August 31, 2001

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

SUBJECT: SURRY POWER STATION UNITS 1 AND 2 AND NORTH ANNA POWER STATION UNITS 1 AND 2 RE: REQUEST FOR THE USE OF ASME CODE CASE N-597 AS AN ALTERNATIVE EVALUATION OF PIPE WALL THINNING (TAC NOS. MB2276, MB2277, MB2223, AND MB2284)

Dear Mr. Christian:

This letter grants the relief you requested from the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI. The relief provides for the use of ASME Code Case N-597 as an alternative evaluation of pipe wall thinning at Surry Units 1 and 2 and North Anna Units 1 and 2.

By letters dated June 13, and June 26, 2001, as supplemented by letter dated July 12, 2001, Virginia Electric and Power Company (VEPCO, the licensee) submitted a request for North Anna Power Station, Units 1 and 2, and Surry Power Station, Units 1 and 2, for relief from ASME Code Section XI (IWA-3100). The Code provides the process for the disposition of flaw examination evaluations that exceed the acceptance standards for materials and welds applicable to the construction of the component. You proposed to use the provisions of ASME Boiler and Pressure Vessel Code Case N-597 for the analytical evaluation of Class 2 and 3 carbon and low-alloy steel piping items subjected to wall thinning as a result of flow-accelerated or other corrosion phenomena.

Code Case N-597 has not been endorsed by the NRC. Since the Code case does not address inspection requirements and wall thinning rates, the staff has determined that the Code case needs to be reviewed prior to use.

In a submittal dated July 12, 2001, your staff clarified for the NRC staff the definitions of “shall” and “should” in the plant procedures that implement the Code case. These procedures are based on industry standard NSAC-202L-R2, “Recommendations for an Effective Flow-Accelerated Corrosion Program.” The use of the term “shall” denotes a mandatory requirement. The use of the term “should” denotes a non-mandatory requirement; however, it is the preferred/desired method to be adhered to unless the flow-accelerated corrosion (FAC) program administrator or management determines otherwise.

Although Code Case N-597 can be applied to flow accelerated and other corrosion phenomena, you provided information related only to the application of this Code case to FAC. The application of this Code case for corrosion phenomena other than FAC is not within the scope of this evaluation.

Based on our review, the NRC staff has concluded that your alternative to use Code Case N-597 and industry standard NSAC-202L-R2, with clarification of the application of "shall" and "should" in this standard, provide an acceptable level of quality and safety. Therefore, the proposed alternative to use Code Case N-597 for the analytical evaluation of Class 2 and 3 carbon and low-alloy steel piping items subjected to wall thinning as a result of flow-accelerated corrosion is authorized pursuant to Title 10 of the *Code of Federal Regulations* Section 50.55a(a)(3)(i) for North Anna and Surry until such time as this Code case is incorporated into 10 CFR Part 50. At that time, if VEPCO intends to continue to implement Code Case N-597, it would need to follow all provisions of the Code case, with limitations issued in the rule, if any.

In addition, components to which this Code case is applied must be repaired or replaced in accordance with the construction code of record and owners' requirements, or a later approved edition of ASME Section III prior to reaching the allowable minimum wall thickness as specified in this Code case.

The staff has completed its evaluation of this request; therefore, we are closing TAC Nos. MB2276, MB2277, and MB2284. TAC No. MB2223 will remain open and be closed under separate cover.

Sincerely,

/RA by R. Correia Acting for/

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

Based on our review, the NRC staff has concluded that your alternative to use Code Case N-597 and industry standard NSAC-202L-R2, with clarification of the application of "shall" and "should" in this standard, provide an acceptable level of quality and safety. Therefore, the proposed alternative to use Code Case N-597 for the analytical evaluation of Class 2 and 3 carbon and low-alloy steel piping items subjected to wall thinning as a result of flow-accelerated corrosion is authorized pursuant to Title 10 of the *Code of Federal Regulations* Section 50.55a(a)(3)(i) for North Anna and Surry until such time as this Code case is incorporated into 10 CFR Part 50. At that time, if VEPCO intends to continue to implement Code Case N-597, it would need to follow all provisions of the Code case, with limitations issued in the rule, if any.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE USE OF CODE CASE N-597 AS AN ALTERNATIVE

FOR THE ANALYTICAL EVALUATION OF CLASS 2 AND 3

CARBON AND LOW-ALLOY STEEL PIPING ITEMS

NORTH ANNA POWER STATION, UNITS 1 AND 2

AND SURRY POWER STATION, UNITS 1 AND 2

VIRGINIA ELECTRIC AND POWER COMPANY

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

1.0 INTRODUCTION

The inservice inspection (ISI) 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 (B&PV) 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(a)(3). 10 CFR 50.55a(a)(3) states, in part, that alternatives to the requirements may be used provided the licensee demonstrates that (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) 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 applicable ASME Code edition and addenda are as follows:

1. North Anna Unit 1 - 1989 Edition, no Addenda
2. North Anna Unit 2 - 1986 Edition, no Addenda
3. Surry Units 1 and 2 - 1989 Edition, no Addenda.

By letters dated June 13, and June 26, 2001, as supplemented by letter dated July 12, 2001, Virginia Electric and Power Company (VEPCO, the licensee) submitted a request for relief from ASME Code Section XI (IWA-3100) for North Anna Power Station, Units 1 and 2 (NAPS), and Surry Power Station, Units 1 and 2 (SPS), that provides the process for the disposition of flaw examination evaluations that exceed the acceptance standards for materials and welds specified in the Section III Edition applicable to the construction of the component. This requirement is identical for all four units. The request provides for an analytical evaluation of Class 2 and 3 carbon and low-alloy steel piping items subjected to wall thinning as a result of flow-accelerated and other corrosion phenomena.

2.0 BACKGROUND

2.1 ASME Section XI Code Requirement

ASME B&PV Code Section XI (IWA-3100) provides the process for the disposition of flaw examination evaluations that exceed the acceptance standards for materials and welds specified in the Code applicable to the construction of the component. This provision stipulates that the disposition shall be subjected to review by the regulatory and enforcement authorities having jurisdiction at the plant site. This flaw evaluation requirement is identical for NAPS and SPS.

2.2 Proposed Alternative

As an alternative to the requirements of IWA-3100, “Evaluation,” the licensee proposes to use the provisions of ASME B&PV Code Case N-597 for the analytical evaluation of Class 2 and 3 carbon and low-alloy steel piping items subjected to wall thinning as a result of flow-accelerated or other corrosion phenomena rather than to repair the component if the construction code minimum wall thickness has been reached. This Code case stipulates that the methods of predicting the rate of wall thickness loss and the predicted remaining wall thickness shall be the responsibility of the owner. The licensee has procedural controls in the VEPCO Flow Accelerated Corrosion (FAC) Program that provide direction for calculating wear rates, forecasting remaining life, and conducting inspections of piping components susceptible to FAC. The methodology is consistent with industry standard, NSAC-202L-R2, “Recommendations for an Effective Flow-Accelerated Corrosion Program,” for calculating wear rates, forecasting remaining life, and conducting inspections as programmatic requirements.

3.0 EVALUATION

The Code requires that the component whose flaws exceed the acceptance standards shall be evaluated to determine disposition that shall be subjected to review by the regulatory and enforcement authorities having jurisdiction at the plant site. As an alternative to the Code requirements, the licensee has proposed to use Code Case N-597, *Requirements for Analytical Evaluation of Pipe Wall Thinning, Section XI, Division 1* for Class 2 and 3 carbon and low-alloy steel piping items for NAPS and SPS. The staff has reviewed this Code case previously in preparing its position for incorporation into 10 CFR Part 50 and determined that it is conditionally acceptable. Since the Code case does not address inspection requirements and wall thinning rates, the staff has determined that the Code case needs to be reviewed and approved prior to use.

The staff finds that the licensee's use of Code Case N-597 provides an acceptable approach for determining wall thinning as a result of flow-accelerated or other corrosion phenomena. However, the approach makes note of the owner's responsibility in developing the methods of predicting the rate of wall thickness loss and the value of the predicted remaining wall thickness. Although Code Case N-597 can be applied to flow-accelerated and other corrosion phenomena, the licensee provided information related only to the application of this Code case to FAC. The application of this Code case to corrosion phenomena other than FAC is not within the scope of this evaluation.

The licensee provided information on the plant inspection and evaluation procedures for calculating wear rates, remaining life, and predicting remaining wall thickness. These procedures are based on NSAC-202L-R2, "Recommendations for an Effective Flow-Accelerated Corrosion Program." The licensee, in its implementation procedures, has eliminated the ambiguities in NSAC-202L-R2; in particular, the licensee clarified the following definitions used in the plant procedures governing their FAC program:

> "Shall" is a mandatory requirement.
>
> "Should" is a non-mandatory requirement; however, it is the preferred/desired method to be adhered to unless the FAC program administrator or management determines otherwise.

This information was provided in a letter dated July 12, 2001.

Components to which this Code case is applied must be repaired or replaced in accordance with the construction code of record and owners' requirements or a later approved edition of ASME Section III prior to reaching the allowable minimum wall thickness as specified in this Code case.

Therefore, the staff finds that the licensee's alternative to the use of Code Case N-597 as applied through industry standard NSAC-202L-R2, with clarifications of the application of "shall" and "should" in this standard, provides an acceptable level of quality and safety for use in connection with Class 2 and 3 carbon and low-alloy steel piping subject to FAC.

4.0 CONCLUSION

The staff concludes that the use of Code Case N-597 and industry standard NSAC-202L-R2, with clarification of the terms "shall" and "should" in this standard, as an alternative evaluation for Class 2 and 3 carbon and low-alloy steel piping items subject to FAC is authorized pursuant to 10 CFR 50.55a(a)(3)(i) until such time as this Code case is incorporated into 10 CFR Part 50. The application of this Code case for corrosion phenomena other than FAC is not within the scope of this evaluation. In addition, components to which this Code case is applied must be repaired or replaced in accordance with the construction code of record and owners' requirements prior to reaching the allowable minimum wall thickness as specified in this Code case. At such time that Code Case N-597 is incorporated into 10 CFR Part 50 and the licensee intends to continue to implement Code Case N-597, the licensee should follow all the provisions in Code Case N-597 with limitations issued in the rule, if any.

Principal Contributor: C. Lauron

Date: August 31, 2001