

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
OF THE SECOND 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN  
REQUESTS FOR RELIEF NO. NDE-23 THROUGH NDE-30  
FOR  
VIRGINIA ELECTRIC AND POWER COMPANY  
NORTH ANNA POWER STATION, UNIT 2  
DOCKET NUMBER: 50-339

1.0 INTRODUCTION

The Technical Specifications for North Anna Power Station, Unit 2 state that the inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel 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(g)(6)(i).

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 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(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for the North Anna Power Station, Unit 2 second 10-year inservice inspection (ISI) interval is the 1986 Edition. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the

licensee that could result if the requirements were imposed. In letters dated August 2, 1995, and September 1, 1995, Virginia Electric and Power Company submitted to the NRC its Second 10-Year Interval Inservice Inspection Program Plan Requests for Relief Nos. NDE-23 through NDE-30 for the North Anna Power Station, Unit 2.

## 2.0 EVALUATION AND CONCLUSIONS

The staff, with technical assistance from its contractor, the Idaho National Engineering Laboratory (INEL), has evaluated the information provided by the licensee in support of its Second 10-Year Interval Inservice Inspection Program Plan Requests for Relief Nos. NDE-23 through NDE-30 for the North Anna Power Station, Unit 2.

Based on the information submitted, the staff adopts the contractor's conclusions and recommendations presented in the Technical Letter Report. The staff concluded that Code requirements contained in Requests for Relief Nos. NDE-23 through NDE-30 are impractical because of interferences and/or limited accessibility by other components. Replacement of the component or design modification would be necessary to perform the Code-required examinations that would result in a burden on the licensee. The licensee's proposed alternatives will provide adequate assurance of structural integrity. Therefore, the licensee's Requests for Relief Nos. NDE-23 through NDE-30 are granted pursuant to 10 CFR 50.55a(g)(6)(i). The relief granted is authorized by law, will not endanger life, property, or 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.

TECHNICAL LETTER REPORT  
SECOND 10-YEAR INSERVICE INSPECTION INTERVAL  
RELIEF REQUESTS NDE-23 THROUGH NDE-30  
VIRGINIA ELECTRIC AND POWER COMPANY  
NORTH ANNA POWER STATION, UNIT 2  
DOCKET NUMBER 50-339

1.0 INTRODUCTION

In letters dated August 2, 1995, and September 1, 1995, Virginia Electric and Power Company submitted Relief Requests NDE-23 through NDE-30 for the second 10-year inservice inspection (ISI) interval at the North Anna Power Station, Unit 2. Clarifying information was provided on May 29, 1996, during a licensee, NRC, and INEL staff conference call. The Idaho National Engineering Laboratory (INEL) staff has evaluated the subject relief requests in the following section.

2.0 EVALUATION

The Code of record for the North Anna Power Station, Unit 2, second 10-year ISI interval is the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, 1986 Edition. The information provided by the licensee in support of the relief requests has been evaluated and the es for disposition are documented below.

A. Relief Request NDE-23, Examination Category C-F-1, Item C5.21, Circumferential Piping Weld

Code Requirement: Table IWC-2500-1, Examination Category C-F-1, Item C5.21, requires 100% surface and volumetric examination of piping welds as defined in Figure IWC-2500-7.

Licensee's Code Relief Request: The licensee requested relief from performing the Code-required 100% volumetric examination of circumferential piping Weld 26 in Line 3"-SI-417-1502-Q1.

Licensee's Basis for Relief (as stated):

"The component listed above is a three inch pipe to tee weld. This component has been examined to the extent practical as required by the Code. The Code required volumetric examination coverage was reduced due to interferences from an adjacent pipe. The extent of volumetric examination which was completed is detailed in Table NDE-23\*. An extended beam path was used to examine the component in the tangential direction from the pipe side. The required surface examination had no limitations. Figure NDE-23-1\* is provided detailing the limitations experienced."

Licensee's Proposed Alternative (As stated):

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements."

Evaluation: The Code requires that the subject weld receive 100% surface and volumetric examinations. However, due to a weld access restriction imposed by an adjacent pipe, complete volumetric examination is impractical. To obtain complete coverage, design modifications would be required. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee has performed the subject examination to the extent practical. Based on the 85.2% volumetric examination and 100% surface examination, it is concluded that significant degradation, if present, would have been detected. These examinations, in combination with similar piping weld examinations, provide reasonable assurance of structural integrity. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

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Not included with this evaluation.

B. Relief Requests NDE-24, 26, and 27, Examination Category B-J, Items B9.11 and B9.31, Piping Welds

Code Requirement: Table IWB-2500-1, Examination Category B-J, Items B9.11 and B9.31 require 100% surface and volumetric examination of weld volumes as defined in Figure IWB-2500-8 for Item B9.11 circumferential piping welds, and Figures IWB-2500-9, -10, and -11 for Item B9.31 branch pipe connection welds.

Licensee's Code Relief Request: The licensee requested relief from performing the complete Code-required examinations of the piping welds listed in the table below.

Relief Request No.	Weld	Line	UT Coverage Percent	Surface Exam Coverage Percent
NDE-24	SW-23	6"-RC-418-1502-Q1	28 Circ Scan 80 Axial Scan	100
	SW-43	12"-RC-423-1502-Q1	28 Circ Scan 83 Axial Scan	
	SW-45	6"-RC-419-1502-Q1	28 Circ Scan 76 Axial Scan	
NDE-26	SW-14	6"-RC-438-1502-Q1	83.3	83.3
	SW-19	6"-RC-439-1502-Q1		
NDE-27	SW-16	6"-RC-438-1502-Q1	29	29
	SW-24	6"-RC-439-1502-Q1		



Licensee's Basis for Relief (as stated):

NDE-24: "The components listed above have been examined to the extent practical as required by the Code. The Code required volumetric examination coverage was reduced due to nozzle configuration, weld joint geometry, and the material type for which the components are constructed. The scope of volumetric examination coverage completed for the above listed welds is listed in Table NDE-24-1. The required surface examinations had no limitations. Figure NDE-24-1 is provided detailing the limitations experienced. Alternative components could not be substituted for examination due to the mandatory selection requirements of the Code."

NDE-26: "The components listed above have been examined to the extent practical as required by the Code. Due to a 3.5 inch diameter branch connection located at the center line of each weld, only 83.3% of the required volume and surface of each weld was examined. Figure NDE-26-1 is provided detailing the limitations experienced as part of an augmented inspection program. Performing additional examinations on welds which would allow greater coverage would require additional radiation dose and expense with very little increase in safety."

NDE-27: "The components listed above have been examined to the extent practical as required by the Code. Due to interference by an existing pipe support, only 6 inches out of 21 inches were examined. The reduction in coverage is detailed in Table NDE-27-1. Figure NDE-27-1 is provide detailing the limitations experienced. These welds are classified as terminal ends and are require to be examined by the ISI program."

Licensee's Proposed Alternative (As stated):

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements."

Evaluation: The Code requires 100% volumetric and surface examination coverage of the subject piping welds. For Relief Request NDE-24, covering pipe-to-nozzle welds, the weld configuration and material acoustic properties (pipe is ASTM A-351 austenitic steel casting) make complete volumetric coverage impractical. For Relief Request NDE-26, branch connections that attach to the pipe at the circumferential weld locations make

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Not included with this evaluation.

complete volumetric and surface examination coverage impractical. For Relief Request NDE-27, supports that encircle 270 degrees of each of the welds restrict access and make complete volumetric and surface examination coverage impractical. To obtain complete examination coverage, design modifications would be necessary. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee performed the examinations to the maximum extent practical, obtaining coverages shown in the table above. Based on the extent of examination coverage achieved and the Code-required examinations of other, similar, welds, it is concluded that significant degradation, if present, would have been detected. This provides reasonable assurance of structural integrity. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

C. Relief Request NDE-25, Examination Category C-A, Item C1.10, RHR Heat Exchanger Vessel Shell Circumferential Weld

Code Requirement: Table IWC-2500-1, Examination Category C-A, Item C1.10, requires 100% volumetric examination of welds as defined in Figure IWC-2500-1.

Licensee's Code Relief Request: The licensee requested relief from performing the Code-required 100% volumetric examination of circumferential vessel Weld 2 (Drawing 12050-WMKS-RH-E-1A) in the residual heat removal (RHR) heat exchanger.

Licensee's Basis for Relief (as stated):

"The component listed above has been examined to the extent practical as required by the Code. The examination was limited due to interferences from saddle plates around the inlet and outlet nozzles. The weld was examined with a 45° and a 60° transducer. An extended beam path was used with both transducers.

The reduction in coverage of the volumetric examination is detailed in Table NDE-25-1\*. Figure NDE-25-1\* is provided detailing the limitations experienced.

Licensee's Proposed Alternative (As stated):

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements."

Evaluation: The Code requires that the subject weld receive a 100% volumetric examination. However, due to access limitations caused by saddle plates around the inlet and outlet nozzles, complete volumetric examination is impractical. To obtain complete coverage, design modifications would be required. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee performed the volumetric examinations to the extent practical, resulting in 81.2% Code coverage. Based on the significant percent of coverage obtained, it is reasonable to conclude that degradation, if present, would have been detected. Thus, reasonable assurance of structural integrity has been provided. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

D. Relief Request NDE-28, Examination Category B-D, Item B3.110, Pressurizer Nozzle-to-Vessel Welds

Code Requirement: Table IWB-2500-1, Examination Category B-D, Item B3.110, requires 100% volumetric examination of welds as defined in Figure IWB-2500-7.

Licensee's Code Relief Request: The licensee requested relief from performing the Code-required 100% volumetric examination of

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Not included with this evaluation.



nozzle-to-vessel Welds 11 and 12 (Drawing 12050-WMKS-RC-E-2) in the pressurizer.

Licensee's Basis for Relief (as stated):

"The components listed above have been examined to the extent practical as required by the Code. The Code required volumetric examination coverage was reduced due to nozzle configuration and weld joint geometry. The scope of volumetric examination coverage completed for the above listed welds is listed in Table NDE-28-1. Figure NDE-28-1 is provide detailing the limitations experienced. Alternative components could not be substituted for examination due to the mandatory selection requirements of the Code."

Licensee's Proposed Alternative (As stated):

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements."

Evaluation: The Code requires that all pressurizer nozzle-to-shell welds be 100% volumetrically examined. The sketches provided show that the subject nozzle welds have limited scan areas as the result of the nozzle configurations and weld joint geometry. Therefore, it is impractical to examine the pressurizer nozzle welds at North Anna Unit 2 to the extent required by the Code. To obtain complete volumetric coverage, design modification of the subject nozzles would be required. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee performed the the subject volumetric examinations to the extent practical, obtaining an average coverage with 13 different scans of 66%, as determined from analysis of the licensee's submitted data. Based on the coverage obtained and the system leakage tests that are performed every refueling outage, it is reasonable to conclude that degradation, if present, would be

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Not included with this evaluation.

detected. Thus, reasonable assurance of structural integrity has been provided. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

E. Relief Requests NDE-29 and NDE-30, Examination Category C-C, Items C3.20 and C3.30, Welded Attachments

Code Requirement: Table IWB-2500-1, Examination Category C-C, Items C3.20 and C3.30, require 100% surface examination of welded attachments to piping and pumps as defined in Figure IWC-2500-5.

Licensee's Code Relief Request: The licensee requested relief from performing the Code-required 100% surface examination of four piping welded attachments associated with Weld 52H in Drawing 12050-WMKS-107D and of charging system pump welded attachment Numbers WS-3 and WS-4 in Drawing 12050-WMKS-CH-P-1A and Numbers WS-3 and WS-4 in Drawing 12050-WMKS-CH-P-1B.

Licensee's Basis for Relief (as stated):

*NDE-29:* "The weld listed above has been examined to the extent practical as required by the Code. Due to interference from an existing pipe support, only five inches out of six inches (83%) of each of the four integral attachments that are associated with weld 52H are accessible for an inservice examination. Figure NDE-29 is provided detailing the limitations experienced. Alternative components could not be substituted for examinations due to the mandatory selection requirements of the Code."

*NDE-30:* "The integral attachment welds listed above have been examined to the extent practical as required by the Code. The Code required surface examination was reduced due to a support pad which the integral attachment rests on and the pump end flange. The support pad prohibits access to the underside of the integral attachment. The end flange prohibits access to one of the outer edges of each integral attachment on the "A" pump. The end flange on the "B" pump limits a portion of the base material required to be examined.

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Not included with this evaluation.

"The limitation on integral attachment welds WS-3 and WS-4 on 2-CH-P-1A was 41% of the examination area as required (59% of the required areas was examined). Figure NDE-30-1 is provided detailing the limitations experienced.

"The limitation on integral attachment welds WS-3 and WS-4 on 2-CH-P-1B was 18.5% of the examination area as required (81.5% of the required areas was examined). Figure NDE-30-2 is provided detailing the limitations experienced."

Licensee's Proposed Alternative (As stated):

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements."

Evaluation: The licensee requested relief from the Code-required 100% surface examination of the subject welded attachments. From review of the drawings provided, it is apparent that performance of the surface examinations to the extent required by Code is impractical. Design modifications would be necessary to provide for complete examination of the subject attachment areas. This would result in a considerable burden on the licensee.

The licensee has performed the surface examinations to the extent practical. Based on the the significant percent of coverage obtained (83% for Relief Request NDE-29; 59% and 81.5% for Relief Request NDE-30), it is reasonable to conclude that degradation, if present, would have been detected. Thus, reasonable assurance of structural integrity has been provided. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.0 CONCLUSION

The INEL staff has reviewed the licensee's relief requests and determined that the Code examination requirements are impractical for the North Anna Nuclear Plant, Unit 2. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i) for Relief Requests NDE-23 through NDE-30.