414 Nicollet Mall
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August 16, 2019

L-XE-19-007
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

Monticello Nuclear Generating Plant
Docket No. 50-263
Renewed Facility Operating License No. DPR-22

Proposed Alternative to Utilize ASME Code Case N-786-3, "Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping", and ASME Code Case N-789-3, "Alternative Requirements for Pad Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping for Raw Water Service"

Pursuant to 10 CFR 50.55a(z)(2), Northern States Power Company, a Minnesota Corporation (NSPM), doing business as Xcel Energy, is requesting proposed alternatives to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BP&V), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," for the Monticello Nuclear Generating Plant and the Prairie Island Nuclear Generating Plant.

Authorization is requested to apply the alternative requirements of ASME Code Case N-786-3, "Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping," in lieu of certain ASME BP&V Code, Section XI, Article IWA-4000 requirements. The reason for the proposed alternative is that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, as described in the enclosed request. The proposed alternative involves the use of permanent or temporary reinforcing sleeves in accordance with Code Case N-786-3 for mitigating degradation such as that from erosion, corrosion, cavitation, or pitting in Class 2 and Class 3 moderate-energy piping.

Authorization is also requested to apply the alternative requirements of ASME Code Case N-789-3, "Alternative Requirements for Pad Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping for Raw Water Service," in lieu of certain ASME BP&V Code, Section XI, Article IWA-4000 requirements. Use of the proposed alternative is based upon the hardship or unusual difficulty without a compensating increase in the level of quality or safety associated with performing a Code repair or replacement of degraded Class 2 and Class 3 moderate-energy carbon steel raw water piping, as described in the enclosed request.

The proposed alternative involves installation of temporary reinforcing pads in accordance with ASME Code Case N-789-3.

We request your review and approval of this multi-site request by September 10, 2020.

If you have any questions, please contact Mr. Rick Loeffler at (612) 342-8981.

Summary of Commitments

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

Martin C Murphy

Martin C. Murphy
Director, Nuclear Licensing and Regulatory Services
Northern States Power Company – Minnesota

Enclosures (2)

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

10 CFR 50.55a Request
Monticello Nuclear Generating Plant (MNGP) - RR-013
Prairie Island Nuclear Generating Plant (PINGP) - 1-RR-5-11 and 2-RR-5-11

Request to Use ASME Code Case N-786-3
in Accordance with 10 CFR 50.55a(z)(2)

1. ASME Code Component(s) Affected

All ASME Code Class 2 and 3 moderate-energy carbon steel piping systems. Moderate energy is defined as less than or equal to 200°F (93°C) and less than or equal to 275 psig (1.9 MPa) maximum operating conditions.

2. Applicable ASME Section XI Code Edition and Addenda

Plant	Interval	Edition	Start	End
MNGP	Fifth	2007 Edition through 2008 Addenda	September 1, 2012	May 31, 2022
PINGP Unit 1	Fifth	2007 Edition through 2008 Addenda	December 21, 2014	December 20, 2024
PINGP Unit 2	Fifth	2007 Edition through 2008 Addenda	December 21, 2014	December 20, 2024

3. Applicable Code Requirement

ASME Code, Section XI, Article IWA-4000 provides requirements for welding, brazing, defect removal, metal removal by thermal means, rerating, and removing, adding, and modifying items or systems.

4. Reason for Request:

Article IWA-4000 requires replacement or weld repair of wall thinning conditions resulting from degradation to be in accordance with NSPM's requirements and the original or later construction code. However, the repair and replacement provisions of IWA-4000 cannot always be utilized when degradation or leakage is identified during plant operations. Other NRC-approved alternative repair or evaluation methods, such as weld overlap, are not always practicable because of wall thinning and/or moisture issues.

One reason for this request is to permit installation of technically sound repairs to provide adequate time for evaluation, design, material procurement, planning and scheduling of an appropriate permanent repair or replacement of the defective piping considering the impact on system availability, maintenance rule applicability, and availability of replacement materials.

The other reason is to permit installation of long-term repairs in the form of full-structural Type B reinforcing sleeves for locally degraded portions of piping systems. The design, construction, and in-service monitoring of such sleeves provide a technically sound equivalent replacement for the segment of piping that is encompassed, comparable to or exceeding the level of quality and safety associated with a permanent ASME Code repair or replacement.

In either case without this repair option, compliance with the specified requirements of IWA-4000 could in some cases necessitate taking a system out of service, resulting in extended technical specification actions and higher risks associated with loss of safety system availability. In other cases, plant shutdown could be necessary, resulting in higher risks associated with an unnecessary plant transient and loss of safety system availability as compared to maintaining the plant online.

5. Proposed Alternative and Basis for Use

NSPM proposes, as an alternative to the requirements of the ASME Section XI Code referenced above, to implement the requirements of ASME Code Case N-786-3, "Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping", for repairs of degradation in moderate energy Class 2 and 3 piping systems resulting from mechanisms such as localized erosion, corrosion, cavitation, or pitting – but excluding conditions involving any form of cracking. These types of defects are typically identified by small leaks in the piping system or by pre-emptive non-code required examinations performed to monitor the degradation mechanisms.

The alternative repair technique described in Code Case N-786-3 involves the application of full encirclement sleeve halves welded together longitudinally by full penetration seam welds to reinforce structural integrity in the degraded area. Type A sleeves reinforce the degraded area but provide no pressure retaining function, as the ends are not welded to the pipe. Type B sleeves are welded to the pipe at each end to restore or maintain pressure integrity. In addition, Type B sleeve thickness and attachment welds may be sized to permit either partial transfer (i.e., "partial-structural sleeve") or full transfer (i.e., "full-structural sleeve") of the bending, axial and torsional loads from the pipe to the sleeve, replacing some or all dependence on the encompassed portion of piping for structural and pressure integrity. The appropriate repair technique will be utilized without flaw removal when

it is determined that the type of repair is suitable for the particular defect or degradation present.

This Code Case invokes the design requirements of Section III of the ASME Code. If an edition of Section III other than the construction code is applied, it will be reconciled with the construction code in accordance with ASME Section XI requirements and will have been accepted by the NRC in 10 CFR 50.55a. The Edition of ASME Section XI identified in Section 2 of this request will apply to the repairs.

The Code Case requires that the cause of the degradation be determined and that the extent and rate of degradation in the piping be evaluated to ensure that there are no other unacceptable locations within the surrounding area that could affect the integrity of the repaired piping. Any areas showing signs of degradation will be included in NSPM's plan for thickness monitoring of full-structural Type B reinforcing sleeves. The area of evaluation will be dependent on the degradation mechanism present but will extend at least $0.75\sqrt{Rt_{nom}}$ (where "R" and "t_{nom}" are the radius and nominal thickness of the pipe, respectively) beyond the edge of any sleeve attachment weld, as required by the Code Case. If the cause of the degradation is not determined, the maximum permitted service life of any reinforcing sleeve will be the time until the next refueling outage.

"Full-structural Type B" means the sleeve and attachment welds alone maintain full capability to withstand structural (mechanical) and pressure loading for which the piping is presently designed without need for additional support or reinforcement and without reliance on any of the piping that is encased by the sleeve. Type A and partial-structural Type B sleeves rely on the encased underlying piping to provide some structural (mechanical) and/or pressure retaining integrity.

Code Case N-786-3 imposes various compensatory measures to account for any uncertainties in the corrosion rates used for design, thus providing reasonable assurance that structural integrity and leakage integrity will be maintained. These include a requirement that the initial degradation rate selected for design shall be equal to or greater than two times the maximum rate observed at the location of the repair. If the degradation rate for that location is unknown, an initial degradation rate of four times the estimated maximum degradation rate for that or a similar system at the same plant site for the same degradation mechanism shall be applied. If both the degradation rate for that location and the cause of the degradation are not conclusively determined, an initial degradation rate of four times the maximum degradation rate observed for all degradation mechanisms for that system or a similar system at the same plant site shall be applied.

The Code Case limits the design life of Type A and partial-structural Type B sleeves to a maximum of one refueling cycle and requires that they be visually monitored for evidence of leakage at least monthly. In addition, the Code Case requires ongoing monitoring of full-structural Type B sleeves as follows: A baseline thickness

examination will be performed for completed full-structural Type B reinforcing sleeves, their attachment welds, and surrounding areas, followed by similar thickness monitoring at a minimum of every refueling outage after installation. The Code Case requires more frequent thickness monitoring inspections to be scheduled when warranted by the degradation rates calculated using reductions in thicknesses observed during these inspections, such that the required design thicknesses will be maintained at least until the subsequently scheduled thickness monitoring inspection. Sleeves shall be removed prior to the degradation infringing upon the design minimum wall thickness. For full-structural Type B sleeves on buried piping, provisions must be made for access during refueling outages in order to accomplish the required inspections.

Type A and partial-structural Type B reinforcing sleeves completely encompass the degraded areas, are designed to accommodate predicted maximum degradation, and must be removed no later than the next refueling outage regardless of when during a refuel cycle or inspection interval they were installed. If areas containing such sleeves are not accessible for direct observation, then monitoring will be accomplished by visual assessment of surrounding areas or ground surface areas above such sleeves on buried piping, or monitoring of leakage collection systems, if available.

Type B reinforcing sleeves may be applied to leaking systems by installing a gasket or sealant between the sleeve and the pipe as permitted by the Code Case, and then clamping the reinforcing sleeve halves to the piping prior to welding. The Code Case requires that any residual moisture be removed by heating prior to welding. If welding of any type of sleeve occurs on a wet surface, the maximum permitted life of the sleeve will be the time until the next refueling outage.

Where sleeves are applied to the outside of piping to mitigate externally corroded areas with potential for bulging under pressure, the Code Case requires the corrosion cavity to be restored to the original contour of the pipe with hardenable fill to minimize the gap beneath the sleeve. Paragraph 1(f) of the originally published Code Case erroneously indicates that sleeves may not be attached to flanges, however, this has been corrected by the errata to the Code Case. Where sleeves are applied adjacent to weld neck flanges, the attachment weld will be extended to the reinforcement on the neck of the flange.

If a buried piping system carrying radioactive fluid is repaired using this alternative, NSPM will monitor for radioactive fluid leakage in accordance with the standard plant monitoring practices for all buried piping containing radioactive fluids. NSPM is committed to implementation of Nuclear Energy Institute (NEI) 07-07, “Industry Ground Water Protection Initiative – Final Guidance Document,” (dated August 2007), in addition to monitoring in accordance with ASME Code Case N-786-3.

Based on the above, the use of Code Case N-786-3 for full-structural Type B reinforcing sleeves provides an acceptable level of quality and safety as an

alternative to the specified code requirements of ASME Section XI. The use of Code Case N-786-3 for Type A reinforcing sleeves and for partial-structural Type B reinforcing sleeves will apply when compliance with the specified code requirements of ASME Section XI would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Code Case N-786-3 was approved by the ASME Board on Nuclear Codes and Standards in April 2017. However, it has not been incorporated into NRC Regulatory Guide 1.147, “In-service Inspection Code Case Acceptability, ASME Section XI, Division 1,” and is therefore not available for application at domestic nuclear power plants without specific NRC approval.

6. Duration of Proposed Alternative

NSPM requests authorization to apply ASME Code Case N-786-3 for the duration of the inservice inspection interval defined in Section 2 of this request or until such time as the NRC approves ASME Code Case N-786-3 in Regulatory Guide 1.147.

7. Precedence

The following similar alternatives for ASME Code Case N-786 and ASME Code Cases N-786-1 have been previously approved by the NRC.

a) A request for application of ASME Code Case N-786 for thirteen Exelon nuclear power plants (a total of 22 units) was approved on July 31, 2014 (Reference 1).

b) A request for application of ASME Code Case N-786-1 was submitted by Entergy in August of 2015 (Reference 2). ASME Code Case N-786-1 was later approved for unconditional use in NRC Regulatory Guide 1.147, Revision 18.

8. References

1) Letter from NRC to Exelon Generations Company, LLC, “Braidwood, Units 1 and 2; Byron Station, Unit NOS. 1 and 2; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3; R.E. Ginna Nuclear Power Plant, LaSalle County Station, Units 1 and 2; Limerick Generating Station, Units 1 and 2; Nine Mile Point Nuclear Station, Units 1 and 2; Oyster Creek Nuclear Generations Station; Peach Bottom Atomic Power Station, Units 2, and 3; Quad Cities Nuclear Power Station, Units 1 and 2; and Three Mile Island Nuclear Station, Unit 1- Proposed Alternative to Utilize Code Case N-786, "Alternative Requirements For Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping Section XI, Division 1", dated July 31, 2014, (ADAMS Accession No. ML14175B593).

2) Letter from NRC to Entergy Operations Inc., “Arkansas Nuclear One, Units 1 and 2; Grand Gulf Nuclear Stations, Unit 1; James A. Fitzpatrick Nuclear Power Plant; Indian Point Energy Center, Units 2 and 3; Palisades Nuclear Plant; Pilgrim Nuclear Power Stations; River Bend Station, Unit 1; and Waterford Steam Electric Stations, Unit 3 – Relief Request RR-EN-15-2, Proposed Alternative to Use American Society of Mechanical Engineers Boiler and Pressure Vessel Code Case N-786-1 ‘Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping, Section XI, Division 1’," dated June 6, 2016, (ADAMS Accession No. ML16096A269).

10 CFR 50.55a Request
Monticello Nuclear Generating Plant (MNGP) - RR-014
Prairie Island Nuclear Generating Plant Units 1 and 2 (PINGP) - 1-RR-5-12 and 2-RR-5-12

Request to Use ASME Code Case N-789-3
in Accordance With 10 CFR 50.55a(z)(2)

1. ASME Code Component(s) Affected

All ASME Code Class 2 and 3 moderate energy carbon steel raw water piping systems. Moderate energy is defined as less than or equal to 200°F (93°C) and less than or equal to 275 psig (1.9 MPa) maximum operating conditions. Raw Water is defined as water such as from a river, lake, or well or brackish/ salt water - used in plant equipment, area coolers, and heat exchangers.

2. Applicable ASME Section XI Code Edition and Addenda

Plant	Interval	Edition	Start	End
MNGP	Fifth	2007 Edition through 2008 Addenda	September 1, 2012	May 31, 2022
PINGP Unit 1	Fifth	2007 Edition through 2008 Addenda	December 21, 2014	December 20, 2024
PINGP Unit 2	Fifth	2007 Edition through 2008 Addenda	December 21, 2014	December 20, 2024

3. Applicable Code Requirement

ASME Code, Section XI, Article IWA-4000 provides requirements for welding, brazing, defect removal, metal removal by thermal means, rerating, and removing, adding, and modifying items or systems.

4. Reason for Request:

Article IWA-4000 requires replacement or weld repair of wall thinning conditions resulting from degradation to be in accordance with NSPM's requirements and the original or later construction code. However, the repair and replacement provisions of Article IWA-4000 cannot always be utilized when degradation or leakage is identified during plant operations. Other NRC-approved alternative or repair or evaluation methods, such as local weld

overlays, are not always practicable because of wall thinning and/or moisture issues.

The proposed alternative will permit installation of technically sound temporary repairs to allow adequate time for evaluation, design, material procurement, planning and scheduling of an appropriate permanent ASME Code repair or replacement of the defective piping considering the impact on system availability, maintenance rule applicability, and availability of replacement materials. Without this repair option, compliance with the specified requirements of Article IWA-4000 would result in hardship and/or unusual difficulty – including higher risks associated with plant shut-downs and extended technical specification actions – without a compensating increase in the level of quality and safety.

5. Proposed Alternative and Basis for Use

NSPM proposes, as an alternative to the requirements of the ASME Section XI Code referenced above, to implement the requirements of ASME Code Case N-789-3, “Alternative Requirements for Pad Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping for Raw Water Service, Section XI, Division 1", for temporary repairs of degradation in moderate energy Class 2 and 3 raw water piping systems resulting from mechanisms such as erosion, corrosion, cavitation, or pitting – but excluding conditions involving flow-accelerated corrosion (FAC), corrosion-assisted cracking, or any other form of cracking. These types of defects are typically identified by small leaks in the piping system or by pre-emptive non-code required examinations performed to monitor the degradation mechanisms.

This repair technique involves welding a metal reinforcing pad – pressure pad or structural pad - to the interior or exterior of the piping system to reinforce the degraded area and restore pressure integrity or pressure and structural integrity. This repair technique will be used when it is determined that the temporary repair method is suitable for the particular defect and type of degradation present.

The code case requires that the cause of the degradation be determined, and that the extent and rate of degradation in the piping be evaluated to ensure there are no other unacceptable locations within the surrounding area that could affect the integrity of the repaired piping.

The area of evaluation is dependent on the degradation mechanism present. The code case requires that when welding a reinforcing pad to a leaking area, precautions such as installation of a gasket or sealant beneath the pad must be taken, as necessary, to prevent welding on wet surfaces.

The code case includes requirements for using actual or estimated corrosion rates for the design of reinforcing pads. For pressure pads, which rely on the underlying pipe for structural integrity and cannot be monitored for continued degradation, rates of twice the corrosion rate measured at that location, or four times the worst-case corrosion rate for that or similar system at the plant site for the same degradation mechanism must be applied to the design. In order to validate the corrosion rates used in the design of pressure pads, the code case requires that areas containing pressure pads be visually observed at least once per month to monitor for evidence of leakage. If the areas containing pressure pads are not accessible for direct observation, then monitoring will be accomplished by visual assessment of surrounding areas, or ground surface areas above pressure pads on buried piping, or monitoring of leakage collection systems, if available.

Structural pads do not rely on the underlying degraded piping for structural integrity so the conservative multipliers identified above do not apply to structural pads. Compensatory measures including a maximum service life of one fuel cycle are required, thus providing reasonable assurance that structural and leakage integrity will be maintained for structural pads. In addition, on-going compensatory monitoring as specified in Paragraph 8 of the code case is required for all reinforcing pads.

Reinforcing pads may be installed on either the exterior surface or the interior surface of piping to mitigate either external or internal corrosion. Where sleeves are applied adjacent to weld neck flanges, the attachment weld will be extended to the reinforcement on the neck of the flange.

For all reinforcing pads, regardless of when during a fuel cycle they are installed, the repair will be considered to have a maximum service life of no later than the end of the next refueling outage, by which time a code repair or replacement must be performed. Detailed requirements for design, installation, examination, pressure testing and inservice monitoring of reinforcing pads are provided in ASME Code Case N-789-3.

ASME Code Case N-789-3 was approved by the ASME Codes and Standards Committee on April 27, 2017; however, it has not yet been incorporated into Regulatory Guide 1.147, “Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1,” and thus is not available for application at nuclear power plants without specific NRC approval.

6. Duration of Proposed Alternative

NSPM requests authorization to apply ASME Code Case N-789-3 for the duration of the inservice inspection interval defined in Section 2 of this request or such time as the NRC approves ASME Code Case N-789-3 in Regulatory

Guide 1.147 or another document. Any reinforcing pads installed at the end of the Inservice Inspection Interval will be removed at the first refueling outage for the unit following the end of the Inspection Interval.

7. Precedence

The following similar alternatives have been previously approved by the NRC:

(a) A request for application of ASME Code Case N-789 for ten Exelon nuclear power plants (a total of 17 units) was approved on May 10, 2012 (Reference 1).

(b) A request for application of ASME Code Case N-789-1 for the Prairie Island Nuclear Generating Plant (2 units) was approved on May 4, 2015 (Reference 2).

(c) Another request for application of ASME Code Case N-789-1 for the First Energy Beaver Valley Nuclear Power Station (2 units) was approved on June 19, 2015 (Reference 3).

8. References

1. Letter from NRC to Exelon Generation Company, LLC, "Braidwood Station, Units 1 and 2; Byron Station, Unit Nos. 1 and 2; Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3; LaSalle County Station, Units 1 and 2; Limerick Generating Station, Units 1 and 2; Oyster Creek Nuclear Generating Station; Peach Bottom Atomic Power Station, Units 2, and 3; Quad Cities Nuclear Power Station, Units 1 and 2; and Three Mile Island Nuclear Station, Unit 1 – Request to Use American Society of Mechanical Engineers Boiler and Pressure Vessel Code Case N-789,'Alternative Requirements for Pad Reinforcement of Class 2 and 3 Moderate Energy Carbon Steel Piping For Raw Water Service, Section XI Division 1'," dated May 10, 2012 (ADAMS Accession No. ML12121A637)

2. Letter from NRC to Northern States Power Company - Minnesota, "Prairie Island Nuclear Generating Plant, Units 1 and 2, "Relief Requests (1-RR-5-5 AND 2-RR-5-5) for the Fifth 10-Year Interval for the Inservice Inspection Program," dated May 4, 2015 (ADAMS Accession No. ML15079A003)

3. Letter from NRC to First Energy Nuclear Operating Company, "Beaver Valley Power Station, Unit Nos.1 and 2 – Relief Request No. BV3-N-789 Regarding Carbon Steel Piping For Raw Water Service," dated June 19, 2015 (ADAMS Accession No. ML15163A147)