



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

May 7, 2015

Site Vice President  
Entergy Nuclear Operations, Inc.  
Vermont Yankee Nuclear Power Station  
P.O. Box 250  
Governor Hunt Road  
Vernon, VT 05354

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - RELIEF REQUEST ISI-06,  
INSERVICE INSPECTION LIMITED EXAMINATIONS FOR THE FOURTH  
10-YEAR INTERVAL (TAC NO. MF4689)

Dear Sir or Madam:

By letter dated August 19, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14237A100), as supplemented by letter dated October 23, 2014 (ADAMS Accession No. ML14302A073), Entergy Nuclear Operations, Inc. (Entergy, the licensee), submitted Relief Request ISI-06 to the U.S. Nuclear Regulatory Commission (NRC) for Vermont Yankee Nuclear Power Station (VY) for the fourth 10-year inservice inspection (ISI) interval program. With regards to Relief Request ISI-06, the licensee requests relief from certain requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code), Section XI, 1998 Edition through 2000 Addenda, for 100 percent examination coverage for several welds.

Additionally, the licensee submitted a letter on September 23, 2013 (ADAMS Accession No. ML13273A204), expressing the intent to permanently shut down VY by the end of calendar year 2014. On January 12, 2015, Entergy certified that VY had permanently ceased power operations on December 29, 2014; and that as of January 12, 2015, all fuel had been permanently removed from the reactor vessel and placed in the spent fuel pool. With the docketing of these certifications, the Part 50 license no longer authorizes operation of the reactor or emplacement of fuel in the reactor vessel.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(5)(iii), the licensee requested relief and to use alternative requirements for ISI items on the basis that the code requirement is impractical.

Based on the enclosed safety evaluation, the NRC staff has determined that it is impractical for the licensee to comply with the "essentially 100 percent" volumetric coverage requirement of ASME Code Section XI. The staff has further determined that granting Relief Request ISI-06, in accordance with 10 CFR 50.55a(g)(6)(i), is authorized by law and will not endanger life or 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. Accordingly, the staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii), and is in compliance with the requirements of 10 CFR 50.55a with the granting of these reliefs.

Therefore, the NRC staff grants relief, pursuant to 10 CFR 50.55a(g)(6)(i), for the subject examinations of the components contained in Relief Request ISI-6, for the fourth ISI interval at VY, which began September 1, 2003, and concluded August 31, 2013.

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

If you have any questions, please contact the NRC Project Manager for VY, James Kim, at (301) 415-4125 or [James.Kim@nrc.gov](mailto:James.Kim@nrc.gov).

Sincerely,



Meena K. Khanna, Chief  
Plant Licensing IV-2 and Decommissioning  
Transition Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure:  
Safety Evaluation

cc w/encl: Distribution via Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST ISI-06

FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL

ENTERGY NUCLEAR OPERATIONS, INC.

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

1.0 INTRODUCTION

By letter dated August 19, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14237A100), as supplemented by letter dated October 23, 2014 (ADAMS Accession No. ML14302A073), Entergy Nuclear Operations, Inc. (Entergy, the licensee), submitted Relief Request ISI-06 to the U.S. Nuclear Regulatory Commission (NRC) for Vermont Yankee Nuclear Power Station (VY) for the fourth 10-year inservice inspection (ISI) interval program. With regards to Relief Request ISI-06, the licensee requests relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code), Section XI, 1998 Edition through 2000 Addenda, for 100 percent examination coverage for several welds.

Additionally, the licensee submitted a letter on September 23, 2013 (ADAMS Accession No. ML13273A204), expressing the intent to permanently shut down VY by the end of calendar year 2014. On January 12, 2015, Entergy certified that VY had permanently ceased power operations on December 29, 2014; and that as of January 12, 2015, all fuel had been permanently removed from the reactor vessel and placed in the spent fuel pool. With the docketing of these certifications, the Part 50 license no longer authorizes operation of the reactor or emplacement of fuel in the reactor vessel.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(5)(iii), the licensee requested relief and to use alternative requirements for ISI items on the basis that the code requirement is impractical.

2.0 REGULATORY EVALUATION

The licensee is requesting relief from the ASME Code, Section XI, ISI requirements under 10 CFR 50.55a(g)(5)(iii). The ISI of ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and the applicable edition and

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 NRC, pursuant to 10 CFR 50.55a(g)(6)(i).

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) must 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 regulation requires 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, which was 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 VY, fourth 10-year ISI interval began September 1, 2003, and concluded August 31, 2013.

The regulation in 10 CFR 50.55a(g)(5)(iii), states, in part, that

the licensee has determined that conformance with a Code requirement is impractical and that the licensee shall notify the NRC and submit information to support the determination. Determination of Impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the code requirements during the inservice inspection interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial 120-month inspection interval or subsequent 120-month inspection interval for which relief is sought.

The regulation in 10 CFR 50.55a(g)(6)(i), states that

[t]he Commission will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or 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.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request and the NRC to authorize the alternative requested by the licensee.

### 3.0 TECHNICAL EVALUATION

#### 3.1 The Licensee's Requested Relief

##### Affected Components

| <b>Section XI<br/>Category and Item<br/>Number</b> | <b>System &amp;<br/>Component<br/>Number</b> | <b>Component Description</b>       | <b>Exam &amp;<br/>Coverage<br/>Percent</b> |
|--|--|------------------------------------|--|
| B-A B1.22  | Nuclear Boiler H4                            | RPV Bottom Head<br>Meridional Weld | UT 36.9%                                   |
| B-A B1.22  | Nuclear Boiler H5                            | RPV Bottom Head<br>Meridional Weld | UT 38.5%                                   |
| B-A B1.22  | Nuclear Boiler H6                            | RPV Bottom Head<br>Meridional Weld | UT 38.5%                                   |
| B-A B1.22  | Nuclear Boiler H7                            | RPV Bottom Head<br>Meridional Weld | UT 36.7%                                   |
| B-A B1.22  | Nuclear Boiler H8                            | RPV Bottom Head<br>Meridional Weld | UT 38.5%                                   |
| B-A B1.22  | Nuclear Boiler J1                            | RPV Bottom Head<br>Meridional Weld | UT 23.1%                                   |
| B-A B1.22  | Nuclear Boiler J2                            | RPV Bottom Head<br>Meridional Weld | UT 24.4%                                   |
| B-D B3.90  | Nuclear Boiler<br>N3A                        | Nozzle to Vessel Weld              | UT 75.60%                                  |
| B-D B3.90  | Nuclear Boiler<br>N3B                        | Nozzle to Vessel Weld              | UT 75.60%                                  |
| B-D B3.90  | Nuclear Boiler<br>N3C                        | Nozzle to Vessel Weld              | UT 75.60%                                  |
| B-D B3.90  | Nuclear Boiler<br>N3D                        | Nozzle to Vessel Weld              | UT 75.60%                                  |
| B-D B3.90  | Nuclear Boiler<br>N4A                        | Nozzle to Vessel Weld              | UT 70.2%                                   |
| B-D B3.90  | Nuclear Boiler<br>N4B                        | Nozzle to Vessel Weld              | UT 65.9%                                   |

| <b>Section XI<br/>Category and Item<br/>Number</b> | <b>System &amp;<br/>Component<br/>Number</b> | <b>Component Description</b>                        | <b>Exam &amp;<br/>Coverage<br/>Percent</b> |
|--|--|---|--|
| B-D B3.90  | Nuclear Boiler<br>N4C                        | Nozzle to Vessel Weld                               | UT 70.2%                                   |
| B-D B3.90  | Nuclear Boiler<br>N4D                        | Nozzle to Vessel Weld                               | UT 70.2%                                   |
| B-D B3.90  | Nuclear Boiler<br>N5A                        | Nozzle to Vessel Weld                               | UT 76.3%                                   |
| B-F B5.10  | Nuclear Boiler<br>N6A-SE                     | 9" Nozzle to Safe End Butt<br>Weld                  | UT 67%                                     |
| B-J B9.11  | Core Spray CS4B-<br>MF5                      | Valve to Pipe<br>Circumferential Weld               | UT 50%                                     |
| B-J B9.11  | RHR RH30-1                                   | Circumferential Weld, Tee<br>to Pipe                | UT 75%                                     |
| B-J B9.11  | RHR RH30-6                                   | Circumferential Weld,<br>Elbow to Pipe              | UT 75%                                     |
| B-J B9.11  | NB<br>RR-BD-13                               | Circumferential Weld<br>Downstream of Valve         | UT 50%                                     |
| B-J B9.11  | NB<br>RR-AD-13                               | Circumferential Weld<br>Downstream of Valve         | UT 50%                                     |
| B-J B9.11  | Nuclear Boiler<br>RV-F9A                     | 4" Circumferential Weld                             | UT 75%                                     |
| B-J B9.11  | Nuclear Boiler<br>RV-F9B                     | 6" Circumferential Weld                             | UT 75%                                     |
| B-J B9.11  | RWCU CU18-4                                  | 4" Circumferential Weld                             | UT 50%                                     |
| B-J B10.10   | Nuclear Boiler<br>ODEG RPV BRKT              | Reactor Vessel Exterior<br>Integral Attachment Weld | PT 20.77%                                  |
| C-A C1.10  | RHR<br>A-HTEX10-4                            | Head Shell to Flange<br>Circumferential Weld        | UT 80.15%                                  |
| C-C C3.20  | FDW FDW-HD36                                 | Integral Attachment Weld                            | MT 50%                                     |

| <b>Section XI<br/>Category and Item<br/>Number</b> | <b>System &amp;<br/>Component<br/>Number</b> | <b>Component Description</b>           | <b>Exam &amp;<br/>Coverage<br/>Percent</b> |
|--|--|--|--|
| C-C C3.20  | FDW FDW-HD36                                 | Integral Attachment Weld               | MT 50%                                     |
| C-C C3.20  | FDW FDW-HD39                                 | Integral Attachment Weld               | MT 50%                                     |
| C-F-2 C5.51  | PCAC AC11-S50                                | 20" Circumferential Weld               | UT 68.7%                                   |
| C-F-2 C5.51  | CORE SPRAY<br>CS1B-S27                       | 12" Circumferential Weld               | UT 88.65%                                  |
| C-F-2 C5.51  | RHR RH14-S356                                | 14" Circumferential Weld               | UT 66.25%                                  |
| C-F-2 C5.51  | RHR RH2A-S58                                 | 24" Circumferential Weld               | UT 85.5%                                   |
| C-F-2 C5.51  | RHR RH8-S294                                 | 20" Circumferential Weld               | UT 87.75%                                  |
| C-F-2 C5.51  | RHR RH3D-S206                                | Circumferential Weld, Pipe<br>to Valve | UT 77%                                     |

Applicable ASME Code Edition and Addenda

The code of record for the fourth 10-year ISI interval was the ASME Section XI, 1998 Edition with 2000 Addenda.

Duration of Proposed Alternative

Relief is requested for the fourth 10-year ISI interval, which began September 1, 2003 and concluded August 31, 2013.

Basis for Relief (as stated by the licensee)

In its letter dated August 19, 2014, the licensee states, in part:

Physical obstructions imposed by design, geometry and materials of construction are typical of vessel appurtenances, biological shield wall, insulation support rings, structural and component support members, adjacent component weldments in close proximity, unique component configurations (valves and pumps), and dissimilar metal weldments.

As a minimum, all components received the required examination(s) to the extent practical with regard to the limited or lack of access available. The examinations conducted confirmed satisfactory results evidencing no unacceptable flaws present, even though "essentially 100 percent" coverage was not attained in a portion of the Section XI examinations. VY concludes that if any active degradation mechanisms or patterns of degradation were to exist in the subject welds, those degradations would have been identified in the examinations performed in adjacent weldment or similar weld configurations.

### 3.2 NRC Staff Evaluation

The licensee is requesting relief from the "essentially 100 percent" volumetric examination for the 36 subject welds. The relief was requested under 10 CFR 50.55a(g)(5)(iii), on the basis that obtaining the 100 percent volumetric weld coverage was impractical.

The original relief request submittal, dated August 19, 2014, did not contain sufficient information to allow the NRC staff to assess the safety implications of the missed coverage or determine the impracticality of obtaining "essentially 100 percent" volumetric coverage for future operation. Relief Request ISI-06 is an unusual case in that the VY permanently shut down on December 29, 2014, and the fuel was permanently removed on January 12, 2015. As the facility is permanently shut down and the fuel has been removed, there will be no future operation. The welds covered in this relief request will no longer be subjected to high temperatures or pressures or thermal or mechanical stresses, so any degradation that may be present in the welds will not have any driving forces to make them continue to grow. The welds no longer serve a safety function related to preventing core damage, as the core has been removed from the reactor. Inspecting welds that serve no safety function would impose a burden on the licensee that is not in the public interest. The licensee has demonstrated that the welds would be impractical to examine, given that the reactor is permanently shut down. As the welds have not shown signs of leakage at this point, there is reasonable assurance of leak tightness and structural integrity for the welds.

### 4.0 CONCLUSIONS

As set forth above, the NRC staff has determined that it is impractical for the licensee to comply with the "essentially 100 percent" volumetric coverage requirement of ASME Code Section XI. The staff has further determined that granting Relief Request ISI-06, in accordance with 10 CFR 50.55a(g)(6)(i), is authorized by law and will not endanger life or 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. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii), and is in compliance with the requirements of 10 CFR 50.55a with the granting of these reliefs. Therefore, the NRC staff grants relief, pursuant to 10 CFR 50.55a(g)(6)(i), for the subject examinations of the components contained in Relief Request ISI-6, for the fourth 10-year ISI interval at VY.



All other ASME Code, Section XI, requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Stephen Cumblidge, NRR

Date: May 7, 2015

Therefore, the NRC staff grants relief, pursuant to 10 CFR 50.55a(g)(6)(i), for the subject examinations of the components contained in Relief Request ISI-6, for the fourth ISI interval at VY, which began September 1, 2003, and concluded August 31, 2013.

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

If you have any questions, please contact the NRC Project Manager for VY, James Kim, at (301) 415-4125 or [James.Kim@nrc.gov](mailto:James.Kim@nrc.gov).

Sincerely,

/RA/

Meena K. Khanna, Chief  
Plant Licensing IV-2 and Decommissioning  
Transition Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure:  
Safety Evaluation

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**ADAMS ACCESSION NO.: ML15120A315**

\*See memo dated April 25, 2015

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