirements will be difficult to meet considering the amount of analytical work that is being requested and has joined a Westinghouse Owners Group (WOG) effort aimed at resolving this issue from a generic standpoint, with additional plant-specific measures to be taken as necessary.

The WOG program was developed in October 1988 and has the following objectives:

- Develop a generic Justification for Continued Operation (JCO) to assure that plant safety is not compromised while the effects of thermal stratification are being determined.
- Collect and summarize relevant design, operational, analytical, and test data for as many WOG plants as possible. In addition, a representative sampling of

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approximately ten plants will be selected to perform a review of plant records and conduct interviews with operations personnel.

- Evaluate data and identify and prioritize significant parameters contributing to this issue. Categorize (group) plants based on these parameters.
- Recommend additional monitoring to supplement the existing transient database required to bound all WOG plants.
- Estimate the effect of thermal stratification on fatigue life as a function of key parameters.
- Recommend short term and long term actions.

The WOG program is designed to benefit from the experience gained in the performance of several plant specific analyses on Westinghouse PWR surge lines. These detailed analyses included definition of revised thermal transients (including stratification) and evaluations of pipe stress, fatigue usage factor, fatigue crack growth, leak-before-break, and support loads. The overall analytical approach used in all of these analyses has been consistent and has been reviewed, in detail, by the NRC staff. A significant amount of surge line thermal monitoring data has been obtained in support of these plant specific analyses. Additional surge line thermal monitoring and plant system data continues to be made available within the WOG, resulting in a steadily increasing database.

To date, the WOG has completed approximately 80% of the effort of assembling plant specific design information on all domestic Westinghouse PWRs (55 units total). This effort will establish the range of key design parameters and permit grouping of plants based on these parameters.

Based on the information assembled to date, and the experience gained in plant specific analyses and monitoring programs, the WOG evaluation has resulted in the following observations regarding plant similarity and thermal stratification:

1. Thermal stratification with temperature gradients greater than 100°F have been measured on all surge lines for which monitoring has been performed (7 plants). (Surge line temperature monitoring has not been performed at Salem).

2. The amount of stratification measured and its relation to time (cycling) varies. This variation has been conservatively enveloped and applied to plant specific analyses. Additional monitoring data representing a wider range of surge line configurations may be needed in order to demonstrate the applicability of these thermal stratification transients to other Westinghouse units.
3. Significant factors which can influence the structural effects of stratification are:
 - a. Location and design of rigid supports and restraints
 - b. Pipe layout geometry and size
 - c. Type and location of piping components
4. Although material and fabrication techniques for Westinghouse surge lines are reasonably consistent and of high quality, the design parameters listed in Item 3 vary among Westinghouse PWRs. This variation in design is primarily a result of plant specific routing requirements and is currently being examined in order to assess the feasibility of a bounding analysis approach.

These observations developed through the ongoing WOG program indicate that the development of thermal stratification loading and fatigue is a complex process. Therefore, in order to precisely evaluate stratification and resulting fatigue, additional time is needed.

The aforementioned plant specific analyses were performed using the thermal data collected during the monitoring of seven (7) pressurizer surge line configurations. The finite element analysis performed has calculated stratification induced loads that substantiate the "leak-before-break" concept. In addition, the thermal induced fatigue loading from the stratification has been determined to be acceptable for the 40-year design life of the piping system. This provides support for the extension of time needed to perform a detailed evaluation of the thermal stratification issue at Salem. This detailed evaluation will be developed through the WOG program by applying thermal monitoring data to specific surge line configurations.

PSE&G hereby requests an alternate schedule to that requested in Action 1.b of NRC Bulletin 88-11. A schedule of two years from receipt of the Bulletin is considered sufficient time to apply the thermal monitoring data to the stress analysis, define

thermal transients, perform all required analyses and update the calculations to ensure compliance with applicable code and regulatory requirements. This schedule, though different from that requested in Action 1.b, is consistent with the requirement to update the stress analyses to include stratification induced fatigue within two years as stated in Action 1.d of the Bulletin.

To assure that plant safety is not compromised within the requested period of schedule extension, a JCO will be submitted to the Staff. The JCO, which is currently being developed, will be submitted by PSE&G to the Staff within 4 months of receipt of the bulletin (May 5, 1989) for Salem Unit 1 and within 1 year of receipt of the bulletin (January 5, 1990) for Salem Unit 2.

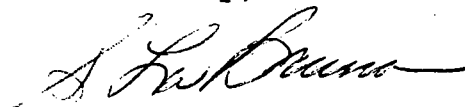
With regard to the visual inspection of the pressurizer surge line required by Action 1.a of NRC Bulletin 88-11, it should be noted here that this inspection was already performed on Salem Unit 2 during the recent Fourth Refueling Outage. The inspection was performed as a result of a commitment made in response to NRC Bulletin 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems." PSE&G committed to the performance of both visual and ultrasonic examinations on both the Salem Unit 1 and Salem Unit 2 pressurizer surge lines during the next two consecutive refueling outages on each unit as well as a field walkdown to verify support and HEBA restraint clearances.

During the Salem Unit 2 Fourth Refueling Outage, the results of the NDE of the pressurizer surge line revealed no recordable indications of flaws. The field walkdown identified no abnormal piping deflection. These results provide additional support for the requested schedule extension for the updated stress analysis.

The next scheduled pressurizer surge line visual and ultrasonic examination and field walkdown will be done at Salem Unit 1 during the Eighth Refueling Outage, tentatively scheduled to begin on April 15, 1989, unless a forced cold shutdown of greater than 7 days in duration occurs prior to that time.

Should you have any questions with regard to this transmittal please do not hesitate to contact us.

Sincerely,



C Mr. J. C. Stone
Licensing Project Manager

Ms. K. Halvey Gibson
Senior Resident Inspector

Mr. W. T. Russell, Administrator
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STATE OF NEW JERSEY)
) SS.
COUNTY OF SALEM)

Stanley LaBruna, being duly sworn according to law deposes and says:

I am Vice President - Nuclear Operations of Public Service Electric and Gas Company, and as such, I find the matters set forth in our letter dated March 6, 1989, concerning the Salem Generating Station, Unit Nos. 1 and 2, are true to the best of my knowledge, information and belief.



Subscribed and Sworn to before me
this 6th day of March, 1989



Notary Public of New Jersey

My Commission expires on _____
VANITA M. MARSHALL
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires May 6, 1993