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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Request for Alternative to Utilize BAW-2228P-A and Withdrawal of Previously Submitted Relief Requests 96-003 and 96-004

Gentlemen:

Title 10 of the Code of Federal Regulations, 10CFR50.55a, requires (in part) that inservice inspection of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 piping be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda, except where alternatives are authorized by the Commission pursuant to 10CFR50.55a(a)(3)(i), or (a)(3)(ii). In order to obtain authorization, the licensee must demonstrate that (1) the proposed alternatives provide an acceptable level of quality and safety, or (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

In letter dated November 12, 1982 (1CAN118203), Arkansas Nuclear One, Unit 1 (ANO-1) requested relief from the surface examination requirements of the reactor vessel core flood nozzle-to-safe end and safe end-to-pipe welds as required by the 1974 Edition of Section XI (Items B1.6 and B4.1, Examination Category B-F). The justification for the relief was hardship caused by the necessary removal of the refueling canal seal plate, shielding bricks and supports in the nozzle area, and insulation. Scaffolding would also have to be erected. Due to the elevation and proximity to the reactor vessel cavity, temporary shielding was not considered practical. It was proposed that the subject welds be examined ultrasonically (full-volume) from the inside diameter (ID) surface.

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In NRC letter dated April 10, 1986 (1CNA048601), the NRC staff granted relief from the ASME requirements for the first 10 year interval. However, the NRC requested that ANO further demonstrate that through ultrasonic testing (UT) of the ID of the core flood nozzle welds, potential outside diameter (OD) flaws would be detected. This demonstration was to

be performed during the second ten year interval. If this could not be demonstrated the ASME required surface examinations would have to be performed.

To confirm the detection capability for this UT technique, the Babcock and Wilcox Owners Group (BWOG) initiated a demonstration program for certain sizes and shapes of flaws in the outer surface of mocked-up nozzle-to-piping weld regions. The successful demonstration of the approach by the BWOG was published in Revision 1 to BAW-2228P, "Fracture Mechanics Assessment of Postulated Outer Surface Semi-Elliptical Circumferential RV Nozzle to Pipe Weld Flaws." NRC review and approval of the report was documented in the Safety Evaluation contained in NRC letter dated March 21, 1996, to the BWOG. The NRC staff stated that further review of this test methodology would not be required given plant specific confirmation of (1) the input stresses under normal/upset and emergency/faulted conditions per Tables 1-4 of Rev. 1 to BAW-2228P, and (2) the material in the inlet, outlet, and core flood nozzles being either A508 Class 2 carbon steel or SA-336 (316) stainless steel.

Relief Request 96-003 to use the same topical report was submitted on August 28, 1996 (1CAN089605). Based on subsequent discussions with the Staff, that request is being withdrawn and replaced with the attached Request for Alternative (also numbered 96-003). Additionally, on July 3, 1996 (1CAN079603), Entergy Operations submitted Relief Request 96-004 for permission to exempt certain portions of emergency feedwater piping from 10-year pressure testing. Since that submittal, Entergy Operations developed an alternative method and completed the required testing. Therefore, Relief Request 96-004 is withdrawn.

The attached Request for Alternative 96-003 confirms the plant specific conditions discussed above. Therefore, an alternative is requested per 10CFR50.55a(a)(3) to use the ID initiated UT examination approach for the subject welds. These welds were examined ultrasonically during Refueling Outage 1R12 (spring of 1995) as part of the second 10-year inservice inspection reactor vessel exam. Entergy Operations proposes to use this alternative for the second 10-year interval, as well as the third 10-year interval which began on June 1, 1997.

If you have questions concerning this submittal, please contact me.

Very truly yours,

Dale E. James
for Dwight C. Mims
Director, Nuclear Safety

DCM/jjd

attachment

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COMPONENT IDENTIFICATION

Code Class:	1
Code of Record:	2nd Interval: 1980 Edition through Winter 1981 Addenda 3rd Interval: 1992 Edition with portions of the 1993 Addenda
Reference:	Table IWB-2500-1
Examination Category:	B-J, B-F
Item Numbers:	B9.11, B5.10
Description:	Examination of Class 1 Welds in Reactor Pressure Vessel (RPV) Nozzles and Safe Ends

Component Numbers:

I.a Six (6) RPV Nozzle-to-Pipe Welds (Examination Category B-J, Item B9.11)

36" 'A' Hotleg Outlet Nozzle-to-Pipe Circumferential Weld (ISI # 14-028)
36" 'B' Hotleg Outlet Nozzle-to-Pipe Circumferential Weld (ISI # 15-026)
28" 'A' Reactor Coolant Pump (RCP) Pipe-to-Nozzle (Inlet) Circumferential Weld (ISI # 11-015)
28" 'B' RCP Pipe-to-Nozzle (Inlet) Circumferential Weld (ISI # 13-015)
28" 'C' RCP Pipe-to-Nozzle (Inlet) Circumferential Weld (ISI # 07-017)
28" 'D' RCP Pipe-to-Nozzle (Inlet) Circumferential Weld (ISI # 09-015)

I.b Two (2) Core Flood Pipe-to-Safe End Welds (Examination Category B-J, Item B9.11)

14" Core Flood Pipe-to-Safe End Circumferential Weld (ISI # 19-019)
14" Core Flood Pipe-to-Safe End Circumferential Weld (ISI # 19-022)

I.c Two (2) RPV Core Flood Nozzle-to-Safe End Welds (Examination Category B-F, Item B5.10)

14" RPV Nozzle-to-Safe End Dissimilar Metal Weld (ISI # 01-025)
14" RPV Nozzle-to-Safe End Dissimilar Metal Weld (ISI # 01-026)

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CODE REQUIREMENT

a. Section XI, Table IWB-2500-1, Examination Category B-J, Item B9.11 requires an outside diameter (OD) surface examination of the weld and adjacent base metal and a volumetric examination of the weld and adjacent base metal (interior one-third volume) on all dissimilar metal piping welds and terminal end piping welds at vessels as defined by figure IWB-2500-8. (Applicable to Items I.a and I.b, above)

b. Section XI, Table IWB-2500-1, Examination Category B-F, Item B5.10 requires an OD surface examination of the weld and adjacent base metal and a volumetric examination of the weld and adjacent base metal (interior one-third volume) on all dissimilar metal piping welds at the RPV nozzles-to-safe ends as defined by Figure IWB-2500-8. (Applicable to Item I.c, above)

BASIS FOR ALTERNATIVE

Pursuant to 10CFR50.55a(a)(3)(ii), an alternative is requested from performing the Code-required surface examinations of the above identified RPV inlet and outlet nozzle-to-pipe welds; on the core flood pipe-to-safe end welds and on the core flood nozzle-to-safe end welds on the basis that compliance with the Code requirements will result in hardship or unusual difficulty without a compensating increase in the level of quality or safety.

The Code of Federal Regulations 10CFR50.55a(g) and ANO-1 Technical Specification 4.0.5 require that American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 systems be routinely inspected as an assurance of continued structural integrity of the pressure boundary. These regular inspections must be performed per Section XI of the ASME Boiler and Pressure Vessel Code, "Rules for Inservice Inspection of Nuclear Power Plant Components." Section XI requires the inspection of all Class 1 nozzle-to-vessel welds (Code Category B-J and B-F) once during each 10-year interval of operation. This includes both ultrasonic (UT) inspection from the inside diameter (ID) of the pipe/nozzle (typically performed during the reactor vessel 10-year inspection) and a surface examination from the OD of the pipe/nozzle. The latter poses a significant hardship for Arkansas Nuclear One, Unit 1 (ANO-1), due to the limited access of the components.

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BASIS FOR ALTERNATIVE (con't)

Entergy Operations' November 12, 1982, letter indicated that the best access to the area where the surface examinations are performed was through the canal seal plate. Since that time, a permanent canal seal plate has been installed to minimize the potential for leakage during refueling. The only access now is through the reactor coolant system hot and cold leg penetrations of the shield wall surrounding the reactor vessel. This access exacerbates the difficulties involving insulation removal and installation, scaffolding erection and dismantling, pipe preparation, temporary shielding, etc. Radiation doses in this area are high (3-5 rem/hour). The additional dose burden on the maintenance staff, as well as the non-destructive examination technicians, would be high because of the limited access.

In lieu of the surface examination, Entergy Operations proposes utilizing an enhanced ultrasonic testing (UT) method to achieve an equivalent level of safety and quality. Demonstration of the UT capability to detect OD flaws was performed in August 1993, by the Babcock and Wilcox Owners Group (BWOG) for all domestic B&W nuclear plants. In this demonstration, the flaws were actual cracks (rather than machined notches) that had been implanted into mock-ups of the RPV inlet nozzle-to-pipe weld, the RPV outlet nozzle-to-pipe weld and the core flood nozzle. The methods used in the fabrication of the mock-up complied with the latest ASME Section XI, Appendix VIII guidance which has been developed in recent years with full NRC participation and approval. The demonstration, which was witnessed by the NRC and the ANO Authorized Nuclear Inspector, was successful in detecting and sizing the various indications. Following the demonstration, the BWOG sponsored a fracture mechanics analysis (performed by Framatome Technology, Inc.) to demonstrate that the types, size and locations of outer surface flaws capable of being detected by the enhanced UT method are acceptable by Code. The results of these analyses were reported to the NRC in Revision 1 to Topical Report BAW-2228P-A, dated February 1995. By letter dated March 21, 1996, the NRC issued the BWOG a Safety Evaluation (SE) on the Topical Report. In the SE, the NRC stated "each licensee that references this topical report as the basis for request for relief from the external surface examination of the RPV nozzle-to-piping welds and replacing it with enhanced UT from the ID must confirm plant-specific applicability by demonstrating that (1) the input stresses under normal/upset and emergency/faulted conditions shown in Tables 1 to 4 [of the topical report] for its plant is a result of using the bounding transient in the analysis and (2) the material in its inlet, outlet, and core flood nozzles is either A508 Class 2 carbon steel or SA-336 (316) stainless steel."

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Entergy Operations has reviewed Tables 1 to 3 of the topical report and confirmed that the stress values listed for ANO-1 are accurate. Further, the values list in Table 4 for stresses at the RPV inlet nozzle, nozzle-to-pipe weld for Davis Besse bound the stresses for the corresponding ANO-1 nozzles. The ANO-1 RPV and core flood nozzles are made of A508, Class 2 carbon steel and the material for the core flood nozzle safe end is SA-336 (316). Based on these results, Entergy Operations meets the requirements specified in the NRC SE discussed above.

PROPOSED ALTERNATIVE EXAMINATIONS

In lieu of performing the Code surface exams for the above mentioned welds, Entergy Operations proposes to use the enhanced ultrasonic techniques performed in accordance with Revision 1 to BWOG document BAW-2228P-A, which has been approved by the NRC in the letter to Babcock and Wilcox Owners Group dated March 21, 1996.

These welds were examined ultrasonically from the pipe/nozzle ID at ANO-1 during the twelfth refueling outage (spring of 1995) as part of the second 10-year inservice inspection (ISI) reactor vessel exam. No flaws were detected using this approach.

Entergy Operations further proposes to use these same techniques to examine the subject welds in the third 10-year ISI interval which began on June 1, 1997.

APPLICABLE TIME PERIOD

Application of the alternative criteria is requested for the second ten-year interval, which began on December 19, 1984, and ended on May 31, 1997, and for the third ten-year interval which began on June 1, 1997.