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

April 29, 2016

Mr. Thomas A. Vehec
Vice President
NextEra Energy
Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER - CORRECTION OF TYPOGRAPHICAL ERRORS IN SAFETY EVALUATION ASSOCIATED WITH LICENSE AMENDMENT NO. 292 (CAC NO. MF7354)

Dear Mr. Vehec:

By letter dated December 22, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15310A082), the U.S. Nuclear Regulatory Commission (NRC) issued Amendment No. 292 to Renewed Facility Operating License No. DPR-49 for the Duane Arnold Energy Center (DAEC). The amendment removed the stored diesel fuel oil and lube oil numerical volume requirements from the technical specifications (TSs) and replaced them with diesel operating time requirements, consistent with Technical Specifications Task Force (TSTF) Traveler TSTF-501, Revision 1, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control."

By letter dated February 22, 2016 (ADAMS Accession No. ML16069A312), the NRC was notified by NextEra Energy Duane Arnold, LLC (the licensee), that errors had been identified in the safety evaluation (SE) enclosed in the December 22, 2015, letter. Specifically, the SE contained several statements implying that the DAEC TSs require the licensee to maintain a 7 day supply of fuel oil for each Diesel Generator (DG).

DAEC has one safety-related diesel fuel oil storage tank, which provides fuel oil to both DGs. In accordance with the DAEC current licensing basis, as specified in the updated final safety analysis report and the TS Bases, the minimum fuel oil required to be available is the amount needed to fuel one DG for 7 days. The SE associated with Amendment No. 292 has been corrected to reflect that the requirement is to maintain a fuel oil supply to fuel a single DG for 7 days.

The NRC staff has determined that these were inadvertent errors and were entirely editorial in nature. Since the proposed corrections do not change any of the conclusions in the SE associated with the issuance of Amendment No. 292 for DAEC, and do not affect the associated notice to the public, there was no impact on the implementation of this amendment within 60 days of issuance. Please find enclosed the replacement SE associated with this amendment. The revised pages contain marginal lines indicating the areas of change. If you have any questions regarding this matter, please contact me at (301) 415-8371.

Sincerely,

Chawla

Mahesh Chawla, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
Corrected Safety Evaluation Associated
with License Amendment No. 292

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**ENCLOSURE**

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

CORRECTED SAFETY EVALUATION ASSOCIATED WITH
LICENSE AMENDMENT NO. 292

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

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

# RELATED TO AMENDMENT NO. 292 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 to the U.S. Nuclear Regulatory Commission (NRC or the Commission) dated January 26, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML15029A600), NextEra Energy Duane Arnold, LLC (the licensee) submitted a license amendment request (LAR) regarding Duane Arnold Energy Center's (DAEC) technical specifications (TSs). The proposed changes would revise TS 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air," by removing the current stored diesel fuel oil, and lube oil numerical volume requirements from the TS and replacing them with diesel operating time requirements consistent with Technical Specifications Task Force (TSTF) Traveler TSTF-501, Revision 1, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control." The availability of this TS improvement was announced in the *Federal Register* (FR) on May 26, 2010 (75 FR 29588), as part of the consolidated line item improvement process.

The licensee requested changes to DAEC's TS to adopt TSTF-501, Revision 1. The licensee's current TS contain numerical volume requirements for both stored diesel fuel oil and lube oil, and any change to the numerical volume requirements currently requires prior approval from the NRC. As an example, diesel fuel oil numerical volume requirements may need to be modified in order to take into account changes to the energy content (BTU/gallon) of available fuels in the market. Fluctuations in energy content could be caused by a variety of factors, including changes to regulatory requirements. By adopting TSTF-501, Revision 1, the numerical volume requirements for both stored diesel fuel oil and lube oil would be removed from the TS. As a result, the numerical volume requirements for both stored diesel fuel oil and lube oil could be modified under licensee control under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 and, therefore, would not require prior NRC approval.

Regarding stored diesel fuel oil and lube oil, no changes to the current plant configuration, current numerical volume requirements, or current 7-day basis are proposed in this application. This request replaces the current numerical volume requirements with the associated current 7-day basis of the numerical volume requirements.

## 2.0 REGULATORY EVALUATION

### 2.1 Description of TS Changes

The proposed changes would revise TS 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air," by removing the current stored diesel fuel oil volume and lube oil level numerical requirements from the TS and replacing them with diesel operating time requirements so that the volume necessary to meet the TS duration requirements may be modified under licensee control. The TS would also be modified so that the stored diesel fuel oil will require that a 7-day supply be available for a single diesel generator (DG), and the lube oil inventory will require that a 7-day supply be available for each DG. As a result, the licensee proposed the following changes:

- Revise Condition A and Condition B in the Action table. Currently, Condition A and Condition B are entered when the stored diesel fuel oil volume and lube oil level numerical requirements are not met. As discussed in the current TS Bases, the numerical diesel fuel oil volume requirement in Condition A is based on a volume of less than a 7-day supply, but greater than a 6-day supply. The numerical diesel lube oil level requirement in Condition B is a volume of less than a 7-day supply, but greater than a 6-day supply. The proposed revision would remove the numerical requirements from the TS. The TS would be modified so that Condition A is entered when the stored diesel fuel oil is less than a 7-day supply, but greater than a 6-day supply. Condition B would be entered when stored diesel lube oil is less than a 7-day supply, but greater than a 6-day lube oil supply for one or more DGs.

- Revise Surveillance Requirements (SRs) 3.8.3.1 and 3.8.3.2. Currently, SR 3.8.3.1 and SR 3.8.3.2 require the licensee to verify that the stored diesel fuel oil volume and lube oil level numerical requirements are met. As discussed in the current TS Bases, the numerical requirements in SR 3.8.3.1 and SR 3.8.3.2 are based on maintaining at least a 7-day supply. The proposed revision would remove the volume numerical requirements from the TS. The TS would be revised so that SR 3.8.3.1 and SR 3.8.3.2 require the licensee to verify that the fuel oil storage tank contains greater than or equal to a 7-day supply of fuel, and that the lube oil inventory is greater than or equal to a 7-day supply for each DG.

The licensee stated that during its review of the TSTF-501 model safety evaluation (SE) published in the FR on May 26, 2010 (75 FR 29588) (Reference 2), it concluded that the technical justifications presented in the SE prepared by the NRC staff are applicable to DAEC and therefore justify this amendment for the incorporation of the proposed changes to the DAEC TSs. In addition, the licensee stated that the changes proposed in the LAR are consistent with the NRC-approved TSTF-501, Revision 1.

### 2.2 Regulatory Requirements and Guidance Applicable to Proposed Changes to LCO 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air," Requirements

The regulation at 10 CFR Section 50.36, "Technical specifications," provides the regulatory requirements for the content required in the TSs. As stated in 10 CFR 50.36, the TSs include Limiting Conditions for Operations (LCOs) and SRs to assure that the LCOs are met.

The regulation at 10 CFR 50.36(c)(2)(i) states that TSs will include LCOs which are "the lowest functional capability or performance levels of equipment required for safe operation of the facility." Paragraph 50.36(c)(2)(i) additionally states that "when a limiting condition for operation of a nuclear reactor is not met, the licensee shall shutdown the reactor or follow any remedial action permitted by the TSs until the condition can be met."

Regulatory Guide (RG) 1.137, Revision 1, provides guidance that describes a method acceptable to the NRC staff for complying with the Commission's regulations regarding fuel oil systems for standby DGs. RG 1.137, Section C.1.c, sets forth two methods for calculation of fuel oil storage requirements as described in Section 5.4 of American National Standards Institute (ANSI) N195 - 1976, "Fuel Oil Systems for Standby Diesel-Generators."

### 2.3 Regulatory Requirements and Guidance Applicable to Proposed Changes to TS SRs 3.8.3.1 and 3.8.3.2

Paragraph 50.36(c)(3) states that TSs will include SRs which 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 LCO will be met."

RG 1.137, Revision 1, addresses the recommended fuel oil practices as supplemented by ANSI N195-1976, Appendix B. The fuel oil properties that are checked to ensure the proper quality of the fuel oil are sediment content, the kinematic viscosity, specific gravity (or American Petroleum Institute (API) gravity), and impurity level.

Regulatory Position 2 of RG 1.137 states, in part, that "Appendix B to ANSI N195-1976 be used as a basis for a program to ensure the initial and continuing quality of fuel oil." As a result, the use of Appendix B of ANSI N195-1976, as referenced by RG 1.137, Revision 1, provides a basis for ensuring the proper quality of the fuel oil; namely that water and sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level are within the specified limits.

## 3.0 TECHNICAL EVALUATION

### 3.1 Proposed Changes to LCO 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air," Requirements

Enough fuel oil is provided to operate a single DG supplying maximum load demand for a period of 7 days. This onsite fuel oil capacity is sufficient to operate a single DG for longer than the time needed to replenish the onsite fuel oil supply from outside sources.

The standby alternating current (AC) power sources are a part of the primary success path and function or actuate to mitigate a design-basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Diesel fuel oil and lube oil are retained in the TS to satisfy 10 CFR 50.36(c)(2)(i), since they support the operation of the standby AC power sources. The proposed changes would revise TS 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air," by removing the current stored diesel fuel oil and lube oil numerical volume requirements from the TS and replacing them with the required diesel

operating time so that the fuel oil and lube oil volumes necessary to support the required diesel operating time may be modified under licensee control.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Each DG has a lube oil inventory capable of supporting a minimum of 7-days of operation. This supply is sufficient to allow the operator to replenish lube oil from outside sources.

In order to meet supply requirements for stored diesel fuel oil and lube oil, TS 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air," currently contains numerical volume requirements associated with a 7-day supply as measured by volume, in gallons. The TS Bases currently state that the numerical volume requirements are based on meeting a 7-day supply. The proposed change would revise TS 3.8.3 by removing the current stored diesel fuel oil and lube oil numerical volume requirements from the TS so that the fuel oil and lube oil volumes necessary to support the required diesel operating time may subsequently be modified under licensee control pursuant to 10 CFR 50.59. The removal of the TS numerical value volume requirement does not change the current plant configuration, the current volume requirements, or the current 7-day basis for the fuel oil and lube oil volume requirements. The revised TS continue to require that the stored diesel fuel oil has a 7-day supply available for a single DG, and that the lube oil inventory has a 7-day supply available for each DG.

Finally, the methodology as to how the stored diesel fuel oil and lube oil numerical volume basis may be modified under licensee control is described in Section 3.5. The use of this methodology is consistent with RG 1.137 and will ensure that there will be an adequate supply of stored diesel fuel oil and lube oil, thereby providing assurance that the lowest functional capability or performance levels of the DG required for safe operation of the facility will continue to be met.

Based on the above evaluation, the NRC staff finds the change to the LCO 3.8.3 requirements to be acceptable.

3.2 Proposed Changes to Condition A and Condition B of TS 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air"

Currently, Condition A and Condition B are entered when the stored diesel fuel oil and lube oil numerical volume requirements are not met. The current TS Bases state that the numerical volume requirements in Condition A and Condition B are based on volumes less than a 7-day supply, but greater than a 6-day supply. The proposal would remove the volumetric requirements from the TS, and would modify Condition A and Condition B to maintain a duration-based requirement such that the Conditions are entered when the stored diesel fuel oil and lube oil inventory is less than a 7-day supply, but greater than a 6-day supply. No other parts of Condition A and Condition B (i.e., Required Actions or Completion Times) are proposed to be modified in the application.

Based on the above evaluation, the NRC staff finds the modifications to the TS 3.8.3, Condition A and Condition B to be acceptable.

3.3 Proposed Changes to TS SR 3.8.3.1 and 3.8.3.2

Currently, SR 3.8.3.1 and SR 3.8.3.2 require the licensee to verify that the stored diesel fuel oil and lube oil numerical volume requirements are met. The licensee proposes to revise SR 3.8.3.1 and SR 3.8.3.2 to reflect the change in LCO requirements, namely that a 7-day supply (rather than a specified numerical volume) be available. As a result, SR 3.8.3.1 and SR 3.8.3.2 would require the licensee to verify that the stored diesel fuel oil and lube oil inventory is greater than or equal to a 7-day supply.

No other revision to these SRs is proposed. The licensee proposes to remove the current numerical volume requirement from the TS, and replace it with the associated current 7-day supply for fuel oil and lube oil.

ANSI N195-1976 discusses how the stored diesel fuel oil requirement is to be calculated based upon the DGs operating at the minimum required capacity for the plant condition which is most limiting for the calculation of such capacity. One method for calculating the stored diesel fuel oil supply takes into account the time dependence of DG loads. That is, if DG loads increase or decrease during the event, the load changes shall be included in the required fuel storage calculation. If the design includes provisions for an operator to supply power to equipment other than the minimum required for the plant condition, such additional loads shall be included in the calculation of required fuel storage capacity. RG 1.137, Revision 1, supplements the above by stating that for the time-dependent load method, the minimum required capacity should include the capacity to power the engineered safety features. A minimum margin of 10 percent will be added to the calculated storage requirement if the alternate conservative calculation discussed next is not used. Another method for calculating the stored diesel fuel oil supply, which is more conservative than the time-dependent load method, is to calculate the storage capacity by assuming that the diesel operates continuously for seven days at its rated capacity. The licensee uses the more conservative, continuous 7-day operation at rated capacity, methodology. Both calculation methods will include an explicit allowance for fuel consumption required by periodic testing. This includes the fuel required for operation of the engine at the minimum loads specified by the engine manufacturer.

One variable used in both stored diesel fuel oil calculation methods is the fuel consumption rate. The property of diesel fuel oil having the most significant effect on the fuel consumption rate is the energy content (heating value) of the fuel. There are standards which correlate the energy content to the fuel's API gravity or absolute specific gravity. At a minimum, plants calculate their required fuel storage values assuming the most limiting API gravity or absolute specific gravity, and therefore, the most limiting fuel energy content. As long as the fuel oil placed in the storage tank is within the API gravity range or absolute specific gravity range specified by the TS Diesel Fuel Oil Testing Program, the calculations of fuel consumption and required stored volume remain valid. Current TS SR 3.8.3.3 requires new fuel to be tested in order to verify that the new fuel API gravity or absolute specific gravity is within the range assumed in the diesel fuel oil consumption calculations.

The lube oil inventory equivalent to a 7-day supply, as well as the 6-day supply associated with Condition B, is based on the DG manufacturer consumption values for the run time of the DG.

Licensee continued adherence to the methods described above provides assurance that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

Based on the above evaluation, the NRC staff finds the duration-based change to SR 3.8.3.1 and SR 3.8.3.2 to be acceptable.

3.4 Addition of Reference to RG 1.137

LCO 3.8.3 requires, in part, that the stored diesel fuel oil and lube oil shall be within limits for each required DG. For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. RG 1.137, Revision 1, addresses the recommended fuel oil practices as supplemented by ANSI N195-1976, Appendix B. The licensee stated they already reference ANSI N195-1976 in their bases. The fuel oil properties that are checked to ensure the proper quality of the fuel oil are sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level.

As a result, the use of Appendix B of ANSI N195-1976, as referenced by RG 1.137, Revision 1, provides a basis for ensuring the proper quality of the fuel oil; namely that water and sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level are within the specified limits. Current TS SR 3.8.3.3 verifies these limits.

3.5 Implementation Requirement to Revise the UFSAR

To ensure an acceptable and consistent fuel oil calculation methodology is maintained, the licensee provided a commitment in its January 26, 2015 letter, to revise DAEC's UFSAR with the following information and to submit the revised description with the next UFSAR update:

> The specific Emergency Diesel Generator (EDG) fuel oil volume contained in the diesel fuel oil storage tank necessary to ensure that EDG run-duration requirements are calculated using Section 5.4 of American National Standards Institute (ANSI) N195-1976, "Fuel Oil Systems for Standby Diesel-Generators," and is based on applying the conservative assumption that the EDG is operated continuously at rated capacity. This fuel oil calculation methodology is one of the two approved methods specified in Regulatory Guide (RG) 1.137, Revision 1, "Fuel Oil Systems for Standby Diesel Generators," Regulatory Position C.1.c.

The NRC staff finds that licensee control of the fuel oil calculation methodology in the UFSAR will continue to adequately ensure public health and safety, as any deviation from the calculation methodology described above requires the licensee to perform an evaluation pursuant to the provisions of 10 CFR 50.59 to determine whether the change requires prior NRC approval.

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 CONSIDERATIONS

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 (80 FR 27200). 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: C. Tilton

Date: December 22, 2015
Corrected by letter dated April 29, 2016

The NRC staff has determined that these were inadvertent errors and were entirely editorial in nature. Since the proposed corrections do not change any of the conclusions in the SE associated with the issuance of Amendment No. 292 for DAEC, and do not affect the associated notice to the public, there was no impact on the implementation of this amendment within 60 days of issuance. Please find enclosed the replacement SE associated with this amendment. The revised pages contain marginal lines indicating the areas of change. If you have any questions regarding this matter, please contact me at (301) 415-8371.

Sincerely,

***/RA/***

Mahesh Chawla, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
Corrected Safety Evaluation Associated
with License Amendment No. 292

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