



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

September 21, 2015

Mr. Brian D. Boles  
Site Vice President  
FirstEnergy Nuclear Operating Company  
Mail Stop A-DB-3080  
5501 North State, Route 2  
Oak Harbor, OH 43449-9760

**SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1 – REQUEST FOR  
ADDITIONAL INFORMATION RELATED TO AMENDMENT REQUEST FOR  
EMERGENCY DIESEL GENERATOR MINIMUM VOLTAGE SURVEILLANCE  
REQUIREMENTS (TAC NO. MF6060)(L-15-117)**

Dear Mr. Boles:

By application dated April 1, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15091A143), FirstEnergy Nuclear Operating Company (FENOC, the licensee) submitted a license amendment request for the Davis-Besse Nuclear Power Station, Unit No. 1. The proposed amendment requests changes to certain technical specification minimum voltage and frequency acceptance criteria for emergency diesel generator testing.

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing your submittal and has determined that additional information is required to complete the review. The specific information requested is addressed in the enclosure to this letter. This request was discussed with FENOC personnel during a teleconference on August 17, 2015. A response to the enclosed request for additional information is requested to be provided by October 9, 2015.

The NRC staff considers that timely responses to requests for additional information help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources.

B. Boles

- 2 -

If circumstances result in the need to revise the requested response date, please contact me at (301) 415-1380.

Sincerely,

A handwritten signature in black ink, appearing to read 'B. Purnell', written in a cursive style.

Blake Purnell, Project Manager  
Plant Licensing III-2 and  
Planning and Analysis Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure:  
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

AMENDMENT REQUEST TO CHANGE EMERGENCY DIESEL GENERATOR

MINIMUM VOLTAGE REQUIREMENTS

FIRSTENERGY NUCLEAR OPERATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

By application dated April 1, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15091A143), FirstEnergy Nuclear Operating Company (FENOC, the licensee) submitted a license amendment request (LAR) for the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). The proposed amendment requests changes to certain technical specification minimum voltage and frequency acceptance criteria for emergency diesel generator (EDG) testing.

Section 3 of the LAR provides the technical evaluation for minimum EDG starting and steady state voltage and frequency. For EDG starting, the existing minimum voltage acceptance criterion will be increased from 4031 V to 4070 V. The minimum acceptable voltage of 4070 V was determined based on the bus voltage required by the EDG output circuit breaker to close. In addition, the existing EDG minimum steady state voltage acceptance criteria would be increased from 3744 V to 4088 V. The LAR states that a more restrictive minimum steady state voltage provides assurance that during EDG loading, the voltage response recommendations of Safety Guide 9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies" (ADAMS Accession No. ML12305A251), can be satisfied.

The NRC staff notes that:

- (a) Safety Guide 9, Section C4, pertains to the starting and load-accepting capabilities of the diesel generator and states, in part, that the diesel generator should be designed such that the frequency will not decrease, at any time during the loading sequence, to less than 95 percent of nominal and the voltage will not decrease to less than 75 percent of nominal.
- (b) The EDG minimum steady state voltage and frequency acceptance criterion, as specified in surveillance requirement 3.8.1.2, 3.8.1.8.b, 3.8.1.11.c.3, 3.8.1.14.b, and 3.8.1.15.c.3, is based on the performance capability of the EDG governor and voltage regulator after perturbations due to load sequencing have dampened and the EDG is in a steady state operating mode.

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that the additional information below is needed to complete its review of the application.

Enclosure

- (1) According to the Updated Final Safety Analysis Report (UFSAR) (ADAMS Accession No. ML14339A821), Table 8.3-1 for EDG loading, Step 1 loading includes loads that do not trip on a loss of power and a 400 horse-power (hp) component cooling water pump that starts as soon as the EDG output breaker closes with the proposed allowable voltage of 4070 V. A large motor (e.g., make up pump) starts within 2.5 seconds of breaker closure.

Explain how the evaluation performed demonstrates that the voltage drop (Attachment H of the LAR) during this stage of EDG loading satisfies Safety Guide 9 criterion and the minimum voltage required for running equipment.

- (2) Provide the acceleration time for the large motors started in load sequencer Step 1 and 1a. Provide a list of the motor-operated valves that are required to operate during this period. Provide a summary of the assumptions, methods, and results of the evaluation performed for this additional loading.
- (3) The NRC staff notes that an 800 hp motor-driven feedwater pump can be manually loaded onto the EDG.

Provide a summary of the assumptions, methods, and results of the evaluation performed to demonstrate that the voltage drop in the auxiliary system will not adversely impact safety-related equipment if the EDG was operating at the steady state voltage of 4088 V prior to pump start.

- (4) For surveillance requirements associated with steady state operation of the EDG, the LAR proposes the following limits: Steady state voltage  $\geq 4088$  V and  $\leq 4400$  V, and frequency  $\geq 59.5$  Hz and  $\leq 60.5$  Hz.
  - a. Explain how the maximum postulated loading evaluated in Attachment H considered the worst-case combination of allowable voltage and frequency coupled with large pumps operating at run out conditions.
  - b. Explain how fuel oil consumption for EDG operation was evaluated after establishing the maximum EDG loading. Compare the revised EDG fuel oil consumption results with the design-bases and TS requirements for the EDG day tank and bulk storage (week) tank.
- (5) In the LAR, the licensee stated that a transient analysis computer model was used to analyze the voltage and frequency response of the DBNPS EDGs during load sequencing associated with the design-basis loss of coolant accident and loss of offsite power. The licensee states this analysis showed that DBNPS EDGs are capable of starting their dedicated engineered safety features loads in the required sequence while meeting the minimum voltage and frequency recommendations of Safety Guide 9 for the loading sequence and each load sequence time interval.

Provide a summary of the EDG frequency and voltage response in a tabulated form with assumptions made for starting voltage and frequency.

B. Boles

- 2 -

If circumstances result in the need to revise the requested response date, please contact me at (301) 415-1380.

Sincerely,

*/RA/*

Blake Purnell, Project Manager  
Plant Licensing III-2 and  
Planning and Analysis Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure:  
Request for Additional Information

cc w/encl: Distribution via Listserv

DISTRIBUTION:

PUBLIC  
LPL3-2 R/F  
RidsAcrsAcnw\_MailCTR Resource  
RidsNrrDeEeeb Resource  
RidsNrrDorl Resource  
RidsNrrDorlDpr Resource  
RidsNrrDorlLp3-2 Resource  
RidsNrrLASRohrer Resource  
RidsNrrPMDavisBesse Resource  
RidsRgn3MailCenter Resource  
SBasturescu  
GMatharu  
JHauser

ADAMS Accession No. ML15222A179

\* by email dated 9/17/15

OFFICE	NRR/DORL/LPL3-2/PM	NRR/DORL/LPL3-2/PM	NRR/DORL/LPL3-2/LA
NAME	JHauser	BPurnell	SRohrer
DATE	8/25/15	8/21/15	8/13/15
OFFICE	NRR/DE/EEEE/BC	NRR/DORL/LPL3-2/BC	NRR/DORL/LPL3-2/PM
NAME	RMathew for JZimmerman*	TTate	BPurnell
DATE	9/17/15	9/21/15	9/21/15

OFFICIAL RECORD COPY