

# ICC Newsletter

**Act now! Special offer to first-time utility attendees to the ICC Spring meeting – ten complimentary registrations! Please contact [billtaylor@pesicc.org](mailto:billtaylor@pesicc.org).**

## From the ICC Chair



Bert Spear

Despite major hurricanes Debby and Helene hitting South Florida in August and September, we successfully held our 152<sup>nd</sup> Fall 2024 meeting in Bonita Springs, Florida.

Fortunately, hotel power was restored within 36 hours of having to cancel the meeting to allow sufficient time for overseas travel cancellations.

The last time an ICC meeting was nearly canceled due to weather was the Fall 2005 meeting originally scheduled in New Orleans. Hurricane Katrina devastated the city that August, so the meeting was relocated to the Doubletree Paradise Valley Resort in Scottsdale, Arizona.

Aside from the hotel ferry and private beach being unavailable at Bonita Springs, the hotel did a fantastic job with post-hurricane clean-up and repairs. It was difficult to discern that the property had been hit by two major storms.

As with the past two ICC meetings, we again set a new registration record – 582 attendees, surpassing 535 in Spring 2024 and 502 in Fall 2023. With three data points, we can now safely conclude that the ICC meeting attendance is on an upward trajectory!

I was also pleased that a new record was set for Guest/Spouse registration: 27 compared to 15 in Spring 2024 and 9 in Fall 2023. The Fall 2025 meeting in Louisville, Kentucky will offer plenty of activities for guests and spouses. Their registration includes the Sunday reception, breakfast each day of the meeting, and access to a dedicated meeting room.

During the ICC Fall 2024 meeting Opening Session, it was my privilege to introduce and recognize six new ICC members who had been approved since the Spring 2024 meeting. Information on ICC membership requirements and application forms can be accessed from the “About Us” tab on the ICC website (<https://pesicc.org/ICCWP/join-icc/>).

In other ICC news, we are likely transitioning to a new ICC meeting registration system. Our current system was custom-developed

two decades ago, and while it has served us well, it is time for an upgrade. We are currently evaluating the Cvent event management system that many of you may recognize as it is widely used in the industry, including by IEEE and EPRI. We hope to launch Cvent in time for the Fall 2025 meeting.

Looking ahead, the Spring 2025 meeting will take place at the Omni Hotel in Louisville, Kentucky – home to the Kentucky Derby/Churchill Downs, the Louisville Slugger Museum & Factory, the Muhammad Ali Center, and, of course, local products that will be of interest to many attendees.

We have scheduled this and the next four meetings to avoid conflicts with Mother’s Day and Halloween. Please see the ICC website for information on future meetings (<https://pesicc.org/ICCWP/meetings/>).

I look forward to seeing everyone in Louisville!

*Bert*  
Albert H. Spear III  
ICC Chair (2024-2025)

## Transmission and Distribution Underground Cable Systems – Design, Installation, and Commissioning – Part 2

### SPRING 2025 ICC EDUCATION SESSION

The upcoming Spring 2025 Education Session will continue with a series of presentations covering T&D UG cable systems design, installation and commissioning. Industry experts from North America and Europe will share their knowledge and experience on the design of new cable systems, solving problems during cable installation and while performing commissioning tests. In the next several meetings we hope to cover ampacity calculations for multiple circuits in congested urban environments, induced voltage issues, GIS and outdoor termination installations, grounding schemes, new installation techniques and many other important topics for new cable circuit designs. A Q&A session with our panelists will be included. Please note that you always have the opportunity to write your request for future topics on the back of your evaluation form.

*Join us!*  
*for an enlightening afternoon at the*  
**Omni Louisville Hotel in Louisville, Kentucky**  
on Wednesday, May 21, 2025, 1:00-5:00 pm.

*We’re always looking for ideas!*  
*If you’d like to participate in future sessions as a speaker, be sure to write your ideas for future topics on the back of the session evaluation form.*

# Electrical Cable Damage & Ignition Characteristics Under Severe Thermal Exposure - High Energy Arcing Fault Program Results

By Gabriel Taylor, PE, U.S. Nuclear Regulatory Commission

Electrical cables provide a critical function for nuclear power plant operation and control. They also present a unique vulnerability due to fire damage causing loss of function and maloperation of equipment. These distinctive characteristics require engineering analysis to ensure safe plant operation during and after fire events.

High Energy Arcing Faults (HEAFs) are a subset of fire events defined by the rapid release of electrical energy in the form of heat, vaporized metal, and mechanical force over a short timeframe. HEAFs are like electrical arc faults but result in the release of more energy due to a longer event duration. Higher thermal energy release can damage equipment such as nearby electrical cables relied on for safe shutdown.

In 2005, a state-of-the-art risk assessment method was published which modeled all HEAF hazards to mimic an event which occurred in 2001. Subsequent operating experience and experimental work demonstrated that not all HEAFs are the same. Development of a refined method to advance risk assessment methods was needed, and it required answering two questions: 1) how to characterize a scenario-specific HEAF hazard, and 2) when do targets (electrical cables) become damaged?

Characterizing the hazard required extensive research and collaboration to understand plant electrical designs, past HEAF events, main generator characteristics, arc voltage estimates, particle size distributions, and oxidation levels. With a refined understanding of plant scenarios, an intensive experimental and analytical program was undertaken. A cost-saving approach using computational fluid dynamic (CFD) modeling was also performed. CFD simulations allow for the numerical evaluation of the impact that key parameters have on the hazard to reduce the number of physical experiments required. With refined and validated CFD models, a simulation matrix was developed and executed to characterize the hazard.

Next, cable damage thresholds were assessed. It is common to use a critical heat flux criteria of 6 kW/m<sup>2</sup> for thermoplastic jacketed cables and 11 kW/m<sup>2</sup> for thermoset jacketed cables for classical thermal fires. However, cable polymers react differently at high intensity thermal exposures (in excess of 1,000 kW/m<sup>2</sup> for some experiments).

Therefore, the exiting heat flux criteria was not suitable for HEAFs. A new metric for predicting cable damage was needed. Damage thresholds based on total incident energy were developed using full-scale HEAF experimental data, literature, focused scope solar furnace experimental data (Figure 1), and engineering judgement. HEAF specific total incident energy thresholds were defined at 15 MJ/m<sup>2</sup> for thermoplastic and 30 MJ/m<sup>2</sup> for thermoset jacketed cables.

With the HEAF hazard and damage criteria defined, the risk assessment method was updated.

In general, the updated method demonstrated a larger damage zone for bus duct scenarios and lower damage zones for switchgear scenarios (see Figure 2). While the results from applying the new method will be plant specific, the updated method provides realism in risk assessment and a tool for utilities to assess plant vulnerabilities and make informed decisions involving plant safety.



Figure 1. Image of three parallel cable samples being exposed to focused solar thermal radiation

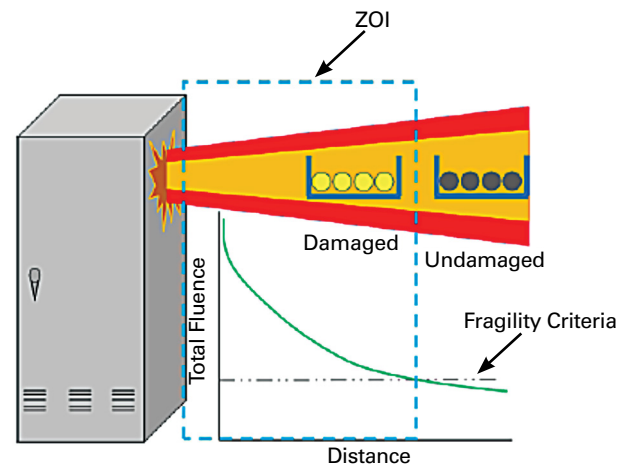


Figure 2. Depiction of the zone of influence (ZOI - damage zone) for a switchgear scenario.

## Standards Corner

By Kathryn Klement,  
ICC Standards Coordinator

We have an opening for Assistant Standards Coordinator. This is a great opportunity to get involved as a member of the ICC Administrative Committee (AdCom) and ultimately take on the Standards Coordinator role. Please contact Kathryn at [kklement@hvgrid-tech.com](mailto:kklement@hvgrid-tech.com) if you are interested.

Since the Fall 2024 meeting, the IEEE SA Standards Board has approved one revised ICC standard:

- IEEE C62.22.1 *Guide for Connection of Surge Arresters to Protect Insulated Shielded Electric Power Cable Systems Up to 46 kV* – WG B06W Chaired by Ben Lanz

Congratulations to the working group for reaching this milestone.

One new project was also approved:

- P3556 *Guide for Direct Current Fast Charging Cables with Thermal Management for Electric Vehicles* - WG D24W Chaired by Phil Laudicina

To get involved in ongoing standards projects, you can attend any of the working group meetings at the next ICC or reach out to the Subcommittee chair for more information.

# Insulated Conductors Committee (ICC) Awards

By Lauri Hiivala, ICC Awards Vice-Chair

The strength of ICC is based on the wide range of expertise and collective technical knowledge of the many volunteer members. An important element of the ICC is recognition of contributions.

## ICC Certificates of Appreciation

At each ICC meeting, Certificates of Appreciation are presented for the best presentation at a Subcommittee, Working Group, Discussion Group or Educational Program meeting, such as the following:

Recipient	Citation
<b>Sverre Hvidsten</b>	for Best Presentation at the Spring 2024 Subcommittee A Meeting: <i>Water Treeing in High Voltage Wet Cable Designs for Offshore Wind Inter Arrays</i>
<b>Diana Ramirez-Wong</b>	for Best Presentation at the Spring 2024 Subcommittee B Meeting: <i>Thermal Performance of Commercially Available Connectors Installed on Water-blocked Cables</i>
<b>Sean Kennedy</b>	for Best Presentation at the Spring 2024 Subcommittee B Meeting: <i>Thermal Performance of Commercially Available Connectors Installed on Water-blocked Cables</i>
<b>Richard Allen</b>	for Best Presentation at the Spring 2024 Subcommittee B Meeting: <i>Avangrid MV Cable &amp; Accessory Standardization</i>
<b>Hunly Chy</b>	for Best Presentation at the Spring 2024 Subcommittee C Meeting: <i>SCE's Vision for a Carbon-Neutral California: Assessing Feasibility and Challenges</i>
<b>Tram Camba</b>	for Best Presentation at the Spring 2024 Subcommittee C Meeting: <i>SCE's Vision for a Carbon-Neutral California: Assessing Feasibility and Challenges</i>
<b>Steve Wetzel</b>	for Best Presentation at the Spring 2024 Subcommittee D Meeting: <i>VFD Cables: Essential or Overkill</i>
<b>Rene Hummel</b>	for Best Presentation at the Spring 2024 Subcommittee F Meeting: <i>Case Study: PD Commission Test of a Long 400kV Feeder</i>
<b>Boguslaw Bochenski</b>	for Best Presentation at the Spring 2024 Educational Program: <i>Challenges with Utility MV Cables</i>

## IEEE PES Technical Committee Certificates of Appreciation

Certificates of Appreciation are also presented to all outgoing Subcommittee, Working Group and Discussion Group Chairs and Vice Chairs, or upon publication of their IEEE standard or guide, such as the following:

Recipient	Citation
<b>Tom Fredericks</b>	for Services Rendered as Chair, Working Group B9: <i>IEEE 1493-2024 IEEE Guide for Evaluation of Solvents Used for Cleaning Electrical Cables and Accessories</i>
<b>Jason Fosse</b>	for Services Rendered as Secretary, Working Group B9: <i>IEEE 1493-2024 IEEE Guide for Evaluation of Solvents Used for Cleaning Electrical Cables and Accessories</i>
<b>Robert Schmidt</b>	for Services Rendered as Chair, Working Group D17: <i>IEEE 1717-2024 Standard for Testing Fire-Resistive, Circuit Integrity Cables and Cable Systems Using a Hydrocarbon Pool Fire Test Protocol</i>
<b>Mick Bayer</b>	for Services Rendered as Secretary, Working Group D17: <i>IEEE 1717-2024 Standard for Testing Fire-Resistive, Circuit Integrity Cables and Cable Systems Using a Hydrocarbon Pool Fire Test Protocol</i>
<b>Nigel Hampton</b>	for Services Rendered as Chair, Working Group F03: <i>IEEE 400.2-2024 Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF)</i>
<b>Andrew Morris</b>	for Services Rendered as Secretary, Working Group F03: <i>IEEE 400.2-2024 Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF)</i>
<b>Paul Leufkens</b>	for Services Rendered as Vice-Chair, Subcommittee G – Transnational Spring 2018 – Fall 2023

## IEEE 82 Update: A Comprehensive Revision Reflecting the Latest Advances

By Rachel Mosier, Chair of WG C14W, Power Delivery Consultants, Inc.

As of 2023, IEEE 82, Recommended Practice for Impulse Voltage Tests on Insulated Cables and Their Accessories, has undergone a significant transformation. This update, based on the latest laboratory research and user experiences, introduces numerous changes to the testing and reporting procedures. Here are the key highlights of these changes:

### 1. Reclassification from Standard to Recommended Practice (RP)

- IEEE 82 is now officially a "Recommended Practice" (RP), though it has served this role despite being labeled as a standard. This RP supplements standards for insulated cables and their accessories.

### 2. Enhanced Guidance on Impulse Generator Sizing and Lightning Impulse Wave Front Time

- The RP offers updated guidance on generator sizing and specifies requirements for lightning impulse wave front times.

### 3. Inclusion of Superimposed Impulse Voltage Waveshapes

- The RP now incorporates guidelines for superimposed impulse voltage waveshapes.

### 4. Detailed Procedures for Heating Cables

- New details have been added for DC cable heating methods, improved temperature measurement techniques, and an alternate method.

### 5. Extensive Updates to Qualification and Type Test Procedures

- The RP features updates on qualification and type test procedures, including time limitations, to make the procedures more consistent and easier to implement.

### 6. Clarified Definitions of Dielectric Failures

- The document includes details on dielectric failures, clearly defining what constitutes a failure.

### 7. Introduction of Three New Annexes

- Three new annexes have been added, covering:
  - Impulse generator energy rating calculation.
  - Impulse generator inductance and impact on wave shapes.
  - Superimposed impulse voltage testing.

This revision was meticulously developed by a group of the industry's most experienced cable impulse testing experts, who dedicated significant effort and care to this project, completing it in just two years. We are deeply grateful for their contributions and dedication.



# International Events Calendar

Compiled by Harry Orton

Reminder: The continuing world situation has made it very difficult to provide accurate conference listings and dates as some conferences have gone virtual while others have changed dates, relocated or have been cancelled. Please refer to the respective website for up-to-date conference information. Be very careful when searching the Internet for conferences and symposia as there are fraudulent websites advertising predatory conferences with very similar names. Their sole purpose is to collect papers and registration fees.

## 2025

### IEEE Rural Electric Power Conference

29 April-1 May, Westminster, CO [www.ieeerepc.org](http://www.ieeerepc.org)

### CIGRE International Symposium

12-15 May, Trondheim, Norway  
<https://cigrerccsymposium2025.com>

### Interwire Trade Exhibition 2025

13-15 May, Atlanta, GA [www.interwire25.com](http://www.interwire25.com)

### EIC (Electrical Insulation Conference)

8-12 June, South Padre Island, TX  
<https://ieee-eic.org/>

### CIRE2025

16-19 June, Geneva, Switzerland  
<http://www.cired2025.org>

### IEEE PES General Meeting

27-31 July, Austin, TX <https://pes-gm.org>

### ICEMPE (International Conference on Electrical Materials and Power Equipment)

3-6 August, Harbin, China.  
<http://icempe2025.org>

### ISH (24th International Symposium on High Voltage Engineering)

24-29 August, Karuizawa, Japan  
Email: [kumada@hvg.t.u-tokyo.ac.jp](mailto:kumada@hvg.t.u-tokyo.ac.jp)

### CEIDP (Conference on Electrical Insulation and Dielectric Phenomena)

14-17 September, Manchester, UK.  
<https://ceidp.org/>

### Wire Southeast Asia

17-19 September, Bangkok, Thailand.  
[www.wire-southeastasia.com](http://www.wire-southeastasia.com)

### CIGRE International Symposium

29 September-2 October, Montreal, Canada  
[www.cigre.ca](http://www.cigre.ca)

## 2026

### Wire Dusseldorf

13-17 April, Dusseldorf, Germany.  
<http://wire-tradefair.com>

### ICD (International Conference on Dielectrics)

21-25 June, Southampton, UK.  
<http://ieee-icd.org/>

### CIGRE Paris General Session 2026

23-28 August, Paris, France.  
[www.cigre-exhibition.com/form](http://www.cigre-exhibition.com/form)

## In Memorium • Richard W. Allen, Jr.

May 1935 – July 2024



Dick Allen, a longtime contributor to the cable industry, passed away at age 89 in July. Dick received a BS in Electrical Engineering and a MS in Electrical Power Engineering, both from Northeastern University. He held engineering and engineering management positions with New England Electric System (NEES) and later with Power Delivery Consultants (PDC), Inc. Dick retired from PDC in 2010 but continued to consult for the cable industry and to mentor young engineers.

Dick was well known as one of the brightest engineers to grace the cable industry, as evidenced during testing for his professional licensing in Rhode Island. Rather than taking the Engineer-in-Training Exam and following up with professional work experience before sitting for the Professional Engineering licensing exam, Dick sat for the PE exam on a Friday (scoring 100% on all sections) and then took the EIT test the next day, missing only a single question. The head of testing contacted Dick's then supervisor and asked, "what would you say if I told you that Dick Allen got 100% on his PE test on Friday and then missed only one question on Saturday?" Dick's boss replied: "It sounds like Dick had a bad Saturday."

Dick was an extremely practical engineer willing to help others find solutions to almost any problem. He authored the book, *Power Cable Engineering*, and taught courses to hundreds of engineers over a 30-year period. He also conducted many seminars and workshops on various cable engineering topics. Dick was lead developer of one of the first cable ampacity programs using a digital computer, which became the basis of many in-house and commercial ampacity programs in use today.

Dick was active in the ICC, EPRI and other industrial groups. He held a patent on the extruded-dielectric pipe-type (EP) cable concept for installing and operating extruded-dielectric cables in steel pipes.

Dick Allen embodied the best of the cable engineering community. We will miss him.

## Volunteers Wanted

The strength of ICC and its value to our members and community rely on the work of many volunteers.

ICC currently has the openings listed below. Your participation is needed.

Please contact Yingli Wen at [y.wen@ieee.org](mailto:y.wen@ieee.org) if you are interested or need more information. Responsibilities of Working Group (WG) officers are detailed in the ICC Policies and Procedures (P&P) for Working Groups and that of Standards Coordinator can be found in the ICC P&P for Standards Development. Both documents can be accessed at <https://pesicc.org/ICCWP/guidelines/>.

- **Assistant Standards Coordinator**
- **Vice Chair, A06D** – Accelerated Electrical Aging
- **Chair and Secretary, B17W** – Guide for Application of Underground Fault Current Indicators (P1216)
- **Secretary, C1W** – Ampacity Topics (P835)
- **Secretary, C12W** – Guide for Dist. Cable Installation Methods in Duct Systems (P971)
- **Vice Chair, C26D** – Medium Voltage Underground Cable Reliability
- **Chair and Secretary, D5W** – Station Cable Installation Criteria (IEEE1185) (P1185)

## Upcoming ICC Events

18-21 May 2025, Omni Louisville, Louisville, KY

26-29 October 2025, Omni Amelia Island Resort, FL

26-29 April 2026, Omni La Costa, Carlsbad, CA

25-28 October 2026, JW Marriott Turnberry, Aventura, FL

## Tell Us What You Think!

ICC welcomes your feedback. If you'd like to suggest topics for upcoming issues of the ICC Newsletter or add a colleague to our email database, please contact Yingli Wen at [y.wen@ieee.org](mailto:y.wen@ieee.org).