Entergy

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PNP 2015-023

April 1, 2015

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

SUBJECT: Response to Second Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528)

Palisades Nuclear Plant
Docket No. 50-255
Renewed Facility Operating License No. DPR-20

REFERENCES:

1. Entergy Nuclear Operations, Inc. letter PNP 2014-049, *License Amendment Request to Implement 10 CFR 50.61a, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events,"* dated July 29, 2014 (ADAMS Accession Package No. ML14211A520).
2. NRC letter, *Palisades Nuclear Plant – Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528),* dated January 20, 2015 (ADAMS Accession No. ML15016A184).
3. Entergy Nuclear Operations, Inc. letter PNP 2015-004, *Response to Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528)*, dated February 13, 2015 (ADAMS Accession No. ML15050A259).
4. NRC letter, *Palisades Nuclear Plant – Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528)*, dated March 19, 2015 (ADAMS Accession No. ML15072A254).

Dear Sir or Madam:

In Reference 1, Entergy Nuclear Operations, Inc. (ENO) submitted a license amendment request for the Palisades Nuclear Plant renewed facility operating license pursuant to 10 CFR 50.61a(c) and 10 CFR 50.90. The proposed amendment would authorize the implementation of 10 CFR 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," in lieu of 10 CFR 50.61, "Fracture toughness requirements for protection against pressurized thermal shock events."

In Reference 2, ENO received a request for additional information (RAI) concerning the license amendment request. ENO responded to the RAI in Reference 3.

In Reference 4, ENO received a second RAI concerning the license amendment request.

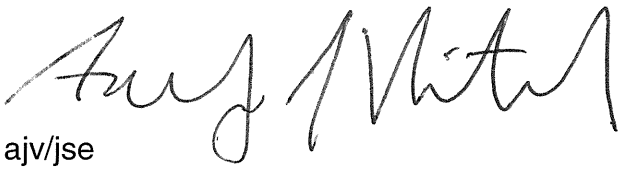
The ENO response to the second RAI is provided in the attachment.

This letter identifies no new commitments and no revisions to existing commitments.

In accordance with 10 CFR 50.91(b), a copy of this application, with the attachment, is being provided to the designated State of Michigan official.

I declare under penalty of perjury that the foregoing is true and correct. Executed on April 1, 2015.

Sincerely,



ajv/jse

Attachment: Response to Second Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a

cc: Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC
State of Michigan

Attachment

Response to Second Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a

By letter dated July 29, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML 14211A520), Entergy Nuclear Operations, Inc. (ENO) submitted a license amendment request (LAR) for Palisades Nuclear Plant (PNP) to implement Title 10 of the Code *of Federal Regulations* (10 CFR) 50.61a, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock (PTS}," also referred to as the alternate PTS rule. PNP is expected to exceed the screening criteria of the PTS rule (10 CFR 50.61) in August 2017, prior to the expiration of its extended operating license (2031). Compliance with the requirements of 10 CFR 50.61a may be met as an alternative to 10 CFR 50.61.

By letter dated January 20, 2015, the Nuclear Regulatory Commission (NRC) issued a request for additional information (RAI) concerning the amendment application (ADAMS Accession No. ML15016A184). ENO responded to the RAI on February 13, 2015 (ADAMS Accession No. ML15050A259).

The NRC issued a second RAI on March 19, 2015 (ADAMS Accession No. ML15072A254).

The ENO response to the second RAI is provided below

1. NRC Information Request – RAI 2-1

In response to RAI 2b of the letter dated February 13, 2015, ENO pointed to WCAP-15353-Supplement 2 – NP, Revision 0, "Palisades Reactor Pressure Vessel Fluence Evaluation," dated July 2011 and provided a summary from WCAP-15353-Supplement 2-NP, Revision 0 as to how the spatial distribution of neutron fluence was calculated, along with a revised Figure 4-1, "Identification and Location of Beltline Region Materials for the Palisades Reactor Vessel" to orient the axial locations of the active fuel and the azimuthal locations of the peak fluence. In the response to RAI 2c, ENO provided neutron flux and fluence values for the limiting material/region, which is the intermediate shell longitudinal weld made with Heat No. W5214.

In reviewing the responses, the staff noted that the flux values in the response to RAI 2c match those for the 60° azimuth in Table 2.2-3 of WCAP-15353-Supplement 2-NP, Revision 0. In the revised Figure 4-1 there is no intermediate shell longitudinal weld at the 60° azimuth. With further staff review of the previously approved PTS evaluations from 2000 and 2010, including WCAP-15353, Revision 0, "Palisades Reactor Pressure Vessel Neutron Fluence Evaluation" dated January 2000 and WCAP-15353-NP, Revision 0, Supplement 1, "Palisades Reactor Pressure Vessel Fluence Evaluation" (ADAMS Accession Nos. ML003686582 and ML110060695, respectively), the staff notes that there is mention of the limiting intermediate shell longitudinal weld at the 60° azimuth, indicating that there was a change in the azimuthal coordinate system for the welds that was not

explicitly described. Based on the RAI responses dated February 13, 2015, and past PTS evaluations, the NRC staff requests further clarification on the responses to RAIs 2b and 2c related to the frame of reference for the azimuthal locations of peak fluence and the axial welds. The NRC staff requests that the change in the azimuthal coordinate system for the welds be provided (e.g. by an additional revision to Figure 4-1) to illustrate the azimuthal variation of projected fluence values after 42.1 EFPY of operation. The visualization of how the fluence varies by azimuthal position and how that fluence distribution compares with the location of the vessel shell longitudinal welds should provide an unambiguous representation of the extended beltline region (e.g. a visual display of the information from Table 8-1, "RT_{MAX-AW} Calculation Results for Palisades at 42.1 EFPY" in the LAR).

ENO Response to RAI 2-1

The azimuthal coordinate system shown in Figure 4-1 in the RAI response dated February 13, 2015 pertains to a reactor design azimuthal coordinate system which differs from the azimuthal coordinate system used in the fluence evaluation. The fluence evaluation used a quadrant model of the reactor to evaluate reactor neutron exposure, as shown in Figure 2.1-1, "Palisades r,θ Reactor Geometry," of WCAP-15353-Supplement 2-NP, Revision 0. In this quadrant model of the reactor, the range of the azimuthal coordinate system extends from 0 degrees to 90 degrees, and is offset from the reactor design coordinate system by 90 degrees. For example, longitudinal welds 1-112A and 3-112A shown at 90 degrees in Figure 4-1, which depicts the reactor design azimuthal coordinate system, are oriented at 0 degrees in the fluence evaluation azimuthal coordinate system, and longitudinal weld 2-112C, which is shown at 150 degrees in Figure 4-1, is located at 60 degrees in the fluence evaluation azimuthal coordinate system.

A revised Figure 4-1 is provided below to clarify the location of reactor vessel materials within the azimuthal coordinate system used in the reactor quadrant model in the fluence evaluation. In this revised figure, the azimuthal coordinate system used in the fluence evaluation is shown in bold, as described in Note 4 in the figure.

Table 8-1, "RT_{MAX-AW} Calculation Results for Palisades at 42.1 EFPY," in WCAP-17628-NP, Revision 1, "Alternate Pressurized Thermal Shock (PTS) Rule Evaluation for Palisades," dated June 2014, provides calculated RT_{MAX-AW} values for the reactor vessel beltline and extended beltline welds. In this table, the maximum fluence calculated for any of the upper shell longitudinal welds, 0.09707×10^{19} n/cm^2, was applied to all of the upper shell longitudinal welds. Likewise, the maximum fluence calculated for any of the intermediate and lower shell longitudinal welds, 2.161×10^{19} n/cm^2, was applied to all of the intermediate and lower shell longitudinal welds. The maximum fluence for all longitudinal welds occurs at 60 degrees in the fluence evaluation azimuthal coordinate system.

Figure 4-1 Identification and Location of Beltline Region Materials for the Palisades Reactor Vessel [3]

Notes:

1. 117.94" corresponds to the upper extent of the extended beltline region. See Table 4-2 for references used to determine this location.

2. 310.86" corresponds to the lower extent of the extended beltline region. See Table 4-2 for references used to determine this location.

3. Map is not drawn to scale. Numbers in parentheses correspond to "No." column in Table 4-1. Dimensions are measured downward from the RV flange surface.

4. The azimuthal coordinate system used in the quadrant model of the reactor in the fluence evaluation is shown in bold and extends from 0 degrees to 90 degrees. The fluence evaluation is documented in WCAP 15353-Supplement 2 – NP, Revision 0.