June 6, 2006

Mr. Karl W. Singer
Chief Nuclear Officer and
Executive Vice President
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6A Lookout Place
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Chattanooga, Tennessee 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNIT 2 - REQUEST FOR ADDITIONAL INFORMATION REGARDING STEAM GENERATOR TUBE INTEGRITY (TSTF-449) (TAC NO. MD0145)

Dear Mr. Singer:

By letter dated February 15, 2006 (Agencywide Documents Access and Management System Accession Number ML060600405), Tennessee Valley Authority (TVA, the licensee), submitted a request to revise the Sequoyah Nuclear Plant, Unit 2 technical specification (TS) requirements consistent with Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, "Steam Generator Tube Integrity," Revision 4 (ML051090200). In addition, the approved alternate tube repair criteria will be deleted as part of this TS change.

In order for the NRC staff to complete its review of the information provided by the licensee, we request that TVA provide responses to the enclosed request for additional information within 60 days. If you have any questions about this material, please contact me at (301) 415-1364.

Sincerely,

/RA/

Douglas V. Pickett, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-328

Enclosure: Request for Additional Information

cc w/encls: See next page

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Mr. Karl W. Singer
Tennessee Valley Authority

SEQUOYAH NUCLEAR PLANT

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REQUEST FOR ADDITIONAL INFORMATION

SEQUOYAH NUCLEAR PLANT, UNIT 2

APPLICATION FOR TECHNICAL SPECIFICATION IMPROVEMENT

REGARDING STEAM GENERATOR TUBE INTEGRITY (TSTF-449)

DOCKET NO. 50-328

TAC NO. MD0145

By letter dated February 15, 2006 (Agencywide Documents Access and Management System Accession Number ML060600405), Tennessee Valley Authority (the licensee) requested a license amendment for Sequoyah Nuclear Plant (SQN), Unit 2 to replace the existing steam generator (SG) tube surveillance program with the program being proposed by the Technical Specification Task Force (TSTF) in TSTF-449, Revision 4. The proposed change revises the Technical Specifications (TS) definition of "Leakage," as well as the TS and Associated Bases for Specifications 3.4.5, "Steam Generator Tube Integrity," and 3.4.6.2, "Operational Leakage." The change also adds Specifications 6.8.4.k, "Steam Generator Program," and 6.9.1.16, "Steam Generator Tube Inspection Report."

In order to complete the review, the staff needs the additional information requested below:

1. In Insert A of the application, the SG Tube Integrity limiting conditions for operation (LCO), on page E2-16 of the application, the "Applicability" is described in terms of operational mode numbers ("MODES 1, 2, 3, and 4"), but the "Actions" use word descriptions ("HOT STANDBY" and "COLD SHUTDOWN"). Since TSTF-449 uses mode numbers, please discuss why you used the word descriptions rather than the mode numbers, or discuss your plans to modify your proposal to be consistent with the TSTF-449 terminology.

2. Insert A, the SG Tube Integrity LCO, page E2-16, the second part of TSTF-449 Condition B is not included. Condition B in the TSTF is as follows: "Required action and associated completion time of Condition A not met OR SG tube integrity not maintained." In the proposed TS for SQN, Unit 2, the second part of this condition is excluded (i.e., "SG tube integrity not maintained"). Please provide justification for removing the key requirement to shut down the reactor if SG tube integrity is not being maintained, or alternatively, discuss your plans to modify your proposed TS LCO to include this key requirement and be consistent with TSTF-449. Since this requirement was not included in the TS submitted for SQN, Unit 1, please discuss whether you have any plans to modify your SQN, Unit 1 TS.

3. In proposed TS 3.4.5.b and the associated Surveillance Requirement 4.4.5.1 (page E2-16), the proposed timing requirement is "prior to startup following a SG tube inspection." The corresponding requirement in TSTF-449 is "prior to entering MODE 4 following a SG tube inspection." Since MODE 4 is defined as "Hot Shutdown" and "Startup" is defined as MODE 2 in the standard technical specifications, the proposed SQN, Unit 2 TS are inconsistent with TSTF-449. Please provide a justification for this difference, or discuss your plans for modifying your proposal to make it consistent with TSTF-449.

4. The fourth and fifth items listed in your proposal under “Provisions for SG tube inspections,” (TS 6.8.4.k.d on pages E2-21 to E2-22, Insert B of your proposed TS) are the Generic Letter (GL) 95-05 voltage-based alternative repair criteria (ARC) at tube support plates (TSPs) and the W* methodology ARC. Since it may be necessary to reference these provisions in other parts of the TS, please discuss your plans for assigning numbers to these items, for example 6.8.4.k.d.4 and 6.8.4.k.d.5.

   In addition, please discuss your plans for modifying your proposed TS 6.8.4.k.d to add these two repair criteria to the sentence that reads, “In addition to meeting the requirements of d.1, d.2, and d.3 below, ...” For example, “In addition to meeting the requirements of d.1, d.2, d.3, d.4, and d.5 below ...”

   Please discuss your plans for moving the repair criteria associated with implementation of the W* criteria to the repair criteria section of the TS (6.8.4.k.c).

   Please discuss your plans for removing the last sentence in proposed TS 6.8.4.k.d under W* methodology. This sentence addresses postulated leakage and is not needed since it is addressed under TS 6.8.4.k.b.2.

5. The staff has made several observations, which are listed below, regarding the section titled “GL 95-05 Voltage-Based ARC (Tubes Support Plate).” This section begins on page E2-20 of your proposal, as part of your proposed TS 6.8.4.k.c (Provisions for SG tube repairs.)

   a. Please discuss your plans for assigning a number to this section so it may be referenced in other parts of your TS (i.e., the accident induced leakage performance criterion).

   b. The second sentence of the introductory paragraph in this section states that the plugging (repair) limit at tube support plate intersections is based on maintaining SG tube serviceability. Please discuss your plans for removing the phrase “maintaining SG tube serviceability,” since serviceability is not defined in your proposed TS.

   c. In several locations in the this section, the proposed TS use the phrase “the lower voltage repair limit (Note 1).” Please discuss your plans for removing this phrase and replacing it with “2.0 volts,” since this is the value applicable to SQN, Unit 2. Keeping Note 1 complicates the proposed TS.

   d. Paragraph (b) of this section states that SG tubes with TSP outside diameter stress corrosion cracking (ODSCC) bobbin voltage greater than the repair limit (i.e., >2.0 volts) will be “repaired or plugged.” Since SQN, Unit 2 does not have an option for tube repair (i.e., sleeving), please discuss your plans to remove this phrase from your proposed TS.

   e. Paragraph (c) of this section specifies a particular eddy current probe (i.e., “rotating pancake coil inspection”). The proposal would require you to use this technology even if other, more advanced, probes were developed for detecting ODSCC at tube support plates. Please discuss your plans for modifying the technical specifications to avoid this limitation (e.g., “rotating pancake coil inspection or comparable technology”).

f. Paragraph (d) of this section states “Not applicable to SQN.” Please discuss your plans for removing this item from the proposed TS since it is not needed.

g. In several places in this section of the proposed TS you refer to other paragraphs within the section (e.g., “as noted in Item c below”). Please discuss your plans for making these references more clear by including the full TS number in these references (e.g., Item 6.8.4.k.c.1.a).

h. The final statement in this TS section refers to an accident leakage limit for the ODSCC ARC and for W* calculated leakage. Since there is a separate section for accident induced leakage, please discuss your plans for moving this requirement to TS section 6.8.4.k.b.2, “Accident induced leakage performance criteria.” With respect to the accident induced leakage performance criteria, you proposed that the accident induced leakage is not to exceed 1 gallon per minute (gpm) for the faulted steam generator except for ODSCC and W* indications that have an approved limit of 3.7 gpm.

   The staff notes that this sentence could be misinterpreted to mean ODSCC indications have a limit of 3.7 gpm and W* indications have a limit of 3.7 gpm. In addition, the reference to “3.7 gpm” should not be needed since it should be consistent with your design and licensing basis (i.e., the second sentence in proposed TS 6.8.4.k.b.2). Please discuss your plans to clarify the accident induced leakage limit. For example, “leakage from all sources, excluding the leakage attributed to the degradation described in TS 6.8.4.k.c.1 and 6.8.4.k.c.2, is not to exceed 1 gpm per SG.”

6. One of the purposes of TSTF-449 is to allow licensees to update their TS to accurately reflect their SG tube integrity program. For implementation of the voltage-based tube repair criteria, licensees have submitted “90-day reports” providing information concerning tube pulls and condition monitoring/operational assessment results. Consistent with the philosophy of TSTF-449, please discuss your plans to modify proposed Section 6.9.1.16, Steam Generator Tube Inspection Report, to include a requirement to provide the information described in Section 6b of Attachment 1 of GL 95-05 to the NRC.

7. According to your proposed structural integrity performance criterion in TS 6.8.4.k.b.1, a safety factor of 1.4 against burst will be applied to the design basis accident primary to secondary pressure differentials. However, GL 95-05, “Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking,” indicated that there is a possibility that a tube may have a burst pressure less than 1.4 times the steam line break pressure differential (given the uncertainties associated with the various correlations). Therefore, the GL 95-05 ARC imposed a limit on the probability of burst (POB) of $1x10^{-2}$. As a result, it is not clear from your submittal that the structural integrity performance criteria is complete since it does not fully address all the performance criteria for implementation of the voltage-based ARC. Please discuss your plans to modify the performance criteria to fully address the voltage-based ARC. For example, discuss your plans for modifying the structural integrity performance criteria to indicate that for predominantly axially oriented ODSCC at the TSP elevations the POB of one or more indications given a steam line break shall be less than $1x10^{-2}$. Upon incorporation of this provision into the structural integrity performance criterion, please discuss your plans to eliminate the associated reporting requirement in proposed TS 6.9.1.16.i, since operation in excess of this limit will not be permitted.

8. Given that the new TS provided in TSTF-449 does not allow operation when the accident induced leakage criteria is exceeded, please discuss your plans to omit TS Section 6.9.1.16.i.1.

9. Proposed TS 6.9.1.16 addresses the requirements for the report that must be submitted within 180 days after initial entry into MODE 4 following completion of an SG tube inspection in accordance with proposed TS 6.8.4.k. The list of requirements includes item 6.9.1.16.i, which requires NRC staff notification “prior to returning the steam generators to service” should any of the conditions listed in your proposed TS 6.9.1.16.i exist. Please discuss your plans for modifying your proposal to renumber proposed TS 6.9.1.16 so the current item i is separated from the 180-day report. For example, the 180-day report might be TS 6.9.1.16.1, the GL 95-05 90-day reporting requirements might be TS 6.9.1.16.2, the GL 95-05 notification prior to returning the steam generators to service might be TS 6.9.1.16.3, and so on. In addition, it is not clear that reference to 10 CFR 50.4 in proposed TS 6.9.1.16.j is needed.

10. In proposed TS 6.8.4.k.a, “Provisions for condition monitoring assessments,” the last sentence states, "Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected and/or plugged, to confirm that the performance criteria are being met." The intent of this paragraph is to ensure that condition monitoring assessments are conducted when the SG tubes are inspected or plugged as stated in paragraph a of Insert 5.5.9 of TSTF-449, Revision 4. Please either provide a justification for using "and/or" in the last sentence of TS 6.8.4.k.a, or discuss your plans to replace "and/or" with "or".

11. The W* inspection methodology in proposed TS 6.8.4.k.c (insert B, page E2-22) begins by stating that implementation requires “a 100 percent rotating coil probe inspection of the hot-leg tubesheet W* distance.” As currently written, the proposal would require you to use this technology even if other, more advanced probes are used to examine the hot-leg tubesheet W* distance. For example, non-rotating probe technology (e.g., array probes) could not be used to satisfy this technical specification. Multiple probe types may be required if, for example, a form of degradation occurs (or is postulated to occur) that cannot be reliably detected in the W* distance using a rotating coil probe. Given your proposed requirement to inspect with methods capable of detecting flaws of any type that may be present along the length of the tube and that may satisfy the applicable tube repair criteria, please discuss your plans to remove the reference to a rotating coil probe.

12. Under the discussion on page E2-22 of the W* methodology in Insert B of the proposed TS, the final sentence of the first paragraph defines the length of tubing that constitutes a tube inspection. This definition excludes the portion of tubing from below the top support on the cold leg. This contradicts your proposed TS 6.8.4.k.d and TSTF-449, which define a tube inspection from the tube inlet end to the tube outlet end. Please discuss your plans for modifying the definition of tube inspection to ensure the cold leg is examined.

13. Under the “Applicable Safety Analyses” section of your proposed TS bases B 3.4 Reactor Coolant System (Insert D, page E3-6) the last sentence of the second paragraph states, “the dose consequences of these events are within the limits of GDC 19 (Ref. 2), and 10 CFR 100 (Ref. 3).” The corresponding sentence in TSTF-449 is as follows:

The dose consequences of these events are within the limits of GDC 19 (Ref. 2) 10 CFR 100 (Ref. 3) or the NRC approved licensing basis (e.g., a small fraction of these limits).

Please discuss your reason for omitting the phrase, “or the NRC approved licensing basis (e.g., a small fraction of these limits)” or discuss your plans to modify your proposal to include it in your TS Bases.

14. The “Actions” section of your proposed TS bases B 3.4 Reactor Coolant System (Insert D, page E3-9), states that the actions are required if “it is determined that tube integrity is not being maintained until the next SG inspection ...” Since your proposed TS require action if tube integrity is not maintained until the next refueling outage or SG tube inspection, please discuss your plans to modify your Bases to add “the next RFO” to this sentence.

15. The “Actions” section of your proposed TS bases B 3.4 Reactor Coolant System (Insert D, page E3-9, next to last paragraph), states that “the reactor must be brought to HOT STANDBY within 6 hours and COLD SHUTDOWN within the next 30 hours” if SG tube integrity is not being maintained. TSTF-449 indicates these actions are required if, “the Required Actions and associated Completion Times of Condition A are not met or if SG tube integrity is not being maintained.” For the Sequoyah Unit 2 proposal, consistency with TSTF-449 would mean that this requirement (HOT STANDBY within 6 hours and COLD SHUTDOWN within the next 30 hours) would be required if SG tube integrity is not being maintained or is not verified within 7 days. Please discuss your reason for omitting this part of the requirement or your plans for modifying it to be consistent with TSTF-449.

16. In your proposed Bases (e.g., Bases section 3/4.4.6.2 on pages E3-16 and E3-17), a maximum value of 0.4 gpm (0.1 gpm per steam generator) for allowable normal operational leakage was listed. Since your TS limit is 150 gallons per day (gpd) per SG (in proposed TS 3.4.6.2.c), please discuss the reason for this discrepancy. If your accident analysis assumes 144 gpd leakage per SG, discuss your plans for modifying your TS (3.4.6.2.c) to be consistent with your accident analysis. Alternatively, if 150 gpd was assumed in your accident analysis, discuss your plans to modify your Bases.

17. In the Applicable Safety Analyses portion of proposed TS Bases section 3/4.4.6.2, Operational Leakage (page E3-17), the maximum assumed leakage rate from a steam generator tube rupture or steam line break accident is changed from 8.21 gpm to 3.7 gpm. It is not clear to the staff whether this change is an administrative change or if you have changed your accident analysis. Since this TS amendment request does not provide the basis for approving a new accident analysis, please confirm that your accident analysis has not changed (i.e., 3.7 gpm is consistent with your NRC approved licensing basis).