



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

August 27, 2012

Mr. Richard L. Anderson  
Vice President  
Duane Arnold Energy Center  
3277 DAEC Road  
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER - ISSUANCE OF AMENDMENT RE:  
TECHNICAL SPECIFICATION CHANGES REGARDING ALTERNATIVE  
TESTING OF SAFETY/RELIEF VALVES (TAC NO. ME7337)

Dear Mr. Anderson:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 282 to Renewed Facility Operating License No. DPR-49 for the Duane Arnold Energy Center. This amendment consists of changes to the Technical Specifications (TSs) and Renewed Facility Operating License in response to your application dated September 29, 2011, as supplemented by letter dated March 12, 2012.

The amendment modifies existing TS surveillance requirements (SR) 3.4.3.2, SR 3.5.1.9, and SR 3.6.5.1, to provide an alternate means for testing of the main steam safety/relief valves (SRVs). The amendment allows for demonstrating the capability of the SRVs to perform their function without requiring the valves to be cycled with steam pressure while installed in the plant in accordance with the Inservice Testing Program. The testing methodology is designed to reduce the potential for SRV leakage and spurious SRV opening.

A copy of our safety evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink, appearing to read "Terry A. Beltz", with a long horizontal flourish extending to the left.

Terry A. Beltz, Senior Project Manager  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosures:

1. Amendment No. 282  
to License No. DPR-49
2. Safety Evaluation

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

NEXTERA ENERGY DUANE ARNOLD, LLC

DOCKET NO. 50-331

DUANE ARNOLD ENERGY CENTER

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 282  
Renewed License No. DPR-49

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by NextEra Energy Duane Arnold, LLC dated September 29, 2011, as supplemented by letter dated March 12, 2012, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-49 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 282, are hereby incorporated in the license. NextEra Energy Duane Arnold, LLC, shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Istvan Frankl, Acting Chief  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachments: Changes to the License  
and Technical Specifications

Date of Issuance: August 27, 2012

ATTACHMENT TO LICENSE AMENDMENT NO. 282  
RENEWED FACILITY OPERATING LICENSE NO. DPR-49  
DOCKET NO. 50-331

Replace the following page of Renewed Facility Operating License No. DPR-49 with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

<u>Remove</u>	<u>Insert</u>
3	3

Replace the following pages of Appendix A, Technical Specifications, with the attached revised pages as indicated. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

<u>Remove</u>	<u>Insert</u>
3.4-7	3.4-7
3.5-7	3.5-7
3.6-18	3.6-18

C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I; Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

NextEra Energy Duane Arnold, LLC is authorized to operate the Duane Arnold Energy Center at steady state reactor core power levels not in excess of 1912 megawatts (thermal).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 282, are hereby incorporated in the license. NextEra Energy Duane Arnold, LLC shall operate the facility in accordance with the Technical Specifications.

(a) For Surveillance Requirements (SRs) whose acceptance criteria are modified, either directly or indirectly, by the increase in authorized maximum power level in 2.C.(1) above, in accordance with Amendment No. 243 to Facility Operating License DPR-49, those SRs are not required to be performed until their next scheduled performance, which is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment No. 243.

(b) Deleted.

(3) Fire Protection

NextEra Energy Duane Arnold, LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the Duane Arnold Energy Center and as approved in the SER dated June 1, 1978, and Supplement dated February 10, 1981, subject to the following provision:

NextEra Energy Duane Arnold, LLC may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

(4) The licensee is authorized to operate the Duane Arnold Energy Center following installation of modified safe-ends on the eight primary recirculation system inlet lines which are described in the licensee letter dated July 31, 1978, and supplemented by letter dated December 8, 1978.

(5) Physical Protection

NextEra Energy Duane Arnold, LLC shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification,

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY																
SR 3.4.3.1	<p>Verify the safety function lift setpoints of the SRVs and SVs are as follows:</p> <table border="0"> <tr> <td style="text-align: center;"><u>Number of SRVs</u></td> <td style="text-align: center;"><u>Setpoint (psig)</u></td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1110 ± 33.0</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1120 ± 33.0</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">1130 ± 33.0</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">1140 ± 33.0</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td style="text-align: center;"><u>Number of SVs</u></td> <td style="text-align: center;"><u>Setpoint (psig)</u></td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">1240 ± 36.0</td> </tr> </table> <p>Following testing, lift settings shall be within ± 1%.</p>	<u>Number of SRVs</u>	<u>Setpoint (psig)</u>	1	1110 ± 33.0	1	1120 ± 33.0	2	1130 ± 33.0	2	1140 ± 33.0			<u>Number of SVs</u>	<u>Setpoint (psig)</u>	2	1240 ± 36.0	In accordance with the Inservice Testing Program
<u>Number of SRVs</u>	<u>Setpoint (psig)</u>																	
1	1110 ± 33.0																	
1	1120 ± 33.0																	
2	1130 ± 33.0																	
2	1140 ± 33.0																	
<u>Number of SVs</u>	<u>Setpoint (psig)</u>																	
2	1240 ± 36.0																	
SR 3.4.3.2	Verify each SRV actuator strokes when manually actuated.	In accordance with the Inservice Testing Program																

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.1.8	<p>-----NOTE----- Valve actuation may be excluded. -----</p> <p>Verify the ADS actuates on an actual or simulated automatic initiation signal.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.5.1.9	Verify each ADS valve actuator strokes when manually actuated.	In accordance with the Inservice Testing Program

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY
SR 3.6.1.5.1	Verify each LLS valve actuator strokes when manually actuated.	In accordance with the Inservice Testing Program
SR 3.6.1.5.2	<p>-----NOTE----- Valve actuation may be excluded. -----</p> <p>Verify the LLS System actuates on an actual or simulated automatic initiation signal.</p>	In accordance with the Surveillance Frequency Control Program



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 282 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-49

NEXTERA ENERGY DUANE ARNOLD, LLC. FOR

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

1.0 INTRODUCTION

By application dated September 29, 2011, as supplemented by letter dated March 12, 2012 (Agencywide Documents Access and Management System Accession Nos. ML112720444 and ML12090A580, respectively), NextEra Energy Duane Arnold, LLC (the licensee) submitted a license amendment to change the Technical Specifications (TSs) for the Duane Arnold Energy Center (DAEC). The proposed changes would modify TS Surveillance Requirements (SRs) 3.4.3.2, 3.5.1.9, and 3.6.1.5.1, to provide an alternative means for testing the main steam system safety/relief valves (SRVs) during various modes of operation. These valves provide overpressure protection and automatic depressurization relief functions. The changes would allow demonstration of the capability of the valves to perform their function without requiring that the valves be cycled with steam pressure while installed in the plant.

Specifically, the changes would allow demonstration of valve operability by manually stroking the SRV actuator, in conjunction with the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) inservice testing (IST) program, without lifting the main valve disc. The main valve disc would be tested as required by the DAEC IST Program.

In a letter dated July 11, 2012 (ADAMS Accession No. ML12170A421), the NRC staff evaluated and approved the licensee's proposed alternative means of testing the main steam SRVs pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Paragraph 55a(a)(3)(i). The staff concluded that the alternative means for testing provided an acceptable level of quality and safety and that the licensee adequately addressed all of the regulatory requirements set forth in the regulations and is in compliance with the ASME OM Code requirements.

2.0 REGULATORY EVALUATION

The regulatory requirements for the content of the TSs are provided in 10 CFR 50.36, "Technical specifications." Criterion 3 of 10 CFR 50.36(c)(2)(ii) requires a limiting condition for operation (LCO) to be established for a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or

Enclosure

transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Furthermore, 10 CFR 50.36(c)(3) specifies that SRs provide assurance that the LCOs will be met. The licensee states that Criterion 3 of 10 CFR 50.36(c)(2)(ii) will continue to be met since full functionality of the SRVs will be tested under the proposed methodology.

The NRC staff's technical evaluation of the proposed TS changes is provided below.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Licensee's Basis for TS Changes

The licensee provided the following information as its basis for the proposed TS change:

There are six Target Rock Model 7467F three-stage SRVs installed at DAEC. The SRVs are located between the reactor vessel and the main steam isolation valves. The SRVs have three TS-required functional modes of operation: (1) overpressure protection (OP) mode, (2) relief mode actuated by the Automatic Depressurization System (ADS) Logic, and (3) relief mode actuated by Low-Low Set (LLS) Logic. The various functions of the SRVs are described respectively in Sections 5.2.2, 6.3.2.2.2, and 5.4.1.3 of the DAEC Updated Final Safety Analysis Report.

The licensee's proposed revision to the TS SRs provides an alternative method of verifying SRV operability. Currently, TS SRs 3.4.3.2, 3.5.1.9, and 3.6.1.5.1 require that each SRV shall be manually stroked open at least once every 24 months. The proposed alternative would revise TS SRs 3.4.3.2, 3.5.1.9, and 3.6.1.5.1 to functionally test the SRV main valve and pilot valves in accordance with the DAEC IST program.

For the SRVs, the actuator test will be performed by energizing a solenoid that pneumatically actuates a plunger. The plunger depresses the second-stage disc located within the main valve body. The test will verify movement of the plunger in accordance with the vendor recommendations. Since the test will be performed without steam pressure, the main valve will not stroke during the test, and the test does not disturb the safety-mode first stage pilot valve.

Valve testing will be performed at a steam test facility, where the valve (i.e., the main valve and pilot valve) and an actuator, representative of the one used at plant, will be installed on a steam header in the same orientation as in the plant. The conditions in the test facility will be similar to those of plant installation, including ambient temperature, valve insulation, and steam conditions. The valve will be leak tested, functionally tested to ensure the valve is capable of opening and closing (including stroke time), and leak tested a final time. Valve seat tightness will be verified by a cold bar test and, if not free of fog, leakage will be measured and verified to be below design limits. In addition, for the safety mode of the SRVs, an as-found setpoint verification and as-found leak check will be performed, followed by verification of set pressure and delay time. The valve will then be shipped to the plant for storage without any disassembly or alteration of the main valve or pilot valve components. Prior to reinstallation, the valve will again be inspected for foreign material and damage. The valve can then be installed, insulated, and proper connections (both pneumatically and electrically) verified per procedure.

The combination of steam testing at the test facility and actuator testing at the site will provide a complete check of the capability for the valve to open and close. Therefore, the proposed

changes will allow the testing of the SRVs such that full functionality is demonstrated through overlapping tests, without cycling the valves under steam pressure with the valves installed.

A potential reason for in-situ testing of the SRVs with steam is to verify that the discharge line to the suppression pool is not blocked. The probability of a relief valve discharge line being sufficiently blocked to prevent the valve from functioning is considered extremely remote. The NextEra Foreign Material Exclusion program implemented at DAEC provides the necessary requirements and guidance to prevent and control the introduction of foreign materials into structures, systems, and components. This program minimizes the potential for debris blocking a relief valve discharge line.

The licensee also noted that this approach will reduce the potential for valve seat leakage and that the proposed alternative test for the SRVs is consistent with the recommendations of NUREG-0737, "Clarification of TMI Action Plan Requirements," Item II.K.3.16, "Reduction of Challenges and Failures of Relief Valves." Item II.K.3.16 notes that the number of relief valve openings should be reduced as much as possible and unnecessary challenges to relief valves should be avoided.

### 3.2 Evaluation of TS Changes

The NRC staff reviewed the licensee's basis for the proposed TS changes, and finds that with the proposed testing the functional capabilities of the SRVs are adequately verified. The main valve, pilot valve and an actuator, representative of the component used at the plant, will be installed at a test facility, in the same orientation as in the plant. The test conditions at the test facility will be similar to those for the installed valves in the plant, including ambient temperature, valve insulation and steam conditions. The valve will then be leak tested, functionally tested to ensure the valve is capable of opening and closing (including stroke time), and leak tested a final time. In addition, for the safety mode of the SRVs, an as-found setpoint verification and as-found leak check will be performed, followed by verification of set pressure and delay time. The valve will then be shipped to the plant without any disassembly or alteration of the main valve or pilot valve components. Prior to installation, the valve will again be inspected for foreign material and damage. Following SRV installation, proper connection, both electrically and pneumatically, will be verified per procedure.

The NRC staff determined that the combination of the steam testing of the valve at the test facility and valve actuator testing at the site provides a complete check of the capability for the valve to open and close. Therefore, the proposed TS changes will allow testing of the SRV such that full functionality is demonstrated through overlapping tests without the need to stroke test the valves on-line under system steam pressure conditions. In addition, the NRC staff agrees that the current testing requirements could result in undesired seat leakage of the SRVs during power operation. Excessive seat leakage during power operation could result in excessive suppression pool temperature and level or unidentified drywell leakage.

The NRC staff also determined that the description of the licensee's FME program provides reasonable assurance that the SRV discharge lines will remain unblocked and that foreign material will not interfere with valve operation.

The licensee also proposed a TS change to test the SRV main valve discs in accordance with the DAEC IST program, as required by the ASME OM Code, which allows a 72-month test

interval, plus a 6-month grace period, for testing all SRVs. A minimum of 20 percent of the SRV group is required to be tested during any 24-month interval. A major difference between the current TS-required SRV manual actuation requirements and the ASME OM Code requirements is that the ASME OM Code allows a series of overlapping tests to individually test SRV components. Furthermore, the ASME OM Code (2004 Edition and later editions and addenda, which was incorporated by reference into 10 CFR 50.55a in 2009) no longer requires in-situ SRV testing.

Another difference between the current TSs and the ASME OM Code is that the ASME OM Code requires less frequent testing of the SRV components. Instead of testing each SRV as a unit every 24 months during startup following a refueling outage, the test frequency for all SRV significant components can be extended for up to six years plus a 6-month grace period. However, the ASME OM Code is performance based and requires that SRVs be tested more frequently if test failures occur. For example, the ASME OM Code requires that two additional valves be tested when a valve in the initial test group exceeds the set pressure acceptance criteria. All remaining valves in the group are required to be tested if one of the additional valves tested exceeds its set pressure acceptance criteria. Therefore, the SRV test frequency would be equivalent to the current TS test frequency, if multiple test failures occur. In addition, the licensee has had no setpoint failures of the valves to stroke open since 1999. Therefore, the NRC staff finds that the proposed testing frequency provides adequate periodic verification of valve operation.

Based on the above evaluation, the NRC staff determined that the proposed changes to the DAEC TS SR 3.4.3.2, SR 3.5.1.9, and SR 3.6.1.5.1, will continue to demonstrate proper SRV operation without the need for in-situ testing with reactor steam, and therefore, are acceptable.

### 3.3 Summary

The NRC staff has reviewed the licensee's proposed changes to the DAEC TS SRs which would provide for alternative testing of the SRVs to demonstrate proper functional operation, without the need to stroke test the valves on-line with system steam pressure conditions. The licensee has adequately justified the proposed changes to the DAEC TSs.

Based on the above evaluation, the NRC staff concludes that there is reasonable assurance that the testing requirements for the SRVs during various modes of operation are adequate and will continue to be met. Therefore, the staff finds the proposed changes to TS SRs 3.4.3.2, 3.5.1.9, and 3.6.1.5.1, to be acceptable.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Iowa State Official was notified of the proposed issuance of the amendment. The State official had no comments.

### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation, or use of a facility component located within the restricted area, as defined in 10 CFR Part 20 and changes SRs. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite,

and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such findings. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Huang

Date of issuance: August 27, 2012

Mr. Richard L. Anderson  
Vice President  
Duane Arnold Energy Center  
3277 DAEC Road  
Palo, IA 52324-9785

August 27, 2012

SUBJECT: DUANE ARNOLD ENERGY CENTER - ISSUANCE OF AMENDMENT RE:  
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Sincerely,

**/RA/**

Terry A. Beltz, Senior Project Manager  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
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ADAMS Accession No.: **ML121980360**

\* SE transmitted by memo dated May 11, 2012

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