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**Technical Evaluation Report on the  
Third 10-year Interval Inservice  
Inspection Program Plan:  
Vermont Yankee Nuclear Power  
Corporation,  
Vermont Yankee Nuclear Power  
Station,  
Docket Number 50-271**

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## ABSTRACT

This report presents the results of the evaluation of the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, submitted December 3, 1993, including the requests for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI requirements that the licensee has determined to be impractical. The *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, is evaluated in Section 2 of this report. The ISI Program Plan is evaluated for (a) compliance with the appropriate edition/addenda of Section XI, (b) acceptability of examination sample, (c) correctness of the application of system or component examination exclusion criteria, and (d) compliance with ISI-related commitments identified during previous Nuclear Regulatory Commission (NRC) reviews. The requests for relief are evaluated in Section 3 of this report.

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## SUMMARY

The licensee, Vermont Yankee Nuclear Power Corporation, has prepared the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, to meet the requirements of the 1986 Edition of American Society of Mechanical Engineers (ASME) Section XI. The third 10-year interval began September 1, 1993, and ends August 31, 2003.

The information in the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, submitted December 3, 1993, was reviewed. Included in the review were the requests for relief from the ASME Code Section XI requirements that the licensee has determined to be impractical. As a result of the review, a request for additional information (RAI) was prepared describing the information and/or clarification required from the licensee in order to complete the review. The licensee provided the requested information in submittals dated December 12, 1994, and December 20, 1994.

Based on the review of the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, the licensee's responses to the Nuclear Regulatory Commission's RAI, and the recommendations for granting relief from the ISI examinations that cannot be performed to the extent required by Section XI of the ASME Code, no deviations from regulatory requirements or commitments were identified in the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0.

## Contents

ABSTRACT . . . . .	ii
SUMMARY . . . . .	iii
1. INTRODUCTION . . . . .	1
2. EVALUATION OF INSERVICE INSPECTION PROGRAM PLAN . . . . .	4
2.1 Documents Evaluated . . . . .	4
2.2 Compliance with Code Requirements . . . . .	4
2.2.1 Compliance with Applicable Code Editions . . . . .	4
2.2.2 Acceptability of the Examination Sample . . . . .	4
2.2.3 Exemption Criteria . . . . .	5
2.2.4 Augmented Examination Commitments . . . . .	5
2.3 Conclusions . . . . .	6
3. EVALUATION OF RELIEF REQUESTS . . . . .	7
3.1 Class 1 Components . . . . .	7
3.1.1 Reactor Pressure Vessel . . . . .	7
3.1.1.1 Request for Relief B-4, Examination Category B-G-1, Item B6.10, Reactor Pressure Vessel Closure Head Nuts . . .	7
3.1.2 Pressurizer (Not Applicable)	
3.1.3 Heat Exchangers and Steam Generators (No relief requests)	
3.1.4 Piping Pressure Boundary . . . . .	8
3.1.4.1 Request for Relief B-3, Examination Category B-J, Items B9.11, B9.21, B9.31, and B9.40, Class 1 Pressure Retaining Pipe Welds . . . . .	8
3.1.5 Pump Pressure Boundary . . . . .	10
3.1.5.1 Request for Relief B-1, Examination Category B-L-2, Item B12.20, Pump Casing Internal Surfaces . . . . .	10
3.1.6 Valve Pressure Boundary . . . . .	12
3.1.6.1 Request for Relief B-2, Examination Category B-M-2, Item B12.50, Valve Bodies Greater Than NPS 4 . . . . .	12
3.1.7 General (No relief requests)	

3.2	Class 2 Components (No relief requests)	
3.3	Class 3 Components (No relief requests)	
3.4	Pressure Tests . . . . .	14
3.4.1	Class 1 System Pressure Tests (No relief requests)	
3.4.2	Class 2 System Pressure Tests (No relief requests)	
3.4.3	Class 3 System Pressure Tests . . . . .	15
3.4.3.1	Request for Relief P-1, Examination Category D-A, D-B, and D-C, Items D1.10, D2.10, and D3.10, System Hydrostatic Tests . . . . .	15
3.4.4	General (No relief requests)	
3.5	General . . . . .	17
3.5.1	Request for Relief F-1, Examination Categories F-A, F-B, and F-C, Items F1.10, F1.20, F1.30, F1.40, F2.10, F2.20, F2.30, F2.40, F3.10, F3.20, F3.30, F3.40, F3.50, Examination of Component Supports . . . . .	17
3.5.2	Request for Relief P-2, IWA-5250, Corrective Measures When Leakage is Detected at a Bolted Connection . . . . .	18
4.	CONCLUSION . . . . .	20
5.	REFERENCES . . . . .	22



TECHNICAL EVALUATION REPORT ON THE  
THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN:  
VERMONT YANKEE NUCLEAR POWER STATION,  
VERMONT YANKEE NUCLEAR POWER CORPORATION  
DOCKET NUMBER 50-271

## 1. INTRODUCTION

Throughout the service life of a water-cooled nuclear power facility, 10 CFR 50.55a(g)(4) (Reference 1) requires that components (including supports) that are classified as American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Class 1, Class 2, and Class 3 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* (Reference 2), to the extent practical within the limitations of design, geometry, and materials of construction of the components. This section of the regulations also requires that inservice examinations of components and system pressure tests conducted during successive 120-month inspection intervals comply with the requirements in the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) on the date 12 months prior to the start of the 120-month inspection interval, subject to the limitations and modifications listed therein. The components (including supports) may meet requirements set forth in subsequent editions and addenda of this Code that are incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein, and subject to Nuclear Regulatory Commission (NRC) approval. The licensee, Vermont Yankee Nuclear Power Corporation, has prepared the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0 (Reference 3), to meet the requirements of the 1986 Edition of the ASME Code Section XI. The third 10-year interval began September 1, 1993, and ends August 31, 2003.

As required by 10 CFR 50.55a(g)(5), if the licensee determines that certain Code examination requirements are impractical and requests relief from them, the licensee shall submit information and justification to the NRC to support that determination.

Pursuant to 10 CFR 50.55a(g)(6), the NRC will evaluate the licensee's determination that Code requirements are impractical to implement. The NRC may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are 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.

Alternatively, pursuant to 10 CFR 50.55a(a)(3), the NRC will evaluate the licensee's determination that either (i) the proposed alternatives provide an acceptable level of quality and safety, or (ii) Code compliance would result in hardship or unusual difficulty without a compensating increase in safety. Proposed alternatives may be used when authorized by the NRC.

The information in the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, submitted December 3, 1993, was reviewed, including the requests for relief from the ASME Code Section XI requirements that the licensee has determined to be impractical. The review of the Inservice Inspection (ISI) Program Plan was performed using the Standard Review Plans of NUREG-0800 (Reference 4), Section 5.2.4, *Reactor Coolant Boundary Inservice Inspections and Testing*, and Section 6.6, *Inservice Inspection of Class 2 and 3 Components*.

In a letter dated October 12, 1994 (Reference 5), the NRC requested additional information that was required in order to complete the review of the ISI Program Plan. The requested information was provided by the licensee in the "Response to Request for Additional Information on the Vermont Yankee Third 10-Year Interval Inservice Inspection (ISI) Program Plan and Associated Requests for Relief" dated December 12, 1994, (Reference 6) and December 20, 1994, (Reference 7). In addition, the licensee noted that an additional request for relief addressing the reactor pressure vessel bottom head welds will be submitted at a later date in a revised Vermont Yankee Third Interval Inservice Inspection Program.

The *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, is evaluated in Section 2 of this report. The ISI Program Plan is evaluated for (a) compliance with the appropriate



edition/addenda of Section XI, (b) acceptability of examination sample, (c) correctness of the application of system or component examination exclusion criteria, and (d) compliance with ISI-related commitments identified during the NRC's previous reviews.

The requests for relief are evaluated in Section 3 of this report. Unless otherwise stated, references to the Code refer to the ASME Code, Section XI, 1986 Edition. Specific inservice test (IST) programs for pumps and valves are being evaluated in other reports.

## 2. EVALUATION OF INSERVICE INSPECTION PROGRAM PLAN

This evaluation consists of a review of the applicable program documents to determine whether or not they are in compliance with the Code requirements and any previous license conditions pertinent to ISI activities. This section describes the submittals reviewed and the results of the review.

### 2.1 Documents Evaluated

Review has been completed on the following information from the licensee:

- (a) *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, dated December 3, 1993 (Reference 3).
- (b) Responses to Request for Additional Information, Vermont Yankee Third 10-Year Interval Inservice Inspection Program Plan and Associated Requests for Relief, dated December 12, 1994, (Reference 6) and December 20, 1994, (Reference 7).

### 2.2 Compliance with Code Requirements

#### 2.2.1 Compliance with Applicable Code Editions

The Inservice Inspection Program Plan shall be based on the Code edition specified in 10 CFR 50.55a(g)(4) and 10 CFR 50.55a(b). Based on the starting date of September 1, 1993, the Code applicable to the third interval ISI program is the 1986 Edition. As stated in Section 1 of this report, the licensee has prepared the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, to meet the requirements of 1986 Edition of the Code.

#### 2.2.2 Acceptability of the Examination Sample

Inservice volumetric, surface, and visual examinations shall be performed on ASME Code Class 1, 2, and 3 components and their supports using sampling schedules described in Section XI of the ASME Code and 10 CFR 50.55a(b). The sample size and weld selection have

been implemented in accordance with the Code and 10 CFR 50.55a(b) and appear to be correct.

The licensee has elected to implement ASME Code Case N-509, *Alternative Rules for the Selection and Examination of Class 1, 2, and 3 Integrally Welded Attachments, Section XI, Division 1*. It is recommended that the proposed alternatives of Code Case N-509 be approved provided that the licensee examines a minimum of 10 percent of integral attachments in each of Code Classes 1, 2, and 3.

#### 2.2.3 Exemption Criteria

The criteria used to exempt components from examination shall be consistent with Paragraphs IWB-1220, IWC-1220, IWC-1230, IWD-1220, and 10 CFR 50.55a(b). The exemption criteria have been applied by the licensee in accordance with the Code, as discussed in the ISI Program Plan, and appear to be correct.

#### 2.2.4 Augmented Examination Commitments

In addition to the requirements specified in Section XI of the ASME Code, the licensee has committed to perform the following augmented examinations:

- (a) Reactor pressure vessel welds will be examined in accordance with Regulatory Guide 1.150 (Reference 8);
- (b) Welds susceptible to intergranular stress corrosion cracking (IGSCC) will be examined as specified by NUREG-0313 (Reference 9);
- (c) The feedwater nozzle will be examined as specified by NUREG-0619 (Reference 10);
- (d) Main Steam piping will be examined from the outermost containment isolation valve to the turbine stop and bypass valves; and

- (e) A sample of Class 2 piping welds that are excluded by the Code from examination based on wall thickness will be examined.

### 2.3 Conclusions

Based on the review of the documents listed above, no deviations from regulatory requirements or commitments were identified in the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0.

### 3. EVALUATION OF RELIEF REQUESTS

The requests for relief from the ASME Code requirements that the licensee has determined to be impractical for the third 10-year inspection interval are evaluated in the following sections.

#### 3.1 Class 1 Components

##### 3.1.1 Reactor Pressure Vessel

###### 3.1.1.1 Request for Relief B-4, Examination Category B-G-1, Item B6.10, Reactor Pressure Vessel Closure Head Nuts

Code Requirement: Table IWB-2500-1, Examination Category B-G-1, Item B6.10 requires 100% surface examination of all reactor pressure vessel (RPV) closure head nuts during each 10-year inspection interval.

Licensee's Code Relief Request: Relief is requested from the surface examination requirements for the reactor pressure vessel closure head nuts.

###### Licensee's Basis for Requesting Relief (as stated):

"The 1986 Edition of ASME Section XI, Table IWB-2500, Category B-G-1, Item No. B6.10, requires a surface examination for the reactor pressure vessel closure head nuts. However, there is no acceptance standard for this Item No. The 1992 edition requires a VT-1 visual examination with acceptance criteria in accordance with IWB-3517. A VT-1 examination will reveal any detrimental service related defects. The visual examination, as opposed to a surface examination, will save time and dose."

###### Licensee's Proposed Alternative Examination (as stated):

"Visually examine the reactor pressure vessel closure head nuts using the VT-1 requirements with the 1992 Edition of ASME Section XI, IWB-3517, acceptance standard."

Evaluation: The licensee has proposed to perform a VT-1 visual examination of reactor pressure vessel closure head nuts in

lieu of the Code-required surface examination. The licensee's proposed VT-1 visual examination is the same as required for other nuts in Examination Category B-G-1. In addition, the 1989 Addenda of Section XI changes the requirement for the subject reactor pressure vessel closure head nuts to a VT-1 visual examination and provides acceptance criteria. Based on the existing examination requirements for nuts other than the reactor pressure vessel closure head nuts and changes to later Editions of the Code, it can be concluded that a VT-1 visual examination is an acceptable alternative examination method that should detect any significant degradation if present.

Conclusion: The licensee's proposed alternative, to perform a VT-1 visual examination on reactor pressure vessel closure head nuts, should detect any significant degradation of the nuts. As a result, an acceptable level of quality and safety will be provided. Therefore, it is recommended that, the proposed alternative VT-1 visual examination be authorized pursuant to 50.55a(a)(3)(i).

3.1.2 Pressurizer (Not Applicable)

3.1.3 Heat Exchangers and Steam Generators (No relief requests)

3.1.4 Piping Pressure Boundary

3.1.4.1 Request for Relief B-3, Examination Category B-J, Items B9.11, B9.21, B9.31, and B9.40, Class 1 Pressure-Retaining Pipe Welds

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-J, Items B9.11, B9.21, B9.31, and B9.40 require the selection of welds in accordance with Note 1 of the Table. Note 1 requires that examinations shall include all terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed either the (1) primary plus secondary stress intensity range of 2.4Sm for



ferritic steel and austenitic steel, or (2) cumulative usage factor U of 0.4.

Licensee's Code Relief Request: The licensee requested relief for Class 1 pipe weld selection based on stress calculations in accordance with Section III.

Licensee's Basis for Requesting Relief (as stated):

"As permitted by 10CFR50.55a(b)(2)(ii), Vermont Yankee has the option of using the 1974 Edition of ASME Section XI, as addended through Summer 1975, or the 1986 Edition, with no addenda, for the extent of examination of Category B-J pipe welds. The fundamental difference between these two options is that the 74/S75 Code provides virtually no guidance for selection of the welds to be examined, other than to pick 25% of the weld population; the 1986 Code requires that stress levels be considered in selecting the 25% to be examined. In the 74/S75 Code Edition a different 25% of the population was to be examined in each of the four intervals although this particular Code paragraph is not explicitly referenced by 10CFR50.55a(b)(2)(ii), and in the 1986 Code Edition the same 25% of the population is examined each interval.

"Vermont Yankee agrees with the philosophy of the 1986 Code Edition in that the higher stressed welds will be examined, and by examining the same welds each interval, it is possible to obtain trending data however, Vermont Yankee is unable to comply explicitly with the calculation requirements of Table IWB 2500-1, Note (1)(b), and by inference, the ASME Section III formulas. The existing pipe stress calculations were based on the analysis procedures of ANSI B31.1. ANSI B31.1 includes some fatigue considerations, however, in less detail than the ASME Section III approach.

"The existing stress calculations were reviewed for all Class 1 Category B-J piping welds and virtually all welds were well below the stress intensity factor of  $2.4S_m$  however the higher stress welds on all lines were selected for examination, except where those welds are inaccessible for inspection.

"This method of selection is superior to the random selection philosophy of the 74/S75 Code. Therefore, there will be an increase in the level of quality safety. To comply verbatim with the 1986 Code is an undue hardship without a compensating increase in the level of quality and safety. It is recognized by 10CFR50.55a(b)(2)(ii) that B31.1 plants do not possess these rigorous calculations."

Licensee's Proposed Alternative Examination (as stated):

"Perform Table IWB-2500-1, Category B-J, Note (1)(b) weld selections based on the existing stress calculations."

Evaluation: Note 1(b) of the Code requires an evaluation of primary plus secondary stress intensities and cumulative usage factors for weld selection. Vermont Yankee Nuclear Power Station was built to the requirements of ANSI B31.1, not to ASME Section III, where Note 1(h) parameters could be applied. Therefore, the required information associated with  $S_m$  and  $U$  are not available for weld selection.

The licensee's proposed alternative is to select welds based on existing ANSI B31.1 stress calculations. The INEL staff believes that this alternative is an acceptable approach for the selection of welds having the potential of being subjected to high stress levels. Therefore, it is believed that an acceptable level of quality and safety will be provided by this selection methodology.

Conclusions: Because the licensee's proposed alternative provides a sound engineering approach to Class 1 piping weld selection by concentrating the examinations on those welds with potentially higher stress levels, an acceptable level of quality and safety will be established. Therefore, it is recommended that, the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3.1.5 Pump Pressure Boundary

3.1.5.1 Request for Relief B-1, Examination Category B-L-2, Item B12.20, Pump Casing Internal Surfaces

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-L-2, Item B12.20 requires a VT-3 visual examination of at least one pump in each group of pumps performing similar functions.

Licensee's Code Relief Request: The licensee requested relief from the frequency and extent of examination for reactor recirculation pump body casings P-18-1A and P-18-1B.

Licensee's Basis for Requesting Relief (as stated):

"These pumps, due to normal operation, have become extremely radioactive. Disassembly of these pumps for the sole purpose of visual examination is impractical and presents a personnel safety hazard. Total exposure for disassembly, decontamination, inspection, reassembly, and testing of one pump is estimated at 15 man-Rem based on previous work. The radiation level inside the pump is estimated to be 1.0 to 8.0 R/hr at the pump opening. The service history of these pumps shows no reason to anticipate a service induced defect, and of the pumps examined to date, no evidence of defects in the pump bodies has been observed. Unnecessary disassembly and reassembly of a pump may actually result in unintended damage. Remote visual examination of the pump interior is not possible without disassembly.

"The 1989 Edition of ASME Section XI, Table IWB-2500, Category B-L-2, Note (2), requires examination only when the pump is disassembled for maintenance, repair, or volumetric examination. The same note states that the examination need only be performed to the extent practicable."

Licensee's Proposed Alternative Examination (as stated):

"Visually examine pump only when pump is disassembled for maintenance, repair, or volumetric examination. The examination will be to the extent practicable. The visual examination (if performed) need only be performed once during the inspection interval. These pumps will undergo a system leakage test each refueling cycle."

Evaluation: The visual examination requirement for internal surfaces of pumps necessitates complete disassembly of the pump. Disassembly of the pump for visual examination of the casing internal surface is a major effort requiring many manhours by skilled maintenance and inspection personnel while causing excessive radiation exposure. Therefore, requiring the licensee to disassemble the pump for the sole purpose of performing the Code-required visual examination is considered impractical.

Visual examination of the pump casing internal surfaces is performed to determine if unanticipated degradation of the casing is occurring due to phenomena such as erosion, corrosion, or cracking. Later editions and addenda of the ASME Code (after 1988) have eliminated disassembly of pumps for the sole purpose of examining the internal surfaces and state that the internal surface visual examination requirement is only applicable to pumps that are disassembled for reasons such as maintenance, repair, or volumetric examination. Therefore, the concept of visual examination of the internal surfaces of the pump casing only if the pump is disassembled for maintenance, repair, or volumetric examination is considered acceptable. Since no problems have been reported in the industry with regard to pump casing internal surfaces, the licensee's proposed alternative will provide adequate assurance of continued inservice structural integrity.

Conclusions: Disassembly of a pump for the sole purpose of inspection is impractical at the Vermont Yankee Power Plant. Therefore, it is recommended that, relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

### 3.1.6 Valve Pressure Boundary

#### 3.1.6.1 Request for Relief B-2, Examination Category B-M-2, Item B12.50, Valve Bodies Greater Than NPS 4

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-M-2, Item B12.50 requires VT-3 visual examination of the valve body internal surfaces of one valve in each group of valves of similar design and function in the system.

Licensee's Code Relief Request: The licensee requested relief from the frequency and extent of VT-3 visual examination requirements for the following valves groups:



Valve Type	Valve Number
28" Darling/Gate	V2-43A, V2-43B, V2-53A, V2-53B
16" Darling/Gate	V2-28A, V2-28B, V2-27A, V2-96A
16" Walworth/Gate	V2-29A, V2-29B
18" Rockwell/Globe	V2-80A, V2-80B, V2-80C, V2-80D, V2-86A, V2-86B, V2-86C
18" B-1, B-2, Rockwell/Globe	V2-86D
10" Walworth/Gate	V23-15, V23-16
6"X8" Dresser/Safety	SV2-70A, SV2-70B
6"X10" Target Rock/Relief	RV2-71A, RV2-71B, RV2-71C, RV2-71D
20" Walworth/Gate	V10-17, V10-18
24" Atwood Morrill/Check	V10-46A, V10-46B
24" Darling/Gate	V10-81A, V10-81B
20" Darling/Gate	V10-88
8" Rockwell/Check	V14-13A, V14-13B
8" LM Powell/Gate	V14-14A, V14-14B
24" Walworth/Gate	V10-25A, V10-25B
24"X20" Walworth/Globe	V10-27A, V10-27B
8" Walworth/Gate	V14-12A, V14-12B

Licensee's Basis for Requesting Relief (as stated):

"Most of these valves, due to normal operation, have become extremely radioactive. Disassembly of these valves for the sole purpose of visual examination is impractical and presents a personnel safety hazard. Unnecessary disassembly and reassembly of a valve may actually result in unintended damage. Remote visual examination of valve interiors is not possible without disassembly.

"The 1989 Edition of ASME Section XI, Table IWB-2500, Category B-L-2, Note (2), requires examination only when a valve is disassembled for maintenance, repair, or volumetric examination. The same note states that the examination need only be performed to the extent practicable."

Licensee's Proposed Alternative Examination (as stated):

"Visually examine valve only when valve is disassembled for maintenance, repair, or volumetric examination. The examination will be to the extent practicable. The visual examination (if performed) need only be performed once during the inspection interval. These valves will undergo a system leakage test each refueling cycle."

Evaluation: The visual examination requirement for internal surfaces of valves necessitates complete disassembly of the valve. Disassembly of the valve for visual examination of the valve body internal surfaces is a major effort requiring many manhours from skilled maintenance and inspection personnel while causing excessive radiation exposure. Therefore, requiring the licensee to disassemble the valve for the sole purpose of performing the Code-required visual examination is considered impractical.

Visual examination of the valve body internal surfaces is performed to determine if unanticipated degradation of the casing is occurring due to phenomena such as erosion, corrosion, or cracking. Later editions and addenda of the ASME Code (after 1988) have eliminated disassembly of valves for the sole purpose of examining the internal surfaces and state that the internal surface visual examination requirement is only applicable to valves that are disassembled for reasons such as maintenance, repair, or volumetric examination. Therefore, the concept of visual examination of the internal surfaces of the valve casing only when the valve is disassembled for maintenance, repair, or volumetric examination is considered acceptable. Since no problems have been reported in the industry with regard to valve body internal surfaces, the licensee's proposed alternative will provide adequate assurance of continued inservice structural integrity.

Conclusions: Disassembly of a valve for the sole purpose of inspection is impractical at the Vermont Yankee Nuclear Power



Station. Therefore, it is recommended that, relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.1.7 General (No relief requests)

3.2 Class 2 Components (No relief requests)

3.3 Class 3 Components (No relief requests)

3.4 Pressure Tests

3.4.1 Class 1 System Pressure Tests (No relief requests)

3.4.2 Class 2 System Pressure Tests (No relief requests)

3.4.3 Class 3 System Pressure Tests

3.4.3.1 Request for Relief P-1, Examination Category D-A, D-B, and D-C, Items D1.10, D2.10, and D3.10, System Hydrostatic Tests

Code Requirement: Section XI, Table IWD-2500-1, Examination Category D-A, Item D1.10, Examination Category D-B, Item D2.10, and Examination Category D-C, Item D3.10, each require a system hydrostatic test at or near the end of each interval.

Licensee's Code Relief Request: The licensee requested relief from elevated test pressure requirements when performing the Code-required hydrostatic tests.

Licensee's Basis for Requesting Relief (as stated):

"Operators perform tours three times a day in accessible areas while the plant is in operation and are trained to look for leakage problems. On all systems, control room operators will observe pressure anomalies or an increase in sump pump operation. Also, the service water system at Vermont Yankee is periodically ultrasonic thickness monitored. It is far more likely that a pressurized component will leak under extended operation, than during a static test that is only observed for a brief time.

"Hydrostatic testing causes an undue hardship without a compensating increase in the level of quality or safety."

Licensee's Proposed Alternative Examination (as stated):

"A system leakage test or a system pressure test will be conducted at or near the end of each inspection interval, consistent with ASME Code Case N-498. The boundary subject to test pressurization during the system tests will extend to all Class 3 pressure retaining components within the system boundary. Prior to performing VT-2 visual examination, the system will be pressurized to nominal operating pressure for a minimum of 4 hours for insulated systems and 10 minutes for noninsulated systems. The system will be maintained at nominal operating pressure during the performance of the VT-2 examination. The VT-2 visual examination will include all components within the boundary described above."

Evaluation: The licensee has requested relief from the 10-year hydrostatic pressure test requirement for Class 3 systems. The ASME Section XI Code committee recently approved Code Case N-498-1, *Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems, Section XI, Division 1* (May 11, 1994). Revision N-498-1 specifies requirements for Class 3 that are identical to those for Class 2 components. In lieu of 10-year hydrostatic pressure testing at or near the end of the 10-year interval, Code Case N-498-1 requires a visual examination (VT-2) to be performed in conjunction with a system leakage test at operating pressure at or near the end of the interval.

The Code-required hydrostatic examination demands considerable time, radiation exposure, and dollar resources. A significant amount of effort may be necessary (depending on system, plant configuration, etc.) to temporarily remove or disable safety and/or relief valves to meet elevated test pressure requirements. The safety assurance for Class 3 systems is provided by periodic system walkdowns of accessible areas during operation and erosion/corrosion programs to detect accelerated degradation of systems.

Conclusions: Giving consideration to the small amount of increased assurance provided by the increased pressure associated with a hydrostatic test versus the pressure for the system leakage test, it can be concluded that performing the Code-required hydrostatic tests results in hardship and/or unusual difficulty for the licensee without a compensating increase in the level of quality and safety. Therefore, it is recommended that, relief be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

3.4.4 General (No relief requests)

3.5 General

3.5.1 Request for Relief F-1, Examination Categories F-A, F-B, and F-C, Items F1.10, F1.20, F1.30, F1.40, F2.10, F2.20, F2.30, F2.40, F3.10, F3.20, F3.30, F3.40, and F3.50, Examination of Component Supports

Code Requirement: Examination Categories F-A, F-B, and F-C, Items F1.10, F1.20, F1.30, F1.40, F2.10, F2.20, F2.30, F2.40, F3.10, F3.20, F3.30, F3.40, and F3.50 require VT-3 visual examination of all component supports on portions of systems required to be examined under IWB, IWC, and IWD.

Licensee's Code Relief Request: The licensee requested relief from the requirements of Subsection IWF. The licensee has elected to adopt ASME Code Case N-491.

Licensee's Basis for Requesting Relief (as stated):

"The 1986 Edition of ASME Section XI, Subsection IWF, does not provide specific guidance for component support exemption or selection criteria; therefore user interpretation of the rules may not meet the intent of the Code. In addition, the rules for additional examinations are general and cannot effectively complement the selection basis nor target specific failure modes."

Licensee's Proposed Alternative Examination (as stated):

"The rules provided in ASME Code Case N-491 (which have been adopted into the 1990 Addenda to ASME Section XI) will be used for the examination requirements of component supports in lieu of Subsection IWF."

Evaluation: In accordance with Regulatory Guide 1.147, Revision 10, issued July 1993, Code Case N-491 is acceptable to the NRC staff for general use in the inservice inspection of components and their supports for water-cooled nuclear reactors. Because this Code Case is approved for general use by the NRC, relief is not required.

3.5.2 Request for Relief P-2, IWA-5250, Corrective Measures When Leakage is Detected at a Bolted Connection

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

Licensee's Code Relief Request: The licensee requested relief from the code-required removal of all bolting for VT-3 visual examination when leakage occurs at a bolted connection.

Licensee's Basis for Requesting Relief (as stated):

"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 an undue hardship without a compensating increase in the level of quality or safety.

The 1992 Edition of ASME Section XI allows the alternative proposed below.

Licensee's Proposed Alternative Examination (as stated):

"If leakage occurs at a bolted connection, one of the bolts shall be removed, VT-3 examined, and evaluated in accordance with IWA-3100. The bolt selected shall be the one closest to the source of leakage. When the removed bolt has evidence of degradation, all remaining bolting in the connection shall be removed, VT-3 examined, and evaluated in accordance with IWA-3100."

Evaluation: The Code requires that if leakage occurs at a bolted connection, all bolting shall be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100. As an alternative, the licensee proposes to remove and examine one bolt, closest to the area of leakage. If degradation is noted on that bolt, the remainder of the bolts will be removed, VT-3 visually examined, and evaluated in accordance with IWA-3100.

Later Editions of Section XI require the removal of only one bolt, closest to the source of leakage, in the initial evaluation of bolting. Considering later Code requirements associated with removal of bolting nearest the source of leakage, it is concluded that the removal of one bolt, nearest the source of leakage, for evaluation will provide sufficient information, thus providing an acceptable level of quality and safety.

Conclusion: The licensee's proposal to remove and examine the bolt nearest the source of leakage as part of the evaluation of leakage at a bolted connection should provide an acceptable level of quality and safety. Therefore, it is recommended that, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternative be authorized.



#### 4. CONCLUSION

Pursuant to 10 CFR 50.55a(g)(6)(i), it has been determined that certain inservice examinations cannot be performed to the extent required by Section XI of the ASME Code. In the case of Requests for Relief B-1 and B-2, the licensee has demonstrated that specific Section XI requirements are impractical; it is therefore recommended that relief be granted as requested. The granting of relief will not endanger life, 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.

Pursuant to 10 CFR 50.55a(a)(3), it is concluded that for Requests for Relief B-3, B-4, P-1, and P-2, the licensee's proposed alternative (i) provides an acceptable level of quality and safety, or (ii) Code compliance will result in hardship or unusual difficulty without a compensating increase in safety. In these cases, it is recommended that the proposed alternative be authorized.

For Request for Relief F-01, it has been determined that relief is not required because the licensee is proposing the adoption of an approved code case.

This technical evaluation has not identified any practical method by which the licensee can meet all the specific inservice inspection requirements of Section XI of the ASME Code for the existing Vermont Yankee Nuclear Power Station facility. Compliance with all the exact Section XI required inspections would necessitate redesign of a significant number of plant systems, procurement of replacement components, installation of the new components, and performance of baseline examinations for these components. Even after the redesign efforts, complete compliance with the Section XI examination requirements probably could not be achieved. Therefore, it is concluded that the public interest is not served by imposing certain provisions of Section XI of the ASME Code that have been determined to be impractical.

The licensee should continue to monitor the development of new or improved examination techniques. As improvements in these areas are achieved, the



licensee should incorporate these techniques in the ISI program plan examination requirements.

Based on the review of the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, the licensee's response to the NRC's request for additional information, and the recommendations for granting relief from the ISI examinations that cannot be performed to the extent required by Section XI of the ASME Code, no deviations from regulatory requirements or commitments were identified.

## 5. REFERENCES

1. Code of Federal Regulations, Title 10, Part 50.
2. American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Division 1:

1986 Edition

3. *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, submitted December 3, 1993.
4. NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants*, Section 5.2.4, "Reactor Coolant Boundary Inservice Inspection and Testing," and Section 6.6, "Inservice Inspection of Class 2 and 3 Components," July 1981.
5. Letter dated October 12, 1994, D. H. Dorman (NRC) to D. A. Reid (VYNPC), containing request for additional information on the third 10-year inservice inspection program.
6. Letter dated December 12, 1994, L. A. Tremblay, Jr. (VYNPC), to Document Control Desk (NRC) containing response to October 24, 1994, Request for Additional Information.
7. Letter dated December 20, 1994, L. A. Tremblay, Jr. (VYNPC), to Document Control Desk (NRC) containing response to October 24, 1994, Request for Additional Information.
8. NRC Regulatory Guide 1.150, *Reactor Pressure Vessel Beltline Weld Examinations*, Rev. 1, February 1983.
9. NRC NUREG-0313 Revision 2, *Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping*, January 1988.
10. NRC NUREG-0619, *BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking*, November 1980.

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11. ABSTRACT (200 words or less)

This report presents the results of the evaluation of the *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, Revision 0, submitted December 3, 1993, including the requests for relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code Section XI requirements that the licensee has determined to be impractical. The *Vermont Yankee Nuclear Power Station, Third 10-Year Inservice Inspection Program Plan*, is evaluated in Section 2 of this report. The ISI Program Plan is evaluated for (a) compliance with the appropriate edition/addenda of Section XI; (b) acceptability of examination sample; (c) correctness of the application of system or component examination exclusion criteria; and (d) compliance with ISI-related commitments identified during previous Nuclear Regulatory Commission reviews. The requests for relief are evaluated in Section 3 of this report.

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