From the ICC Chair

It’s hard to believe this year marks the 70th anniversary of the first ICC meeting. I remember my first ICC meeting in the mid-nineties. I learned a great deal from the working group discussions on standards and guides and the subcommittee presentations. But just as informative and beneficial were the discussions that occurred during breaks and dinners. The networking and building of friendships that occur among colleagues at the ICC is priceless. I found that first meeting to be so valuable that I have attended ever since.

In 2016 I had the honor of becoming the ICC chair, and it has been a pleasure to serve this great organization in that role for two years. The upcoming Fall meeting will be the end of my term, and Rusty Bascom will be taking on the responsibility as the ICC chair. I know he will do a great job.

I want to thank all of you for the dedication and contributions you provide at every meeting. It’s not a coincidence that the ICC is one of the top committees in PES - it’s because of all your hard work and commitment. I encourage every ICC member to be involved with our many subcommittees. This will keep the ICC ahead of new technologies, provide a learning platform for our industry, and continue to attract new members for many years to come.

I look forward to seeing everyone in Hollywood, Florida this October.

Safe travels!

Frank Frentzas
Commonwealth Edison
IEEE PES ICC 2016 – 2017 Chair

Fall 2017 Education Session – The Latest ICC Guides and Standards

By Rachel Mosier, Education Session Chair, PDC and Jared Jajack, Education Session Vice Chair, AEP

Do you ever find it hard to keep up with the most recent ICC guides and standards? At ICC, it’s impossible to attend every session of interest. So how can you find out what the latest ICC publications are and how they will impact you?

That’s what this session is all about. We’ll be covering the most recently published and soon-to-be published ICC guides and standards, providing a primer on each one. The presentations will span all subcommittees, so there will be something for everyone.

Plan to attend this education session at the Margaritaville Hollywood Beach Resort in Hollywood, Florida on Wednesday, November 1, from 1:00 – 5:00 p.m.

Industry Report: Smart Utilities

By Ram Ramachandran, SRValueconsulting LLC

The 2017 Strategic Directions: Electric Industry Report from Black & Veatch is now available. This report captures the views of global engineering and thought leaders on how reliability, aging infrastructure and customer demand for green energy are driving investments in transmission and distribution. The report also explores how utilities — despite headlines suggesting potential rollbacks of emissions mandates — are driving the grid further toward sustainability. It can be downloaded at https://www.bv.com/reports.

ICC Newsletter Team

Harry Orton, ICC Communications Chair
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Ram Ramachandran, AC Task Force Chair
Rating of Underground Power Cables with Boundary Temperature Restrictions
By George J. Anders, F. IEEE

The usual way of rating electric power cables is to compute the current such that conductor temperature does not exceed the specified limit. This limit can be different for normal and emergency operations. The procedures for ampacity calculations are well established and are part of several international and national standards.

However, in several countries (particularly in Europe), another restriction is imposed on the maximum current the cable can carry. This restriction limits the temperature rise at a point other than the cable conductor. For example, in the Netherlands, Denmark and France, the temperature rise at the cable surface is imposed to prevent soil dryout in the vicinity of the cable installation. In North America, a notion of the “boundary” temperature limit is sometimes entertained. The boundary can refer to the cable surface but also to the edge of the duct bank or a backfill.

Installation of submarine cables in the North Sea or the Baltic Sea is subjected to a temperature restriction called the 2 K-criterion. This means that a so-called “ecological point” in the seabed, situated at a depth directly above the cable, is not permitted to heat up by more than 2.0 °Kelvin (K) due to cable losses. Normally, the depth of this point is defined as m. In practice, the 2 K-criterion can have tremendous effects on the cable design, enforcing greater laying depths under the sea bottom and/or more expensive cables with larger conductor cross-sections.

Rating, continued on page 4
Unplanned cable system failures in a nuclear environment can have serious consequences for plant safety and reliability. Combined with plans for North American nuclear power plant re-licensing and life extension (from 40 to 60 or even 80 years), it is inevitable that plant operators and regulators place a strong focus on implementing testing-driven cable aging management programs (CAMPs) for medium voltage (MV) plant cables.

The fundamental intent of adopting partial discharge (PD) testing in an MV nuclear power plant (NPP) CAMP is to diagnose latent (i.e., undeveloped) localized insulation defects in cable systems. There are, however, a number of unique PD testing considerations in NPPs, which are briefly summarized in the table to the left.

Addressing these constraints requires careful technical consideration of the test source, test methodology (levels, duration, sequence), measurement/detection methodology, and evaluation methodology/interpretation criterion. A PD test approach satisfying these considerations is shown in the chart to the right. The approach is based on extensive application experience and statistics from PD testing MV cables in Canada Deuterium Uranium (CANDU) and US pressurized water reactor/boiling water reactor (PWR/BWR) NPPs.

Utilizing this approach, PD testing has been applied in NPPs for commissioning, post-repair acceptance, maintenance, and diagnostic trending. The commissioning testing was a success and the circuit was energized in November 2016.
Testing of First 500 kV Underground Transmission Circuit in North America
By Alfred Mendelsohn, Power Delivery Solutions, Inc.

The first underground 500 kV XLPE transmission line in North America was recently completed by Southern California Edison (SCE) about 20 miles east of Los Angeles. The SCE 500 kV XLPE underground cable circuit consists of two sub circuits approximately four miles long, with two outdoor terminations and 11 joints on each cable.

Due to the criticality of the circuit, and considering that this is the first time a 500 kV XLPE circuit was being installed in North America, SCE decided to install a permanent PD monitoring system to monitor all joints and terminations. This also facilitated the commissioning testing of the circuits.

The commissioning testing requirements for the project consisted of an AC Hipot test at 433 kV (1.5 U0) for one hour with simultaneous PD testing of all joints and terminations. This represents the highest voltage AC Hipot test in North America for an underground XLPE transmission circuit. To be able to perform the AC test, it was necessary to use four large 260 kV resonant test set (RTS) units, two in series coupled in parallel with another two in series.

The commissioning testing was performed at the end of August 2016 and all accessories and the cables were found to have negligible PD at 433 kV. The 500 kV XLPE circuits were energized in November 2016 and have been in service without any issues since then.