

September 19, 2005

Mr. Michael Kansler
President
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: SAFETY EVALUATION OF RELIEF REQUEST RI-01 - VERMONT YANKEE
NUCLEAR POWER STATION (TAC NO. MC0960)

Dear Mr. Kansler:

By letter dated October 1, 2003, as supplemented on December 23, 2003, January 22, 2004, and March 31, June 8, and August 1, 2005, Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. submitted Relief Request RI-01 for Vermont Yankee Nuclear Power Station (VYNPS). The relief request proposes to use various Boiling Water Reactor Vessels Internal Program guidelines as an alternative to certain requirements of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for inservice inspection (ISI) of reactor vessel internal (RVI) components. The subject relief request is for the fourth 10-year ISI interval at VYNPS, which began on September 1, 2003.

The Nuclear Regulatory Commission staff has completed its review of Relief Request RI-01 as documented in the enclosed Safety Evaluation (SE). Our SE concludes that the proposed alternative will ensure that the integrity of the RVI components is maintained with an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to Section 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations* for the remainder of the fourth 10-year ISI interval.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in this relief request remains applicable, including third-party review by the authorized Nuclear Inservice Inspector.

M. Kansler

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If you have any questions regarding this matter, please contact the VYNPS Project Manager, Mr. Richard B. Ennis, at (301) 415-1420.

Sincerely,

/RA/

Darrell J. Roberts, 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

M. Kansler

- 2 -

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Vermont Yankee Nuclear Power Station

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Vermont Yankee Nuclear Power Station

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO RELIEF REQUEST RI-01
FOR THE FOURTH 10-YEAR INTERVAL OF THE INSERVICE INSPECTION PROGRAM
ENTERGY NUCLEAR VERMONT YANKEE, LLC
AND ENTERGY NUCLEAR OPERATIONS, INC.
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NO. 50-271

1.0 INTRODUCTION

By letter dated October 1, 2003, as supplemented on December 23, 2003, January 22, 2004, and March 31, June 8, and August 1, 2005, Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (the licensee) submitted Relief Request RI-01 for Vermont Yankee Nuclear Power Station (VYNPS). The relief request proposes to use various Boiling Water Reactor Vessels Internal Program (BWRVIP) guidelines as an alternative to certain requirements of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for inservice inspection (ISI) of reactor vessel internal (RVI) components. The subject relief request is for the fourth 10-year ISI interval at VYNPS, which began on September 1, 2003.

2.0 REGULATORY REQUIREMENTS

The ISI of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME 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 Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). Pursuant to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, 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 ISI of

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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 ten-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 ASME Code of record for the fourth ten-year ISI interval for VYNPS is the 1998 Edition with the 2000 Addenda of the ASME Code, Section XI. The fourth ten-year ISI interval began September 1, 2003, and ends August 31, 2013.

3.0 LICENSEE’S EVALUATION

3.1 Components for Which Relief is Requested

ASME Code, Section XI, Class 1, Examination Categories B-N-1 and B-N-2, Code Item Numbers B13.10, Vessel Interior, B13.20, Interior Attachments within Beltline Region, B13.30, Interior Attachments beyond Beltline Region, and B13.40, Core Support Structure.

3.2 Examination Requirements From Which Relief is Requested

ASME Code, Section XI requires the examination of certain RVI components. These examinations are included in Table IWB-2500-1, Categories B-N-1 and B-N-2, and identified with the following item numbers:

- B13.10 - Examine accessible areas of the reactor vessel interior each period by the VT-3 method.
- B13.20 - Examine interior attachment welds within the beltline region each interval by the VT-1 method.
- B13.30 - Examine interior attachment welds beyond the beltline region each interval by the VT-3 method.
- B13.40 - Examine surfaces of the core support structure each interval by the VT-3 method.

These examinations are performed to assess the structural integrity of the RVI components.

3.3 Licensee’s Basis for Requesting Relief and Justification for Granting Relief

The licensee concluded that the alternative inspections (described below) will maintain an adequate level of quality and safety of the affected welds and will not adversely impact the health and safety of the public. As part of its justification for the relief, the licensee stated that boiling-water reactors (BWRs) now examine RVI components in accordance with BWRVIP guidelines. These guidelines have been written to address the safety-significant RVI components and to examine these components using appropriate methods and reexamination frequencies. The licensee also noted that the NRC has agreed with the BWRVIP approach, in principal, and has issued safety evaluations (SEs) for these guidelines. Note, “in principal” means that, for some reports, final SEs have been written, but the final BWRVIP acceptance

reports which incorporate these SEs may not have been issued. Relief from examinations in Table IWB-2500-1 of the ASME Code are requested pursuant to 10 CFR 50.55a(a)(3)(i).

3.4 Alternative Examination

In lieu of the requirements of ASME Code, Section XI, 1998 Edition through 2000 Addenda, the licensee proposed to examine the RVI components in accordance with BWRVIP guideline requirements. The particular guidelines that are applicable to the various RVI components are:

BWRVIP-18, "BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines"

BWRVIP-25, "BWR Core Plate Inspection and Flaw Evaluation Guidelines"

BWRVIP-26, "BWR Top Guide Inspection and Flaw Evaluation Guidelines"

BWRVIP-38, "BWR Shroud Support Inspection and Flaw Evaluation Guidelines"

BWRVIP-41, "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines"

BWRVIP-47, "BWR Lower Plenum Inspection and Flaw Evaluation Guidelines"

BWRVIP-48, "Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines"

BWRVIP-76, "BWR Core Shroud Inspection and Flaw Evaluation Guidelines"

In addition to the BWRVIP reports noted above, the licensee identified NUREG-0619 "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking," as the basis for its proposed alternative examinations for the feedwater sparger tee welds and the feedwater sparger piping and brackets.

In its October 1, 2003, submittal, the licensee included a comparison between the Category B-N-1 and B-N-2 inspection requirements in the 1998 Edition through 2000 Addenda of Section XI of the ASME Code and the inspection requirements given in the aforementioned BWRVIP documents. The licensee also provided information on the inspection methods, inspection frequencies, and the inspection sampling methods for various RVI components and subcomponents covered under the scope of this relief request. After conference calls between the NRC staff and the licensee on November 6, 2003, January 12, 2004, and July 13, 2005, the licensee concluded that the ASME Code, Section XI, Category B-N-1 and B-N-2 inspection requirements did not apply to some of the components and subcomponents listed in the original submittal. By letters dated December 23, 2003, January 22, 2004, and August 1, 2005, the licensee provided a final list of components and subcomponents covered under the scope of this relief request and identified the inspection requirements which constituted their proposed alternative to the ASME Code, Section XI, Category B-N-1 and B-N-2 inspection requirements. The licensee's proposed alternative for the components and subcomponents covered under the scope of this relief request is summarized in Attachment 1 of this SE.

The licensee also stated that it will follow the requirements of BWRVIP-94, "Program Implementation Guideline." BWRVIP-94 states that where guidance in existing BWRVIP documents has been supplemented or revised by subsequent correspondence approved by the BWRVIP Executive Committee, the most current approved guidance will be implemented.

4.0 NRC STAFF EVALUATION

The NRC staff reviewed the information provided by the licensee in its submittals regarding its proposed alternatives to the ASME Code ISI requirements and the technical bases for the licensee's proposed alternatives. The staff reviewed the status of each of the referenced BWRVIP guidance documents and the applicability of the information provided in NUREG-0619. The staff found all of the referenced BWRVIP reports (with the exception of the BWRVIP-76 report which is under staff review) to be acceptable, with any additional conditions associated with the implementation of the subject BWRVIP reports outlined in the corresponding staff SE for that report. The staff also confirmed the applicability of the information given in NUREG-0619 as supporting the licensee's proposed alternative for the feedwater sparger tee welds and the feedwater sparger piping and brackets. The staff did, however, identify some issues which required additional clarification by the licensee or which required the licensee to modify its proposed alternatives.

By a request for additional information dated January 4, 2005, the NRC staff requested that the licensee justify how the proposed alternative inspection method, scope of inspection, inspection frequency and acceptance criteria provide an acceptable level of quality and safety as compared to Section XI requirements of the ASME Code. In its response dated June 8, 2005, the licensee compared ASME Code, Section XI inspection requirements with the corresponding BWRVIP inspection guidelines for the RVI components and their subcomponents that are classified under the ASME Code, Section XI, Categories B-N-1 and B-N-2, Item Numbers B 13.10, B 13.20, B 13.30, and B.13.40. The licensee, as an example, provided additional information regarding the BWRVIP inspection requirements for four of the RVI components and their subcomponents (core spray piping, jet pump, top guide and control rod drive tube), representing each of the aforementioned ASME Code, Section XI category/item numbers. This additional information demonstrated that the proposed inspection guidelines would adequately identify the aging degradation of the RVI components in a timely manner, and the inspection guidelines would provide an acceptable level of quality and safety.

In a conference call on July 13, 2005, the NRC staff noted that the licensee's proposed alternative for the inspection of the H12 core shroud support leg welds was not consistent with the conditions imposed in the staff's SE for the BWRVIP-38 report. Specifically, the staff noted that, to be consistent with the staff's SE for the BWRVIP-38 report, the licensee's proposed alternative should have noted that the license would inspect the H12 core shroud support leg welds when appropriate inspection tooling and methodologies are developed. The licensee, in its response letter dated August 1, 2005, revised its proposed alternative to indicate that it will perform inspection on the H12 weld when appropriate inspection tooling and methodologies are developed.

Therefore, based on the information in the licensee's submittals, the NRC staff has confirmed that the licensee's proposed alternatives (as documented in the attachment to this SE) are consistent with the technical bases documented in NUREG-0619 and the BWRVIP reports cited in Section 3.0 of this SE.

Consistent with the determination that was made in the NRC staff's SEs which approved each of the cited BWRVIP reports (with the exception of BWRVIP-76), the BWRVIP inspection requirements (as supplemented by the NUREG-0619 requirements) incorporated into the licensee's proposed alternative will identify aging degradation of the RVI components in a timely

manner. Therefore, the staff has concluded that the implementation of the inspection requirements specified in the licensee's proposed alternative will ensure that the integrity of the RVI components will be maintained with an acceptable level of quality and safety.

It should be noted that the BWRVIP-76 report is currently under review by the NRC staff. Therefore, the licensee's proposed alternative inspection requirements for the core shroud subcomponents which rely on the technical basis established by the BWRVIP-76 report may need to be revised based on any conditions documented in the staff's final SE on BWRVIP-76. This will, however, be addressed as the licensee has stated it will follow the guidelines of the BWRVIP-94 report, which would require the licensee to address any conditions imposed on use of the BWRVIP-76 report resulting from the staff's final SE.

5.0 CONCLUSION

Based on the information provided in the licensee's submittals, the NRC staff concludes that the alternatives proposed in Relief Request RI-01, and as summarized in the attachment to this SE, will ensure that the integrity of the RVI components is maintained with an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternative is authorized for the fourth 10-year ISI interval. All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector. Any components that are not included in this relief request will continue to be inspected in accordance with the ASME Code Section XI requirements.

Principal Contributor: G. Cheruvenki

Date: September 19, 2005

ATTACHMENT 1

VYNPS Comparison of ASME Category B-N-1 and B-N-2 Requirements With BWRVIP Guidance Requirements ⁽¹⁾

ASME Item No. Table IWB-2500-1	Component	ASME Exam Scope	ASME Exam	ASME Frequency	Applicable BWRVIP Document	BWRVIP Exam Scope	BWRVIP Exam	BWRVIP Frequency
B13.10	Reactor Vessel Interior	Accessible Areas (Non-specific)	VT-3	Each period	BWRVIP-18, 25, 26, 38, 41, 47, 48, 76	Per VYNPS Program Procedure PP 7027 See the Licensee's supplement dated January 22, 2004		
B13.20	Interior Attachments Within Beltline – Riser Braces	Accessible Welds	VT-1	Each 10-year Interval	BWRVIP-48 Table 3-2	Riser Brace Attachment	EVT-1	100% in first 12 years, 25% during each subsequent 6 years
	Lower Surveillance Specimen Holder Brackets				BWRVIP-48 Table 3-2	Bracket Attachment	VT-1	Each 10-year Interval
B13.30	Interior Attachments Beyond Beltline – Steam Dryer Hold- down Brackets	Accessible Welds	VT-3	Each 10-year Interval	BWRVIP-48 Table 3-2	Bracket Attachment	VT-3	Each 10-year Interval
	Guide Rod Brackets				BWRVIP-48 Table 3-2	Bracket Attachment	VT-3	Each 10-year Interval
	Steam Dryer Support Brackets				BWRVIP-48 Table 3-2	Bracket Attachment	EVT-1	Each 10-year Interval
	Feedwater Sparger Brackets				BWRVIP-48 Table 3-2	Bracket Attachment	EVT-1	Each 10-year Interval
	Core Spray Piping Brackets				BWRVIP-48 Table 3-2	Bracket Attachment	EVT-1	Every 4 Refueling Cycles
	Upper and Middle Surveillance Specimen Holder Brackets				BWRVIP-48 Table 3-2	Bracket Attachment	VT-3	Each 10-year Interval
	Shroud Support (Weld H9)				BWRVIP-38 3.1.3.2, Figure 3-5	Weld H9	EVT-1 or UT	Maximum of 6 years for EVT-1, Maximum of 10 years for UT
	Shroud Support Legs (H12 Welds)	(Rarely Accessible)			BWRVIP-38 3.2.3	Not Required Note 2	Not Required Note 2	Not Required Note 2

ASME Item No. Table IWB-2500-1	Component	ASME Exam Scope	ASME Exam	ASME Frequency	Applicable BWRVIP Document	BWRVIP Exam Scope	BWRVIP Exam	BWRVIP Frequency
B13.40	Integrally Welded Core Support Structure – Shroud Support	Accessible Surfaces	VT-3	Each 10-year Interval	BWRVIP-38 3.1.3.2, Figure 3-5	Welds H8, H9	EVT-1 or UT	Maximum 6 years for EVT-1, 10 years for UT
	Shroud				BWRVIP-76 2.2.1	Welds H1, H2	EVT-1 or UT	Maximum 10 years
					BWRVIP-76 Figure 3-3	Vertical and Ring Segment Welds Below H2	EVT-1 or UT	Maximum 6 years for one-sided EVT-1, 10 years for UT
					BWRVIP-76 3.5	Tie-rod Repair	VT-3	All four within 10 years

NOTES

1. This Table provides only an overview of the requirements. For more details, refer to ASME Code Section XI, Table IWB-2500-1, and the appropriate BWRVIP document(s).
2. Periodically, VYNPS will have access to the lower plenum welds due to maintenance activities not related to the inspection recommendations in the BWRVIP guidelines. In such cases, VYNPS will perform inspection of the shroud support leg welds to the extent practical. When inspection tooling and methodologies are developed that allows access to the lower plenum without disassembly beyond normal refueling activities, shroud support leg welds will be inspected with an appropriate nondestructive examination method. Results of inspections will be used to determine a re-inspection schedule. VYNPS will adopt future inspection methods and schedules as they are developed and included into the BWRVIP-38 report and approved by the NRC staff.