

April 6, 2005

Mr. Karl W. Singer  
Chief Nuclear Officer and  
Executive Vice President  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNIT 2 - REQUEST FOR ADDITIONAL  
INFORMATION REGARDING THE STEAM GENERATOR TUBE INSERVICE  
INSPECTION REPORTS FOR THE END-OF-CYCLE 12 REFUELING OUTAGE  
(TAC NO. MC4545)

Dear Mr. Singer:

By letter dated December 12, 2003 (Agencywide Documents Access and Management Systems (ADAMS) Accession No. ML033510702), Tennessee Valley Authority (TVA, the licensee) submitted the 15-day steam generator (SG) plugging report in accordance with Technical Specification (TS) 4.4.5.5.a for the Sequoyah Nuclear Plant, Unit 2, Cycle 12 refueling outage. The inservice inspection of the Unit 2 SG tubes was completed on November 30, 2003. By letter dated March 9, 2004 (ADAMS ML040710360), TVA submitted the 90-day SG voltage-based alternate repair criteria report in accordance with Unit 2 License Condition 2.C.(8)(b). By letter dated September 20, 2004 (ADAMS ML042720448), TVA submitted the 12-month SG inspection report in accordance with TS 4.4.5.5.b. In addition to these reports, the U.S. Nuclear Regulatory Commission staff summarized additional information concerning the 2003 SG tube inspection in a letter dated April 20, 2004 (ADAMS ML040680349).

In order for the staff to complete its review of these reports, we have identified the enclosed request for additional information (RAI). Based on discussions with your staff, we understand that you intend to respond to this RAI by April 15, 2005.

Sincerely,

*/RA/*

Douglas V. Pickett, Senior Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-328

Enclosure: As stated

cc w/enclosure: See next page

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Mr. Karl W. Singer  
Tennessee Valley Authority

SEQUOYAH NUCLEAR PLANT

cc:

Mr. Ashok S. Bhatnagar, Senior Vice President  
Nuclear Operations  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Mr. Paul L. Pace, Manager  
Licensing and Industry Affairs  
ATTN: James D. Smith  
Sequoyah Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Soddy Daisy, TN 37384-2000

Mr. Larry S. Bryant, General Manager  
Nuclear Engineering  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Mr. David A. Kulisek, Plant Manager  
Sequoyah Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Soddy Daisy, TN 37384-2000

Mr. Randy Douet  
Site Vice President  
Sequoyah Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Soddy Daisy, TN 37384-2000

Senior Resident Inspector  
Sequoyah Nuclear Plant  
U.S. Nuclear Regulatory Commission  
2600 Igou Ferry Road  
Soddy Daisy, TN 37379

General Counsel  
Tennessee Valley Authority  
ET 11A  
400 West Summit Hill Drive  
Knoxville, TN 37902

Mr. Lawrence E. Nanney, Director  
Division of Radiological Health  
Dept. of Environment & Conservation  
Third Floor, L and C Annex  
401 Church Street  
Nashville, TN 37243-1532

Mr. John C. Fornicola, Manager  
Nuclear Assurance and Licensing  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

County Mayor  
Hamilton County Courthouse  
Chattanooga, TN 37402-2801

Mr. Fredrick C. Mashburn  
Senior Program Manager  
Nuclear Licensing  
Tennessee Valley Authority  
4X Blue Ridge  
1101 Market Street  
Chattanooga, TN 37402-2801

Ms. Ann P. Harris  
341 Swing Loop Road  
Rockwood, Tennessee 37854

REQUEST FOR ADDITIONAL INFORMATION

SEQUOYAH UNIT 2 END OF CYCLE 12 STEAM GENERATOR

INSERVICE INSPECTION REPORTS

DOCKET NO. 50-328

Questions Regarding the Alternate Repair Criteria 90-Day Report

1. The process used for determining Cycle 12 voltages was described in Section 3.2, Voltage Growth Rates for Cycle 12. In this section, it was stated, if review of historical data did not detect an indication, then the voltage for the previous cycle was assumed to be 0.0 volts. However, on Page 8 of Generic Letter (GL) 95-05 Attachment 1, it is stated that voltage growths should only be evaluated for those bobbin indications that can be identified at two successive inspections, except if an indication changes from nondetectable to a relatively high voltage such as 2 volts. The GL 95-05 guidance was developed to ensure a conservative growth rate distribution by not permitting a large number of low voltage growth values, which may have initiated during the middle of the cycle to be used in the growth rate distribution. A large number of low-voltage growths will decrease the sampling frequency of the larger-voltage growths. Please discuss the basis for your approach and your further plans for following the GL 95-05 guidance in this area.
2. Figures 4.1 through 4.4 represent the measured and predicted number of indications as a function of the Cycle 12 voltage distribution. Consistently, the measured number of indications were larger than the predicted number of indications. The consistent underprediction of the number of indications raises questions about the adequacy of the probability of detection adjustment at Sequoyah Unit 2 (i.e., either the bobbin detection threshold is low or the rate of initiation of new indications is high). Although the safety implications of these underpredictions are not currently significant, given that the leakage and burst probability estimates are well within acceptance and reporting limits, these underpredictions may become significant as more (and larger) indications are left in service. Please discuss any corrective actions you have taken or plan to take to address this issue.
3. In Section 5.3, Leak Rate Correlation, it is stated that the leakage correlation for a structural limit of 2560 psi was used for the condition monitoring assessment and the leakage correlation for a structural limit of 2405 psi was used for the operational assessment. The use of 2405 psi for the operational assessment was based on Unit 2 receiving credit for power operated relief valve actuation. In Section 6.2, End of Operational Cycle 12 Burst Probabilities and Leak Rates, there is no discussion of which structural limit is used for the burst probability condition monitoring and operational assessment calculations. Please provide this information.

ENCLOSURE

4. Please discuss whether you implement a probe wear criterion different than that discussed in GL 95-05. If you implement the probe wear criteria discussed in letters dated February 9, 1996, February 23, 1996, and March 18, 1996, please address the assessments required for implementation of this criteria. Please discuss whether the probe wear criteria used at your plant resulted in the underpredictions cited in your reports.
5. Section 6.0 describes the condition-monitoring assessment. Figures 6.1 through 6.4 depict the distribution of end-of-cycle voltages adjusted by the nondestructive examination uncertainty distribution. Please discuss whether the discrete distributions in these figures (which may have been truncated/adjusted for fractional indications) were used in the condition monitoring assessment or whether the condition-monitoring assessment utilized a nontruncated/adjusted distribution of indications.
6. Section 5.0 discusses the leak rate methodology used. Please confirm that the methodology and computer code used for your calculations are consistent with the U.S. Nuclear Regulatory Commission approved methodology.
7. Tables 6.1 and 6.2 indicate that the probability of burst and postulated accident induced leak rate were underpredicted in a few cases. One of the reasons cited for the underpredictions was that a different database was used for the condition monitoring than for the operational assessment calculations. Please discuss the extent to which the following technical issues (identified at other plants) could have resulted in these underpredictions:
  - a. Use of a nonvoltage dependent growth rate distribution
  - b. Probe wear criteria (see related question)
  - c. Mix residual criteria
  - d. Growth rate for unplugged tubes
  - e. A growth rate that increases from cycle-to-cycle

If the above issues (or other technical issues identified at plants that have implemented this repair criteria) resulted in (or contributed to) the underpredictions, discuss what corrective actions, if any, you plan on taking to address this situation.

#### Questions Regarding the 12-Month Steam Generator Inspection Report

1. Please discuss the reason (e.g., noise) for preventively plugging the tubes identified in Tables 2.1 through 2.4 of your September 20, 2004, letter.
2. Please discuss the results of your foreign object search and retrieval inspection. If any loose parts were left in the SGs, please discuss whether analyses were performed to ensure that tube integrity would be maintained until the next inspection of these tubes.