



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

October 19, 2016

Mr. Jack R. Davis  
Vice President, Regulatory Assurance  
Entergy Services, Inc.  
1340 Echelon Parkway  
Jackson, MS 39213

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1; GRAND GULF NUCLEAR STATION, UNIT 1; AND WATERFORD 3 STEAM ELECTRIC STATION - RELIEF REQUEST EN-ISI-15-1, PROPOSED ALTERNATIVE TO MAINTAIN INSERVICE INSPECTION RELATED ACTIVITIES TO THE 2001 EDITION/2003 ADDENDUM OF AMERICAN SOCIETY OF MECHANICAL ENGINEERS, SECTION XI CODE (CAC NOS. MF7133, MF7134 AND MF7136)

Dear Mr. Davis:

By letter dated November 20, 2015, as supplemented by letter dated June 2, 2016, Entergy Operations Inc. and Entergy Nuclear Operations, Inc. (Entergy, the licensee) submitted a request to the Nuclear Regulatory Commission (NRC) for the use of the 2001 Edition/2003 Addenda to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, for the performance of inservice inspection (ISI) related activities associated with Entergy's repair/replacement, pressure testing, and nondestructive testing programs during the fourth 10-year ISI Interval for Grand Gulf Nuclear Station (GGNS) and Waterford 3 Steam Electric Station (WF3), and the fifth 10-year ISI Interval for Arkansas Nuclear One, Unit 1 (ANO-1).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), Entergy requested an alternative on the basis that the alternative provides an acceptable level of quality and safety for the aforementioned plants and corresponding ISI intervals to continue the use of the 2001 Edition through the 2003 Addenda requirements of ASME Section XI for the performance of repair/replacement, pressure testing, and nondestructive testing activities until standardized corporate procedures for these activities are updated in December 2017. The proposed duration of this alternative is from January 1, 2017 through November 30, 2017.

The NRC staff has reviewed the subject request and finds that the proposed alternative provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the use of RR EN-ISI-15-1 for ANO-1 during fifth 10-year ISI interval and at GGNS and WF3 during fourth 10-year ISI intervals from January 1, 2017 through November 30, 2017.

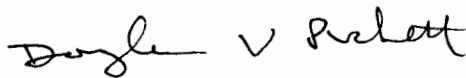
All other requirements of the ASME Code for which relief has not been specifically requested and authorized by the NRC staff remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

J. Davis

- 2 -

If you have any questions, please contact Richard V. Guzman, Senior Project Manager, at (301) 415-1030 or [Richard.Guzman@nrc.gov](mailto:Richard.Guzman@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Douglas V. Pickett". The signature is fluid and cursive, with a large "D" and "P".

Douglas V. Pickett, Acting Chief  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-313, 50-416, 50-382

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  
PROPOSED ALTERNATIVE TO MAINTAIN INSERVICE INSPECTION RELATED ACTIVITIES  
TO THE 2001 EDITION/2003 ADDENDUM OF ASME SECTION XI CODE  
RELIEF REQUEST EN-ISI-15-1  
ENTERGY OPERATIONS INC.  
ENTERGY NUCLEAR OPERATIONS, INC.  
ARKANSAS NUCLEAR ONE, UNIT 1;  
GRAND GULF NUCLEAR STATION, UNIT 1; AND  
WATERFORD 3 STEAM ELECTRIC STATION  
DOCKET NOS. 50-313, 50-416, AND 50-382

1.0 INTRODUCTION

By letter dated November 20, 2015 (Agency-wide Document Access and Management System (ADAMS) Accession Number ML15329A305), as supplemented by letter dated June 2, 2016 (ADAMS Accession No. ML16154A567), Entergy Operations, Inc. and Entergy Nuclear Operations, Inc. (Entergy, the licensee), requested the use of an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV Code) Section XI, 2007 Edition through 2008 Addenda, for performance of repair/replacement activities (R&R), pressure testing (PT) and non-destructive testing (NDE) during the fifth 10-year inservice inspection (ISI) interval.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), Entergy requested an alternative on the basis that the alternative provides an acceptable level of quality and safety for the fifth 10-year ISI interval for Arkansas Nuclear One (ANO), Unit 1; the fourth 10-year ISI Interval for Grand Gulf Nuclear Station (GGNS); the fifth 10-year ISI interval for James A. Fitzpatrick Nuclear Power Plant (JAF); and the fourth 10-year ISI interval for Waterford Steam Electric Station (WE3) to continue the use of the 2001 Edition through the 2003 Addenda requirements of ASME Section XI for the performance of nondestructive examinations (NDE), pressure testing (PT), and repair/replacement (R&R) activities until standardized corporate procedures for these activities are updated in December 2017. The proposed duration of this alternative is from January 1, 2017 through November 30, 2017.

Enclosure

By letter dated June 2, 2016, the licensee updated the relief request (RR) EN-ISI-15-1, and stated that Entergy has determined to permanently cease power operations at James A. Fitzpatrick Nuclear Power Plant (JAF) on January 27, 2017. Entergy provided certification of this decision to the U.S. Nuclear Regulatory Commission (NRC) in letter (JAFP-16-0045) dated March 16, 2016 (ADAMS Accession No. ML16076A391). As a result, JAF is excluded from the NRC staff's review of the requested RR EN-ISI-15-1.

## 2.0 REGULATORY EVALUATION

Section 50.55a(g)(4) of 10 CFR states, in part, that throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) which are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements set forth in Section XI of Editions and Addenda of the ASME B&PV Code to the extent practical within the limitation of design, geometry, and materials of construction of the components.

Section 50.55a(g)(4)(ii) of 10 CFR states, in part, that the inservice examination of components and system pressure tests conducted during 120-month intervals must comply with the latest Edition and Addenda of the Code incorporated by reference in 10 CFR 50.55a(a) 12 months before the start of the 120-month inspection interval or the optional ASME Code cases listed in NRC Regulatory Guide 1.147.

Section 50.55a(z) of 10 CFR states, in part, that alternatives to the requirements of paragraphs (b) through (h) may be used, when authorized by the NRC, if the licensee demonstrates that (1) the proposed alternatives would provide an acceptable level of quality and safety (10 CFR 50.55a(z)(1)) or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety (10 CFR 50.55a(z)(2)). Section 50.55a allows the NRC to authorize alternatives and to grant relief from ASME Code requirements upon making the necessary findings.

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 Commission to authorize, the alternative requested by the licensee.

## 3.0 TECHNICAL EVALUATION

### 3.1 The License's Request for Alternative – RR EN-ISI-15-1

#### 3.1.1 ASME Code Components Affected

The affected components are ASME Code Class 1, 2, 3, metallic containment (MC) and concrete containment (CC) components and component supports at ANO-1, GGNS, and WF3 plants

#### 3.1.2 ASME Code Requirement

The licensee is required to update the plants (ANO-1, GGNS, and WF3) 120-month ISI program to the latest Edition and Addenda of the ASME B&PV Code, Section XI, as approved by the NRC in 10 CFR 50.55a(a).

### 3.1.3 Applicable Code Edition and Addenda

The current code of record for the fourth 10-year ISI intervals at GGNS and WF3, and the fifth 10-year ISI intervals at ANO-1, is the ASME B&PV Code, Section XI 2001 Edition through 2003 Addenda.

The table below identifies the proposed update Edition/Addenda of ASME Section XI applicable to the 10-year ISI intervals at various Entergy plants. As shown in the table, the new ISI intervals at ANO-1, GGNS, and WF3 begin on various dates throughout 2017.

| Plant | ISI Interval | ASME Section XI Edition/Addenda | Interval Start | Interval End |
|-------|--------------|---------------------------------|----------------|--------------|
| ANO-1 | 5th          | 2007 Edition/2008 Addenda       | 5/31/2017      | 5/30/2027    |
| GGNS  | 4th          | 2007 Edition/2008 Addenda       | 6/2/2017       | 6/1/2027     |
| WF3   | 4th          | 2007 Edition/2008 Addenda       | 7/1/2017       | 6/30/2027    |

Note:

1. ANO-1, GGNS, and WF3 will update to the ASME Section XI 2007 Edition/2008 Addenda, unless otherwise required by the NRC in 10 CFR 50.55a(a), when these plants update their 10-year ISI Programs.
2. All Entergy plants, including ANO-1, GGNS, and WF3, perform ISI-related activities such as NDE, PT, and R&R activities in accordance with standardized programs based on a common Edition/Addenda of the ASME Section XI which, at present, is the 2001 Edition/ 2003 Addenda. The planned update to the NDE, PT, and R&R programs is scheduled for December 1, 2017.

### 3.1.4 Proposed Alternative RR EN-ISI-15-1

The licensee proposes to continue use of the 2001 Edition through the 2003 Addenda of ASME B&PV Code, Section XI, for performance of R&R, PT and NDE activities until standardized corporate procedures for these activities are updated. Specifically, the licensee asked relief from updating the various Entergy plants (ANO-1, GGNS, and WF3) ISI program to certain sections of the 2007 Edition through the 2008 Addenda while maintaining and performing ISI related activities such as R&R, PT, and NDE to the current ASME Section XI 2001 Edition through the 2003 Addenda requirements. For the 2007 Edition through the 2008 Addenda, the licensee will be using articles IWA-2400, -2500, and -2600; articles 1000 and 2000 of IWB, IWC, IWD, IWE, IWF; and IWL and Mandatory Appendix X. The relief request, Enclosure 1, identifies specific articles to be used from each set of Edition and Addenda.

### 3.1.5 Licensee' Basis for Alternative RR EN-ISI-15-1

As stated in its letter dated June 2, 2016, the licensee will update the subject plants (ANO-1, GGNS, and WF3) ISI Program for the next 10-year intervals (see table in Section 3.1.3) in accordance with 10 CFR 50.55a(g)(4)(ii) on December 1, 2017. While the ISI related activities such as R&R, PT, and NDE would normally be included as part of the update to the 2007 Edition and 2008 Addenda of ASME Section XI, the proposed alternative is to maintain these ISI related activities in compliance with ASME Section XI 2001 Edition through the 2003 Addenda, while conforming to all conditions of 10 CFR 50.55a.

The licensee has standardized the performance of ISI related activities such as R&R, PT, and NDE across its entire nuclear fleet to the ASME Section XI, 2001 Edition through the 2003 Addenda. The licensee stated that while ISI Program plans are controlled on a site-by-site basis, the R&R, PT, and NDE programs are administered under a corporate set of procedures. The licensee noted that updating the plants (ANO-1, GGNS, and WF3) ISI, R&R, PT, and NDE program activities to the 2007 Edition through the 2008 Addenda would require establishing and maintaining two different programs; one for these plants (ANO-1, GGNS, and WF3) and one for the other Entergy nuclear stations.

The licensee explained that maintaining these plants (ANO-1, GGNS, and WF3) ISI related activities to the 2001 Edition through the 2003 Addenda standard with the other plants in its fleet will improve the level of quality and safety at these Entergy plants. The licensee further explained that this allows leveraging the knowledge from the other Entergy nuclear stations of ISI related activities to provide these plants (ANO-1, GGNS, and WF3) with a wealth of experience to draw on and minimizing the time spent on developing and maintaining procedures that are different from the rest of the fleet.

### 3.1.6 Duration of Proposed Alternative

The start and end dates of the new 10-year ISI intervals at ANO-1, GGNS, and WF3 are specified in Section 3.1.3 above. However, with seven (7) Entergy nuclear operating plants, including ANO-1, GGNS, and WF3, starting new 10-year ISI intervals between July 1, 2015 and December 1, 2017, the licensee proposed to standardize its corporate administered NDE, PT, and R&R programs across its entire nuclear fleet using the 2001 Edition through 2003 Addenda through November 30, 2017. On December 1, 2017, Entergy intends to update the Code of Record for NDE, PT, and R&R programs to the latest Edition/Addenda of the ASME Section XI incorporated by reference in 10 CFR 50.55a(a) for the entire fleet. Therefore, the proposed duration of this alternative for ANO-1, GGNS, and WF3 is from the start date of the new 10-year ISI interval for each plant through November 30, 2017 as shown below:

| Plant | ISI Interval | Duration of Relief Request |                       | ISI Interval End Date |
|-------|--------------|----------------------------|-----------------------|-----------------------|
|       |              | ISI Interval Start Date    | ISI Interval End Date |                       |
| ANO-1 | 5th          | 5/31/2017                  | 11/30/2017            | 5/30/2027             |
| GGNS  | 4th          | 6/2/2017                   | 11/30/2017            | 6/1/2027              |
| WF3   | 4th          | 7/1/2017                   | 11/30/2017            | 6/30/2027             |

### 3.2 NRC Staff Evaluation

The NRC staff review considered three areas of interest: (1) the proposed alternative, (2) differences between the two ASME Section XI Codes and (3) the application of two separate Codes of record.

Enclosure 1, page 1 of 2, Table, "Proposed ASME Section XI Code of Record for ANO-1, GGNS, WF3," of RR EN-ISI-15-1 as documented in the licensee's letter dated November 20, 2015, identifies the applicable subsections and articles that will be applied at ANO-1, GGNS, and WF3 in the dual ASME Codes.

The table includes nine footnotes which are significant because they provide clarifications. Footnote number 1 states that Entergy will follow all conditions mandated in 10 CFR 50.55a. Footnote number 3 states that Entergy will follow the conditions imposed on the use of IWA-4540 when performing system leakage tests pursuant to 10 CFR 50.55a. Footnote number 5 clarifies that Entergy will not use the acceptance standards of IWB-3514 of the 2001 Edition through the 2003 Addenda to disposition flaws detected in Alloy 600/82/182 metal.

The NRC staff noted that under the proposed alternative, if a flaw is detected in an ASME Class 1 austenitic stainless steel or nickel-based alloy weld in ANO-1, GGNS, and WF3, the flaw may remain in service using the acceptance standards in IWB-3514 of the 2001 Edition. However, under the 2007 Edition, the flaw needs to be dispositioned by an evaluation which may result in a shorter inspection interval because the acceptance standards of IWB-3514 cannot be used to disposition the flaw. In this scenario, the 2001 Edition would be less conservative than the 2007 Edition. For example, the 2007 Edition of the ASME Code, Section XI prohibits the use of IWB-3514 to disposition planar surface flaws in nickel-based Alloy 600, 82, or 182 material in boiling-water reactor (BWR) (or pressurized water reactor (PWR)) environment, or austenitic stainless steels and associated welds in BWR environments because of the stress corrosion cracking concerns. The 2001 Edition through the 2003 Addenda of the ASME Code, Section XI, does not have this limitation for IWB-3514. This issue is further discussed below. The licensee stated that if a flaw is found in an ASME Class 1 austenitic stainless steel or nickel-based alloy weld, it would either evaluate the acceptability of the flaw in accordance with IWB-3600 or correct the flawed condition by performing an approved ASME Section XI repair/replacement activity.

Footnote numbers 2 and 4 clarify the articles (e.g., IWA-2000) and subarticles (e.g., IWA-2100) of the Editions and Addenda that will be used. The licensee stated that IWL-3000, IWL-4000, and IWL-5000 will be used for concrete examination at ANO-1 and GGNS.

The NRC staff notes that IWF-5000 of the 2001 Edition requires that the ISI of snubbers be performed in accordance with the ASME Operation and Maintenance (OM) Code, Part 4. The NRC staff notes that IWF-5000 was initially removed from the 2006 Addenda and subsequently the 2007 Edition does not contain IWF-5000. Footnotes 6 and 9 of Table 1 as shown in Enclosure 1 to the November 20, 2015 letter states that as required by 10 CFR 50.55a(b)(3)(v), snubber pre-service and in-service inspection and testing requirements are implemented in subsection ISTD of the ASME OM Code, 2004 Edition through 2006 Addenda, in its entirety. The NRC staff finds that the deletion of IWF-5000 in the 2006 Addenda through the 2007 Edition does not affect the licensee's ISI of the snubbers which will be performed in accordance

with the OM Code. The NRC staff finds that the licensee's snubber inspection and testing program satisfies 10 CFR 50.55a(b)(3)(v) and is, therefore, acceptable. In the letter dated June 2, 2016, Entergy stated that for the repair and replacement of the snubbers at ANO-1, GGNS, and WF3 will be performed in accordance with the applicable Edition and Addenda of the ASME Section XI.

Footnotes number 8 clarifies the use of Appendix VIII. For mandatory appendices, the NRC staff finds that the licensee appropriately identified that when applying Appendix VIII to perform performance-demonstrated based ultrasonic examinations, the 2001 Edition, no Addenda, in lieu of the 2001 Edition through the 2003 Addenda, should be used. This is because 10 CFR 50.55a(b)(2)(xxiv) requires the use of the 2001 Edition, no Addenda for the performance demonstration of ultrasonic examinations, when the code of record is later than the 2001 Edition. Whereas, if ultrasonic examinations are performed in accordance with Code Case N-729-1 will comply with the 2004 Edition/No Addenda of Appendix VIII to comply with the condition in 10 CFR 50.55a(g)(6)(ii)(D)(4).

The NRC staff has determined that the table and associated footnotes provide clear descriptions and commitments as to which subsections, articles and subarticles of the Editions and Addenda of the ASME Code, Section XI that will be applicable for the duration of the proposed alternative. The NRC staff finds that the table and associated footnotes satisfy 10 CFR 50.55a.

The NRC staff noted that the licensee is already accustomed to the use of dual ASME Code Editions and Addenda for the ISI program. The licensee presently selects, plans, and schedules the performance of ISI examinations and tests in accordance with the 2007 Edition through 2008 Addenda of ASME Section XI while the repair/replacement, pressure testing, and NDE activities are performed in accordance with the 2001 Edition through 2003 Addenda. The dual Code Editions and/or Addenda proposed in RR EN-ISI-15-1 are identical to those previously approved by the NRC in a safety evaluation for Relief Request PRR-26 for another Entergy Plant Pilgrim Nuclear Power Station in June 19, 2015 (ADAMS Accession number ML15166A401). Therefore, a process for tracking and monitoring the implementation of dual Code Editions and Addenda of ASME Section XI already exists at other Entergy plants.

Based on the above, the NRC staff finds that the licensee has acceptable process controls to manage, track and control two sets of the ASME Code appropriately at Entergy plants (ANO-1, GGNS, and WF3).

In summary, the NRC staff finds that RR EN-ISI-15-1 as documented in the licensee's letter dated November 20, 2015, as supplemented on June 2, 2016 provides the necessary information as to which article in which Edition and Addenda of the ASME Code that will be applicable to the ASME Code Class 1, 2, 3, MC and CC components and component supports. The NRC staff has determined that approval of later Editions and Addenda of the ASME Section XI Code in 10 CFR 50.55a does not make earlier Editions and Addenda of the ASME Code unsafe because the NRC staff has also approved the earlier Editions and Addenda with conditions in 10 CFR 50.55a. Furthermore, the staff did not find it necessary to mandate that plants following earlier Editions and Addenda of ASME Code, Section XI immediately implement any of the changes incorporated into the 2007 Edition through the 2008 Addenda of Section XI.



The NRC staff finds that the proposed alternative is acceptable because the licensee will follow the requirements in the 2001 Edition through the 2003 Addenda for R&R, PT and NDE activities and the 2007 Edition through the 2008 Addenda of the ASME Code for ISI Program selection, planning and scheduling of ISI examinations and tests.

#### 4.0 CONCLUSION

As set forth above, the NRC staff determines that the proposed alternative RR EN-ISI-15-1 provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the use of RR EN-ISI-15-1 at ANO-1 during fifth 10-year ISI and at GGNS and WF3 during fourth 10-year ISI intervals from January 1, 2017 through November 30, 2017.

All other requirements of the ASME Code for which relief has not been specifically requested and authorized by the NRC staff remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: G. Bedi

Date: October 19, 2016.

J. Davis

- 2 -

If you have any questions, please contact Richard V. Guzman, Senior Project Manager, at (301) 415-1030 or [Richard.Guzman@nrc.gov](mailto:Richard.Guzman@nrc.gov).

Sincerely,

**/RA/**

Douglas V. Pickett, Acting Chief  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-313, 50-416, 50-382

Enclosure:  
Safety Evaluation

cc w/encl: Distribution via ListServ

**DISTRIBUTION:**

|                              |                             |                             |
|------------------------------|-----------------------------|-----------------------------|
| PUBLIC                       | LPL1-1 R/F                  | RidsNrrPMANO Resource       |
| RidsNrrDorlDpr Resource      | RidsNrrDorlLpl1-1 Resource  | RidsNrrPMGrandGulf Resource |
| RidsNrrDeEpn Resource        | RidsACRS_MailCTR Resource   | RidsNrrPMWaterford Resource |
| RidsNrrLAKGoldstein Resource | RidsRgn1MailCenter Resource | GBedi, NRR                  |

**ADAMS Accession No. ML16278A017**

**\*SE and concurrence sent via email**

|        |                    |                    |                 |                       |
|--------|--------------------|--------------------|-----------------|-----------------------|
| OFFICE | NRR/DORL/LPLI-1/PM | NRR/DORL/LPL1-1/LA | NRR/DE/EPNB/BC* | NRR/DORL/LPL1-1/BC(A) |
| NAME   | RGuzman            | KGoldstein         | DAlley*         | DPickett              |
| DATE   | 10/11/16           | 10/11/16           | 07/25/16        | 10/19/16              |

**OFFICIAL RECORD COPY**