March 20, 2018

MEMORANDUM TO: APLB Files

FROM: Greg A. Casto, Chief ***/RA/***
PRA Licensing Branch B
Division of Risk Assessment
Office of Nuclear Reactor Regulation

SUBJECT: CLOSE-OUT OF FIRE PROBABILISTIC RISK ASSESSMENT FREQUENTLY ASKED QUESTION 16-0011 ON ALTERNATIVE METHODOLOGY TO NUREG/CR-6850 FOR BULK CABLE TRAY IGNITION CRITERIA

Background

During industry peer reviews and Nuclear Regulatory Commission (NRC) staff review of Fire Probabilistic Risk Assessments (FPRAs) related to license amendment requests (LARs) to implement National Fire Protection Association "Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Plants" (NFPA 805, 10 CFR 50.48(c)), methods and approaches different from the accepted methods were encountered. NRC staff, the Nuclear Energy Institute, and representatives from the nuclear industry worked to identify these methods, approaches, and factors in current LARs (including but not limited to NFPA 805 LARs), and to address them through a frequently asked question (FAQ) process. This FAQ process is only one NRC process whereby a new FPRA method can be reviewed or developed.

NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities, Final Report," (NUREG/CR-6850) provides general ignition and fire damage criteria for thermoplastic and thermoset electrical cables in the form of a temperature and radiant heat flux damage criteria. These criteria effectively treat ignition and damage as the same; however, fire test data suggest that ignition and functional failure of the circuit do not always occur simultaneously and that more specific criteria are appropriate for the purpose of more realistically estimating vertical fire propagation in a stack of horizontal cable trays during certain fire scenarios at a nuclear power plant.

FPRA FAQ 16-0011, Cable Tray Ignition," (enclosed), updates, in part, the guidance available in Chapters 8, Appendix H, and Appendix R of NUREG/CR-6850. This FAQ provides adjusted ignition criteria for use in determining when conditions are present to initiate vertical fire propagation beyond a single cable tray.

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Discussion and Conclusion

The NRC staff and the nuclear industry held a series of public meetings to discuss the resolution of FPRA FAQ 16-0011.

The guidance in this FAQ establishes a new set of generic ignition criteria, 500˚C and 25 kW/m^2, for determining when bulk cable tray ignition occurs such that subsequent vertical fire propagation begins. For instance, once either of the new criteria are reached, it should be assumed that a sufficient amount of energy is being released from a section of cabling to ignite a cable tray located directly above. It is worth noting that the criteria provided in NUREG/CR-6850, including cable damage criteria, still apply for assessing cable damage and fire spread independent of ignition. It is also worth noting that the new criteria provided in this FAQ is not to be used for individual cables or scenarios involving targets other than trays filled with cables. Lastly, licensees are expected to monitor industry operating experience and fire research efforts for any new information that could affect the applicability of the new criteria provided in this FAQ and take any necessary steps to ensure that their FPRAs represent the as-built, as-operated plant.

The guidance in FPRA FAQ 16-0011 is acceptable for use by licensees.

Enclosure
1. FAQ 16-0011 Cable Tray Ignition

SUBJECT: CLOSE-OUT OF FIRE PROBABILISTIC RISK ASSESSMENT FREQUENTLY ASKED QUESTION 16-0010 ON ALTERNATIVE METHODOLOGY TO NUREG/CR-6850 FOR MAINTAINING FIRE PROBABALISTIC RISK ASSESSMENT IGNITION FREQUENCIES WEIGHTING FACTORS

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