



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

January 17, 2018

Mr. Dean Curtland  
Site Director, Duane Arnold Energy Center  
Next Era Energy Duane Arnold, LLC  
3277 DAEC Road  
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER – REQUEST FOR RELIEF FOR  
NO. RR 04, ALTERNATIVE TO ASME CODE INSERVICE INSPECTION  
REQUIREMENTS FOR SEAL WELD PROCEDURE QUALIFICATION  
(CAC NO. MF9373, EPID L-2017-LLR-0020)

Dear Mr. Curtland:

By letter dated March 7, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17069A172), as supplemented by letter dated September 12, 2017, (ADAMS Accession No. ML17255A919) to the U.S. Nuclear Regulatory Commission (NRC), NextEra Energy Duane Arnold, LLC (the licensee), proposed an alternative to the requirements of Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at Duane Arnold Energy Center (DAEC). As an alternative to the ASME Code requirements, the licensee requested relief from IWA-4221, "Construction Code and Owner's Requirements," to allow weld procedure specifications (WPSs) for seal welding of the installed and uninstalled spare main steam relief valves (MSRVs) to be post-production qualified (Relief Request No. RR-04, Revision 0). The WPSs would meet all other provisions of ASME Code, Section XI.

Based on the information provided in the licensee's proposed relief request and response to the NRC staff's request for additional information in letter dated September 12, 2017, the NRC staff concludes that compliance with the ASME Code requirement would result in hardship without a compensating increase in the level of quality and safety, and the licensee's proposed alternative provides reasonable assurance of structural integrity. Therefore, the requested relief is authorized in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2) for the fifth 10-year inservice inspection (ISI) interval program at DAEC which began on November 1, 2016, and is scheduled to end on October 31, 2026.

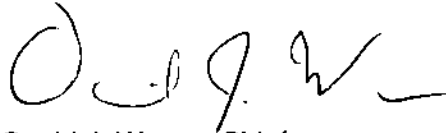
All other ASME Code, Section XI, requirements for which relief was not specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

D. Curtland

-2-

If you have any questions regarding this matter, please contact Mr. Mahesh Chawla at (301) 415-8371 or by email at [Mahesh.Chawla@nrc.gov](mailto:Mahesh.Chawla@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'D. J. Wrona', with a stylized flourish at the end.

David J. Wrona, Chief  
Plant Licensing Branch III  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:  
Safety Evaluation

cc w/encl: ListServ



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NO. RR-04

ALTERNATIVE FOR SEAL WELD PROCEDURE QUALIFICATION

NEXTERA ENERGY DUANE ARNOLD, LLC

DUANE ARNOLD ENERGY CENTER

DOCKET NUMBER 50-331

1.0 INTRODUCTION

By letter dated March 7, 2017, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17069A172), as supplemented by letter dated September 12, 2017, (ADAMS Accession No. ML17255A919) to the U.S. Nuclear Regulatory Commission (NRC), NextEra Energy Duane Arnold, LLC (the licensee), proposed an alternative to the requirements of Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at Duane Arnold Energy Center (DAEC). As an alternative to the ASME Code requirements, the licensee requested relief from IWA-4221, "Construction Code and Owner's Requirements," to allow weld procedure specifications (WPSs) for seal welding of the installed and uninstalled spare main steam relief valves (MSRVs) to be post-production qualified. The WPSs would meet all other provisions of ASME Code, Section XI.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee requested to use the proposed alternative on the basis that complying with the specified ASME Code requirements would result in hardship and/or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY EVALUATION

Adherence to Section XI of the ASME Code is mandated by 10 CFR 50.55a(g)(4), which states, in part, that ASME Code Class 1, 2, and 3 components (including supports) will meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI.

The regulation in 10 CFR 50.55a(z) states, in part, that alternatives to the requirements of paragraph (g) of 10 CFR 50.55a may be used, when authorized by the NRC, if the licensee demonstrates that: (1) the proposed alternative provides an acceptable level of quality and safety, 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.

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

### 3.0 TECHNICAL EVALUATION

#### 3.1 ASME Code Components Affected

The components are ASME Code Class 1 MSRVs identified as component numbers: PSV-4400, PSV-4401, PSV-4402, PSV-4405, PSV-4406, PSV-4407, and six uninstalled spare MSRVs.

#### 3.2 Applicable Code Addition and Addenda

The Code of Record for the fifth 10-year ISI interval at DAEC is the ASME Code, Section XI, 2007 Edition through the 2008 Addenda.

#### 3.3 Applicable Code Requirement

Section XI, IWA-4221, "Construction Code and Owner's Requirements," of the ASME Code states, in part, that: "(a) An item to be used for repair/replacement activities shall meet the Owner's Requirements."

The licensee requests relief from IWA-4221 to allow weld procedure specifications for seal welding of the installed and spare MSRVs to be post-production qualified in accordance with ASME Code, Section IX, requirements.

#### 3.4 Reason for Request (as stated by the licensee)

The original WPS for seal welding were qualified in accordance with the Manufacturer's standard rather than ASME requirements. The Manufacturer's standard included multiple surface non-destructive examinations (NDE) and macro examinations of sectioned specimens. The three seal welds affected are the bellows-to-spacer plate seal weld, the pilot seat-to-body seal weld, and the second stage seat-to-body seal weld.

The 1968 Edition, Winter 1968, Addenda of ASME Code, Section III, did not include fabrication requirements for valves or provide any requirements for seal welding. The General Electric (GE) design specification required weld procedures to be qualified in accordance with ASME Code, Section IX. However, the author of this design specification, and the original purchaser of the MSRVs (GE), believed that this requirement was never intended to be applicable to seal welding. It is reasonable to assume that the 1968 Edition of ASME Code, Section IX, should have been used to qualify seal welding procedures since the 1968 Edition of ASME Code, Section IX, paragraph Q-10 (b), requires all welding to be qualified using reduced section tension specimens and guided bend specimens.

Although the Target Rock procedures have since been revised to reference the new procedure qualification records (PQRs) using the same seal weld parameters as the original seal welding procedure and meeting all tensile and bend tests requirements in accordance with ASME Code, Section IX, a hardship still exists to meet the ASME Code, Section XI, requirements for having a qualified weld procedures prior to production welding and subsequent code stamping. As stated in the previous interval relief request (see Section 4.0 below), in order to meet this requirement, all seal welds would have to be removed and rewelded using the same welding procedure that is now pre-qualified. Also, removal of existing seal welds would require the MSRV be completely disassembled, the seat rings replaced, and the reassembled valve tested. This unnecessary welding evolution could potentially degrade the carbon steel casting. Therefore, replacement of existing seal welds is considered a hardship, or unusual difficulty, without a compensating increase in the level of quality and safety.

### 3.5 Proposed Alternative and Basis for Use (as stated by the licensee)

Pursuant to 10 CFR 50.55a, "Codes and standards," paragraph (z)(2), NextEra Energy requests authorization to continue using the updated Target Rock WPSs for the seal welding of the installed and spare MSRVs that were post-production qualified in accordance with ASME Code, Section IX, requirements. This proposed alternative is deemed to be acceptable because NextEra Energy considers implementation of the applicable Code requirements to be a hardship or unusual difficulty without a compensating increase in level of quality and safety.

In 2007, Target Rock completed three PQRs using the same seal welding parameters as in the original seal welding procedures and the weld coupons were tested in accordance with the 2004 Edition, 2006 Addenda, of ASME Code, Section IX. All tensile and bend testing was found acceptable to the ASME Code, Section IX, requirements. All three seal weld WPSs have been revised to reference the new PQRs that were qualified via tensile and bend testing.

These post-qualifying PQRs verify that the seal welds made with the original seal WPSs meet all tensile and bend test requirements and justify continued use. The revised seal welding WPSs that now reference the new PQRs are planned to be used during future Repair/Replacement activities, if performed by Target Rock.

### 3.6 Duration of Proposed Alternative

The duration of the proposed alternative is the fifth 10-year ISI interval which began on November 1, 2016, and is scheduled to end on October 31, 2026.

## 4.0 NRC STAFF EVALUATION

The licensee proposed an alternative, Relief Request No. RR-04, to the requirements of IWA-4221 to allow WPSs for seal welding of the installed and spare MSRVs, referenced in Section 3.1 above, to be post-production qualified in accordance with ASME Code, Section IX, requirements for the fifth 10-year ISI interval at DAEC. The same alternative was proposed for the fourth 10-year ISI interval at DAEC by letter dated July 31, 2007, as supplemented by letter dated February 19, 2008 (ADAMS Accession Nos. ML072220137 and ML080590357, respectively). The NRC approved the fourth 10-year ISI interval proposed alternative, Relief Request No. NDE-R012, by letter dated July 2, 2008 (ADAMS Accession No. ML081680709).

Proposed alternative Relief Request No. RR-04 is applicable to the same components and welds as the previous interval request and references the same improperly qualified WPSs and

the same post production PQRs and WPSs that were produced to justify the continued operation of installed valves and the future use of spare valves during the last interval. The NRC staff is not aware of any operational experience, modification to the DAEC licensing basis, or other information that would change or invalidate the staff's previous conclusion, in the NRC staff's July 2, 2008, letter referenced above, to permit the continued use of the updated Target Rock WPSs for the seal welding of the installed and spare MSRVs that were post-production qualified in accordance with ASME Code, Section IX, requirements. Therefore, the NRC staff finds that the licensee's proposed alternative provides reasonable assurance of structural integrity during the fifth 10-year ISI interval at DAEC.

If the welds were not accepted for continued use, then qualification of the WPSs for seal welding prior to production welding and subsequent ASME Code stamping would require all seal welds to be removed and rewelded using the same parameters as in the original WPSs. Also, removal of existing seal welds would require that the MSRVs be completely disassembled, the seat rings replaced, and the reassembled valves tested. This additional welding could potentially degrade the carbon steel casting. Therefore, the NRC staff finds that reworking the valves to replace the existing seal welds would result in a hardship, or unusual difficulty, without a compensating increase in the level of quality and safety.

## 5.0 CONCLUSION

As set forth above, the NRC staff determines that the licensee's proposed alternative provides reasonable assurance of structural integrity and leak tightness of the subject piping segments, and complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the 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)(2). Therefore, the NRC staff authorizes the use of Relief Request No. RR-04, Revision 0, at DAEC, for the fifth 10-year ISI interval.

All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including the third-party review by the Authorized Nuclear In-service Inspector.

Principal Contributor: R. Davis, NRR

Date of Issuance: January 17, 2018

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RDavis, NRR

**ADAMS Accession No.: ML17347A111**

\*via e-mail

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