

<http://ewh.ieee.org/cmte/substations/>

Chair: Markus Etter
Vice-Chair: Diane Watkins
Secretary: Joe Gravelle

1. Significant Accomplishments (include details and examples):

a. Standards -- Substations Committee currently manages 48 standards. Of these, 26 were in active development in 2016, with the following deliverables:

1) Publishing:

- PC37.123 Guide for Specifications for High Voltage Gas-Insulated Substations Rated Above 52 kV
- PC37.122.4 New – Application and User Guide for Gas-Insulated Transmission Lines (GIL) Rated 72.5 kV and Above
- P1268 Revision – Guide for Safety in the Installation of Mobile Substation Equipment
- P525 Revision – Guide for Cable Systems in Substations
- P1815.1 – Exchanging Information between Networks Implementing IEC 61850 and IEE Standard 1815.

2) Balloting:

- P1818 Guide for the Design of Low Voltage Auxiliary Systems for Electric Power Substations
- P1615 Recommended Practice for Network Communications in Electric Power Substations
- P2030.100 Recommended Practice for Implementing an IEC 61850 Based Substation Communication, Protection, Monitoring and Control System
- P2030.101 Recommended Practice for the design, installation and monitoring of Time Synchronization Systems for Power Utility Substations
- P693 Recommended Practice for Seismic Design of Substations

b. Tutorials and Panels Summary

1) Annual Meeting, Atlanta, GA – Four tutorials presented

- Tutorial 980 – Guide for Oil Containment Systems
- Tutorial 1264 – Guide for Animal Deterrents for Substations

- CIGRE - Air Insulated Substation Design for Severe Climate Conditions
 - CIGRE – SF6 Application and Responsible Use – Challenges & Options
- 2) GM 2016, Boston, MA
- Panel Session on Research Priorities and Open Problems in Power Systems Communications and Networking
 - Panel Session on domain-specific Big Data Analytics Tools in Power Systems
 - Paper forum session on various substation related topics
 - 6 papers hosted in the Poster Session
 - Due to the PES reorganization that moves the work of the C0 Subcommittee to a modified Power System Relaying and Control (PSRC) Committee and Power System Communications and Cybersecurity (PSCC) Committee, the C0 subcommittee presented a tribute video to review the work accomplished in C0 over the years.
 - A member of the Substations Committee serves as Editor of the Transaction of Power Delivery. His work included the review of more than 60 papers; many of which were selected for publication.
- 3) 2016 T&D Conference and Exposition
- Tutorial K10 – High Voltage Gas Insulated Technology
 - Half-day Tutorial on Substation Animal Deterrents
 - Paper forum session on various substation related topics
 - 14 papers hosted in the Poster Session
- 4) Slovenia
- Tutorial E5 – Direct Lightning Stroke Shielding of Substations
- 5) Australia
- Tutorial E5 – Direct Lightning Stroke Shielding of Substations
- c. Other Committee and Subcommittee Activities
- 1) The Annual Meeting of the Substations Committee was held in Atlanta, Georgia. The meeting was co-hosted by Southwire and Southern Company. The administrative subcommittee (B0) also met at the PES General Meeting in Boston, MA in July.

- 2) Other Subcommittee meetings were held at the JTCM in January, the General Meeting in July, and the PSRC meeting in September.
- 3) The substation committee sponsors a "Special Issue on Modern Substation Technologies", which will be published in the IEEE Transaction of Power Delivery. 85 short papers have been submitted. After the evaluation of the short papers 23 full length papers has been submitted for the special issue. These papers are under review. Final decision is expected by end of 2016

2. Benefits to Industry and PES Members from the Committee Work:

The most notable activity of the Substations Committee is the revision and updating of standards and guides, and initiating work on new standards. These standards are widely utilized and provide the most direct benefit to the industry.

In addition to standards work, the Substations Committee donated \$10,000 to the PES Scholarship Initiative to support university students pursuing degrees in engineering.

3. Benefits to Volunteer Participants from the Committee Work:

Participants have benefited from their collaboration on technical problems with industry leaders and experts, discussing contemporary industry problems and concerns, and the satisfaction of creating standards and guides that are useful to the industry. Committee meetings have included presentations of experts in specific fields and debating of ideas and industry practices, including CIGRE member input. Substations Committee members have also benefited from their exposure to technical paper reviews and technical paper presentations.

Active participants also have opportunities to take on leadership roles and improving their leadership skills as well as mentoring skills working with teams with a variety of experience in technical and organizational activities.

Substations are considered strategic assets, and a number of their components are now reaching the end of their original design life. Valuable information is exchanged on the modern design approaches and explaining new technologies, as well as the issues specific to new technology and suggested improvements for the electric power industry market; for example, Voltage-Source Converters (VSC) and IEC 61850 protocols.

4. Recognition of Outstanding Performance:

- 1) Substations Committee Distinguished Individual Service: **Craig Preuss** for his many years of leadership and dedicated service to the Substations Committee and his leadership of C0 and growing its working groups.
- 2) IEEE PES Technical Committee Working Group Recognition Award: K12 – IEEE Guide to Specification for GIS Electric Power Substation Equipment Above 52 KV – Chair George Becker

- 3) IEEE PES Technical Committee Working Group Recognition Award: K12 – IEEE Guide for Specifications for Gas-Insulated Substations Rated 52kV and Above – Chair George Becker

5. Coordination with Other Entities (PES Committees, CIGRE, standards, etc.)

- 1) IEC – IEEE liaison Herman Koch presented activities with IEC including: Status Reports SC 17C, and SC17A.
- 2) CIGRE – US national committee supports Grid of the Future, Chicago in November 11 – 13. Next year Grid of the Future will be in Philadelphia, October 30th. Two extra days to hold a colloquium with C1 on Grid codes.
- 3) PSRC –Ongoing Joint work with the following standards:
 - New Cyber Security standard PC37.240
 - Time synchronization standard PC37.238.
 - H23*/SUBS C18: Guide for Naming IEDs (COMDEV)
 - H24-1/SUBS C7: Revision of IEEE STD profile for the use of IEEE1588 Precision Time Protocol
 - I31/ SUBS C2*: Environmental & Testing Req. for Devices Installed in Electric Power Transmission or Distribution Facilities (IEEE 1613/1613.1)
 - H3/SUB C4: Time tagging in Protection and Disturbance Recording IED's
 - H22/SUB C19: Guide for Cyber Security for Protection Related Data Files
 - K12: Guide for Protecting Transmission Static VAR Compensators
- 4) T&D – Joint work on 1613.1
- 5) Switchgear Committee Joint Work – Joint Standards C37.20.9 Standard for Metal-Enclosed Switchgear Rated 1 kV to 52 kV Incorporating Gas Insulating Systems – George Becker WG Vice Chair and Liaison from K0 – draft to be balloted in 2016.
- 6) NESC – Bruce Dietzman represented the Substations Committee at the NESC - Subcommittee 3 – Electric Supply Stations meeting held at the IEEE headquarters in Piscataway, NJ on October 8, 2015. This was the last subcommittee meeting before submittal of the 2017 NESC to the main committee for approval. Final approval and publication will occur by the end of 2016.

6. New Technologies of Interest to the Committee:

- 1) HEMP – High-altitude electromagnetic pulse, and IEMI- Intentional Electromagnetic Interference
- 2) Voltage-Source Converters (VSC)

7. Significant Plans for the Next Period:

- 1) JTCM meeting in New Orleans, LA in January 2017 Attending more working group meetings in 2016 with D0 and E0 subcommittees.



**IEEE Power & Energy Society
Substations Committee
2016 Annual Report**

- 2) Annual meeting in Richmond, VA in May 2017, including numerous Tutorials
- 3) Further engage with Intelligent Grid CC and any key standards development
- 4) Nominate Fellow candidates
- 5) Nominate members for IEEE achievement awards
- 6) Publish 4 standards that are due in balloting
- 7) Ballot 5 standards that are planned for 2017.
- 8) Technical Paper Panel Session at PES General Meeting in Chicago, IL
- 9) Tutorials at 2017 GM in Chicago, IL

8. Global Involvement

PES is looking to increase involvement with members from Regions 8, 9 and 10 (Africa, Europe, Middle East, Latin America, Asia and Pacific). Please provide the following information

Total Number of committee members	Officers from regions 8,9 and 10	Subcommittee officers from regions 8, 9 and 10	Subcommittee members from regions 8,9, and 10
405	1	2	71

Submitted by: Markus Etter

Date: 12/19/2016