

September 16, 2019

L-PI-19-037
10 CFR 50.55a

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

Prairie Island Nuclear Generating Plant, Units 1 and 2
Docket Nos. 50-282 and 50-306
Renewed Facility Operating License Nos. DPR-42 and DPR-60

Response to Request for Additional Information: 10 CFR 50.55a Requests Nos. 1-RR-5-10 and 2-RR-5-10, Proposed Alternative to Reactor Vessel Inservice Inspection (ISI) Intervals for Prairie Island Unit 1 and Unit 2 (EPID: L-2019-LLR-0055)

- References:
- 1) Letter (L-PI-19-002) from NSPM to the NRC, "10 CFR 50.55a Requests Nos. 1-RR-5-10 and 2-RR-5-10, Proposed Alternative to Reactor Vessel Inservice Inspection (ISI) Intervals for Prairie Island Unit 1 and Unit 2", dated June 13, 2019 (ADAMS Accession No. ML19164A166)
 - 2) Email from the NRC to NSPM, "Request for Additional Information RE: Prairie Island Relief Requests 1-RR-10 and 2-RR-10", dated August 14, 2019 (ADAMS Accession No. ML19233A003)

In Reference 1, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), requested an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 2007 Edition through 2008 Addenda, for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2. Specifically, NSPM requested authorization to extend the Unit 1 and Unit 2 reactor pressure vessel inservice inspection (ISI) intervals via a relief request for Unit 1 (1-RR-5-10) and Unit 2 (2-RR-5-10).

The NRC identified the need for additional information and provided the Request for Additional Information (RAI) in Reference 2. The enclosure to this letter provides NSPM's response to the NRC RAI.

If there are any questions or if additional information is needed, please contact Mr. Jeff Kivi at 612-330-5788.

Summary of Commitments

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

A handwritten signature in black ink, appearing to read "Scott Sharp". The signature is fluid and cursive, with a large, sweeping "S" at the beginning and a long, horizontal stroke extending to the right.

Scott Sharp
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC

Response to Request for Additional Information

10 CFR 50.55a Requests Nos. 1-RR-5-10 and 2-RR-5-10, Proposed Alternative to Reactor Vessel Inservice Inspection (ISI) Intervals for Prairie Island Unit 1 and Unit 2

1.0 BACKGROUND

In Reference 1, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), requested an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 2007 Edition through 2008 Addenda for the Prairie Island Nuclear Generating Plant (PINGP) Units 1 and 2. Specifically, NSPM requested authorization to extend the Unit 1 and Unit 2 reactor pressure vessel inservice inspection (ISI) intervals via a relief request for Unit 1 (1-RR-5-10) and Unit 2 (2-RR-5-10).

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2.0 RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

NRC RAI-1

Tables 2 and 3 in Title 10 of Code of Federal Regulations Part 50.61a, "Alternative fracture toughness requirements for protection against pressurized thermal shock events" list maximum number of flaws depthwise for welds and plates (or forgings) of a generic RPV. However, Tables 2a and 2b of Alternative Requests 1-RR-5-10 and 2-RR-5-10 show different maximum number of weld and forging flaws for the PINGP, Units 1 and 2 RPV beltline, considering plant-specific RPV geometries. Please explain the differences and the manner in which the values in Tables 2a and 2b were derived (scaled).

NSPM Response to RAI-1

Table 2 in 10 CFR 50.61a provides the limiting maximum number of flaws in the inspection volume of welds. These are presented within various ranges of through-wall extent (TWE) from TWE_{MIN} to TWE_{MAX} in terms of flaws per 1000 inches of weld length.

In order to consider the actual plant-specific weld length, 10 CFR 50.61a(e)(1)(i) states:

The licensee shall determine the allowable number of weld flaws in the reactor vessel beltline by multiplying the values in Table 2 of this section by the total length of the reactor vessel beltline welds that were volumetrically inspected and dividing by 1000 inches of weld length.

For PINGP Units 1 and 2, the plant-specific weld length is 832 inches. Therefore, the number of flaw values from Table 2 of 10 CFR 50.61a are multiplied by 832 and divided by 1000 to determine the plant-specific allowable number of flaws within the weld material of the reactor vessel beltline as presented in Tables 2a and 2b of Reference 1. Table A, below, presents this in more detail and is provided for convenience:

| Through-Wall Extent TWE (inches) | | 10 CFR 50.61a maximum number of weld flaws per 1000 inches | Scaling Factor | Scaled maximum number of flaws |
|-------------------------------------|--------------------|--|-------------------|-----------------------------------|
| TWE _{MIN} | TWE _{MAX} | | | |
| 0 | 0.075 | No Limit | 0.832 | No limit |
| 0.075 | 0.475 | 166.70 | 0.832 | 139 |
| 0.125 | 0.475 | 90.80 | 0.832 | 76 |
| 0.175 | 0.475 | 22.82 | 0.832 | 19 |
| 0.225 | 0.475 | 8.66 | 0.832 | 8 |
| 0.275 | 0.475 | 4.01 | 0.832 | 4 |
| 0.325 | 0.475 | 3.01 | 0.832 | 3 |
| 0.375 | 0.475 | 1.49 | 0.832 | 2 |
| 0.425 | 0.475 | 1.00 | 0.832 | 1 |
| 0.475 | Infinite | 0.00 | 0.832 | 0 |

Table A – Plant-Specific Allowable Number of Flaws Within the Weld Material of the Reactor Vessel Beltline

Similarly, Table 3 in 10 CFR 50.61a provides the limiting maximum number of flaws in the inspection volume of the forging area. These are presented within various ranges from TWE_{MIN} to TWE_{MAX} in terms of flaws per 1000 square inches of total area.

In order to consider the actual plant-specific plate or forging area, 10 CFR 50.61a(e)(1)(ii) states:

The licensee shall determine the allowable number of plate or forging flaws in their reactor vessel beltline by multiplying the values in Table 3 of this section by the total surface area of the reactor vessel beltline plates or forgings that were volumetrically inspected and dividing by 1000 square inches.

For PINGP Units 1 and 2, the plant-specific total forging area in the reactor vessel beltline is 5565 square inches. Therefore, the number of flaw values from Table 3 of 10 CFR 50.61a are multiplied by 5565 and divided by 1000 to determine the plant-specific allowable number of flaws in the reactor vessel beltline forging material as presented in Tables 2a and 2b of Reference 1. Table B, below, presents this in more detail and is provided for convenience:

| Through-Wall Extent TWE (inches) | | 10 CFR 50.61a maximum number of forging area flaws per 1000 square inches | Scaling Factor | Scaled maximum number of flaws |
|-------------------------------------|--------------------|--|-------------------|-----------------------------------|
| TWE _{MIN} | TWE _{MAX} | | | |
| 0 | 0.075 | No Limit | 5.565 | No limit |
| 0.075 | 0.375 | 8.05 | 5.565 | 45 |
| 0.125 | 0.375 | 3.15 | 5.565 | 18 |
| 0.175 | 0.375 | 0.85 | 5.565 | 5 |
| 0.225 | 0.375 | 0.29 | 5.565 | 2 |
| 0.275 | 0.375 | 0.08 | 5.565 | 1 |
| 0.325 | 0.375 | 0.01 | 5.565 | 1 |
| 0.375 | Infinite | 0.00 | 5.565 | 0 |

Table B - Plant-Specific Allowable Number of Flaws Within the Reactor Vessel Beltline Forging Material

The plant-specific weld length and total forging area for both PINGP Unit 1 and Unit 2 is calculated based on the information provided in Table C, below:

| | |
|---|--------------------|
| Inside Diameter of Weld Inspection Volume | 132.39 inches |
| Reactor Vessel Base Metal Thickness | 6.69 inches |
| Number of Circumferential Welds | 2 |
| Circumferential Weld Length | 415.93 inches |
| Total Weld Length (in beltline) | 832 inches |
| Total Forging Area (in beltline) | 5565 square inches |

Table C – Plant-Specific Inspection Area Information

3.0 REFERENCES

1. Letter (L-PI-19-002) from NSPM to the NRC, “10 CFR 50.55a Requests Nos. 1-RR-5-10 and 2-RR-5-10, Proposed Alternative to Reactor Vessel Inservice Inspection (ISI) Intervals for Prairie Island Unit 1 and Unit 2”, dated June 13, 2019 (ADAMS Accession No. ML19164A166)
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