



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

July 30, 2025

MEMORANDUM TO: Duane A. Hardesty, Chief
Fire External Hazards Analysis Branch
Division of Risk Analysis
Office of Nuclear Regulatory Research

FROM: Adam Lee, Fire Protection Engineer /**RA**/
Fire External Hazards Analysis Branch
Division of Risk Analysis
Office of Nuclear Regulatory Research

SUBJECT: SUMMARY OF THE JULY 14, 2025, COMMENT-GATHERING
MEETING WITH THE PUBLIC ON THE DRAFT RESEARCH
INFORMATION LETTER, "REPOSE BIAS OF ELECTRIC
CABLE COATINGS AT FIRE CONDITIONS," VOLUMES 1, 2, &
3, AND AGED CABLE COATING PROJECT PLAN

On July 14, 2025, the U.S. Nuclear Regulatory Commission (NRC) staff from the Office of Regulatory Research (RES) conducted a public meeting with members of the public and interested stakeholders. This was a comment-gathering meeting, with allotted time to allow for members of the public and interested stakeholders to ask questions and comment on the cable coating research and aged cable coating project plan.

The attendees had an opportunity to ask questions, make comments, and participate in the topics covered by the NRC staff. The meeting facilitated feedback on the cable coating research and the aged cable coating project plan. No regulatory decisions were made because of this meeting.

The meeting notice, agenda and presentation are available in the NRC's Agencywide Documents Access and Management System Accession (ADAMs) Nos. ML25167A182 and ML25191A208, respectively.

CONTACT: Adam Lee, RES/DRA/FXHAB
301-415-3872

MEETING INFORMATION:

Public Meeting Notice ADAMS Accession No.: ML25167A182

NRC RES Presentation Slides ADAMS Accession No.: ML25191A208

Meeting Attendees: Enclosure 1 provides the list of attendees for the meeting as captured by Microsoft Teams participation list.

MEETING SUMMARY:**OPENING REMARKS**

At the beginning of the comment-gathering meeting, Adam Lee, RES, delivered opening remarks and encouraged attendees to ask questions and make comments during the allotted time slot.

KEY DISCUSSION TOPICS*Fire-Retardant Electrical Cable Coatings and History of Use in Nuclear Facilities (Volume 1)*

NRC staff provided an overview of the history and regulatory aspects of fire-retardant cable coatings. NRC staff discussed fire protection regulations and drivers for fire-retardant cable coating research that resulted due to the Browns Ferry Nuclear (BFN) plant fire. The development of the performance-based fire probabilistic risk assessment (PRA) methodology, as detailed in NUREG/CR 6850, "Fire PRA Methodology for Nuclear Power Facilities: Detailed Methodology, Final Report," Appendix Q, "Passive Fire Protection Features," provides guidance on fire-retardant cable coatings based on test data. However, this current guidance is based on limited test data, highlighting the need for this current research to improve the characterization of flammability and functionality of cables under fire conditions.

Question and Answer for Volume 1

NRC staff provided attendees with the opportunity to ask questions and/or make comments about the material covered in Volume 1. No questions or comments were asked during the allotted period for Volume 1.

Fire Properties of Cables (Volume 2)

NRC staff summarized Volume 2 which focuses on the fire properties of cables and how different coatings affect their fire resistance. Various tests, including thermogravimetric analysis, cone calorimetry, and ignition tests, were conducted to measure thermal properties and heat release rates. From testing, NRC observed that coated cables showed increased ignition times and reduced peak heat release rates (HRR) compared to uncoated cables. For full-scale tests, such as the vertical flame spread and horizontal tray tests, NRC staff discussed the importance of proper coating application thickness. All test results were for nonaged cable and coating samples.

Question and Answer for Volume 2

NRC staff provided attendees with the opportunity to ask questions and/or make comments about the material covered in Volume 2. There were questions and comments regarding updating NUREG/CR 6850 Appendix Q, and whether NRC staff were planning on re-reviewing similar topics that may be affected by the Appendix Q update, such as NUREG/CR-6850 Appendix H, "Damage Criteria," and the Frequently Asked Questions (FAQ) 16-0011 related to bulk cable tray ignition. The NRC staff stated that the NRC is actively working with the Electric Power Research Institute (EPRI) to provide an update to the bulk cable tray ignition topic and that data from this project may be used to inform the bulk cable tray as well. For other topics, such as Appendix H, if the EPRI and NRC team identify additional changes based on this research, the two organizations will revise the documentation accordingly.

NRC staff received comments about ensuring that conflicting data or guidance does not result from updating Appendix Q. NRC staff emphasized that the aging portion is still needed to make conclusions and updates to Appendix Q. NRC staff will carefully consider any updates to this guidance to ensure other guidance is not inadvertently impacted.

Another attendee asked a question/comment regarding the prolonged ignition source on the cables during testing and how at the plant cables are typically exposed to short bursts of energy such as arc flashes. NRC staff clarified that the experiments are used to gather a wide- array of failure data. For specific events, such as quick arc events, it was clarified that other guidance such as NUREG-2262 / EPRI 3002025942, "High Energy Arcing Fault Frequency and Consequence Modeling," and the use of ignition bins can be used to characterize specific events.

Cable Functionality (Volume 3)

NRC staff discussed methods for assessing circuit integrity under fire conditions, highlighting and discussing the differences between two systems: the Installation Resistance Measurement System (IRMS) and Surrogate Circuit Diagnostic Unit (SCDU). NRC staff discussed observations regarding cable functionality, and noted that cable coatings, especially for thermoplastic cables, generally delay damage, with thicker coatings providing better protection. Horizontal and vertical tests showed that non-qualified cables benefit more from coatings, and cable construction and thermal exposure conditions significantly impact damage delays. For qualified cables, there were mixed results. It was noted that cable construction and configuration will impact the delay in damage, as will the thermal exposure conditions.

Question and Answer for Volume 3

An attendee asked a question about where to submit additional questions and comments. NRC staff clarified that the best ways to submit additional questions or comments were through email, as well as through the feedback form. NRC staff recommended feedback as soon as possible so that the NRC staff has sufficient time to consider comments and make changes to the final research information letter (RIL) document and aged cable coating program as appropriate.

Aged Cable Coating Research

NRC staff discussed the purpose and drivers for the aged cable coating research, with the aim to understand the functional and thermal fire properties of aged coatings and develop updates to NUREG/CR 6850 Appendix Q. Experiments will be conducted by NRC and National Institute

of Standards and Technology (NIST) staff, using a drying oven to age samples to simulated ages of around 40, 80, and 120 years, with the non-aged (zero years) cable serving as the control. NRC staff discussed how the Arrhenius model will determine aging time and temperature, with the most conservative activation energy ensuring accurate aging. Tests will include cone calorimetry and bench-scale circuit integrity assessments to evaluate fire properties and functionality of both coated and uncoated cables.

Question and Answer for Aged Cable Coating Research

An attendee had a comment about the choice of aging temperature. The attendee mentioned relevant research regarding the various temperatures in boiling water reactors (BWRs) and pressurized water reactors (PWRs) that were gathered by EPRI and how the report may provide useful insights into choosing the aging temperature. NRC staff noted the comment and thanked the attendee for the input.

An attendee asked about the proposed timeline for performing these tests. NRC staff responded that the testing is planned for September/October timeframe, with periodic testing throughout the next year or so.

Another attendee asked how long the cables are estimated to age to get a simulated age of 100 years. NRC staff clarified that the values are dependent on activation energies of the materials and with temperatures closer to operating temperatures, aging may take longer than a year. The attendee asked an additional question about whether the temperature is going to be decided based on how long we have or deciding the length based on the temperature. NRC staff responded that they would consider finding a balance between achieving representative temperatures and extending the oven aging time. NRC staff mentioned that the testing may try to bound the aging temperature as close to the assumed operating temperature while also keeping the length of the aging within the timeframe of the research project. An associate from NIST, who is performing the tests, clarified that the testing protocol allows for adjustments for any discernable trends throughout the testing.

CLOSING REMARKS

NRC staff thanked the participants for their feedback and welcomed any additional feedback or questions through email or the public meeting feedback system. The NRC staff adjourned the meeting.

If you have any questions, please contact Adam Lee at 301-415-3872, or via email at Adam.Lee@nrc.gov, or Gabe Taylor at 301-415-0781, or via email at Gabriel.Taylor@nrc.gov.

Enclosures:

1. Meeting Attendance List

SUBJECT: SUMMARY OF THE JULY 14, 2025, COMMENT-GATHERING MEETING WITH THE PUBLIC ON THE DRAFT RESEARCH INFORMATION LETTER, "REPOSE BIAS OF ELECTRIC CABLE COATINGS AT FIRE CONDITIONS," VOLUMES 1, 2, & 3, AND AGED CABLE COATING PROJECT PLAN, DATED: JULY 28, 2025

DISTRIBUTION:

PUBLIC

RES_DRA_FXHAB Distribution

ALee, RES

GTaylor, RES

DHardesty, RES

BSmith, RES

DMurdock, RES

MSadollah, RES

MMcConnell, NRR

ADAMS Accession Number: Memo; ML25210A426***via email**

OFFICE	RES/DRA/FXHAB	RES/DRA/FXHAB	RES/DRA/FXHA/BC
NAME	ALee	GTaylor	DHardesty
DATE	07/24/2025	07/28/2025	07/28/2025

OFFICIAL RECORD COPY

**NUCLEAR REGULATORY COMMISSION
COMMENT-GATHERING MEETING WITH THE PUBLIC,
“CABLE COATING RESEARCH AND AGED CABLE COATING PROJECT PLAN”**

**List of Meeting Attendees*
July 14, 2025**

Name	Organization
Adam Lee	U.S. Nuclear Regulatory Commission (NRC)
Evan Davidson	NRC
Timothy Eichler	NRC
Zeinab Farahmandfar	NRC
Kenneth Hamburger	NRC
Duane Hardesty	NRC
Matthew McConnell	NRC
Nick Melly	NRC
Darrell Murdock	NRC
Mo Sadollah	NRC
Michelle Sutherland	NRC
Gabe Taylor	NRC
Rob Burg	Engineering Planning and Management (EPM)
Vicken Khatchadourian	EPM
Michael Szkutak	EPM
Tyler N. Wong	EPM
Ilya Golberg	Electric Power Research Institute (EPRI)
Ashley Lindeman	EPRI
Andrew Mantey	EPRI
Mary H. Miller	Dominion Energy
Herbert Stansberry	Intertek
Michael Empey	Jenson Hughes
Amir Afzali	Member of the Public
Shresta Beledé	Member of the Public
Sofia Bouhrizi	Member of the Public
SBristol	Member of the Public
Jocelyn Martinez	Member of the Public
Sierra Esco	Mississippi Emergency Management Agency
Kevin McGrattan (Unverified)	National Institute of Standards and Technology (NIST)
Jasper Wittig	Neal R. Goss and Co., Inc.
Fifield, Leo (External)	Pacific Northwest National Laboratory (PNNL)
Austin Michael Glover	Sandia National Laboratory (SNL)
Marc Janssens	Southwest Research Institute

*Attendance list based on Microsoft Teams participant list. This list does not include individuals that connected only via telephone or individual names of attendees that did not provide sign-in information.

Cable Coating and Aged Cable Coating Research Public Meeting Summary DATE July 29, 2025

DISTRIBUTION:

ALee, RES/DRA/FXHAB

ADAMS Accession No.: Memo ML25210A426

OFFICE	RES/DRA/FXHAB			
NAME	ALee AL			
DATE	Jul 24, 2025			

OFFICIAL RECORD COPY