

August 26, 2002

Mr. Jay K. Thayer  
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SUBJECT: THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN  
REQUEST FOR RELIEF NO. P-4 FOR VERMONT YANKEE NUCLEAR  
POWER STATION (TAC NO. MB4833)

Dear Mr. Thayer:

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed and evaluated the information provided by Vermont Yankee Nuclear Power Corporation (VYNPC) in its letter dated April 15, 2002, proposing its third 10-Year Inservice Inspection Interval Program Plan Request for Relief No. P-4 for Vermont Yankee Nuclear Power Station. On July 31, 2002, VYNPC's interest in the license was transferred to Entergy Nuclear Vermont Yankee, LLC (ENVY) and Entergy Nuclear Operations, Inc. (ENO). On August 6, 2002, ENO requested that the NRC continue to review and act on all requests before the Commission which had been submitted before the transfer. Accordingly, the NRC staff has acted upon the request. The licensee's proposed alternative to use Code Case N-566-1 is authorized pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55a(a)(3)(i) for the remainder of the third 10-year ISI interval or until such time as Code Case N-566-1 is published in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1." At that time, if the licensee intends to continue to implement Code Case N-566-1, the licensee should follow all conditions specified in the Regulatory Guide, if any.

The staff's evaluation and conclusions are contained in the enclosed safety evaluation.

Sincerely,

/RA/

Jacob I. Zimmerman, Acting Chief, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure: As stated

cc w/encl: See next page

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Docket No. 50-271  
 Enclosure: As stated  
 cc w/encl: See next page

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\*\*/C/ via e-mail \*\*\* See previous concurrence.

Accession Number: ML022200094 \* Input received 7/25/02, no major changes made.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
THIRD 10-YEAR INTERVAL INSERVICE INSPECTION REQUEST FOR RELIEF NO. P-4  
ENERGY NUCLEAR VERMONT YANKEE, LLC  
AND ENERGY NUCLEAR OPERATIONS, INC.  
VERMONT YANKEE NUCLEAR POWER STATION  
DOCKET NO. 50-271

## 1.0 INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) has reviewed the information concerning inservice inspection (ISI) program Request for Relief No. P-4 for the third 10-year interval for Vermont Yankee Nuclear Power Station (VY) provided in Vermont Yankee Nuclear Power Corporation (VYNPC) letter dated April 15, 2002. On July 31, 2002, VYNPC's interest in the license was transferred to Entergy Nuclear Vermont Yankee, LLC (ENVY) and Entergy Nuclear Operations, Inc. (ENO). On August 6, 2002, ENO requested that the NRC continue to review and act on all requests before the Commission which had been submitted before the transfer. Accordingly, the staff has acted upon the request.

## 2.0 REGULATORY EVALUATION

Inservice inspection of the American Society of Mechanical Engineers (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 relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) of 10 CFR states that alternatives to the requirements of paragraph (g) may be used, when authorized by the Commission, if 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 pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) 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 Code of record for the VY third 10-year ISI interval is the 1986 Edition with no Addenda of the ASME Code, Section XI.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Request for Relief No. P-4

##### 3.1.1 Code Requirement

Section XI, IWA-5250(a)(2), states that, if leakage occurs at a bolted connection, the bolting shall be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100.

##### 3.1.2 Component Identification

Pressure Retaining Components, Bolted Connections

ASME Code Class: 1, 2, and 3

Categories: B-P, C-H, D-A, D-B, D-C

Code Items: B15.10, B15.11, B15.50, B15.51, B15.60, B15.61, B15.70,  
B 15.71, C7.10, C7.20, C7.30, C7.40, C7.50, C7.60, C7.70, C7.80 D1.10,  
D2.10, D3.10

##### 3.1.3 Licensee's Code Relief Request

Relief is requested from the corrective measures of IWA-5250(a)(2).

##### 3.1.4 Licensee's Basis for Requesting Relief

In a bolted connection, if leakage occurs, not all of the bolting may be wetted. Removal of all bolting at a leaking connection potentially requires the plant to be shutdown. This is not always a prudent decision and may cause undue hardship without a compensating increase in the level of quality or safety.

ASME Section XI, 1986 Edition with no Addenda, is the Code of record for the Third Inservice Inspection Interval that commenced on September 1, 1993. IWA-5250(a)(2) requires, as a corrective action for leakage at bolted connections, the removal of bolting, a VT-3 visual examination for corrosion, and an evaluation in accordance with IWA-3100 be conducted.

Presently, VY has an approved Relief Request, P-2 (NVY 95-87 dated June 14, 1995, TAC No. M88344), to use IWA-5250(a)(2) of ASME Section XI, 1992 Edition with no Addenda, in lieu of the requirements of IWA-5250(a)(2) of the 1986 Edition with no Addenda. If Relief Request P-4 is approved, Relief Request P-2 will be considered superseded and only the requirements of Code Case N-566-1 will apply.

##### 3.1.5 Licensee's Proposed Alternative Examination

VY requests approval of use of Code Case N-566-1 pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the alternative would provide an acceptable level of quality and safety. Removal of pressure retaining bolting at mechanical connections for the VT-3 visual examination and subsequent evaluation in locations where leakage has been identified is not always the most prudent course of action to determine the condition of the bolting for the cause of the leak. The IWA-5250(a)(2) requirement to remove, examine, and evaluate bolting in this situation does not

allow consideration of other factors, which may indicate the condition of mechanical joint bolting.

If leakage occurs at a bolted connection, the required actions specified as (a) or (b) shall be met in accordance with Code Case N-566-1, "Corrective Action for Leakage Identified at Bolted Connections, Section XI, Division 1." Use of the Code Case will provide reasonable assurance of structural integrity based on maintaining the applicable Code safety margins.

VY requests the authorization to perform an alternative to the Code-required bolting removal. If evidence of leakage during a system pressure test of Class 1, 2, and 3 systems corrective action will be taken in accordance with Code Case N-566-1.

### 3.2 Staff Evaluation

The Code requires that all bolts be removed from leaking bolted connections and that the bolts be VT-3 visual examined for corrosion and evaluated in accordance with IWA-3100. The Code requirements provide assurance that bolting corroded by system leakage will be detected and that corrective actions will be taken. However, the Code requirements are often unnecessarily conservative since corrosion is dependent on other factors beyond system leakage. Additionally, removal and examination of all bolts may not be necessary to ensure continued integrity of the bolted connection.

In lieu of these requirements, the licensee has proposed to implement Code Case N-566-1 "Corrective Action for Leakage Identified at Bolted Connections Sections, Division 1" dated February 15, 1999, which requires in part that an engineering evaluation be performed to determine the need for additional examinations of the bolts considering the criteria listed as follows:

The requirements of Code Case N-566-1 below shall be met:

- (a) The leakage shall be stopped, and the bolting and component material shall be evaluated for joint integrity as described in (c) below.
- (b) If the leakage is not stopped, the joint shall be evaluated in accordance with IWB-3142.4 for joint integrity. This evaluation shall include the considerations listed in (c) below.
- (c) The evaluation of (a) and (b) above is to determine the susceptibility of the bolting to corrosion and failure. This evaluation shall include the following:
  - 1. the number and service age of the bolts;
  - 2. bolt and component material;
  - 3. corrosiveness of process fluid;
  - 4. leakage location and system function;
  - 5. leakage history at the connection or other system components
  - 6. visual evidence of corrosion at the assembled connection

The above approach allows the licensee to utilize a systematic approach and sound engineering judgement. In accordance with the Code, the evaluation of bolting subject to VT-3 examination is done in accordance with IWA-3100, which corresponds to IWB-3100 for Class 1 and IWC-3100 for Class 2. By contrast, Code Case N-566-1 requires evaluation in accordance with IWB-3142.4 irrespective of the piping class. This is a more stringent evaluation than that

of the Code. The alternative use of the Code Case in lieu of the requirements of IWA-5250(a)(2) in regard to corrective action for leakage identified at bolted connections provides an acceptable level of quality and safety.

#### 4.0 CONCLUSION

The staff concludes that licensee's proposed alternative to use Code Case N-566-1 in lieu of the requirements of IWA-5250(a)(2) in regard to corrective action for leakage identified at bolted connections provides a reasonable, acceptable level of quality and safety. Therefore, the licensee's proposed alternative to use Code Case N-566-1 is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval or until such time as Code Case N-566-1 is published in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1." At that time, if the licensee intends to continue to implement Code Case N-566-1, the licensee should follow all conditions specified in the Regulatory Guide, if any.

Principal Contributor: Tom McLellan

Date: August 26, 2002