

August 8, 2000

Mr. Michael D. Wadley, President
NSP Nuclear Generation
Northern States Power Company
414 Nicollet Mall
Minneapolis, MN 55401

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 2 - EVALUATION OF
RELIEF REQUEST NO. 8 FOR THE THIRD 10-YEAR INTERVAL INSERVICE
INSPECTION PROGRAM PLAN (TAC NO. MA5296)

Dear Mr. Wadley:

By letter dated April 1, 1999, Northern States Power Company (NSP) submitted Relief Request No. 8, related to the third 10-year interval inservice inspection program plan, entitled "Limited Examination." The staff has reviewed and evaluated the information provided by NSP's submittal and finds the request for relief acceptable. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), the staff grants approval of Relief Request No. 8 Parts A-F and H, and Part G is authorized pursuant to 10 CFR 50.55a(a)(3)(ii). The relief granted 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 on NSP if the requirements were imposed on the facility.

The detailed results of the staff's review are provided in the enclosed safety evaluation. If you have any questions concerning this action, please call Mr. T. Kim of my staff at (301) 415-1392.

Sincerely,

/RA/

Claudia M. Craig, Chief, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-306

Enclosure: Safety Evaluation

cc w/encl: See next page

August 8, 2000

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NSP Nuclear Generation
Northern States Power Company
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Minneapolis, MN 55401

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD TEN-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN AND

REQUEST FOR RELIEF NO. 8

PRAIRIE ISLAND NUCLEAR STATION, UNIT 2

DOCKET NO. 50-306

1.0 INTRODUCTION

Inservice inspection (ISI) of the American Society of Mechanical Engineers Code (ASME Code) Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code, and applicable addenda, as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(6)(g)(i). The regulation at 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 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 pre-service examination requirements, set forth in 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 ten-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, which was incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The Code of record for Prairie Island Nuclear Station, Unit 2, is the 1989 edition.

2.0 EVALUATION

By letter dated April 1, 1999, Northern States Power Company (the licensee) submitted its third 10-year interval ISI program plan Request for Relief No. 8 (Parts A, B, C, D, E, F, G, and H) for Prairie Island, Unit 2. The Idaho National Engineering and Environmental Laboratory (INEEL), NRC's contractor, has evaluated the information provided by the licensee in support of Request for Relief No. 8.

Based on the results of the review, the staff adopts the contractor's evaluations and recommendations for granting relief or authorizing alternatives contained in the Technical Letter Report (TLR) (Attachment 1) prepared by INEEL. Attachment 2 lists each relief request and the status of approval.

ENCLOSURE

For Prairie Island, Unit 2, relief is granted from the inspection requirements that have been determined to be impractical to perform. Alternatives are authorized where it provides an acceptable level of quality and safety, or where compliance would result in a hardship or unusual difficulty without a compensating increase in quality or safety.

The requests for relief are granted or authorized for the third 10-year interval ISI program at Prairie Island Unit 2. Additionally, the grant of relief or authorization of an alternative is based upon the fulfillment of any commitments made by the licensee in its basis for each relief request and the alternatives proposed.

The staff notes that the licensee indicated their intent to use the 1992 edition of ASME Code, Section XI, for future examinations of the reactor pressure vessel closure head nuts in Request for Relief No. 8, Part C. The 1992 edition specifies a VT-1 visual examination for the closure head nuts as opposed to the surface examination currently required by the 1989 edition (the licensee's Code of record for the third ISI interval). As stated in 10 CFR 50.55a(g)(4)(iv) inservice examination of components may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in paragraph (b) of this section (10 CFR 50.55a) and subject to Commission approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met. Therefore, while the licensee has indicated that it intends to use the 1992 edition for future examinations of reactor vessel closure head nuts, it must submit this as an alternative to the current Code requirements and address the related requirements for Commission approval.

3.0 CONCLUSION

The Prairie Island, Unit 2, ISI program requests for relief from the Code requirements have been reviewed by the staff with the assistance of its contractor, INEEL. The TLR provides INEEL's evaluation of these requests for relief. The staff has reviewed the TLR and concurs with the evaluations and recommendations for granting relief or authorizing alternatives. A summary of the determinations for the requests for relief is presented in Attachment 2. The staff concludes that the requests for relief, as evaluated by this safety evaluation, will provide reasonable assurance of structural integrity of the subject components in the licensee's requests for relief. The staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) and authorizing alternatives pursuant to 10 CFR 50.55a(a)(3)(ii) is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest.

Attachments: 1. Technical Letter Report
2. Summary of Relief Requests

Principal Contributor: A. Keim

Date: August 8, 2000

TABLE 1

SUMMARY OF RELIEF REQUESTS

INEEL TLR Sec.	System or Component	Exam Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Disposition	RR No. 8
(Revision 0) Part A	2.1	Reactor Pressure Vessel	B-A	B1.40	Head to Flange Weld	Volumetric	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)RR No. 8
(Revision 0) Part B	2.2	Pressurizer	B-F	B5.40	Pressurizer Nozzle-to-Safe End Welds	Volumetric/Surface	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)
RR No. 8 (Revision 0) Part C	2.3	R e a c t o r P r e s s u r e Vessel	B-G-1	B6.10	Closure Head Nuts	Surface	Utilize surface coverage obtained.	Granted 10 CFR50.55a(g)(6)(i)RR No. 8
(Revision 0) Part D	2.4	Class 1 Piping	B-J	B9.11 B9.21 B9.31	Circumferential Piping Welds Circumferential Piping Welds Branch Connection Welds	Volumetric/Surface Surface Volumetric/Surface	Utilize volumetric/Surface coverage obtained	Granted 10 CFR50.55a(g)(6)(i)RR No. 8
(Revision 0) Part E	2.5	C l a s s 2 P r e s s u r e Vessels	C-B	C2.21	Nozzle-to-Shell Welds	Volumetric/Surface	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)RR No. 8
(Revision 0) Part F	2.6	Class 2 Piping	C-F-1	C5.11 C5.21	Circumferential Welds in SS Piping	Volumetric/Surface	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)RR No. 8
(Revision 0) Part G	2.7	Class 2 Piping	C-F-2	C5.81	Branch Connection Welds	Surface	Utilize surface coverage obtained	Authorized 10 CFR50.55a(a)(3)(ii)RR No. 8
(Revision 0) Part H	2.8	Class 2 Pumps and Piping	C-C	C3.20 C3.30	Piping Integral Attachments Pump Integral Attachments	Surface	Utilize surface coverage obtained	Granted 10 CFR50.55a(g)(6)(i)

TECHNICAL LETTER REPORT
ON THE THIRD 10-YEAR INTERVAL INSERVICE INSPECTION
REQUEST FOR RELIEF 8, REVISION 0
FOR
NORTHERN STATES POWER
PRAIRIE ISLAND UNIT 2
DOCKET NUMBER: 50-306

1. INTRODUCTION

By letter dated April 1, 1999, the licensee, Northern States Power, submitted Request for Relief 8, Revision 0, seeking relief from the requirements of the ASME Code, Section XI, for the Prairie Island Unit 2, third 10-year inservice inspection (ISI) interval. The Idaho National Engineering and Environmental Laboratory (INEEL) staff's evaluation of the subject request for relief is in the following section.

2. EVALUATION

The information provided by Northern States Power in support of the request for relief from Code requirements has been evaluated and the basis for disposition is documented below. The Code of record for the Prairie Island Unit 2, third 10-year ISI interval, which began December 21, 1994, is the 1989 Edition of Section XI of the ASME Boiler and Pressure Vessel Code.

2.1 Request for Relief No. 8 (Revision 0) Part A, Examination Category B-A, Item B1.40, Reactor Pressure Vessel Head-to-Flange Weld

Code Requirement: Examination Category B-A, Item B1.40, requires volumetric and surface examination of 100% of the weld length, as defined by Figure IWB-2500-5, of the reactor pressure vessel (RPV) head-to-flange weld to be performed during each inspection interval.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examination coverage requirement for RPV head-to-flange Weld W-6.

Licensee's Basis for Requesting Relief (as stated):

"The following 10 CFR 50.55a paragraphs apply to the inservice inspection of components in accordance with the ASME Section XI code: 50.55a(g)(5)(iv): Where an examination requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program as permitted by paragraph (g)(4) of this section, the basis for this determination must be demonstrated to the satisfaction of the Commission...

"Prairie Island was designed and constructed prior to development of ASME XI and therefore design for inspectability and inspection coverage is not, in many cases, sufficient to permit

satisfying the current Code requirements. Limitations to inspections are primarily due to obstructions and interferences.

“Reactor Vessel Closure Head Weld (W-6): Volumetric coverage is limited to 58.70%. Inspection limited due to flange configuration prohibits UT exam from flange side and lifting lugs limit UT from head side for 17.5 inches. (See Figures 1 and 2).¹

“The nature of the limitations have been noted on the ISI examination reports and are included in the ISI Outage Summary Report. NSP will continue to document the limitations.

“All in-service inspections at Prairie Island Unit 2 have been done to the greatest extent practical. When limitations to required inspections are encountered M&SP procedure ISI-LTS-1 is applied which requires alternative examination techniques be considered, or applied to gain the maximum obtainable inspection coverage practical. In all of the above items identified, this procedure was used and the maximum inspection coverage was achieved.

“Limitations are due to design, geometry, and materials of construction of the components or ALARA concerns.”

Licensee’s Proposed Alternative Examination (as stated):

“NSP will continue to utilize the most current techniques available for future examinations.”

Evaluation: The Code requires 100% volumetric and surface examination of the RPV closure head-to-flange weld during each inspection interval. Figures supplied by the licensee show that the surface geometry of the flange, in combination with access restrictions caused by the head lifting lugs, preclude complete ultrasonic scans of the full volume of this weld. Therefore, the Code-required 100% volumetric examination is impractical to achieve. To gain access for 100% coverage, the component would have to be redesigned and modified. This would place a significant burden on the licensee.

The licensee is able to obtain 58.7% of the required volumetric coverage. In addition, the licensee has completed the Code-required surface examination. These examinations should detect any existing patterns of degradation, and provide reasonable assurance of the continued structural integrity of the weld. Therefore, based on the impracticality of the Code volumetric coverage requirements, and the extent of examinations performed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.2 Request for Relief No. 8 (Revision 0) Part B, Examination Category B-F, Item B5.40, Examination of the Pressurizer Nozzle-to-Safe End Welds

Code Requirement: Examination Category B-F, Item B5.40, requires 100% volumetric and surface examination, as defined by Figure IWB-2500-8, of the dissimilar metal pressurizer nozzle-to-safe end butt Weld W-1.

Licensee’s Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examination coverage for pressurizer nozzle-to-safe end butt Weld W-1.

Licensee’s Basis for Requesting Relief (as stated):

“The following 10 CFR 50.55a paragraphs apply to the inservice inspection of components in accordance with the ASME Section XI code: 50.55a(g)(5)(iv): Where an examination requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program as permitted by paragraph (g)(4) of this section, the basis for this determination must be demonstrated to the satisfaction of the Commission...

“Prairie Island was designed and constructed prior to development of ASME XI and therefore design for inspectability and inspection coverage is not in many cases, sufficient to permit satisfying the current Code requirements. Limitations to inspections are primarily due to obstructions and interferences.

“Pressurizer Safety B Weld (W-1): Volumetric coverage limited to 78.00%. Joint configuration prevents UT scanning more than 1 inch on either side of the weld (See Figure 3)².

“The nature of the limitations have been noted on the ISI examination reports and are included in the ISI Outage Summary Report. NSP will continue to document the limitations.

“All in-service inspections at Prairie Island Unit 2 have been done to the greatest extent practical. When limitations to required inspections are encountered M&SP procedure ISI-LTS-1 is applied which requires alternative examination techniques be considered, or applied to gain the maximum obtainable inspection coverage practical. In all of the above items identified this procedure was used and the maximum inspection coverage was achieved.

“Limitations are due to design, geometry, and materials of construction of the components or ALARA concerns.”

Licensee's Proposed Alternative Examination (as stated):

“NSP will continue to utilize the most current techniques available for future examinations.”

Evaluation: The Code requires 100% volumetric and surface examination of the subject pressurizer dissimilar metal nozzle-to-safe end weld during each inspection interval. Figures supplied by the licensee show that the surface geometry (extreme radius and contour) of the flange, preclude complete ultrasonic scans of the full volume of this weld. Therefore, the Code-required 100% volumetric examination is impractical to achieve. To gain access for 100% coverage, the component would have to be redesigned and modified. This would place a significant burden on the licensee.

The licensee was able to obtain a significant portion (78%) of the required volumetric coverage. In addition, the licensee has completed the Code-required 100% surface examination. These examinations should detect any existing patterns of degradation, and provide reasonable assurance of the continued structural integrity of the weld. Therefore, based on the impracticality of the Code volumetric coverage requirements, and the extent of examinations performed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.3 Request for Relief No. 8 (Revision 0) Part C, Examination Category B-G-1, Item B6.10, Reactor Vessel Closure Head Nuts

Code Requirement: Examination B-G-1, Item B6.10 requires 100% surface examination of the reactor vessel closure head nuts.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code surface examination coverage requirements of the reactor vessel closure head nuts.

Licensee's Basis for Requesting Relief (as stated):

"The following 10 CFR 50.55a paragraphs apply to the inservice inspection of components in accordance with the ASME Section XI code: 50.55a(g)(5)(iv): Where an examination requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program as permitted by paragraph (g)(4) of this section, the basis for this determination must be demonstrated to the satisfaction of the Commission...

"Prairie Island was designed and constructed prior to development of ASME XI and therefore design for inspectability and inspection coverage is not in many cases, sufficient to permit satisfying the current Code requirements. Limitations to inspections are primarily due to obstructions and interferences.

"Reactor Vessel Closure Head Nuts (RV Nuts 1-48): Surface examination coverage limited to 82.50%. Inside diameter of nut prohibits induction of two directional fields when utilizing yoke. (See Figures 4 and 5)³.

"The nature of the limitations have been noted on the ISI examination reports and are included in the ISI Outage Summary Report. NSP will continue to document the limitations.

"All in-service inspections at Prairie Island Unit 2 have been done to the greatest extent practical. When limitations to required inspections are encountered M&SP procedure ISI-LTS-1 is applied which requires alternative examination techniques be considered, or applied to gain the maximum obtainable inspection coverage practical. In all of the above items identified this procedure was used and the maximum inspection coverage was achieved.

"Limitations are due to design, geometry, and materials of construction of the components or ALARA concerns."

Licensee's Proposed Alternative Examination (as stated):

"NSP will continue to utilize the most current techniques available for future examinations.

"Because of the limitation of examination methodology on the threaded region of the nuts, future examination on this item (RV Nuts (1-48)) will be performed according to the requirements of 1992 ASME Code Sec. XI, Table IWB 2500-1, item B6.10, which requires a visual, VT-1 inspection of the surface area of the nuts."

Evaluation: The Code requires 100% surface examination of the carbon steel reactor pressure vessel closure head nuts during each inspection interval. Figures supplied by the licensee show that the inside diameter of the closure head nut is too small to allow entry of the magnetic yoke. Therefore, the complete magnetic field cannot be induced into portions of the ID surface. Consequently, the Code-required 100% surface examination is impractical to achieve. To gain access for the required 100% coverage, the closure head nuts and/or equipment would have to be redesigned and modified. These modifications would place a significant burden on the licensee.

The licensee was able to obtain a significant portion (82.5%) of the required surface coverage. These examinations should have detected any existing patterns of degradation, thereby providing reasonable assurance of the continued structural integrity of the closure head nuts. Therefore, based on the impracticality of the Code surface coverage requirements and the extent of examinations performed, it is recommended that relief for previous examinations of the subject closure head nuts be granted pursuant to 10 CFR 50.55a(g)(6)(i).

Note: Although not evaluated as part of this request for relief, the licensee has indicated their intent to use the 1992 Edition of ASME Section XI for future examinations of the reactor pressure vessel closure head nuts. The 1992 Edition specifies a VT-1 visual examination for the closure head nuts as opposed to the surface examination currently required by the 1989 Edition (the licensee's Code of record for this interval). 10 CFR 50.55a(g)(4)(iv) states that inservice examination of components may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in paragraph (b) of this section [10 CFR 50.55(a)] and subject to Commission approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met. Therefore, while the licensee has indicated that it intends to use the 1992 Edition for future examinations of reactor vessel closure head nuts, it must submit this as an alternative to the current Code requirements for Commission approval.

2.4 Request for Relief No. 8 (Revision 0) Part D, Examination Category B-J, Items B9.11, B9.21, and B9.31, Pressure Retaining Welds In Piping

Code Requirement: Examination Category B-J, Items B9.11 and B9.31 requires 100% surface and volumetric examination of circumferential and branch connection welds in pressure-retaining piping NPS 4 or larger, as defined by Figure IWB-2500-8, -9, -10, and -11, each inspection interval. Examination Category B-J, Item B9.21 requires 100% surface examination of circumferential welds in pressure-retaining piping less than NPS 4, as defined by Figure IWB-2500-8, each inspection interval.

Licensee's Code Relief Request: Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee has requested relief from performing volumetric or surface examinations (as applicable) to the extent required by the Code for the welds identified in the following table.

Comp. ID	Component Description	ASME Category	Item Number	Aggregate Coverage	Limitation	W-6/2LSU
	Reactor Coolant A	B-J	B9.11	29.50%	Volumetric Examination limited by pump configuration.	W-6
	Accumulator Discharge B	B-J	B9.11	83.80%	Volumetric Examination limited by joint configuration and vent line.	W-2
	Pressurizer Safety B	B-J	B9.11	76.70%	Volumetric Examination limited by safe end configuration	W-5
	Reactor Coolant A	B-J	B9.11	68%	Volumetric Examination limited by nozzle geometry	W-1
	Reactor Coolant A	B-J	B9.11	47.90%	Volumetric Examination limited by joint configuration.	W-1
	Reactor Coolant B	B-J	B9.11	84%	Volumetric Examination limited by joint configuration.	W-12
	Seal Injection	BB-J	B9.21	50.00%	Surface examination limited by Box Restraint	W-1
	Pressurizer Surge	B-J	B9.31	87.00%	Volumetric Examination limited by joint configuration.	W-1
	RCS Draindown	B-J	B9.31	60.00%	Volumetric Examination limited by joint configuration.	

Licensee's Basis for Requesting Relief (as stated):

"The following 10 CFR 50.55a paragraphs apply to the inservice inspection of components in accordance with the ASME Section XI code: 50.55a(g)(5)(iv): Where an examination requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program as permitted by paragraph (g)(4) of this section, the basis for this determination must be demonstrated to the satisfaction of the Commission...

"Prairie Island was designed and constructed prior to development of ASME XI and therefore design for inspectability and inspection coverage is not in many cases, sufficient to permit satisfying

the current Code requirements. Limitations to inspections are primarily due to obstructions and interferences.

“Reactor Coolant Loop A Weld (W-6/2LSU): Volumetric coverage limited to 29.5%. Pump configuration prohibits UT examination downstream of weld centerline (See Figure 6)⁴.

“Accumulator discharge B Weld (W-6): Volumetric coverage is limited to 83.80%. Joint configuration prohibits UT scanning from downstream side and vent line prohibits UT scan from 39 inches to 1.5 inches of circumference. (See Figure 7).

“Pressurizer Safety B Weld (W-2): Volumetric coverage is limited to 76.70%. Safe end configuration prohibits UT exam on upstream side. (See Figure 8).

“Reactor Coolant Loop A Weld (W-5): Volumetric coverage is limited to 68.00%. Nozzle geometry upstream of weld limits UT examination. (See Figure 9).

“Reactor Coolant Loop A Weld (W-1): Volumetric coverage is limited to 47.90%. Joint configuration prohibits UT scanning nozzle from side. (See Figure 10).

“Reactor Coolant Loop B Weld (W-1): Volumetric coverage is limited to 84.00%. No UT scan on upstream side of weld due to configuration (See Figure 11).

“Seal Injection B Weld (W-12): Surface examination coverage is limited to 50.00%. Box restraint limits access from weld centerline to beyond exam area, upstream side. (See Figure 12).

“Pressurizer Surge Weld (W-1): Volumetric coverage is limited to 87.00%. Two circumferential scan limitations at 90 degrees and 270 degrees for 12.7 inches due to hot leg and surge line configuration. (See Figures 13 and 14).

“Reactor coolant system Drain down Weld (W-1): Volumetric coverage is limited to 60.00%. Joint configuration limits scan. (See Figure 15).

“The nature of the limitations have been noted on the ISI examination reports and are included in the ISI Outage Summary Report. NSP will continue to document the limitations.

“All in-service inspections at Prairie Island Unit 2 have been done to the greatest extent practical. When limitations to required inspections are encountered M&SP procedure ISI-LTS-1 is applied which requires alternative examination techniques be considered, or applied to gain the maximum obtainable inspection coverage practical. In all of the above items identified this procedure was used and the maximum inspection coverage was achieved.

“Limitations are due to design, geometry, and materials of construction of the components or ALARA concerns.”

Licensee’s Proposed Alternative Examination (as stated):

“NSP will continue to utilize the most current techniques available for future examinations.”

Evaluation: Examination Category B-J, Items B9.11 and B9.31, require 100% surface and volumetric examination of circumferential and branch pipe connection welds NPS 4 or larger in Class 1 pressure-retaining piping. However, as shown in sketches provided by the licensee, the

extent of volumetric examinations of the subject Items B9.11 and B9.31 welds is limited by interference from pipe supports, vent lines, joint configurations and nozzle geometries. Therefore, the Code volumetric coverage requirements are impractical for these welds. To complete the examinations to the extent required by the Code, the licensee would have to redesign and modify the subject piping and/or piping supports. Imposition of the Code coverage requirements would result in a considerable burden on the licensee.

For the subject Items B9.11 and B9.31 welds, the licensee has performed examinations ranging from 29.5% to 87% of the Code-required volumetric examinations and 100% of the surface examinations. Based upon the portion of the welds examined volumetrically, and the 100% surface examination coverage, it is concluded that significant patterns of degradation would have been detected, and reasonable assurance of the structural integrity of these circumferential welds is provided.

Examination Category B-J, Item B9.21, requires 100% surface examination of circumferential welds in Class 1 pressure-retaining piping less than NPS 4. However, as shown in sketches provided by the licensee, the extent of surface examinations of the subject Item B9.21 weld is limited by interference from a box restraint. Therefore, the Code required surface coverage requirements is impractical for the subject weld. To complete the examination to the extent required by the Code the licensee would have to redesign and modify the subject piping and/or box restraint. Imposition of the Code coverage requirements would result in a considerable burden on the licensee.

For the subject Item B9.21 weld, the licensee has performed 50% of the Code-required surface examinations. Based upon surface examination coverage obtained, it is concluded that significant patterns of degradation would have been detected, and reasonable assurance of the structural integrity of this circumferential weld is provided.

Based on the impracticality of meeting the Code requirements for the subject examination areas, and the reasonable assurance provided by the examinations that were completed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i) for the subject welds.

2.5 Request for Relief No. 8 (Revision 0) Part E, Examination Category C-B, Item C2.21, Pressure-Retaining Nozzle Welds in Vessels

Code Requirement: Examination Category C-B, Item C2.21 requires 100% surface and volumetric examination of nozzle-to-shell (or head) welds in Class 2 vessels as defined by Figure IWC-2500-4(a) or (b). In the case of multiple vessels of similar design, size, and service, the required examinations may be limited to one vessel or distributed among the vessels.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examination of steam generator 21 nozzle Weld N-1.

Licensee's Basis for Requesting Relief (as stated):

"The following 10 CFR 50.55a paragraphs apply to the inservice inspection of components in accordance with the ASME Section XI code: 50.55a(g)(5)(iv): Where an examination requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program as permitted by paragraph (g)(4) of this section, the basis for this determination must be demonstrated to the satisfaction of the Commission...

"Prairie Island was designed and constructed prior to development of ASME XI and therefore design for inspectability and inspection coverage is not in many cases, sufficient to permit satisfying the current Code requirements. Limitations to inspections are primarily due to obstructions and interferences.

"Steam Generator #21 Nozzle (N-1): Volumetric coverage is limited to 86.11%. UT scanning limitation due to nozzle configuration. (See Figure 16)⁵.

"The nature of the limitations have been noted on the ISI examination reports and are included in the ISI Outage Summary Report. NSP will continue to document the limitations.

"All in-service inspections at Prairie Island Unit 2 have been done to the greatest extent practical. When limitations to required inspections are encountered M&SP procedure ISI-LTS-1 is applied which requires alternative examination techniques be considered, or applied to gain the maximum obtainable inspection coverage practical. In all of the above items identified this procedure was used and the maximum inspection coverage was achieved.

"Limitations are due to design, geometry, and materials of construction of the components or ALARA concerns."

Licensee's Proposed Alternative Examination (as stated):

"NSP will continue to utilize the most current techniques available for future examinations."

Evaluation: The Code requires 100% surface and volumetric examination of Class 2 pressure vessel nozzle-to-shell welds. However, sketches provided by the licensee show that complete volumetric examination of the subject steam generator nozzle weld is limited due to the nozzle design configuration (extreme nozzle to shell radius). Therefore, the Code examination requirements are impractical for this weld. To meet the Code requirements, the subject component would require engineering redesign and modification to allow access to the subject weld. Imposition of the Code requirements would result in a considerable burden on the licensee.

The licensee was able to obtain a significant portion (86.11%) of the required volumetric coverage. Additionally, the Code-required 100% surface examination was performed on the nozzle weld. Therefore, based on the volume examined and the Code-required surface examinations performed, it is concluded that significant patterns of degradation, if present, would have been detected and reasonable assurance of the structural integrity of the pressure-retaining nozzle weld has been provided.

Based on the impracticality of meeting the Code examination requirements for the subject weld, and the reasonable assurance provided by the examinations that were completed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.6 Request for Relief No. 8 (Revision 0) Part F, Examination Category C-F-1, Items C5.11 and C5.21, Pressure-Retaining Welds in Austenitic Stainless Steel or High Alloy Piping

Code Requirement: Examination Category C-F-1, Items C5.11 and C5.21 require 100% surface and volumetric examination of circumferential welds in piping $\geq 3/8$ inch nominal wall thickness for piping \geq NPS 4, and circumferential welds in piping $\geq 1/5$ inch nominal wall thickness for piping \geq NPS 2 and \geq NPS 4 as defined by Figure IWC-2500-7.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examinations of the following welds:

Comp. ID	Component Description	ASME Category	Item Number	Aggregate Coverage	Limitation	W-20/LSU
	RHR Pump B Suction	C-F-1	C5.11	83.30%	Flange configuration prohibits volumetric exam on downstream side	W-21/LSU
	RHR Pump B Suction	C-F-1	C5.11	82.30%	Flange configuration prohibits volumetric exam on upstream side	W-19/LSU
	RHR Pump B Suction	C-F-1	C5.11	83.30%	Flange configuration prohibits volumetric exam on upstream side	W-6
	RV Safety Injection	C-F-1	C5.11	85.87%	Pipe to valve limits volumetric exam on pipe side of weld	W-1
	RV Safety Injection	C-F-1	C5.11	77.80%	Valve configuration limits volumetric exam on valve body	W-7
	SI 21 Discharge	C-F-1	C5.21	77.50%	Valve configuration limits volumetric exam on valve body	

Licensee's Basis for Requesting Relief (as stated):

"The following 10 CFR 50.55a paragraphs apply to the inservice inspection of components in accordance with the ASME Section XI code: 50.55a(g)(5)(iv): Where an examination requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program as permitted by paragraph (g)(4) of this section, the basis for this determination must be demonstrated to the satisfaction of the Commission...

"Prairie Island was designed and constructed prior to development of ASME XI and therefore design for inspectability and inspection coverage is not in many cases, sufficient to permit satisfying the current Code requirements. Limitations to inspections are primarily due to obstructions and interferences.

“RHR Pump B suction Weld (W-20/LSU): Volumetric coverage is limited to 83.30%. Flange configuration prohibits UT exam on downstream side. (See Figure 17)⁶.

“RHR Pump B suction Weld (W-21/LSU): Volumetric coverage is limited to 82.30%. Flange configuration prohibits UT exam on upstream side. (See Figure 18).

“RHR Pump B suction Weld (W-19/LSD): Volumetric coverage is limited to 83.30%. Flange configuration prohibits UT exam on upstream side. (See Figure 19).

“Reactor Vessel Safety Injection Weld (W-6): Volumetric coverage is limited to 85.87%. UT exam limited to the pipe side and weld crown only due to pipe to valve configuration. (See Figure 20).

“Reactor Vessel Safety Injection Weld (W-1): Volumetric coverage is limited to 77.80%. Valve configuration prohibits scanning on valve. (See Figure 21).

“Safety Injection 21 Discharge Weld (W-7): Volumetric coverage is limited to 77.50%. Valve configuration prohibits UT scanning on valve. (See Figure 22).

“The nature of the limitations have been noted on the ISI examination reports and are included in the ISI Outage Summary Report. NSP will continue to document the limitations.

“All in-service inspections at Prairie Island Unit 2 have been done to the greatest extent practical. When limitations to required inspections are encountered M&SP procedure ISI-LTS-1 is applied which requires alternative examination techniques be considered, or applied to gain the maximum obtainable inspection coverage practical. In all of the above items identified this procedure was used and the maximum inspection coverage was achieved.

“Limitations are due to design, geometry, and materials of construction of the components or ALARA concerns.”

Licensee's Proposed Alternative Examination (as stated):

“NSP will continue to utilize the most current techniques available for future examinations.”

Evaluation: The Code requires 100% volumetric and surface examination of the subject Class 2 circumferential piping welds. Review of the contour sketches provided by the licensee revealed that complete volumetric examination is impractical due to component configurations including valve bodies and flange geometries. To meet the Code requirements for volumetric examination, the subject welds and/or adjoining components would require significant engineering re-design and modifications. Therefore, the Code volumetric examination requirement for the subject welds is impractical. Imposition of this requirement would create a considerable burden on the licensee.

The licensee was able to obtain a significant portion ranging from 77.50% to 85.87% of the required volumetric coverage on each weld. Additionally, the Code-required 100% surface examination was performed on the subject welds. Therefore, based on the volume examined and the Code-required surface examinations performed, it is concluded that significant patterns of degradation, if present, would have been detected and reasonable assurance of the structural integrity of the pressure-retaining nozzle welds has been provided.

Based on the impracticality of meeting the Code examination requirements for the subject welds, and the reasonable assurance provided by the examinations that were completed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.7 Request for Relief No. 8 (Revision 0) Part G, Examination Category C-F-2, Item C5.81 Pressure-Retaining Welds in Carbon or Low Alloy Steel Piping

Code Requirement: Examination Category C-F-2, Item C5.81 requires 100% surface examination of branch connection welds in piping NPS 2 as defined by Figure IWC-2500-9 to 13.

Licensee's Proposed Alternative: In accordance with 10 CFR 50.55a(a)(3)(ii), the licensee proposed that the coverages obtained be found acceptable for piping branch connection Weld W-27 on the main steam system. The licensee stated:

"NSP will continue to utilize the most current techniques available for future examinations."

Licensee's Basis for Proposed Alternative (as stated):

"The following 10 CFR 50.55a paragraphs apply to the inservice inspection of components in accordance with the ASME Section XI code: 50.55a(g)(5)(iv): Where an examination requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program as permitted by paragraph (g)(4) of this section, the basis for this determination must be demonstrated to the satisfaction of the Commission...

"Prairie Island was designed and constructed prior to development of ASME XI and therefore design for inspectability and inspection coverage is not in many cases, sufficient to permit satisfying the current Code requirements. Limitations to inspections are primarily due to obstructions and interferences.

"Main Steam B Weld (W-27): Surface examination coverage is limited to 72.20%. Component support prohibits examination of a portion of W-27. (See Figure 23)⁷.

"The nature of the limitations have been noted on the ISI examination reports and are included in the ISI Outage Summary Report. NSP will continue to document the limitations.

"All in-service inspections at Prairie Island Unit 2 have been done to the greatest extent practical. When limitations to required inspections are encountered M&SP procedure ISI-LTS-1 is applied which requires alternative examination techniques be considered, or applied to gain the maximum obtainable inspection coverage practical. In all of the above items identified this procedure was used and the maximum inspection coverage was achieved.

"Limitations are due to design, geometry, and materials of construction of the components..."

Evaluation: The Code requires 100% surface examination of the subject Class 2 branch connection weld. However, sketches provided by the licensee show that the examination of the subject weld is restricted due to a component support. The licensee stated that they have been able to achieve 72.20% of the required surface examination coverage. The licensee has performed walkdowns of the area to determine the difficulty involved with the removal of the support to obtain the additional required coverage, and determined that the time and physical constraints to remove the support does not warrant the additional coverage. From

sketches provided, it appears that removal of the support from the piping would require a temporary alternative piping support. In addition, the removal of the piping support may result in excessive loading and undue stresses on piping and nearby components, as well as possible damage to the piping support.

Based on the efforts that would be involved with the piping support removal, and the risks of possible damage to the component during removal, imposition of the Code requirements would result in a significant hardship. A compensating increase in the level of quality and safety would not be provided by requiring the licensee to remove the support for the sole purpose of obtaining an additional 28% of surface examination coverage. The surface examination performed will provide reasonable assurance of the continued structural integrity of the subject branch connection weld. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), it is recommended that the alternative be authorized.

2.8 Request for Relief No. 8 (Revision 0) Part H, Examination Category C-C, Items C3.20 and C3.30, Integral Attachments for Piping and Pumps

Code Requirement: Examination Category C-C, Item C3.20 and C3.30 requires 100% surface examination of integrally welded attachments on piping and pumps as defined by Figure IWC-2500-5. Examinations are limited to attachment welds of components examined under Examination Categories C-F and C-G.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required surface examinations on the following welds.

Comp. ID	Component Description	ASME Category	Item Number	Aggregate Coverage	Limitation	
	Main Steam A	C-C	C3.20	83.52%	Surface examination limited by restraint interference	H-2 H-1
	Main Steam A	C-C	C3.20	69.63%	Surface examination limited by restraint interference	H-3
	Main Steam A	C-C	C3.20	85.97%	Surface examination limited by restraint interference	H-3
	SI Pump 21	C-C	C3.30	75.40%	Pump configuration limits complete surface examination at base of support	H-4
	SI Pump 21	C-C	C3.30	75.40%	Pump configuration limits complete surface examination at base of support	H-2
	SI Pump 21	C-C	C3.30	75.40%	Pump configuration limits complete surface examination at base of support	H-1
	SI Pump 21	C-C	C3.30	75.40%	Pump configuration limits complete surface examination at base of support	

Licensee's Basis for Requesting Relief (as stated):

"The following 10 CFR 50.55a paragraphs apply to the inservice inspection of components in accordance with the ASME Section XI code: 50.55a(g)(5)(iv): Where an examination requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program as permitted by paragraph (g)(4) of this section, the basis for this determination must be demonstrated to the satisfaction of the Commission...

"Prairie Island was designed and constructed prior to development of ASME XI and therefore design for inspectability and inspection coverage is not in many cases, sufficient to permit satisfying the current Code requirements. Limitations to inspections are primarily due to obstructions and interferences.

"Main Steam A Hanger (H-2): Surface examination coverage limited to 83.52%. Examination limited to 76 inches of weld length due to configuration of restraint. (See Figure 24)⁸.

"Main Steam A Hanger (H-1): Surface examination coverage limited to 69.63%. Examination limited to 188 inches of weld length out of 270 inches total due to configuration of restraint. (See Figure 25).

"Main Steam A Hanger (H-3): Surface examination coverage limited to 85.97%. Examination limited to 49 inches of weld length out of 57 inches total due to configuration of restraint. (See Figure 26).

"Safety Injection Pump #21 Hanger (H-3): Surface examination coverage limited to 75.40%. Configuration prohibits examining weld at base support. (See Figure 27).

"Safety Injection Pump #21 Hanger (H-4): Surface examination coverage limited to 75.40%. Configuration prohibits examining weld at base support. (See Figure 28).

"Safety Injection Pump #21 Hanger (H-2): Surface examination coverage limited to 75.40%. Configuration prohibits examining weld at base support. (See Figure 29).

"Safety Injection Pump #21 Hanger (H-1): Surface examination coverage limited to 75.40%. Configuration prohibits examining weld at base support. (See Figure 30).

"The nature of the limitations have been noted on the ISI examination reports and are included in the ISI Outage Summary Report. NSP will continue to document the limitations.

"All in-service inspections at Prairie Island Unit 2 have been done to the greatest extent practical. When limitations to required inspections are encountered M&SP procedure ISI-LTS-1 is applied which requires alternative examination techniques be considered, or applied to gain the maximum obtainable inspection coverage practical. In all of the above items identified this procedure was used and the maximum inspection coverage was achieved.

"Limitations are due to design, geometry, and materials of construction of the components or ALARA concerns."

Licensee's Proposed Alternative Examination (as stated):

"NSP will continue to utilize the most current techniques available for future examinations."

Evaluation: The Code requires 100% surface examination of the subject integrally welded attachments. Review of the sketches submitted by the licensee revealed that complete examination coverage was impractical due to restricted access caused by interference from permanent restraints and pump configurations. To meet the Code requirements, the integral attachments and/or interfering structures would require design modification and/or removal to allow access to the subject welds. Therefore, surface examination of the subject integral attachment

welds is impractical to perform to the extent required by the Code. Imposition of this requirement would create a considerable burden on the licensee without a compensating increase in safety.

The licensee has completed a significant portion ranging from 75.40 to 85.97% of the Code-required surface examinations for the subject components. Based upon the surface coverage obtained for each component, it is reasonable to conclude that existing patterns of degradation, if present, would have been detected, thus providing reasonable assurance of the structural integrity of the subject integral attachment welds. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

3. CONCLUSION

The INEEL staff has reviewed the licensee's submittals and concludes that the Code requirements are impractical to meet for the issues contained in Relief Request No. 8 (Revision 0) Part A-F, and H. Therefore, relief should be granted pursuant to 10 CFR 50.55a(g)(6)(i).

For Relief Request No. 8 (Revision 0) Part G, it is concluded that the Code requirements would result in hardship without a compensating increase in the level of quality and safety. Therefore, it is recommended that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

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