Jeffrey T. Gasser
Vice President

Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205 992.7721
Fax 205 992 0403

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February 12, 2003

Docket Nos: 50-424

NL-03-0200

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Vogtle Electric Generating Plant
Response to Request for Additional Information
Steam Generator Tube Inspections

Ladies and Gentlemen:

By letters dated April 5, and July1, 2002, Southern Nuclear Operating Company submitted reports summarizing for Vogtle Unit 1 the steam generator tube inspections performed during the 2002 refueling outage. On January 13, 2003, during a telephone call, your staff requested additional information on these and previous steam generator inspection reports. Attached are the responses to your staff's questions.

Sincerely,

Jeffrey T. Gasser

JTG/KWK/daj

Enclosures:

cc: Southern Nuclear Operating Company
Mr. J. D. Woodard, Executive Vice President
Mr. G. R. Frederick, General Manager – Plant Vogtle
Mr. M. Sheibani, Engineering Supervisor – Plant Vogtle
Document Services RTYPE: CVC7000

U. S. Nuclear Regulatory Commission
Mr. L. A. Reyes, Regional Administrator
Mr. F. Rinaldi, NRR Project Manager – Vogtle
Mr. J. Zeiler, Senior Resident Inspector – Vogtle

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1. It was indicated that nine tubes were plugged in steam generator 4 at the start of 1R10. Please clarify whether this reflects all tubes plugged or just the tubes plugged following commencement of commercial operation. NRC records indicate that for this steam generator, four tubes were plugged prior to commercial operation, three tubes were plugged in 1995 (1R5), and six tubes were plugged in 1997 (1R7) for a total of 13 tubes.

Question 1 Response:

The nine plugged tubes in steam generator 4 at the start of 1R10 were only those plugged following commencement of commercial operation. NRC records indicating a total of 13 plugged tubes are correct.

2. It was indicated that bobbin and plus-point exams of the region of the tube between the tube sheet and flow distribution baffle areas was performed for the tubes in rows 1 and 2 before and after Ultrasonic Energy Cleaning. Please provide a brief description of the cleaning process and clarify why these examinations were performed. In addition, discuss the results of the eddy current examinations.

Question 2 Response:

Description of cleaning process
Ultrasonic energy cleaning (UEC) is a process where ultrasonic energy is used to disrupt scale and secondary side deposits that have accumulated on the outside surface of steam generator (SG) tubes. At Vogtle 1R10, the process was applied in SG1 for the purpose of field demonstration of the process, which had not previously been used in a commercial nuclear power SG. The ultrasonic energy was initiated into the tube bundle via operation of ultrasonic transducers which were placed in the tube lane and covered with water. The water served as a medium for transmission of ultrasonic wave energy from the transducers to the tube bundle. During the transducer operation, the water was maintained at a depth of approximately 19 inches above the top of the tube sheet (below the flow distribution baffle plate (FDB))

Why examinations were performed
The examinations were performed to validate laboratory test results that demonstrated no adverse effects to tube integrity during UEC. Even with the very low potential for SG tube degradation, Southern Nuclear decided eddy current testing should be performed as positive verification the application resulted in no detectable detrimental effects since the 1R10 application was a first time application of UEC technology in a commercial nuclear power SG.

Results of eddy current examinations
No damage to the SG as a result of high frequency sound waves was detected via the pre-UEC and post-UEC eddy current inspections.

3. It was indicated that two tubes were plugged during the outage since an acceptable examination could not be performed due to tube geometry (i.e., difficulty in passing a rotating coil probe through the low row tubes). In 1997, two tubes had also been plugged at Vogtle 1 due to "restrictions" and visual inspections of the region were unsuccessful. In light of the above, please clarify what size probe would not pass through these tubes and the location of the "restriction". In addition, discuss the largest size probe that ever passed through these four tubes. Discuss whether any additional diagnostics were performed this outage to characterize the reason for the inability to pass probes through these tubes. Discuss the likelihood that the restrictions are caused by an inservice condition rather than from the tight bend radius. If the cause is the "tight radius", discuss why the frequency of observing this condition seems to be increasing with time.

Question 3 Response:

In 1996, Vogtle 1 experienced a mid-cycle shut down due to a loose part in Steam Generator 4. The loose part was identified as a guide tube support pin. Additionally, prior to 1997, inspections of the low row U-bends in Vogtle 1 had been performed with a .520" bobbin coil.

In the 1997 inspection of Steam Generator 4, tube row 4 column 3 was plugged due to a loose part lodged in the tube approximately 22 inches above the hot leg tube end. This foreign object was visually confirmed. Tubes row 4 column 4 and row 1 column 31 were also plugged due to what is believed to be a foreign object lodged in the tube near the u-bend region These foreign objects are believed to be pieces of a guide tube support pin that were lodged in the tube during operation. Unsuccessful attempts were made during the outage to retrieve and/or dislodge these pieces and to perform visual inspections of the loose part. As a result, these tubes were plugged. Both these tubes successfully passed a .520" bobbin probe during the previous inspection.

During the Unit 1 10th refueling outage, the decision was made to plug Row 1 Column 122 in steam generator 1, along with tube Row 2 Column 1 in steam generator 4 as a result of the rotating coil probe binding and stopping rotation during examinations. Attempts were made to inspect from both the hot leg and the cold leg without success utilizing a .500" rotating coil probe. Both tubes had successfully passed a .520" bobbin coil during previous inspections. The binding of the rotating coil probe in the tube is believed to be the result of the differences in the design dimensions of the rotating coil and bobbin probes and their ability to make the bend over the low row u-bends.

4. Discuss whether the rate of wear at the anti-vibration bars (AVBs) measured during this outage was consistent with what was previously observed.

Question 4 Response:

For the four Vogtle 1 steam generators, the 95% cumulative percent distribution growth values are less than 10% for the prior 2-cycle intervals. There has been no unusual change in the rate of progression of the previously observed AVB wear sites, and no tubes were found to have experienced excessive AVB wear.

5. Please discuss the nature of the indication in steam generator 1 in row 58 column 70. It appears that there is a 19-percent through-wall indication at the hot-leg baffle plate (BPH). Include in this discussion any diagnostic examinations performed to confirm the nature of indications of this type (e.g., tube pulls).

Question 5 Response:

This indication was first reported at the hot leg flow distribution baffle during the Unit 1 8th refueling outage. The indication was wear like and believed to be caused by a loose part; however, no loose part was found in the area. The indication was then rotating coil probe tested utilizing the AVB/ASME combination standard and determined to be 19% through wall. The indication was then tested again during the Unit 1 10th refueling outage with no changes in the signal character.