

## **NRR-DMPSPEm Resource**

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**From:** Purnell, Blake  
**Sent:** Thursday, July 19, 2018 3:40 PM  
**To:** Lashley, Phil H.  
**Cc:** talentz@firstenergycorp.com; Nesser, Kathryn M; Wrona, David  
**Subject:** Davis-Besse - Request for Additional Information Regarding License Amendment Request to Adopt NFPA 805 (CAC No. MF7190, EPID L-2015-LLF-0001)  
**Attachments:** DB NFPA 805 RAI 3.pdf

Mr. Lashley,

By application dated December 16, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15350A314), as supplemented by letters dated February 2, March 7, July 28, and December 16, 2016; January 17, June 16, and October 9, 2017; and April 2, 2018 (ADAMS Accession Nos. ML16033A085, ML16067A195, ML16210A422, ML16351A330, ML17017A504, ML17170A000, ML17284A190, and ML18094A798, respectively), FirstEnergy Nuclear Operating Company (the licensee), submitted a license amendment request for Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS). The proposed amendment would change the current fire protection program at DBNPS to one based on the National Fire Protection Association Standard 805 (NFPA 805), "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, as incorporated into Title 10 of the *Code of Federal Regulations* Section 50.48(c).

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing your submittals and has determined that additional information is required to complete the review. A response to the attached request for additional information is requested to be provided within 60 days from the date of this email.

Sincerely,

Blake Purnell, Project Manager  
Plant Licensing Branch III  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission

Docket No. 50-346  
EA-14-094

**Hearing Identifier:** NRR\_DMPS  
**Email Number:** 486

**Mail Envelope Properties** (MW2PR0901MB25055ECC5329BC6D89B65944E6520)

**Subject:** Davis-Besse - Request for Additional Information Regarding License Amendment  
Request to Adopt NFPA 805 (CAC No. MF7190, EPID L-2015-LLF-0001)  
**Sent Date:** 7/19/2018 3:40:08 PM  
**Received Date:** 7/19/2018 3:40:00 PM  
**From:** Purnell, Blake

**Created By:** Blake.Purnell@nrc.gov

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**Post Office:** MW2PR0901MB2505.namprd09.prod.outlook.com

| <b>Files</b>          | <b>Size</b> | <b>Date &amp; Time</b> |
|-----------------------|-------------|------------------------|
| MESSAGE               | 1480        | 7/19/2018 3:40:00 PM   |
| DB NFPA 805 RAI 3.pdf |             | 136924                 |

**Options**  
**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

REQUEST FOR ADDITIONAL INFORMATION  
LICENSE AMENDMENT REQUEST TO ADOPT  
NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805  
FIRSTENERGY NUCLEAR OPERATING COMPANY  
DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1  
DOCKET NO. 50-346

By application dated December 16, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15350A314), as supplemented by letters dated February 2, March 7, July 28, and December 16, 2016; January 17, June 16, and October 9, 2017; and April 2, 2018 (ADAMS Accession Nos. ML16033A085, ML16067A195, ML16210A422, ML16351A330, ML17017A504, ML17170A000, ML17284A190, and ML18094A798, respectively), FirstEnergy Nuclear Operating Company (the licensee), submitted a license amendment request (LAR) for Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS). The proposed amendment would change the current fire protection program at DBNPS to one based on the National Fire Protection Association Standard 805 (NFPA 805), "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, as incorporated into Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.48(c).

The NRC staff is reviewing the licensee's April 2, 2018, submittal and has determined that the additional information below is required to complete the review.

**FPE RAI 01.02**

In its letter dated April 2, 2018, the licensee submitted a revised version of LAR Attachment S, "Modifications and Implementation Items." In Table S-2, "Implementation Items," items DB-0779, DB-1900, DB-0540, DB-1912, DB-1838, and DB-2041 were grouped with the implementation items for pre-fire plan revisions. However, the description of these implementation items in Table B-1 of LAR Attachment A does not appear to be consistent with the description provided in Table S-2.

Confirm that implementation items DB-0779, DB-1900, DB-0540, DB-1912, DB-1838, and DB-2041 will be completed, as described in Table B-1 of LAR Attachment A, prior to the implementation of the new NFPA 805 fire protection program.

**PRA RAI 03.01**

The April 2, 2018, response to PRA RAI 03.e indicates that the licensee's modeling of main control room (MCR) abandonment scenarios due to loss of control (LOC) has changed. Instead of using a single fault tree that leads to an undefined core damage (CD) state, the fault tree was altered to represent abandonment contribution to three specific CD sequences:

- sequence TBQU - transient-induced loss-of-coolant accident, after a loss of decay heat removal and failure of makeup or high-pressure injection cooling;

- sequence TBU - transient with loss of decay heat removal via steam generators and failure of makeup or high-pressure injection cooling; and
- sequence TQU - transient-induced small loss-of-coolant accident with failure of high-pressure injection.

The response also states that a human failure event for failing to abandon the MCR was incorporated into the fault tree for only one of the three CD sequences (i.e., TBQU). In addition, the response states that the alternate shutdown panel (ASP) model logic was “modified slightly” to credit handheld instruments to recover indications and maintain feedwater control given loss of power to the ASP.

- a) Explain how the fire scenarios leading to MCR abandonment due to LOC were determined to contribute to only the three CD sequences identified in the response. If fire scenarios leading to MCR abandonment due to LOC can contribute to other CD sequences, then identify these sequences and either:
  - i. Justify not modeling these additional sequences; or
  - ii. Provide updated risk results, including the total transition core damage frequency (CDF), large early release frequency (LERF), change in CDF ( $\Delta$ CDF), and change in LERF ( $\Delta$ LERF), for the aggregate analysis, under the response to PRA RAI 03, that incorporates the additional CD sequences associated with MCR abandonment due to LOC into the fire PRA. Compare these results to the acceptance guidelines in Regulatory Guide (RG) 1.174, Revision 2, “An Approach For Using Probabilistic Risk Assessment In Risk-Informed Decisions On Plant-Specific Changes To The Licensing Basis,” (ADAMS Accession No. ML100910006). Identify and justify the sequences that were added.
- b) Explain why failure to abandon the MCR due to LOC is modeled for one sequence (i.e., TBQU) and not for the other sequences (i.e., TBU and TQU). If failure to abandon the MCR due to LOC can contribute to other sequences, either:
  - i. Justify not modeling this human failure event in the other sequences; or
  - ii. Provide updated risk results, including the total transition CDF, LERF,  $\Delta$ CDF, and  $\Delta$ LERF, for the aggregate analysis, under the response to PRA RAI 03, that incorporates the decision to abandon the MCR due to LOC into the appropriate sequences in the fire PRA. Compare these results to the acceptance guidelines in RG 1.174. Describe how the modeling was adjusted.
- c) Describe the handheld instruments and justify their credit in the fire PRA to recover indications and maintain feedwater control given loss of power to the ASP. Also address the following:
  - i. Explain how the use of the handheld instruments is supported by applicable operating procedures.
  - ii. Justify the failure modes and failure probabilities (e.g., random failures, unavailability due to testing and maintenance) associated with the handheld instruments.

- iii. Discuss the maintenance and testing (including calibration and testing frequency) performed on the handheld instruments to ensure their reliability supports the credited function.

Alternatively, provide updated risk results, including the total transition CDF, LERF,  $\Delta$ CDF, and  $\Delta$ LERF, for the aggregate analysis, under the response to PRA RAI 03, that do not credit the use of handheld instruments to recover indications and maintain feedwater control given loss of power to the ASP. Compare the results to the acceptance guidelines in RG 1.174.

### **PRA RAI 03.02**

The April 2, 2018, response to PRA RAI 03.e indicates a number of changes have been implemented in the fire PRA model used for the aggregate analysis.

- a) Numerous single compartment modeling updates (i.e., 29 updates) were made to the fire PRA used for the aggregate analysis, including adjustments of target sets and detection timing. The number of updates of this type suggests that there may have been a basic change in approach or methodology.

Discuss whether the single compartment modeling updates reflect a change in the underlying modeling approach or methodology. Identify if these updates constitute a PRA upgrade, as defined by American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) PRA standard RA-Sa-2009, "Addenda to ASME/ANS RA-S-2008 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," as qualified by RG 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," (ADAMS Accession No. ML090410014). For those updates that constitute a PRA upgrade, provide an implementation item that will ensure these updates will be reviewed and any issues resolved in accordance with an NRC-accepted process (e.g., full-scope peer review, focused-scope peer review, facts and observations) closure review) before self-approval of post-transition changes. Alternatively, justify that an implementation item is not needed.

- b) The fire modeling for fire compartments Q-01 and S-01 incorporated the guidance in NUREG-2178, "Refining and Characterizing Heat Release Rates From Electrical Enclosures During Fire (RACHELLE-FIRE), Volume 1: Peak Heat Release Rates and Effect of Obstructed Plume, Final Report," April 2016 (ADAMS Accession No. ML16110A140). NUREG-2178 provides updated heat release rates and guidance on obstructed plume modeling. According to NUREG-2178, the obstructed plume model is not applicable to cabinets in which the fire is modeled at elevations of less than one-half of the cabinet height.

Identify if any electrical cabinets, to which the obstructed plume model of NUREG-2178 is applied, have the fire modeled at an elevation of less than one-half of the cabinet height. Justify any cases where the obstructed plume model is credited for a fire located at less than one-half of the cabinet's height. Alternatively, provide updated risk results, including the total transition CDF, LERF,  $\Delta$ CDF, and  $\Delta$ LERF, for the aggregate analysis, under the response to PRA RAI 03, that do not credit the obstructed plume mode for fires modeled at elevations less than one-half of the cabinet height. Compare the results with the acceptance guidelines in RG 1.174.

**PRA Question 02.d.01**

The January 17, 2017, response to PRA RAI 02.d states that LAR Attachment S, Table S-2, implementation item DB-1695 would be revised to include following:

- 1) Following completion of implementation items presented in LAR Attachment S, Table S-2, the fire PRA model will be updated as necessary to properly reflect the as-built, as-operated transitioning plant.
- 2) If the updated, transitioning fire PRA model results in risk estimates exceeding RG 1.174 risk acceptance guidelines, refinement of analytic estimates for the internal events and fire PRA will be made (that may include, but are not limited to, increased detailed fire modeling or circuit analysis, application of alternate NRC endorsed methodologies), or plant modification or procedure changes will be made, if necessary, prior to use of the model.

This revision was not incorporated into implementation item DB-1695 in the April 2, 2018, revised version of LAR Attachment S. Confirm that implementation item DB-1695 will be completed as described in the January 17, 2017, response to PRA RAI 02.d, prior to the implementation of the new NFPA 805 fire protection program, or explain why these actions do not need to be completed prior to implementation.