

IEEE Power and Energy Society 2014 Entity Annual Report

Entity: Substations Committee

Chair: Mike Dood

Vice-Chair: Markus Etter

Secretary: Diane Watkins

1. Significant Accomplishments (include details and examples):

a. Standards -- Substations Committee currently manages 57 standards. Of these, 42 were in active development in 2014, with the following deliverables:

1) Publishing:

- P837 Revision – Standard for Qualifying Permanent Connections Used in Substation Grounding
- PC37.122.1 Revision – Guide for Gas-Insulated Substations Rated Above 52 kV

2) Balloting:

- P80 Revision – Guide for Safety in AC Substation Grounding
- P1815.1 New – Standard for Exchanging Information between Networks Implementing IEC 61850 and IEEE Std 1815 (Distributed Network Protocol – DNP3)
- 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

3) Reviewing (PARs for new documents):

- P1032 Guide for Protecting Transmission Static VAR Compensators
- P1052 Guide for the Functional Specifications for Transmission Static Synchronous Compensator (STATCOM) Systems
- P1677 GIL Application Guide
- P1821 Usage of Design Tools for Power Electronic Building Blocks (PEBB) and PEBB-Based Systems

b. Tutorials and Panels Summary

1) IEEE PES T&D Conference, Chicago

- The Data Acquisition, Processing, and Control Systems Subcommittee sponsored the panel session *On-line Condition Monitoring Value for Present and Future Grids*

- The High-Voltage Power Electronics Subcommittee sponsored the panel session *FACTS/Power Electronics Installations*
 - The Data Acquisition, Processing, and Control Systems Subcommittee sponsored the panel session *How to Protect Substations from Physical or Cyber Intrusion*
 - The Gas-Insulated Substations (GIS) Subcommittee conducted a Tutorial titled *Gas Insulated Substations (GIS) and Transmission Lines (GIL)*
 - There were 8 papers hosted in the Poster Session
- 2) Annual Meeting, Portland – Four tutorials presented
- Tutorial on 1427 – Electrical Clearances and Insulation Levels in Air-Insulated Electric Power Substations
 - Tutorial on 1815 & 1815.1 – Distributed Network Protocol (DNP3) and Mapping DNP3 to IEC 61850
 - Tutorial 1127 – Design, Construction, and Operation of Substations for Community Acceptance and Environmental Compatibility
 - Tutorial 81 – Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
- 3) GM 2014, Washington, DC
- Tutorial on Voltage Sourced Converters
 - Paper forum session on various substation related topics
 - 13 papers hosted in the Poster Session
- 4) The Tutorials and Panel Sessions GIS/GIL/SF6 Working Group is revising the Gas-Insulated Substations (GIS) and Lines (GIL) tutorial, which has so far been presented 32 times to a total of over 1,000 attendees in 12 countries around the world.
- 5) 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.
- c. Other Committee and Subcommittee Activities
- 1) The Annual Meeting of the Substations Committee was held in Portland, Oregon and hosted by Portland General Electric. A training session was provided to Working Group officers on standards procedures and the overall process for balloting a standard. The administrative subcommittee (B0) also met at the PES General Meeting in Washington, DC in July.
 - 2) Other Subcommittee meetings were held at the JTCM in January, the General Meeting in July, the PSRC meeting in September, and at Nashville in October.

- 3) The GIS/GIL Handbook Working Group published a 324 page text titled *Gas Insulated Substations (GIS)*. It was written by 18 authors from the Gas-Insulated Substations (GIS) Subcommittee. It has been very well-received by readers.

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. Of particular note is the publishing of updated and new standards:

- C37.122.5 Guide for Moisture Measurement and Control in SF6 Gas-insulated Equipment

The working groups of the subcommittees are supporting the industry by offering publications in the transactions, panel sessions, and tutorials in conjunction with the Annual Substations Meeting, the JTCM, the PES General Meeting, and the IEEE/PES T&D Expo.

The subcommittees encourage technical exchanges for meeting the expectations and the concerns of both the equipment manufacturers and the users; for example:

- Cyber security initiatives
- Gas insulated technology
- Voltage-Sourced Converters

In addition to standards work, the Substations Committee donated \$5,000 to the PES Scholarship Initiative to support university students pursuing degrees in engineering. The scholarship funds were donated in memory of a dedicated, long-time member of the Substations Committee who passed away in 2012.

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.

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: **Diane Watkins** for six years of outstanding and dedicated service as M0 chair of the Meetings Subcommittee
- 2) Substations Committee Working Group Recognition: **Dave Giegel** for the successful work of coordinating the revision of Standard C37.122.5 with international bodies CIGRE B3 and IEC TC 10 on new content and with the working group K8 to meet the time schedule of the revision.
- 3) Substations Committee “Gary Engmann” Outstanding Working Group Member: **Chuck Hand** for many great contributions to the K0 Subcommittee and working groups, especially in developing GIS standards C37.122 and C37.122.1, and GIL guide C37.122.4.
- 4) Substations Committee Subcommittee Past Chair: **Dave Solhtalab** for his leadership and dedication in performing the Chair function of the GIS Subcommittee K0 from 2011 – 2013.
- 5) IEEE-SA Recognition: **Sam Sciacca** for successful balloting of IEEE 1686 “Standard for Intelligent Electronic Devices Cyber Security”
- 6) IEEE-SA Recognition: **Diane Watkins** for successful balloting of IEEE 1127 “Guide for the Design, Construction, and Operation of Electric Power Substations for Community Acceptance and Environmental Compatibility”
- 7) IEEE-SA Recognition: **Rich Keil** for successfully balloting IEEE80 “Guide for Safety in AC Substation Grounding”

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

- 1) IGCC – Provided input to the Intelligent Grid Coordinating Committee on the PES Smart Grid Roadmap.
- 2) DOE – SCADA and GIS Subcommittees provided input to the United States Department of Energy (DOE) on a set of priority issues relating to a new White House initiative: the Quadrennial Energy Review (QER).
- 3) IEC – Permission has been given to add text from IEC 62271-203 to C37.122.1 of K11 working group.
- 4) CIGRE – Held a joint panel session on On-line Condition Monitoring at the IEEE T&D Conference.
- 5) PSRC –Ongoing Joint work on new Cyber Security standard PC37.240 and time synchronization standard PC37.238.
- 6) T&D – Joint work on 1815 and 1613.1
- 7) NESC – Bruce Dietzman represented the Substations Committee at the last meeting, which included proposed changes on the 2017 version.

6. New Technologies of Interest to the Committee:

- 1) Voltage-Source Converters (VSC)
- 2) DNP3 to 61850 interoperability
- 3) Environmental testing based upon 1613/1613.1

7. Significant Plans for the Next Period:

- 1) Annual meeting in Minneapolis, Minnesota in May 2015, including numerous Tutorials
- 2) Further engage with Intelligent Grid CC and any key standards development
- 3) Nominate several Fellow candidates
- 4) Nominate members for IEEE achievement awards
- 5) Execute IEEE PES Technical Council's plan on technical reorganization
- 6) Publish 4 standards that are due in balloting
- 7) Ballot 4 standards that are planned for 2015
- 8) Technical Paper Panel Session at PES General Meeting in Denver, CO
- 9) Tutorials at 2015 GM in Denver, CO

Submitted by: Mike Dood

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