

November 20, 2001

Mr. Michael A. Balduzzi
Senior Vice President and Chief Nuclear Officer
Vermont Yankee Nuclear Power Corporation
185 Old Ferry Road
P.O. Box 7002
Brattleboro, VT 05302-7002

SUBJECT: INSERVICE INSPECTION REQUEST FOR RELIEF FROM AMERICAN SOCIETY
OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE
(ASME CODE), SECTION XI REQUIREMENTS THIRD 10-YEAR INSPECTION
INTERVAL-VERMONT YANKEE NUCLEAR POWER STATION
(TAC NO. MB2310)

Dear Mr. Balduzzi:

By letter dated June 29, 2001, Vermont Yankee Nuclear Power Corporation (VY), the licensee for Vermont Yankee Nuclear Power Station, submitted Relief Request No. P-3 proposing an alternative to the requirements of the ASME Code, Section XI to pressurize an insulated system for 4 hours prior to the visual examination during system pressure testing. VY will adopt Code Case N-498-1 (Alternative Rules for 10-year System Hydrostatic Testing for Class 1, 2, and 3 Systems, Section XI, Division 1), which has been approved by the U.S. Nuclear Regulatory Commission (NRC) for the 10-year hydrostatic testing of piping and components of the high-pressure coolant injection and the reactor core isolation cooling within the Class 2 and Class 3 portions of these systems. In addition, the licensee's proposed alternative from the code case requirement would allow a hold time of 10 minutes at system operating pressure for insulated piping and components of the above systems in lieu of the required 4-hour hold time due to operational limitations.

The NRC staff finds the licensee's request to be acceptable, and therefore, authorizes the proposed alternative pursuant to 10 CFR 50.55a(a)(3)(ii) for the third 10-year inservice inspection interval. The staff's evaluation is contained in the enclosure. This safety evaluation completes the technical review performed under TAC No. MB2310. If you have any questions, please call Robert Pulsifer, the Project Manager, at 301-415-3016.

Sincerely,

/RA/

James W. Clifford, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure: Safety Evaluation

cc w/encl: See next page

Vermont Yankee Nuclear Power Station

cc:

Regional Administrator, Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. David R. Lewis
Shaw, Pittman, Potts & Trowbridge
2300 N Street, N.W.
Washington, DC 20037-1128

Ms. Christine S. Salembier, Commissioner
Vermont Department of Public Service
112 State Street
Montpelier, VT 05620-2601

Mr. Michael H. Dworkin, Chairman
Public Service Board
State of Vermont
112 State Street
Montpelier, VT 05620-2701

Chairman, Board of Selectmen
Town of Vernon
P.O. Box 116
Vernon, VT 05354-0116

Mr. Michael Hamer
Operating Experience Coordinator
Vermont Yankee Nuclear Power Station
P.O. Box 157
320 Governor Hunt Road
Vernon, VT 05354

G. Dana Bisbee, Esq.
Deputy Attorney General
33 Capitol Street
Concord, NH 03301-6937

Chief, Safety Unit
Office of the Attorney General
One Ashburton Place, 19th Floor
Boston, MA 02108

Ms. Deborah B. Katz
Box 83
Shelburne Falls, MA 01370

Mr. Raymond N. McCandless
Vermont Department of Health
Division of Occupational
and Radiological Health
108 Cherry Street
Burlington, VT 05402

Mr. Gautam Sen
Licensing Manager
Vermont Yankee Nuclear Power
Corporation
185 Old Ferry Road
P.O. Box 7002
Brattleboro, VT 05302-7002

Resident Inspector
Vermont Yankee Nuclear Power Station
U. S. Nuclear Regulatory Commission
P.O. Box 176
Vernon, VT 05354

Director, Massachusetts Emergency
Management Agency
ATTN: James Muckerheide
400 Worcester Rd.
Framingham, MA 01702-5399

Jonathan M. Block, Esq.
Main Street
P. O. Box 566
Putney, VT 05346-0566

November 20, 2001

Mr. Michael A. Balduzzi
Senior Vice President and Chief Nuclear Officer
Vermont Yankee Nuclear Power Corporation
185 Old Ferry Road
P.O. Box 7002
Brattleboro, VT 05302-7002

SUBJECT: INSERVICE INSPECTION REQUEST FOR RELIEF FROM AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE (ASME CODE), SECTION XI REQUIREMENTS THIRD 10-YEAR INSPECTION INTERVAL-VERMONT YANKEE NUCLEAR POWER STATION (TAC NO. MB2310)

Dear Mr. Balduzzi:

By letter dated June 29, 2001, Vermont Yankee Nuclear Power Corporation (VY), the licensee for Vermont Yankee Nuclear Power Station, submitted Relief Request No. P-3 proposing an alternative to the requirements of the ASME Code, Section XI to pressurize an insulated system for 4 hours prior to the visual examination during system pressure testing. VY will adopt Code Case N-498-1 (Alternative Rules for 10-year System Hydrostatic Testing for Class 1, 2, and 3 Systems, Section XI, Division 1), which has been approved by the U.S. Nuclear Regulatory Commission (NRC) for the 10-year hydrostatic testing of piping and components of the high-pressure coolant injection and the reactor core isolation cooling within the Class 2 and Class 3 portions of these systems. In addition, the licensee's proposed alternative from the code case requirement would allow a hold time of 10 minutes at system operating pressure for insulated piping and components of the above systems in lieu of the required 4-hour hold time due to operational limitations.

The NRC staff finds the licensee's request to be acceptable, and therefore, authorizes the proposed alternative pursuant to 10 CFR 50.55a(a)(3)(ii) for the third 10-year inservice inspection interval. The staff's evaluation is contained in the enclosure. This safety evaluation completes the technical review performed under TAC No. MB2310. If you have any questions, please call Robert Pulsifer, the Project Manager, at 301-415-3016.

Sincerely,

/RA/

James W. Clifford, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure: Safety Evaluation

cc w/encl: See next page

DISTRIBUTION:

PUBLIC J. Clifford T. Clark W. Beckner
PDI-2 R/F R. Pulsifer OGC ACRS
EAdensam(e-mail EGA1) P. Patnaik G. Hill (2) G. Meyer, RI
Accession #ML012880174 * See previous concurrence.

OFFICE	PDI-2/PM	PDI-2/LA	EMCB/SC	OGC	PDI-2/SC
NAME	RPulsifer	TClark	TChan*	RHeofling*	JClifford
DATE	11/15/01	11/15/01	11/06/01	11/14/01	11/15/01

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM
REQUEST FOR RELIEF FROM AMERICAN SOCIETY OF MECHANICAL ENGINEERS
BOILER AND PRESSURE VESSEL CODE (ASME CODE), SECTION XI REQUIREMENTS
VERMONT YANKEE NUCLEAR POWER STATION
VERMONT YANKEE NUCLEAR POWER CORPORATION
DOCKET NUMBER 50-271

1.0 INTRODUCTION

Inservice inspection (ISI) of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the 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). 10 CFR 50.55a(a)(3) states that 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 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. The applicable edition of the ASME Code, Section XI, for the third 10-year ISI interval of Vermont Yankee Nuclear Power Station, is the 1986 Edition.

By letter dated June 29, 2001, Vermont Yankee Nuclear Power Corporation, the licensee for Vermont Yankee Nuclear Power Station (VY), submitted a request for relief (Relief Request No. P-3) from certain requirements of the applicable ASME Code, Section XI and Code Case

Enclosure

N-498-1 (Alternative Rules for 10-year System Hydrostatic Testing for Class 1, 2, and 3 Systems, Section XI, Division 1) regarding the 4-hour hold time at nominal operating pressure prior to visual examination during system pressure test of insulated lines in the high-pressure coolant injection (HPCI) and the reactor core isolation cooling (RCIC) systems which consist of the steam supply to the pump turbines, steam exhaust from the turbines to the suppression pool and condensate lines from steam supply and exhaust. VY proposes to implement the alternative rules for 10-year hydrostatic testing of Class 2 and 3 systems as provided in Code Case N-498-1, with the exception that the test hold time shall be a minimum of 10 minutes due to operational limitations on the suppression pool.

The staff has evaluated the licensee's request for relief pursuant to 10 CFR 50.55a(a)(3)(ii) for the third 10-year ISI interval of VY.

2.0 BACKGROUND

2.1 Identification of System

Insulated portions of the HPCI and the RCIC.

2.2 Code Requirements

ASME Code, Section XI, 1986 Edition, Table IWC-2500-1, Examination Category C-H and Table IWD-2500-1, Examination Categories D-A, D-B, and D-C, require a VT-2 visual examination during a system hydrostatic test once every 10-year ISI interval. Subsection IWA-5213(d) requires a 4-hour hold time for insulated systems, and a 10-minute hold time for non-insulated systems or components after attaining the test pressure and temperature conditions prior to performing the VT-2 visual examination.

Code Case N-498-1 (Alternative Rules for 10-year System Hydrostatic Testing for Class 1, 2, and 3 Systems, Section XI, Division 1), approved for use by NRC in Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 12, allows performance of a system leakage test in lieu of the hydrostatic test but also requires pressurization for a minimum of 4 hours for insulated systems and 10 minutes for non-insulated systems at nominal operating pressure prior to performing the VT-2 visual examination.

2.3 Licensee's Requested Relief

Relief is requested from maintaining the 4-hour holding time at test pressure required by the Code in subsection IWA-5213(d) and also in Code Case N-498-1, step b(3) and step c(3) for the subject systems.

2.4 Licensee's Proposed Alternative (as stated)

"The system pressure test described in Code Case N-498-1 will be conducted as required, except that a 10-minute hold time will be used rather than the 4-hour hold time specified in the Code Case. For insulated portions of the HPCI and RCIC systems, the following will be used in lieu of steps b(3) and c(3) in Code Case N-498-1:

Prior to performing the VT-2 visual examination, the system shall be pressurized to nominal operating pressure for a minimum of 10 minutes. The system shall be maintained at nominal operating pressure during performance of the VT-2 visual examination.

A minimum 10-minute hold time prior to visual inspection will provide adequate assurance of the leak-tight integrity of insulated components.”

2.5 Licensee’s Basis for Relief (as stated)

“Code Case N-498-1 specifies that pressure tests include a 4-hour hold time prior to performing the VT-2 visual examination of insulated systems. Compliance with the 4-hour hold time will result in a hardship, without a compensating increase in quality or safety.

The HPCI and RCIC systems are not required to operate during normal plant operation. These systems are periodically functionally tested in accordance with Technical Specifications [TS] surveillance requirements, for a duration of typically between 30 to 40 minutes each quarter. Operation of these systems adds heat to the suppression pool. Control of these additional heat loads for extended periods of system operation (e.g., 4 hours) would require operating the Residual Heat Removal (RHR) system in suppression pool cooling mode. In order to place the RHR system in suppression pool cooling mode at power, Technical Specifications require entry into the Limiting Condition for Operation (LCO) for the RHR Low Pressure Coolant Injection (LPCI) mode. Extending the HPCI or RCIC system functional test duration to more than four hours in order to satisfy the Code Case N-498-1 hold time would subject the suppression pool to unnecessarily excessive heat loads and could challenge the Technical Specifications suppression pool temperature limit. It would also require remaining in the LPCI LCO for an extended period of time, thereby reducing the availability of safety-related equipment.

HPCI and RCIC systems are operated under a quarterly surveillance program and are therefore monitored operationally 4 times per year or 40 times per ISI interval. Additionally, the proposed alternative hold time is the same as for pressure test requirements performed once each inspection period per ASME Section XI, 1986 IWA-5213(b) for testing required by IWC-2500-1 Category C-H and IWD-2500-1 Category D-B.”

3.0 EVALUATION

Both the Code and Code Case N-498-1 specify pressure tests that require a 4-hour hold time prior to performing the VT-2 visual examination during the hydrostatic test of insulated systems. The licensee has stated that compliance with the 4-hour hold time will result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The licensee has further stated that performance of the test with a 4-hour hold time could compromise plant safety.

Based on the review of information provided, the staff believes that in order to maintain suppression pool temperature within the TS limits, the pressure test and the 4-hour hold time for the subject system would require dedicated operation of the RHR system in the suppression pool cooling mode while the reactor is at power. Furthermore, due to exhaust of steam from the HPCI turbine into the suppression pool, the steam condensation capability of the

suppression pool will be reduced. Therefore, should an actual plant emergency occur during the test, the ability to bring the plant to a safe shutdown condition could be compromised.

Within each 10-year inspection interval, a system functional test at operating pressure including a VT-2 visual examination is conducted on the system at 40-month intervals in accordance with the Code. At or near the end of each inspection interval, the Code requires a hydrostatic test, which by virtue of Code Case N-498-1, can be a system leakage test requiring pressurization to nominal operating pressure for at least 4 hours prior to the VT-2 visual examination. However, the licensee's proposed alternative would allow performance of the system functional test with pressurization for at least 10 minutes at nominal operating pressure without removal of the insulation in lieu of a 4-hour hold time at this pressure prior to the VT-2 visual examination.

The piping and components subject to the VT-2 visual examination contain steam. The staff believes that steam leaks are audible and, therefore, are more easily detectable than comparable water leaks from insulated components. Therefore, for these components, a reduced hold time for steam piping at nominal operating pressure without removal of the insulation prior to performing VT-2 visual examination is expected to permit detection of leakage. The piping included in this relief are the portions extending from the steam admission valve through the HPCI turbine and the turbine exhaust piping to the suppression pool along with the associated drains and vent lines. In an unlikely event of missing a very small leak during a system functional test, the leak can be detected during maintenance activities requiring pump/turbine operation for post-maintenance testing or the next system functional test. Further, assuming reasonable crack growth between consecutive tests for the portion of subject piping which is at system pressure during normal plant operation, the system will also remain functional in spite of a leak. Compliance with the Code requirement would require removal of insulation from the affected piping, conducting the test, and replacement of the insulation following the test. This would result in hardship to the licensee without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

The NRC staff concludes that for HPCI turbine inlet and exhaust piping to the suppression pool and the associated drains and vents, maintaining a 4-hour hold time at nominal operating pressure prior to the VT-2 visual examination during a system pressure test challenges the heat limitations of the suppression pool and, thus, could create an operational safety concern. A system functional test at nominal operating pressure with a 10-minute hold time at pressure without removal of the insulation prior to performing the VT-2 visual examination will provide reasonable assurance of leak-tight integrity of the subject system. In addition, the staff considers the removal and subsequent reinstallation of insulation for the sole purpose of complying with the requirements of the applicable Code and Code Case N-498-1 to be a hardship without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee's proposed alternative is authorized for the third 10-year ISI interval of Vermont Yankee Nuclear Power Station.

Principal Contributor: P. Patnaik

Date: November 20, 2001