



August 21, 2014

NG-14-0204  
10 CFR 50.90

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Duane Arnold Energy Center  
Docket No. 50-331  
Renewed Op. License No. DPR-49

Response to Request for Additional Information, Application for Technical Specification Change Regarding Battery Terminal and Charger Voltage and Amperage

- References: 1) License Amendment Request (TSCR-145): Application for Technical Specification Change Regarding Battery Terminal and Charger Voltage and Amperage, NG-13-0297, dated August 29, 2013 (ML13247A275)
- 2) Electronic Communication, Request for Additional Information - Duane Arnold – LAR – TS Change Regarding Battery Terminal and Charger Voltage and Amperage Section Affected 3.8.4 – MF2763, dated August 5, 2014

In the Reference 1 letter, NextEra Energy Duane Arnold, LLC (hereafter NextEra Energy Duane Arnold) submitted a License Amendment Request for the Duane Arnold Energy Center (DAEC) pursuant to 10 CFR 50.90. Subsequently, the NRC Staff requested, via Reference 2, additional information regarding that application.

The Enclosure to this letter contains the requested information.

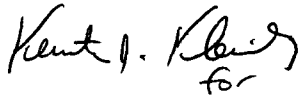
This additional information does not impact the 10 CFR 50.92 evaluation of "No Significant Hazards Consideration" previously provided in the referenced application.

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NRR

This letter does not make any new commitments or changes to existing commitments.

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

I declare under penalty of perjury that the foregoing is true and correct.  
Executed on August 21, 2014

A handwritten signature in black ink, appearing to read "Kent J. Klein" with a small "for" written below it.

T. A. Vehec  
Vice President, Duane Arnold Energy Center  
NextEra Energy Duane Arnold, LLC

Enclosure

cc: NRC Regional Administrator  
NRC Resident Inspector  
NRC Project Manager  
A. Leek (State of Iowa)

Enclosure to NG-14-0204

Response to Request for Additional Information, Application for Technical  
Specification Change Regarding Battery Terminal and Charger Voltage and Amperage

2 pages follow

**Response to Request for Additional Information,  
Application for Technical Specification Change Regarding Battery Terminal  
and Charger Voltage and Amperage**

**NRC Request**

By letter dated August 29, 2013 (Agencywide Document Access Management System Accession Number (ML13247A275), Nextera Energy Duane Arnold, LLC (the licensee) requested an amendment to the Renewed Facility Operating License No. DPR-49 for the Duane Arnold Energy Center (DAEC). The proposed change would revise DAEC Technical Specifications (TS) Surveillance Requirements (SRs) 3.8.4.1 and 3.8.4.6 by changing the battery terminal voltage and the battery charger voltage and amperage to account for the replacement of the existing 58 cell batteries with new 60 cell batteries.

On May 28, 2014 (ML14154A007) the licensee provided response to NRC staff's request for additional information sent via an email on April 24, 2014 (ML14115A441). In its letter dated July 24, 2014 (ML14209A921), the licensee provided a letter from the battery manufacturer C&D Technologies, Inc., regarding the impacts of equalizing voltage range of 2.28-2.29 volts per cell on the DAEC batteries.

The NRC staff reviewed the information provided in this letter and has following comments and additional request for information.

This equalizing voltage range is outside the recommended equalizing voltage range for this type of cells; the recommended equalizing voltage range is 2.33 to 2.38 volts per cell. The manufacturer's letter stated that the time required for completing a recharge would be extended when the voltage is limited to 2.29 Vpc and there would be limited mixing of the electrolyte such that it would take a long time for the specific gravity reading to represent the strength of the electrolyte.

The licensee clarified that DAEC only discharges the batteries during extended/refuel outages and the equalization/recharge portion of the testing procedures continues until the batteries are properly charged and all the individual cell voltages and specific gravities are verified before the batteries are placed back on float charge.

1. DAEC Updated Final Safety Analysis Report (UFSAR) Chapter 8, Section 8.3.2.1.2, states:

"Each battery charger is sized to restore its battery to full charge after a 4-hour emergency discharge while carrying normal steady state DC loads."

- a. Provide the design basis/duration for DAEC battery chargers to fully charge their respective batteries after a 4-hour emergency discharge while carrying normal steady state DC loads. In this case, discuss the impacts of the

extended recharge time due to the lower equalizing voltage per cell on the battery chargers, the operability of the batteries, and the DC power systems.

**Response**

The current DAEC design basis does not include a specified duration for the DAEC battery chargers to fully charge their respective batteries after a 4-hour discharge. The referenced statement from the UFSAR is a charger sizing design requirement that is not impacted by this proposed modification to the batteries since no time limit is included.

There is no impact from the extended recharge time because the DAEC only performs battery discharges during major outages. DAEC Tech Specs only allow for an 8 hour window for either of the 125 VDC batteries to be inoperable, which is not long enough to perform a 4 hour discharge and a recharge of the batteries. Thus, discharge tests are never performed when the plant is on-line.

There is also no impact if the batteries were to be discharged in a Station Blackout event since the DAEC accident analysis does not take credit for the batteries after the 4 hour discharge timeframe.

**NRC Request**

- b. Since the manufacturer's letter stated that it would take a long time for the specific gravity reading to represent the strength of the electrolyte, discuss how the licensee would ensure that the batteries are fully charged after a 4-hour emergency discharge while being connected to the DC system.

**Response**

Since there are no timing requirements for the batteries to be recharged after an emergency discharge, Operations would determine when to recharge the batteries.

The DAEC procedure for equalizing/recharging the batteries requires the battery cells to remain on equalizing charge until the voltage or specific gravities stabilize at the required values. Then, three to seven days after the cells have been returned to float voltages, each cell's specific gravity, temperature, electrolyte level, and voltage as well as the total battery voltage, are tested. Only after all values are determined to be within expected parameters is the battery recharge considered complete.

**NRC Request**

2. Confirm whether the battery recharge time is credited in an accident analysis. If so, discuss the impacts of a longer recharge time on the results of the analysis.

**Response**

The battery recharge time is not credited in the DAEC accident analysis.