



FirstEnergy Nuclear Operating Company

Perry Nuclear Power Plant
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September 7, 2018
L-18-186

10 CFR 50.55a

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT:
Perry Nuclear Power Plant
Docket No. 50-440, License No. NPF-58
Proposed Alternative to Use ASME Code Case N-831

In accordance with the provisions of 10 CFR 50.55a(z)(1), FirstEnergy Nuclear Operating Company (FENOC) hereby requests Nuclear Regulatory Commission (NRC) approval of a proposed alternative to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," for use at the Perry Nuclear Power Plant (PNPP).

FENOC requests approval to use ASME Code Case N-831, "Ultrasonic Examination in Lieu of Radiography for Welds in Ferritic Pipe, Section XI, Division 1." The proposed alternative IR-061, Revision 0, would provide an acceptable level of quality and safety, and is described in detail in the Enclosure.

FENOC requests approval of the proposed alternative by February 28, 2019 to permit implementation during the seventeenth PNPP maintenance and refueling outage scheduled to begin in March 2019.

There are no regulatory commitments contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Phil H. Lashley, Acting Manager - Nuclear Licensing and Regulatory Affairs, at 330-315-6808.

Sincerely,

David B. Hamilton

Enclosure: Perry Nuclear Power Plant 10 CFR 50.55a Request IR-061, Revision 0

cc: NRC Region III Administrator
NRC Resident Inspector
NRC Project Manager

L-18-186
Enclosure

Perry Nuclear Power Plant
10 CFR 50.55a Request IR-061, Revision 0
(4 pages follow)

**Proposed Alternative
in Accordance With 10 CFR 50.55a(z)(1)**

--Alternative Provides Acceptable Level of Quality and Safety--

1. ASME Code Components Affected

American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Class 1, 2, and 3 ferritic piping repair and replacement welds

2. Applicable Code Edition and Addenda

The applicable ASME Code, Section XI, edition and addenda are specified below:

- 2001 Edition through 2003 Addenda, for the Perry Nuclear Power Plant (PNPP) third inservice inspection (ISI) interval
- 2013 Edition for the fourth PNPP ISI interval

3. Applicable Code Requirements

Paragraph IWA-4221 of the 2001 Edition through 2003 Addenda and the 2013 Edition of Section XI requires the owner to meet the applicable Owner's Requirements and Construction Code requirements when performing repair and replacement activities.

Paragraph IWA-4520 of the 2001 Edition through 2003 Addenda and the 2013 Edition of Section XI requires that welding or brazing areas and welded joints made for fabrication or installation of items be examined in accordance with the Construction Code identified in the Repair/Replacement Plan with certain specified exceptions. The examination requirements for ASME Section III welds are contained in the ASME Code, Section III, subarticles NB-5200, NC-5200, and ND-5200.

10 CFR 50.55a(b)(2)(xx)(B), "System leakage tests: Second provision," requires that:

The NDE provision in IWA-4540(a)(2) of the 2002 Addenda of Section XI must be applied when performing system leakage tests after repair and replacement activities performed by welding or brazing on a pressure retaining boundary using the 2003 Addenda

through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section.

Paragraph IWA-4540(a)(2) of the 2002 Addenda of ASME Section XI requires, in part, that the nondestructive examination method and acceptance criteria of the 1992 Edition or later of Section III be met prior to return to service.

4. Reason for Request

FirstEnergy Nuclear Operating Company (FENOC) periodically replaces piping in support of the Flow Accelerated Corrosion program as well as other repair and replacement activities. The use of encoded phased array ultrasonic examination techniques (PAUT) in lieu of radiographic testing (RT) to perform the required examinations of the replaced welds would eliminate the safety risk associated with performing RT, which includes the planned exposure and the potential for accidental personnel exposure. PAUT minimizes the impact on other outage activities normally involved with performing RT such as limited access to work locations and the need to control system fluid fill status. RT requires piping to remain fluid empty for adequate examination sensitivity and resolution. In addition, encoded PAUT is equivalent or superior to the code-required RT for ASME ferritic piping repair and replacement welds for detecting and sizing critical (planar) flaws, such as cracks and lack of fusion (Reference 1). PAUT provides sizing capabilities for both depth and length dimensions of a flaw, which are required to apply the acceptance criteria of the applicable code case. RT does not provide depth sizing capabilities.

The provisions in paragraphs IWA-4520(b)(2) and IWA-4521 of the 2008 Addenda through the latest edition allowing the substitution of ultrasonic examination for radiographic examination specified in the Construction Code are not approved per 10 CFR 50.55a(b)(2)(xix).

In accordance with 10 CFR 50.55a(z)(1), relief is therefore requested on the basis that the proposed alternative to use PAUT in lieu of RT for ferritic piping repair and replacement weld examinations will provide an acceptable level of quality and safety.

5. Proposed Alternative and Basis for Use

FENOC is proposing to perform encoded PAUT examination techniques in accordance with ASME Code Case N-831 (Reference 2) in lieu of the ASME code-required RT for Class 1, 2, and 3 ferritic piping repair and replacement

welds specified in Section XI paragraphs IWA-4221, IWA-4520, IWA-4540(a)(2), and Section III subarticles NB-5200, NC-5200, and ND-5200.

Similar techniques are being used throughout the nuclear industry for examination of dissimilar metal welds, overlaid welds, and other applications including ASME B31.1 piping replacements. In Reference 1, the NRC has recognized that PAUT provides an equally effective examination for identifying the presence of fabrication flaws in carbon steel welds to that of radiography.

Encoded PAUT is equivalent or superior to RT for detecting and sizing critical (planar) flaws. In this regard, the basis for the proposed alternative was developed from numerous codes, code cases, associated industry experience, articles, and the results of RT and encoded PAUT examinations. The examination procedure and personnel performing examinations are qualified using representative piping conditions and flaws that demonstrate the ability to detect and size flaws that are both acceptable and unacceptable to the defined acceptance standards. The demonstrated ability of the examination procedure and personnel to appropriately detect and size flaws provides an acceptable level of quality and safety.

6. Duration of Proposed Alternative

The proposed alternative is requested for the following inservice inspection intervals:

- The PNPP third 10-year ISI interval that began on May 18, 2009 and is currently scheduled to end on May 17, 2019.
- The PNPP fourth 10-year ISI interval that is currently scheduled to begin on May 18, 2019 and end on May 17, 2029.

7. Precedent

The NRC approved a similar request to perform encoded PAUT examination techniques in accordance with the process defined in the ASME Code Case N-831 for the Millstone Power Station, North Anna Power Station, and the Surry Power Station in a January 24, 2018 NRC staff letter (Reference 3). FENOC's request IR-061, Revision 0, proposes using the same code case for Class 1, 2, and 3 ferritic piping repair and replacement weld examinations.

8. **References**

- 1) US NRC, NUREG/CR-7204, "Applying Ultrasonic Testing in Lieu of Radiography for Volumetric Examination of Carbon Steel Piping," ML15253A674.
- 2) ASME Boiler and Pressure Vessel Code, Code Case N-831, "Ultrasonic Examination in Lieu of Radiography for Welds in Ferritic Pipe," Section XI, Division 1. ASME Approval Date: October 20, 2016.
- 3) Letter from M. Markley (U.S. NRC) to D. Stoddard (Dominion Nuclear Connecticut, Inc. and Virginia Electric and Power Company), "Millstone Power Station, Units 2 and 3; North Anna Power Station, Units 1 and 2; and Surry Power Station, Units 1 and 2; Proposed Alternative for the Use of Encoded Phased Array Ultrasonic Examination (CAC Nos. MF9923, MF9924, MF9925, MF 9926, MF9927, and MF9928; EPID L-2017-LLR-0060)," dated January 24, 2018, ML18019A195.