

June 15, 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 UNIT 1 RE: ASME SECTION XI INSERVICE  
INSPECTION (ISI) PROGRAM RELIEF REQUEST PARTIAL-1 (TAC NO.  
MB0555)

Dear Mr. Christian:

This letter grants the relief you requested for Partial-1 for North Anna Power Station, Unit 1.

By letter dated November 21, 2000, Virginia Electric and Power Company (VEPCO) requested relief from certain ISI requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. Interferences from the protrusion of the reactor nozzles into the reactor vessel interior prevented the complete examination of three reactor nozzle-to-vessel welds.

Our evaluation and conclusion are contained in the enclosed Safety Evaluation. The staff has concluded that the requirements of Section XI of the ASME Code are impractical for the subject welds and reasonable assurance of structural integrity is provided by the completed examinations. The relief you requested is authorized pursuant to Title 10 of the *Code of Federal Regulations* Section 50.55a(g)(6)(i) for the third 10-year ISI interval.

The staff has completed its evaluation of this request; therefore, we are closing TAC No. MB0555.

Sincerely,

*/RA/*

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

Docket No. 50-338

Enclosure: As stated

cc w/encl: See next page

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Virginia Electric and Power Company

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF PARTIAL-1

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION

NORTH ANNA POWER STATION, UNIT 1

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-338

1.0 INTRODUCTION

By letter dated November 21, 2000, Virginia Electric and Power Company (the licensee) requested relief from certain inservice examination requirements of the 1989 Edition of the American Society of Mechanical Engineers (ASME) Code, Section XI, in regard to volumetric examinations conducted on three reactor nozzle-to-vessel welds during the third 10-year inspection interval for North Anna Power Station, Unit 1. The licensee stated that the welds were examined to the extent practical; however, due to the weld joint geometry, the reduction in coverage was greater than 10 percent. The protrusion of the nozzle beyond the shell physically restricted access for 100-percent coverage of the clockwise and counter-clockwise scans from the vessel shell.

2.0 BACKGROUND

The inservice inspection (ISI) of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable 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).

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. The applicable ISI Code of Record for the third 10-year ISI interval of North Anna Power Station, Unit 1, is the 1989 Edition of the ASME B&PV Code, Section XI.

Enclosure

## 2.1 REQUEST FOR APPROVAL OF AN ALTERNATIVE

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with certain Code requirements is impractical for its facility, the licensee shall notify the Commission and submit, as specified in 10 CFR 50.4, information to support the determinations. 10 CFR 50.55a(g)(6)(i) states that the Commission will evaluate determinations under 10 CFR 50.55a(g)(5) that the Code requirements are impractical. The Commission 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 DISCUSSION (RELIEF REQUEST PARTIAL-1)

### 3.1 IDENTIFICATION OF COMPONENTS

<u>Mark/Weld#</u>	<u>Line #</u>	<u>Drawing #</u>	<u>Class</u>
9	1-RC-R-1	11715-WMKS-RC-R-1.1	1
11	1-RC-R-1	11715-WMKS-RC-R-1.1	1
13	1-RC-R-1	11715-WMKS-RC-R-1.1	1

### 3.2 CODE REQUIREMENTS

The 1989 Edition of ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item Number B3.90, does not allow any limitations to the required volumetric examinations. However, Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds," which has been approved for use by NRC in Regulatory Guide 1.147, allows a reduction in coverage if the reduction is less than 10 percent.

### 3.3 CODE REQUIREMENTS FROM WHICH RELIEF IS REQUESTED

Relief is requested from performing the Code-required volumetric examinations for the identified nozzle-to-vessel welds.

### 3.4 LICENSEE'S BASIS FOR REQUESTING RELIEF

Welds 9, 11 and 13 have been examined to the extent practical as required by the Code. Due to weld joint geometry, the reduction in coverage for the listed components was greater than 10%. The protrusion of the nozzle beyond the shell physically restricted access for 100% coverage of the clockwise and counter-clockwise scans from the vessel shell. One hundred percent of the weld volume was covered from the nozzle bore. Table NDE-Partial-1 is provided detailing the limitations experienced [attached]. An amplifying sketch is also provided [attached].

### 3.5 LICENSEE'S PROPOSED ALTERNATIVE PROVISIONS

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

### 3.6 STAFF EVALUATION

The ASME Code, Section XI, 1989 Edition, requires volumetric examination of 100 percent of the reactor nozzle-to-vessel weld. However, a reduction in examination coverage of less than 10 percent is acceptable due to interferences as provided by Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds," which has been approved for use by NRC in Regulatory Guide 1.147. During the third 10-year inspection interval, the nozzle-to-vessel welds identified in the November 21, 2000, submittal as weld numbers 9, 11, and 13 were examined in the transverse direction with an average of 54-percent volumetric coverage and in the axial direction from the nozzle bore for 100-percent volumetric coverage, which resulted in an average of 77 percent in lieu of the Code-required coverage in excess of 90 percent. The limitation in examination coverage was attributed to the protrusion of the nozzle into the vessel interior, which restricted scanning from one side of each weld from the interior surface of the reactor vessel. The licensee has examined the subject welds to the maximum extent practical by ultrasonic examination. The staff has determined that it is impractical to perform the Code-required examination of the subject nozzle-to-vessel welds due to the interference of the nozzle protrusion. In order to comply with the Code requirement, a design modification of the reactor vessel would be required that would impose a significant burden on the licensee. The staff, however, believes that the volumetric examination conducted for each weld provides reasonable assurance of structural integrity of the weld since any significant pattern of degradation in the weld would have been detected with a high degree of confidence during examination of the accessible 77 percent of weld volume. Furthermore, in the highly unlikely event that a service-induced flaw in the weld propagates to the inside surface of the weld, it would most likely be detected during the Code-required VT-3 visual examination of the reactor vessel interior surface, which is also conducted during the inspection interval. Therefore, the probability of a flaw existing in an unexamined volume is extremely small.

### 3.7 CONCLUSION

The staff has reviewed the licensee's submittal and concludes that compliance with the Code requirements are impractical for weld numbers 9, 11, and 13 due to interferences caused by the nozzle protrusions into the interior surfaces of the reactor vessel. The staff has further determined that if the Code requirements were to be imposed upon the licensee, the nozzles would have to be redesigned, which would impose significant burden on the licensee. Thus, the staff has determined that it is impractical to perform the Code-required examination of the subject nozzle-to-vessel welds due to the interference of the nozzle protrusion. In addition, the staff finds that the examination coverages of the accessible weld volume provide reasonable assurance of the structural integrity of the subject welds. Therefore, relief is granted from the Code requirements pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year ISI for North Anna, Unit 1. 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 upon the licensee that could result if the requirements were imposed on the facility.

Principal Contributor: P. Patnaik

Date: June 15, 2001