

**IEEE Power Engineering Society
Substations Committee Annual meeting 2004
New Orleans, LA
Summary Report**

Entity: TRANSMISSION & DISTRIBUTION SUBSTATIONS SUBCOMMITTEE (D0)

Chair: Ken White; whitekd@bv.com

Vice-Chair: Hamid Sharifnia; hamid@pacificorp.com

Subcommittee activities D0

The subcommittee meeting took place Wednesday afternoon, April 13, with 11 members and 14 guests present. The meeting consisted of a presentation by Dave Childress of Southern States entitled "Disconnect Switch Mounted Interrupting Devices: How to Choose What to Use When and Where." The presentation was very well received.

Working group activities were as follows:

WG D1: Substation Clearances

The working group met on April 12 with 8 members and 11 guests in attendance. The main thrust of the meeting was to resolve the negative ballots received from the ballot of Draft 13 of Guide P1427. There were 4 negative ballots with comments and one negative ballot without comments. Hanna Abdallah will be responsible for those comments regarding the example calculations in Annex B. Many of the comments were editorial in nature and appear to be straightforward in their resolution. Hamid Shirifnia will take over as chair of D1 so that the current chair, Ken White, can address the D0 Subcommittee more effectively. Hamid will take the lead on getting the negative ballots resolved, addressing the comments that accompanied the affirmative ballots, revising Draft 13, and getting the guide back to IEEE for the recirculation of Draft 14. The next meeting of WG D1 will be in New Orleans in October 2005.

WG D3: Substation Bus Design

As of 6/13/05, no report has been submitted.

WG D4: Substation Safety

The meeting of Working Group D-4 was held 11 members and 8 guests present.

Chair Lane Garrett had Martin Havelka report on the re-circulation of the ballot on revisions to IEEE Std. 1268, "IEEE Guide for the Safe Installation of Mobile Substation Equipment". Martin reported that the initial ballot had 74 members of SA requesting to ballot, of which there were 60 ballots. Of the 60, 52 were for approval, 5 were negative, and three abstained. On the re-ballot of the 74 there were 62 casting a ballot. Of the 62, 55 were for approval, 3 were negative and three abstained. Martin explained that he had contacted by phone the original 5 negative ballots and after discussing the changes in the re-ballot all were going to vote for approval. One of the 5 changed to approval, another sent Martin an email saying that he/she was in favor of approval. The remaining 3 negative ballots were discussed by the committee and it was agreed to proceed. Martin will discuss procedure with IEEE staff and proceed with approval process. Lane Garrett and Anne-Marrie Sahazizian thanked Martin for his excellent work.

Lane led a discussion regarding a National Electrical Safety Code (NESC) interpretation request dealing with fence grounding, Rule 09E2, "Point of Connection of Grounding Conductor, Fences." The response from NESC representative leaves some unanswered questions. The request and response is sent to members along with these minutes.

Lane mentioned that there was proposed revisions to ASTM F 855 "Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment" that would establish a category of grounding assemblies that would be tested with currents having a high asymmetrical current component. If this revision is not incorporated in F 855, we might want to include it in our standard IEEE-1246 "IEEE Guide for Temporary Protective Grounding Systems Used in Substations". (Both Lane and Shashi Patel are members of F 855)

Frank Denbrock submitted a written report which is sent to members with these minutes.

The next meeting of Working Group D-4 will be in conjunction with Working Groups D-6, D-7 and D-9 meetings and in conjunction with the IEEE/PES T&D Exposition being held Sunday October 9 through Friday October 14, 2005 in New Orleans LA. Exact time , date and location will be sent to everyone at a later date.

WG D5:Direct Stroke Shielding of Substations

Bob Nowell, Chairman, opened the meeting with introductions, with 5 members and 11 guests present. Six of the guests were added as members of the working group. Attendance at this meeting was hurt substantially since many members also belong to Working Group D7 which was meeting at the same time.

The participants were queried as to what new expectations and interest for Guide 998 are. Russell Wilcox from Entergy emphasized a need for more detailed risk analysis of the protection methodologies. Contribution (beneficial or not?) of tall communication towers inside substations was also suggested as an investigation topic. Non-traditional methods such as Charge Transfer Systems (CTS) and Early Streamer Emission (ESE) were discussed as potential topics for a revision of the guide.

Bruce Kaiser of Lightning Master Corporation in Clearwater, FL gave a brief overview of lightning phenomena from his perspective and discussed a three step approach used by Lightning Master.

Russell Wilcox of Entergy presented an Excel spreadsheet macro he uses at Entergy to apply the EGM direct stroke shielding method.

Dr. Sakis Meliopoulos of Georgia Tech presented a computerized visualization of the EGM method.

Boris Shvartsberg reported on six papers he had researched concerning conventional and non-conventional lightning protection systems.

A task force (TF1) consisting of Boris Shvartsberg (PSEG) and Brian Stephens (Ameren) was formed for the purpose of researching new literature on all of the protection methods (fixed angle, empirical, EGM, CTS, ESE, and any others).

A repeat of the survey done as part of the original 998 development will be repeated.

Bob Nowell will review the status of WG D5 PAR and take appropriate action as it relates to new and ongoing work efforts.

WG D6: Substation Grounding Testing

The WG met on April 11 with 29 members and guests in attendance.

The PAR that has been approved does not have the wording that clearly reflects what we are trying to accomplish. More discussion with IEEE will be done.

A question was raised about clause 5 pertaining to the safety precautions of performing a ground test. People should be informed of potential hazards.

Inquiry on the progress of reviewing and rewriting the current clauses was posed. There was progress on a few clauses.

Further discussion of what work needs to be done continued. Volunteers were solicited to work on the new clauses

Everyone should send in their comments by the end of May 2005 so the WG can get a chance to discuss them at the next meeting.

Future meetings:

- At the Annual Power Meeting , San Francisco. Monday, June 13. 4:30-6pm.
- T&D in New Orleans Oct. 13, Specifics to be determined.

Reorganizing 81.2 and 81.1

It was suggested that it would make sense to integrate 81.2 into the main document. Divide clause 9 into 2 parts, large systems and smaller systems. Also difficult systems with a lot of buried underground metal structures.

WG D7: Substation Grounding Safety

As of 6/13/05, no report has been submitted by the WG chair.

WG D8: Turnkey Substation Project Specifications

This WG did not meet in Tampa. Currently, the guide has been issued for reaffirmation. The reaffirmation closed with 51 affirmative votes and five negative votes. Work is currently underway to resolve the negative ballots.

WG D9: Permanent Connections Used in Substations

Two primary subjects were discussed during the meeting:

1) Aged conductor testing

Samples of 2/0, 7 str Cu conductor from a Southern Company substation were exhumed and used to conduct a series of tests lead by two manufacturers.

Findings were presented on Resistance, Pullout, and Fault Current on new to new and new to aged crimp connections with this conductor and with 'new', recently purchased conductor. Questions were asked regarding corrected resistance measurements and test techniques. Findings on this limited test program indicated that there were some differences in the two sets of samples (new to new and new to aged), but not significant differences.

Several WG members presented a similar test series on both exothermic and mechanical connectors with this conductor and 'new', recently purchased conductor. Questions about corrected resistance measurements and test techniques were also asked. Findings on this limited test program indicated that there were some differences in the sets of samples (new to new and new to aged), and also between different connection methods (exothermic versus mechanical (crimp)).

Discussion ensued about whether or not there is still a reason to continue with this issue. Variables such as wire brushing methods, differences in soil conditions, difference in current practices between utilities, and lack of documented current problems with connecting to aged conductor during substation retrofits or upgrades, make this issue very difficult to quantify.

There was a motion to drop the issue of aged conductor for the next revision of the Standard. The motion was seconded and brought to vote. Vote Results: 13 yea, 6 nea, 1 abstain. Motion carried. Aged cable issue eliminated from consideration in next revision of the Standard.

2) Connections to risers. Testing of connections to risers and testing of parallel connections.

There was discussion about the addition of a test sequence to qualify the use of parallel connectors that are intended for attachment to structures for grounding purposes, and whether or not there is a need to add a sequence to the Standard to address this.

The sketch showing the layout for the test sequence was developed. The sketch contains 8 parallel connections, two per plate, that are fixed to the plate at 90 degree angles with respect to each other. 4 plates are shown in a 'square' one plate at each corner, two connectors per plate. One of the goals discussed is to test these parallel connections when attached to a representative 6" x 8", 3/8" steel plate that represents the structure or riser. There were questions about how to adequately constrain this type of test circuit in an EMF test to prevent severe movement.

ACTION: The sketch of test schematic that will be issued to the WG and comments requested to determine what folks believe would be the best overall test plan for parallel connections.

Next meeting is in the fall in conjunction with IEEE T&D show.

Submitted by: Ken White, Chair D0

Date: 6/13/05