

March 8, 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 - INSERVICE INSPECTION REQUEST
FOR RELIEF FROM ASME CODE, SECTION XI REQUIREMENTS SECOND
10-YEAR INSPECTION INTERVAL (TAC NO. MB0021)

Dear Mr. Scalice:

By letter dated June 6, 2000, the Tennessee Valley Authority (TVA) submitted a request for relief from the volumetric examination requirements of the American Society of Mechanical Engineers Code (the Code), Section XI, associated with Steam Generator Nos. 2 and 4. The purpose of requesting relief is due solely to the short remaining service life and the scheduled replacement of the steam generators 4 months after the Code-required examinations. TVA requested relief in this case as a hardship under Title 10, *Code of Federal Regulations*, Section 50.55a(a)(3)(ii).

The U.S. Nuclear Regulatory Commission staff has evaluated TVA's request for relief and finds the request to be acceptable. The staff concludes that compliance with the Code requirements for the specified steam generator shell weld and nozzle inside radius sections would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Furthermore, the staff concludes that the volumetric examinations of the subject items in the previous interval and inspections in the current interval provide reasonable assurance of structural integrity for the short remaining service life of the steam generators. The staff's Safety Evaluation is contained in the enclosure.

Sincerely,

/RA/

Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-327

Enclosure: Safety Evaluation

cc w/enclosure: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SECOND 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM

REQUEST FOR RELIEF FROM ASME CODE, SECTION XI REQUIREMENTS

SEQUOYAH NUCLEAR PLANT, UNIT NO. 1

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

1.0 INTRODUCTION

The inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (Code) and applicable addenda as required by Title 10, *Code of Federal Regulations* (10 CFR), Section 50.55a(a)(g) (10 CFR 50.55a(g)), except where specific written relief has been granted by the U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). As stated in 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable editions of the ASME Code, Section XI, for the second 10-year inservice inspection (ISI) interval of Sequoyah Nuclear Plant (SQN), Unit 1, is the 1989 Edition.

By letter dated June 6, 2000, Tennessee Valley Authority (TVA), the licensee for SQN Unit 1, submitted request for relief from the volumetric examination requirements of the ASME Code, Section XI, associated with SQN Unit 1 Steam Generator Nos. 2 and 4. The purpose of requesting relief is due solely to the short remaining service life and the scheduled replacement of the steam generators four months after the Code-required examinations.

ENCLOSURE

2.0 DISCUSSION (RELIEF REQUEST NO. 1-ISI-16)

Unit: 1

System

Reactor Coolant and Main Steam systems

Component Identification

Two primary side inlet and outlet nozzle inside radius sections and one shell circumferential weld in the steam generators as noted below.

Steam Generator No. 4 inside radius sections SG-4-C-IR and SG-4-H-IR

Steam Generator No. 2 shell circumferential weld no. SGW-D2 (lower shell to transition cone)

Code Requirements

ASME Code, Section XI, 1989 Edition, Table IWB-2500-1, Examination Category B-D, Item No. B3.140 for nozzle inside radius and Table IWC-2500-1, Examination Category C-A, Item No. C1.10 for shell circumferential weld require a volumetric examination during each 10-year inservice inspection interval.

Licensee's Requested Relief

Relief is requested from performing volumetric examination of the primary side nozzle inside radius sections of Steam Generator No. 4 and the shell circumferential weld of Steam Generator No. 2, scheduled for examination during the second period of the second 10-year inspection interval.

Licensee's Proposed Alternative

The ASME Section XI code requirement for visual (VT-2) examination for leakage during system pressure tests in accordance with Examination Category B-P (steam generator primary side) and C-H (steam generator secondary side) will be performed on SQN Unit 1 following the refueling outage. These examinations for leakage provide assurance for structural and leak-tight integrity of the entire pressure boundary for SQN Unit 1 steam generators until they are replaced.

Licensee's Basis for Relief

During the first inspection interval, all eight of the primary side nozzle inside radius sections were examined. Additionally, during the first period of SQN's current second inspection interval, two of the primary side inlet nozzle inside radius sections were re-examined. These nozzle inside radius examinations yielded acceptable results.

During SQN's first inspection interval, the number of steam generator shell circumferential welds requiring examination was equal to the number of welds on one of the steam generators. All of these shell circumferential weld examinations yielded acceptable results.

In accordance with ASME Section XI, two of the primary side nozzle inside radius sections and one shell circumferential weld are scheduled for re-examination in the second period of SQN's second 10-year inspection interval. SQN's second ISI period (middle period of the second 10-year interval) ends on December 14, 2002. Replacement of the Unit 1 steam generators is scheduled to begin in March 2003. The SQN Unit 1 steam generators are scheduled to be replaced during the third period of the

second 10-year inspection interval (during the Cycle 12 refueling outage starting in March 2003). Compliance with the ASME Section XI examination requirements for the two primary side nozzle inside radius sections and the one shell circumferential weld would result in a hardship. The hardships are increased personnel radiation exposure and increased resources and outage cost without a compensating increase in the level of quality and safety.

For the new SQN Unit 1 replacement steam generators, TVA plans to perform ASME Section XI preservice examinations on applicable replacement steam generator welds, nozzle inside radius sections, and replaced piping connection welds.

3.0 EVALUATION

The licensee states that during the first 10-year inspection interval of SQN Unit 1, primary side nozzle inside radius sections of all four steam generators and the shell circumferential weld of the subject steam generator were volumetrically examined in accordance with the Code. The results of volumetric examination were acceptable. Additionally, during the first period of the second 10-year inspection interval, the inside radius sections of the primary side nozzles of another steam generator were also volumetrically examined with acceptable results. The volumetric examinations with regard to inservice inspection performed during each inspection interval serve two purposes. First, the non-destructive examination (NDE) results provide assurance of continuing structural integrity of these welds and adjacent base metal. Second, the NDE results provide documentation of the "NDE signature" of the examination volume (e.g., geometric reflectors, acceptable flaws) with current NDE technology that can be used for comparison with future inservice examination results. Based on the acceptable results of the volumetric examinations conducted in the first 10-year inspection interval, the staff believes that there is reasonable assurance of continued structural integrity of these items until at least the end of current inspection period. In addition, there is no information which would suggest that there is a degradation mechanism active in the subject items that would cause a failure in the third inspection period of the current inservice inspection interval.

The licensee's inservice inspection program, which conforms to the applicable ASME Code, Section XI, requires volumetric examination of the subject items during the second period of the current second 10-year interval. However, the licensee has planned and scheduled the replacement of the Unit 1 steam generators during the beginning of the third period of the current inspection interval, approximately four months after completion of the Code-required volumetric examinations. Considering the amount of radiation exposure to licensee personnel during the performance of the Code-required examinations, and the reasonable assurance of structural integrity of the subject items for the remaining life of the current steam generators provided by the satisfactory results of past volumetric examinations of these and similar welds, the staff has determined that compliance to the Code requirement would result in hardship without a compensating increase in the level of quality and safety. The staff further believes that should there be an unacceptable through-wall flaw existing in the subject items, the licensee's proposed alternative of performing a VT-2 visual examination during system pressure test in lieu of the Code-required volumetric examinations would detect it and ensure leak-tight integrity of the pressure boundary.

4.0 CONCLUSION

The staff concludes that compliance with the Code requirements for the specified steam generator shell weld and nozzle inside radius sections would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Furthermore, the staff concludes that the

volumetric examinations of the subject items in the previous interval and inspections in the current interval provide reasonable assurance of structural integrity for the short remaining service life of the steam generators. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee's proposed alternative is authorized for the second 10-year inservice inspection interval of SQN, Unit No. 1

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Date: March 8, 2001

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SEQUOYAH NUCLEAR PLANT

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