

April 11, 2001

Mr. David A. Christian  
Senior Vice President - Nuclear  
Virginia Electric and Power Company  
5000 Dominion Blvd.  
Glen Allen, Virginia 23060

SUBJECT: NORTH ANNA POWER STATION UNITS 1 AND 2, AND SURRY POWER STATION UNITS 1 AND 2 RE: ASME SECTION XI, SUPPLEMENT 4 OF APPENDIX VIII INSERVICE INSPECTION (ISI) PROGRAM RELIEF REQUEST (TAC NOS. MB0476, MB0477, MB0479, AND MB0480)

Dear Mr. Christian:

This letter grants the relief you requested from the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, Appendix VIII, Supplement 4, subparagraph 3.2(c) for North Anna and Surry Power Stations, Units 1 and 2. The relief requested from the requirements of subparagraph 3.2(b) is no longer needed because the relevant portion of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a was recently changed.

By letter dated November 7, 2000, as supplemented January 12, 2001, Virginia Electric and Power Company (VEPCO) proposed relief from the acceptance criteria of the ASME Boiler and Pressure Vessel Code Section XI, Appendix VIII, Supplement 4, subparagraphs 3.2(b) and (c) to use alternative acceptance criteria for the ultrasonic examination of the clad/base metal interface of the reactor vessel.

Our evaluation and conclusion are contained in the enclosed Safety Evaluation. VEPCO's proposed alternative requirements to the ASME Code, Section XI, Appendix VIII, Supplement 4, subparagraph 3.2(c) provide an acceptable level of quality and safety. The relief you requested is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval for North Anna Unit 1, the second 10-year ISI interval for North Anna Unit 2, and the third 10-year ISI interval for Surry Units 1 and 2.

The relief you requested from subparagraph 3.2(b) of the ASME Code, Section XI, Appendix VIII, Supplement 4, is no longer needed. On March 26, 2001, the NRC published in the *Federal Register* (66 FR 16390) a rule change to 10 CFR 50.55a(b)(2)(xv)(C)(1), which deals with flaw detection criteria. The rule change corrected an earlier administrative error in the regulation, and the relief you sought is no longer required. The matter was discussed with Mr. D. Sommers of your licensing staff.

D. A. Christian

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The staff has completed its evaluation of this request; therefore, we are closing TAC Nos. MB0476, MB0477, MB0479, and MB0480.

Sincerely,

*/RA/*

Richard L. Emch, Jr., Chief, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-280, 50-281, 50-338, and 50-339

Enclosure: As stated

cc w/encl: See next page

The staff has completed its evaluation of this request; therefore, we are closing TAC Nos. MB0476, MB0477, MB0479, and MB0480.

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Richard L. Emch, Jr., Chief, Section 1  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF

FROM ASME SECTION XI, SUPPLEMENT 4 OF APPENDIX VIII

SURRY AND NORTH ANNA POWER STATIONS, UNITS 1 AND 2

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NOS. 50-280, 50-281, 50-338, AND 50-339

1.0 INTRODUCTION

The inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code) Class 1, Class 2, and Class 3 components is to be performed in accordance with Section XI of the Code and applicable edition and addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 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)(i) states in part that proposed alternatives may be used, when authorized by the staff, if the licensee demonstrates that the proposed alternatives would provide an acceptable 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 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) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein and subject to Commission approval. The Code of record for North Anna Power Station, Unit 1 and Surry Power Station, Units 1 and 2 is the 1989 Edition of the ASME Code, Section XI. The Code of record for North Anna Power Station, Unit 2 is the 1986 Edition of the ASME Code, Section XI.

The staff has reviewed the information submitted by Virginia Electric and Power Company (licensee) by letter dated November 7, 2000, as supplemented January 12, 2001, requesting relief from certain Code-required inspection criteria.

Enclosure

## 2.0 DISCUSSION

### 2.1 Code Requirements for Which Relief is Requested

The ASME Code Section XI, Supplement 4 of Appendix VIII (1995 Edition through 1996 Addenda) subparagraph 3.2(c).

### 2.2 Licensee's Proposed Alternative to the Code

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed using the root mean square (RMS) value of 0.15 inch specified in 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies the depth sizing criterion of Appendix VIII, Supplement 4, Subparagraph 3.2(a), in lieu of Subparagraph 3.2(c).

## 3.0 EVALUATION

10 CFR 50.55a(g)(6)(ii)(C) imposes implementation of Appendix VIII to the 1995 Edition with 1996 Addenda of Section XI of the Code. The imposed implementation schedule for Supplement 4 to Appendix VIII is November 22, 2000. Supplement 4, Subparagraph 3.2(c) of the Code requires that the ultrasonic testing (UT) performance demonstration results be plotted on a two-dimensional plot with the measured depth plotted along the ordinate axis and the true depth plotted along the abscissa axis. For qualification, the plot must satisfy the following statistical parameters: (1) slope of the linear regression line is not less than 0.7; (2) the mean deviation of flaw depth is less than 0.25 inches; and (3) correlation coefficient is not less than 0.70.

As an alternative, the licensee proposed eliminating the use of Supplement 4, Subparagraph 3.2(c) of the Code, which imposes three statistical parameters for depth sizing. The first parameter, Subparagraph 3.2(c)(1), pertains to the slope of a linear regression line. The linear regression line is the difference between actual versus true value plotted along a through-wall thickness. With regard to Supplement 4 of the Code performance demonstrations, a linear regression line of the data is not applicable because the performance demonstrations are performed on test specimens with flaws located in the inner 15 percent through-wall. The differences between the actual versus true values produce a tight grouping of results that resemble a shotgun pattern. The slope of a regression line from such data is extremely sensitive to small variations, making the parameter of Subparagraph 3.2(c)(1) a poor and inappropriate acceptance criterion. The second parameter, Subparagraph 3.2(c)(2), pertains to the mean deviation of flaw depth. The value used in the Code is too lax with respect to evaluating flaw depths within the inner 15 percent of wall thickness. Therefore, the licensee proposed to use the more appropriate criterion of 0.15 inch RMS of 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies Subparagraph 3.2(a), as the acceptance criterion. The third parameter, Subparagraph 3.2(c)(3), pertains to a correlation coefficient. The value of this correlation coefficient in Subparagraph 3.2(c)(3) is inappropriate for this application since it is based on the linear regression from Subparagraph 3.2(c)(1).

The US nuclear utilities created the Performance Demonstration Initiative (PDI) to implement performance demonstration requirements contained in Section XI, Appendix VIII of the Code. To this end, PDI has developed a performance demonstration program for qualifying UT equipment, procedures, and personnel. PDI was aware of the inappropriateness of

Subparagraph 3.2(c) early in the development of their program. They brought the issue before the appropriate ASME committee, which formalized eliminating the use of Supplement 4, Subparagraph 3.2(c) in Code Case N-622. NRC staff representatives participated in the discussions and consensus process of this Code case. Based on the above, the NRC staff finds that the use of Subparagraph 3.2(c) requirements in this context is inappropriate and that the proposed alternative to use the RMS value of 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies the criterion of Appendix VIII, Supplement 4, Subparagraph 3.2(a) of the Code, in lieu of Subparagraph 3.2(c), will provide an acceptable level of quality and safety.

#### 4.0 CONCLUSION

Based on the discussion above, the staff has concluded that the proposed alternative for North Anna Power Station, Units 1 and 2, and Surry Power Station, Units 1 and 2, will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the staff authorizes the proposed alternative for the third 10-year ISI interval for North Anna Unit 1, the second 10-year ISI interval for North Anna Unit 2, and the third 10-year ISI interval for Surry Units 1 and 2.

Principal Contributor: B. Fu

Date: April 11, 2001