



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENCLOSURE

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
FIRST 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM, REVISION 14
AND THIRTEEN ASSOCIATED REQUESTS FOR RELIEF
TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT, UNIT 1
DOCKET NO. 50-327

1.0 INTRODUCTION

Technical Specification 4.0.5 for the Sequoyah Nuclear Plant, Unit 1, states that the surveillance requirements for inservice inspection and testing of the American Society for Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Class 1, 2, and 3 components shall be applicable as follows: Inservice Inspection of ASME Code Class 1, 2, and 3 components ... shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50.55a(g), except where a specific request for relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i) or 10 CFR 50.55a(a)(3).

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 Code, Section XI, of editions and addenda that become effective in the future, to the extent practical within the limits of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components shall comply with the latest edition and addenda of Section XI of the Code incorporated by reference in 10 CFR 50.55a(b) on the date 12 months prior to the date of issuance of the operating license.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the Code is not practical for its facility, information shall be submitted to the Commission in support for the determination(s) and a request made for relief from the Code requirement. After evaluation of the determination(s), pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

Pursuant to 10 CFR 50.55a(a)(3), if the licensee determines that an alternative to the ASME Code requirements would provide an acceptable level of quality and safety, information shall be submitted to the Commission in support of the

determination(s) and a request made for relief from the Code requirements. After evaluation of the determinations, pursuant to 10 CFR 50.55a(a)(3)(i), the Commission may grant relief from the Code.

In a letter dated May 5, 1989, the Tennessee Valley Authority (TVA), forwarded the Sequoyah Nuclear Plant, Unit 1, first 10-year interval Inservice Inspection (ISI) Program, Revision 14. This program is to meet the requirements of the 1977 Edition, Summer 1978 Addenda of Section XI of the Code with the following exception: the extent of examination for Code Class 1 piping welds have been determined by the 1974 Edition through Summer 1975 Addenda as required by 10 CFR 50.55a(b).

The staff, with technical assistance from its contractor, Science Applications International Corporation (SAIC), has reviewed (1) the Unit 1 first 10-year interval ISI Program, Revision 14, including additional information related to the program in TVA letters dated January 25, and July 12, 1990, and (2) the requests for relief from certain ASME Code requirements for Unit 1 during the first inspection interval.

The Sequoyah Nuclear Plant, Units 1 and 2, were built and licensed to the same edition/addenda of the Code. Accordingly, the first 10-year Interval ISI Program for these two units are almost identical. The additional information in TVA's letter dated July 12, 1990, concerned (1) the Unit 2 relief requests granted by NRC letter dated April 19, 1990 and (2) the Unit 1 relief requests. The additional information for Unit 2 relief requests will be the subject of a separate evaluation on Unit 2.

2.0 EVALUATION

The ISI Program has been evaluated for (a) application of the correct Section XI Code edition and addenda, (b) compliance with examination and test requirements of Section XI, (c) acceptability of the examination sample, (d) compliance with prior ISI commitments made by TVA, (e) correctness of the application of system or component exclusion criteria, and (f) adequate information to support requests for relief from Section XI Code requirements. The information provided by TVA in support of requests for relief from Section XI Code requirements has been evaluated and the bases for granting relief from the requirements are documented in the attached SAIC Technical Evaluation Report (TER) SAIC-89/1474 dated May 1990. A list of the TVA submittals reviewed by SAIC is given in the TER. The NRC staff concurs with the findings and recommendations contained in the TER with the exceptions of the relief granted for ISI-6 and the changes generated by the additional information supplied by TVA in its letter dated July 12, 1990.

The changes generated by the TVA letter of July 12, 1990 and the evaluations by the staff are as follows:

2.1 Relief Requests ISI-1 and ISI-8

Relief Request ISI-1, Pump Internal Pressure Boundary Surface, Category B-L-2, Item B12.20, page 26 to 28 of the attached TER, phrase (c) and Relief Request ISI-8, Pressure Retaining Welds on Pump Casings, Category B-L-1, Item B12.10, pages 24

and 25 of reference (1), phrase (d); both of the phrases "periodic inservice testing of pumps is conducted in accordance with IWP." are to be deleted, as are all text references to IWP on pages 27 and 24 of the attached TER, respectively.

The 1977 Edition with addenda through Summer 1978, ASME Code, Section XI, IWP-1100 defines the scope of IWP as applying to pumps installed in light-water cooled nuclear power plants and which are provided with an emergency power source. The reactor coolant pumps at Sequoyah Unit 1 (and 2) are not in its IWP program.

2.2 Relief Request ISI-2

Relief Request ISI-2, Valve Internal Pressure Boundary Surface, Category B-M-2, Item B12.40, pages 29 to 31 of the attached TER; phrase (b): Add the phrase "as applicable" between "IWV" and ", and".

The 1977 Edition with addenda through Summer 1978, ASME Code, Section XI, IWV-1100 defines the scope of IWV as applying to valves in light-water cooled nuclear power plants which are required to perform a specific function in shutting down a reactor to cold shutdown condition or in mitigating the consequences of an accident. TVA has described the valves presently included in relief request ISI-2 as being within the scope of IWV in their letter of July 12, 1990. However, when additional valves are included in this relief request in the future, a valve is not to be added to the IWV program solely on the basis that it is subject to Category B-M-2 visual examination.

2.3 Relief Request ISI-6

Relief Request ISI-6, Steam Generator Nozzle Inside Radius Section, Category B-D, Item 83.140, pages 15 to 17 of the attached TER is not granted as proposed.

The licensee had proposed not performing the volumetric examinations until the second inspection interval. The justification was based upon the Electric Power Research Institute (EPRI) Report NP-4242, "Long Term Inspection Requirements for Nuclear Power Plants." This report recommended that the inner radius of these nozzles be examined no sooner than at half the plant life, and subsequently, at the established code inspection intervals. The EPRI Report NP-4242 has not been received or reviewed by the NRC staff. Upon reviewing the relief requested under ISI-6, we have concluded that delaying the inspection required by the Code from the first 10-year interval to the second 10-year interval is inadequately justified. The reasons for our position are as follows:

- (a) There is no assurance that the original flaw size assumed in the EPRI report was not exceeded. This plant predates the requirements for preservice examinations. TVA's preservice inspection results were not noted in the original request.
- (b) The techniques used for this preservice ultrasonic inspection need to have demonstrated adequate sensitivity to detect the allowable reference flaw size.

The provision for relief in 10 CFR 50.55a(g) is designed for situations where the limits of design, geometry, or materials of construction of the components makes it impractical to physically perform the inspections. Another avenue for changes of inspection requirements under the regulations is provided in 10 CFR 50.55a(a)(3). Here, the licensee proposes alternatives which must either (1) provide an acceptable level of quality and safety, or (2) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. If there is a compelling reason for changing the Code requirements, there are mechanisms within the Code to effect the necessary changes. The staff has concluded that performing the code required volumetric examinations of Item B3.140 in the first 10-year interval is required.

Sequoyah Nuclear Plant Unit 1's commercial operating date is July 1, 1981. The code requirement in B3.140 for inspection of at least 25 percent of this item in the first inspection period was not performed. It is impossible (i.e., impractical) to perform the inspections required in the first 40-month inspection period as it ended November, 1984. Accordingly, relief is needed from the requirement in B3.140 of performing at least 25 percent of the items by the end of the first inspection period because none of the items were inspected in the first inspection period of the first inspection interval. The request for Relief ISI-6 was submitted to the staff in TVA letter dated August 23, 1983 prior to the end of the first inspection period. Therefore, the staff considered if relief from this requirement would be acceptable.

The development of cracks at the inner nozzle radius of these nozzles at the beginning of their life is remote, as indicated by the EPRI Report NP-4242, and delay of 25 percent of these inspections from the end of the first 40-month period to the end of the first 10-year inspection interval poses no threat to safety. In subsequent 10-year intervals, the requirements of the code shall be met. Therefore, delaying the volumetric examination of the nozzle sections until the third inspection period of the first inspection interval and then following the code requirements is acceptable.

2.4 Relief Requests Summary

Table 1 presents a summary and status of the relief requests as determined by the staff. Thirteen relief requests have been reviewed and nine are acceptable. Of the nine acceptable requests, for one, ISI-9, we have determined that the proposed alternatives to the Code requirements will provide an acceptable level of quality and safety at Unit 1 pursuant to 10 CFR 50.55a(a)(3)(i). For the remaining eight requests, ISI-1, ISI-3 to ISI-5, ISI-8, ISI-10, and ISI-13, we have determined that the Code requirements are impractical to perform at Unit 1 and the alternative requirements will not endanger life or property, or the common defense and security, and are in the public interest considering the burden that could result on TVA if the Code requirements were imposed on Unit 1 pursuant to 10 CFR 50.55a(g)(6)(i).

For the four relief requests which we could not grant approval, one, ISI-11 was withdrawn. Two requests were determined as not being necessary at this time and are postponed (ISI-2 and ISI-7) and one request, ISI-12, is not needed.

The table lists the restrictions, if any, for each relief request that is acceptable. Where the relief requests' status is "Granted with alternative requirements", the alternative requirements are as recommended in the SAIC TER except as amended above (i.e., ISI-1, ISI-2, ISI-6, and ISI-8). The granting of relief requests as provided in this SE is contingent upon all other requirements of Section XI being met for inservice examinations, inservice tests and system pressure tests of the components affected by these relief requests.

The NRC imposed augmented and accelerated field weld inspections generated a relief request for Unit 2 because these inspections were required to be performed within the next two refueling outages (i.e., Unit 2 Cycle 3 and Unit 2 Cycle 4), both of which fell within the second inspection period for the 10-year inspection interval. The Code spells out that there is to be a maximum percentage of 67% for given inspection categories to be completed in the second period and relief from this requirement was granted for Unit 2 in the staff's letter dated April 19, 1990. This is relief request ISI-14 for Unit 2. For Unit 1, the applicable refueling outages, Unit 1 Cycle 4 and Unit 1 Cycle 5, fall within the second and third inspection periods, respectively. Therefore, the Code specified requirements can be met, and accordingly, relief is not required or granted for Unit 1 for the NRC imposed inspections.

3.0 CONCLUSIONS

For the Unit 1 ISI Program, TVA submitted 13 requests for relief from the requirements of the Code: ISI-1 to ISI-13. As discussed above, we have determined that these requests may be granted except for the following four requests: ISI-4, ISI-7, ISI-11 and ISI-12. Of these four requests, one was withdrawn (ISI-1), one is not needed (ISI-12), and two are postponed (ISI-2 and ISI-7). Therefore, nine requests for relief should be granted.

For request ISI-9, we have determined that the proposed alternatives to the Code requirements will provide an acceptable level of quality and safety at Unit 1. For the remaining eight requests, ISI-1, ISI-3 to ISI-6, ISI-8, ISI-10, and ISI-13, we have determined that the Code requirements are impractical to perform at Unit 1 and the alternative requirements will not endanger life or property, or the common defense and security, and are in the public interest considering the burden that could result on TVA if the Code requirements were imposed on Unit 1.

The NRC imposed augmented and accelerated field weld inspections generated a relief request for Unit 2 which is not needed for Unit 1 because these inspections were required to be performed within the next two refueling outages (Unit 2 Cycle 3 and Unit 2 Cycle 4) both of which fell within the second inspection period. The Code spells out that there is to be a maximum percentage of 67% for given inspection categories to be completed in the second period and relief from this requirement was granted. For Unit 1, the applicable refueling outages, Unit 1 Cycle 4 and Unit 1 Cycle 5, fall within the second and third inspection periods, respectively. Therefore, the Code specified requirements can be met at Unit 1, and accordingly, relief is not required for the NRC imposed inspections at Unit 1.

Granting relief from Code requirements is authorized by law where (1) the proposed alternative would provide an acceptable level of quality and safety (pursuant to 10 CFR 50.55a(a)(3)(i)), (2) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety (pursuant to 10 CFR 50.55a(a)(3)(ii)), or (3) the Code requirement is impractical and the alternative requirement will not endanger life or property, or the common defense and security, and is in the public interest (pursuant to 10 CFR 50.55a(g)(6)(i)).

Therefore, pursuant to 10 CFR 50.55a(a)(3)(i) and 10 CFR 50.55a(g)(6)(i) of the Commission's regulations, TVA should be granted the following requests for relief from the Code: ISI-1, ISI-3 to ISI-6 ISI-8 to ISI-10, and ISI-13.

Where the relief status is "Granted with alternative requirements," the alternative requirements are as recommended in the attached TER except as noted in this SER. The granting of these relief requests will be contingent upon all other requirements of Section XI being met for inservice examinations, inservice tests, and system pressure tests of the components affected by these relief requests.

The staff concludes that the Sequoyah Nuclear Plant, Unit 1, first 10-Year Interval ISI Program, Revision 14, with the additional information provided in References 3 and 4 and the specific written reliefs constitute the basis for compliance with 10 CFR 50.55a(g) and the Technical Specification 4.0.5 and is, therefore, acceptable.

4.0 REFERENCES

1. Science Applications International Corporation, "First Interval Inservice Inspection Program, Sequoyah Nuclear Station Unit 1, "Technical Evaluation Report SAIC-89/1474," Idaho Falls, Idaho, dated May 1990.
2. Letter from C. H. Fox (TVA) to NRC, Subject: Augmented and Accelerated Inservice Inspection Program for Unit 1, dated May 5, 1989.
3. Letter from M. J. Ray (TVA) to NRC, Subject: Response to NRC Request for Information, Inservice Inspection Program, dated January 25, 1990.
4. Letter from E. G. Wallace (TVA) to NRC, Subject: NRC Safety Evaluation Report for the First 10-Year Interval Inservice Inspection Program, dated July 12, 1990.

Enclosures:
As Stated

Principal Contributor: D. E. Smith

Dated: October 25, 1990

TABLE 1

SUMMARY OF RELIEF REQUESTS (SYSTEM/COMPONENTS)

<u>RELIEF REQUEST NUMBER</u>	<u>ITEM NO.</u>	<u>EXAM CAT.</u>	<u>SYSTEM OR COMPONENT</u>	<u>VOLUME OR AREA TO BE EXAMINED</u>	<u>REQUIRED METHOD</u>	<u>LICENSEE PROPOSED ALTERNATIVE</u>	<u>RELIEF REQUEST STATUS</u>
<u>10 CFR 50.55a(g)(6)(i) Requests</u>							
ISI-1	B12.20	B-L-2	Pumps	Internal Pressure Boundary Surfaces	Visual	Visual exam of surfaces if pump opened for maint. If not, UT thickness from exterior	Granted with alternative requirements
ISI-2	B12.40	B-M-2	Valves	Internal Pressure Boundary Surfaces	Visual	None	Postponed until specific relief requests are presented towards end of interval
ISI-3	B5.50	B-F	Bimetal Welds	Pressure retaining bimetallic welds in piping	Surface Volumetric	Inspect to extent possible	Granted with alternative requirements
	B9.10 B9.20 B9.30 C5.10 C5.20 C5.30	B-J C-F	Welds	Pressure retaining welds in piping	Surface Volumetric	Inspect to extent possible	Granted with alternative requirements
ISI-4	C1-10	C-A	Steam Generator	Class 2 Circum. shell welds	Volumetric	Inspect to extent possible	Granted with alternative requirements
ISI-5	B1.21	B-A	Reactor Vessel	Bottom head Circum. weld	Volumetric	Inspect to extent possible	Granted with alternative requirements

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ISI-6	B3.140	R-D	Steam Generator	Nozzle inside radius section	Volumetric	Postpone until next interval	Granted with alternative requirements
ISI-7	B0.10	B-J	Piping	Reactor coolant loop piping welds	Volumetric	None	Postponed until fourth interval
ISI-8	B12.10	B-L-1	Pumps	Pressure retaining welds on pump casings	Surface Volumetric	Surface exam only	Granted with alternative requirements
ISI-10	B1.30	B-A	Reactor vessel	Flange to upper shell weld	Volumetric at Table IWB-2412-1 frequency	Delay volumetric to end of interval	Granted
ISI-11							Withdrawn
ISI-12	C1.10 C1.20 C1.30 C3.10	C-A C-C C-C C-E	Pressure vessels	Shell weld at structural discontinuities attachments	Volumetric Volumetric Volumetric Surface	None	Relief not required
ISI-13	C2.20	C-B	Pressure vessels	RHR HTEX nozzle to vessel welds	Surface Volumetric	Surface exam only	Granted

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<u>10 CFR 50.55a(a)(3)(i) Requests</u>							
ISI-9	UT cali- bration			Use of 5-percent notches in lieu of side-drilled holes		Continue use of existing blocks	Granting pro- vided alter- native existing blocks meet applicable Code re- quirements