From:	Carolyn Lauron
To:	Andrew Brenner
Cc:	Greg Cranston; Manny Sayoc
Subject:	NRC Staff response to Question re: Electrical Separation (Project 99902049)
Date:	Monday, July 31, 2023 9:18:00 AM

Hi Andrew –

Please find the NRC staff response to the SMR (Holtec) question regarding the subject topic.
If you have questions or need more information, please let us know.

Thanks,
Carolyn

Question:

Electrical Separation Question – New/Advanced Plants Per RG 1.189 Section 8 (Reference 1)
Considering the deterministic full-fire-area damage analysis expectation of Position 8.2, to what extent is the use of 3-hour-rated ERFBS (electrical raceway fire barrier systems) admissible to ensure one credited safe-shutdown train remains free of fire damage for new plants?

The question is posed since the use of ERFBS historically aligns with compliance with Appendix R separation alternatives established for legacy plants, as contrasted with compliance with 10 CFR 50.48(a) for the new plant designs. (Reference 2)

Simply put, for a new/advanced plant design, is a 3-hour-rated ERFBS, qualified in accordance with RG 1.189, Appendix B (which appears to align with Generic Letter 86-10, Supplement 1) considered an acceptable separation alternative where both redundant trains of safe-shutdown cables are unavoidably located in the same fire area? (Reference 3) The usage of 3-hour-rated ERFBS would be considered for areas other than the traditional “pinch points” of the main control room and reactor containment.

Additionally, for new/advanced plant designs, it appears that separation alternatives within reactor containment, in addition to 20 ft spacing, free of intervening combustibles or hazards, the use of “radiant energy shields” per RG 1.189, Section 6.1.1.1, remains an acceptable alternative means of achieving adequate separation. Is this approach consistent with NRC guidance and applicable regulations?

NRC Staff Response:

The NRC staff notes that the following discussion is not a regulatory decision.

The intention of the NRC fire protection Policy for new reactors, published by the Commission in SRM-SECY-90-016, is to not rely on equipment or cables installed in a fire area to ensure safe shutdown for a fire in that fire area. (Reference 4) To achieve this,

separation within a fire area should be relied on as little as possible. Therefore, except for control rooms and containments, there should be no fire areas which contain equipment or cables for all success paths for a required safety function. This ensures that a success path for each safety function is available free of fire damage since the equipment and cables for that success path will be located in a separate fire area.

Since the approach described in RG 1.189 is guidance, rather than a requirement from a regulation, proposed deviations from this approach would not require exemptions. However, deviations from this approach would need to be reviewed by the NRC as part of the licensing process. The goal of the NRC review would be to reach a determination that the fire protection program, as described in the fire protection plan, ensures the capability to safely shut down the plant in accordance with, for example, 10 CFR 50.48(a)(iii).

The NRC staff notes that the separation strategies described in RG 1.189, Section 5.3.1.1, "Protection for the Safe-Shutdown Success Path," are available for the protection of equipment and cables in the category of "Important to Safety." Discussion of the Important to Safety category of equipment and cables, as well as other safe shutdown topics, is in RG 1.189 Section 5, "Safe-Shutdown Capability."

For inside containment, RG 1.189, Section 6.1.1, "Containment," describes one approach for fire protection. The goal, as described in RG 1.189, Section 8.2, "Enhanced Fire Protection Criteria," is to demonstrate one success path for each safety function free of fire damage.

In all cases, the NRC will review plant-specific details on an individual basis.

References:

1. U.S. NRC, Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plants," Revision 4, dated May 2021. https://www.nrc.gov/docs/ML2104/ML21048A441.pdf
2. Title 10 of the Code of Federal Regulations (10 CFR), Section 50.48, "Fire Protection."
3. U.S. NRC, Generic Letter 86-10, "Implementation of Fire Protection Requirements," Supplement 1, dated March 25, 1994. https://www.nrc.gov/reading-rm/doc-collections/gen-comm/gen-letters/1986/gl86010s1.html
4. U.S. NRC, Staff Requirements Memorandum (SRM), SRM-SECY-90-016, "Evolutionary Light Water Reactor (LWR) Certification Issues and their Relationships to Current Regulatory Requirements," dated June 26, 1990, ADAMS Accession No. ML003707885. (SECY-90-016, ADAMS Accession No. ML003707849.)