Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379-2000

Robert A. Fenech
Vice President, Sequoyah Nuclear Plant

January 8, 1993

TVA-SQN-TS-92-10 10 CFR 50.90

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - TECHNICAL SPECIFICATION (TS) CHANGE 92-10, W* TUBE PLUGGING CRITERIA FOR STEAM GENERATORS (S/G)

Reference: TVA letter to NRC dated November 18, 1992, "Sequoyah Nuclear Plant (SQN) - Westinghouse Commercial Atomic Power (WCAP) No. 13532, Revision 1, 'Sequoyah Units 1 and 2, W* Tube Plugging Criteria for SG Tubesheet Region of WEXTEX Expansions'"

In accordance with 10 CFR 50.90, we are enclosing a requested amendment to Licenses DPR-77 and DPR-79 to change the TSs of SQN Units 1 and 2. The proposed change revises TS surveillance requirements and bases to incorporate alternate S/G tube plugging criteria. This criteria is referred to as the W* criteria and was developed for SQN Units 1 and 2 on plant specific conditions. The W* criteria takes into account the reinforcing effect that the tubesheet has on the external surface of the S/G tube in the Westinghouse Explosive Tube Expansion (WEXTEX) region. The approach taken to develop W* criteria is to use the general methodology of the staff approved L* criteria for hardroll expansions and adapt the methods for WEXTEX expansions. The W* criteria provide alternate tube plugging requirements for S/G tubes having indications in the WEXTEX region. The W* criteria reduce the need to repair or plug S/G tubes and are based on maintaining structural and leakage integrity of tubes that are returned to service with indications in the WEXTEX region.

The proposed TS change is identified in Enclosure 1. The justification for the proposed TS change is provided in Enclosure 2. A proposed determination of no significant hazards consideration performed pursuant to 10 CFR 50.92 is provided in Enclosure 3. The WCAP analysis supporting this TS change was previously provided in the reference letter.

A001 ||

NRC issuance of the proposed change is requested as soon as possible. Approval before the upcoming Unit 1 refueling outage is desired to preclude additional plugging of S/G tubes during the outage (currently scheduled to begin April 2, 1993, and end June 5, 1993). A 30-day period is requested to implement the TS change upon NRC approval. TVA will keep NRC project management informed of any schedule changes through routine project review meetings.

Please direct questions concerning this issue to D. V. Goodin at (615) 843-7734.

Sincerely,

Robert A. Fenech

Robert A. Fenech

Sworn to and subscribed before me
this 8th day of January 1993

Dora Barker
Notary Public
My Commission Expires 3-9-96

Enclosures
cc (Enclosures):
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ENCLOSURE 1

PROPOSED TECHNICAL SPECIFICATION CHANGE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-92-10)

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UNIT 2

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3/4 4-14
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INSERT A

4. All nonplugged tubes with previously identified degradations within the tubesheet shall be bobbin coil inspected through the full length of the tubesheet region. All W* tubes shall be rotating pancake coil (RPC) inspected the full W* distance. W* tubes may be excluded from 4.4.5.2.b.1, provided the degradation is contained within or below the W* distance.

INSERT B

d. All steam generators in which W* tubes are located shall be inspected at each subsequent refueling outage.

INSERT C

6. Plugging Limit (except in the tubesheet region of W* tubes) means the imperfection depth at or beyond which the tube shall be removed from service and is equal to 40% of the nominal tube wall thickness. Within the tubesheet and below the W* distance, any degradation is acceptable. Within the W* distance, the following limits shall apply:

    a. A minimum length as defined in 4.4.5.4.a.11 shall be demonstrated to be nondegraded by RPC inspection.

    b. Axial cracks must have the upper crack tip below the Bottom of the WEXTEX Transition (BWT) and top of tubesheet plus eddy current uncertainty.

    c. Bands of parallel, axial oriented cracks shall be limited to five cracks. If the cracks are inclined relative to the tube axis (30° or less), the total circumferential oriented inclination summed over all cracks shall be less than 92° at the beginning of cycle. Similarly, the circumferential extent of closely spaced axial cracks must be less than 92° at beginning of cycle between the "null points" on the RPC amplitude.

    d. Circumferential cracking identified within the W* distance must be located below the BWT and at least 0.1 inch below the top of the tubesheet. The extent of circumferential cracking must be less than a 92° arc.

    e. The total calculated steam-line break leakage shall be less than 1.0 gpm for any steam generator. If the calculated leakage exceeds the allowable limit, an appropriate number of tubes with degradation shall be removed from service to satisfy the allowable leakage limit.

INSERT D

10. Bottom of the WEXTEX Transition (BWT) is the highest point of contact between the tube and tubesheet below the top-of-tubesheet as determined by eddy current testing.

11. W* Distance is the distance into the tubesheet below the BWT that precludes tube pullout. The W* distance requires 5.1 inches of nondegraded tubing for Zone B and 4.2 inches of nondegraded tubing for Zone A. The following must be added to the nondegraded distance to obtain the W* distance and the RPC inspection extent:
    a. Axial lengths of cracks detected.
    b. Crack end effects (1.0 times crack length for Zone B and 1.2 times crack length for Zone A).
    c. NDE measurement uncertainty.

12. W* Tube is a tube with degradation, within the W* distance equal to or greater than 40%, and degraded within the limits specified in 4.4.5.4.a.6. In addition, a W* tube is a tube with any degradation below the W* distance.

INSERT E

a. Following each in-service inspection of steam generator tubes, the number of tubes plugged in each steam generator and the results of the inspection of W* tubes shall be reported to the Commission within 15 days following restart (Mode 2) of the unit.

INSERT F

Extensive European operating experience with axial primary water stress corrosion cracking (PWSCC) cracks left in service has demonstrated negligible normal operating leakage from PWSCC cracks even under free span conditions in the roll transitions. PWSCC cracks in WEXTEX expansions in the tubesheet region would be further leakage limited by both the tight tube-to-tubesheet crevice and the limited crack opening permitted by the tubesheet constraint. Consequently, negligible normal operating leakage is expected from cracks within the tubesheet region of WEXTEX expansions.

INSERT G

For tubes to which the W* criteria is applied, indications of degradation in excess of 40% throughwall can remain in service without a loss of functionality or structural and leakage integrity. Tubes to which W* is applied can experience throughwall degradation up to the limits defined in the NRC staff approved version of WCAP-13532 without increasing the probability of a tube rupture or large leakage event. It is intended that the W* criteria and resulting inspections be applied to the tube sheet sections of the steam generator that are susceptible to PWSCC. The guidance of Regulatory Guide 1.121 is used to assess the limits of acceptable tube degradation within W*. A potential exists for W* tubes to allow primary-to-secondary leakage during a postulated steam-line break. Information is provided in WCAP-13532 that is used to define steam generator W* Zones A and B and to calculate the expected leakage at steam-line break conditions for W* tubes. The calculated leak rate shall be limited to less than 1.0 gpm in any one steam generator in order to maintain offsite doses to within 10% of the 10 CFR 100 limits during a postulated steam-line break event.