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AEP-NRC-2018-82
10 CFR 50.55a

Docket Nos.: 50-315
50-316

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

Donald C. Cook Nuclear Plant Units 1 and 2
Response to Request for Additional Information Regarding the Alternative Request for Elimination of the Reactor Pressure Vessel Threads in Flange Examination

References:

1. Letter from Q. S. Lies, Indiana Michigan Power Company (I&M), to U.S. Nuclear Regulatory Commission (NRC), "Donald C. Cook Nuclear Plant Units 1 and 2, Proposed Alternative Request for Elimination of the Reactor Pressure Vessel Threads in Flange Examination," dated June 14, 2018, Agencywide Documents Access and Management System Accession No. ML18169A148.

2. E-mail from A. W. Dietrich, NRC, to H. L. Levendosky, I&M, "D.C. Cook Units 1 and 2 - RAI for RPV Threads in Flange Alternative (EPID L-2018-LLR-0084)," dated November 8, 2018.

This letter provides Indiana Michigan Power Company's (I&M), licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, response to the Request for Additional Information (RAI) by the U. S. Nuclear Regulatory Commission (NRC) regarding an alternative request to the examination requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Examination Category B-G-1, "Pressure Retaining Bolting, Greater than 2 inches (50 mm) in Diameter," Item Number B6.40, Threads in Flange.

By Reference 1, I&M submitted a request to eliminate the volumetric examination requirements of Section XI of the ASME Code threads in the reactor pressure vessel flange for the remainder of the CNP fourth 10-year inservice inspection interval. By Reference 2, the NRC transmitted an RAI concerning the alternative request submitted by I&M in Reference 1. I&M is providing, as an enclosure to this letter, its response to the RAI contained in Reference 2.

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There are no new regulatory commitments made in this letter. Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Director, at (269) 466-2649.

Sincerely,

Quinton S. Lies

Q. Shane Lies
Site Vice President

BMC/kmh

Enclosure:

Response to Request for Additional Information Regarding the Alternative Request for Elimination of the Reactor Pressure Vessel Threads in Flange Examination

c: R. J. Ancona – MPSC
R. F. Kuntz, NRC, Washington D.C.
MDEQ – RMD/RPS
NRC Resident Inspector
K. S. West – NRC Region III
A. J. Williamson – Ft. Wayne AEP, w/o enclosure

Enclosure to AEP-NRC-2018-82

Response to Request for Additional Information Regarding the Alternative Request for Elimination of the Reactor Pressure Vessel Threads in Flange Examination

By letter dated June 14, 2018, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18169A148) (Reference 1), Indiana Michigan Power Company (I&M), licensee for Donald C. Cook Nuclear Plant Units 1 and 2, submitted an alternative request to the examination requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Examination Category B-G-1, "Pressure Retaining Bolting, Greater than 2 inches (50 mm) in Diameter," Item Number B6.40, Threads in Flange.

The U. S. Nuclear Regulatory Commission (NRC) staff is currently reviewing the submittal, and has determined that additional information is needed in order to complete the review. The requests for additional information (RAI)s and I&M's responses are provided below.

RAI-1

In the licensee's submittal, under "Flaw Tolerance Evaluation," the licensee states that a linear elastic fracture mechanics (LEFM) evaluation consistent with Subsection IWB-3500 of the ASME Code of Record was performed. Based on the NRC staff's evaluation, it appears that the licensee's LEFM evaluation was performed consistent with ASME Code Section XI, Appendix G, and Section 6.2.2 of EPRI Report No. 3002010354, dated December 2017.

Confirm that the licensee's LEFM evaluation was performed consistent with ASME Code Section XI, Appendix G, or provide specifics related to how the LEFM evaluation was performed.

I&M Response to RAI-1

I&M confirms that the LEFM evaluation in Reference 1 was performed consistent with Appendix G of ASME Code Section XI (Reference 2) and Section 6.2.2 of EPRI Report No. 3002010354, "Reactor Pressure Vessel (RPV) Threads in Flange Examination Requirements," (Reference 3).

RAI-2

In the licensee's submittal, under "Flaw Tolerance Evaluation," the licensee states that the allowable stress intensity factor (K) for preload is 27.5 ksi√in (kilopound per square inch square root inches), based on an ASME Code derived K_{IC} (lower bound fracture toughness) of 53.9 ksi√in and a safety factor of 2. NRC staff calculated an allowable K of 27.0 ksi√in based on an ASME Code derived K_{IC} of 53.9 ksi√in and a safety factor of 2.

Explain the calculation of allowable K for preload.

I&M Response to RAI-2

In developing the response to this request, I&M performed a review of EPRI Report 3002010354 (Reference 3), which formed the basis for the calculation of allowable K for preload. Based on discussion with the principal investigators of the EPRI Report, the fracture toughness for the flange at $(T\text{-}RT_{NDT})$ at 0°F was calculated correctly as 53.9 ksi$\sqrt{\text{in}}$, but an error was found in the application of the safety factor to the fracture toughness of the flange. This error was carried over into Reference 1. The allowable stress intensity factor at preload should be 27.0 ksi$\sqrt{\text{in}}$. This value remains greater than the maximum K values for preload conditions summarized in Table 2 of the enclosure to Reference 1.

References:

1. Letter from Q. S. Lies, Indiana Michigan Power Company, to U.S. Nuclear Regulatory Commission, "Donald C. Cook Nuclear Plant Unit 1 and Unit 2, Proposed Alternative Request for Elimination of the Reactor Pressure Vessel Threads in Flange Examination," dated June 14, 2018, ADAMS Accession No. ML18169A148.

2. ASME Boiler and Pressure Vessel Code, Section XI, 2004 Edition, no Addenda.

3. Reactor Pressure Vessel (RPV) Threads in Flange Examination Requirements, EPRI, Palo Alto, CA: 2017. 3002010354.