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United States Nuclear Regulatory Commission
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Perry Nuclear Power Plant
Docket No. 50-440
Submittal of In-Service Examination Program Relief Requests

Ladies and Gentlemen:

In accordance with 10 CFR 50.55a(a)(3)(i), relief requests for the Perry Nuclear Power Plant (PNPP) In-Service Examination Program are being proposed. Attachment 1 contains the following: Relief Request IR-046, which addresses requirements for flaw lengths estimated by ultrasonics; Relief Request IR-047, which addresses reactor vessel nozzle-to-vessel welds; and Relief Request IR-048, which addresses personnel requirements for performance of ultrasonic examinations. Attachment 1 contains the identification of the affected components, the applicable code requirements, the description and basis of the proposed relief requests, and the proposed alternate testing for each of the three relief requests.

Approval of the attached relief requests is requested by January 31, 2001, to support PNPP's eighth refuel outage. It is recognized that this request is not timely to allow a desired review time. However, the timeliness of the attached relief requests is related to the recent resolution of implementation issues regarding the recent rulemaking, which amended 10 CFR 50.55a.

There are no regulatory commitments contained in this letter or its attachment. If you have questions or require additional information, please contact Mr. Gregory A. Dunn, Manager - Regulatory Affairs, at (440) 280-5305.

Very truly yours,

for John K. Wood

Attachment

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III

A047

RELIEF REQUEST No. IR-046

I. Identification of Components

All ASME Section XI, Class 1, Examination Category B-A, Item no. B1.10, Shell Welds, and B1.20, Head Welds, at the Perry Nuclear Power Plant (PNPP) that are subject to Appendix VIII, Supplement 4, examination.

II. ASME B&PV Section XI Requirements

10 CFR 50.55a(g)(6)(ii)(C) was amended to require expedited implementation of Appendix VIII of Section XI, Division 1, 1995 Edition with the 1996 Addenda (Federal Register, 64 FR 51370). Appendix VIII, Supplement 4, Subparagraph 3.2(b), requires that flaw lengths estimated by ultrasonics be the true length -¼ inch, +1 inch for a length sizing qualification. 10 CFR 50.55a(b)(2)(xv)(C)(1) requires a depth sizing acceptance criteria of 0.15 inch Root Mean Square (RMS) be used in lieu of the requirements of Subparagraph 3.2(b) to Supplement 4 to Appendix VIII of Section XI of the 1996 Addenda of the Code.

III. Relief Request

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested to use a length sizing qualification tolerance of 0.75 inch RMS.

IV. Basis for Relief

On January 12, 2000, NRC staff, representatives from the Electric Power Research Institute (EPRI) Nondestructive Examination Center, and representatives from the Performance Demonstration Initiative (PDI) participated in a conference call. The discussion during the conference call included the differences between Supplement 4, "Qualification Requirements for the Clad/Basemetal Interface of Reactor Vessel," of Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems;" Paragraph 10 CFR 50.55a(b)(2)(xv)(C)(1) in the rule (Federal Register, 64 FR 51370); and the implementation of Supplement 4 by the PDI Program. Supplement 4, Subparagraph 3.2(b) imposed a flaw sizing tolerance of –1/4 inch, +1.0 inch of the true length to the performance demonstration qualification criteria. Paragraph 10 CFR 50.55a(b)(2)(xv)(C)(1) requires a depth sizing acceptance criteria of 0.15 inch Root Mean Square (RMS) in lieu of the requirements of Supplement 4, Subparagraph 3.2(b). The PDI program uses a length sizing tolerance of 0.75 in RMS for Supplement 4, Subparagraph 3.2(b). The NRC staff acknowledged that Paragraph 10 CFR 50.55a(b)(2)(xv)(C)(1) in the rule was an error and should actually be a length sizing tolerance of 0.75 inch RMS, the same tolerance that was being implemented by the PDI program.

United States nuclear utilities created the PDI to implement demonstration requirements contained in Appendix VIII. PDI developed a performance demonstration program for qualifying ultrasonic testing techniques. In 1995, the NRC staff performed an assessment of the PDI program and reported that PDI was using a length sizing tolerance of 0.75 inch RMS for reactor pressure vessel performance demonstrations. This criterion was introduced to reduce testmanship (passing the test based on manipulation of results rather than skill).

The NRC staff noted in their assessment report, dated March 6, 1996, that the length sizing tolerance was not according to Appendix VIII, but the report did not take exception to PDI's implementation of the 0.75 inch RMS length sizing tolerance. The NRC staff requested that the length sizing difference between PDI and the Code be resolved.

Resolution of the differences between the PDI program and the Code was provided through PDI's participation in development of a Code case that reflected PDI's program. The Code case was presented to ASME for discussion and consensus building. NRC representatives participated in this process. ASME approved the Code case and published it as Code Case N-622, "Ultrasonic Examination of RPV and Piping, Bolts and Studs, Section XI, Division 1."

Operating in parallel with the actions of PDI, the NRC staff incorporated most of Code Case N-622 criteria in the rule published in the Federal Register, 64 FR 51370. In a conference call on January 12, 2000, PDI identified the omission of the length sizing tolerance in Paragraph 10 CFR 50.55a(b)(2)(xv)(C)(1) of the rule. The staff agreed that the omission of the length sizing tolerance 0.75 inch RMS in the rule was an oversight, and the inclusion of depth sizing tolerance to Paragraph 3.2(b) of Supplement 4 to Appendix VIII was an error. The NRC staff will correct the error in an upcoming rule.

V. Alternative Examination(s)

In lieu of the length sizing requirements of ASME Section XI, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 4, Subparagraph 3.2(b), a length sizing qualification tolerance of 0.75 inch RMS will be used.

VI. Implementation Schedule

This relief request is intended to be utilized in PNPP's next refueling outage (Refuel Outage 8) through the remainder of PNPP's second 10-Year inspection interval (November 18, 1998 – November 17, 2008).

References:

1. NRC Assessment of the PDI Program, Jack R. Strosnider, Chief Materials and Chemical Engineering Branch, to Bruce J. Sheffel, Chairman, PDI, March 6, 1996, Table 2, Item 94-005, p34.

2. Meeting Summary, Teleconference between NRC and representatives from PDI, D. G. Naujock, Metallurgist, NDE & Metallurgy Section, to Edmund J. Sullivan, Chief NDE & Metallurgy Section, Chemical Engineering Branch, Division of Engineering, U.S. NRC, March 6, 2000.

RELIEF REQUEST No. IR-047

I. Identification of Components

All of PNPP's Examination Category B-D, Item B3.90, Reactor Vessel Nozzle-to-Vessel Welds (33 Total).

II. ASME B&PV Section XI Requirements

Rules for Inservice Inspection of Nuclear Power Plant Components, Section XI, 1989 Edition, Examination Category B-D Full Penetration Welds of Nozzles in Vessels. Code Item B3.90, Figure IWB-2500-7 (a) & (b).

ASME Section V, 1989 Edition, Article 4, Paragraphs: T-441.3.2.5 Angle Beam Scanning, T-3.2.6 Scanning for Reflectors Oriented Parallel to the Weld, and T-441.3.2.7 Scanning for Reflectors Oriented Transverse to the Weld.

III. Relief Request

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested to use the alternative examination volume requirements of Code Case N-613, Figures 1 and 2, in lieu of the requirements of ASME Section XI Figures IWB-2500-7 (a) and IWB-2500-7 (b). The PNPP also requests to use Code Case N-613's technique (i.e., scanning orientation) requirements, in combination with implementation of ASME XI, Appendix VIII, Supplement 7. This is in lieu of the requirements of ASME Section V, Article 4 for the performance of the required volumetric examinations as specified in Table IWB-2500-1 Category B-D of the 1989 Edition of ASME Section XI.

IV. Basis for Relief

Inservice examination of selected welds is currently performed in accordance with the requirements of 10 CFR 50.55a, plant Technical Specifications, and the 1989 Edition of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for In-Service Inspection of Nuclear Power Plant Components. This Code edition invokes the examination volume requirements of Figures IWB-2500-7 (a) and IWB-2500-7 (b). This Code edition also invokes the examination requirements of Appendix I, Article I-2000, which reference ASME Section V, Article 4 that essentially prescribes the use of a twenty (20) year old examination methodology. The required examinations will be performed using procedures qualified in accordance with ASME Code, Section XI, Div. 1, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 7. This will provide added assurance that the welds have remained free of service related flaws thus enhancing quality and ensuring plant safety and reliability.

The examination volume for the Reactor Vessel pressure retaining nozzle-to-vessel welds extends far beyond the weld into the base metal and is unnecessarily large. This results in significantly increased examination times. As the area being examined is a base metal region, which is not prone to in-service cracking and that was extensively examined before the vessel was put into service and during PNPP's first 10-year inspection interval, it also results in no measurable increase in safety.

Code Case N-613 reduces the examination volume adjacent to the widest part of the weld from half of the vessel wall thickness to one-half (1/2) inch. This removes examination of base metal that was extensively examined during construction and preservice inspection and that is not in the high residual stress region associated with the weld. Cracks, should they initiate, occur in the high-stressed areas of the weld. These high-stressed areas are contained in the volume that is defined by Code Case N-613 and are subject to examination. Code Case N-613 also deletes the requirement to detect flaws perpendicular to the weld-base metal interface on the grounds that flaws never occur as a result of the welding process. Furthermore, the likelihood of inservice cracking with this orientation in these regions is very low, having never been observed.

Implementation of Code Case N-613 is expected to reduce on-vessel examination time by as much as 8 hours for each nozzle-to-vessel weld examination. Most of the PNPP's nozzle-to-vessel welds are within the biological shield wall with dose rates in the vicinity of the nozzles ranging from 100 milli-REM to over 1 REM per hour. Thus, over the course of a 10-year inspection interval, use of Code Case N-613 is expected to reduce personnel radiation exposure by as much as 10 REM.

V. Alternative Examination(s)

1. Perform examinations in accordance with Code Case N-613

2. Perform examinations in accordance with ASME Code, Section XI, Div. 1, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 7.

VI. Implementation Schedule

This relief request is intended to be utilized in PNPP's next refueling outage (Refuel Outage 8) and through the remainder of PNPP's second 10-Year inspection interval (November 18, 1998 – November 17, 2008).

RELIEF REQUEST No. IR-048

I. Identification of Components

All components subject to ultrasonic examination in accordance with the 1995 Edition and 1996 Addenda of ASME Section XI, Appendix VIII.

II. ASME B&PV Section XI Requirements

The 1995 Edition and 1996 Addenda of ASME Section XI, Subsubarticle VII-4240 requires a minimum of 10 hours of annual training.

10 CFR 50.55a(b)(2)(xiv) requires that all personnel qualified for performing ultrasonic examinations in accordance with Appendix VIII shall receive 8 hours of annual hands-on training on specimens that contain cracks. This training must be completed no earlier than 6 months prior to performing ultrasonic examinations at a licensee's facility.

III. Relief Request

Relief is requested in accordance with 10 CFR 50.55a(a)(3)(i) from the requirements of Subsubarticle VII-4240, Annual Training.

IV. Basis for Relief

10 CFR 50.55a was amended in the Federal Register (Volume 64, No. 183 dated September 22, 1999) to require the 1995 Edition, with the 1996 Addenda of Section XI for Appendix VIII qualification requirements. This also imposes the requirements of Appendix VII of the 1995 Edition, with 1996 Addenda of Section XI. This includes Subarticle VII-4240, which requires a minimum of 10 hours of annual training.

10 CFR 50.55a(b)(2)(xiv) requires that all personnel qualified for performing ultrasonic examinations in accordance with Appendix VIII shall receive 8 hours of annual hands-on training on specimens that contain cracks. This training must be completed no earlier than 6 months prior to performing ultrasonic examinations at a licensee's facility.

Paragraph 2.4.1.1.1 in the Federal Register contains the following statement,

"The NRC had determined that this requirement (10 hours of training on an annual basis) was inadequate for two reasons. The first reason was that the training does not require laboratory work and examination of flawed specimens. Signals can be difficult to interpret and, as detailed in the regulatory analysis for this rulemaking, experience and studies indicate that the examiner must practice on a frequent basis to maintain the capability for proper interpretation. The second reason is related to the length of training and its frequency. Studies have shown that an examiner's capability begins to diminish within approximately 6 months if skills are not maintained. Thus, the NRC had determined that 10 hours of annual training is not sufficient practice to maintain skills, and that an examiner must practice on a more frequent basis to maintain proper skill level.

The PDI program has adopted a requirement for 8 hours of training, but it is required to be hands-on practice. In addition, the training must be taken no earlier than 6 months prior to performing examinations at a licensee's facility. PDI believes that 8 hours will be acceptable relative to an examiner's abilities in this highly specialized skill area because personnel can gain knowledge of new developments, material failure modes, and other pertinent technical topics through other means. Thus, the NRC has decided to adopt in the Final Rule the PDI position on this matter. These changes are reflected in § 50.55a(b)(2)(xiv)".

Implementation of the requirements contained in ASME Section XI and the Final Rule will result in redundant systems. Use of the Final Rule requirements in lieu of the ASME Section XI annual training requirements will simplify record keeping, satisfy the need for maintaining skills, and provide an acceptable level of safety.

V. Alternative Examination(s)

Annual ultrasonic training shall be conducted in accordance with 10 CFR 50.55a(b)(2)(xiv) in lieu of Section XI, Appendix VII, Paragraph VII-4240.

VI. Implementation Schedule

This relief request is intended to be utilized in PNPP's next refueling outage (Refuel Outage 8) and through the remainder of PNPP's second 10-Year inspection interval (November 18, 1998 – November 17, 2008).