



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 4, 2016

Mr. Scott D. Northard
Site Vice President
Northern States Power Company - Minnesota
Prairie Island Nuclear Generating Plant
1717 Wakonade Drive East
Welch, MN 55089-9642

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 –
REQUEST RELIEF FOR 1-RR-4-11 AND 2-RR-4-11 ASSOCIATED WITH
CERTAIN INSERVICE INSPECTION OF COMPONENT WELDS FOR THE
FOURTH 10-YEAR INTERVAL (CAC NOS. MF7210 AND MF7211)

Dear Mr. Northard:

By letter dated December 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15355A253), as supplemented by letter dated July 13, 2016 (ADAMS Accession No. ML16195A529), the Northern States Power Company – Minnesota (NSPM or the licensee) submitted relief requests (RR) 1-RR-4-11, Revision 0, and 2-RR-4-11, Revision 0, from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, requirements for certain inservice inspections (ISI) of component welds. These reliefs were requested for Prairie Island Nuclear Generating Plant, Unit 1 (PINGP1), and Unit 2 (PINGP2), for the fourth 10-Year ISI Interval which ended December 20, 2014.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a (g)(5)(iii), the licensee submitted the request for relief from examination coverage requirements imposed by the ASME Code on the basis that compliance with the ASME Code requirement is impractical.

The U.S. Nuclear Regulatory Commission (NRC or Commission) staff reviewed the proposed relief and concludes that ASME Code examination coverage requirements are impractical for the subject welds listed in RRs 1-RR-4-11 and 2-RR-4-11. Furthermore, based on the examination techniques used, the coverages obtained, and the system leakage tests performed each inspection period, it is reasonable to conclude that if significant service-induced degradation was present, evidence of it would have been detected by the examinations that were performed. Therefore, for the items in the licensee's requests, relief is granted, pursuant to 10 CFR 50.55a(g)(6)(i) for the subject welds during the fourth ISI interval at PINGP1 and PINGP2.

The NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) for 1-RR-4-11 and 2-RR-4-11, is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. All other ASME Code, Section XI, requirements for which relief was not specifically requested

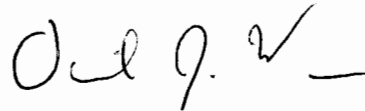
S. Northard

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and approved in the subject RRs remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact Robert Kuntz at 301-415-3733, or via e-mail at Robert.Kuntz@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "D. J. Wrona", with a stylized flourish at the end.

David J. Wrona, Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosure: Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF REQUESTS 1-RR-4-11 AND 2-RR-4-11

NORTHERN STATES POWER COMPANY – MINNESOTA

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2

DOCKET NOS. 50-282 AND 50-306

(CAC NOS. MF7210 AND MF7211)

1.0 INTRODUCTION

By letter dated December 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15355A253) as supplemented by letter dated July 13, 2016 (ADAMS Accession No. ML16195A529), the Northern States Power Company – Minnesota (NSPM or the licensee) submitted relief requests (RRs) 1-RR-4-11, Revision 0, and 2-RR-4-11, Revision 0, from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, requirements for certain inservice inspections (ISI) of component welds. These reliefs were requested for Prairie Island Nuclear Generating Plant, Unit 1 (PINGP1), and Unit 2 (PINGP2), for the fourth 10-Year ISI interval which ended December 20, 2014.

2.0 REGULATORY EVALUATION

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(a) 12 months prior to the start of the 120-month interval, subject to the conditions listed in 10 CFR 50.55a(b). The Code of Record for the fourth 10-year interval ISI program, which began on December 21, 2004, and ended on December 20, 2014, is the 1998 Edition through the 2000 Addenda of Section XI of the ASME Code.

10 CFR 50.55a(g)(5)(iii) states, in part, that licensees may determine that conformance with certain ASME Code requirements is impractical and that the licensee shall notify the U.S. Nuclear Regulatory Commission (NRC or Commission) and submit information in support of the

Enclosure

determination. Determination of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the code requirements during the ISI interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial 120-month inspection interval or subsequent 120-month inspection interval for which relief is sought.

10 CFR 50.55a(g)(6)(i), states that the NRC will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The NRC may grant such relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

3.0 EVALUATION

3.1 ASME Code Component Identification

ASME Code Class: Code Class 2

Exam Category: C-A, Pressure Retaining Welds in Pressure Vessels
C-C, Welded Attachments for Vessels, Piping, Pumps, and Valves

Item Numbers: C1.10, Shell Circumferential Welds
C1.20, Head Circumferential Welds
C3.10, Welded Attachments

Weld Identification: RHR Heat Exchanger 12 Head-to-Shell Weld (W-1)
RHR Heat Exchanger 22 Head-to-Shell Weld (W-1)
RHR Heat Exchanger 12 Shell-to-Flange Weld (W-2)
RHR Heat Exchanger 12 Welded Attachment (H-2/IA)
RHR Heat Exchanger 21 Welded Attachment (H-2/IA)

3.2 ASME Code Requirements

ASME Code, Section XI, 1998 Edition with Addenda through 2000, Examination Category C-A, requires 100 percent volumetric examination coverage of the pressure retaining welds as defined in Table IWC-2500-1 and shown in Figures IWC-2500-1.

ASME Code, Section XI, 1998 Edition with Addenda through 2000, Examination Category C-C, requires 100 percent surface examination of the attachment welds in accordance with Table IWC-2500-1 and Figure IWC-2500-5. Note 4 of Table IWC-2500-1 allows that 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.

ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1," as approved for use by the NRC in Regulatory Guide (RG) 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, Section XI, Division 1 states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10 percent, i.e., greater than 90 percent examination coverage is obtained.

ASME Code, Section XI, 1998 Edition with Addenda through 2000, Mandatory Appendix I, Article I-2210, requires that ultrasonic (UT) examination of vessels not greater than 2 inches in thickness shall be conducted in accordance with Appendix III as supplemented by Table I-2000-1.

ASME Code, Section XI, 1998 Edition with Addenda through 2000, Article IWA-2221, requires that surface examinations shall be conducted in accordance with Section V, Article 7 for magnetic particle examinations, Article IWA-2222 requires Section V, Article 6, for liquid penetrant examinations, and Article IWA-2223 Section XI, Appendix IV, for eddy current examinations.

3.3 Licensee's Request for Relief

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief on the basis that compliance with the ASME Code requirement is impractical. The licensee stated that limitations imposed by the residual heat removal (RHR) heat exchanger (HX) weld configuration preclude obtaining 100 percent coverage for the above referenced welds. For the volumetric examinations, the licensee stated that the nozzle reinforcing rings and integrally welded supports interfere with the scanning of the head-to-shell and shell-to-flange welds, and that the configuration of the weld-neck flange also interferes with the scanning of the shell-to-flange weld. For the surface examination of the attachment weld, the licensee stated that 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 HXs. The licensee concluded that to increase examination coverage on the subject welds a significant design modification or replacement of components would be required and that there are no other techniques that would provide increased coverage.

The examination coverages and results as documented in the licensee request are as follows:

<u>RHR HX</u>	<u>Weld Type</u>	<u>Exam</u>	<u>Coverage</u>	<u>Results</u>
12	head-to-shell weld (W-1)	Volumetric	74%	No recordable indications
22	head-to-shell weld (W-1)	Volumetric	74%	No recordable indications
12	shell-to-flange weld (W-2)	Volumetric	32%	No recordable indications
12	welded attachment (H-2/IA)	Surface	75%	No unacceptable conditions
21	welded attachment (H-2/IA)	Surface	85%	No unacceptable conditions

Additionally, the licensee stated that the HXs are pressure tested once each inspection period in accordance with examination category C-H and that none of the pressure tests have identified evidence of leakage from the welds that are the subject of this relief request.

3.4 Staff Evaluation

As described in the licensee submittal, the nozzle reinforcing rings and the integrally welded supports interfere with the ultrasonic scanning of the W-1 head-to-shell welds. Also as described in the licensee submittal, the nozzle reinforcing rings, the integrally welded supports, and the configuration of the weld-neck flange interfere with the ultrasonic scanning of the W-2 shell-to-flange weld. The licensee submittal states that welds W-1 and W-2, which are ASME Code Category C-A welds, were ultrasonically examined to achieve the maximum obtainable coverage. The UT examinations of these welds were performed in accordance with mandatory Appendices I and III, which are appropriate for vessels not greater than 2 inches in thickness. Figures 1, 2, and 3 of the original licensee submittal show that the vessel thickness for these welds is less than 2 inches, thus the appropriate ASME Code requirements were used for the ultrasonic examination.

The ASME Code requires 100 percent volumetric examination of the Category C-A welds. Due to the interferences mentioned by the licensee, to obtain full ASME Code coverage of the Category C-A welds in this relief request would require a significant modification or replacement of the HXs to increase the shell length of the channel head to provide increased distances from the nozzles and supports to the welds. For weld W-2, an alternative configuration of the weld neck flange would also be required. Therefore, obtaining 100 percent volumetric examination of the Category C-A welds in this RR would be impractical.

For the welded attachments (H-2/IA), the licensee describes that 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 HXs thus, interfering with the required surface examination. The ASME Code requires 100 percent surface examination of the required areas of the Category C-C welded attachments. Due to the interferences mentioned by the licensee, to obtain full ASME Code coverage of the Category C-C welds in this relief request would require a significant modification or replacement of the heat exchangers to increase the distance between the concrete support pedestals and the exchanger shell. Therefore, obtaining 100 percent surface examination of the Category C-C welds in this relief request would be impractical.

Because the licensee submittal did not specify the ASME Code requirements for performing the surface examination of the Category C-C attachment welds, the NRC staff issued a request for additional information (RAI) for the licensee to provide the applicable code for the surface examinations. In its response to the RAI (ADAMS Accession Number ML16195A529), the licensee stated that the surface examination of Category C-C attachment welds was performed in accordance with liquid penetrant procedures which incorporated the requirements of ASME Code Section V, Article 6, and Figure IWC-2500-5. The NRC staff finds the licensee response acceptable, since the surface examination procedure is in accordance with the requirements of ASME Code, Section XI, Article

IWA-2220, which requires liquid penetrant examination to be conducted in accordance with

Section V, Article 6, and the requirements of Section XI, Table IWC-2500-1, which requires that surface examination of Category C-C attachment welds be conducted in accordance with the requirement of Figure IWC-2500-5.

In addition to the volumetric examinations required by the ASME Code for Category C-A full penetration welds, the system leakage tests required by the ASME Code for Category C-H pressure retaining components is an additional line of defense in the detection of service induced degradation. Table IWC-2500-1 requires a system leakage test for all Category C-H pressure retaining components each inspection period. The VT-2 visual examination specified in Table IWC-2500-1 and IWA-5240 for these leakage tests requires, in part, that:

- accessible external exposed surfaces be examined for evidence of leakage and
- the surrounding areas of inaccessible surfaces be examined for evidence of leakage.

The acceptance criteria specified in Table IWC-2500-1 and IWC-3516 for these leakage tests requires, in part, that corrective action be taken for identified leakage, unless within defined permissible limits.

Based on the examination techniques used, the volumetric coverage obtained, and the system leakage tests performed each inspection period, it is reasonable to conclude that, if significant service-induced degradation was present in these welds, evidence would have been detected by the examinations performed. Based on operational experience and the extent to which the examinations were performed, the NRC staff has determined with reasonable assurance that the structural integrity of these welds was maintained throughout the fourth 10-year ISI interval program.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and concludes that ASME Code examination coverage requirements are impractical for the subject welds listed in RRs 1-RR-4-11 and 2-RR-4-11. Furthermore, based on the examination techniques used, the coverages obtained, and the system leakage tests performed each inspection period, it is reasonable to conclude that if significant service-induced degradation was present, evidence of it would have been detected by the examinations that were performed. Therefore, for the items in the licensee's requests, relief is granted, pursuant to 10 CFR 50.55a(g)(6)(i) for the subject welds during the fourth ISI interval at PINGP1 and PINGP2.

The NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) for RRs 1-RR-4-11 and 2-RR-4-11, is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. All other ASME Code, Section XI, requirements for which relief was not specifically requested

and approved in the subject relief request remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Joel Jenkins, NRR

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If you have any questions, please contact Robert Kuntz at 301 415 3733, or via e-mail at Robert.Kuntz@nrc.gov.

Sincerely,

/RA/

David J. Wrona, Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosure: Safety Evaluation

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