NEXTera ENERGY
DUANE ARNOLD

September 5, 2017

NG-17-0127
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Duane Arnold Energy Center
Docket No. 50-331

License Amendment Request (TSCR-170), Revision to Technical Specification 3.5.1, ECCS-Operating

Pursuant to 10 CFR 50.90, NextEra Energy Duane Arnold, LLC (NextEra) hereby requests an amendment to the Duane Arnold Energy Center (DAEC) Technical Specifications (TS). The proposed amendment would revise the DAEC TS by modifying an existing Surveillance Requirement (SR) regarding the Automatic Depressurization System (ADS) nitrogen supply. As discussed in the Enclosure, the proposed change does not involve a significant hazards consideration pursuant to 10 CFR 50.92, and there are no significant environmental impacts associated with the change.

The Enclosure to this letter provides NextEra's evaluation of the proposed change. Attachment 1 to the Enclosure provides a markup of the TS showing the proposed changes, Attachment 2 provides the clean-typed TS pages and Attachment 3 provides the proposed TS Bases changes. The changes to the TS Bases are provided for information only and will be incorporated in accordance with the TS Bases Control Program upon implementation of the approved amendment.

NextEra requests approval of the proposed license amendment by September 1, 2018. Once approved, the amendment shall be implemented within 90 days.

This letter contains no new or revised regulatory commitments.

In accordance with 10 CFR 50.91, a copy of this application, with enclosures, is being provided to the designated State of Iowa official.

If you have any questions or require additional information, please contact Michael Davis, Licensing Manager, at 319-851-7032.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on September 5, 2017.

Dean Curtland
Site Director, Duane Arnold Energy Center
NextEra Energy Duane Arnold, LLC

Enclosure: Evaluation of the Proposed Change

cc: Regional Administrator, USNRC, Region III,
Project Manager, USNRC, Duane Arnold Energy Center
Resident Inspector, USNRC, Duane Arnold Energy Center
A. Leek (State of Iowa)

ENCLOSURE to NG-17-0127

NEXTERA ENERGY DUANE ARNOLD, LLC
DUANE ARNOLD ENERGY CENTER

License Amendment Request (TSCR-170), Revision to Technical Specification 3.5.1, ECCS-Operating

EVALUATION OF PROPOSED CHANGE

Attachment 1 - Proposed Technical Specification Changes (Mark-Up)

Attachment 2 - Revised Technical Specification Pages

Attachment 3 - Proposed Technical Specification Bases Changes (Mark-Up)

1.0 SUMMARY DESCRIPTION

NextEra Energy Duane Arnold, LLC (NextEra) hereby requests an amendment to the Duane Arnold Energy Center (DAEC) Technical Specifications (TS) to modify TS 3.5.1, "ECCS-Operating." The proposed change would decrease the nitrogen supply requirement for the Automatic Depressurization System (ADS) in Surveillance Requirement (SR) 3.5.1.3 from 100 days to 30 days.

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

The purpose of the Automatic Depressurization System (ADS) is to provide an automatic means of reducing reactor pressure for events such as pipe breaks or reactor loss of water level transients when the High Pressure Coolant Injection (HPCI) System is unable to maintain reactor water level. The pressure reduction enables low pressure injection systems such as Low Pressure Coolant Injection (LPCI) mode of the Residual Heat Removal (RHR) System and Core Spray (CS) to inject additional makeup water into the vessel to restore or maintain water level preventing overheating of the fuel cladding.

The ADS utilizes four of the six safety/relief valves (SRVs) provided in the Nuclear Boiler System to accomplish reactor vessel depressurization. The four ADS valves open in response to reactor low level signals, which indicate that a loss of coolant accident (LOCA) has occurred. The presence of an ADS initiation signal indicates that the HPCI system is unable to maintain reactor vessel water level and additional injection sources are required. The ADS will then act to reduce reactor vessel pressure to the point where the low pressure injection sources, such as LPCI and CS, are capable of reactor vessel injection.

The ADS SRVs are equipped with nitrogen accumulators and check valves to store pneumatic energy for relief valve operation. Each ADS SRV accumulator has a volume of 200 gallons and is equipped with an inlet check valve at the boundary between the safety-grade accumulator system and the non-safety related drywell nitrogen supply system. The inlet check valves serve to minimize the loss of nitrogen from the ADS accumulators in the event that the normal drywell nitrogen supply system should fail.

The normal pneumatic supply to the ADS SRVs is from the drywell nitrogen supply system. The drywell nitrogen supply system is a recirculation system maintained through a pneumatic supply system compressor, which takes a suction from the drywell. The drywell nitrogen supply system also maintains pressure in the ADS SRV accumulators.

When the drywell nitrogen system accumulator pressure drops to the setpoint, the compressor is started and nitrogen is supplied to the drywell nitrogen system accumulator. In the automatic operating mode, the compressor starts at a nitrogen accumulator pressure of 95 psig and stops when the system accumulator reaches 105 psig. The compressor can be manually operated. The nitrogen compressor is capable of being powered from onsite. In the event of a loss of offsite power, manual switchover provides the nitrogen compressor with onsite emergency diesel power.

2.2 Current Technical Specifications Requirements

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 ≥ 90 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 ≥ 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 ≤ 100 psig in 36 hours.

2.3 Reason for the Proposed Change

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 discovery, the ADS accumulators have remained operable; however the 100-day nitrogen supply is close to being challenged. Review of the DAEC accident analyses has shown that the worst-case DAEC accident scenario will require the use of ADS for 3 days post-accident. Reducing the duration of time from 100 days to 30 days still provides ample conservativism for the DAEC accident analyses and allows for an increase in accumulator margin.

2.4 Description of the Proposed Change

SURVEILLANCE		FREQUENCY
SR 3.5.1.3	Verify a ~~100~~ 30-day supply of nitrogen exists for each ADS accumulator.	In accordance with the Surveillance Frequency Control Program

The proposed change is supported by changes to the TS Bases. The regulation at Title 10 of the Code of Federal Regulations (10 CFR), Part 50.36, states, "A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the technical specifications." Changes to the TS Bases will be made in accordance with the Technical Specifications Bases Control Program following approval of the requested amendment. The proposed TS Bases changes are consistent with the proposed TS change and provide the purpose for each requirement in the specification consistent with the Commission's Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors, dated July 2, 1993 (58 FR 39132). Therefore, the Bases changes are provided for information and approval of the Bases is not requested.

3.0 TECHNICAL EVALUATION

The primary purpose of the long-term ADS is to keep the reactor pressure low enough so low-pressure emergency core cooling systems (ECCS) can be used to keep the core cooled. The current DAEC ECCS-LOCA analyses have been reviewed. The Main Steam Line Break Outside Containment (MSLO) is the limiting scenario regarding SRV actuations. Eleven (11) SRV actuations are estimated for this event, including the ADS actuations, and the maximum required time of ADS availability to meet any LOCA event is found to be no longer than 12 hours.

While a 100-day ADS nitrogen supply is not specifically credited in the following analyses, Containment, Fire Protection (NFPA 805), Station Blackout (SBO) and Anticipated Transient Without Scram (ATWS) analyses have also been reviewed. The review concluded that the reactor would be depressurized by HPCI/RCIC and/or ADS operation within 3 days following any postulated accident or event that would create a hostile environment in the drywell. Once initial depressurization is completed, long term core cooling can be assured without ADS either by operation of the shutdown cooling mode of RHR or by utilizing low pressure ECCS.

Therefore, the TS SR to verify a 100-day supply of nitrogen is overly conservative and can be reduced to 30 days while maintaining more than sufficient margin.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements

The following NRC requirements are applicable to the proposed change.

The regulations at Title 10 of the Code of Federal Regulations (10 CFR) Part 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.

The regulatory requirements in 10 CFR 50.36 are not specific regarding the actions to be followed when TS are not met other than a plant shut down. The proposed change to the TS Surveillance Requirement will continue to maintain adequate margin such that safety limits will not be challenged and limiting conditions for operation will be met. The proposed change does not impact quality of the system. Therefore, the proposed change is consistent with the requirements of 10 CFR 50.36.

10 CFR 50.46, *Acceptance criteria for emergency core cooling systems 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 LOCA. The DAEC UFSAR Chapter 3 contains an evaluation of the design basis of the DAEC as measured against the Atomic Energy Commission (AEC) General Design Criteria (GDC) for nuclear power plants, Appendix A, of 10 CFR 50 effective May 21, 1971, and subsequently amended July 7, 1971. Criteria 35, 36 and 37 state:

Criterion 35—Emergency core cooling. A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts.

Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

Criterion 36—Inspection of emergency core cooling system. The emergency core cooling system shall be designed to permit appropriate periodic inspection of important components, such as spray rings in the reactor pressure vessel, water injection nozzles, and piping, to assure the integrity and capability of the system.

Criterion 37—Testing of emergency core cooling system. The emergency core cooling system shall be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leaktight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system.

The proposed change has no effect on the current design of the ADS since it makes no physical changes to the system. Therefore, the proposed change has no effect on the application of these criteria.

NUREG-0737 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 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.

The Technical Evaluation above shows that the accumulator design is still acceptable. Therefore, the NUREG-0737 Item II.K.3.28 position is still met.

The proposed change does not affect compliance with these regulations or guidance and will ensure that the functional capabilities or performance levels of equipment required for safe operation are met.

4.2 No Significant Hazards Consideration Analysis

The DAEC Technical Specifications (TS) currently require verifying a 100-day supply of nitrogen exists for each ADS accumulator. The proposed amendment will change the requirement to verifying a 30-day supply of nitrogen exists for each ADS accumulator.

NextEra has evaluated whether or not a significant hazards consideration is involved with the proposed amendment using the criteria in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The proposed change modifies a SR for verification of the nitrogen supply for the ADS accumulators. Accidents are initiated by the malfunction of plant equipment, or the catastrophic failure of plant structures, systems or components. The performance of this surveillance is not a precursor to any accident previously evaluated and does not change the manner in which the ADS operates. Technical evaluation of the change concluded that a 30-day nitrogen supply is more than adequate to ensure that the reactor is depressurized, so the consequences of an accident remain unchanged.

   Therefore, the proposed change does not involve a significant increase in the probability or consequence of a previously evaluated accident

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   The proposed change does not involve physical alterations to the plant. No new or different type of equipment will be installed, and there are no physical modifications required to existing installed equipment associated with the proposed change. The proposed change does not create any failure mechanism, malfunction or accident initiator not already considered in the design and licensing basis.

   Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No

   Although the proposed change will decrease the required supply of nitrogen for the ADS accumulators from 100 days to 30 days, the assessment above has shown that the reactor would be depressurized within 3 days following any postulated accident or event that would create a hostile environment in the drywell. Once initial depressurization is completed, long term core cooling can be assured without ADS. Therefore, the proposed change will not involve a significant reduction in a margin of safety.

Based on the above, NextEra concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.3 Conclusions

In conclusion, based on the considerations discussed above, (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.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

ATTACHMENT 1

Proposed Technical Specification Changes (Mark-Up)

1 page follows

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 ~~100~~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.	In accordance with the INSERVICE TESTING PROGRAM

SYSTEM	FLOW RATE	NO. OF PUMPS	SYSTEM HEAD CORRESPONDING TO A REACTOR PRESSURE OF
Core Spray	≥ 2718 gpm	1	≥ 113 psig
LPCI	≥ 4320 gpm	1	≥ 20 psig

(continued)

ATTACHMENT 2

Revised Technical Specification Pages

1 page follows

SURVEILLANCE REQUIREMENTS (continued)

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Core Spray	≥ 2718 gpm	1	≥ 113 psig
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(continued)

ATTACHMENT 3

Proposed Technical Specification Bases Changes (Mark-Up)

1 page follows

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.3

Verification that a ~~100~~30-day supply of nitrogen exists for each ADS accumulator ensures adequate nitrogen pressure for reliable ADS operation. The accumulator on each ADS valve provides pneumatic pressure for valve actuation. The design pneumatic supply pressure requirements for the accumulator are such that following a failure of the pneumatic supply to the accumulator, each ADS valve can be actuated at least 5 times up to ~~100~~30 days following a LOCA (Reference 4). This SR can be met by either: 1) verifying that the drywell nitrogen header supply pressure is ≥ 90 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~~30-day supply of nitrogen exists for each accumulator. The results of this analysis can also be used to determine when the ~~100~~30-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 ≥ 90 psig. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Frequency takes into consideration administrative controls over operation of the nitrogen system and alarms for low nitrogen pressure.

SR 3.5.1.4, SR 3.5.1.5, and SR 3.5.1.6

The performance requirements of the low pressure ECCS pumps are determined through application of the 10 CFR 50, Appendix K criteria (Ref. 8). This periodic Surveillance is performed (in accordance with the ASME Code requirements for the ECCS pumps) to verify that the ECCS pumps will develop the flow rates required by the respective analyses. The low pressure ECCS pump flow rates ensure that adequate core cooling is provided to satisfy the acceptance criteria of Reference 10. The pump flow rates are verified against a system head equivalent to the RPV pressure expected during a LOCA. The total system pump outlet pressure is adequate to overcome the elevation head pressure between the pump suction and the vessel discharge, the piping friction losses, and RPV pressure present during a LOCA. These values may be established during preoperational testing or by analysis.

(continued)