[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[NRC-2019-0119]

Methodology for Modeling Fire Growth and Suppression for

Electrical Cabinet Fires in Nuclear Power Plants

AGENCY: Nuclear Regulatory Commission.

ACTION: Draft NUREG; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing for public comment a draft NUREG entitled, "Methodology for Modeling Fire Growth and Suppression for Electrical Cabinet Fires in Nuclear Power Plants" (NUREG-2230/EPRI 3002016051). This report is a joint product of the NRC and the Electric Power Research Institute (EPRI) collaborating under a memorandum of understanding for fire research. The purpose of this report is to provide an approach that more closely models the types of fire progressions and response activities observed in operating experience. This report provides a revised set of parameters addressing both the fire growth portion and the suppression response for electrical cabinet fires

DATES: Submit comments by [INSERT DATE 30 DAYS FROM DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. Comments received after this date will be considered if it is practical to do so, but the Commission is able to ensure consideration only for comments received before this date.

ADDRESSES: You may submit comments by any of the following methods:

- **Federal Rulemaking Web Site:** Go to https://www.regulations.gov/ and search for Docket ID **NRC-2019-0119**. Address questions about docket IDs in Regulations.gov to Jennifer Borges; telephone: 301-287-9127; e-mail:

Jennifer.Borges@nrc.gov. For technical questions, contact the individuals listed in the

FOR FURTHER INFORMATION CONTACT section of this document.

- **Mail comments to:** Office of Administration, Mail Stop: TWFN-7-A60M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Program Management, Announcements and Editing Staff.

For additional direction on obtaining information and submitting comments, see "Obtaining Information and Submitting Comments" in the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: David W. Stroup, Office of Nuclear Regulatory Research, telephone: 301-415-1649, e-mail: David.Stroup@nrc.gov; or Nicholas Melly, Office of Nuclear Regulatory Research, telephone: 301-415-2392, e-mail: Nicholas.Melly@nrc.gov. Both are staff of the U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

I.   **Obtaining Information and Submitting Comments**

A. Obtaining Information

Please refer to Docket ID **NRC-2019-0119** when contacting the NRC about the availability of information for this action. You may obtain publicly-available information related to this action by any of the following methods:

- **Federal Rulemaking Web Site:** Go to https://www.regulations.gov/ and search for Docket ID **NRC-2019-0119**.

- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly-available documents online in the ADAMS Public Documents collection at https://www.nrc.gov/reading-rm/adams.html. To begin the

search, select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. The draft NUREG on "Methodology for Modeling Fire Growth and Suppression Response of Electrical Cabinet Fires in Nuclear Power Plants" is available in ADAMS under Accession No. ML19163A293.

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

B. Submitting Comments

Please include Docket ID **NRC-2019-0119** in your comment submission.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC will post all comment submissions at https://www.regulations.gov/ as well as enter the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment submissions to remove such information before making the comment submissions available to the public or entering the comment into ADAMS.

II.   Discussion

Over the past decade, modern fire probabilistic risk assessments (PRAs) have been developed using NUREG/CR-6850 (EPRI 1011989), *EPRI/NRC Fire PRA*

Methodology for Nuclear Power Facilities. The results show that fire can be a significant portion of the overall site risk profile, however, the methodology was never fully piloted tested before implementation. As a result, some areas of the fire PRAs have been found to be overly conservative resulting in potentially unrealistic results. Additional research is being conducted to improve the tools, methods, and data used for fire PRAs and refine the estimates of risk and close technical gaps in the methodology.

Recent research efforts focused on obtaining more detailed information regarding the fire incidents at nuclear power plants. This data collection has enabled researchers to obtain more details on the fire attributes, timeline, and plant impact. This project specifically reviewed the available electrical cabinet fire incident data in an effort to update the methodology to better reflect the observed operating experience. Insights from the data review served as the basis for amending portions of the fire modeling and suppression response to more accurately align with operating experience.

Specifically, the methodology described in this report provides:

- A conceptual fire event tree progression model developed through a review of insights from the fire event database. From this review, guidance was developed to allow for consistent classification of fire events into two different growth profiles, *Interruptible* and *Growing*.

- Split fractions for *Interruptible* and *Growing fires* for use in the revised detection-suppression event tree.

- A revised electrical cabinet heat release rate (HRR) profile for use in the detailed fire modeling of *Interruptible Fires.* This revised profile includes a pre-growth period of up to 8 minutes of negligible HRR. The treatment for the HRR profile for *Growing* Fires was not modified in this research.

- Revisions to the detection-suppression event tree to include paths for crediting early intervention by plant personnel as well as new parameters to facilitate these revisions. These new parameters include an opportunity to credit detection by general plant personnel.

- An opportunity for main control room (MCR) indications as a means for fire detection when applicable in the detection-suppression event tree.

- New suppression curves for electrical cabinets (Bin 15) applicable to *Interruptible* and *Growing* electrical cabinet fire scenarios.

- New suppression curves for the MCR.

- A new electrical fire suppression curve for use with other non-cabinet electrical ignition sources (e.g., motors, pumps, transformers).

- A probability of automatic smoke detection effectiveness for characterizing the ability of spot type smoke detection devices to operate in a range of geometric conditions and heat release rates. This is necessary for better alignment with operating experience, which suggests that the majority of the fires are detected by plant personnel and MCR indicators instead of automatic smoke detection systems.

- An updated Bin 15 fire frequency that makes use of the fire event data

    classified in EPRI 3002005302, *Fire Events Database Update for the*

    Period 2010-2014.

    Dated at Rockville, Maryland, this 25th day of June 2019.

    For the Nuclear Regulatory Commission.

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