



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 12, 2012

Vice President, Operations
Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES - RELIEF FROM THE REQUIREMENTS OF THE ASME CODE
FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL
(TAC NO. ME6150)

Dear Sir:

By letter dated May 3, 2011 (Agencywide Documents Access and Management System, Entergy Nuclear Operations, Inc. (ENO)(the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for relief from American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Subsection IWA-2232, for ultrasonic examination of the reactor pressure vessel flange to upper shell weld. As an alternative, ENO proposed to use ASME Code, Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems."

The NRC staff concludes that the proposed alternative will provide equivalent or better examination results than those realized from the ASME Code, Section V requirements and, accordingly, will provide an acceptable level of quality and safety. Therefore, pursuant to Title 10 *Code of Federal Regulations* Section 50.55a(a)(3)(i), the NRC staff authorizes the proposed alternative for the examination of the subject welds for the third Inservice Inspection interval at Palisades Nuclear Plant.

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All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in this relief request remain applicable, including third party review by the Authorized Nuclear Inservice Inspector. If you have any questions, please contact the Project Manager, Mahesh Chawla at 301-415-8371 or via e-mail at Mahesh.chawla@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "Shawn Williams". The signature is written in a cursive style with a long horizontal flourish at the end.

Shawn Williams, Acting Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure: Safety Evaluation

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL RELIEF REQUEST

PALISADES NUCLEAR PLANT

ENTERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-255

1.0 INTRODUCTION

By letter dated May 3, 2011 (Agencywide Documents Access and Management System accession number ML111230697), Entergy Nuclear Operations, Inc. (ENO) (the licensee) submitted a Relief Request to the Nuclear Regulatory Commission (NRC) concerning the reactor vessel shell-to-flange-weld examination applicable to the Palisades Nuclear Plant (PNP) for the third 10-year inservice inspection (ISI) interval. The applicable 1989 Edition of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) requires ultrasonic examination of the weld in accordance with the Section V, Article 4, via Section XI, Appendix I. In lieu of this, the licensee has proposed an alternative to perform the ultrasonic examination of the weld with equipment, procedures, and personnel qualified to the requirements of the Section XI, Appendix VIII, supplements 4 and 6, 1995 Edition through 1996 Addenda of the ASME Code, as amended by Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a.

2.0 REGULATORY EVALUATION

The 10 CFR 50.55a(g) specifies that ISI of nuclear power plant components shall be performed in accordance with the requirements of the ASME Code, Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The 10 CFR 50.55a(g)(6)(i) states that the Commission may grant such relief and may impose such alternative requirements as it determines is authorized by law, and will not endanger life or property or the common defense and security and is otherwise in the public interest, given the consideration of the burden upon the licensee. The 10 CFR 50.55a(a)(3) states that 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. The 10 CFR 50.55a(g)(5)(iii) states that if the licensee has determined that conformance with certain code requirements is impractical for its facility, the licensee shall notify the Commission and submit, as specified in §50.4, information to support the determinations.

Enclosure

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 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 ISI 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) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein.

3.0 TECHNICAL EVALUATION

3.1 Licensee Evaluation

Components for Which Relief is Requested

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-A, Item B1.30, reactor pressure vessel (RPV) shell-to-flange weld.

ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-A, Item B1.30, requires essentially 100 percent volumetric examination, as defined by ASME Code, Section XI, Figure IWB-2500-4, "Essentially 100%." The 1989 Edition of the ASME Code, Section XI, Subsection IWA-2232, requires ultrasonic test (UT) examination of the RPV shell-to-flange weld to be in accordance with ASME Code, Section V, Article 4, via by Appendix I of Section XI (subsubarticle I-2120).

Licensee's Request for Relief (As Stated by the Licensee)

[The licensee] is requesting relief from the requirements of the ASME Code, Section XI, Subsection IWA-2232. The relief would allow [the licensee] to implement an alternative to the ASME Code, Section V, Article 4, for volumetric weld examinations performed inside the PNP [RPV]

Licensee's Proposed Alternative Examination

The licensee proposes to follow the requirements of the 1995 Edition through 1996 Addenda of the ASME Code, Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," Supplements 4 and 6 as amended by 10 CFR 50.55a for examining subject weld. This would supersede the use of the requirements of the 1989 Edition ASME Code, Section V, Article 4 as amended by 10 CFR 50.55a. The examinations performed using the alternative would be credited to the extended third ten-year ISI interval ending on December 12, 2015, as noted in the submittal.

3.2 NRC Staff Evaluation

The ASME Code requires that ultrasonic examination of shell-to-flange welds in vessels greater than 2 inches in thickness be conducted in accordance with Article 4 of the ASME Code, Section V, as supplemented by requirements in Table I-2000-1. ASME Code, Section V, Article 4 provides a prescriptive process for qualifying UT procedures and performing examinations. The licensee instead proposes to use procedures and personnel qualified in accordance with performance-based criteria listed in the 1995 Edition through 1996 Addenda of the ASME Code, Section XI, Appendix VIII, Supplements 4 and 6 as implemented by the industry's Performance Demonstration Initiative (PDI) program. These performance-based methods are currently required by 10 CFR 50.55a for examination of all other RPV shell welds (having replaced the Article 4 techniques). Amplitude-based examination techniques such as the prescriptive UT procedures that comply with the requirements of Article 4 of ASME Code, Section V, are based on the amplitude of the returned signal and correlating that amplitude with an equivalent machined reflector such as a notch or a side-drilled hole. However, correlation between defect size and amplitude has been poor. This is not unexpected given the number of variables associated with the material, equipment and defect itself. The material has potential velocity and microstructure variations, and the equipment has potential amplitude variations due to the type of pulser, frequency band, cabling, and other inherent electrical parameters. Perhaps the biggest variable is the defect itself. Ultrasonic examination is highly sensitive to defect orientation. Also, roughness, curvature, and location play a role in the ability to detect and size defects.

When prescriptive UT procedures that comply with the requirements of Article 4 of ASME Code, Section V, were used in round robin tests containing real flaws in RPV mockups, and the results statistically analyzed according to the screening criteria of ASME Code, Section XI, Appendix VIII, the procedures proved to be less effective than examinations that utilize Appendix VIII, Supplements 4 and 6, qualified procedures. Performance-based UT is generally applied with higher sensitivity, which increases the probability of detecting a flaw when compared to prescriptive Section V, Article 4 requirements. Procedures, equipment, and personnel qualified through the PDI program have demonstrated their skill level in detecting flaws common to nuclear power plants and have shown high probability of detection levels. This has resulted in an increased reliability of inspections for weld configurations subject to the requirements of Appendix VIII.

The NRC staff concludes that the use of UT procedures and personnel qualified to the 1995 Edition through 1996 Addenda of Section XI of the ASME Code, Appendix VIII, Supplement 4 and 6, as modified by 10 CFR 50.55a(b)(2)(xv) by demonstration through the PDI program for the RPV shell-to-flange weld, provides equivalent or better examination results than those obtained from ASME Code, Section V requirements. Therefore, based on the above analysis, the staff concludes that an acceptable level of quality and safety will be maintained when using the licensee's proposed alternative examination.

4.0 CONCLUSION

The NRC staff concludes that the proposed alternative with PDI qualified procedures and personnel applied from the RPV vessel side of the weld along with the improved capabilities as discussed above will provide equivalent or better examination results than those realized from the ASME Code, Section V requirements and, accordingly, will provide an acceptable level of

quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the proposed alternative for the examination of the subject welds for the third ISI interval at PNP. All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in this relief request remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Dan Widrevitz

Date: March 12, 2012

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in this relief request remain applicable, including third party review by the Authorized Nuclear Inservice Inspector. If you have any questions, please contact the Project Manager, Mahesh Chawla at 301-415-8371 or via e-mail at Mahesh.chawla@nrc.gov.

Sincerely,

/RA/

Shawn Williams, Acting Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure: Safety Evaluation

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