

December 21, 2015

L-PI-15-106 10 CFR 50.55a

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

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

#### <u>10 CFR 50.55a Requests: Relief from Impractical Examination Coverage Requirements</u> for the Fourth Ten-Year Inservice Inspection Program Interval

Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (g)(5)(iii), Northern States Power Company, a Minnesota Corporation (NSPM), d/b/a Xcel Energy requests relief from examination coverage requirements imposed by the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," for the Prairie Island Nuclear Generating Plant (PINGP).

This 10 CFR 50.55a request is for weld examinations performed during the Fourth Ten-Year Inspection Interval Units 1 and Unit 2 December 21, 2004 through December 20, 2014, where the required coverage of "essentially 100 percent" could not be obtained when examined to the extent practical. The basis for the 10 CFR 50.55a request is that compliance with the examination coverage requirement is impractical due to plant design. The details of the 10 CFR 50.55a request are provided in the enclosure for 1-RR-4-11, Rev 0 (PINGP Unit 1) and 2-RR-4-11, Rev 0 (PINGP Unit 2).

PINGP is submitting this request for the Fourth Ten-Year Inservice Inspection Interval which ended December 20, 2014.

If there are any questions or if additional information is needed, please contact Ms. Pamela Johnson, at 651-267-6829.

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#### Summary of Commitments

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

Site Vice President, Prairie Island Nuclear Generating Plant Northern States Power Company - Minnesota

#### Enclosure

cc: Administrator, Region III, USNRC Project Manager, PINGP, USNRC Resident Inspector, PINGP, USNRC

#### ENCLOSURE

10 CFR 50.55a Request 1-RR-4-11, Rev. 0 (PINGP Unit 1) 10 CFR 50.55a Request 2-RR-4-11, Rev. 0 (PINGP Unit 2) Request for Alternative for Limited Examinations Fourth Interval Units 1 and 2

Alternative in Accordance with 10 CFR 50.55a(z)(2)

16 Pages Follow

#### Alternative in Accordance with 10 CFR 50.55a(z)(2)

#### 1. <u>ASME Code Components Affected</u>

Code Class:	ASME Section XI, Class 2				
Components:	Unit 1 – Residual Heat Removal (RHR) Heat Exchanger 12				
	Head-to-Shell Weld (W-1)				
	Unit 1 – RHR Heat Exchanger 12 Shell-to-Flange Weld (W-2)				
	Unit 1 – RHR Heat Exchanger 12 Welded Attachment (H- 2/IA)				
	Unit 2 – RHR Heat Exchanger 21 Welded Attachment (H- 2/IA)				
i.	Unit 2 – RHR Heat Exchanger 22 Head-to-Shell Weld (W-1)				
Code:	ASME Section XI, 1998 Edition through the 2000 Addenda				
Examination					
Category:	C-A and C-C				
Item Numbers:	C1.10, C1.20 and C3.10				

#### 2. <u>Applicable Code Edition and Addenda</u>

- The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Rules for Inservice Inspection of Nuclear Power Plant Components, Section XI, 1998 Edition with Addenda through 2000 as conditioned by 10CFR50.55a, is the code of record for the Prairie Island Units 1 and 2, 4th 10-year interval.
- Code Case N-460, "Alternative Examination Coverage for Class 1 and 2 Welds, Section XI, Division 1" as approved by Regulatory Guide 1.147, Inservice Inspection Code Case Acceptability, ASME section XI, Division 1, Revision 17.

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#### 3. <u>Applicable Code Requirements</u>

Table 1									
Code Requirements									
Exam Cat.	Item No.	Examination Requirements							
C-A	1.10	Mandatory Appendix I and III	Essentially 100% volumetric examination of the weld length for the volume shown in Figure IWC-2500-1.						
C-A	1.20	Mandatory Appendix I and III	Essentially 100% volumetric examination of the weld length for the volume shown in Figure IWC-2500-1.						
C-C	3.10		Essentially 100% surface examination of the required areas of each welded attachment. Conditions: (1) (a) The attachment is on the outside surface						
			of the pressure retaining component. (b) The attachment provides component support as defined in NF-1110. (c) The attachment weld joins the						
			attachment either directly to the surface of the component or to an integrally cast or forged attachment to the component. (d) The attachment weld is full penetration, fillet or partial penetration continuous						
			or intermittent (2) The extent of examination includes						
			essentially 100% of the length of the attachment weld at each attachment subject to examination.						
			<ul> <li>(3) Selected samples of welded attachments shall be examined each inspection interval.</li> <li>(4) For multiple weeks of similar design</li> </ul>						
			(4) For multiple vessels of similar design, function, and service, only one welded attachment of only one of the multiple vessels shall be selected for examination.						

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Note: As defined by ASME Code Case N-460, essentially 100% means more than 90% of the examination volume of each weld where reduction in coverage is due to interference by another component or part geometry.

#### 4. <u>Impracticality of Compliance</u>

Due to the configuration, it is not possible to meet the examination coverage requirements of ASME Section XI, 1998 Edition with Addenda through 2000, as clarified by Code Case N-460. Relief is requested in accordance with 10CFR50.55a(z)(2). The limited examinations subject to this request are a result of attempts to perform the examinations during the 4<sup>th</sup> interval.

When examined, the welds listed within this request did not receive the required Code coverage due to their configuration, presence of permanent attachments and proximity to building structure. These limitations prohibit essentially 100% coverage of the listed ultrasonic and surface examinations.

Table 2 summarizes the percent of Code coverage obtained with references to figures that show the extent of coverage and the limitations, and photographs of the obstructions.

#### 5. Burden Caused by Compliance

# Examination Category C-A, Unit 1 and 2- RHR Heat Exchanger 12 and 22, respectively Head-to-Shell Weld (W-1) and Unit 1 –RHR Heat Exchange 12 Shell-to-Flange Weld (W-2)

The RHR heat exchanger is a 24 inch vessel with a "U" shaped tube bundle. The stainless steel channel head for the heat exchanger consist of a weld-neck flange welded to one end of the shell (Weld 2) and an elliptical head welded to the other end of the channel head shell (Weld 1). The length of the shell between the flange and the elliptical head is 13 inches. The 13 inch long shell section contains two nominal pipe size (NPS) 8 nozzles with 12 inch diameter reinforcing rings. The nozzles are located 180° apart. In between the two nozzles, there are integrally welded supports that span most of the distance between the nozzles.

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The nozzle reinforcing rings and the integrally welded supports interfere with scanning Weld 1 on the heat exchangers of both units.

The nozzle reinforcing rings, the integrally welded supports, and the configuration of the weld-neck flange interfere with scanning Weld 2 on the Unit 1 heat exchanger.

The configuration described is typical of Units 1 and 2.

To obtain full Code coverage of the subject welds would require a significant modification or replacement of the heat exchangers to increase the shell length of the channel head to provide an increased distance from the nozzles and supports to the welds. For Weld 2, an alternative configuration of the weld-neck flange would also be required. Due to the current configuration, there are no other volumetric techniques that would provide increased coverage.

# Examination Category C-C, Unit 1 and 2- RHR Heat Exchanger 12 and 21, integral attachment weld (H-2/IA)

The RHR heat exchanger is a 24 inch vessel with a "U" shaped tube bundle. The stainless steel channel head for the heat exchanger consist of a weld-neck flange welded to one end of the shell and an elliptical head welded to the other end of the channel head shell. The length of the shell between the flange and the elliptical head is 13 inches. The 13 inch long shell section contains two NPS 8 nozzles with 12 inch diameter reinforcing rings. The nozzles are located 180° apart. In between the two nozzles, there are integrally welded supports that span most of the distance between the nozzles. The integrally welded supports are in close proximity to concrete pedestals that support the heat exchangers.

The close proximity of the concrete pedestals limits access to the bottom fillet weld that attaches the horizontal support plate to the channel shell of the heat exchangers.

The configuration described is typical of both heat exchangers of Units 1 and 2.

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To obtain full Code coverage for surface examination of the attachment welds would require significant modification or replacement of the heat exchangers to increase the distance between the concrete support pedestals and the exchanger shell.

Due to the current configuration, there are no other surface techniques that would provide increased coverage.

#### 6. <u>Proposed Alternative and Basis for Use</u>

**Proposed Alternative:** 

There are no proposed alternatives.

Basis:

The examination coverage described in Table 2 and the applicable Figures represent the maximum obtainable coverage. RHR heat exchanger shell-to-flange, shell-to-head, and attachment welds were examined in the third interval and found to have similar limitations as follows: Weld 1 of the Unit 1 RHR heat exchanger 12 was ultrasonically examined and found to be limited to 74% coverage. Weld 2 of the Unit 1 RHR heat exchanger 12 was ultrasonically examined and found to be limited to 74% coverage. Weld 2 of the Unit 1 RHR heat exchanger 12 was ultrasonically examined and found to be limited to 27% coverage. The attachment welds of one support of the Unit 1 RHR heat exchanger 12 were surface examined found to be limited to 71% coverage. The attachment welds of both supports of the Unit 2 RHR heat exchanger 21 were surface examined found to 85% coverage. Weld 1 of the Unit 2 RHR heat exchanger 22 was ultrasonically examined and found to be limited to 74% coverage.

The examinations of the fourth interval did not identify any indications of defects or unacceptable conditions according to the acceptance criteria of ASME Section XI, IWC-3510 and IWC-3512.

The fourth interval examination of Weld 2 (Figure 3) identifies "best effort" coverage that is in excess of the reported Code coverage. Best effort coverage

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includes areas of the required volume that are in the path of the projected sound beam, but are beyond the qualified limit.

The RHR heat exchangers are within the ASME Section XI, Class 2 boundaries and in addition to the volumetric examinations required by Examination Category C-A, the heat exchangers are also pressure tested once each inspection period in accordance with Examination Category C-H. None of the pressure tests have identified evidence of leakage from the welds that are subject of this relief request.

The Unit 1 and 2 RHR heat exchangers are the original vessels and there has been no degradation of the channel heads identified since initial operation. Additionally, the Fifth 10 Year Interval Inservice Inspection program has been prepared using Code Case N-716-1, "Alternative Piping Classification and Examination Requirements". For the Fifth Ten Year Interval, the Unit 1 and Unit 2 RHR heat exchangers are considered Low Safety Significant and the welds that are subject of this relief request will not be subject to examination.

In accordance with 10 CFR 50.55a(g)(5)(iii), Prairie Island has determined that conformance with the requirements of ASME Section XI, Table IWC-2500-1, Examination Category C-A and Code Case N-460 for examination of the welds subject of this request is impractical. The impracticality has been demonstrated by the examinations performed during the Fourth Ten Year Interval as described herein.

#### 7. <u>Duration of Proposed Relief</u>

This relief request is applicable to the Prairie Island Unit 1 and 2 Fourth Ten Year Inservice Inspection Interval.

#### 8. <u>Precedents:</u>

# <u>10 CFR 50.55a Request 1-RR-4-11, Rev. 0 (PINGP Unit 1)</u> <u>10 CFR 50.55a Request 2-RR-4-11, Rev. 0 (PINGP Unit 2)</u>

Request for Alternative for Limited Examinations Fourth Interval Units 1 and 2

#### Alternative in Accordance with 10 CFR 50.55a(z)(2)

Prairie Island Nuclear Generating Plant Request for Relief No. 11 dated May 29, 2001. (Accession No. ML011550260)

Prairie Island Nuclear Generating Plant Request for Relief No. 9 dated November 16, 2002. (Accession No. ML023290578)

Prairie Island Nuclear Generating Plant Request for Relief No. 16 dated January 7, 2004. (Accession No. ML040150068)

Nuclear Regulatory Commission Letter to Kewaunee Power Station dated September 20, 2012 Subject: Kewaunee Power Station – Evaluation of Relief Request Number RR-G-5 Regarding Fourth 10-Year Interval Inservice Inspection Program (TAC No. ME7378) (Accession No. ML12249A44)

#### 9. <u>References</u>

Title 10 of the Code of Federal Regulation, Part 50.55a, Codes and Standards.

ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components", 1998 Edition through the 2000 Addenda

ASME Section XI, Division 1, Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds"

Regulatory Guide 1.147, Inservice Inspection Code Case Acceptability, ASME section XI, Division 1, Revision 17

NRC Presentation "Coverage Relief Requests" dated January 13 – 15, 2015 presented at the Industry/NRC NDE Technical Information Exchange Public Meeting

				Table 2			
Component Configuration	System Component ID Material	Exam Year	ASME Section XI Coverage (%)	Angles (s)/ and Wave Modes	Figure and Photograph	Impracticality of Compliance Exam Results	Other Examination Results
Unit 1 Residual Heat Exchanger 12 Head to Shell	Residual Heat Removal Weld 1 Summary No. 303053 Stainless to Stainless	2009	Exam Cat C- A Item No. C1.20 Figure No. IWC-2500-1 74%	45° S 60° S 70° S <sup>1</sup> 60° L	1	Inservice examination limited due to welded support proximity to weld on shell side and nozzle reinforcement plates on shell / head covering weld. No Recordable Indications	Surface examination is not required by Code. System Pressure test; Acceptable
Unit 1 Residual Heat Exchanger 12 Shell to Flange	Residual Heat Removal Weld 2 Summary No. 303054 Stainless to Stainless	2012	Exam Cat C- A Item No. C1.10 Figure No. IWC-2500-1 32%	45° S 60° S 70° S	3	Inservice examination limited due to flange configuration. Shell side is limited due to welded attachments and nozzle reinforcement plates. No Recordable Indications	Surface examination is not required by Code. System Pressure test; Acceptable

<sup>&</sup>lt;sup>1</sup> This weld was scanned with the 70° shear wave, but no additional coverage was obtained, therefore the 70° shear wave is not shown on Figure 1.

				Table 2			
Component Configuration	System Component ID Material	Exam Year	ASME Section XI Coverage (%)	Angles (s)/ and Wave Modes	Figure and Photograph	Impracticality of Compliance Exam Results	Other Examination Results
Unit 1 Residual Heat Exchanger 12 welded Attachment	Residual Heat Removal Attachment Weld H-2/IA Summary No. 323052	2012	Exam Cat C- C Item No. C3.10 75%	N/A	3	Inservice examination limited due to welded support proximity to building structure.	System Pressure test; Acceptable
Unit 2 Residual Heat Exchanger 21 welded Attachment	Residual Heat Removal Attachment Weld H-2/IA Summary No. 521419	2010	Exam Cat C- C Item No. C3.10 85%	N/A	Not Shown. Similar to HX 12 Photograph 3.	Inservice examination limited due to welded support proximity to building structure.	System Pressure test; Acceptable

Table 2							
Component Configuration	System Component ID Material	Exam Year	ASME Section XI Coverage (%)	Angles (s)/ and Wave Modes	Figure and Photograph	Impracticality of Compliance Exam Results	Other Examination Results
Unit 2 Residual Heat Exchanger 22 Head to Shell	Residual Heat Removal Weld 1 Summary No. 501477 Stainless to Stainless	2013	Exam Cat C- A Item No. C1.20 Figure No. IWC-2500-1 74%	45º S 60º L	2	Inservice examination limited due to welded support proximity to weld on shell side and nozzle reinforcement plates on shell / head covering weld. No Recordable Indications	Surface examination is not required by Code. System Pressure test; Acceptable

#### Alternative in Accordance with 10 CFR 50.55a(z)(2)



Total Examination Coverage Achieved 74%

Figure 1

# Alternative in Accordance with 10 CFR 50.55a(z)(2)



Total Examination Coverage Achieved 74%

Figure 2

#### Alternative in Accordance with 10 CFR 50.55a(z)(2)



-Total weld Length 76"

-8" area with no coverage due to four welded supports (2" each) on shell side -16" Area with no coverage due to the two nozzle saddle welds (8" each)



**Total Examination Coverage Achieved 32%** 

Figure 3



Photograph 1 Unit 1, Residual Heat Exchanger 12 Head-to-Shell Weld (Weld 1)

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Photograph 2

Unit 2, Residual Heat Exchanger 22 Head-to-Shell Weld (Weld 1)

#### Alternative in Accordance with 10 CFR 50.55a(z)(2)



Photograph 3

Unit 1, Residual Heat Exchanger 12 Shell-to-Flange Weld (Weld 2)