

July 18, 2001

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 1 - ISSUANCE OF AMENDMENT
REGARDING CLARIFICATION OF LICENSE CONDITION 2.C.(9)(D)
(TAC NO. MB1963) (TS 01-02)

Dear Mr. Scalice:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 270 to Facility Operating License No. DPR-77 for the Sequoyah Nuclear Plant (SQN), Unit 1, in response to your application dated May 14, 2001. The amendment provides clarification of a Tennessee Valley Authority (TVA) commitment as contained in SQN Unit 1 License Condition 2.C.(9)(d). The commitment is associated with steam generator inspection criteria for tube support plate intersection tube dents registering less than 5 volts during eddy current testing. Clarification of TVA's commitment is based on agreements reached during a meeting on April 11, 2001, between TVA and NRC staff.

A copy of our 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 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. 50-327

Enclosures: 1. Amendment No. 270 to
License No. DPR-77
2. Safety Evaluation

cc w/enclosures: See next page

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 270
License No. DPR-77

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated May 14, 2001, 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, Operating License No. DPR-77 is amended as indicated in the attachment to this license amendment.
3. This license amendment is effective as of its date of issuance, to be implemented no later than 45 days after issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Patrick M. Madden, Acting Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Operating License

Date of Issuance: July 18, 2001

ATTACHMENT TO LICENSE AMENDMENT NO. 270

FACILITY OPERATING LICENSE NO. DPR-77

DOCKET NO. 50-327

Revise Facility Operating License No. DPR-77 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 change.

REMOVE

Page 5

INSERT

Page 5

9) Steam Generator Inspection (Section 5.3.1)

- (a) Prior to March 1, 1981, TVA shall provide to the NRC the results of its tests to determine the feasibility of using a steam generator camera device.
- (b) Prior to start-up after the first refueling, TVA must install inspection ports in each steam generator if the results of the camera device inspection are not satisfactory to the NRC.
- (c) Prior to start-up after the first refueling, TVA will plug Row 1 of the steam generator tubes, if required by NRC.
- (d) By May 20, 1997, TVA shall establish a steam generator inspection program that is in accordance with the commitments listed in Enclosure 2 to the TVA letter to the Commission on this subject dated March 12, 1997, as modified by TVA letters dated March 17, 1997 and May 14, 2001.

(10) Water Chemistry Control Program (Section 5.3.2)

This requirement has been deleted.

(11) Negative Pressure in the Auxiliary Building Secondary Containment Enclosure (ABSCE) (Section 6.2.3)

After the final ABSCE configuration is determined, TVA must demonstrate to the satisfaction of the NRC that a negative pressure of 0.25 inches of water gauge can be maintained in the spent fuel storage area and in the ESF pump room.

(12) Environmental Qualification (Section 7.2.2)

- (a) No later than November 1, 1980, TVA shall submit information to show compliance with the requirements of NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," for safety-related equipment exposed to a harsh environment. Implementation shall be in accordance with NUREG-0588 by June 30, 1982.
- (b) By no later than December 1, 1980, complete and auditable records must be available and maintained at a central location which describe the environmental qualification method used for all safety-related electrical equipment in sufficient detail to document the degree of compliance with the DOR Guidelines or NUREG-0588. Thereafter, such records should be updated and maintained current as equipment is replaced, further tested, or otherwise further qualified to document complete compliance by June 30, 1982.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 270 TO FACILITY OPERATING LICENSE NO. DPR-77

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT, UNIT 1
DOCKET NO. 50-327

1.0 INTRODUCTION

By letter dated May 14, 2001, the Tennessee Valley Authority (TVA) proposed a change to the Operating License for the Sequoyah Nuclear Plant (SQN), Unit 1. The proposed change would provide clarification of a TVA commitment as contained in SQN Unit 1 License Condition 2.C.(9)(d). The commitment is associated with steam generator (SG) inspection criteria for tube support plate intersection tube dents producing a less than 5 volts signal during eddy current testing. Specifically, the proposed change would re-define the Unit 1 Dent Sampling Plan for dents less than 5 volts contained in a TVA letter to the NRC dated March 12, 1997. The change would establish a lower threshold of 1.0 volts as measured by eddy current for evaluating tube support plate locations with rotating pancake coil probes. Clarification of TVA's commitment is based on discussions between TVA and NRC staff during a meeting on April 11, 2001.

2.0 BACKGROUND

The proposed change is associated with commitments contained in a TVA letter to the NRC dated March 12, 1997, incorporated by reference into SQN Unit 1 License Condition 2.C.(9)(d), that describes the inspection and sampling of SG tubes at dented tube support plate intersections that produce an eddy current signal less than 5 volts. License Condition 2.C.(9)(d) references the TVA commitments that, in part, define SQN's SG inspection program for Unit 1. The commitments in the license condition are associated with SQN's use of NRC Generic Letter (GL) 95-05 voltage based alternate repair criteria (ARC). The GL 95-05 voltage based ARC are to be applied to predominantly axially oriented outside diameter stress corrosion cracking (ODSCC) at tube support plate (TSP) locations.

SQN Unit 1 SGs have specific commitments associated with dent inspection criteria due to the large population of dented intersections in these SGs. The TVA letter dated March 12, 1997 is specifically referenced in License Condition 2.C.(9)(d) and contains a commitment that describes SQN's Unit 1 Dent Sampling Plan for dents less than 5 volts. The commitment language currently does not provide a minimum voltage threshold for dent inspection less than 5 volts.

Following the SQN Unit 1 SG tube inspections for the Cycle 10 refueling outage (March 2000), TVA met with the NRC staff May 15, 2000, to discuss the results of the unit 1 Cycle 10 SG inspections. This meeting was requested by the NRC staff based on the identification of three circumferential cracks in less than 2 volt dented intersections during the tube inspections. Discussions that the NRC held with TVA subsequent to the SG inspections revealed that TVA had not examined 100% of the <5 volt dented tube support plate intersections with a rotating pancake coil probe as required by the SQN Unit 1 License Condition 2.C.(9)(d), but had used a 2 volt lower threshold to limit the examinations.

During the meeting, TVA provided their interpretation of the commitment regarding inspection and sampling of less than 5 volt dented intersections with a rotating pancake coil probe. TVA noted in the meeting that the commitment was not intended to apply to dented intersections that were less than 2 volts. For the purpose of clarifying this with the NRC staff, TVA agreed that this commitment would be restated and clarified in a future TVA submittal. NRC suggested that TVA develop appropriate sampling strategies for <2 volts dented intersections for the future submittal.

A second meeting was held with NRC staff on April 11, 2001. During this meeting, TVA presented their proposed strategy for Unit 1 SG tube inspections that would define a more conservative "calling" threshold than 2 volts for dented TSP intersections less than 5 volts. TVA proposed a threshold of 1 volt, based on their conclusion that there is subjectivity associated with interpreting the test data for <1 volt dented intersections and it is often inconclusive as to whether they are actually detecting a dent.

Based on the discussions at the second meeting, TVA submitted a license amendment request, dated May 14, 2001, to revise SQN Unit 1 License Condition 2.C.(9)(d) to reflect a new 1.0-volt threshold. This submittal replaces the commitment to inspect all dents less than 5 volts with an RPC probe.

It should be noted that SQN Unit 1 has also received approval for the use of an ARC specific to the management of primary water stress corrosion cracking (PWSCC) at the TSPs in the SG tubes. The NRC issued Amendment No. 252 to SQN Unit 1 on March 8, 2000, for this ARC, which added additional steam generator inspection requirements to the plant technical specifications, including dent inspection plans. The changes to License Condition 2.C.(9)(d) are specific to the inspection program for the ODSCC ARC, and do not represent any changes to the approved inspection program for the PWSCC ARC as described in Amendment No. 252.

3.0 EVALUATION AND CONCLUSION

3.1 Evaluation

The purpose of the SG tube inspection and repair limits is to provide reasonable assurance that tubes accepted for continued service without plugging and repair will exhibit adequate structural and leakage integrity with appropriate allowance for error or variability and for defect growth prior to the next inservice inspection.

During the last SG tube examination in March 2000, TVA conducted a total of 36,294 nondestructive examinations on the tubes in the four SQN Unit 1 SGs. These exams included

a 100% bobbin-coil inspection of all tubes and 100% "Plus Point" (+Point) inspections of hot leg dented tube support plate intersections having eddy current instrument indications greater than or equal to 2 volts. Although TVA performed a 100% bobbin coil inspection of the tubes, circumferential flaws would likely not have been detected if the +Point had not been used. This is because the bobbin coil probe, unlike the +Point probe, is not qualified to detect circumferential flaws. The +Point probe was also used as a diagnostic tool for 1647 bobbin coil indications in less than 2-volt dented intersections detected by bobbin coil inspections.

Three circumferential stress corrosion cracks (two inner diameter, one outer diameter) were identified during these less than 2-volt +Point inspections and the tubes were removed from service by plugging. No circumferential crack has been identified in a dent less than 1.5 volt, according to TVA. Approximately 200 other tubes were plugged for other reasons during the March 2000 outage.

TVA's proposed amendment would modify the SQN Unit 1 Operating License to clarify a TVA commitment for SG inspection criteria of dented intersections in the less than 5-volt range. TVA's commitment, under the proposed change, would provide a conservative strategy by utilizing a 1-volt "calling" threshold for inspection and sampling dented intersections. To support this inspection strategy, TVA, at the meeting with the NRC on April 11, 2001, presented a number of Lissajous scans from the last SG inspections with voltage amplitudes ranging from 0.37 volts to 3.74 volts. TVA concluded from the Lissajous patterns that the dents that have less than 1.0-volt signals result in patterns that are very hard to interpret. This is because it is difficult to determine whether an actual SG tube defect is indicated, because interpretations of the patterns could be inconclusive and subjective. Therefore, TVA proposed a threshold of greater than or equal to 1.0 volts for +Point inspections.

TVA proposes that the new threshold be implemented for the steam generator inspection for Unit 1 at the end of cycle 11. Implementation of the new threshold will result in inspection of dented intersections greater than or equal to 1 volt in all 4 steam generators. This will result in 15,774 dent inspections with +Point compared to a based scope of 8360 dent inspections at the end of Cycle 10. This will provide data for approximately 5000 additional dented intersections to validate the end of Cycle 10 operational assessment methodology, assumptions, and conclusions. Based on the circumferential cracking found in previous inspections, TVA concludes that no indications are predicted to have percent degraded areas large enough to challenge structural integrity. TVA, at the meeting with the NRC on April 11, 2001, presented their conclusions that the percent degraded area for the largest circumferential crack in a <2 volt dent found during the U1C10 inspections, 6.36%, was far smaller than the condition monitoring structural limit of 58.2% percent degraded area (including uncertainties).

The staff finds the new inspection strategy acceptable because the staff believes it is more likely that circumferential cracks that would challenge structural integrity before SG replacement will be found in the 1 - 2 volt range rather than in the <1 volt range. The staff notes that there may be a need for TVA to expand the validation inspection sample size and consider in-situ pressure testing in some cases if the inspection strategy is challenged by structural or leakage concerns. TVA has indicated that in such cases, a plan will be developed and the NRC will be informed of the expansion scope.

3.2 Conclusion

The staff finds TVA's proposal to change SQN Unit 1 License Condition 2.C.(9)(d) to reference a TVA letter dated May 14, 2001 acceptable. The May 14, 2001 letter changes TVA's commitment for inspecting dented intersections that are less than 5 volts, by establishing a lower threshold of greater than or equal to 1 volt for RPC of indications found by bobbin coil examination. No such threshold previously existed. This change will continue to provide an adequate margin of safety for maintaining SG tube structural and leakage integrity with appropriate allowance for error or variability and for defect growth.

4.0 STATE CONSULTATION

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

5.0 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. 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 previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (66 FR 29362). 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.

6.0 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: Ronald W. Hernan, NRR

Dated: July 18, 2001

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