

**POWER SYSTEM RELAYING  
COMMITTEE**

**OF THE**

**IEEE POWER ENGINEERING SOCIETY**

**MINUTES OF THE MEETING**

**January 10 – 13, 2005**

**San Diego, CA**

**Final  
Approved**

**Power System Relaying Committee  
Main Committee Meeting Agenda  
January  
San Diego, CA**

- |              |  |                                |
|--------------|--|--------------------------------|
| <b>I.</b>    | <b>Call to order / Introductions</b>                                       | <b>Phil Winston</b>            |
| <b>II.</b>   | <b>Approval of Minutes/Financial Report</b>                                | <b>Miriam Sanders</b>          |
| <b>III.</b>  | <b>Reports of Interest</b>   | <b>Phil Winston</b>            |
|              | <b>A Technical Paper Coordinator's Report</b>                              | <b>Charlie Henville</b>        |
|              | <b>B PES Report- points of interest</b>                                    | <b>Phil Winston</b>            |
|              | <b>C CIGRE Report</b>  | <b>T. W. Cease</b>             |
|              | <b>D UCA Report</b>  | <b>John Burger</b>             |
|              | <b>E EPRI Report</b>   | <b>Joe Hughes</b>              |
|              | <b>F IEC Report</b>  | <b>Eric Udren</b>              |
|              | <b>G Standard Coordinator's Report</b>                                     | <b>Jeff Gilbert</b>            |
|              | <b>H Substation Committee Report</b>                                       | <b>Jim Evans</b>               |
|              | <b>I Other Reports of Interest</b>   |                                |
|              | <b>(contact Miriam Sanders prior to Main Committee meeting)</b>            |                                |
| <b>IV.</b>   | <b>Awards/ Recognition</b>   | <b>Roger Hedding</b>           |
| <b>V.</b>    | <b>Subcommittee Reports</b>  | <b>Phil Winston</b>            |
|              | <b>I - Relaying Practices</b>  | <b>Jim Ingleson</b>            |
|              | <b>C - Systems Protection</b>  | <b>Tony Seegers</b>            |
|              | <b>D - Line Protection</b>   | <b>Roger Hedding</b>           |
|              | <b>K - Substation Protection</b>   | <b>Charlie Sufana</b>          |
|              | <b>H - Relaying Communications</b>   | <b>Ken Fodero</b>              |
|              | <b>J - Rotating Machinery</b>  | <b>Steve Conrad</b>            |
| <b>VI.</b>   | <b>Old Business/ New Business/ General Announcements</b>                   | <b>Phil Winston</b>            |
| <b>VII.</b>  | <b>Presentations</b>   | <b>Miriam Sanders</b>          |
|              | <b>A Impact of Distributed Resources on Distribution Relay Performance</b> | <b>Tony Seegers (WG D4)</b>    |
|              | <b>B Trends in Relay Performance</b>                                       | <b>Mark Carpenter (WG I17)</b> |
| <b>VIII.</b> | <b>Adjourn</b>   | <b>Phil Winston</b>            |

**Call to order / introductions****Henville**

In Phil Winston's absence, Charles Henville called the meeting of the IEEE/ PSRC Main Committee in San Diego, CA to order at 7:30 AM on January 14,2005

**Approval of Minutes – September meeting and misc.****Sanders**

The minutes of the Portland meeting September 13-16, 2004 were approved.

**Chairman's Report****Winston**

Isn't it ironic that almost a week ago I left home looking forward to arriving in sunny California only to find it raining on me. Now as I sit at my kitchen table back in Atlanta, it is stilling raining on me, thanks to a broken water pipe in the ceiling.

This meeting was to provide me with two distinct honors. The first of which was to Chair my first Main Committee meeting. The second, and most important, was to recognize and honor various achievements of our Committee's Working Groups and past leaders.

As we see a changing of leadership in several key areas including two Sub- Committees, Standard's Coordinator, Awards Chairman, and Officers we obviously need to recognize the significant contributions that these individuals have provided to the PSRC over their tenure. Just as significant, we need to acknowledge the tremendous talent that we have in this committee, at all levels, that allows the work of this Committee to continue at such a high level of technical achievement as the new leaders accept their roles.

I look forward to serving you over the next two years. Additionally, I would like to thank each and every one of you for your efforts and contributions that have allowed the PSRC to be, what I believe is, the premiere organization within the Power Engineering Society.

**Technical Paper Coordinators Report****Henville**

Fourteen papers were sponsored by the PSRC for presentation at the PSCE meeting in New York. Additionally the PSRC sponsored a Panel Session on Wide Area Protection and Control which was chaired by Damir Novosel.

There were thirty-two papers submitted for the 2005 General Meeting. The PSRC will accept approximately twenty-five, which includes four papers that were returned to the authors for requested revisions. Tentatively, we will request two or three technical sessions and the remainder will be presented during the poster sessions. We are asking for volunteers for the Technical Session Chairs; therefore, please advise Charlie Henville if you could provide this very important service.

**CIGRE Report****Cease****PES Report****John McDonald**

The IEEE PES Executive Committee met on Thursday, October 14, 2004 in conjunction with the 2004 Power System Conference and Exposition (PSCE) in New York, New York. This report will summarize the highlights of the meeting.

**PES Contested Elections**

The Nominations & Appointments Committee, chaired by immediate Past President John Estey, is reviewing candidates for the 2006-2007 positions of IEEE Division VII Director and PES President-Elect, Secretary and Treasurer. Phone interviews of potential candidates will take place in January 2005. The slate of candidates will be submitted to the Governing Board before March 1 and published in IEEE Power & Energy magazine before May 1.

Individual voting members of PES may, by petition, propose names to be added to the ballot for these offices in accordance with IEEE and PES Bylaws. Nominating petitions for qualified candidates must be received at the PES Executive Office by Noon on June 10, 2005. For details, contact the PES Executive Office. To be eligible for nomination to the office of PES President-Elect, the nominee must have served as a member of the Governing Board in some capacity for at least two years.

#### Upcoming Executive Committee Meeting

The IEEE PES Executive Committee will meet on January 20, 2005 in Tampa, Florida.

Power System Conference and Exposition (PSCE) in New York, New York

The inaugural PSCE was very successful. Total attendance was approximately 1,000.

#### Wind Power

In October a meeting was held during the PSCE to make further progress to integrate relevant technical activities related to wind power within PES. Key outcomes included creating a group within PES Technical Committees to specifically deal with wind power and to coordinate all relevant activities within the other Technical Committees, co-locating a future wind power meeting with a PES meeting, and planning a specific joint conference focused on wind power in the near future.

#### Power System Basics for Non-Engineering Professionals Short Course

Applied Professional Training, Inc. (APT) completed the course material on schedule in mid-September. The Contractor project deliverables included:

Student Study Guide: PowerPoint presentation annotated with supplementary notes

Instructor Notes: PowerPoint presentation annotated with instructor notes

Evaluation sheet to capture student comments and feedback

The new course was given, for the first time, on Thursday, October 14 by Steve Blume (APT President & CEO), in conjunction with the IEEE PES PSCE. There were approximately 40 paid course attendees. The course material is now available for use by PES Chapters worldwide, according to a policy currently being finalized by the PES Governing Board. Contact Bob Dent, PES Executive Director, at the PES Executive Office for interest in hosting the course for your PES Chapter.

#### PES Experts Database

The database of almost 500 experts has been prepared and distributed to those who expressed interest in it. It is in an Access database and can be used to find people willing to discuss PES-area technical subjects, selected by topic and by location.

#### Broadband over Power Line (BPL) Communications

The IEEE Standards Association facilitated a meeting at the 2004 Denver General Meeting, which was to bring all interested parties together to begin the standards making process for broadband over power line (BPL) communications. This technology allows broadband communications over existing electric utility lines. The Power System Communications Committee, the Transmission and Distribution Committee, the Division VII Director, and the Vice President – Technical Activities represented the Power Engineering Society at this meeting.

An ad-hoc committee was created within the Technical Activities Department to determine what standards the PES needed to sponsor to move this technology forward. Committee membership consists of the following:

Transformers Committee – Ken Hanus, Chair  
Power Systems Communications Committee – John Newbury  
Transmission and Distribution Committee – Vito Longo

A subsequent meeting was sponsored by the IEEE-SA in Piscataway, New Jersey on July 20, 2004. Vito Longo represented the PES at this meeting. The next meeting of this group was held on October 13, also in Piscataway.

More information on these activities can be found at the following website:

<http://grouper.ieee.org/groups/bpl/>

#### Cellphone Battery Standard

The Station Battery Committee recently completed work and received approval of IEEE Standard No. 1625-2004 for Rechargeable Batteries for Laptops. A similar standard for cell phone batteries has been proposed in a PAR submitted for consideration by the New Standards Committee at their October meeting. The Corporate Advisory Group sponsored this PAR, but they have requested that the Power Engineering Society assume sponsorship of this PAR based on the excellent performance shown by the Station Battery Committee in the preparation of Standard 1625. The PES Executive Committee approved this sponsorship by e-mail ballot in October.

#### Graduates of Last Decade (GOLD) Outreach at General Meeting in Denver in June 2004

For the second consecutive year we were able to meet with young engineers from the area where the General Meeting was held. In this case it was Denver and previously a similar meeting was held in Toronto during 2003 PES General Meeting. IEEE members and non-members were invited from the Denver area to participate in this meeting. Some special weather conditions were present in Denver just before the meeting (heavy hail and tornado warnings) that reduced the expected and confirmed audience. However, the ones that were able to make it and participate created a very good forum with their comments and concerns. The meeting began with a presentation about PES and IEEE including information on the organizations, objectives, goals and advantages to become a member and remain a member. After the presentation, the participants gathered together with members of the PES Governing Board and went through a questionnaire to measure their understanding and knowledge about IEEE PES and how they evaluate the participation in professional organizations such as these. Also, during this discussion, the participants provided important feedback information to the PES officers, including concerns and comments on how they feel the organization could serve them better.

#### PES Meetings Activities

A call for papers for the 2005 meeting in St. Petersburg, Russia has been released and can be found at [www.sei.irk.ru/PowerTech2005](http://www.sei.irk.ru/PowerTech2005). Several hundred papers have already been received. Local arrangements have been negotiated including housing in a high-end hotel and in very inexpensive locations to accommodate the broad spectrum of participants. President Teddy Puttgen confirmed the permanent sponsorship of PowerTech by PES in correspondence earlier this year.

The CIGRE symposium has been confirmed for the Sheraton Hotel in New Orleans October 5 – 7, 2005. A committee of PES and CIGRE representatives is working on the program and a call for papers is shortly to be released. This meeting immediately precedes the T and D Conference and Exposition.

The T&D conference and exposition in China is in the planning stages with the location confirmed in Dalian, China for August 2005.

#### **EPRI Report**

No written report at this meeting

**Hughes**

## IEC Report

Udren

### TC 95 Measuring Relays

The following are the TC 95 standards projects on which there has been recent action:

1. We voted favorably in late October on the CDV for IEC 60255-27, *Product safety requirements for measuring relays and protection equipment*. This standard addresses mechanical, construction, insulation, and materials requirements. It will have serious impact on relay design requirements, and on acceptability of existing designs in markets that will require 60255-27. Several WG members reviewed the draft prior to the vote deadline, and found no unacceptable features.
2. IEC 60255-26, *Electromagnetic compatibility requirements for measuring relays and protection equipment*, was issued in August as an International Standard. This provides a concise tabulated overview of all the recently issued TC 95 standards for electrical environment testing of relays.
3. The CDV for 60255-22-1, *Electrical disturbance tests for measuring relays and protection equipment - 1 MHz burst immunity tests*, has been accepted with no significant technical changes and moves on to FDIS balloting. The test has a single set of levels – 2.5 kV common mode and 1 kV differential mode for process I/O; and 1 kV common mode only for communications ports. Communications ports for temporary connections, or short connections (<3 m), are exempted.

We do not post IEC Standards drafts or published standards on the PSRC web site, but contact Eric Udren at <mailto:eric.udren@kema.com> or 412-531-8739 if you need a copy for standards process review and comment.

We have noted that TC 95 has nearly completed its suite of environmental and safety standards for relays, driven by EC regulations. We reported in May that TC 95 is looking to its future, and forming a new Ad Hoc Working Group AHWG1 looking at needs and opportunities for *functional* standards. Dr. Murty Yalla of Beckwith Electric has volunteered and now serves as the representative for the USNC, and to a large extent for PSRC. The first meeting is scheduled for mid-February. PSRC WG I4 and Dr. Yalla have met to develop proposals for the IEC AHWG, and to help Murty respond to the questionnaire just received from the AHWG Convenor.

We will bring up that TC 95 should reinstate the largely completed work on the revision of IEC 60255-3, the inverse-time overcurrent relay curves standard, which was being adapted to include and update IEEE C37.112. The AHWG has already shown interest in the ANSI device numbers standard C37.2. We will propose that the IEC adopt the upcoming new revision of the IEEE Synchrophasor Standard C37.118. Most significantly, we will present prime examples of IEEE Application Guides for relaying topics, and propose that IEC look at developing and/or adopting and publishing such standards. This will be new territory for them, and could possibly reshape the relationship among the IEC, the PSRC, and national bodies that publish relay application guidance.

### **TC 57 - Teleprotection and Power System Control**

WG 10 continues with IEC 61850, Communication Networks and Systems in Substations, which defines a standard protocol for substation control and protection. All the 9 sections in the original project are now issued as International Standards, while the newer Section 10 on Conformance Testing is at the final draft International Standard (FDIS) voting stage. Meanwhile, WG 10 is reviewing technical detail issues in the rest of the sections that arise as manufacturers implement the design. There are also working groups that are looking at developing or adapting object definitions for new applications, including Hydro and DG, where 61850 standards can be applied.

## Standard Coordinators Report

Gilbert

The Standards Coordinator, Jeffrey Gilbert, met with the Chairs of the Working Groups writing and revising standards documents at sessions beginning at 7:30 AM and 9:00 AM on January 11, 2005, in Salon E of the San Diego Marriott Del Mar, San Diego, California.

The status of PARs, Standards and Guides, were reviewed at the meeting. The status of the PARs is summarized below. The actions to be taken for keeping up-to-date the approval of the PARs and for keeping

live the Standards and Guides are identified. A summary of the specific approvals received, since the September 2004 meeting of the PSRC, are identified as well.

Information concerning the Standards Association (SA), Board of Governors, Committees of SA, the Development of standards, Recommended Practices and Guides and related issues is available on the following web site. <http://standards.ieee.org/>

Some of the other web sites for obtaining useful information are as follows.

<b>Information on</b>	<b>Web site address</b>
Update your information with SA	<a href="http://standards.ieee.org/resources/development/">http://standards.ieee.org/resources/development/</a>
PAR application, extension and other forms	<a href="http://www.standards.ieee.org/guides/par/">http://www.standards.ieee.org/guides/par/</a>
Submitting a PAR	<a href="http://standards.ieee.org/guides/par/ePARform.html">http://standards.ieee.org/guides/par/ePARform.html</a>
PAR Extension	<a href="http://standards.ieee.org/guides/par/extension.rtf">http://standards.ieee.org/guides/par/extension.rtf</a>
Style manual	<a href="http://www.standards.ieee.org/guides/style/2000Style.pdf">http://www.standards.ieee.org/guides/style/2000Style.pdf</a>
Template	<a href="http://www.standards.ieee.org/resources/spasystem/index.html">http://www.standards.ieee.org/resources/spasystem/index.html</a>
Pre-balloting editorial review	<a href="http://standards.ieee.org/resources/development/">http://standards.ieee.org/resources/development/</a> Follow: Balloting the Draft → Ballot Invitation → Submitting the Draft for Mandatory Editorial Coordination
Up-load drafts for balloting	<a href="http://standards.ieee.org/eprocess/upload_balloting_file/">http://standards.ieee.org/eprocess/upload_balloting_file/</a>
Request for invitation to ballot	<a href="http://standards.ieee.org/resources/development/">http://standards.ieee.org/resources/development/</a> Follow: Balloting the Draft → Ballot Invitation → Requesting a Ballot Invitation
Join a balloting pool	<a href="http://standards.ieee.org/resources/development/">http://standards.ieee.org/resources/development/</a> Follow: Balloting the Draft → Join and Existing Balloting Pool
Submit request for initiating balloting	<a href="http://standards.ieee.org/resources/development/">http://standards.ieee.org/resources/development/</a> Follow: Balloting the Draft → Sponsor Ballot → Requesting Initiation of a Ballot
Submit request for recirculation ballot	<a href="http://standards.ieee.org/resources/development/">http://standards.ieee.org/resources/development/</a> Follow: Balloting the Draft → Sponsor Ballot → Requesting Initiation of a Ballot → Recirculation ballot
Status of standards etc	<a href="Http://www.standards.ieee.org/db/status/status.txt">Http://www.standards.ieee.org/db/status/status.txt</a>
NesCom activities	<a href="http://www.standards.ieee.org/board/nes/">http://www.standards.ieee.org/board/nes/</a>
RevCom activities	<a href="http://www.standards.ieee.org/board/rev/">http://www.standards.ieee.org/board/rev/</a>
SA Operations Manual	<a href="http://standards.ieee.org/sa/sa-om-toc.htm">http://standards.ieee.org/sa/sa-om-toc.htm</a>
SA Bylaws	<a href="http://standards.ieee.org/guides/bylaws/index.htm">http://standards.ieee.org/guides/bylaws/index.htm</a>
SB Operations Manual	<a href="http://standards.ieee.org/guides/opman/index.html">http://standards.ieee.org/guides/opman/index.html</a>
SB Bylaws	<a href="http://standards.ieee.org/guides/bylaws/index.html">http://standards.ieee.org/guides/bylaws/index.html</a>

## Important Changes

1. As of 2005 January 01, there are no paper ballots. All documents will be balloted electronically and requests for paper balloting are no being entertained by the Standards Association.
2. New balloting procedures are being introduced in 2005. Sponsors will be allowed to start invitation to ballot, choose opening and closing dates, and delegate balloting privileges. The balloters will be allowed to view invitations to ballot, join balloting groups, download documents, submit ballots and comments, and review the responses of the sponsors to the comments.
3. The Style Manual has been revised. The new manual contains updates to style requirements and incorporates changes made to the IEEE-SA Operations Manual. Important changes that working group chairs should be aware of include:
  - Initiation of mandatory editorial coordination at the start of the ballot invitation,
  - Submission of all relevant copyright permission letters at the start of the ballot invitation
  - New format for normative references and new requirements for definitions
  - Required use of IEEE templates for document development

### Standards Coordination Effort

PARs applied for by all Committees of the Power Engineering Society (PES) are being circulated among the Standards Coordinators of the PES Committees. The number and title of each new PAR approved by the Standards Board is posted on the PSRC Web site at the following address.

<http://www.pes-psrc.org/Standards/NewPars2005MM.html>

where MM is the month approval was granted.

The copy of each PAR can be viewed by clicking at the number of the PAR in the list. All members of the PSRC are requested to review the newly approved PARs. If you are interested in the development work planned in a PAR, contact the Chair of the Working Group that is developing the document and sign up for participating in the activity of that Working Group.

### **STANDARDS ACTIVITIES SINCE THE SEPTEMBER 2004 MEETING OF THE PSRC**

The status of the standards approval activities, which have taken place since the September, 2004, meeting of the PSRC, is as follows.

#### **1. Standards Published**

- |          |   |
|----------|---|
| C37.90.2 | Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference   |
| C37.93   | Guide for Power System Protective Relay Applications of Audio Tones over Telephone Channels   |
| C37.103  | Guide for Differential and Polarizing Circuit Testing   |
| C37.115  | Standard for Test Method for Use in the Evaluation of Message Communications Between Intelligent Electronic Devices in an Integrated Substation Protection, Control and Data Acquisition System |

#### **2. Standards waiting to be Published**

- |          |   |
|----------|---|
| PC37.111 | Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems |
| PC37.113 | Guide for Transmission Line Protection  |
| PC37.114 | Guide for Determining Fault Location on AC Transmission and Distribution Lines      |

#### **3. Standards reaffirmed**

- |         |   |
|---------|---|
| C37.111 | Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems |
|---------|---|

C37.113 Guide for Transmission Line Protection

**4. Standards withdrawn**

PC37.97 Guide for Protective Relay Applications to Power System Buses

**5. Standards approved**

PC37.90.2 Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference

PC37.103 Guide for Differential and Polarizing Circuit Testing

PC37.114 Guide for Determining Fault Location on AC Transmission and Distribution Lines

**6. Standards submitted for approval**

PC37.92 Standard for Low Energy Analog Signal Inputs to Protective Relays

PC37.114 Guide for Determining Fault Location on AC Transmission and Distribution Lines

**7. Standards to be submitted for approval**

PC37.90 Standard for Relays and Relay Systems Associated with Electric Power Apparatus

**8. Standards Balloted**

PC37.119 Guide for Breaker Failure Protection of Power Circuit Breakers

**9. Standards submitted for balloting**

PC37.102 Guide for AC Generator Protection

PC37.109 Guide for the Protection of Shunt Reactors

PC37.118 Standard for Synchrophasors for Power Systems

PC37.119 Guide for Breaker Failure Protection of Power Circuit Breakers

**10. Standards re-circulated**

PC37.111 Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems

PC37.113 Guide for Transmission Line Protection (for Reaffirmation)

PC57.13.3 Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

**11. Standards to be re-circulated**

PC37.90 Standard for Relays and Relay Systems Associated with Electric Power Apparatus

PC37.92 Standard for Low Energy Analog Signal Inputs to Protective Relays

PC57.13.3 Guide for Grounding of Instrument Transformer Secondary Circuits and Cases (after resolving negative ballots)

**12. Standards to be submitted for Re-affirmation**

C37.99 Guide for Protection of Shunt Capacitor Banks

The PARs approved since September 2004, submitted, and the PARs for which extension has been applied are as follows. The PARs, which will expire in the near future, are also listed. Applications for extending the lives of these PARs should be filed soon.

**13. New PAR approved**

None

**14. New PARs applied for**

None

**15. PAR Extensions approved**

PC37.98 Standard Seismic Testing of Relays  
PC37.101 Guide for Generator Ground Protection  
PC37.110 Guide for the Application of Current Transformers used for Protective Relaying Purpose  
PC57.13.1 Guide for Field Testing of Relaying Current Transformers

**16. PAR Extensions applied for**

PC37.98 IEEE Standard Seismic Testing of Relays  
PC37.101 Guide for Generator Ground Protection  
PC37.117 Guide for the Application of Protective Relays Used for Abnormal Frequency Load Shedding and Restoration  
PC37.110 IEEE Guide for the Application of Current Transformers Used for Protective Relaying Purposes  
PC57.13.1 Guide for Field Testing of Relaying Current Transformers

**17. Modified PAR approved**

PC57.13.3 Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

**18. Modified PAR submitted**

PC57.13.3 Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

**19. PARs to be Submitted**

PC37.111 Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems  
PC37.113 Guide for Transmission Line Protection (for Reaffirmation)  
233 Power System Protection Testing

**20. PARs expiring in 2005**

PC37.105 Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations  
PC37.109 Guide for the Protection of Shunt Reactors  
PC37.116 Guide for Protective Relay Application to Transmission-Line Series Capacitor Banks  
PC37.119 Guide for Breaker Failure Protection of Power Circuit Breakers  
PC57.13.1 Guide for Field Testing of Relaying Current Transformers  
PC57.13.3 Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

**SUBMITTAL DEADLINES & STANDARDS BOARD MEETING SCHEDULE**

**PAR/Std Submittal Deadline**

February 4, 2005  
April 29, 2005  
August 12, 2005

**Standards Board Meeting**

March 20, 2005  
June 9, 2005  
September 22, 2005

October 17, 2005

December 7, 2005

## **Substation Committee Report**

**Evans**

### **Significant Accomplishments in 2004:**

The Data Acquisition Processing and Control Systems Subcommittee's three Working Groups and three Task Forces held meetings at Substations Committee Annual Meeting, PES General Meeting and with the Power Systems Relaying Committee in January and September. The Subcommittee met at the Substations Committee Annual Meeting in April.

The Application of Computer Aided Systems to Substations Working Group, C1, is addressing numerous issues regarding PCs in substations/substation automation and SCADA. They have discussed plans for a guide for Documentation of Substation Device Interconnections. They also have begun an effort to define computer hardware and software purchasing guidelines for substation applications. The guideline is expected to address several issues of survivability of a PC in the substation environment as well as software and operating system administration. A draft document has been circulated.

In conjunction with the PSRC C1 task force, they have begun working on several aspects of security as it impacts substation automation and substation devices. Their perspective is one of an IT/Operational security effort to define how security can/should be overlaid on the operational needs of an automation system. The effort is focusing on technical aspects (secure socket layers, embedded security agents, remote provisioning management) as well as operational security of the various computers and configurations associated with automation systems (configuration protection, password administration, documentation control, vendor security

They revised the scope of the Working Group to be more closely aligned to the C0 Subcommittee scope.

Applications of New Technologies in Substation Monitoring and Control Working Group, C2, continues to provide education for industry professionals. C2 sponsored three tutorials:

The Interface Between Automation and the Substation (Substations Committee Annual Meeting)

The Interface Between Automation and the Substation (IEEE PES General Meeting, Denver, CO)

Introduction to Substation Automation (IEEE PES General Meeting, Denver, CO)

They also completed work on IEEE Standard 1613, Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations. That work has been successfully balloted, approved by the IEEE Standards Association, and published. C2 continued its informational forums with three Working Group presentations:

Task Force C2TF4 successfully balloted IEEE Standard P1646, Standard Communication Time Delivery Performance Requirements for Electric Power Substation Automation. P-1646 has been accepted by the Standards Board for publication. With this item completed, C2TF4 has decided no further pieces of former P-1525 are worth salvaging and has disbanded.

The Electric Network Control Systems Standards Working Group, C3, is making significant headway in the revision and updating of IEEE Standard C37.1. They now have a stable outline for the new document titled "Standard for SCADA and Automation Systems". Volunteers have produced drafts of the majority of the clauses. Task Force C3TF1 continues work on P1615, Recommended Practice for Network Communications in Electric Power Substations. Significant portions this work are completed. PSRC has met jointly with C3TF1 and shows interest in contributing to the effort.

In addition to the three tutorials sponsored by WG C2, the Subcommittee C0, held a single topic technical meeting at the Power Systems Conference and Exposition in New York to discuss the growing trend of replacing switchyard control centers with pre-fabricated, pre-wired, "drop in" centers to simplify the upgrading

process.

Benefits to Industry from the 2004 Work (provide specific examples):

The C0 Subcommittee and its Working Groups and Task Forces are serving industry in a number of ways. For example, Working Group C1 is addressing the issue of documenting the configuration and interconnections of the automated substation. The traditional methods using engineering drawings are out moded. They are also taking a serious look at securing substation automation systems from intruders.

Working Group C2 continues to be the information exchange forum for industry professionals dealing with computer related topics in the context of substation applications. They have undertaken the task of identifying the technical requirements for communications devices used in substations for data collection, exchange and automation. Existing standards recognize only protective devices. C2 has also developed a comprehensive standard, IEEE Standard 1613-2004, Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations. Through the efforts of Task Force C2TF4, IEEE P1646 has been developed which will provide a standard specification of communication time delivery performance requirements that can be used by utilities in their procurement specifications for substation automation. Other standards development bodies and research organizations will have a baseline to use in their work

WG C2's sponsorship of tutorials, as listed previously, provides an inexpensive way to provide training for industry professionals and they have been well attended.

W G C3 is re-writing IEEE Standard C37.1-1994 that did not recognize the use of IEDs as data sources or control outputs for SCADA. The revision now underway will fill that gap. It will also be expanded to address the issues in specifying substation automation systems.

WG C3 is also working on IEEE P1615, which when completed, will be a companion recommended practice to IEEE Standard 1379, which has had widespread acceptance by industry. IEEE P1615 will include such topics as file transfer, virtual terminal, DNP over TCP/IP, ModBus TCP and IEC 60870-5-104.

Benefits to Volunteer Participants from the 2004 Work (provide specific examples):

Volunteers serving the C0 Subcommittee and its Working Groups and Task Forces can access the free exchange of information and experiences on a broad range of related topics that comes with the work at hand. These networking opportunities give access not available on any other front. When participating in the creation and revision of standards, volunteers have the opportunity for input heightening the likelihood that the standards they work on will meet their needs and the needs of the industry. By participating in Working Group and Task Force activities members also have the opportunity to develop verbal (presentational) and written communications skills.

Recognition of Outstanding Performance:

The C0 Subcommittee Floyd W. Greenway Award was presented to H. Lee Smith for his contributions to standards work.

Certificates of Appreciation were awarded to members of the Task Force that completed work on IEEE P1646.

Certificate of Appreciation was also awarded to participants in the three tutorials presented in 2003s as well.

Significant Plans for 2005:

Working Group C1 will continue exploring security requirements for substation real-time data stored on and/or accessed by computers. They expect to complete a document specifying computer-purchasing guidelines for substation computers.

Working Group C2 is pursuing presenting the tutorial Introduction to Substation Automation at the IEEE PES T&D Meeting in October. They are also searching for an appropriate forum to continue the discussion of "drop-in" substation control centers.

Working Group C3 plans to continue working on revising IEEE Standard C37.1. The goal is to have a draft of all sections completed by the Mid 2005.

Problems and Concerns:

Attendance at meetings by utility professionals is diminishing. There seems to be a significant drift away from supporting our activities by utility management. Also, the workload of members does not allow for participation in a large number of meetings. Fewer volunteers are willing or able to contribute to group efforts.

**OLD BUSINESS**

None

**NEW BUSINESS**

None

**FUTURE MEETINGS**

May 23-25, 2005	Columbus, OH	Drury Hotels/Convention Center
September 8-16, 2005	Calgary, AB	The Westin Calgary (Joint with CIGRE SC B5)
January 9-12, 2006	New Orleans, LA	Hotel Monteleone
May 15-18, 2006	Albany, NY	Desmond Hotel

**B: ADVISORY COMMITTEE**

**Chair: R.P. Taylor**

**Vice Chair: P. B. Winston**

**B1: Awards and Technical Paper Recognition**

**Chair: R. Hedding**

**Vice Chair: F. Plumptre**

The following awards were handed out at the Main Committee Meeting:

Certificates of Appreciation to

Damir Novosel, System Protection Subcommittee

Mark Carpenter, Line Protection Subcommittee

Tony Seegers, D3 Impact of Distributed Resources on Distribution Relay Protection

Karl Zimmerman D2, Guide For Determining Fault Location on AC T & D Lines

Miriam Sanders, H9, Considerations in Applying PLC and Relays to Special Line Applications

Prize Paper Award Certificates for:

"Performance of Generator Protection during System Disturbances"

Working group members: Subhash Patel\* - Chair; Kevin Stephan, Munnu Bajpai, Ratan Das\*, Tom Domin\*, Everett Fennell\*, John Gardell, I Gibbs\*, Charlie Henville, Pat Kerrigan\*, Hardy King\*, Prem Kumar, Chuck Mozina, Mike Reichard\*, Joe Uchiyama\*, Sahib Usman\*, D. L. Viers\*, Don Wardlow\*, Murty Yalla\*

\* Absent from January meeting

WG Recognition Award Certificates for:

"Guide for Determining Fault Location on AC T & D Lines"

Karl Zimmerman Chair, Damir Novosel, Alex Apostolov, Larry Budler Patrick Caroll, Jamie De La Ree, Barry Anderson, Herbert Jacobi, Mladen Kezunovic, Bill Lowe, Rai Marttila Moh Sachdev Tony Seegers, Tarlochan Sidhu, Demetrious Tziouvaras, Ray Young

Special Service Award to Joe Uchiyama.

Distinguished Service Plaque for Rick Taylor, for his service as Committee Chair.

In the Awards and Recognition Committee meeting, Rick Taylor was appointed as Vice Chair.

**B2: Fellows Awards**

**Chair: J.S. Thorp**

The Fellows Committee met and discussed a request from Mel Olkin.

Damir Novosel will represent the PSRC on the PES Fellows Committee.

**B3: Membership Committee**

**Chair: M.J. Swanson**

Attendance during the PSRC meeting in San Diego was 192, which is considered higher than average, but that was expected since we had a joint meeting. During 2004 we averaged 160 attendees.

11 new attendees were in our Newcomers Orientation meeting on Tuesday, which is considered below normal. I took a more active role in the conduct of the meeting.

Tracking retention:

New attendees at the May 2003 meeting: (4) attended all six meetings (2) attended five meetings; (1) attended four meetings, (5) attended three meetings; and (18) attended only their first meeting.

New attendees at the September 2003 meeting: (5) attended four meetings; (1) attended three meetings; (1) attended three meetings; (5) attended two meetings, and (9) attended only their first meeting.

New attendees at the January 2004 meeting: (2) attended three meetings; (2) attended two meetings; and (18) attended only their first meeting.

New attendees at the May 2004 meeting: (2) attended all three meetings; (3) attended two meetings; and (12) attended only their first meeting.

I am working with Bill Lowe and several others on an "About PSRC" page on our website.

Stan Horowitz has volunteered to contact Ohio State's Power Program administrators at attend the next PSRC meeting in Columbus. I will contact AEP.

**B4: O/P Manual & W.G. Training**

**Chair: J.C. Appleyard**

No activity to report

**B5: Bibliography and Publicity**

**Chair: T.S. Sidhu**

**Vice Chair: M. Nagpal**

The B5 WG met during the Jan. 2005 meeting. The WG discussed the preparation of 2003 and 2004 bibliography papers. These papers will be

completed and sent for publication in the IEEE Trans. on Power Delivery. There was a full support from PSRC ADCom to keep publishing these papers in the transactions. Mel Swanson will contact the PSRC Chairman and provide a publicity report as per his needs.

**B8: Long Range Planning**

**Chair: George Nail**

No activity to report

**B9: PSRC Web Site**

**Chair: Bill Lowe**

Accomplishments:

- All pages relating to the January meeting have been updated.
- Added information links to the Agenda page for the San Diego / Del Mar area.
- The pes-psrc mailing list subscriber data and web email addresses have been updated per information that has been provide to me.
- Repaired the broken links to the IEEE discounted publications.

Future projects and items to explore:

- Work on a Main committee member web page.
- Continue to develop the "About PSRC" page. I will be depending on others to provide the content for this page. Mal Swanson will be providing some of the information that will be available through this page. We need volunteers to write the various portions that are needed. If contributors cannot be solicited, a working group will be formed to work on this project.
- New concepts for the main page will be explored. We have to find an easier way to get people to use our site. I think there should be a lot more information available on the main page. A test page will be developed.
- Determine why users of Netscape and Mozilla web browsers are having trouble using the meeting pre-registration page. This form has been in place for more than a year and I do not recall similar problems in the past.
- There has been no simple way to obtain web statistics. The raw data is available from our site provider, but there are no simple or common tools to decipher this data. I am continuing to explore this topic. Ken Fodero has volunteered to help me with this.
- Update all necessary web pages relating to the January 2005 meeting.
- Update pes-psrc mailing list subscriber data and web email addresses.

**C: SYSTEM PROTECTION SUBCOMMITTEE**

**Chair: T. Seegers**

**Vice Chair: R. Hunt**

The System Protection Subcommittee met on January 12th, 2005 at 3:45 PM in San Diego, CA. 40 people attended the meeting, including 21 members.

8 WGs met at this meeting. Working Group C4 changed names to "Industry Experience with System Integrity Protection Schemes" to more accurately reflect the WG assignment. Working Group C7, Guidelines for Protection System Testing disbanded. Working C11 Guide for Protection System Testing started to produce an IEEE Guide, and will submit a PAR after the May meeting. The Performance of Relaying during Stressed Conditions was renamed to C12 to resolve a conflict with the existing C8 Phasor Models working group. Task Force TF13 Guide for Undervoltage Load Shedding will meet at the May meeting, with Alex Apostolov appointed as chair and Shinichi Imai as vice-chair.

Jeff Pond has been accepted as a member of the C System Protection Subcommittee.

**WG Reports:**

### **C1: Cyber Security Issues for Relaying**

The C1 working group met in 2 joint sessions with the PSSC Working Group C1. A total of 8 existing members plus 5 new members and 26 guests attended.

Herbert Faulk gave an update on IEC work on cyber security.

There was much discussion on security vulnerabilities and the need for security measures.

Work was done to refine the outline and some writing assignments were made. Assignments are due by March 15.

Draft 1 of the paper will be sent out.

### **C2: Power Quality Issues in Protective Devices**

C2 did not meet in San Diego.

### **C3: Processes, Issues, Trends and Quality Control of Relay Settings**

Working Group C3 met Tuesday, January 11, 2005 in San Diego, CA in a single session with 13 members and 10 guests participating.

All initial writing assignments for the body of the report have been submitted. Discussion and comments during the meeting included:

- Section 3.3: The specific issue of configuration management and change control will be clarified (Arif Cubucku).
- Section 4.2.2: Verifying the system model (Alex Apostolov), WECC requirements for verifying the system model (Jon Sykes)
- Section 4.3:
  - The use of tools to simplify the relay setting process (e.g., autocalculation of taps in bank diffs, relay setting rules in short circuit/relay database programs), with suggestions to vendors (Alex Apostolov)
  - Any legal requirements for retaining superseded relay settings/calculations (Art Buanno)?
  - Any BC Hydro guidelines for retaining superseded relay settings/calculations (Frank Plumtre)?
- Section 4.6:
  - The use of computer-aided checking of relay settings (Gary Kobet)
  - Review/addition of detail to this section (Ron Beazer)
- Section 9.0: Utility engineers to provide input to this section (Greg Sessler, Stan Klein, Jim O'Brien, and George Gresko to work with Solveig Ward)
- Sections 1.0 Introduction, 2.0 Definitions, and 10.0 Conclusions and Recommendations will be developed (Steve Kunsman and Gary Kobet)

The deadline for these revisions is February 15. A revised draft will be sent to the group by March 1, for review and comments to be discussed at the May meeting.

The next stage of work will include refining the sections to fit the scope and create a coherent document and eliminate redundancy. An editorial team made up of Ken Birt, Steven Kell, and Gary Kobet will review the March document toward this effort.

The WG requests that the revised draft be posted to the PSRC website by March 8. Gary Kobet will send this draft to Rich Hunt, vice-chair of C-SC by March 1.

To review, output of the working group will be a PSRC report, with an associated Transactions paper summarizing the report. Target date for completion is 2006.

#### **C4: Industry Experiences With Power System Protection Schemes (PSPS)**

WG C-4 met in double sessions with 15 members and 15 guests

The Working Group volunteers presented writing assignments and discussed:

- The outline of the topics to be raised in the questionnaire
- A liaison structure for the Working Group, intended to facilitate personal contacts as questioner gets on the way to be submitted and thought the response process
- Importance of coordination with the manufacturers for tapping on their knowledge of geographic resources in part of the worlds we may have less contacts with
- A template of a procedure for acceptance and archiving of the information on RAS submitted to (Main) Mid American Area Reliability Council regional councils; he also presented the list of criteria to review installations.
- The need for the questionnaire to cover technology related implementation issues (use of PMUs, protocols, time synchronization techniques, etc.) which were not addressed in the previous IEEE/CIGRE survey

Stan Horowitz proposed the name change of the WG which would better reflect its mission. It was unanimously accepted (new name is "Industry Experience with System Integrity Protection Schemes").

Jaime Delaree, explained that the software tool in possession of the PSRC is dated 1997 and there may be some incompatibles with many of the personal computers that would be used for responding to the survey. The members discussed the possibility for some large organizations (vendors, IEEE itself, universities) which may already possess a web-based software. The SC Chair (Tony Seegers) volunteered to look into the appropriate mechanism for the most efficient way for respondent to fill out the survey.

Second Session:

- Presentation by Mr. Shinichi Imai, on TEPCO's practice of voltage and reactive power management, which was followed by a number of questions. Among other things, Mr. Imai proposed creation of the new WG on under-voltage load shedding.

After each session and the presentation, members discussed the next steps and members with new assignments. Writing assignments received will be distributed electronically to the members before the May 2005 meeting

#### **C5: Deployment and use of Disturbance Recorders**

The Working Group met on Wednesday, January 12, 2005 with 8 members and 6 guests present. Richard Young joined the working group.

Vice Chairman Tony Napikoski has requested to be a corresponding member of the working group due to budget restrictions within his organization. Jeff Pond will fill this position.

A copy of Draft 9 of the report was distributed on CD. Outstanding writing assignments were reviewed. Several were received. The report needs to be edited. Tony Guiliante, Harish Mehta, Bruce Pickett, and Richard Young have agreed to provide an editorial review of this draft and send their comments to the chairman by March 1. Our goal is to have two review cycles prior to the next meeting.

Jim Ingleson has posted draft 9, both as a Word document and a zipped file, on the website for all who are interested. The web address is <http://www.pes-psrc.org/c/CWG5.html>

#### **C6: Relay Engineering in Power Engineering Curricula**

No Working Group minutes submitted.

#### **C7: Guide for Protection System Testing**

WG C-7 Met on January 12 in single session with total 20 (9 M, 11 G) in attendance.

The WG members reviewed the latest working copy of the WG member's contributions

- The CIGRE WG 34-04, January 1986, Evaluations of characteristics and performance of power system protection relay and protective systems, report for other types of protection and protective devices will be reviewed as it pertains to system testing with focus on system testing
- Typical test setup arrangements and equipment requirements for end-to-end testing and agreed to combine contributions from different members
- Discussed system testing and the value of standard library – To help manufacturers test their respective devices in the same way, and for users to have a confidence level to the products. The WG members agreed to include a recommendation. Other WG may need to be created for developing the details
- Draft of the proposed PAR in preparation of the recommendation to the Subcommittee guide to officially begin in May 2005

Since the results of the WG points to the need for a guide, it is recommended that the WG be disbanded and a new WG be established with a new assignment to prepare a Guide. The recommended assignment is:

#### **Assignment:**

The Working Group will develop a guide for Power System Protection Testing. The Guide will include System Application Test Requirements, Scope and level of tests and Benefits of system testing for Overall Protective Schemes. This assignment encompasses overall system testing procedures (generators, line, transformer, capacitors, SPSs, end-to-end testing, distributed application within substation, etc.), data collection requirements, as well as the test procedure definitions. The WG will describe the methods, extent, and types of system tests for protection at various voltage levels and applications. Includes control functions which are inherent to the protective system, Security vs. Dependability (Out of step). Importance of line testing, testing various phases, indirect trip time, closed loop tests (dynamic / non-linear tests).

#### **C8: Phasor-Based Models for Analyzing Relay Performance**

The working group did not meet in San Diego. The working group is awaiting feedback from the IEEE on the editorial review of the paper.

#### **C9: Under Frequency Load Shedding and Restoration**

The working group met on Tuesday, January 11th, with 13 members and 10 guests present. The latest draft has been reviewed by the working group editors. The draft document will be sent to the IEEE Editor for pre-ballot review by February 15th, and we will request that a balloting body be formed, in anticipation of balloting later this year. A PAR extension was requested and approved.

The working group discussed writing a paper to present at a technical conference. Five working group members (Alex Apostolov, Rich Young, Vahid Madani, Pratap Mysore, and Mukesh Nagpal) volunteered to write the paper and prepare an associated presentation.

Tony Seegers, Subcommittee Chairman, suggested that work on the paper wait until the balloting process has taken place to determine if any changes will be required to the guide before the paper is prepared.

#### **C11: Guide for Protection System Testing**

It was decided at the meeting in San Diego to disband Working Group C7, and start a new Working Group C11, with the goal of creating an IEEE Guide. The new WG C11 will hold a first meeting at the May PSRC meeting. A possible assignment was discussed, as follows.

#### **Assignment:**

The Working Group will develop a guide for Power System Protection Testing. The Guide will include System Application Test Requirements, Scope and level of tests and Benefits of system testing for Overall Protective Schemes. This assignment encompasses overall system testing procedures (generators, line, transformer, capacitors, SPSs, end-to-end testing, distributed application within substation, etc.), data collection requirements, as well as the test procedure definitions. The WG will describe the methods, extent, and types of system tests for protection at various voltage levels and applications. Includes control functions which are inherent to the protective system, Security vs. Dependability (Out of step). Importance of line testing, testing various phases, indirect trip time, closed loop tests (dynamic / non-linear tests).

#### **C12: Performance of Relaying During Stressed Conditions**

The WG met with impressive attendance of 17 members and 32 guests. The WG reviewed and updated the assignment:

Create a working group report and a summary IEEE paper that will describe performance of protective relays during stressed power system conditions. The work will not cover Special Protection Systems or Remedial Action Schemes.

Importance of Cooperation and sharing of information with the NERC System Protection & Control Task Force has been emphasized. Tom Wiedman and Bill Kennedy will present results of the TF work at the May PSRC meeting. To further strengthen the cooperation, Hassan Shah will be liaison with the TF.

The WG reviewed and updated the scope. The outline of the report was created and a number of members volunteered to contribute by April 15, 2005. The plan for completion is January 2008.

#### **CTF13: Task For on Undervoltage Load Shed**

A new task force CTF13 Task Force on Undervoltage Load Shed will meet at the May meeting, with Alex Apostolov as Chair of the task force, and Shinichi Imai as Vice-Chair. The task force will explore the possibility of writing a paper, or creating an IEEE Guide, on undervoltage load shed applications.

#### **Power System Analysis, Computing & Economics Committee Liaison by Malcolm Swanson**

No activities to report

#### **NERC by Phil Winston**

No activities to report

#### **Liaison Report of the IEEE PES Power System Stability Controls SC to the PSRC by Gary Michel**

No activities to report

#### **D: LINE PROTECTION SUBCOMMITTEE**

**Chair: Roger Hedding**

**Vice Chair: Mike McDonald**

**D1: Cold Load Pickup Issues and Protection**  
**Chair: Tony Napikoski**  
**Vice Chair: Dean Miller**

The WG met in one session on Tuesday afternoon, January 11, with 8 members and 8 guests present. Tony was unable to attend the meeting so Dean the Vice Chair lead the meeting. The assignment statement and schedule for the working group were reviewed. Two writing contributions were reviewed and minor modifications were made. After discussions on the desired meanings of the topics on the report outline, writing assignments were made for a majority of the topics. The writing assignments are due to Tony by April 1.

Next meeting: one session, computer projector, room for 20 people.

**D4: Application of Overreaching Distance Relays**  
**Chair: Russ Patterson**  
**Vice Chair: Walter McCannon**

The working group met with 43 attendees (17 members and 22 guests). This was 2<sup>nd</sup> meeting of WG.

Meeting minutes from September were briefly reviewed. It was noted that at the September meeting it was the consensus of the working group that the output of the WG would initially be a report to the PSRC with a paper produced for placement on the PSRC website and for presentation at various relay conferences.

Russ Patterson gave presentation on TVAs older philosophy of reverse zone 3 for breaker/relay failure.

John Burger gave presentation on AEP philosophy of zone 2 and zone 3 distance relays.

Simon Chano discussed Hydro-Québec philosophy.

Draft A of the outline was reviewed with writing assignments made. Members were very willing to accept writing assignments. Assignments due end of February.

Next meeting will need computer projector and seating for up to 50 attendees.

**D5: Guide for Protective Relay Applications to Distribution Lines**  
**Chair: Phil Waudby**  
**Vice Chair: Randy Crellin**

The Working Group met in a double session with 26 members and 13 guests.

After introductions and approval of the previous meeting minutes, we started review and discussion of the review comments that we received for Draft 2 of the document.

We received 94 pages of comments from 14 individuals and completed/addressed 35 pages from 3 individuals or 37%. Several members who did not submit comments prior to the meeting indicated that they would submit their comments shortly.

During the 2 ½ hour time period, we had a lot of beneficial conversation and committed to additional writing assignments to expand and/or clarify the document contents.

For the May meeting we would again like to use a double session for 40 people with no audio visual.

**D6: Power Swing and Out-of-Step Considerations on Transmission Lines**  
**Chair: Mike McDonald**

### **Vice Chair: Demetrios Tziouvaras**

The WG met on January 11 in a single session with 13 members and 10 guests. Several items in Draft 6 of the Report were discussed and changes agreed to.

Comments on this draft are due to the Chairman by January 27<sup>th</sup>. The goal is to incorporate any changes into Draft 7 and to send a ballot to the working group and sub committee members by February 15<sup>th</sup>.

Next meeting: single session, 35 people, computer projector.

### **D7: Loss of AC Voltage Considerations Chair: Elmo Price Vice Chair: Russ Patterson**

The working group met with 8 attendees (5 members and 3 guests).

Draft 3.0 was handed out and reviewed. Edits/additions were suggested for various figures and text.

Jack started discussion about breaker status input enabling the LOV logic.

Elmo mentioned relay logic diagrams would be good – volunteered to add some relay logic diagrams.

Elmo asked group to go back and read & comment on the section “Schemes provided by Solid State and EM Relays”.

Reviewed figures to ensure IEEE standard device numbers used consistently. Made assignment to get them thoroughly reviewed. Assignments were made to prepare needed figures.

Comment made that “Breaker Reclosing” section needs to be expanded.

Comment made to add write-up on “bus potential transfer” in “Operational Configurations that Cause LOV” section.

Discussion about what to do with this document. Report? No balloting required for a report. Roger Hedding said a report would be first and a guide (if forthcoming) would come later – based on committee’s feedback. A transactions paper would be another option.

The decision was made for the output to be a report first – and then decide at that point (with input from committee) if it should become a guide, transactions paper etc.

Elmo talked about some possible “fruits” of this paper – including new ideas on what microprocessor relay manufacturers can do based on LOP. E.g. if the relay determines that b-phase input is missing – what can be done when fault occurs on b-phase. Better ways of responding when LOP detected. Enhancements. Adaptive from the point of view of the box – substation integration/automation – the future. Add section

### **Resulting Assignments**

- Gary Kobet wrote a section (starts at line 167 in Draft 3.0 as handed out at meeting) on open-delta PTs. Need to get Gary to see where in the document this write-up should be placed.
- Elmo Price to make relay logic diagrams to put in document. “Fill in figure 11 with some basic logic as starting point”.
- Gary Kobet to add titles to the figures in the section on “Schemes provided by Solid State and EM relays”.
- Gary Kobet to review text on “Schemes provided by Solid State and EM relays” and ensure figures are referenced properly in the text.
- Need figures added to help in explanation of section on “Transmission Switchyards”.

- Russ Patterson & Walter McCannon to review figures to ensure IEEE standard device numbers used consistently.
- Rich Young to prepare figures and get to Walter McCannon for the section “De-energizing the bus to which VTs are connected...” and “Separating the protection scheme for a system element...” under the heading “Transmission Switchyards”. Page 18 in Draft 3.0.
- Ken Behrendt volunteered to expand “Breaker [Re]closing” section and add logic diagram(s) as necessary.
- Ken Behrendt to add write-up on “bus potential transfer” in “Operational Configurations that Cause LOV” section.
- Elmo Price to work on “conclusions” section.
- Elmo Price to e-mail the entire group to solicit ideas that could be included in a new section (“future considerations for LOP applications”).

Next meeting will need seating for up to 25 attendees.

**D8: Justifying Pilot Protection on Transmission Lines**

**Chair: Gary Kobet**

**Vice Chair:**

The WG met for the first time on Tuesday, January 11, 2005 in San Diego with 22 in attendance: 11 guests and 11 members.

The group reviewed and approved the scope, to focus on the outline of the report. The initial outline prepared by a subgroup addresses three points of interest:

- 1) Criteria to determine the need for, and benefits of, pilot protection; such as high-speed reclosing, improved system stability and power quality, easier coordination, better resistive coverage, regulatory issues and more;
- 2) Criteria to determine how many pilot systems are needed in a given application depending on the voltage level, driven by regulatory issues and economics, role of voting schemes and redundant channels, dependability vs security, and more;
- 3) Alternatives to pilot protection and fall back strategies when the channel is lost or degraded, such as step distance, zone 1 extension, taking the line out of service, and more.

The initial outline was discussed and a number of changes were made. The group agreed to expand the initial outline by looking briefly, without creating overlaps with other WGs, into types of pilot channels, and relation between selecting the channel and selecting the scheme.

Suggestions were made to look into previous and ongoing works of CIGRE on tele-protection, and the H-committee on digital protection channels.

Request was made towards participating utilities to provide the group with summaries and highlights of their pilot protection practices.

For the next meeting – aimed at finalizing the outline and distributing writing assignments – the group kindly requests a single session with a computer projector and seating for 30 attendees.

**D9: Revision of C37.113 – Guide for Protective Relay Application To Transmission Lines**

**Chair: Mohindar Sachdev**

**Vice-Chair: Simon Chano**

The Working Group D09, Revision of C37.113 - Guide for Protective Relay Applications to Transmission Lines, met for the first time in Salon E room, Marriott Del Mar, San Diego CA on January 11, 2005. Thirty-three protection engineers attended the meeting; twenty-eight attendees joined the Working Group. Two other members of the PSRC joined the WG after the inaugural meeting.

The Chairman reported that three negative ballots were received when the guide was balloted in August 2004 for reaffirmation. He further reported that the negative balloters had agreed to change their votes to affirmative

with comments on the assurance that the PSRC would work on the revision of the guide. The comments provided with those ballots were then reviewed.

It was agreed that the Chair prepare the PAR and submit after giving the WG members a chance to provide comments on the draft. Working copies of the guide will be distributed before the next meeting.

For the next meeting: single session, room for 45 persons and a computer projector.

**D10: EMTP Reference Models For Transmission Line relay Testing**

**Chair: Kalyan Mustaphi**

**Vice Chair: Tarlochan Sidhu**

The WG did not meet in San Diego.

**Old Business:**

At their December 2004 meeting, the Standards Board gave approval for publication of C73.114 Guide for Determining the Fault Location on Transmission and Distribution Lines. The Guide should be available in 2005. Karl Zimmerman will form a group to create a Summary Paper of for presentation at regional conferences.

**New Business:**

Roger mentioned that the Working Group chairman are responsible for maintaining their group's website – whether they do it themselves or have someone else do it for them.

There was discussion on supporting the IEEE/PES Meetings.

**High Impedance Fault Activity:**

None reported.

**H: RELAY COMMUNICATIONS SUBCOMMITTEE**

**Chair: K. J. Fodero**

**Vice Chair: A. P. Apostolov**

**H2: PROTECTION USING SPREAD SPECTRUM COMMUNICATIONS**

**Chairman: Ken Behrendt**

**Vice Chair: Bill Lowe**

**Output:**

**Established: 2001**

**Expected Completion Date: 2003**

The H2 working group met in a single session on Tuesday, January 11, 2005 with 9 members and 15 guests in attendance.

Introductions were the first order of business.

A few outstanding issues were then discussed relating to draft 5.1.

- The recently received clause 5.7 created some discussion. It was finally agreed to leave it unchanged.
- Several grammatical errors relating to possessives will be corrected.
- The section on security again roused some discussion. The addition of a few words made the statement acceptable.

After these last few changes are incorporated the report will be sent to the subcommittee chair for approval. If approved the chair will ballot the officers and the subcommittee at the same time.

The H2 group will remain to develop a presentation to the main committee.

The next meeting will consist of a single session. A room for 25 is needed.

**H4: COMTRADE Issues**

**Chair: Ratan Das**

**Vice Chair: Amir Makki**

**Output: Recommended Practice**

**Expected Completion Date: 2005**

The Working Group H4, met on January 11, 2005 in their first meeting. Thirteen members and eleven guests were present.

Discussions were held about the submission of PAR and its content. The PAR will be prepared based on the issues identified by the H5d working group. Chair will circulate the PAR among the members for their comments.

PAR will be submitted to IEEE before the May 2005 meeting based on the comments received from members.

We will meet at the May 2005 meeting. We need a room for 40 people with a computer projector.

At the conclusion of this business, the meeting was adjourned.

**H5: Common Data Format for IEDs**

**Chair: L. Smith**

**Vice Chair:**

**Output: Recommended Practice**

**Expected Completion Date: 2005**

See reports from working groups H5-A, B and C below.

**H5-A: Common Format for IED Configuration Data**

**Chair: D. Weinbach**

**Vice Chair: Dac-Phuoc Bui, Hydro Quebec TransEnergie**

**Output: Recommended Practice**

**Expected Completion Date: 2005**

Working group H5-a met on Wednesday, January 12, 2005 at 7:30AM with 19 members and guests

Summary:

Ashok Gopalakrishnan presented parameters for defining distance elements...

Alex Apostolov presented the functional hierarchy with a table of all possible setting elements under IEC 61850 description. Alex passed the document to interested members for assignments.

Arif Cubukcu volunteered to use his company website to distribute and share the information.

The assignment is to check the list of setting elements under IEC 61850, to find out if the structure and if all the settable elements match vendor products and for Utilities to see if the list of all settable elements fulfills the need for their relay settings. All missing settable elements are to be pointed out from each case for discussions, solutions and for adding to the existing list. The assignment is to be completed as soon as possible prior to the next meeting in May 2005.

### Assignments:

*Note: The website will be used to distribute and share the following information.*

Alex- will do the assignment for AREVA relays.  
Christoph- will do the assignment for ABB relays.  
Veselin- will do the assignment for SEL relays.  
Shigeki- will do the assignment for TMT&D relays.  
David (not present) will be asked to do the assignment for Basler relays.  
Mark (not present) will be asked to do the assignment for GE relays.  
All relay vendor not present is welcome to do this assignment.  
All Utilities is welcome to participate to assignment.

Next meeting requirements: Room for 30, Computer Projector Required

### **H5-B: Common Format for IED Event Data**

**Chair: M. Adamiak**

**Vice Chair: K. Narendra**

**Output: Recommended Practice**

**Expected Completion Date: 2005**

WG H5-b met on Wednesday 20 attendees. The meeting started with a clarification of the scope and purpose of the group, those being:

Scope: Develop an XML based file format for storing, sharing, and analyzing power system event data.

Purpose: To facilitate event data integration and analysis from multiple data sources from different vendor devices.

Requirements:

- XML based
- Integrate multiple types of data (see next slide)
- Integrate data from multiple protocols (e.g. – 61850, DNP, 870, etc.)

Event Data Types:

1. System events (relay targets, trips, data change) - SysEvt
2. Status changes - StaChg
3. –Controls - CtlChg
4. –Equipment status (non-alarm) - EqpSta
5. –Equipment alarms (operation vs maintenance) - EqpAlm
6. –External environment (e.g. – security) - ExtSta
7. Internal IED alarms - IntAlm
8. Setting changes (including changed values) – SetChg

Note: Data Type names and numbers suggested by chairman

The general format of an event was defined as follows:

- Location
  - substation name
  - voltage level (optional)
  - Bay (optional)
- IED Name
- TimeStamp (UTC based Date and Time)
  - Local offset (option)
- Sequence Number (optional??)

- Data (text?, number? – including identification of LD and LN)
- Event Type
- Data extension (e.g. – fault report info)

In order to try mapping this format to a real device, volunteers from the vendor community were solicited and identified to try a mapping and schema for next meeting.

### **H5-C: Common Format for IED Sampled Data**

**Chair: Benton Vandiver**

**Vice Chair:**

**Output: Recommended Practice**

**Expected Completion Date: 2005**

The working group met on Wednesday, January 12, 2005, with 7 members and 3 guests present following concurrent sessions with H5-a and H5-b. The meeting minutes from the September meeting in Portland were reviewed and approved by the group.

A discussion on the previously identified 11 questions related to IED sample data and COMTRADE provided an opportunity to reach consensus on almost all questions. Three questions were removed as being satisfied from others listed. Based on the previous investigations, it was agreed that parameters for sampled data pertaining to COMTRADE has a very good chance of being a compatible subset of the PQDIF standard. During this review it was determined that a mapping table between COMTRADE and PQDIF would be a key part of the report and be of extreme benefit for a final recommendation in the report.

The items Data Format and Data Type were reviewed for accuracy and agreement was reached on what would be recommended in the report. The report outline was reviewed again and the members/guests will be solicited for contributions on sections of interest. Sections not confirmed by March 1<sup>st</sup> will be assigned by direct contact. Existing writing assignments are due by April 15<sup>th</sup> for distribution prior to the May meeting. All documents will be distributed to participants by email for review and comment by Feb 1<sup>st</sup> and again before the May meeting.

The H5-c working group expects to meet again in concurrent sessions with H5-a and H5-b in a combined meeting requiring a room for 20 with PC projector and screen as part of the ongoing triple session.

### **H6: APPLICATION OF SUBSTATION ETHERNET LAN COMMUNICATION FOR PROTECTION AND CONTROL**

**Chairman: John Burger**

**Vice Chairman: Charlie Sufana**

**Output: Special Report**

**Established: 1999**

**Expected Completion Date: 2003**

The H6 Working Group met January 11, 2005, in San Diego, CA with 9 members and 18 guests in a single session with Chairman John Burger presiding. The minutes of the September 2004 meeting were approved as printed..

John Burger indicated to the working group that the paper is about 90% complete.

Christoph Brunner gave an IEC update. IEC61850 part 10 is at the FDIS stage and is due by end of February and then all parts will be complete. He also indicated that the revision process has already started. Clarifications are being made. Power quality add-ons are being made. Several other IEC working groups are extending IEC61850 for their work. WG17 is extending for distributed energy sources. WG 18 for hydro plant is extending models. Wind power TC88 is using 61850 also. These groups will feed back into 61850. An IEC website is being opened for everyone to input issues; anyone will be able to present issues. Dennis asked about SIM model harmonization to 61850 and Christoph gave short update on that work.

Mark Adamiak mentioned that demand response using 61850 down to the house level is being developed.

Dennis Holstein gave an update on CIGRE work being done. CIGRE B5.11 (Fernando Cobelo is the convenor) is starting up to look at the impact of going to 61850. The H6 paper will be used as input. B5.09 (Dennis Holstein is the convenor) for remote on-line management for protection and controls also looking for IEC61850. They are looking for people who want to help.

Veselin Skendzic and others worked on section 7 Security. Chris Huntley provided some reworded sections. Section discusses the use of VLANs. VLANs should not see any traffic from any other VLAN and should enhance security. Mark Adamiak wondered if the title should be changed from Security to something else. Veselin Skendzic said it is a security method. Veselin commented that some think 2 LANs are for security but is really for redundancy. VLAN messages go only to where they are supposed to go. He explained that the switches and relay have settings for the VLAN and that VLAN is switchable but not routeable.

Discussion continued on this matter about security. Concern was raised about whether the system could be breached. VLAN is really an isolation method so if someone gets into the station then it could be breached. Veselin says the VLAN scheme adds onto the firewalls and can not get into it from outside the station.

The working group then went through suggested wording changes provided by Chris Huntley. It was also determined that the terms GOOSE, GSSE, and GSE need to be clarified to reflect UCA or IEC61850 usage. Mark Adamiak will provide a writeup. Christoph Brunner suggested that the section on page 18 needs to be restructured. John Burger will work on correcting the numbering of the figures in Chapter 5.

For the next meeting, the working group will need a room for at least 30 people, an overhead, and will meet in a single session.

#### **H8: FILE NAME CONVENTION**

**Chair: A. Makki**

**Vice Chair: E. Gunther**

**Established: 2003**

**Expected Completion Date:**

The group meet on time and the minutes from the last meeting were distributed and approved.

The Chair notified the group that the TRUC has accepted the H8 report for presentation at the next Fault & Disturbance Conference. The presentation is scheduled for April 26<sup>th</sup>, 2005.

The chair also notified the group that the work will also be presented to the main committee at the next PSRC meeting.

The group continued working on the 12 assignments previously issued. 10 of the assignments are complete and the last 2 assignments will be finalized during the next meeting.

The group will meet again during the upcoming spring meeting. A room for up to 20 people with a flip chart is requested.

At the conclusion of the business, the meeting was adjourned.

#### **H11: REVISION TO THE SYNCROPHASOR STANDARD**

**Chairman: K. Martin**

**Vice-Chairman: Dan Hamai**

**Established: 2000**

**Output: Revised Standard PC37.118**

**Expected Completion Date: 2003**

Working Group H11 met at 10:30 am on Wednesday, January 12. Twelve members and nine guests were present.

The minutes from the September meeting were read and approved.

Ken Martin announced that the Final Draft, Version 6.0, was converted to PDF and submitted to IEEE. The IEEE has initiated the Invitation to Ballot process.

Five WG members formed a group to address any negative ballots.

Ideas to advertise the Standard once it is approved were discussed. The WG will continue to discuss the content of a future paper at the May meeting.

The WG discussed the possibility of dual application to IEC.

**H14: Telecommunication Terms Used by Protection Engineers****Chairman: Roger Ray****Vice Chairman: Ray Young****Established: 2001****Output: Paper****Expected Completion Date: 2006**

H14 met on Tuesday, January 11, 2005. Introductions were made.

There were 5 members and 1 guest present.

Parts of the document were given out to WG members to alphabetize their sections and remove all duplicate definitions. We reviewed a complete document at our meeting and made some changes. Since folks did not use a consistent method for alphabetizing their sections, we decided upon a standard. Between now and the next meeting we will break the document up into assignments for people to re-alphabetize and to tag definitions that they think should not be part of the document. They were also asked to suggest definitions to add to the document along with a suggested definition.

The assignments will be reassembled into one document and we will review the definitions were tagged for removal.

Need a room for 10 people plus a computer projector.

**Task Force Reports****HTF1: Teleprotection Review****Chairmen: Marc Benou****Established: 2003****Expected Completion Date: ?**

Task Force HTF1 met Wednesday, January 12, 2005 in San Diego, CA in a single session with 19 in attendance. Nine have agreed to become members.

Three possibilities were stated at the outset as the possible focus of the task force.

1. A general review of the C37.90 family of standards for all three types of teleprotection: PLC, audio, and digital.
2. A general review of C37.90 standards with comparison to their IEC counterparts, namely 60834-1. The differences to be compared and decisions to be made whether to change IEEE standards when merited.

The IEC standards also contain specific testing standards for communication capabilities including jitter, security and dependability that are not contained in the IEEE standards. The question was asked if the PSRC should consider having it's own standard.

3. The possibility of generating a digital teleprotection guide similar to C37.93.

It was also requested that other ideas for the task force be entertained.

Two possibilities were discussed. First, a digital teleprotection guide and secondly a review of IEC 60834-1 and generating a IEEE standard for teleprotection testing including communication testing standards. The consensus of the group was to proceed with a digital teleprotection guide. Consideration was given to possibly creating a standard for digital communications testing but it was determined that an example of testing procedures could be inserted in the guide and the decision to create a standard could be made at a later time.

A verbal request was made to PSCC for a joint guide. The scope of the guide will be increased to include communication between substations if PSCC agrees to the joint effort.

Discussion was started on the scope of the guide and thus far, teleprotection type (including current differential and phase comparison communications), different types of media, and both synchronous and asynchronous communications. Also included in the guide will be an example of testing procedures for digital communications so the vendors and users can have a format to compare different equipment for security and dependability. It was also discussed that a section should be added to handle problems in the digital system. An initial name for the guide is "Guide for Power System Protective Relay Applications of Digital Teleprotection."

The upcoming May 2005 meeting in Columbus will be used to come up with an outline and whether the result should be a paper or a guide. IEC 60834-1, IEC 60834-2, and IEEE C37.93 will be distributed to the members by email.

Another session as a task force is required to determine the scope and outline of the group. A room for 25 people in a single session is requested for the next meeting.

#### **HTF2: Broadband Communications over Power Line Carrier**

**Co-Chairmen: Veselin Skendic and Mark Simon**

**Established: 2003**

**Expected Completion Date: ?**

The group met on Tuesday with 22 members and guests. Joint meeting with PSCC proved exceptionally productive, with the main meeting attraction being the presentation given by PSCC chairman Dr. John Newbury. Dr. Newbury started with theoretical BPLC propagation background, followed by description of current BPLC developments, international pilot installations, modulation techniques, regulatory climate, and emission measurement techniques.

Dr. Newbury agreed to share his presentation with the working group members (E-mail follow up). At the request of the H subcommittee, chairman will request Dr. Newbury's permission to post the presentation at the PSRC web site.

Projected needs for the next meeting: NONE, No meeting is planned

#### **HTF3: Comparison of Teleprotection Standards**

**Chairman: Mark Simon**

**Established: 2005**

**Expected Completion Date: ?**

Assignment: To evaluate the need for a document that compares existing standards for Teleprotection equipment and channels. Items in scope included IEEE, IEC and NEBS.

Mark Simon will chair the taskforce. The taskforce will hold its first meeting May 2005.

## ***Liaison Reports***

### **1. Power System Communications Committee - E. A. Udren**

The Power Systems Communications Committee met at the PES General Meeting in Denver in June 2004.

The Power Line Carrier Subcommittee has completed the PLC Application Guide P643 and transmitted to REVCOM after successful balloting.

The ANSI C93 standards on PLC equipment are in need of updating, and NEMA is transferring rights to IEEE so that PSCC can go to work on them. The affected standards are:

- ANSI C93.1 CCVTs
- ANSI C93.2 Line Traps
- ANSI C93.4 Line Tuners and Auxiliary Equipment (oldest, and first to work on)
- ANSI C93.5 Dedicated Transmitter/Receiver Equipment

The Wire Line Subcommittee is working with these standards:

- IEEE 1590-2003 Recommended Practice for the Electrical Protection of Optical Fiber Communication Facilities Serving, or Connected to, Electrical Supply Locations – now available for ordering.
- IEEE 487-2000 IEEE Recommended Practice for the Protection of Wire-Line Communication Facilities Serving Electric Supply Locations – IEEE is still receiving questions on interpretation, application, and coordination with other standards on personnel safety (step and touch potentials). The scheduled review is in 2005.
- IEEE 820-1984 (R1999) IEEE Standard Telephone Loop Performance Characteristics – New revision project is just under way.

The PSCC has working groups in operation for System Security Assessment (recommended practice) and Broadband over Power Line (BPL) Carrier Data Systems (application standard).

#### Standards and projects update:

##### *Reaffirmations:*

- 776 - IEEE Guide for Inductive Coordination of Electric Supply and Communications Line- 9/2003
- 1137 - IEEE Guide for the Implementation of Inductive Coordination Mitigation Techniques and Applications - 12/2003

##### *New Projects:*

- P820 - Standard Telephone Loop Performance Characteristics - PAR approved 3/2004
- P1649 - Recommended Practice on Information Security Risk Assessment in Power System Operations - PAR approved 12/2003
- P1675 - Standard for Broadband over Power Line Hardware and Personnel Safety - waiting for approval

##### *New Standards:*

- 1222 - Standard for All-Dielectric Self-Supporting Fiber Optic Cable – 12/2003
- 1590 - Recommended Practice for the Electrical Protection of Optical Fiber Communication Facilities Serving, or Connected to, Electrical Supply Locations – 12/2003

The next meeting is at the Power Systems Conference and Exposition, Oct. 10-14 in New York. There will be a January 2005 meeting with the PSRC meeting in San Diego, and a meeting at the Summer 2005 PES General Meeting in San Francisco.

### **2. Substation Committee - J. Tengdin**

### 3. IEC TC57 Working Group 10, 11 and 12 Report - E. A. Udren

#### Coordination Reports

##### **Old Business:**

The FCC has released FCC 04-245 on October 14. This document is available on the FCC.gov web site. The PSRC submitted recommendations during the comment stage of the NPRM, Notice of Proposed Rulemaking. The recommendations involved clarifications of the definition of BPL, Broadband Power Line Carrier to eliminate any confusion between BPL and PLC used for relaying. The second recommendation was to include a warning for personal safety when making measurements in the vicinity of power lines. Both recommendations of the PSRC were adopted.

##### **New Business:**

#### **I: RELAYING PRACTICES SUBCOMMITTEE**

**Chair: J. W. Ingleson**

**Vice-Chair: T. S. Sidhu**

**Webmasters: T. S. Sidhu and M. Tamije Selvy**

**Past Chair: J.G. Gilbert**

**1. Introduction:** The Relaying Practices Subcommittee (SC) met on January 11 to 13, 2005 in San Diego. Introductions were made, and an attendance list was circulated. The recorded meeting attendance was 26 Subcommittee Members and 23 guests.

The following Subcommittee Members were present at this meeting: B. Anderson, A. Apostolov, M. Carpenter, J.W. Chadwick Jr., R. Das, J. Gilbert, S. Horowitz, B. Jackson, L. Kojovic, B. Lowe, M. Meisinger, G. Moskos, B. Mugalian, M. Nemier, B. Pettigrew, M. Ranieri, M. Sachdev, D. Sercik, T.S. Sidhu, M. Simon, M. Swanson, D. Tziouvaras, E. Udren, D. Weers, R. Whitaker, R. Young.

Guests were present at this meeting were as follows: S. Kell, M. Achtedramp, M. Blader, S. Sambasivam, F. Lopez, D. Fontana, R. Taylor, M. Best, S. Thakur, C. Mozina, W. Elmore, T. Giuliante, M. Sanders, R. Ray, V. Skendzic, S. Ward, F. Friend, J. O'Brien, J. Pond, G. Brunello, S. Imai, H. Ito, A. Johnson.

**2. Approval of minutes of the previous meeting:** The minutes of the previous meeting were approved with no changes.

**3. Items of interest from the Advisory Committee Meeting:** The Chairman reported on some brief items from the Advisory Committee meeting.

**4. Reports from the Working Group Meetings:** Updated information and a current report from each working group has been placed on each working group's web page, and will be updated whenever necessary. Formatting problems sometimes occur in copying WG reports to their website and thence to the SC minutes. We suggest that, if you perceive that there are formatting problems, you will consult the WG web page directly.

#### **I1: Revision of C37.103, Differential and Polarizing Relay Circuit Testing**

**Chair: M.S. Sachdev**

**Vice-Chair: J. D. Huddleston, III**

**Output: Revision of C37.103-1990**

The Working Group did not meet during the PSRC meetings held on January 11-13, 2005 in San Diego.

Mohindar Sachdev reported at the Subcommittee I meeting that the successfully balloted draft of C37.103, which had been submitted to the Standards Board, was approved at the Board meeting held on September 23,

2004. Subsequently, the guide was published as C37.103TM-2004, IEEE Guide for Differential and Polarizing Circuit Testing.

Having completed the assigned task, it is recommended that the WG be disbanded.

### **I2: Terminology Usage Review**

Chair: M. J. Swanson

Vice-Chair: Barb Anderson

Output: Updates to IEEE 100: Standard Dictionary of Electrical and Electronic Terms

The I2 Working group met at 10:30 am on Tuesday January 11, 2005 with seven members and one guest. Mal Swanson chaired the meeting. Minutes from the last meeting were approved.

The Working Group then reviewed terms from various documents.

1. Terms from C37.110 will be tabled until the next meeting.
2. Terms from PC37.118:
  - o "Nyquist rate" is in the IEEE dictionary. Roger Whittaker will check with the working group chair to see if he agrees with the IEEE dictionary definition or if it needs to be revised.
  - o "Reporting rate" was revised and approved.
  - o "Theoretical phasor" was revised and approved.
3. Terms from C37.109:
  - o Walt Elmore will see if "coreless reactor" and "four-reactor scheme" are in C37.100 or the IEEE dictionary. If not, these definitions are approved.
  - o Walt will talk to Kevin Stephan about the term "disc-type reactor"
4. Fred Friend reviewed C27.117 and found no new terms.

The Working Group discussed an award to Jim Huddleston, since he may not be attending future PSRC meetings. Mal will talk to Roger Hedding regarding recognition for Jim.

The meeting was adjourned at 11:20 pm.

### **I3: Microprocessor-based Protection Equipment Firmware Control**

Chair: R. Beresh

Vice-Chair: D. Weinbach

Output: Recommended Practice

WG I3 did not meet at the Jan. 2005 meeting.

### **I4: IEC Standards Advisory**

Chair: E. A. Udren

Vice-Chair: M. M. Ranieri

Output: IEC Standards Advisory

WG I4 is a continuing group that reviews and develops US positions and inputs for IEC TC 95 (Measuring Relays) standards projects. I4 incorporates the Technical Advisory Group (TAG) to the US National Committee of IEC for TC 95.

The WG met to review TC 95 activities and focus on support of one important new activity.

For the May 2005 meeting in Portland, we expect one session with 15 attendees. A projector will be helpful.

**I5: Trial-Use Standard for Low Energy Inputs to Protective Relays**

Chair: E. A. Udren

Vice-Chair: P. G. McLaren

Output: New Trial Use IEEE Standard P1331

This WG has been developing C37.92, now titled Standard for Analog Inputs to Protective Relays from Electronic Voltage and Current Transducers. As of December 2004, the project is effectively completed.

The WG met to review the status of C37.92 in light of IEEE editorial review and two recirculation ballots since September. On December 13, a final successful recirculation ballot was completed, and the Standard proceeds to RevCom. The RevCom chairman was not anticipating problems with acceptance and publication. The IEEE editor will fix some non-technical details already identified.

Of the three negative ballots on the first balloting, two were resolved. The individual who cast the third negative ballot has not responded to repeated efforts at contact.

Recent significant changes include a new title eliminating the words "low energy," and the making of the valid data indication as a required output.

The WG has brought out an old draft for a WG paper describing the Standard, and three WG members agreed to review and update it. The WG does not expect to need any more meetings, but will disband after publication and completion of the paper.

**I6: Revision of C37.90, Relay and Electrical Power Apparatus**

Chair: M.M. Ranieri

Vice-Chair: J. Teague

Output: Revision of ANSI/IEEE C37.90-1989 (R1994)

The working group did not meet at the San Diego PSRC meeting. The Final draft of PC37.90D15 with all the applicable negative ballot change made was re-circulated. The final results include two negative ballots that we could not resolve. The suggested changes requested by the two negative balloters could not be resolved during the re-circulation period so they still remain as negative ballots. The WG will submit all the information and IEEE editor comments along with the detail on the two outstanding negative ballots to the standards board for their review and final approval.

The WG chairman will send out this final information via email to the WG members for their review and approval and begin work on the summary paper as well. The WG chairman has some volunteers to help work on the summary paper so we did not schedule a WG meeting for the Spring PSRC meeting in Columbus.

**I9: Revision of C37.105 - Standard For Qualifying Class 1E Relays And Auxiliaries For Nuclear Power Plants**

Chair: S. Mazumdar

Vice-Chair: S.M. Usman

Output: Revision of C37.105

WG I9 did not meet at the Jan. 2005 meeting.

**I10: C37.98-1987 - Standard Seismic Testing of Relays**

Chair: M. Nemier

Vice-Chair: M. Bajpai

Output: Revision of IEEE Standard C37.98

There were 4 members in attendance.

Members: Marie Nemier, Mario Ranieri, Terry Crawley and Roy Ball

The major items discussed are as follows:

- In December 2004, the PAR extension was approved for 2 years (through December 2006).
- Request a liaison to the IEEE nuclear sub-committee. Action Item: Marie Nemier
- The current revision of the standard shall be updated to the new 2005 style manual and e-mailed to members.
- **Action Item:** Marie Nemier
- Provide a sample seismic test report of a relay for information and review.
- **Action Item:** Roy Ball
- E-mail harmonization annex appendix to members.
- **Action Item:** Marie Nemier
- Develop comments between IEC Table 2 severity class and C37.98 for the harmonization annex appendix.
- **Action Item:** Mario Ranieri and Terry Crawley
- Develop a graph showing Figure 1 from C37.98 and Figure 1 from IEC 60255-21-3 to illustrate differences in the standard response spectrum for the harmonization annex appendix.  
**Action Item:** Roy Ball
- Review Table 1 of C37.98 for correct terminology and develop a footnote to Table 1 for multifunction relays.
- **Action Item:** Roy Ball and Steve Kunsman

#### **I12: Revision of C57.13.1, IEEE Guide for Field Testing of Relaying Current Transformers**

Chair: M. Meisinger

Vice-Chair: D.R. Sevcik

Output: Revision of ANSI/IEEE C57.13.1-1981 (R1992)

Working Group I12 met in the morning of 12 January with 5 members. Subsequent to the September 2004 meeting Draft 6 was submitted to the IEEE editor for review and comments that were returned were incorporated. Also, an extension of the PAR to complete the assignment was previously requested and received. At the January 2005 meeting it was pointed out that some comments from one of the working group members were inadvertently left out of Draft 6 and were incorporated at the meeting and designated as Draft 7. I12 Working Group is now ready to submit Draft 7 to the IEEE Standards Association for the balloting process.

#### **I13: C57.13.3 IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases**

Chair: M.S. Sachdev

Vice-Chair: B. Mugalian

Output: Guide

The Working Group I13, Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases, met in Salon BC, Marriott Del Mar, San Diego CA on January 11, 2005. Nine members and one guest were present.

The Chairman reported that one coordination comment and two negative ballots were received when Draft 8 was recirculated. The working group discussed changes and corrections to the guide to address the comment

and the negative ballots. The changes agreed to at the meeting will be made in the draft and it will be recirculated.

A summary paper prepared by Sahib Usman was distributed. The Working Group members are to provide comments on the paper by February 1. It was agreed that the paper should be submitted for presentation at North American protection conferences.

The working group will meet at the May 2005 meeting to review the results of the reticulated ballot and, if necessary, discuss the draft of the summary paper.

**I14: Telecommunication Terms/New Terms Used by Power System Protection Engineers**

Chair: T.A. Phillippe

Vice-Chair: R. Young

Output: Special Publication

By action of the SC, this WG was transferred into Relay Communications (H) Subcommittee. Reports of this group will no longer appear under this SC.

**I15: Revision of C37.110, IEEE Guide for the Applications of Current Transformers Used for Protective Relaying Purposes**

Chair: G.P. Moskos

Vice-Chair: B. Jackson

Output: Revision of IEEE C37.110-1996

The working group met with 5 members and 13 guests.

A PAR extension was approved with a new completion date of December 2006.

The chairman reviewed Draft 6 which is being prepared to go to ballot.

A review team consisting of Ratan Das, Simon Chano, Barry Jackson, Mukesh Nagpal, Bruce Pickett, Kevin Stephan and Del Weers will review the document and provide comments to the chairman. The team was asked to review format, labeling, page numbers, figures, equations, examples, etc.

Barbara Beckwith has agreed to review the grammar within the guide.

**I17: Trends in Relay Performance**

Chair: W.M. Carpenter

Vice-Chair: J.D. Wardlow

Output: Special Report

The Working Group met on January 11, 2005 with 4 members and 11 guests and began gathering data from 2004 performance. On January 13, 2005 Mark Carpenter made a presentation to the PSRC of the data collected for the four years between 2000 and 2003.

**I18: Harmonization of IEEE C37.90.2**

Chair: J. Burnworth

Vice-Chair: W. Higinbotham

Output: Revision of C37.90.2

The working group met on January 11, 2005. The summary paper developed will be available on the working group website soon.

**I19: Understanding Microprocessor-Based Technology Applied to Relaying**

Chair: M.S. Sachdev

Vice-Chair: R. Das  
Output: Special Publication

The Working Group met on January 11, 2005. I19 is an extension of I16, which issued its report and was disbanded and reborn as I19. The working group immediately went to work on a revision and expansion of the I16 report.

## **5. Task Force Reports:**

### **ITF1: Relay Service Letter Database**

Chair: J.W. Ingleson

The database was last updated on November 14, 2002, and is available on the ITF1 area of the SC web site.

### **ITF2: Application of Rogowski Coils used for Protective Relaying Purposes**

Chair: L. Kojovic

The group met on Tuesday with 8 members.

Meeting started with a PPT presentation on Rogowski coil applications in modern switchgear, followed by a reviewing the taskforce "Assignment" / "Scope" statements, and the proposed guide outline.

The group accepted the proposed guide outline and is ready to submit the PAR, and convert to a working group status at the next meeting.

Members requested that the ITFT2 presentation be posted on the WEB (in the working group directory on the PSRC WEB site).

Projected needs for the next meeting: 20 attendees, with Computer Projector.

The group will become WG I7.

### **ITF4: Optical Current and Voltage Sensor Systems**

Chair: H. Gilleland

Assignment: Report to Subcommittee

The ITF4 Task Force meeting in San Diego on January 11, 2005 had over 20 active participants, and accomplished essentially all of its objectives. The key issues addressed and discussed in the meeting are listed below:

- Reviewed the ITF4 Report to the Relaying Practices Sub-Committee for the September 2004 meeting that held in Portland.
- PAR development: We discussed the draft of the proposed PAR with the title of "Guide for Application of Optical Current and Optical Voltage Sensor Systems for Protective Relaying".
  - The draft was developed by TW Cease, and was available on the IEEE web site for review by the Task Force prior to the meeting. The expected date for the initial sponsor ballot for the PAR will be January 30, 2008.
  - A few changes need to be made in the draft of the PAR and it will then be presented to the Relaying Practices Subcommittee - the target date is the end of February '05.
  - A Project Number will be assigned to the PAR, and at the next PSRC meeting the ITF4 Task Force will become a "Working Group".
  - The next major step will be to apply for a PAR from IEEE-SA.

- Development of the Guide
  - Teams have been established to develop the eleven sections that will be included in the Guide.
  - At the San Diego session the Team Leaders each presented an update of the material that they plan to include in their section.
  - This material will be available on the PSRC web site.
- The Task Force would like to change the WG name on the PSRC agenda to “Guide on Application of Optical Sensor Systems” – we would also like to continue to meet on Tuesday morning – and request that ITF2 on Godowsky Coils be schedule to follow the ITF4 session – not in the same timeslot.

The group will become WG 18.

**Old Business:** There was no old business discussed at this meeting.

**New Business:** The main committee presentation of WG I13 will be conducted during the May 2005 meeting. Suggestion for a new task force on “Time Synchronization” was discussed and it was agreed to form a task force that would meet at the May 2005 meeting.

**J: ROTATING MACHINERY PROTECTION SUBCOMMITTEE**

**Chair: S. P. Conrad**

**Vice Chair: W. G. Hartmann**

The Subcommittee met with 16 members and 13 guests in attendance on January 12, 2005, in San Diego, California. The meeting started with introductions, sign-ins, and approval of the previous meeting’s minutes. The Chairman reported on the Advisory Committee meeting highlights.

**J3: Protection of Generators Interconnected with Distribution System**

**Chair: E. Fennell**

**Vice Chair: R. Pettigrew**

**Output: Transaction Paper**

The Working Group (WG) met in single session with 8 members and 8 guests in attendance

The WG reviewed each section of Draft 5 of the transaction paper during the meeting. The members identified and recommended changes and comments.

Brad Nelson accepted an assignment to perform an editorial review of Draft #6. The plan is then to submit Draft #7 to ballot the Subcommittee, PSCR Officers and WG-J3 before the next (May 2005) meeting.

**J4: Revision of C37.102 AC Generator Protection Guide**

**Chair: M. Yalla**

**Vice Chair: K. Stephan**

**Established: 2000**

**Output: Revised Guide**

**Expected Completion Date: 2005**

**Status: 15<sup>th</sup> meeting**

This meeting of WG J4, C37.102 IEEE Guide for AC Generator Protection was held with 13 members and 9 guests.

Draft 6 of the guide was uploaded to the IEEE at the end of December for issuing invitations to the ballot. Draft 6 included some redrawn figures and other editorial corrections. A few minor technical corrections to the Annex were discussed and will be incorporated as part of the ballot process. Differences in data used between this WG and the J5 paper on coordination of generator protection with generator control were discussed. The WG also discussed a recently published paper on generator breaker flashover protection. This paper may provide good material for the next revision of C37.102.

**J5: Generator Protection Setting Criteria**

**Chair: C.J. Mozina**

**Vice Chair: M. Reichard**

**Output: Paper**

The WG met with 13 members and 13 guests.

The meeting was spent reviewing draft 6 of the paper. A number of assignments were made. Terry Crawley will provide a NERC reference document that addresses the requirement to coordinate AVR control with generator protection. Mike Reichard and Terry Crawley will add material to section VII of the paper that discusses the coordination of the AVR V/Hz limiter with the V/Hz protection.

The one line diagram (Fig. 4) in the paper will be modified by the Chairman to incorporate line impedance data that is missing and correct symbols so they match those of the calculations portion of the paper. The Chairman will also address other comments on the drawings in the paper.

All assignments are due to the Chairman by the end of February so a balloting draft can be put together prior to the May 2005 meeting.

**J7: Revision of C37.101, Generator Ground Protection Guide**

**Chair: J.T. Uchiyama**

**Vice Chair: R. Das**

**Co-Vice Chair: Mike Reichard**

**Output: Revised Guide**

The Working Group J7, met on January 12, 2005 in two sessions. 9 members and 6 guests were present in the first session, while ten members and seven guests were present in the second session. The minutes of the September 2004 meeting held in Portland, OR was approved.

PAR has been extended for two years. Vice-chair has circulated Draft 6 before the meeting and received some comments on that draft. The comments have been incorporated in Draft 7 and discussions were held on Draft 7 in the meeting.

We will ballot Draft 7 among working group members and subcommittee members before the next meeting. Any major issues will be resolved in the May 2005 meeting. If there are no major issues, Draft 8 (based on any minor comments) will be submitted to IEEE for balloting.

**JTF1: “Protection of VFD Motors” Task Force**

**Chair: J. Gardell**

**Vice Chair: Prem Kumar**

**Output: Task Force Report**

The Task Force (TF) met in a single session with 10 members and 3 guests and was chaired by Jon Gardell, Chairman, for a single session.

The Chairman reviewed the activities to date for the WG. Terry Crawley and Prem Kumar gave a status update at their respective company projects with drives focusing in on protection issues. Comments were discussed concerning the draft II outline and writing assignments were given for sections I through VI. Joshua Park will conduct a literature search on drives papers. The assignments are due April 15, 2005, to the Chairman.

A guest speaker, Ed Owen of GE, is planned for the May 2005 meeting. Mike Reichard will work with the Chairman to coordinate this presentation. He Chairman will provide issue all writing assignments to the TF prior to the May 2005 meeting.

### **Liaison Reports**

#### **Electric Machinery Committee**

**C.J. Mozina**

The Electric Machinery Committee will hold its annual meeting at the PES General Meeting during June 2005 in San Francisco. Osama A. Mohammed of Florida International University is the new Chairman. The two new Electric Machinery standards, C50.12 "American National Standard for Salient-Pole Synchronous Generators" and C50.13 "American National Standard for Cylindrical Rotor Generators" that we cite in many of our standards are complete and will be sent to the Standards Board.

#### **IAS I&CP Committee**

**C.J. Mozina**

The I&CPS Department met at the General Meeting of the IAS during October 2004 in Seattle. WG sessions were held on Digital Relay Testing, Hybrid Generator Grounding, Bus and Breaker Failure Protection and Distributed Generators. The outputs of all four WGs are to be IAS Transaction Papers.

### **Color Book Series**

The Buff Book is due for revision and the revision process was begun at the meeting. All the IAS color books are being delayed in the revision process because the IAS has decided to create a "Mother Book" which is to contain material thought to be common to a number of IAS colored books. The intent of this new book is to avoid duplication by putting basic information into one book. An example would be fault current and voltage drop calculations. The exact content of the "Mother Book" has not been yet determined, but the fault current calculations will undoubtedly be shifted out of the Buff Book. The uncertainty has delayed work on revising the Buff Book.

### **Hybrid Grounding WG**

The WG paper will address basic equipment requirements and prove through EMTP studies that undesirable overvoltages are not produced. Dave Shipp of Cutler Hammer (C-H) will be the Chairman of the WG for the next phase of the investigation. C-H will provide their EMTP and programming help to run the studies. We have decided to use the model generator used in a previously published Transaction Paper on medium voltage generator grounding (33 MVA, 400A grounding, terminal surge capacitance of 0.25uf). Cases to be simulated were developed with expected output prior to the Spring WG meeting in May 2005.

During the year, in addition to a Transaction Paper in the IAS magazine published an article that added hybrid grounding. Five generators at Pulp & Paper mills were converted to hybrid grounding and one major pulp and paper company has decided to convert all their generators over the next ten years to hybrid grounding.

### **Coordination Reports**

#### **P958-EDPG, Guide for Adjustable Speed Drives**

**J. Gardell**

The IEEE has published the Guide and it is available from them either in PDF or paper format.

#### **P408-NPEC, Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations**

**R.V. Rebbapragada**

No report.

#### **P1010, Guide for Control of Hydroelectric Power Plants Wayne Hartmann**

No report. Coordination complete.

#### **Old Business**

No report

#### **New Business**

George Nail informed the SC of a new synchronizing system used for a small reciprocating generator (about 3 MW) that essentially matches the generator to the system (voltage, frequency) with zero phase angle between the generator and the system. This would mitigate breaker closing speed problems (slow breaker, indeterminate breaker time).

Kevin Stephan asked if the group monitored unequal breaker phase currents in two breaker applications (breaker and one half, ring bus). This is due to experience with negative sequence overcurrent trips when one breaker is opened the other path has substantial unequal phase currents (from open disconnect, high impedance contacts, failed open breaker contacts, etc.). Some users replied that they do monitor this on high voltage applications.

Tom Weidman discussed how a new, soon to be released NERC report (tentative release 3/05) will address generator to AVR control coordination issues that is similar to the information found in the J5 WG "Generator Protection Setting Criteria." This report is scheduled to be released at the end of March 2005.

Everett Fennell expressed to the SC the need for investigation of protection considerations during static starting of combustion turbine generators. The SC agreed and a Task Force will meet at the May 2005 meeting to discuss issues and make go-forward recommendations.

#### **K: SUBSTATION PROTECTION SUBCOMMITTEE**

**Chair: C. R. Sufana**

**Vice Chair: F. P. Plumptre**

The Subcommittee met Wednesday January 12, 2005, at San Diego, California with 17 members and 22 guests attending. The minutes of the previous meeting in Portland were approved.

#### **ITEMS OF INTEREST FROM THE ADVISORY COMMITTEE MEETING:**

Charlie Sufana reported:

1. Starting 2005, only electronic balloting will be applicable for handling the balloting process. In addition, Working Groups will be responsible for deciding the start/stop dates, who is on the balloting body, etc. Visit the IEEE headquarters web site for more information.
2. For all PAR requests, PAR extension requests are done on line now.
3. There will no longer be an assistant secretary position for the PSRC executive.

#### **Reports from the WG Chairs**

##### **K01: PROTECTION OF TRANSFORMERS AGAINST FAULTS AND ABNORMAL CONDITIONS**

**Chair: Moh Sachdev**

**Vice-Chair: Pratap Mysore**

**Established: 1998**

**Output: Revision of IEEE C37.91-2000**

**Expected Completion Date: 2007**

The Working Group K01, Protection of Transformers Against Faults and Abnormal Conditions, met in Coronado room, Marriott Del Mar, San Diego CA on January 12, 2005. Eleven members and nine guests were present.

Draft 2 was sent by Email to the members before the meeting. Copies of Draft 2 of the guide and contributions received but not included in the draft were distributed. The contributions were discussed and new writing

assignments were made. The contributions are due in the first week of March. Draft 3 will be ready by the next meeting. This draft is expected to be the one that will be balloted among the WG before submitting to the Standards Association.

The working group will meet at the May 2005 meeting in two sessions to review Draft 3.

#### **K2: BREAKER FAILURE PROTECTION**

**Chair: R.A. Hedding**

**Vice Chair: A. CHAUDHARY**

**Established, 2001**

**Output: ANSI C37.119**

**Expected Completion Date: 2006**

**Draft 5**

The working group met on 1/11-12/2005 with what turned out to be 2 sessions with 27 members and 15 guests present.

Since the last meeting Draft 5 was balloted and passed with a 98% approval. 1 negative ballot. This meeting was spent addressing the negative ballot which was resolved and reviewing the "ton" of technical comments that were returned with the ballots. A good number were reviewed. The rest will be considered by a team from the working group consisting of : Martin Best, George Nail, Gerald Johnson, Roger Hedding.

We have also been asked to present a tutorial based on our work at the Texas A & M relay conference this Spring. This will take place on the Monday afternoon before the conference. Gerald Johnson, Don Sevcik, and Eric Udren agreed to help with the seminar.

We hope to finish with the technical comments and re-circulate the guide before the next meeting.

Next meeting will require 1 session for 40 people with a computer projector.

#### **K3: REDUCING OUTAGES THROUGH IMPROVED PROTECTION AND AUTORESTORATION IN DISTRIBUTION SUBSTATIONS**

**Chair: B. Pickett**

**Vice Chair: T. Sidhu**

**Established, 2002**

**Output: Paper**

**Draft 6a**

The WG meet on 1-11-05 with 12 members and 4 guests. Draft 6A was reviewed. The Agenda for the meeting was as follows:

1. call to order and introductions
2. minutes from previous meeting reviewed
3. discussions on outstanding assignments
4. New assignments
  - everyone to review document with suggestions for consolidation
  - John Appleyard - review/provide information on adaptive functions, fuse saving applications
  - Tarlochan Sidhu - provide appendix information on other fault preventative measures, overall editing, ref. To Mo Sachdev's figure in WG paper

Next meeting, room for 25 plus CP

#### **K4: BUS PROTECTION GUIDE**

**Chair: S. P. Conrad**

**Vice Chair: R. W. Haas**  
**Established, 1999 (Originally 1983)**  
**Output: Revision of Standard ANSI C37.97**  
**Expected Completion Date: 2004**

The WG meet with 11 new members and 3 guests in attendance.

The PAR for the WG has expired, therefore the activity has been withdrawn.

There will be a new task force formed (TF14) for the May '05 meeting to develop an assignment scope. The earlier work will be considered by the TF for its use in this work.

Bogdan Kajtenny agreed to chair the TF.

Single session, for 25 people plus CP.

**K5: APPLICATION OF ANCILLARY PROTECTION and CONTROL FUNCTIONS to MULTIPLE RELAYS**

**Chair: Simon Chano**  
**Vice Chair: Dean Miller**

The WG meet in a double session on Tuesday, January 11, 2005 with 17 members and 23 guest attending at least one of the two sessions.

Four presentations were made in the sessions.

Martin Best, Randy Crellin, Frank Plumptre and Simon Chano discussed issues of different applications related to protection, control and monitoring functions in numerical multiple protection systems. It was agreed by all members to start working on a draft outline of the special publication before the meeting.

The Chair will send an updated copy of all the presentations to the WG in preparation for the outline.

Mukesh Nagpal joined the WG as a member

Next meeting: single session for 40 people plus CP.

**K7: GUIDE FOR THE PROTECTION OF SHUNT REACTORS.**

**Chair: K. A. Stephan**  
**Vice Chair: P. G. Mysore**  
**Established, 1999**  
**Output: Revision of ANSI/IEEE C37.109**  
**Expected Completion date: 2004**  
**Status: Reviewing Draft 11**

The Working Group met on Tuesday, January 11, 2005, in one session with 2 members and 4 guests. The balloting body has been formed and the ballot should be issued shortly. Guest Jeff Nelson described an air-core reactor arrangement that produced unusual levels of continuous unbalance current. Jeff also went through the steps taken to mitigate the unbalance in terms of reducing closed metallic loops within the magnetic fields. Also discussed was the application of sudden pressure (non-electrical) tripping devices to oil filled equipment for detecting turn-to-turn faults. It is felt that the present C37.109 guide adequately addresses turn-to-turn fault protection. Guest George Moskos mentioned installation of shunt reactors equipped with load tap changers. The group also discussed the term "disc type winding" for consideration by the Terminology Usage Review working group.

Next Meeting:

Single Session  
15 people, no A/V

**K10 (Ex KTF1): SCC21 Distributed Resources Standard Coordination**

**Chair: Gerald Johnson**

**Vice Chair: TBA**

**Established, 1999**

**Expected Completion Date: 200x**

**Output: Standard through the SCC 21**

K10--SCC21 Distributed Resources Standard Coordination working group met on January 11, 2005, with 8-members and 8-guests. We reviewed progress of the four IEEE DG working groups, P1547.1, .2, .3, and .4.

- IEEE P1547.1- Standard for Conformance Tests Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems completed the balloting process on 12-22-04. Ben Kroposki, 1547.1 secretary reported that the standard passed. There was a ballot pool 118 eligible voters of which 94 responded, exceeding the 75% returned ballot requirement. Of the 94, there were 7 abstentions, 13 negative ballots with comments, and 74 affirmatives, exceeding the 75% affirmation requirement. Plans are to address the negative ballots and recirculate after the Feb working group meeting.
- IEEE P1547.2- Draft 1 of Application Guide for Interconnecting Distributed Resources with Electric Power Systems" has not met since our last meeting so there is nothing new to report. The next .2 working group meeting is scheduled for February 8 & 9, 2005 in Las Vegas.
- IEEE P1547.3 - Draft Guide For Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems. November 1 through 3 in Dallas TX but still have do not have a working draft. They will also meet in Las Vegas on Feb 10 & 11, 2005.
- IEEE P1547.4 – Draft Guide for the Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems has not met since our last meeting so there is nothing new to report. The next .4 working group meeting is scheduled for February 8 & 9 2005 in Las Vegas

The working group and guests had a brief round table discussion on the status of regional DG standards at which point Don Hornak reported on the November 04 New York Public Service Commission Interconnection Policy upgrade which raised the limit from 300KW to 2MW. As a point of interest, Walter McCannon of Southern Company reported by email that he has identified seventy-five internal combustion peak-shaving generators that are connected to customer switchgear served by Georgia Power Company spot network vaults. Don Hornak also reported that he will be a member of the Renewed Consensus Discussions on FERC Interconnection (Small Generation Coalition) and will report to us on their progress.

We then turned the meeting over to Mark Carpenter of TXU who did a great presentation on "Interconnection and Parallel Operation Requirements of TXU Electric Delivery" which included the DG connection guidelines that cover a good portion of the state of Texas. For those interested, Mark's presentation will be attached to these minutes.

We plan to continue the presentation process covering local requirements and case studies. Dave Costic of Detroit Edison will be our next presenter at the Columbus meeting in May.

Gerald Johnson, PE  
Basler Electric  
Richmond VA

**K13 (PC 37.116): GUIDE FOR PROTECTIVE RELAY APPLICATION OF TRANSMISSION-LINE SERIES CAPACITOR BANKS.**

**Chair: F. P. Plumptre**

**Vice Chair: Dan Hamai**

**Established, 1999**

**Output: Guide for the application of protection on transmission series capacitor banks**

**Expected Completion Date: 2005**

**Draft 8.2**

Working Group K13 met on Tuesday January 11, in a single session with 6 members and 5 guests were present.

Frank Plumptre attended the afternoon session of the T & D Series Capacitor Working group meeting on the Tuesday. This group has the responsibility of producing a guide for the specification of transmission series capacitors. As well, members of the T & D working group joined us in the K13 session.

Draft 8.2 of the guide was distributed in December and comments were solicited in the form of a WG ballot. Considerable discussion took place to address WG comments to arrive at a consensus by the WG. A few remaining editorial issues remain. As well, comments from the T & D WG need to be addressed and incorporated in the document.

It is important that comments are received by the T & D working group as soon as possible as the PAR for K13 activities expires the end of 2005 (balloting needs to be completed this year).

To facilities future liaison between K13 and the T & D working groups, it is planned to have joint sessions between the two groups every January meeting starting January 06.

Next Meeting: Single Session 10 people, no A/V

**Liaison Reports:**

**1. Transformer Committee, J.D. Huddleston III -**

No update

**Coordination Reports:**

**All coordination reports will be available after the January 2003 meeting.**

**1.a) ANSI/IEEE Standard C37.20.3 Standard For Metal-Enclosed Interrupter Switchgear.**

**F. Plumptre.**

The 1987 standard was superceded by C37.20.3-2001 Edition. No further updates.

**b) C37.100.1, Common Requirements for IEEE Power Switchgear Standards F Plumptre**

Draft D3 was balloted in June 2004.

**2. PC62.91-SPD, Revision of IEEE 32 Requirements, Terminology, and Test Procedures for Neutral Grounding Devices, D. C. Dawson.**

No update

**3. P1375 Guide for the Protection of Large Stationary Battery Systems, S. Conrad**

No update

**4. P1409 Guide for Application of Power Electronics for Power Quality Improvements on Distribution Systems Rated 1 kV through 38 kV, Steve Conrad**

No update.

**5. P1106 Recommended Practice for Installation, Maintenance, Testing and Replacement of Vented Nickel-Cadmium Batteries for Stationary Applications, Steve Conrad.**

No update

**6. ANSI/IEEE Switchgear Standards, Vittal Rebbapragada**

**a) PC37.30.01 Standard Requirements for High Voltage Air Switches, Switching Devices, and Interrupters.**

No update.

**b) PC37.100.1 IEEE Standard of Common Requirements for Power Switchgear.**

No update

**8. PC37.20.1 Standard for Metal Enclosed Low Voltage Power Circuit Breakers, Irwin Hasenwinkle**

No update

**Old Business**

No old business

**New Business**

1. A new task force formed for the Bus protection guide (KTF14), chaired by Bogdan Kasztenny
2. An Arc Flash task force will be formed (KTF9), chaired by Karl Zimmerman to look at Protection Impact due to OSHA requirements to reduce the impact of ARC Flash.
3. Discussion on Non-Conventional Fault Current Limiters. Mike Thomson will arrange for presentations at the May 2005 Sub Committee meeting. Vahid Madani will consider making a presentation. Charlie Sufana will contact Brian Johnson in case he can make a presentation.
4. There was considerable discussion on Gas Sudden Pressure Tripping versus Alarming. It was also discussed as to whether the K subcommittee should undertake a survey. For now, this topic is tabled.

**Post January 12, 2005, updates:**

Venkat Mynam of SEL will present a talk at the May 2005 K SC meeting on Non-conventional Fault Current Limiters. This also means that we will need to have a speaker for the Main Committee meeting for September 2005. Volunteers are requested.

Presentations:

Presentations of interest are always welcomed at the main committee. This meeting we had the pleasure of two such presentations.

Tony Seegers did an excellent job of presenting D4's working group work on Impact of Distributed Resources on Distribution Relay Performance.

Mark Carpenter presented the I17's working group work on Trends in Relay Performance and did an excellent job as well.

We thank both Tony and Mark for outstanding contributions to our main committee meeting.