May 10, 2002

Mr. J. A. Scalice
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 - ISSUANCE OF TECHNICAL SPECIFICATION AMENDMENT REGARDING STEAM GENERATOR TUBE INSPECTION SCOPE (TAC NO. MB4994) (TS 02-05)

Dear Mr. Scalice:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 266 to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant, Unit 2 (SQN-2). This amendment is in response to the Tennessee Valley Authority (TVA) application dated May 6, 2002, as supplemented by a letter dated May 8, 2002. The amendment request was submitted as an emergency license amendment request, to be reviewed and noticed by the NRC staff pursuant to Title 10, *Code of Federal Regulations* (10 CFR), Section 50.91(a)(5). The need for the proposed change is based on a late-emerging issue regarding the results of the recent SQN-2 steam generator (SG) tube inspections and the identification of indications within the tubesheet region. The NRC staff, in a May 3, 2002, conference call with TVA, stated that an emergency Technical Specification (TS) change would be required to permit resumption of operation following the refueling outage. The proposed change specifically revises TS Surveillance Requirement 4.4.5.4.a.8 to clearly delineate the scope of the SG tube inspection required in the tube sheet region.

A copy of the NRC staff's Safety Evaluation is also enclosed. A Notice of Issuance will be included in the next Commission's biweekly *Federal Register* notice. Please direct any questions you or your staff should have to me at (301) 415-2010.

Sincerely,

/RA/

Ronald W. Hernan, Senior Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-328

Enclosures: 1. Amendment No. 266 to License No. DPR-79
2. Safety Evaluation

cc w/enclosures: See next page

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 266
License No. DPR-79

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated May 6, 2002, as supplemented by a letter dated May 8, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-79 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 266, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented prior to entering Mode 4 following the Sequoyah Unit 2 Cycle 12 Refueling Outage.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Thomas Koshy, Acting Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: May 10, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 266

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

Revise the Appendix A Technical Specifications by removing the page identified below and inserting the enclosed page. The revised page is identified by the captioned amendment number and contains a marginal line indicating the area of change.

REMOVE	INSERT
3/4 4-13	3/4 4-13

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 266 TO FACILITY OPERATING LICENSE NO. DPR-79

STEAM GENERATOR TUBE INSPECTION CRITERIA

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-328

1.0 INTRODUCTION

By letter dated May 6, 2002, as supplemented by a letter dated May 8, 2002, the Tennessee Valley Authority (TVA, the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) to revise the Technical Specifications (TSs), for the Sequoyah Nuclear Plant, Unit 2 (SQN-2). The proposed change would modify TS Surveillance Requirement (SR) 4.4.5.4.a.8 to clarify the scope of the steam generator (SG) tube inspections required in the SG tubesheet region. The SR 4.4.5.4.a.8 provides a definition for tube inspection as used in SQN SG TS 4.5.4. The amendment request was submitted as an emergency request in accordance with Title 10, *Code of Federal Regulations* (10 CFR), Section 50.90. The need for the proposed change is based on a late-emerging issue regarding the results of the recent SQN-2 steam generator (SG) tube inspections and the identification of indications within the tubesheet region. The NRC staff, in a May 3, 2002, conference call with TVA, stated that an emergency Technical Specification (TS) change would be required to permit resumption of operation following the refueling outage. Because of the potential impact of preventing resumption of power operation, the NRC is reviewing this amendment request in accordance with 10 CFR 50.91 as an emergency licensing action. This amendment would apply only for Unit 2, Cycle 12 of operation.

Currently, the applicable SG tube inspection criterion requires an inspection of the SG tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg. The new definition would define a tube inspection as an inspection from 5.5 inches below the top of the hot-leg tubesheet completely around the U-bend to the top support of the cold leg. Essentially, the new definition would not require inspection of the bottom portion of the tube in the hot-leg tubesheet (i.e., the lower 15.5-inches of the tube).

2.0 BACKGROUND

Sequoyah Units 1 and 2 are 4-loop Westinghouse plants with Model 51 SGs. Each SG contains about 3400 tubes. The SG tubes are mill-annealed Alloy 600 with an outside diameter of 0.875-inches and a wall thickness of 0.050-inches. Each tube is secured in the tubesheet by an explosive expansion process referred to as the Westinghouse Explosive Tube Expansion (WEXTEX) process. The tubesheet is approximately 21 inches thick and each tube is

expanded for essentially the full thickness of the tubesheet. The WEXTEX process forms an interference fit between the tube and tubesheet. This interference fit forms the interface which provides the structural and part of the leaktight boundary between the primary and secondary systems at each end of an SG tube. The transition from the expanded portion of the tube to the unexpanded portion of the tube is referred to as the WEXTEX transition or the expansion transition.

Each SG contains seven tube support plates to provide lateral support to the tubes. The tube support plates are carbon steel, 0.75-inches thick, with drilled holes through which the tubes are inserted. There is nominally a 0.013 to 0.018-inch diametral clearance between the tube and the tube support plate at each tube support plate intersection. At Sequoyah Units 1 and 2 (predominantly Unit 1), however, corrosion of the carbon steel tube support plates has led to the buildup of hard corrosion products (primarily magnetite) in the annulus between the tube and tube support plate. This magnetite buildup ultimately leads to radial deformation of the tubes at the vicinity of the intersection. This radial deformation is referred to as denting.

TVA, in its May 8, 2002, letter stated the following:

> This emerging regulatory issue, as TVA understands it, concerns the NRC's opinion that additional rotating pancake probe inspections (below the top of tubesheet) are now a prerequisite for compliance with existing TS provisions, unless this TS change is granted. Nevertheless, since there is a common understanding that any tube degradation in this region [i.e., the region below 5.5 inches], regardless of morphology, does not have a nexus to safety, TVA requests prompt approval of this amendment to avoid unnecessary restart delays. The current Mode 4 projection date remains as May 13.

The NRC technical staff requested the licensee to submit the amendment because techniques qualified for detecting circumferential flaws were not used to inspect a region of the tube bundle in which circumferential flaws were identified during the outage (i.e., circumferential flaws were found in the expanded portion of the tube at a significant distance away from the WEXTEX expansion transition).

Historically, circumferential flaws have primarily occurred at the expansion transition. As a result, the use of techniques qualified for detecting circumferential flaws to inspect other regions of the tube within the tubesheet were not necessary (since there was no operating experience or expectation that they would occur in this region). The presence of circumferential flaws in the expanded region of the tube represents a new degradation mechanism.

The NRC also requested the licensee to submit the amendment request since circumferential flaws in the tubesheet region can pose a safety concern depending on their location with respect to the top of the tubesheet. If significant circumferential flaws are located near the top of the tubesheet, the tube could pull out of the tubesheet or the tube may leak during normal operating or postulated accident conditions. If circumferential flaws are located a significant distance below the top of the tubesheet, the safety significance is reduced since the likelihood of tube pullout from the tubesheet and/or primary-to-secondary leakage is reduced or eliminated. Since the licensee had not demonstrated the necessary distance to preclude tube pullout or leakage, the NRC concluded an amendment was warranted.

3.0 PROPOSED TECHNICAL SPECIFICATION AMENDMENT

TVA proposes a one-cycle change to the TSs for SQN-2 to redefine a tube inspection as follows:

- Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg excluding the portion of the tube within the tubesheet below 5.5 inches (as measured from the top of the tubesheet).

4.0 EVALUATION

4.1 Introduction

Because of the importance of SG tube integrity, the NRC requires the performance of periodic inservice inspections of SG tubes. These inspections are performed to detect SG tube degradation prior to leakage or failure. Upon the detection of defective tubes, the NRC requires tubes to be plugged prior to restoring the SGs to service. The minimum requirements are outlined in a plant's TSs.

The requirements for the inspection of SG tubes are intended to ensure that this portion of the reactor coolant system maintains its structural and leakage integrity. Structural integrity refers to maintaining adequate margins against gross failure, rupture, and collapse of the SG tubes. Leakage integrity refers to limiting primary-to-secondary leakage during normal operation and postulated accidents to within acceptable limits.

The structural criteria that the tubes are intended to meet are specified in Regulatory Guide (RG) 1.121, "Bases for Plugging Degraded PWR [pressurized-water reactor] SG Tubes." Adequate leakage integrity during transients and postulated accidents is demonstrated by showing that the resulting leakage from the tubes will not exceed a rate that would violate offsite or control room dose criteria. These criteria are specified, in part, in 10 CFR Part 100 and in General Design Criteria 19 of Appendix A to 10 CFR Part 50.

To provide assurance of adequate structural and leakage integrity, licensees perform inservice inspections of the SG tubes. These inspections are intended to detect mechanical or corrosive damage to the tubes, which may result from manufacturing and/or inservice conditions. In addition, the inservice inspections of the SG tubes provide a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken. Tubes with degradation that exceed the tube repair limits specified in a plant's TSs are removed from service by plugging or are repaired by sleeving (if approved by the NRC for use at the plant).

The existing TSs do not take into account the reinforcing effect of the tubesheet on the external surface of the expanded tube. The presence of the tubesheet constrains the tube and complements tube integrity in that region by essentially precluding tube deformation beyond the expanded outside diameter of the tube. The resistance to both tube rupture and tube collapse is significantly enhanced by the tubesheet. In addition, the proximity of the tubesheet to the tube in the expanded region significantly reduces the leakage of through-wall flaws in a tube.

Based on these considerations, power reactor licensees have proposed, and the NRC has approved, alternate repair criteria for defects located in the portion of the SG tube contained in the tubesheet when these defects are a specific distance below the expansion transition or the top of the tubesheet, whichever is lower. For plants with SGs similar to those used at Sequoyah (i.e., with tubes expanded using the WEXTEX process), the NRC has approved alternate repair criteria referred to as the W-star (W*) criteria for defects located in the tubesheet. Specifically, the staff has approved the W* repair criteria for Diablo Canyon Units 1 and 2 (refer to NUDOCS Accession Number 9903030010 and ADAMS Accession Number ML021200166).

The W* repair criteria define a distance referred to as the W* distance such that any type or combination of tube degradation below this distance is considered acceptable (i.e., even if inspections below this region identified flaws, the regulatory requirements pertaining to tube structural integrity would still be met provided there were no flaws within the W* distance). The W* distance is measured from the bottom of the WEXTEX transition region. The key consideration in determining the W* distance is the amount of undegraded tubing necessary to prevent axial pullout of the tube from the tubesheet. Tube pullout could result from the internal pressure in the tube.

In determining the alternate repair criteria for Diablo Canyon Units 1 and 2, a specific methodology was used. This methodology determined the required W* distance for two regions of the tube bundle: Zone A and Zone B. The analysis considered the forces acting to pull the tube out of the tubesheet (i.e., from the internal pressure on the tube) and the forces acting to keep the tube in place. These latter forces are a result of friction and the forces arising from (1) the residual preload from the WEXTEX expansion process, (2) the differential thermal expansion between the tube and the tubesheet, (3) internal pressure in the tube within the tubesheet, and (4) dilation of the tubesheet holes from bowing of the tubesheet due to pressure and thermal differentials across the tubesheet. This generic analysis, using bounding or non-plant specific values for secondary system pressure and primary temperature, resulted in W* distances of 5.2-inches for Zone A and 7.0-inches for Zone B. Zone A includes tubes within the periphery of the tube bundle and Zone B includes tubes in the interior of the tube bundle. The SG is divided into zones to reflect the fact that the effects of bowing of the tubesheet are a function of the radial position of the tube in the tube bundle.

In applying the W* distances, uncertainties in the nondestructive examination (NDE) parameters must be accounted for. These uncertainties include, but are not limited to, the uncertainties in determining the location of the bottom of the WEXTEX expansion and the inspection distance (i.e., W* length). These uncertainties are also addressed in the W* methodology, as discussed in the staff's safety evaluation approving the W* repair criteria for Diablo Canyon.

4.2 Sequoyah Proposal

During their April 2002 SG tube inspections at SQN-2, TVA used the bobbin coil and rotating pancake coil probes to inspect portions of the tube within the hot-leg tubesheet. Specifically, the bobbin coil was used to inspect the entire portion of the tube in the tubesheet and the rotating probe was used to inspect the portion of the tube from the top of the tubesheet to approximately 5.5 inches below the top of the tubesheet. The bobbin coil is sensitive to axial flaws and is relatively insensitive to circumferentially-oriented flaws (i.e., the bobbin coil is not qualified to detect circumferentially-oriented tube degradation). The rotating probe is sensitive to both axially- and circumferentially-oriented flaws. During these inspections, circumferential flaws were identified near the inspection boundary (i.e., within the region of 5.5 inches below the top of the tubesheet) with the rotating (+ point) probe. Tubes found to have such flaws were taken out of service by plugging. The NRC staff questioned the basis for not expanding the inspection to include areas below 5.5 inches from the top of the tubesheet, since the TSs require inspections from the hot-leg tube end up through the entire tubesheet and through the top support plate on the cold-leg side of the SG. To clearly delineate the scope of the SG tube inspections required in the tubesheet region, TVA has proposed this amendment.

The licensee's basis for using the rotating probe to inspect from the top of the tubesheet to 5.5 inches below the top of the tubesheet relies on analyses similar to those used in determining the W* tube repair criteria discussed above. The licensee's methodology (documented in WCAP-13532, Revision 1, "Sequoyah Units 1 and 2, W* Tube Plugging Criteria for SG Tubesheet Region of WEXTEX Expansions") is similar, but not identical, to the methodology approved for use at Diablo Canyon. Some of the differences include (1) the secondary side pressure used in the analysis, which affects the loads the tubes are required to withstand, the contact pressure between the tube and the tubesheet, and tubesheet hole dilation from bowing of the tubesheet (2) the primary temperature, which affects the contact pressure between the tube and the tubesheet due to thermal expansion and the tubesheet hole dilation from bowing of the tubesheet, (3) the radial contact pressure as a result of the WEXTEX expansion (i.e., expansion preload), (4) the coefficient of friction, and (5) the methodology for accounting for tubesheet bow.

As a result of the differences between the two methodologies (i.e., the SQN and the generic methodology), the W* distances for the hot leg at SQN-2 were calculated to be 4.2 inches for Zone A and 5.1 inches for Zone B. These distances are significantly less than the results from the generic analysis (W* distances of 5.2-inches for Zone A and 7.0-inches for Zone B).

Given the expedited schedule for this review, the NRC did not review the methodology provided by TVA in WCAP-13532, Revision 1; rather, the NRC relied on its previous evaluation of the generic methodology used in support of the Diablo Canyon W* alternate repair criteria. The generic methodology used bounding values for secondary side pressure and primary temperature. These values are conservative compared to SQN-2's expected secondary side pressure and primary temperature for the next operating cycle. As a result, the W* distance for SQN-2 will be less than the 7.0 inches approved for use at Diablo and more in line with the 5.1 inches calculated in the SQN specific analysis. However, the NRC could not conclude that the 5.1 inches (adjusted by 0.4 inches for NDE uncertainty and the location of the bottom of the WEXTEX transition in relation to the top of the tubesheet) was the correct absolute value. As a result, the licensee has committed to submit a revised analysis and amendment application

during their next cycle of operation (i.e., Cycle 12), to justify use of the W* repair criteria and/or the appropriate inspection distance.

The NRC staff's analysis to justify operation for the upcoming cycle (i.e., Cycle 12) is not based specifically on calculations but on inspections, tube plugging, and conservatisms that exist that were not taken into account in the staff's approval of the Diablo Canyon W* repair criteria. These factors are as follows:

1. The licensee inspected the entire tube within the tubesheet region with a bobbin coil and plugged all tubes with flaws in this region. The bobbin coil is capable of detecting axially oriented flaws.

2. The licensee inspected from the top of the tubesheet to 5.5 inches below the top of the tubesheet with a rotating probe and plugged all tubes with flaws in this region. The rotating probe is capable of detecting both axially- and circumferentially-oriented flaws.

3. The generic W* distances of 7.0 inches for Zone B (interior of tube bundle) and 5.2-inches for Zone A (peripheral tubes) represent the most limiting lengths in those regions and bound all other tubes in the zone.

4. The generic W* distances were determined using bounding parameters (i.e., secondary side pressure and primary side temperature) resulting in more conservative W* distances. If actual SQN-2 parameters for Cycle 12 operation had been used, the W* distances would be lower.

5. The most limiting region of the tube bundle is Zone B, which is in the interior of the tube bundle. If tubes in this region began to pull out of the tubesheet, they would be constrained by contact with neighboring tubes. As a result, the likelihood that a tube would pull out of the tube bundle is small. This effect was not considered in the development of the W* distance and adds conservatism to the evaluation.

6. The generic W* distances were determined from lower bound tube pull forces for WEXTEX expansions (based on a smooth tubesheet hole) in order to maximize the W* distance and bound the variability in WEXTEX expansions.

7. A 0.7-inch tapered gap is assumed extending down from the bottom of the WEXTEX transition, which adds conservatism to the evaluation.

8. SQN-2 has denting at the tube support plates which would further restrain tube pullout and would likely prevent the axial pressure load necessary to cause tube pullout. This effect was not considered in the development of the W* distance and adds conservatism to the evaluation.

9. The circumferential flaws identified within the tubesheet region during the 2002 inspections at SQN-2 would satisfy the structural performance criteria even if evaluated as freespan indications. As a result, even if similar indications existed below the portion of the tube inspected with a rotating probe (i.e., approximately 5.1 inches below the WEXTEX expansion) and above the generic 7.0-inch W* distance at the beginning of cycle, the tubes would begin the cycle with margin to tube pullout.

Although the NRC staff did not verify that a W* distance of 5.1 inches was the correct absolute value, the staff did consider the Diablo Canyon W* evaluation, the SQN-2 W* evaluation (submitted in 1992), the unaccounted for conservatisms in these analyses, and the April 2002 SQN-2 inspection results and associated corrective actions, to arrive at the conclusion that the licensee's proposal to limit the tube inspection to the uppermost 5.5 inches of the hot-leg tubesheet is an acceptable approach for one cycle of operation.

5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

TVA concluded that operation of SQN-2 in accordance with the proposed change to the TSs does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92(c).

TVA is proposing to modify the SQN-2 TSs to revise SR 4.4.5.4.a.8. This SR defines SG tube inspection scope. TVA's proposed change clarifies the tube inspection to exclude the portion of the tube within the tubesheet below the W* distance. The amendment is based on Westinghouse Electric Company WCAP-13532, Revision 1, entitled "Sequoyah Units 1 and 2, W* Tube Plugging Criteria For SG Tubesheet Region of Wextex Expansions." The WCAP was developed for SQN SGs for application of W* alternate repair criteria. The W* analysis accounts for the reinforcing effect that the tubesheet has on the external surface of the SG tube within the tubesheet region. The W* analysis shows that tube integrity and leakage below the W* distance remain within the existing design limits.

TVA provided the following analysis of this amendment with respect to the three standards set forth in 10 CFR 50.92(c):

A. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

TVA proposes to modify the SQN Unit 2 TSs to incorporate SG tube inspection scope based on WCAP-13532. The W* analysis take[s] into account the reinforcing effect the tubesheet has on the external surface of an expanded SG tube.

Tube bundle integrity will not be adversely affected by the implementation of the W* tube inspection scope. SG tube burst or collapse cannot occur within the confines of the tubesheet; therefore, the tube burst and collapse criteria of draft RG 1.121 are inherently met. Any degradation below the W* distance is shown by analyses and test results to be acceptable, thereby precluding an event with consequences similar to a postulated tube rupture event.

Tube burst is precluded for cracks within the tubesheet by the constraint provided by the tubesheet. Thus, structural criterion is satisfied by the tubesheet constraint. However, a 360-degree circumferential crack or many axially oriented cracks could permit severing of the tube and tube pullout from the tubesheet under the axial forces on the tube from primary to secondary pressure differentials. Section 4 of WCAP-13532 describes the testing that was

performed to define the length of non-degraded tubing that is sufficient to compensate for the axial forces on the tube and thus prevent pullout. The operating conditions utilized in WCAP-13532, Revision 1 were specific to SQN and are summarized in Section 3. The differences in current operating conditions do not change the calculation results. Section 4 also defines the W* length.

In conclusion, the incorporation of the W* inspection scope into SQN Unit 2 TS maintains existing design limits and does not involve a significant increase in the probability or consequences of an accident previously evaluated.

B. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Tube bundle integrity is expected to be maintained during all plant conditions upon implementation of the proposed tube inspection scope. Use of this scope does not induce a new mechanism that would result in a different kind of accident from those previously analyzed. Even with the limiting circumstances of a complete circumferential separation of a tube occurring below the W* distance, SG tube pullout is precluded and leakage is predicted to be maintained within the Final Safety Analysis Report limits during all plant conditions.

C. The proposed amendment does not involve a significant reduction in a margin of safety.

Upon implementation of the W* inspection scope, operation with potential cracking below the W* distance in the WEXTEX expansion region of the SG tubing meets the margin of safety as defined by RG 1.121 and RG 1.83 and the requirements of General Design Criteria 14, 15, 31, and 32. Accordingly, the proposed change does not involve a significant reduction in the [a] margin of safety.

The NRC has reviewed the licensee's analysis and, based on this review, it appears that the three standards of 10 CFR 50.92(c) are satisfied. Therefore, the NRC staff has determined that the amendment request involves no significant hazards consideration.

6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendment. The State official had no comments.

7.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative

occupational radiation exposure. The Commission has made a final no significant hazards finding with respect to this amendment. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

8.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Kenneth Karwoski, NRR

Date: May 10, 2002

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Tennessee Valley Authority

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4.4.5.4 Acceptance Criteria

a. As used in this Specification:

1. Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.

2. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.

3. Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation.

4. % Degradation means the percentage of the tube wall thickness affected or removed by degradation.

5. Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.

6. Plugging Limit 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. Plugging limit does not apply to that portion of the tube that is not within the pressure boundary of the reactor coolant system (tube end up to the start of the tube-to-tubesheet weld). This definition does not apply to tube support plate intersections if the voltage-based repair criteria are being applied. Refer to 4.4.5.4.a.10 for the repair limit applicable to these intersections. For Cycle 11 and 12 operation, this definition does not apply for axial PWSCC indications, or portions thereof, which are located within the thickness of dented tube support plates which exhibit a maximum depth greater than or equal to 40 percent of the initial tube wall thickness. Refer to 4.4.5.4.a.11 for the repair limits applicable to these intersections.

7. Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 4.4.5.3.c, above.

8. Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg excluding the portion of the tube within the tubesheet below 5.5 inches (as measured from the top of the tubesheet).*

9. Preservice Inspection means an inspection of the full length of each tube in each steam generator performed by eddy current techniques prior to service to establish a baseline condition of the tubing. This inspection shall be performed prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.

*This exclusion is for Unit 2, Cycle 12 operation only.