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

August 16, 2018

Mr. Mano Nazar
President and Chief Nuclear Officer
Nuclear Division
NextEra Energy Duane Arnold, LLC
Mail Stop: NT3/JW
15430 Endeavor Drive
Jupiter, FL 33478

SUBJECT: DUANE ARNOLD ENERGY CENTER - ISSUANCE OF AMENDMENT 306 TO REVISE TECHNICAL SPECIFICATION 3.5.1, ECCS-OPERATING (EPID L-2017-LLA-0288)

Dear Mr. Nazar:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 306 to Renewed Facility Operating License No. DPR-49 for the Duane Arnold Energy Center (DAEC). The amendment consists of changes to the DAEC Technical Specifications (TS) 3.5.1 in response to your application dated September 5, 2017, as supplemented by letter dated March 1, 2018.

The amendment revises the DAEC TS 3.5.1, "ECCS – Operating" to decrease the nitrogen supply requirement for the automatic depressurization system in Surveillance Requirement 3.5.1.3 from 100 days to 30 days.

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

Sincerely,

Mahesh L. Chawla, Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosures:
1. Amendment No. 306 to License No. DPR-49
2. Safety Evaluation

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NEXTERA ENERGY DUANE ARNOLD, LLC

DUANE ARNOLD ENERGY CENTER

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

DOCKET NO. 50-331

Amendment No. 306
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 5, 2017, as supplemented by letter dated March 1, 2018, 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.

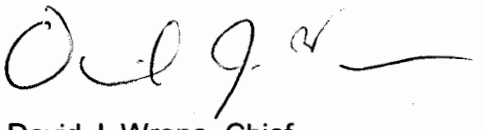
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-49 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 306, 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 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment:
Changes to the Renewed Facility Operating
License No. DPR-49 and
Technical Specifications

Date of Issuance: August 16, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 306

RENEWED FACILITY OPERATING LICENSE NO. DPR-49

DOCKET NO. 50-331

Replace the following page of Renewed Facility Operating License DPR-49 with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

REMOVE	INSERT
3	3

Replace the following page of Appendix A, Technical Specifications, with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

REMOVE	INSERT
3.5-5	3.5-5

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. 306, 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 Program

NextEra Energy Duane Arnold, LLC shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment request dated August 5, 2011 (and supplements dated October 14, 2011, April 23, 2012, May 23, 2012, July 9, 2012, October 15, 2012, January 11, 2013, February 12, 2013, March 6, 2013, May 1, 2013, May 29, 2013, two supplements dated July 2, 2013, and supplements dated August 5, 2013 and August 28, 2013) and as approved in the safety evaluation report dated September 10, 2013. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.1.2	----------NOTE---------- The low pressure coolant injection (LPCI) system may be considered OPERABLE during alignment and operation for decay heat removal in MODE 3, if capable of being manually realigned and not otherwise inoperable. ---------- ----------NOTE---------- Not required to be met for system vent flow paths opened under administrative control. ---------- Verify each ECCS injection/spray subsystem power operated and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.5.1.3	Verify a 30-day supply of nitrogen exists for each ADS accumulator.	In accordance with the Surveillance Frequency Control Program
SR 3.5.1.4	Verify the following ECCS pumps develop the specified flow rate against a system head corresponding to the specified reactor pressure. SYSTEM HEAD NO. CORRESPONDING OF TO A REACTOR SYSTEM FLOW RATE PUMPS PRESSURE OF Core Spray ≥ 2718 gpm 1 ≥ 113 psig LPCI ≥ 4320 gpm 1 ≥ 20 psig	In accordance with the INSERVICE TESTING PROGRAM

(continued)

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 306 TO FACILITY OPERATING LICENSE NO. DPR-49

NEXTERA ENERGY DUANE ARNOLD, LLC

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

1.0 INTRODUCTION

By application dated September 5, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17248A284), as supplemented by letter dated March 1, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18060A325), NextEra Energy Duane Arnold, LLC (the licensee), requested changes to the technical specifications (TSs) for the Duane Arnold Energy Center (DAEC).

The supplemental letter dated March 1, 2018, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC or Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on November 21, 2017 (82 FR 55407).

The proposed changes would revise the DAEC TS 3.5.1, "ECCS - Operating" to decrease the nitrogen supply requirement for the automatic depressurization system(ADS) Surveillance Requirement (SR) 3.5.1.3 from 100 days to 30 days.

The current SR 3.5.1.3 states:

SURVEILLANCE		FREQUENCY
SR 3.5.1.3	Verify a 100 day supply of nitrogen exists for each ADS accumulator.	In accordance with the Surveillance Frequency Control Program

The proposed amendment would modify SR 3.5.1.3 to state:

SURVEILLANCE		FREQUENCY
SR 3.5.1.3	Verify a 30-day supply of nitrogen exists for each ADS accumulator.	In accordance with the Surveillance Frequency Control Program

Changes to the TS Bases will be made in accordance with the TS Bases control program following approval of the requested amendment. The proposed TS Bases changes are provided for information only.

2.0 REGULATORY EVALUATION

The regulatory requirements and guidance documents the NRC staff considered in its review of the proposed amendment included the following:

- The regulations at Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Section 50.36, "Technical specifications," establish the requirements related to the content of the TS, Section 50.36(c)(3) states:

  > Surveillance requirements. Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

- 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems (ECCS) for light-water nuclear power reactors," requires an ECCS system that meets the criteria in 10 CFR 50.46(b) for cooling performance following a loss-of coolant accident (LOCA).

- NUREG-0737, "Clarification of TMI [Three Mile Island] Action Plan Requirements," Item II.K.3.28, "Verify Qualifications of Accumulators on Automatic Depressurization System Valves," states:

  > Position. Safety analysis reports claim that air or nitrogen accumulators for the automatic depressurization system (ADS) valves are provided with sufficient capacity to cycle the valves open five times at design pressures. GE [General Electric] has also stated that the emergency core cooling (ECC) systems are designed to withstand a hostile environment and still perform their function for 100 days following an accident. Licensee should verify that the accumulators on the ADS valves meet these requirements, even considering normal leakage. If this cannot be demonstrated, the licensee must show that the accumulator design is still acceptable.

3.0 TECHNICAL EVALUATION

As described in the DAEC updated final safety analysis report (UFSAR), Section 6.3.2.2.2, "Automatic Depressurization System," the ADS provides automatic nuclear system depressurization for small breaks assuming failure of the high-pressure coolant system so that low-pressure coolant injection (LPCI) and the core spray system can operate. The relief capacity of the ADS is based on the time required after its initiation to depressurize the nuclear system so that the core can be cooled by the core spray and the LPCI systems and meet the requirements of 10 CFR 50.46.

The DAEC updated final safety analysis report also notes that the ADS uses four of the nuclear system pressure relief valves to relieve the high-pressure steam to the suppression pool. The pressure relief valves open automatically after receiving reactor vessel low water level signals and discharge pressure indications from any low-pressure cooling system pump (LPCI or core spray) and after a 2-minute (nominal) delay. The delay provides time for the operator to

manually inhibit the ADS actuation if control room information indicates the signals are false or actuation is not needed. Each of the four automatic depressurization system safety/relief valves (SRVs) is equipped with a Seismic Category I 200 gallon nitrogen accumulator. The accumulators receive their supply from the nonseismic normal primary containment nitrogen pneumatic supply system. Each ADS accumulator system has an inlet check valve at the boundary between the safety-grade accumulator system and the nonsafety drywell nitrogen supply system. The inlet check valves serve to minimize the loss of nitrogen from the ADS accumulator systems in the event that the normal drywell nitrogen supply system should fail. The inlet check valves are soft-seated type which has significantly lower leakage rates than conventional hard-seated type check valves. The soft seat is replaceable. Leakage tests are performed during each refueling outage on the check valves and other system components to ensure that the leakage rates are at an acceptable level. The maximum acceptable leakage rate for the tests is 25 standard cm^3/min (cubic centimeters/minute). Each ADS accumulator system has the capability to accommodate a nitrogen system leakage of 30 standard cm^3/min for up to 100 days without makeup and still provide five actuations of the ADS SRVs. Thus the accumulators meet the requirement of NUREG-0737, Item II.K.3.28, which is to cycle the ADS valves open five times over a 100-day period following a design-basis LOCA.

In its September 5, 2017, license amendment request (LAR), the licensee stated that the current DAEC TS contains a SR to verify that a 100-day nitrogen supply exists for each ADS accumulator in Mode 1 and in Modes 2 and 3 when reactor steam dome pressure is > 100 psig. This SR can be met by either: (1) verifying that the drywell nitrogen header supply pressure is $\geq$ 90 pounds per square inch gauge (psig), or (2) when drywell nitrogen header supply pressure is < 90 psig, using the actual accumulator check valve leakage rates obtained from the most recent tests to determine, analytically, that a 100-day supply of nitrogen exists for each accumulator. The results of this analysis can also be used to determine when the 100-day supply of nitrogen will no longer exist for individual ADS accumulators, and when each ADS valve would subsequently be required to be declared inoperable, assuming the drywell nitrogen supply pressure is not restored to $\geq$ 90 psig.

The current TS action for two or more ADS valves inoperable during Modes of applicability requires entering Mode 3 in 12 hours and reducing reactor steam dome pressure to $\leq$ 100 psig in 36 hours.

The licensee stated in the LAR, the reason for the proposed change is that industry operating experience revealed that vendor information used to calculate ADS accumulator sizing was incorrect. The volume of air required to stroke the operators was actually 40 cubic inches instead of 15 cubic inches. Since the discovery, the ADS accumulators remained operable; however, the 100-day nitrogen supply is close to being challenged. The licensee's review of the DAEC accident analyses showed that the worst-case DAEC accident scenario will require the use of ADS for 3 days post-accident. As such, the licensee determined that reducing the duration of time from 100 days to 30 days still provides adequate conservativism for the DAEC accident analyses and sufficient accumulator margin still remains.

The NRC staff noted that in page 2 of NUREG-0737 it is stated, in part:

> The staff will consider requests for relief from various aspects of these criteria. Such requests should explain the need for relief, include a clear description of design features of the proposed installation, and provide a safety rationale supporting the adequacy of the proposed installation. A licensee or applicant seeking relief from any element of our

criteria should submit a request for relief, along with supporting justification, in response to this letter.

As part of the supporting justification required by NUREG-0737 for the proposed relief to reduce the duration of time from 100 days to 30 days, the NRC staff requested the licensee to describe the worst-case event, including the number of times the valves are required to cycle open over the 3 days post-accident period for the worst-case accident scenario. In addition, the staff requested the licensee to confirm that the capacity to cycle the ADS valves open at least five times will still remain available during the proposed 30 day period, as required by NUREG-0737.

In response to the NRC staff's request for additional information, the licensee stated that the limiting event in the 3-day post-accident period where the ADS valves would be expected to depressurize the reactor is a small break loss of coolant accident (SBLOCA) corresponding to a 0.01 ft^2 (foot) steam line break. During this event, drywell pressure peaks at approximately 35 pounds per square inch absolute (psia) at 1800 seconds when the drywell sprays are initiated. The licensee's calculation conservatively assumed that an ADS accumulator provides 10 valve cycles. Further, the licensee's analysis demonstrated that the SRVs can be opened 10 times at the peak containment pressure. Thus, the ADS accumulators have adequate capacity to cycle the valves and depressurize the reactor during the limiting event; and therefore, the NRC staff finds the licensee's response acceptable.

The NRC staff reviewed the licensee's original submittal and their response to the staff's request for additional information, related documentations, including the plant TS, TS Bases, and UFSAR. The staff understands that the limiting event in the 3-day post-accident period when the ADS valves would be expected to depressurize the reactor is a SBLOCA corresponding to a 0.01 ft^2 steam line break, and that during the event ADS accumulators have adequate capacity to cycle the valves and depressurize the reactor because the SRVs can be opened 10 times at the peak containment pressure. The NRC staff finds this license amendment request acceptable because of the following reasons:

1. The ADS valves have the capacity to cycle 10 times, the proposed amendment will continue to satisfy the requirement of Item II.K.3.28 of NUREG-0737 for the nitrogen accumulators which requires the accumulators to have sufficient capacity to cycle the valves to open five times, and

2. as required by NUREG-0737, the licensee's request for the relief explains the need for the relief, includes a description of the DAEC ADS system design features, and provides a safety rationale supporting the adequacy of the proposed change.

Based on the above, the staff concludes that the licensee's supporting justification for the proposed change to decrease the nitrogen supply requirement for the ADS in SR 3.5.1.3 from 100 days to 30 days provides reasonable assurance that the accident analyses continue to have adequate conservativism and that sufficient margin for the ADS accumulators to depressurize the reactor still remains; and, therefore, the proposed change is acceptable.

Based on the above, the NRC staff further concludes that the proposed amendment to reduce ADS nitrogen supply requirement from 100 days to 30 days will remain consistent with the facility operation that will be within safety limits, the limiting conditions for operation will be met, and that the proposed amendment meets the requirements of 10 CFR

50.36(c)(3), 10 CFR 50.46, and NUREG-0737. The staff, therefore, finds the proposed amendment 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 on July 16, 2018. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATIONS

The amendment changes a surveillance requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 50. 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 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 finding (82 FR 55407). 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) there is reasonable assurance that 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 Contributor: M. M. Razzaque, DSS/SRXB

Date of issuance: August 16, 2018

SUBJECT: DUANE ARNOLD ENERGY CENTER - ISSUANCE OF AMENDMENT 306 TO REVISE TECHNICAL SPECIFICATION 3.5.1, ECCS-OPERATING (EPID L-2017-LLA-0288) DATED AUGUST 16, 2018

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