

August 14, 2002

Mr. Jay K. Thayer
Site Vice President - Vermont Yankee
Entergy Nuclear Vermont Yankee, LLC
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - SAFETY EVALUATION
OF INSERVICE TESTING RELIEF REQUEST FOR SAFETY RELATED PUMPS
(TAC NO. MB5102)

Dear Mr. Thayer:

The U.S. Nuclear Regulatory Commission (NRC) has reviewed Relief Request RR-P11 associated with the inservice testing (IST) of safety-related pumps at the Vermont Yankee Nuclear Power Station, submitted by Vermont Yankee Nuclear Power Corporation (VYNPC or the licensee) in its letter dated May 9, 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 were previously submitted by VYNPC. Accordingly, the NRC staff has acted upon the request. The licensee requests to use American Society of Mechanical Engineers (ASME) OMa-1996 Code, Subsections ISTB 6.2 and ISTB 4.6, in lieu of the corresponding requirements in its Code of record (ASME OMa-1988, Part 6). The ASME OMa-1996 addenda was incorporated by reference in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(b) on September 22, 1999 (64 FR 51370).

On the basis of its review, the NRC staff concludes that the licensee's request to use the OMa-1996 Code, Subsections ISTB 6.2 and ISTB 4.6, is authorized for the remainder of the third 10-year IST interval pursuant to 10 CFR 50.55a(f)(4)(iv). The enclosure contains the staff's 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: 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
Entergy Nuclear Vermont Yankee, LLC
P.O. Box 250
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
Manager, Licensing
Entergy Nuclear Vermont Yankee, LLC
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

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

Mr. Michael R. Kansler
Sr. Vice President and Chief Operating
Officer
Entergy Nuclear Operations, Inc.
Mail Stop 12A
440 Hamilton Ave.
White Plains, NY 10601

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cc w/encl: See next page

DISTRIBUTION:

PUBLIC	R. Pulsifer	G. Hill (2)	J. Zimmerman
PDI-2 R/F	T. Clark	T. Bergman, EDO	C. Anderson, RI
S. Richards	OGC	ACRS	

* Input received 7/5/02. No major changes made.

** See previous concurrence.

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OFFICE	PDI-2/PM	PDI-2/LA	EMEB*	OGC**	PDI-2/SC(A)
NAME	RPulsifer	TClark	DTerao	RHoefling	JZimmerman
DATE	8/13/02	8/13/02	7/5/02	7/30/02	8/13/02

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE TESTING PROGRAM

ENTERGY NUCLEAR VERMONT YANKEE, LLC

AND ENTERGY NUCLEAR OPERATIONS, INC

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

1.0 INTRODUCTION

Title 10 of the *Code of Federal Regulations*, Section 50.55a (10 CFR 50.55a), requires that inservice testing (IST) of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME *Boiler and Pressure Vessel Code* (ASME B&PV Code) and the ASME *Code for Operation and Maintenance of Nuclear Power Plants* (ASME OM Code) and applicable addenda, except when alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to 10 CFR 50.55a(a)(3)(i), 10 CFR 50.55a(a)(3)(ii), or 10 CFR 50.55a(f)(6)(i). In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the alternatives will provide an acceptable level of quality and safety, (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, or (3) conformance would be impractical for its facility. The regulations at 10 CFR 50.55a authorize the Commission to approve alternatives and to grant relief from ASME Code requirements upon making the necessary findings. The regulation at 10 CFR 50.55a(f)(4)(iv) states that IST of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to Commission approval. Portions of editions or addenda may be used provided that all the related requirements of the respective editions and addenda are met.

In its letter dated May 9, 2002, Vermont Yankee Nuclear Power Corporation (VYNPC), licensee for Vermont Yankee Nuclear Power Station (VY), submitted a relief request (RR-P11) for its third 10-year interval IST program for pumps and valves, requesting approval by the U.S. Nuclear Regulatory Commission (NRC) to implement ASME OM Code 1995 Edition, 1996 Addenda (OMa-1996 Code), Subsection ISTB 6.2, "Acceptance Criteria," and ISTB 4.6, "New Reference Values," at VY. VYNPC proposed implementation of ASME OMa-1996 Code, Subsections ISTB 6.2 and ISTB 4.6, for the pumps in the ISI program at VY. The current Code of record for the VY IST program is the ASME OMa-1988 Code, Part 6 (pumps). 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 were previously submitted by VYNPC. Accordingly the NRC staff has acted upon the request.

Enclosure

The NRC staff's findings with respect to VYNPC's request to use and implement the OMa-1996 Code, Subsections ISTB 6.2, and ISTB 4.6, in lieu of OMa-1988 Addenda, Part 6, paragraph 6.1, "Acceptance Criteria," are contained in this safety evaluation.

2.0 RELIEF REQUEST

2.1 Relief Request RR-P11

VYNPC has requested relief from the current requirements of ASME OM, 1987 Edition, OMa-1988 Addenda, paragraph 6.1, "Acceptance Criteria." VY proposes to use the OM-1995 Edition, OMa-1996 Addenda, Subsection ISTB, paragraph 6.2, "Acceptance Criteria," and its related requirement ISTB 4.6, "New Reference Values," in lieu of OMa-1988, Part 6, paragraph 6.1, "Acceptance Criteria," for the pumps in VY's IST program. VYNPC has proposed to use the provisions in OMa-1996, ISTB 6.2.2, "Action Range," which allow an analysis of pumps in instances where their performance enters the required action range, in lieu of the corrective actions required by its current Code of record.

2.1.1 VYNPC's Basis for Request

VYNPC stated that it is difficult to replace or repair a pump that is still operating within acceptable design parameters as determined through analysis. The repair or replacement involves rendering the associated subsystems inoperable and unavailable. Replacement or repair of a pump in this condition unnecessarily increases the unavailability of the pump and its associated subsystem and is not consistent with availability goals established in accordance with 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." Further, repairing a pump that is operating acceptably and within design parameters does not provide a compensating increase in the level of quality and safety. OMa-1996, Subsection ISTB 6.2.2, provides an alternative corrective action if a pump's performance enters the required action range by allowing an analysis of the pump's performance and establishment of new reference values.

2.1.2 Alternative Testing

The licensee proposes to use ISTB 6.2, "Acceptance Criteria," and its related requirement ISTB 4.6, "New Reference Values," from the OMa-1996 addenda in lieu of OMa-1988, Part 6, paragraph 6.1, "Acceptance Criteria." References to OMa-1996, Tables ISTB 5.2.1-1, 5.2.1-2, 5.2.2-1, and 5.2.3-1, shall be understood to refer to the ranges and test parameters in OMa-1988, Part 6, Table 3. VYNPC will continue to test the pumps at the frequency specified in OMa-1988, Part 6, paragraph 5.1, "Frequency of Inservice Test."

The ASME OMa-1996 Code, Subsection ISTB 6.2, "Acceptance Criteria," specifies the actions to be taken for pumps in the alert range (ISTB 6.2.1), for pumps in the action range (ISTB 6.2.2), and for systematic error (ISTB 6.2.3). In particular, ISTB 6.2.2 provides that, for pumps in the required action range, an analysis may be performed and new reference values established in accordance with paragraph ISTB 4.6. Paragraph 4.6, "New Reference Values," allows that, in cases where the pump test parameters are either within the alert or required action ranges of Tables ISTB 5.2.1-1, 5.2.1-2, 5.2.2-1, and 5.2.3-1, a new set of reference

values may be established. The reasonable assurance of a pump's operational readiness in this condition will be provided by the following:

1. The pump's continued use is supported by analysis.
2. The analysis includes verification of the pump's operational readiness.
3. The analysis shall include both a pump level and a system level evaluation of operational readiness.
4. The cause of the change in pump performance shall be determined.
5. An evaluation shall be performed of all trends indicated by available data.
6. The results of this analysis shall be documented in the record of tests.

3.0 EVALUATION

The OMa-1988, Part 6, paragraph 6.1, "Acceptance Criteria," specifies actions required to be taken if any of the measured pump parameters fall within the alert or required action ranges. For test results in the alert range, the frequency test shall be doubled (every 1.5 months) until the cause of the deviation is determined and the condition is corrected. For test results in the required action range, the pump shall be declared inoperable until the cause of the deviation has been determined and the condition corrected.

ASME OM Code 1995 Edition, 1996 Addenda, was incorporated by reference on September 22, 1999 (64 FR 51370) by the NRC in a rule change to 10 CFR 50.55a. OMa-1996, Subsection ISTB, paragraph 4.6, "New Reference Values," states that: "In cases where the pump's test parameters are either within the alert or required action ranges of Tables ISTB 5.2.1-1, 5.2.1-2, 5.2.2-1, and 5.2.3-1, and the pump's continued use at the changed values is supported by analysis, a new set of reference values may be established." Paragraph ISTB 4.6 also states that the analysis shall include both a pump level and a system level verification of pump operational readiness, the cause of the change in pump performance, and an evaluation of all trends indicated by available data.

Paragraph ISTB 6.2.1 in ASME OM Code 1995 Edition, for the pump alert range, provides the same acceptance criteria as OMa-1988, Part 6, which continues to specify doubling the test frequency if the test parameter falls within the alert range. Paragraph ISTB 6.2.2 provides acceptance criteria for the required action range, that the pump be declared inoperable until the cause of deviation is determined and the condition corrected. However, paragraph ISTB 6.2.2 also allows an analysis to be performed and new reference values to be established in accordance with ISTB 4.6 in lieu of pump repair or replacement specified in OMa-1988. VYNPC has proposed to adopt ISTB 6.2 and related requirement ISTB 4.6, in order to establish new reference values by analysis of pump performance. The regulations, as specified in 10 CFR 50.55a(f)(4)(iv), allow the adoption of portions of later editions and addenda of the Code provided related requirements are met.

The NRC has previously issued guidance on performing an analysis where the result of an ASME Code test of a pump or valve concludes that the operability of the component is questionable. NRC Generic Letter (GL) 91-18, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions," dated November 7, 1991, and the October 8, 1997, revision, discussed resolution of degraded and nonconforming conditions and operability. In Section 6.11, "Technical Specification Operability vs. ASME Code, Section XI Operative Criteria," of GL 91-18 the NRC indicates that, in cases where the required action range limit is more conservative than its corresponding technical specification limit, the corrective action may not be limited to replacement or repair. The corrective action may consist of an analysis to demonstrate that the specific pump performance degradation does not impair operability and that the pump or valve will fulfill its function. A new required action range may be established after such an analysis which would then allow a determination of operability. Hence, when licensees request to use the analysis alternative in OMa-1996, ISTB 6.2, the staff has authorized the alternative because it is consistent with the guidance in GL 91-18.

The performance of an analysis to establish pump reference values should include, at a minimum, a comparison of the current measurements for the particular parameter (i.e., flow rate, vibration, discharge pressure, or differential pressure) to the baseline measurements, an evaluation of the trend of available data for the parameter, and a determination of the cause and the need for corrective action. Alternative diagnostic methods, such as vibration spectral analysis, are expected to be used to support the analysis. The analysis is subject to NRC inspection. This analysis must provide reasonable assurance that the condition of the pump will not further degrade such that, before the next pump test or before repairs can be performed, the pump will fail. Additionally, it should be noted that changes to the vibration reference values would only affect the vibration relative alert and required action limits, and not the absolute limits specified by the Code. If the absolute limits are exceeded, the licensee would be required to declare the pump inoperable in accordance with the Code.

The use of this analysis to continue the operation of the pumps is expected to be a rare occurrence, and should be used cautiously. This analysis is not intended to be used regularly to evaluate the operability of all pumps that fall into the required action range in order to declare the pump operable and define new reference values where significant degradation has occurred. Repeated application of this analysis could lead to stair-stepping the Code limits downward to the safety limits of the pump, and lead to component failure. The licensee should have an understanding of the margin of each pump above its design-basis requirements. With this understanding, the staff considers the acceptance of the licensee's proposal to be appropriately evaluated based on the provisions in 10 CFR 50.55a(f)(4)(iv), regarding the use of more recent editions of the ASME Code. VY has not identified Code provisions that could be related to ISTB 6.2 (i.e., ISTB 4.3(e)(1) on stable pump flow considerations and ISTB 5.2.3 on comprehensive pump test performance). The staff finds that the licensee's proposed alternative to perform an analysis to establish new reference values provides reasonable assurance of operational readiness of the pump.

4.0 CONCLUSION

The proposed alternative to use OM Code-1995 Edition, OMa-1996 Addenda, Subsections ISTB 6.2 and ISTB 4.6, in lieu of paragraph 6.1 of OMa-1988, Part 6 (Code of record), for pump

acceptance criteria, is authorized for the remainder of the third 10-year IST interval pursuant to 10 CFR 50.55a(f)(4)(iv).

Principal Contributor: J. Arroyo

Date: August 14, 2002