

**POWER SYSTEM RELAYING
COMMITTEE**

OF THE

IEEE POWER ENGINEERING SOCIETY

MINUTES OF THE MEETING

May 17-20, 2004

St. Louis, MO

Final
Approved at 16th September, 2004 Meeting

**Power System Relaying Committee
Main Committee Meeting Agenda
May
St. Louis, MO**

- | | | |
|-------|--|----------------------|
| I. | Call to order / Introductions | Taylor |
| II. | Approval of Minutes | Henville |
| III. | Reports of Interest | |
| | A. Chairman's Report | Taylor |
| | B. Technical Paper Coordinators Report | Winston |
| | C. PES Report | McDonald |
| | D. Cigre Report | Cease |
| | E. UCA Report | Burger |
| | F. EPRI Report | Hughes |
| | G. IEC Report | Udren |
| | H. Standard Coordinators Report | Sachdev |
| | I. Substation Committee Report | Tengdin |
| IV. | Subcommittee Reports | |
| | K - Substation Protection | Sufana |
| | H - Relaying Communications | Fodero |
| | J - Rotating Machinery | Conrad |
| | I - Relaying Practices | Ingleson |
| | C - Systems Protection | Novosel |
| | D - Line Protection | Carpenter |
| V. | Old Business | Taylor |
| VI. | New Business | Taylor |
| VII. | General Announcements | Taylor |
| VIII. | Presentations | |
| | Special Considerations in PLC for Protective Relaying
Fault Location on Transmission and Distribution Lines | Sanders
Zimmerman |
| IX. | Adjourn | Taylor |

Call to order / introductions

Taylor

Rick Taylor called the meeting of the IEEE/ PSRC Main Committee in St. Louis, MO to order at 8:00 AM on May 20th, 2004.

Approval of Minutes – Tampa meeting and misc.

Henville

The minutes of the Tampa meeting September January 12-15, 2004 were approved.

It was noted that the St. Louis meeting was expected to run at a loss since the registration fee of \$80 did not completely cover all meeting costs. However this loss was expected, to avoid the PSRC from having too large a reserve. For the May 2004 meeting, the financial support of a coffee break by Ameren was gratefully acknowledged.

Chairman's Report

Taylor

The PSRC meeting in St. Louis was a success in all respects. First and foremost, our attendance was excellent and the active participation by our attendees was continually evident by filled meeting rooms and lively debate. I wish to personally thank Charlie Henville and Miriam Sanders for the meeting arrangements and coordination. I would also like to thank Ameren Services, no doubt encouraged by Mike McDonald, for their contributions to the meeting financially, and with the time and efforts of several employees.

I am pleased to report that our ongoing efforts to make our standards and guides more accessible to the relaying community have been somewhat successful. The IEEE has agreed to make our guides available in an electronic format [.pdf] for a price of \$30. This price is less than ½ the price prior to this arrangement. However, I will continue to pursue an even lower \$10 or \$15 price for, at least, some of these guides. It is the PSRC position that this valuable work, if given wide distribution, will increase industry interest, and their participation, in our work.

In addition, in late 2003, a new compendium that includes all PSRC supported standards and guides was made available on CDROM. The price of this compendium, when last I checked, was below \$200. Purchase of the compendium or the reduced price guides can be accomplished by visiting the IEEE-SA web site. There is also a link to this site on the PSRC web site.

The PSRC is an all volunteer committee. All of our outstanding technical output is the product of volunteers. In addition, there are many individuals who quietly make other contributions to our success. I have previously mentioned Charlie and Miriam, who hold the very time-consuming secretary and assistant secretary positions. Others who deserve, but never expect, recognition for their mostly behind-the-scenes contributions include Bill Lowe and Moh Sachdev. Bill has performed the lion's share of building and maintaining our web site. Moh has tirelessly represented the PSRC in perhaps the toughest assignment we have, that of Standard's Coordinator. Next time you see one of these individuals, give them a pat on the back and a thank you and, while you are at it, give yourself one also for being a contributor to our winning team. Thanks.

Technical Paper Coordinators Report

Winston

There will be two PSRC sponsored Technical Ppaper sessions at the upcoming PES General Meeting in Denver. The Monday afternoon session, chaired by Charlie Henville and the Tuesday morning session, chaired by Alex Apostolov, will each have four papers presented. An additional 4 papers will be presented at the Poster Session. The PSRC is also co-sponsoring a panel related to the NE Blackout with the Technical Council. Mr. Tom Wiedman has agreed to represent the PSRC on this panel.

Twenty-one papers have been submitted to the PSRC for presentation consideration at the PSCE meeting in New York. To date, 16 have been accepted, 1 rejected, and 4 returned to the authors for corrections. The PSRC is sponsoring a Panel Session on Wide Area Protection and Control which will be Chaired by Damir Novosel

CIGRE Report

Cease

Approved Minutes of IEEE PSRC Meeting May 17-20, 2004

The 2004 General Session will be held in Paris as normal. The US has submitted 4 papers for consideration for the conference under the Protection and Automation Study Committee (SC-B5). There were 3 of the US SC-B5 papers accepted. A list of all US papers follows:

Title	Author(s)
Transformer Condition Assessment Experiences Using Automated On-Line Dissolved Gas Analysis	Stan Lindgren
PCB Rogowski Coils - High Precision Low Power Sensors	Ljubomir Kojovic
Use of Synchronized Phasor Measurement System for Enhancing AC-DC Power System Transmission Reliability and Capability	Bharat Bhargava
B5 Paper: Automated Setting of Relays for Transmission Line Pilot Protection	Paul F. McGuire
B5 Paper: A Stepped-Event Technique for Simulating Protection System Responses	Ashok Gopalakrishnan
B5 Paper: Automated Fault Analysis Using Advanced Information Technology for Data Integration and Information Exchange	Mladen Kezunovic
Dynamic Thermal Circuit Ratings - Improved Thermal Models for Substation Equipment	Ram Adapa
An Analytical Model for the Economic Assessment of RTO/SMD Implementation in the U.S.	Yan Lin

The preferential subjects for Sc-B5 are as follows.

PS1

Use and Benefits of Information Technology (IT) in Substation Automation, Protection and Local Control

- Use and Benefits in monitoring, operational planning, maintenance planning, asset management
- Quality of information: security, accuracy/validity, contemporariness, speed of acquisition
- Use and experiences of internet/intranet and WEB applications in Protection and Substation Automation
- Standardization issues for Substation Automation, Protection and Control: present situation and experiences, expectations and limits, IEC 61850 perspectives

PS2

The needs for software aids/tools in Protection Management and Engineering: application, databases, and testing/certification.

- Single entry databases for multi-user access, user interfaces, links with other bases
- Tools for protection settings and interaction with power system tools
- Tools for applying settings and for conjunctive operation of test equipment
- Documentation tools for life time management of protection equipment

The schedule for the sessions is shown on the following page.

The 2005 Colloquium will be held in Calgary, Canada. More details will be provided later.

CIGRE 2004

	Dimanche 29 août	Lundi 30 août	Mardi 31 août	Mercredi 01-sept	Jeudi 02 sept	Vendredi 03/09
LE PALAIS	16 h 00 Opening					
SALLE BLEUE	<i>morning</i>	OPENING PANEL	D1	B2	D2	B1
	<i>afternoon</i>	WORKSH OP DISTURB ANCES GENERAL ASSEMBL Y				
SALLE MAILLOT	<i>morning</i>		C3	A3	C4	
	<i>afternoon</i>					
SALLE HAVANE	<i>morning</i>		C2	C6	A2	B5
	<i>afternoon</i>					
SALLE BORDEAUX	<i>morning</i>	EPEE PANEL	B3	B4	C5	C1
	<i>afternoon</i>					
SALLE 252 A&B	<i>morning</i>					A1
	<i>afternoon</i>					
CE/SC	<i>morning</i>			A1		
	<i>afternoon</i>					

- A1 Machines électriques tournantes/Rotating Electrical Machines
- A2 Transformateurs/Transformers
- A3 Equipement à haute tension/High Voltage Equipment
- B1 Câbles isolés/Insulated Cables
- B2 Lignes aériennes/Overhead Lines
- B3 Postes/Substations
- B4 CCHT et électronique de puissance/HVDC and Power Electronics
- B5 Protection et automatisation/Protections and Automations
- C1 Développement et économie des réseaux/System Development and Economics
- C2 Conduite et exploitation des réseaux/System Control and Operation
- C3 Réseaux et environnement/System Environmental Performance
- C4 Performances techniques des réseaux/System Technical Performance
- C5 Marché de l'électricité et régulation/Electricity Markets and Regulation
- C6 Réseaux de distribution et production décentralisée/Distribution Systems and Dispersed Generation
- D1 Matériaux et technologies émergentes/Materials and Emerging Technologies
- D2 Systèmes d'information et télécommunications/Information Systems and Telecommunications

PES Report
No report at this meeting

John McDonald

EPRI Report
No report at this meeting

Burger

IEC Report

Udren

TC 95 Measuring Relays

TC 95 is forming a new Ad Hoc Working Group looking at needs and opportunities for functional standards. After years of developing electrical environment type testing standards to cover every possible influence, this functional deliberation gets closer to PSRC activity. We are seeking US WG members with broad background to contribute ideas. Traveling to meetings is desirable, but corresponding membership is also a possibility. It is important to bring eligible PSRC projects and activities for consideration by the AHWG. See WG I4 minutes posting for the IEC document describing the activity. Use contact information just below to contact E. Udren, the Technical Advisor to the USNC.

Just this week, TC 95 is posting the CDV for 60255-27, IEC Safety Standard for Protective Relays. This Standard reads like a collection of UL standards on the mechanical, construction, and materials requirements, but with some different specifics. It will have serious impact on relay design requirements, and on acceptability of existing designs in markets that will require 60255-27. It also could impact the role of utilities in selecting and installing relays that comply with formal industry safety standards. Earlier drafts have been circulated to the WG and publicized in IEC reports. This is the last chance for manufacturers or others to get comments to the IEC WG, and tougher to get them to accept changes now than before. Manufacturers should review this draft Standard and comment.

We do not post IEC Standards drafts on the PSRC web site, but contact Eric Udren at eudren@kema.us or 412-532-8739 if you would like a copy for review and comment.

See the Annex at the end of WG I4 minutes for an overview of 60255-27 contents.

TC 57 - Teleprotection and Power System Control

WG 10 keeps working on IEC 61850, Communication Networks and Systems in Substations, which defines a standard protocol for substation control and protection. Status of 61850 sections:

1. Introduction and Overview – International Standard (IS)
2. Glossary – IS
3. General Requirements – IS
4. Systems and Project Management – IS
5. Communications Requirements for Functions and Device Models – IS
6. Substation Configuration Language (SCL) in XML Schema – Final Draft International Standard out for yes/no only vote (FDIS)
7. -1 -Abstract Communications Services Interface (ACSI) Principles and Models – IS
-2 – ACSI – IS
-3 – Common Data Classes – IS awaiting publication
-4 – Logical Node and Data Object Addressing – IS
8. -1 – Mapping to MMS and ISO 8802-3 – FDIS
9. -1 – Sampled Values over Serial Unidirectional Data Link – IS
-2 – Sampled Values over ISO/IEC 8802-3 [Ethernet] Network – IS awaiting publication.
10. Conformance Testing – CDV issued

Other new 61850 work:

- Power Quality Models update to 7-4 amendment 1 (Basic Communications Structure – Compatible Logical Node Classes and Data Classes) – CD in development.
- Extension of common data classes for statistical and historical information – 7-3 Amendment 1, CD in development.
- Technical issues and amendments to all parts under discussion as real implementations are developed by vendors.
- WG 17 on DR and 18 on Hydro applications each need new logical nodes (LNs) added to 7-4.
- TC 88 Wind Power needs statistical and historical information, and is returning to use of 61850 now that it will have these extensions.

Standard Coordinators Report

Sachdev

The Standards Coordinator, Mohindar Sachdev, met with the Chairs of the Working Groups writing and revising standards documents at 8:00 AM / 9:45 AM on May 18, 2004 in Frisco Room, Hyatt Regency St. Louis Hotel, St. Louis, MO.

Naeem Ahmed, Standards Liaison for the PSRC discussed the procedures used for writing, revising, balloting and approval of standards documents.

The status of PARs, Standards and Guides, were reviewed at the meeting. The status of the PARs is summarized in this report. 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 January 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.

Information on	Web site address
Update your information with SA	http://standards.ieee.org/resources/development/
PAR application, extension and other forms	http://www.standards.ieee.org/guides/par/
Submitting a PAR	http://standards.ieee.org/guides/par/ePARform.html
PAR Extension	http://standards.ieee.org/guides/par/extension.html
Style manual	http://www.standards.ieee.org/resources/glance_at_writing_new.html
Template	http://www.standards.ieee.org/resources/glance_at_writing_new.html
Pre-balloting editorial review	http://standards.ieee.org/resources/development/
Up-load drafts for balloting	http://standards.ieee.org/eprocess/upload_balloting_file/
Request for invitation to ballot	http://standards.ieee.org/resources/development/
Join a balloting pool	http://standards.ieee.org/resources/development/
Submit request for initiating balloting	http://standards.ieee.org/resources/development/
Status of standards etc	http://www.standards.ieee.org/db/status/status.txt
NesCom activities	http://www.standards.ieee.org/board/nes/
RevCom activities	http://www.standards.ieee.org/board/rev/
SA Operations Manual	http://www.standards.ieee.org/sa/sa-view.html
SA Bylaws	http://www.standards.ieee.org/sa/sa-view.html
SB Operations Manual	http://www.standards.ieee.org/board/
SB Bylaws	http://www.standards.ieee.org/board/

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/Astandards.html>

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 JANUARY 2004 MEETING OF THE PSRC

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

1. Standards Published

PC37.106 Guide for Abnormal Frequency Protection for Power Generating Plants

2. Standards waiting to be Published

PC37.93 Guide for Power System Protective Relay Applications of Audio Tones over Telephone Channels

PC37.103 Guide for Differential and Polarizing Circuit Testing

PC37.115 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

3. Standards approved

PC37.93 Guide for Power System Protective Relay Applications of Audio Tones over Telephone Channels

4. Standards NOT approved

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

5. Standards submitted for approval

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

6. Standards to be submitted for approval

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

7. Standards Balloted

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

8. Standards submitted for balloting

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

9. Standards re-circulated

None

10. 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

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

11. Standard to be submitted for Re-affirmation

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

C37.113 IEEE Guide for Protective Relay Applications to Transmission Lines

The PARs approved since January 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.

12. New PARs applied for

PC37.232 Recommended Practice for Naming Time Sequence Data Files

13. New PAR approved

PC37.232 Recommended Practice for Naming Time Sequence Data Files

14. PAR Extensions applied for

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

PC37.102 Guide for AC Generator Protection

PC37.118 Standard for Synchrophasors for Power Systems

15. PAR Extensions approved

PC37.102 Guide for AC Generator Protection

16. PARs expiring at the end of 2004

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

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

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

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
- PC37.117 Guide for the Application of Protective Relays Used for Abnormal Frequency Load Shedding
- PC37.118 Standard for Synchrophasors for Power Systems
- 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	Standards Board Meeting
May 14, 2004	June 25, 2004
August 13, 2004	September 23, 2004
October 19, 2004	December 8, 2004
February 4, 2005	March 20, 2005

Substation Committee Report

Tengdin

IEEE Std™ 1613 Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations was published on August 12, 2003. At the time this standard was being developed by the Substations Committee Working Group, PSRC WG I6 had begun efforts to update IEEE C37.90. The then latest draft of PC37.90 was used as input to P1613. In the 2004 balloting of PC37.90, language allowing the specified impulse tests to be conducted in the field was objected to by a number of balloters. As a result, that language was deleted and its removal confirmed in a recirculation ballot. But the language allowing field impulse testing is in IEEE 1613-2003. Once PC37.90 has been approved by the Standards Board (with that field testing language no longer present), the Substations Committee Working Group intends to open a PAR for the sole purpose of deleting that field test language from IEEE 1613-2003, and thus stay in synch with C37.90.

Balloting has been successfully completed on P1646 Draft Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation.

Work continues in updating C37.1, the “SCADA standard.” The new title is “Standard for SCADA and Automation Systems”.

Task Force C3TF1 is at work on a recommended practice (P1615) for networked communications in a substation. This is an extension of IEEE 1379 “Recommended Practice for RTU to IED Communications” which was based on serial links.

Work is now complete on the revised version of the Automation Tutorial. It was presented at the IEEE T&D Expo in Dallas in September 2003 and will be given again at the June PES meeting in Denver.

OLD BUSINESS

None

NEW BUSINESS

None

FUTURE MEETINGS

September 13-16, 2004	Portland, OR	Doubletree Lloyd Centre
January 10-13, 2005	San Diego, CA	San Diego Marriot Del Mar
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

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

PES Prize Working Group for Technical Report was awarded to one of our working groups, " Application of Peer to Peer Communications for Protective Relaying"

We will institute a "Service Award" given on the multiples of 5 years working on the PSRC. E.g. 5,10,15,20..... It's hoped to get this underway at January 2005 meeting.

Members to give chair notice of working groups in their subcommittees whose work is completed so the appropriate award can be obtained from PES.

It was decided to nominate someone from the PSRC for the IEEE- SA International Award. The nomination will be submitted by May 31st.

Future awards were also discussed but deferred to September meeting.

B2: Fellows Awards

Chair: J.S. Thorp

Nothing to report.

B3: Membership Committee

Chair: M.J. Swanson

No written report

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 WG met on May 18, 2004 with four members in attendance. 2003 bibliography paper is being prepared and the first draft of the paper should be ready by end of June 2004. Mal Swanson will prepare the publicity report according to the requirements of the PSRC Chair and he will contact Phil Winston for the proper format. Tarlochan Sidhu will contact PSRC Webmaster (who was not

present at the St. Louis meeting) for posting the relaying bibliography compendium. Al Darlington will continue reviewing NERC reports as they become available.

B8: Long Range Planning

Chair: George Nail

No activity to report

B9: PSRC Web Site

Chair: Bill Lowe

Accomplishments:

- Digital photos of several past meetings have been posted.
- A web page listing all of the IEEE Fellows, that participate in the PSRC, has been developed and made available via the "What's New" page.
- All pages relating to the past and future meetings have been updated.
- A web page was developed to describe the function purpose of our email list. Instructions are provided to allow interested people to subscribe and unsubscribe.
- The "Published Reports" page has been reorganized in an attempt to make it easier to use and to find the various reports.
- The pes-psrc mailing list subscriber data and web email addresses have been updated per information that has been provided to me.

C: SYSTEM PROTECTION SUBCOMMITTEE

Chair: D. Novosel

Vice Chair: T. Seegers

The System Protection Subcommittee met on May 19th, 2004 at 4:30 PM in St Louis, Missouri. 47 people attended the meeting, including 18 members.

10 WGs met at this meeting.

The chairman asked for literature on blackout related matters to support activity headed by Mark Carpenter to collect PSRC materials to be made available to the industry.

WG Reports:

C1: Cyber Security Issues for Relaying

The C1 working group met with 6 members and 12 guests. John Tengdin made a presentation of Cyber Security Tools for SCADA and Substation Automation and the remaining time was spent on defining the outline of the report.

The assignment was not changed but the wording was slightly modified for clarity:

- To prepare a report documenting the status of cyber security standards **and to** recommend procedures and guidelines for cyber security for protective relays
- To provide a liaison to other agencies preparing cyber standards in fields related to relaying
- To provide timely review from a relaying perspective of draft documents prepared by other agencies

Furthermore, we decided that 'Cyber Security' as considered by this group should encompass all 'Electronic Data' as related to Relaying, i.e. both local and remote access should be included.

We extended the report due date from the previous May 2005 target to September 2005. This is still a very ambitious schedule. Hopefully, assignments can be handed out at the next meeting and a draft developed soon after.

Outline of the Report

The outline was discussed but not finalized to an extent to hand out assignments. The sections to be included are:

- Introduction
 - Scope; what is the intention of the report
- Need for access (section title to be suggested by Mark Simon)
 - Who and why should various groups have access to relay data
 - What data should be made accessible, or not accessible
- Access control
 - Local access
 - Passwords
 - Data/settings/configuration storage on devices (PC's) moved outside secure perimeter
 - Intrusion detection
 - Remote access
 - Passwords
 - Modem/telephone line (dial-up)
 - Wireless
 - TCP/IP VPN, Internet, Intranet
 - Firewalls
 - Encryption
 - Authentication
 - Intrusion detection
 - Virus protection
- Existing standards
 - Status

Even though no assignments were handed out it was commented that SEL's papers could provide information about password handling, and possibly also other aspects.

Some issues about network security (or lack thereof) were discussed and Joe Gould, RuggedCom, was invited to make a 'Networking Overview' presentation at the next meeting.

Dennis Holstein requested an Email Exploder on our behalf and the web site <http://grouper.ieee.org/groups/psrc/ctf1/> and several folders exist. Dennis has volunteered to be the administrator for these functions.

However, due to some problems the members email addresses are not posted. As soon as this is corrected, Dennis will send out an email to all members to let them know that the list exploder is working correctly.

Meeting minutes and documents produced or reviewed by the group will be posted on the website and the members will be notified when they are posted or updated. Everything that needs to go up on the website should be sent to Dennis Holstein (holsteindk@adelphia.net).

Liaisons

Cyber security tools for SCADA and Substation Automation

John Tengdin presented a 'Recommended Practice (AGA12) for the retrofit of serial SCADA links and the access to IED dialup maintenance ports' being developed by Gas Technology Institute. The presentation will be posted on our web site.

OPUS Publishing is involved in a development project for these security tools that involve both application software and hardware at the IED end. Trial installations are underway and we look forward to receive updates from John.

Cigré

CIGRE JWG D2/B3/C2 is developing a series of papers on cyber-security. They had initially invited C1 to a meeting in June but the meeting was postponed until some later date. Dennis Holstein will keep us informed about any requests from this CIGRE working group.

C2: Power Quality Issues in Protective Relaying

Chair: T.W. Cease

Vice Chair: S. Kunsman

C2 met Tuesday May 18, 2004 in St. Louis, MO with 6 members and 7 guests present. The total number of members is 26.

No additional comments or writing sections have been turned in since the last meeting. TW Cease and Steve Kunsman will take the report content, add the summary, conclusion and make editorials for the final draft report. The report will be issued for ballot by July. Comments and ballot responses are to be received by the end of August and will be presented at the next WG meeting in September. The report will be concluded at that meeting.

Steve Kunsman will find an IEC and EN expert in Europe to comment on section 3.4 & 3.5.

TW reviewed the open action items from last meeting. Actions complete from last meeting:
Section 3.6.1 Writing assignment on issues of PQ monitoring and relays - Steve Kunsman

Again - all members have been asked to review the document. The latest version of the document will be posted on the IEEE PSRC C Subcommittee website under WG C2. The link to the PSRC site will be provided in the distribution of the minutes along with the document.

Old Issues:

Eric Gunther will identify other IEEE PQ documents that can be used for inclusion or reference in the C2 document.

Eric Gunther proposed that the C2 document be provided to the IEEE Standard Coordinating Committee 22 that is the PQ coordinating body for all of the IEEE. They can review and provide comments to the C2 working group.

Action Items:

1. Section review assignments due June 24, 2004
Section 6 – Roger Hedding
All sections – all members
2. Additional writing assignments due June 24, 2004
Section 3.6.3 Application of ITI Curve for Distribution Networks - Patrick Carroll
Summary/Recommendation paragraph on next steps to the paper - Eric Udren
3. Eric Gunther to distribute a recently published paper on PQ in Word format. Sections maybe used for inclusion in the paper.
4. Update and provide comments on bibliography - Sidhu
5. TW to send out a ballot document requesting PSRC members for comments and approval.

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

Chair: Steve Kunsman

Vice Chair: Gary Kobet

Working Group C3 met Tuesday, May 18, 2004 in St. Louis, MO in a single session with 8 (of 21) members and 15 guests participating. Five of these guests requested to become new members increasing the total membership to 26.

There was some discussion concerning the intended output of the working group (paper, report, guide). The general consensus was that the nature of the material being covered did not warrant a guide. It was subsequently decided that the output of the working group, at least for now, will be a PSRC report, with an associated Transactions paper summarizing the report. Target date for completion is 2006.

The balance of the session was taken to review the draft outline and enlist more volunteers for the different sections. The different volunteers were noted on the latest draft outline, which will be e-mailed to all members and interested guests. Discussion items of note include:

- The review of relay event records for system faults provides an opportunity to validate the system short circuit model and determine correct/incorrect or expected/unexpected relay operation. This idea was to be included in the section on the Relay Setting Process.
- The issue of quality control was discussed, and it was decided that the writers of the sections on quality control and handling of different firmware versions should review the latest draft of the I3 WG to avoid duplication of effort/material. The target of this paper is implications of these issues for the utility and on the quality of relay settings developed and applied by the utility, not so much on vendor quality control/assurance.
- Since the WG output will be a PSRC report, the references will be moved to the end of the document.

A first draft for each section should be sent to the Chair/Vice-Chair by August 16, 2004, so that the sections can be combined into a first overall draft of the report, which will be reviewed at the September meeting. Reminders will be sent in June and July to each section owner.

Next meeting request single-session, 30 participants, with computer projector.

Action Items:

- 1) Refine the Outline Section details and start working on the section content. A first draft of the section is due August 16, 2004 - **Outline section owners and assistants**
- 2) Send any relevant references to vice-chair for inclusion in Reference section – **All members**
- 3) Send any suggestions for needed definitions to vice-chair for inclusion in Definitions section – **All members**

C4: Industry Experience with Remedial Action Schemes

Chair: V. Madani

Vice Chair:

WG C-4 held its first meeting for one sessions today with total 19 in attendance. Ten (10) attendees signed up to be WG members.

a) Review of Assignments

The attendees discussed a list of topics including:

- Types of schemes to be included in the survey - Should the survey encompass (wide area, UF, UV, any form of none-conventional, or should it focus on the complex schemes
- Should UV load shedding schemes with multi-station be included?

- Focus the survey such that responses are clear and provide the reader with useful information

NERC 2002 definition of SPS and RAS schemes was posted for the attendees to review and discuss as a starting point.

A proposal was made for the WG members to check the Regional Councils web sites or definitions of SPS and / or RAS to verify if there are differences than the NERC definition and to help the WG with preparing a definition for the type of schemes the survey should include.

WG Chair is also coordinating with PSRC CIGRE liaison.

Recommend we continue to use terminology consistent with industry practice and familiarity

C5: Deployment and Use of Disturbance Recorders

Chair: W.M. Strang

Vice Chair: A. Napokowski

The meeting was called to order at 4:30 P.M. Tuesday, May 18, 2004 with 8 members and 10 guests in attendance. Jim Hackett of Mehta Tech joined the working group as a member. Chairman Barry Jackson resigned as chairman due to time constraints of the job. Bill Strang assumed the chair. Tony Napokowski will be the vice-chair. Tony was unable to attend this meeting due to a conflict in working group schedules.

Outstanding assignments were reviewed, Alex Apostolov indicated he will submit outline section 2 by e-mail following this meeting. Additional writing assignments were made to complete the open sections of the outline. These writing assignments are requested to be e-mailed to the chairman by July 15. They will be added to the initial draft and posted on the working group web site prior to the next meeting. The chairman will also attempt to edit a draft prior to the next meeting for a single voice.

Larry Smith reported that due to interest in the time stamp response of various IEDs to a change of current magnitude, he had conducted a preliminary test of a number of units by various manufacturers and designs. The initial results showed interesting results. Larry will analyze these results and submit a report to the working group intended as an annex to the paper.

C6: Relay Engineering in Power Engineering Curricula

Chair: S.S. Venkata

Vice Chair: J. DeLaRee

Working group C-6 met with four members and five guests. The meeting was conducted by Juan M Gers. Copies of the minutes of the last meeting in Tampa, Florida were distributed. During the meeting the content of a course on electrical protections at senior elective level or 1st year graduate was discussed. The course will be made up by self-contained, stand-alone modules.

It was agreed to distribute by e-mail the content that was discussed, so that members and guests can review it and present additions and/or modifications prior to the next committee of C6 group when the course content should be defined and the modules allocated among members for writing and development.

C7: Protection System Testing

Chair: V. Madani

Vice Chair: H. DoCarmo

WG C-7 Met on May 18 in two sessions with total 40 (20 M, 20 G) in attendance:

b) Review of Assignments

The WG members reviewed several contributions and exchanged comments and observations and also had a presentation by Mladen Kezunovic.

Writing assignment topics discussed included:

- a. Interlocking and Control functions inherent to the protective schemes will be included in the writing assignments for the purpose of system testing
- b. Balance of security vs. dependability (Out of step). Importance of line testing
 - i. Testing for various types of faults, applying faults to different phases and inception angles, closed loop tests (dynamic / non-linear tests).
 - ii. One of the examples discussed is about the recent newsworthy events that have captivated our attention (August 14, 2003) and whether methods of system testing would be able to identify some of the contributing elements in advance to be rectified.
- c. Testing of combination of devices as a system
- d. Open-loop and closed loop system testing solutions
- e. Cost effective and easy-to-use techniques
- f. Flexibility for adjusting / adopting to system changes
- g. Each section to reflect on the incremental differences of system testing in comparison to the conventional test methods, and the advantages of new protection system testing.
- h. Discussion on the scope clarification to include Control functions associated with protection.

Suggested Updated Scope:

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, reactors, 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.

Interlocking and Control functions inherent to the protective schemes will be included in the writing assignments

- c) **One presentation** by Mladen Kezunovic covering

New ways of using permanent test installations, field units and lab set-ups to evaluate / trouble shoot protective relay operations

Test philosophy, experiences and trends for system testing and statistical performance analysis of functions within a device

C8: Phasor-Based Models for Analyzing Relay Performance

Chair: M. Meisinger

Vice Chair: M. S. Sachdev

The Working Group did not meet during the PSRC meetings in St. Louis, MO.

The Vice Chair reported that editorial changes suggested in Draft 9 were incorporated in Draft 10, which was submitted to the members of the C Subcommittee for comments of substance. No such comments were received. The draft was then submitted to the Officers of the PSRC for approval.

The approval was received. The paper will be now be submitted for publication in the IEEE Transactions on Power Delivery.

Subcommittee will keep the wg active pending discussion.

C9: Application of Protective Relays used for Abnormal Load Shedding and Restoration

Chair: A. Apostolov

Vice Chair: K. Behrendt

Met with 9 members and 11 guests

The working group met on Wednesday, May 19th, with 9 members and 11 guests present. Draft 4 of the document had been circulated, with an informal working group survey to solicit comments.

The working group discussed the schedule for proceeding to ballot the document:

- resolve internal negative responses by May 19th (today)
- submit revised document (Draft 5) to IEEE Editor by June 18th
- revise Draft 5, based on Editor's comments by July 15th
- convert document to pdf and upload to the IEEE Web Site by July 31st.

The remainder of the session was used to review comments. The one negative response was resolved. Additional comments will be sent to the review committee for review and incorporation into Draft 5.

C10: Effects on Changing Utility Environment on Protective Relaying

Chair: J. DeLa Ree

Vice Chair: R. Hunt

Working group C-10 met, Tuesday, May 18, 2004 with 15 attendees.

Version 5 of the WG Report was distributed to all members and interested guest.

Discussions centered around editorial changes necessary to make the report more readable. Version 6 of the report will be submitted to Sub-Committee C for final approval. After acceptance from SC-C the recommendation of the Working Group is to be dissolved.

C11: Protection Issues during System Restoration

Chair: T. Sidhu

Vice Chair: D. Tziouvaras

The working group met on May 18, 2004 with 5 members and 6 guests in attendance. The paper was balloted successfully by the working group and sent to the subcommittee and officers for comment/approval. At this meeting, the comments received from Charlie Henville were discussed and resolved. Bill Kennedy and Alex Apostolov agreed to give a final reading to the paper. The paper will then be sent to IEEE for publication in the "Transactions on Power Delivery."

Power System Analysis, Computing & Economics Committee Liaison

by Malcolm Swanson

No activities to report

NERC by Phil Winston

NERC is initiating a zone 3 application review. We are the body to respond as the experts on relaying. We currently have 9 PSRC members on the review group.

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

No activities to report

Old Business

C Web site has been updated

New Business

Stan Horowitz proposed a new working group to investigate performance of protective systems on protected equipment during stressed conditions including discussion of dependability vs security.

Subcommittee approved forming a task force with the title: **TF12 Performance of Relaying during Stressed Conditions**

As Stan will not be available to come to our next meeting, George Bartok/Damir Novosel will chair the task force to meet in September.

D: LINE PROTECTION SUBCOMMITTEE

Chair: M. Carpenter

Vice Chair: Roger Hedding

D1: Cold Load Pickup Issues and Protection

Chair: Tony Napikoski

Vice Chair: Dean Miller

The working group met for the first time with 11 members and 5 guests Tuesday afternoon. Dean Miller is vice chairman. We discussed the assignment to prepare a report on cold load pickup and inrush issues and their effect on protection. We also discussed possible literature sources on the subjects.

Pat Carroll of WE Energies presented the results of the last survey of distribution practices for the questions in the survey on cold load pick up.

An outline for the report was started. Several writing assignments were made.

Pat Carroll of WE Energies also made a presentation on three events on the WE Energies distribution system showing circuits being energized after automatic reclosing. These three examples demonstrated three very different levels of inrush.

Next meeting requires one session for 25 people and a computer projector.

D2: Fault Locating PC 37.114/D7 Guide for Determining the Fault Location on Transmission And Distribution Lines

Chair: Karl Zimmerman

Vice Chair: Damir Novosel

The working group did not meet.

The guide has been balloted with 100% affirmation. Awaiting feedback from IEEE editorial staff. Staff is to review the week of May 17th. Results expected by the end of May. A recirculation of the guide is required after edits

No meeting required in September.

D3: Impact of Distributed Resources on Distribution Relay Protection

Chair: Tony Seegers

Vice Chair: Ken Birt

Working group D3 met on Tuesday, May 18, 2004. 10 members and 15 guests attended the meeting.

Draft 6.0 of the paper was accepted. Tony Seegers will accept minor changes until the paper is posted on the PSRC web site.

The paper will be published on the PSRC web site and presented at the regional relay conferences.

A power point presentation for the conferences is being prepared by Rich Hunt. The first draft should be ready in June.

Presentations

WPRC – 2004 – Dean Miller

Georgia Tech –

MPSC – Pratap Mysore

Texas A&M

PSRC main committee meeting – January 2005

Power Generation Conference

Distribu Tech –

Clemson –

NWPPA –

Iowa – Nebraska System Protection Seminar – Ken Birt

Others volunteering as presenters :

Don Sevcik

Rich Hunt

Ron Beazer

Tony Seegers

For the September no meeting will be scheduled.

D5: Guide for Protective Relay Applications to Distribution Lines

Chair: W. P. Waudby

Vice Chair: R. Crellin

The working group met in a double session with 37 attended. (22 members and 15 guests).

After introductions and a review of the guide status, we discussed comments on the following six "special application" writing assignments:

- 8.2 Automation
- 8.7 Distributed Generation
- 8.8 Capacitor Banks & SVC
- 8.9 Communications
- 8.12 Static Var Compensators
- 8.16 Resonant Grounding in Distribution systems

We had a lot of good discussions and assigned three new volunteers to revise the appropriate sections to include comments and investigate suggestions to the document.

We discussed and voted to remove the capacitor banks and SVC (8.8) and static Var Compensators (8.12) clauses because these two topics did not directly effect the distribution line protection practices.

We anticipate completing our review of the remaining clause 8 special application writing assignments at our September meeting.

Writing assignments and document comments are due June 30th.

Next meeting requires a double session for 40 people and no a/v requirements.

D6: Out of Step Considerations on Transmission Lines

Chair: M. McDonald

Vice Chair: Mukesh Nagpal

The WG met in a single session on Tuesday May 18th with 13 members and 18 guests.

25 copies of Draft 3 of our 34 page paper was distributed for guests and members who had not brought their emailed copy with them.

The chairman briefly covered many of the changes incorporated in Draft 3. Changes included incorporating Stan Horowitz's comments, an updated section 5 from Juergen Holbach, a new section from Peter Kemp on Power System Stabilizers, Demetrios' computer simulations plots of power swings of two source and multi-source power swings, a small section addressing testing, captured relay events relating to out-of-phase closure of a breaker and the resulting end of line zone 1 trip on the power swing, re-formatting the entire document, and re-writing sections 1, 2 and 3 for readability and content.

Discussion of the contents of the draft led to the following:

1. At least one additional method of detecting power swings will be added in Draft 4.
2. There is a recognized need to point out the merits and downfalls of each method
3. Guidance is needed in determining the proper method to apply
4. Bill Kennedy volunteered to provide a section covering the above and welcomed any input from others within the next 2 weeks.

The chairman requested the WG members review all existing material and provide any comments within 3 weeks so that we can quickly move forward as soon as the material is received from Bill.

The intent is to have draft 4 produced by mid-June.

D7: Loss of AC Voltage Considerations

Chair: E. Price

Vice Chair: R. Patterson

Working Group D7 met with 8 members and 5 guests. Draft 2.2 of the report on LOV Considerations was reviewed for content purpose and completeness. There still remain shortcomings that need to be addressed before a literary and technical editing process can begin.

The following contribution assignments were made with a completion date of July 16:

Gary Kobet

- LOV application problem during Watts Bar Nuclear event.
- Write a section on Other Application . . . UV, frequency, load shedding, cap bank, voltage differential, etc.

- Russ Patterson
 - Elmo Price
 - Walter McCannon
 - Greg Sessler
 - Don Lukach
 - Rich Young
- Restructure Draft 2.2 of the [word] document to provide section and paragraph numbers.
 - Add words under technology to address 60 and 21 devices.
 - Edit paragraph after Table 2 that incorporate Art Buano's comments. Review with Art.
 - Backup hard disk.
 - Consider Mark Carpenters comments about a bus load of breakers going into LOV where CCVT fails.
 - Add figures under "AC Voltage Circuit Configurations"
 - Redo all figures in Visio. Send Visio files to Elmo.
 - Write up under LOV Options –add more options that can be done under LOV conditions.
 - Write a discussion on other [than blown fuses] LOV cases. E.g. relay gets potential from VT, but separated from VT by bus tie breaker.

Next meeting Requirements: Single meeting, 20 persons, computer projector

D10: EMTP Reference Models for Transmission Line Relay Testing

Chair: K. Mustaphi

Vice Chair: T. Sidhu

The working group met on Wednesday, May 19, 2004 with 6 members and 3 guests. The WG Report has been sent for balloting. The ballots are due to the chairman by May 31st. The working group decided to write a summary paper and have it published in the IEEE Transactions on Power Delivery. Kalyan Mustaphi and Tarlochan Sidhu will prepare the paper and send to wg members for discussion at the September meeting. Comments from the ballot will also be discussed.

Next meeting : one session, 15 people, no a/v

DTF2: Zone 3 Setting Applications

The task force met with 30+ attendees. Eighteen attendees expressed interest in becoming members of a working group should one be formed (later in the meeting it was determined to form a working group).

Stan Horowitz gave presentation on origin of forward reaching Zone 3 relays. His presentation gave the history of why they were first used.

Randy Horton gave presentation on line ratings and their impact on Zone 3 settings.

Tom Weidman gave some insight into Recommendation 8a. Tom worked on the NERC committee that produced these recommendations. Tom said that the system operators need 20 minutes to shed load once a problem has been recognized. Tom stressed that 55 million customers were without power. He suggested that we come up with a way to set Zone 3 that would allow the line to be overloaded for up to twenty minutes.

Good, spirited discussion ensued.

Someone mentioned that they set their Zone 3 to handle the worst case power swing. It was mentioned that relays should be set to ride through all recoverable swings. It was also mentioned that distance relays should not be used to provide overload protection.

Loadability – The document that comes from this working group should reference this issue.

Performance structure from the NERC August 14th blackout investigation team.

Good discussion ensued.

Mark Carpenter asked to broaden the title to “Distance Relays”. Another gentleman asked for “Overreaching Distance Relays”. Stan Horowitz wanted to limit the scope to Zone 3 – its need and how to set it. Randy Horton agreed with Horowitz.

It was a consensus of the group that a working group be formed.

A vote was taken to change the title. The title was changed to “Application of Overreaching Distance Relays”

Volunteers For Write Up and Possible Presentation For Next Meeting

Bill Kennedy (Loadability)
Tony Napikowski
Guy Colpron

Simon Chano
John Burger

New Business

Frank Plumtre asked for a discussion on tapped connections at HV and EHV levels. What is the utility practice on allowable bus arrangements for such taps. What are other issues written into interconnect agreement ? A lengthy discussion ensued with several different guides given from different utilities.

Gary Kobet proposed a task force to discuss justification of pilot protection on transmission lines. Can you still operate a line if pilot channel is faulty ?? This will become a task force at the September meeting. DTF 4. Chaired by Gary.

High Impedance Fault Activity

Several instances of high impedance fault activity were reported by Hydro Quebec, BC Hydro, and United Illuminating Co.

Motion to adjourn

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, May 18th, 2004 with 6 members and 3 guests in attendance.

After introductions the agenda and draft 3 of the working group report were distributed. Murty Yalla also distributed a document with tables showing the primary wireless standards in use today, including 802.11 and 802.15. It was suggested that 802.16 should also be added. Also included in the document is a list of other spread spectrum radios from various manufacturers that use proprietary, non-standard protocols. Murty agreed to summarize the table and remove references to specific manufacturers.

Writing contributions from Mark Simon and Veselin Skendzic were then discussed. The following changes were agreed upon:

- Mark Simon will provide additional radio references.
- Table 5.4 will be deleted
- Veselin and/or Mark Simon will expand the section on repeaters
- Section numbers will be checked and revised as necessary
- John Distefano's writing contribution on path engineering will be moved to the Appendix
- Future Trends will include protection and control functions for series capacitor banks, and other applications where isolation is required between equipment at different voltage levels.

This should complete the writing assignments. Hopefully the next draft (Draft 5) will be final. The working group will be surveyed before the next meeting to determine if we agree that the report is ready to be submitted to the Main Committee. A revised draft document (Draft 4) will be posted on the H2 web site as contributions are received.

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

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, C and D 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

Met on Wednesday, May 19, 2004 at 8:00AM
24 in attendance. 13 Members and 11 guests

Summary:

The group was given a presentation on common protection functions of various relay types. The purpose was to show that there are common functionalities that can have standardized names agreed upon. Alex will provide a spreadsheet to be circulated to all members, and members are requested to comment on and add to the spreadsheet for various relay types. Several members volunteered for specific additions and reviews.

At the next meeting we will review the additions and comments/

Presenter:

Alex Apostolov, Areva

Presentation: Functions and Sub-functions of common relay types

Proposed Scope of group (from January 2004 meeting):

Define an XML IED Configuration File format using the IEC 61850 Substation Configuration Language

Limitations on scope (from January 2004 meeting, reaffirmed May 2004):

- a) Will not define a method for representing user-defined Logic in a standardized format/language. That task should go to a parallel or follow-on group.
- b) Will extend but not change or conflict with IEC 61850 standard
- c) Will not act as a standalone black-box description of the behavior of an IED. The I.L. and possibly other information on the device will still be necessary for understanding the behavior of the IED.

Issues:

At next meeting:

- a) Discuss and agree on functions and sub-functions
- b) Make writing assignments

Next meeting requirements: Room for 30, Computer Projector Required

H5-B: Common Format for IED Event Data

Chair: M. Adamiak

Vice Chair:

Output: Recommended Practice

Expected Completion Date: 2005

WG H5-b met with a number of members and guests. A strawman proposal for the common format was reviewed and several changes were suggested. In particular, the goal of modeling the event information around the IEC 61850 log format was re-iterated, however, it was noted that the proposed information in the report goes beyond the information presently available in the log alone. As such, it was identified the event record would have to be post-processed in order to combine all the needed information (such as incorporation of fault reports and analog event values). A revised version of the strawman will be created by Christoph Brunner and issued for review before the next meeting.

Other discussions included the need to be able to merge multiple event files from multiple IEDS. As a result, the decision was made to include the data reference of each event item in order to facilitate data sorting. Additional discussion addressed the concept of development of a "standard list" of event items. In particular, it was noted that all data items and attributes are potential sources of event data.

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, May 19th, with 8 members and 6 guests present following concurrent sessions with H5-a and H5-b. The meeting minutes from Tampa were reviewed and approved by the committee. The H5-c chairman reviewed the Tampa meeting topics and announced that the planned presentation by Eric Gunther would be postponed until the next meeting due to a schedule conflict of Eric's. Therefore a revised agenda was made to discuss the topics of Data Formats and Data Types presently in the COMTRADE standard and any known issues. A presentation of the PQDIF standard supported Data Formats and Types was reviewed and discussed. This resulted in an initial agreement of what Data Types are missing in the present COMTRADE standard and that a short report with recommendation would be planned for H5-d for future consideration. The chairman will prepare a draft of the report and circulate to members & guests.

An active discussion then focused on the need for a road map to parse existing Comtrade sample data (DAT) formats into the equivalent PQDIF formats including the reverse application. It was recognized that

this would be necessary as IED's continue multifunction expansion and would assuredly include PQDIF requirements. It was also agreed that a key product of this committee should be a report detailing this road map. Lossless conversion between the standards is the goal. Additionally, any necessary extensions or modifications to the PQDIF standard found during this investigation would be submitted to the proper subcommittee to achieve this goal. A further investigation to ensure IEC 61850 sampled data compatibility with the COMTRADE standard both present and future was recommended. It was mentioned that a Guide or Recommended Practice might be needed so a recommendation will be included in the report if deemed necessary. Assignments for the reports will be forthcoming based on the draft to be circulated by the chairman.

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 30 with PC projector and screen as part of a triple session.

H5-D: COMTRADE Issues

Chair: Ratan Das

Vice Chair: Amir Makki

Output: Recommended Practice

Expected Completion Date: 2005

The Working Group H5-d, COMTRADE Issues, met in Illinois Room, Hyatt Regency St. Louis Hotel, MO at 9:30 AM on May 18, 2004. Twelve members and fourteen guests were present. One guest joined the working group.

Minutes of the Previous Meeting: The minutes of the January 2004 meeting held in Tampa, FL were approved as distributed via Email and handed out during the meeting.

Discussion on Presentation:

The meeting started with the discussion on the Presentation by Erich Gunther at the Tampa meeting. Members agreed that PQDIF standard addresses different requirements. Application of PQDIF standard and conversion of data from COMTRADE to PQDIF or vice-versa should be addressed by H5-C WG.

Discussion On Assignments

1. Discussions were held on the assignment (Item C) on Combining the four files into a single file format or into two files. Members agreed that INF, HDR files are rarely used. Assignment needs to be modified in line with the discussion to address the advantages and disadvantages of having one or two files.
2. Discussions were held on the assignment (Item A) on relaxing the standard's file name convention (8.3 DOS Format). Members agreed that it is necessary. However, members felt that file name should be such that files can be transferred from one computer to another or copied into the CD.
3. Members expressed their concern of adopting the H8 convention alone (Item B) and want flexibility in using the file name. Submitted assignment will be divided into two parts and Item B will be submitted to Vahid Madani for comments.
4. Members suggested to use the name 'Calculated Channels' instead of Virtual Channels in item F.
5. Following Assignments were distributed earlier:
 - A. Relaxing the standard's file name convention (8.3 DOS format)
 - B. Adopting the Naming Convention reported by the H8 working group to name COMTRADE files.
 - C. Combining the four (INF, HDR, CFG, DAT) files into a single file format. Other proposals included combining the 3 (INF, HDR, CFG) information files in one file and leaving the data file as a separate file.
 - D. Addressing the dynamic sampling issue.

- E. Handling various types of implementations of the format
 - F. Modifying the standard to allow for scripting of Calculated Channels or Software Channels (analog and digital).
 - G. Compatibility issues related to the 1991 and 1999 versions
 - H. Saving large files to multiple floppy disks.
 - I. Impact of 61850 on COMTRADE standard
6. Following Assignment was distributed at the meeting:
- J. Issues related to Binary Files

Assignments A, B and C require re-writing. Assignments E and H has been submitted and enclosed for review and comments. Assignments D, F, G, I & J are due by July 16, 2004 along with revised assignments A, B and C.

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

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

Not available yet.

H8: FILE NAME CONVENTION

Chair: A. Makki

Vice Chair: Ratan Das

Established: 2003

Expected Completion Date:

The Working Group met on May 18th with 9 members and 8 guests present The minutes from the last meeting were discussed and approved.

The Chair notified the members that the initial PAR application was submitted and approved and that the group, now designated P37.232, is officially tasked "to write a Recommended Practice for naming time sequence data (TSD) files such as transient records, event sequences and periodic logs."

Copies of the PAR application were distributed and discussed. An error in the Reason section was reported by one of the present members. The error will be corrected at the next scheduled time for PAR submittal to allow reasonable time for other corrections, additions and due deliverables.

A number of additional issues were raised regarding the 2001 TSD Naming Convention report. An equivalent number of members volunteered to address these issues by writing summary reports and making "short" presentations at the next meeting.

The group will meet again during the upcoming fall meeting. A room for up to 25 people with a computer projector and white screen 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 9:30 am on Wednesday, May 19 in a double session. Ten members and five guests were present.

Draft 4.2 was distributed. Changes from the last Draft were highlighted, discussed, and approved/revised. All of the outstanding comments were addressed. Based on this discussion, additional writing assignments were made.

Revisions will be included in the Final Draft which will be distributed to Working Group members prior to the September meeting.

H14: Telecommunication Terms Used by Protection Engineers

Chairman: Roger Ray

Vice Chairman: Ray Young

Established: ?

Output: ?

Expected Completion Date: ?

H14 met on Tuesday, May 18, 2004. Introductions were made.

There were 6 members and 3 guests present.

The group discussed the direction to go with our task. The conclusion of this discussion was to write a WG report. Mal Swanson took on the task of scanning 3 books of terms and running them thru an OCR Program. The resultant OCR file will be divided into 4 parts. Oscar Bolado, Mal Swanson, Roger Ray and Marc Benou will check over these parts and correct the OCR errors. The goal is to get this completed by mid-March. Then we can put together all the terms into one document to begin reviewing at the next meeting in May. We will need a room for 10-15 people & no projector.

Task Force Reports

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 13 members.

Discussions started with a short technical overview of the topic for the benefit of the new members. Mark Simon provided latest update on the FCC activities, and the ongoing efforts of providing technical input in front of PSRC to FCC.

Initial draft of the subcommittee report was circulated for comments. It was proposed that the work be wrapped up at the next meeting, unless we can find volunteers for a technical presentation on the topic.

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

HTF3: Asynchronous Fiber Optic Multiplexers

Chairman: Bill Higinbotham

Established: 2004

Expected Completion Date: ?

Minutes not available.

Liaison Reports

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

No report is yet available from PSCC. January meeting in San Diego.

2. Substation Committee - J. Tengdin

The PES Substations Committee met in April in New Orleans. Balloting is complete on P1646, and the document is being submitted to the Standards Board for approval. Work continues on updating and revising PC37.1 - Standard for SCADA and Automation Systems. The members of the C Subcommittee are looking forward to the joint meeting with PSRC in September.

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

This is reproduced from the IEC Report, and the WG I4 report, elsewhere on the PSRC web site.

WG 10, 11, and 12 have reorganized into a single WG to continue with IEC 61850, Communication Networks and Systems in Substations, which defines a standard protocol for substation control and protection. Status of 61850 sections:

11. Introduction and Overview – International Standard (IS)
12. Glossary – IS
13. General Requirements – IS
14. Systems and Project Management – IS
15. Communications Requirements for Functions and Device Models – IS
16. Substation Configuration Language (SCL) in XML Schema – Final Draft International Standard out for yes/no only vote (FDIS)
17. -1 -Abstract Communications Services Interface (ACSI) Principles and Models – IS
- 2 – ACSI – IS
- 3 – Common Data Classes – IS
- 4 – Logical Node and Data Object Addressing – IS
18. -1 – Mapping to MMS and ISO 8802-3 – FDIS
19. -1 – Sampled Values over Serial Unidirectional Data Link – IS
- 2 – Sampled Values over ISO/IEC 8802-3 Network – FDIS
20. Conformance Testing – CD

There is a new project for section 7-401 on power quality data, work on communications systems for distributed energy resources, and for hydro plant monitoring and control.

WG 15 is working on cyber security issues. There have been multiple efforts within IEEE to coordinate PSCC, Substations, PSRC, and SCC 36 security work with the IEC WG

Coordination Reports

Old Business: None

New Business: None

I: RELAYING PRACTICES SUBCOMMITTEE

Chair: J. W. Ingleson

Vice-Chair and Webmaster: T. S. Sidhu

Chair: J. W. Ingleson

Vice-Chair & Webmaster: T. S. Sidhu

Past Chair: J. G Gilbert

The Relaying Practices Subcommittee (SC) met on May 19, 2004 in St. Louis, MO. Introductions were made, and an attendance list was circulated. The recorded meeting attendance was 24 Subcommittee Members and 12 guests.

The minutes of the previous meeting were approved with no changes.

The Chairman reported on some brief items from the Advisory Committee meeting.

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 May meetings of the PSRC. The Chairman reported that the editors suggestions on the changes needed for the approved guide were received and approval of the changes was communicated to the editors. The guide is expected to be published during the next four to six weeks.

I2: Terminology Usage Review

Chair: M. J. Swanson

Vice-Chair: J.D. Huddleston, III

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

The I2 Working group met at 11:00 am on Tuesday May 18, 2004 with seven members. Mal Swanson chaired the meeting. After some discussion regarding procedures for terms approved by the Committee, Mal volunteered to ask Rick Taylor for his help. The Working Group also discussed recognition for Jim Huddleston's many years of service to the Working Group, as well as the PSRC as a whole. Mal will check with Rick Taylor for Committee ideas. The Working Group then reviewed terms from various documents.

1. Terms from the Audio Tone Guide C37.93 were approved.
2. Terms from the Fault Location Guide C37.114:
 - a. Re-defined five terms, which will be approved off-line, since this document is in final approval. Other terms are in a definitions section of this document and will, therefore, be approved through the balloting procedure.
 - b. Defined "apparent impedance: the ratio of voltage to current at a relay location."
 - c. Defined "infeed: current into a fault at some location on the system between the fault and the location of a relay that alters the voltage at a relay location."
3. Terms from the Generator Ground Protection Guide C37.102:
 - a. Three words were in a definitions section but are not in the IEEE dictionary. "GSU transformer" and "hybrid ground protection scheme" were approved as submitted. The third, "phantom tertiary," will need to be discussed with the Chairman of that group.
4. Terms from C37.90.2:

- a. The Working Group suggested that the Chairman change the term, “antenna drive” to “signal strength.”
- b. The term, “digital pulse synchronization” needs to be defined by the C37.90.2 Working Group and submitted to the I2 Working Group.
- c. The term, “far field” is in the definition section of document.
- d. Fred Friend will discuss the other terms with the Chairman of C37.90.2.
 5. PC57.13.1 was reviewed; no new terms needed definition.
 6. C37.102 was reviewed; no new terms needed definition.
 7. Fred Friend will review C37.117.
 8. Oscar Bolado will review C37.231.

The meeting was adjourned at 12:15 pm.

I3: Microprocessor-based Protection Equipment Firmware Control

Chair: R. Beresh

Vice-Chair: D. Weinbach

Output: Recommended Practice

Bob was not able to attend this session so Dave Weinbach led the meeting. I3 met at 3:00 Tuesday, May 17th with 4 members and 10 guests in attendance. There were 6 utilities represented, much more utility participation than in previous meetings – as requested at the January meeting. The meeting commenced with introductions, handed out draft 4 document. The remainder of the meeting was spent in review of draft 4 with significant contributions from many members and guests. After reviewing the document, editing assignments were made. Writing assignments are due to Bob Beresh one or before July 1st, 2004.

I4: IEC Standards Advisory

Chair: E. A. Udren

Vice-Chair: M. M. Ranieri

Output: IEC Standards Advisory

The WG met on May 19 and discussed the following:

TC 95 Measuring Relays

TC 95 is forming a new Ad Hoc Working Group AHWG1 looking at needs and opportunities for functional standards. This gets closer to PSRC activity. If the US can propose a WG member – now is the time. Through public announcement, we see on behalf of the USNC traveling, or at least corresponding WG members with broad background to contribute ideas. It is important to bring eligible PSRC projects and activities for consideration by AHWG1.

See IEC document 95/158 DC, posted on this web site, for more information on the project. Contact Eric Udren at eudren@kema.us or 412-532-8739 if you have interest.

Just this week, TC 95 is posting the CDV for 60255-27, IEC Safety Standard for Protective Relays. We've had no US comments yet – this is the last chance for manufacturers or others to get comments to the IEC WG, and tougher to get them to accept changes now than before. Manufacturers should review this draft Standard.

The draft is e-mailed to WG/TAG members. WG members, and anyone else indicating interest, should submit comments by August 15.

Earlier drafts have been circulated to the WG and publicized in IEC reports. PSRC members have not contributed the expertise to comment on the mechanical, construction, and materials requirements. This Standard reads like a collection of UL standards, but with some different specifics. It will have serious impact on relay design requirements, and on acceptability of existing designs in markets that will require 60255-27. It also could impact the role of utilities in selecting and installing relays that comply with formal industry safety standards.

We do not post IEC Standards drafts on the PSRC web site, but contact Eric Udren at eudren@kema.us or 412-532-8739 if you would like a copy for review and comment.

See Annex at the end of these minutes for an overview of 60255-27 contents.

TC 57 - Teleprotection and Power System Control

WG 10, 11, and 12 have reorganized into a single WG to continue with IEC 61850, Communication Networks and Systems in Substations, which defines a standard protocol for substation control and protection. Status of 61850 sections:

1. Introduction and Overview – International Standard (IS)
2. Glossary – IS
3. General Requirements – IS
4. Systems and Project Management – IS
5. Communications Requirements for Functions and Device Models – IS
6. Substation Configuration Language (SCL) in XML Schema – Final Draft International Standard out for yes/no only vote (FDIS)
7. -1 -Abstract Communications Services Interface (ACSI) Principles and Models – IS
- 2 – ACSI – IS
- 3 – Common Data Classes – IS awaiting publication
- 4 – Logical Node and Data Object Addressing – IS
8. -1 – Mapping to MMS and ISO 8802-3 – FDIS
9. -1 – Sampled Values over Serial Unidirectional Data Link – IS
- 2 – Sampled Values over ISO/IEC 8802-3 [Ethernet] Network – IS awaiting publication.
10. Conformance Testing – CDV issued

Other new 61850 work:

- Power Quality Models update to 7-4 amendment 1 (Basic Communications Structure – Compatible Logical Node Classes and Data Classes) – CD in development.
- Extension of common data classes for statistical and historical information – 7-3 Amendment 1, CD in development.
- Technical issues and amendments to all parts under discussion as real implementations are developed by vendors.
- WG 17 on DR and 18 on Hydro applications each need new logical nodes (LNs) added to 7-4.
- TC 88 Wind Power needs statistical and historical information, and is returning to use of 61850 now that it will have these extensions.

Annex – Extract from January 2002 WG I4 Agenda

IEC 60255-27 Protective Relay Family Specific Product Safety Standard - we knew it was coming....

- No response to attempts to get US participation - US is out of the WG process.
- Will determine new tests for CE Mark - manufacturers' issue.
- Driven by EC regulatory process.
- Based on Generic IEC 61010 safety standards - not free to change outside that framework.
- IEC WG attempts to get a consistent set of requirements out of 60255-5 and 61010.
- Looks generally like a UL verification program, but all the specifics are different. (Note - UL 3111 is close to IEC 61010).

· Key concept - categories of circuits with regard to voltage and user exposure and safety :

ELV - Extra low voltage - 50 Vac, 75 Vdc

SELV - Safety ELV - ELV and separation from dangerous voltages

PELV - Protective ELV - ELV plus insulation and grounding protection

HLV - Hazardous live voltage circuit

Ways in which user could be exposed and is protected under normal or single-fault conditions determine product design.

· Key concept - For insulation design, creepage and clearance, and impulse testing - interaction of

-Rated circuit operating voltage

-Overvoltage category (application environment)

-Pollution degree (contaminants, moisture, and enclosure protection)

-Altitude

-Tracking properties rating of insulation surface

-Ratings and user exposure to the proximate insulated circuit or conductor (ground, or something else?)

-Derived from 60255-5

Overview of Contents

- Product must be safe for normal and single-fault (insulation failure) conditions.
- Protective ground or double insulation needed between things user can touch and HLV circuits.
- Direct contact - test fingers, straight and with joints.
- Clearances from circuits that are live or could become live due to a single fault.
- Discharge time of capacitive energy storage (50 microcoulombs).
- Paint and paper insulation don't count
- Labeling for hazardous accessible circuits.
- Fault modes of impedance protection.
- Protective classes - grounded metal, double or reinforced insulation, hazardous voltages accessible or via single fault.
- Verification of ground bonding impedance, and design for long-term performance.
- Leakage currents.
- Solid insulation requirements and tests.
- Creepage and clearance figures, tables, and examples.
- Unsafe-voltage control schemes - survive 20 hits from a 2 ohm source.
- Tests for single faults of user protection barriers; one of two elements at a time.
- Ground disconnection is a fault to deal with.
- Controlled devices must be energized - heaters, motors, etc.
- Transformer secondaries are shorted. Short hazardous circuit to part when heating occurs.
- Put fault on output circuit which can cause fire or hazard.
- Heating - wait up to 1 hour for a secondary fault, or up to 4 hours if degradation is still occurring.
- Test voltage withstand after single fault.
- Electric burn test circuit - 30 to 500 kHz.
- Heating and temperature burns - temp rise <65 C; single fault produces no fire, dangerous gases, flying parts.
- Mechanical safety - no crush, cut, pierce, or pinch of flesh.
- Smooth and round edges - normal and maintenance.
- Connections and connectors - strain withstand and relief, cable sizes, IEC wire standards.
- Flammability - materials and design.
- Enclosure construction for fire protection of non-limited circuits.
- Spreading of fire - wrap in flammable material and apply fault.
- Requirements for components - this document and IEC component standards.
- Supply capacitors; transformers and coil devices (a lot on acceptable construction); electromechanical components (switches and relays), connectors and terminal blocks; high-integrity parts. No semiconductor barriers.
- Explosion protection; battery concerns.
- Documentation, marking and packing requirements.
- How to show operating ranges and specs. Fuse type indications.
- Type tests - dry heat operating; dry heat storage; cold storage; damp heat operating; shock; vibration; seismic; bump; clearance and creepage impulse; IP rating (enclosure protection); hi-pot; insulation resistance; protective ground impedance; ground continuity; materials & components flammability; thermal continuous withstand; thermal short-time; single fault conditions.
- How to get our arms around this new work - largely outside PSRC expertise - try to involve UL and get to one program for relay manufacturers.
- Problem - interacts with some PSRC C37.90.0 requirements.

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

The WG met on May 18 to review a limited number of changes from Draft 11 to Draft 12 of PC37.92. Draft 11 was to be the version for balloting, but the IEEE Standards Board raised an objection to the title, which was "Standard for Low Energy Analog Signal Inputs to Protective Relays." They wanted a definition of the energy level included in the title.

We resolved this problem to their satisfaction by changing the title to "Standard for Analog Inputs to Protective Relays from Electronic Voltage and Current Transducers." The PAR has been revised. The WG reviewed PC37.92 Draft 12, which includes the new title plus minor wording changes throughout the text to eliminate references to the energy level of the interface (although the maximum signal power level and one per unit signal voltages were and still are precisely and numerically defined). The WG discussion pointed to a handful of additional revisions that will still be counted as part of Draft 12 to be submitted for rebaloting. The Draft 11 .pdf file posted on this web site in May of 2004 will be replaced with Draft 12 when mark-up and figure changes are complete.

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 WG met to review our spreadsheet for the C37.90 D14 negative only ballot comments, and the final draft of our re-circulation letter for C37.90 D15. Additional information added to the spreadsheet was reviewed in detail and accepted by the WG. The WG chairman met after the WG meeting with Naeem Ahmad, of IEEE, to get recommendations for the preferred method for submitting detailed documentation for the negative ballot comments and resolution in the re-circulation package. This documentation will be compiled by the WG chair into the preferred IEEE format and will be sent along to the WG prior to submittal of our re-circulation package.

We expect that the completed re-circulation package will be uploaded in the IEEE web site prior to June 21.

I7: Revision of C37.90.3, Electrostatic Discharge Testing for Protective Relays

Chair: J. Teague

Vice-Chair: J.T. Tengdin

Output: New IEEE Standard C37.90.3

This WG has completed its assignment and has been disbanded with thanks by the Subcommittee. See WG web page for background information.

I8: Revision of C37.90.1, Standard Surge Withstand Capability Test

Chair: J.G. Gilbert

Vice-Chair: J. Teague

Output: Revision of IEEE Standard C37.90.1-1989(R1994)

This WG has completed its assignment and has been disbanded with thanks by the Subcommittee. See WG web page for background information.

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

The WG met on May 18, 2004 with seven members and three guests in attendance. PAR will be revised to change scope. The WG discussed and resolved the IEEE/PSRC editorial comments. After these changes are made, the draft standard will be put for electronic balloting.

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

Chair: M. Nemier

Vice-Chair: M. Bajpai

Output: Revision of IEEE Standard C37.9

There were 4 members in attendance: Marie Nemier, Subinoy Mazumdar, Mario Ranieri and Jeff Burnworth. Harmonization with IEC 60255-21 part 3 was discussed. As an action item, all members are to

review IEC 60255-21 part 3 and sections 4 & 5 of C37.98. At the following meeting, assignments will be made for each member to revise the standard to allow for harmonization if possible. Where harmonization is not possible, an item will be added to a table in a new addendum.

I11: Survey of Relay Test Practices

Chair: E. Krizauskas

Vice-Chair: W.G. Lowe

Output: Conference Paper

This working group was disbanded with thanks by the SC. For more information see the WG web page.

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)

The Working Group met in one session with 5 members and 1 guest present. Comments from the ballot of Working Group members on Draft 5 of the revised guide was distributed, discussed and changes incorporated. Draft 6 revision of the guide will be submitted to the IEEE editor.

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 Jefferson/Knickerbocker, The Hyatt Regency Union Station Hotel, St. Louis MO on May 18, 2004. Six members and three guests were present.

The Chairman reported that Draft 5 was revised in the light of the discussions at the January meeting. Draft 6 of the guide was balloted in the working group and was approved or approved with comments (ballots were received from all members of the WG - 100% approval). Draft 6 was also submitted to the Standards Association (SA) Editors for review. Changes suggested by the editors and the WG members were incorporated in Draft 6 generated Draft 7. This was submitted to the SA for balloting. Invitations to Ballot have been issued and will close on June 13.

Some additional assignments were made. V. Rebbapragada will write up an Annex B (informative) discussing the practices described in the guide with those of the other IEEE standards. Also, he will send the latest draft of IEEE Std. 525 to M. Sachdev. It would be useful to add a figure to Annex A describing why a ground shield is brought back through a window-type CT for proper operation. Finally, M. Sachdev will prepare a two-page summary paper for publication in the "Energy and Power" magazine of the IEEE PES.

The working group will meet at the September 2004 meeting to review the result of the balloting and resolve any negative ballots if they are not resolved by then.

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 four members and four guests. The PAR for this WG expires at the end of 2004. It was decided that WG should go forward and attempt to complete the balloting process by the end of Sept. 2004. If the WG is unable to submit the Oct. 19th deadline, then a PAR extension application will be submitted.

I16: Understanding Microprocessor-Based Technology Applied to Relaying

Chair: M.S. Sachdev

Vice-Chair: R. Das

Output: Guide

The Chairman reported that the draft of the document was submitted to the members of the I Subcommittee for comments of substance. The comments received were editorial in nature. The comments were posted and the report was submitted to the officers of the PSRC for approval. The approval was received and the final document was posted on the WG website. Hyperlinks have also been added on the PSRC Main Committee website and the I Subcommittee website, After a brief discussion on the plans for future work, the meeting was adjourned.

On a recommendation of the WG Chair, the Subcommittee agreed to disband the WG.

I17: Trends in Relay Performance

Chair: W.M. Carpenter

Vice-Chair: J.D. Wardlow

Output: Special Report

The Working Group met on May 18, 2004 with 3 members and 9 guests. The performance data from 2003 was presented. A total of 4 years of data has been collected. Four companies participated in all four years, and 5 other companies participated in a fewer number of year. One company's data was inadvertently omitted from the tabulation. It will be added, the report put on the Web, and a presentation made in the future to the main committee. The committee will not meet again until the January meeting. The Working Group will continue to annually update the report.

I18: Harmonization of IEEE C37.90.2

Chair: J. Burnworth

Vice-Chair: W. Higinbotham

Output: Revision of C37.90.2

The working group met with 7 members and 3 guests.

The results and comments received from the recent ballot were reviewed. The ballot results were as follows:

Ballot Summary

PC37.90.2 Revision

Closing date: 2004-02-22

1. This ballot has met the 75% returned ballot requirement.

69 eligible people in this ballot group.

55 affirmative votes

1 negative votes with comments

0 negative votes without comments

1 abstention votes

=====

57 votes received = 82% returned

1% abstention

2. The 75% affirmation requirement is being met.

55 affirmative votes

1 negative votes with comments

=====

56 votes = 98% affirmative

One negative ballot was received. Discussion with the submitter resolved the reason for the submittal. It was agreed that an email from the submitter would be sent to the chairman as evidence of the negative ballot resolution.

Of the 49 comments received, 3 were identified as technical and the balance as editorial. The working group reviewed all comments, and rejected 2 of the 3 technical comments for incorporation. The 3rd technical comment will be discussed with the submitter for clarification.

Since all accepted comments were of editorial nature, it was agreed by the working group to pursue submittal for approval of the draft standard. Implementation of the editorial changes can then be performed during the IEEE editorial phase of the final document.

Action Items:

Jeff Burnworth

1. Review/discuss technical comment received from Ron Westfall.
(note: Completed 5/19/04. Comment is editorial, add clarification only).
2. Respond to all submitters of comments.
3. Submit draft for approval by IEEE.

I19: Analysis of Substation Data

Chair: L.E. Smith

Vice-Chair: B.A. Pickett

Output: Special Publication

This WG was disbanded with thanks by action of the Relay Practices SC on May 22, 2002. The I19 final report is available on the WG web page.

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 ITF2 first meeting was held on Monday, May 18 with 19 members.

The agenda included:

1. Introduction,
2. PPT presentation on Rogowski coils, and
3. Discussion to develop a guide on the Application of Rogowski Coils used for Protective Relaying Purposes.

All attendees unanimously supported development of the guide with suggestion that work be coordinated with other WGs on non-conventional sensors.

This TF will meet at the September PSRC meeting in Portland, Oregon.

Guide Contents (subject to change):

1. Overview
 - 1.1 Scope
 - 1.2 Purpose
2. References
3. Definitions
4. Principle of Rogowski coil operation
5. Different types of Rogowski coils
6. Performance characteristics (linearity, accuracy, sensitivity, frequency response)
7. Installation considerations (installations, grounding, and shielding)
8. IEC Standards on instrument transformers (relevant to Rogowski coils)
9. Testing (type, routine, and field testing)
10. Interface requirements with relays
11. Applications for protective relaying
12. Bibliography

Annex: Other non-conventional technologies for current measurements

ITF3: Conducted Electromagnetic Interference

Chair: W. Higinbotham

Vice-Chair: J. Burnworth

This TF has been disbanded with thanks by action of the Subcommittee.

ITF4: Optical Current and Voltage Sensor Systems

Chair: H. Gilleland

Assignment: Report to Subcommittee

ITF4 Objective:

- Determine if there was a need for and sufficient interest by PSRC members for the Task Force to recommend that a Working

Group is set-up to develop Guide or a Standard for optical current sensor technology in relaying applications.

ITF4 Activity:

- The Task Force held four working sessions to discuss the issues related to this assignment. The meetings were all well attended, and there were a lot of spirited discussions.

ITF4 Recommendation:

- The Task Force decided to recommend that a PSRC Working Group be established to develop a Guide for the "Application of Optical Current and Optical Voltage Sensor Systems for Protective Relaying."

- The Guide would address both current and voltage optical sensor system technology.

- Other non-conventional low-energy technologies, such as Rogowski coils, will be included as an Annex in the Guide.

- The Guide will address the issues and needs of PSRC members – it is not intended to duplicate or conflict with standard activity in-work or already completed.

HITF5: Common Formats for Protection IED Data

Chair: A.P. Apostolov

This work is mainly in the scope of the Relaying Communications Subcommittee and has been transferred to that group. Reports will no longer appear under this SC.

6 & 7. Liaison and Coordination Reports:

Instrument Transformers SC of the PES Transformers Committee and Revision of C57.13-1993, IEEE Standard Requirements for Instrument Transformers:

The Transformers Committee last met in San Diego this past April. The Minutes for the that meeting are not yet available. An up-dated report will be available when these Minutes are posted.

Liaison from the Instrument Transformers Subcommittee:

No report

Coordination for W.G. PC57.13 (Revision of the C57.13 Standard: General Requirements for Instrument Transformers (Tom Nelson, Chair).

The 1993 Revision was re-affirmed.

Coordination for W.G. PC57.13.6: Instrument Transformers for Use with Electronic Relays and Meters, (Chris Ten-Haagen, Chair):

The results of the Ballot were expected by time of the San Diego meeting.

See the Transformers Committee web page at <http://www.Transformerscommittee.org> for further details.

P384-NPEC, Standard Criteria for Independence of Class 1E Equipment and Circuits

Draft PAR was circulated to Ad COM on may 8,2000. Revised PAR approved A00-2 on 3/17/01 by Stds BD through 12/05.revision in progress.

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

9. New Business:

The chair indicated that PSRC is collecting documents related to 'Blackouts' for posting on the web. If anyone wants to recommend a document for inclusion, please contact the Chair of the Vice-Chair of this Subcommittee.

J: ROTATING MACHINERY PROTECTION SUBCOMMITTEE

Chair: S. P. Conrad

Vice Chair: W. G. Hartmann

The subcommittee met with 12 members and 10 guests in attendance.

J1: Revision of C37.106-1987 Guide for Abnormal Frequency Protection for Power Generating Plants

Chair: G. Benmouyal

Vice Chair: E. Fennell

Output: Revise Guide Transaction Paper

The Working Group (WG) did not meet in St. Louis. The Guide has been published and is now available from IEEE-SA.

The WG has completed its assignment and has disbanded. The SC appreciates the work performed by the WG.

J3: Protection of Generators Interconnected with Distribution System

Chair: E. Fennel

Vice Chair: R. Pettigrew

Output: Transaction Paper

The Working Group (WG) met with 11 members and 16 guests.

The WG recommended a new WG/Task Force or a second paper to report on wind farms. Mike Reichard has done some work in this area. Other sources of information should also be investigated.

The WG also discussed whether to include other technologies (i.e. micro-turbines, fuel cells, etc.). This WG's activity is focused on synchronous machines sized 3MVA or less.

The J-SC chair requested the WG chair to provide a description of the proposed WG or second paper.

J4: Revision of C37.102 AC Generator Protection Guide

Chair: M. Yalla

Vice Chair: K. Stephan

Output: Revised Guide

This meeting of Working Group J4, C37.102 IEEE Guide for AC Generator Protection was held on Tuesday, May 18, 2004, with 13 members and 19 guests in a double session.

Draft 4 of the guide was issued before this meeting and the changes from Draft 3 were discussed. Major discussions included incorporating upcoming changes in C50.13 Standard Requirement for Cylindrical Rotor Synchronous Generators (allowable field overcurrent and negative sequence withstand), setting and use of distance backup protection from the generator terminals (including one or two zones), volts per hertz time delays, and general comments on cleaning up figures and text.

Writing assignments are due June 18, 2004.

J5: Generator Protection Setting Criteria

Chair: C.J. Mozina

Vice Chair: M. Reichard
Output: Paper

The Working Group (WG) met with 14 members and 6 guests.

The majority of the meeting was spent reviewing Draft 4 of the paper. The paper is to be submitted to the SC for approval prior to the September meeting.

J6: Performance of Generator Protection During System Disturbances
Chair: S. Patel
Vice Chair: K. Stephan
Output: Transaction Paper

Working Group J6 met on Wednesday, May 19, 2004, in a single session with 5 members and 5 guests.

The paper has been submitted and accepted as a Transactions paper by the IEEE. IEEE has sent the chair the publication proof and the chair has accepted the proof. The paper is awaiting publication. The paper is available on the PSRC website until it is published by the IEEE.

The WG discussed the possible effect the August 14, 2003 blackout had on this Working Groups recently completed report. The WG felt at present, there is not enough technical information available to warrant an addendum or additional work to the J6 paper. However, it was emphasized that the final NERC report is forthcoming on the recent blackout. It was agreed that the WG should continue in September and review this report. In addition, the June PES General Meeting will feature a panel session discussing issues of the August 14 blackout. Slides from the J6 presentation at a previous PSRC main committee meeting will be offered for use in the panel discussion.

J7: Revision of C37.101, Generator Ground Protection Guide
Chair: J.T. Uchiyama
Vice Chair: R. Das
Output: Revised Guide

The Working Group J7, met on May 19, 2004. Seven members and six guests were present. The minutes of the May meeting held in Tampa, FL were approved.

Chair Joe Uchiyama is in Afghanistan for one-year military service assignment. He will continue to hold the position of the chair. Vice-chair Ratan Das will take on the responsibility of the chair. However, he will continue to hold the position of the Vice-chair. Mike Reichard will take on the responsibility of Co-Vice Chair and assist in completion of the work, in absence of the chair. We will request to extend the PAR, which expires this year, for two more years.

Discussions were held on the present Draft 5 which incorporates all the comments. Members will get a copy of this draft tomorrow and provide comments by end June. Draft 6 will be sent to members by July 31. Comments on revised draft are due by August 31, 2004. Draft 5 was sent to IEEE for pre-ballot format approval in April 2004.

JTF1: "Protection of VFD Motors" Task Force
Chair: J. Gardell
Vice Chair: R. Das
Output: TBD

The Task Force (TF) met in a single session with 6 members and 6 guests.

The TF would like include information from an Electric Utility's application(s) of VFD. If you have such please provide information to Jon Gardell.

Liaison Reports

Electric Machinery Committee

C.J. Mozina

The committee will meet in Denver in conjunction with the PES General meeting. Drafts of C50.12 and C50.13 are referenced in the J4 WG guide (PC37.102).

IAS I&CP Committee

C.J. Mozina

Four good papers discussing grounding of industrial machines are available in the IEEE-IAS Jan/Feb '04 Transactions. These papers include the "hybrid" grounding scheme which may be considered in limiting short-circuit damage. Additional EMTP investigation of hybrid grounding is discussed in the Mar/Apr transactions as well.

The generator grounding WG is continuing its investigation of hybrid grounding to address concerns raised by the PSRC members. Their work is to produce a paper addressing basic equipment requirement, and report on EMTP studies of transient voltages due to the switching. Case studies have been agreed to and programming is underway. The WG next meets in October 2004.

Coordination Reports

P958-EDPG, Guide for Adjustable Speed Drives

J. Gardell

Draft of the Guide is available from Jon if you wish to provide comment.

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

Coordination complete.

K: SUBSTATION PROTECTION SUBCOMMITTEE

Chair: C. R. Sufana

Vice Chair: F. P. Plumptre

The Subcommittee met Wednesday May 19, 2004, at St. Louis, Missouri with 20 members and 14 guests attending. The minutes of the previous meeting in Tampa were approved.

ITEMS OF INTEREST FROM THE ADVISORY COMMITTEE MEETING:

Charlie Sufana reported:

1. Through the efforts of Rick Taylor, price of IEEE protection guides has been reduced to \$30. These guides are pdf based documents ordered over the internet (refer to the "Whats New" link near the top of the main PSRC web page.
2. Regarding the NE black-out, it is requested that all sub-committee members look for documents that could be put on line <PSRC web site> related to this subject. For example these could include: underfrequency load shedding, Response of Z3 relays. Al Darlington reported that he produced a paper at 1978 Georgia Tech on response of underfrequency relay operation in the Florida system during a disturbance. Sub committee members to submit documents to Charlie Sufana.

3. On an individual basis, PSRC members are encouraged to solicit contacts in other utilities to inform them of activities of the PSRC. This includes reference to the PSRC web site.
4. FYI to sub-committee members there are no copywrite issues nor is a PAR required for web based PSRC documents.

Reports from the WG Chairs

K1: GUIDE FOR THE PROTECTION OF TRANSFORMERS AGAINST FAULTS AND ABNORMAL CONDITIONS

Chair: Mohindar Sachdev

Vice-Chair: Pratap Mysore

Established: 2003

Output: Subcommittee Report

Expected Completion Date: 2008

K1 working group met in one session on Wednesday May 19, 2004 with 13 members and 11 guests. Comments on draft 1 were discussed. Five new assignments were made. Draft 2 will be circulated before the next meeting. WG plans to meet in one session at the next meeting with a seating capacity for 35 participants and with a computer projector.

K2: BREAKER FAILURE PROTECTION

Chair: R.A. Hedding

Vice Chair: A. CHAUDHARY

Established, 2001

Output: ANSI C37.119

Expected Completion Date: 2006

Draft 3

K2 met with 20 members and 16 guests in a single session Tuesday morning, May 18, 2004. Draft 4 date April 22, 2004 was distributed to those who requested a copy. Several clauses were discussed. Some writing assignments were given. After the next meeting, we should be ready to send the DRAFT to IEEE editors for editing. Then ballot. We are looking to finish the assignment on time.

For next meeting need a one session for 40 participants plus 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 3

Met 5-19-04 with 5 members and 9 guests.

Draft 4A was reviewed.

Writing assignments were made.

Next meeting- single session for 20; computer projector

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 3 members and 3 guests.

The draft is being submitted to the Standards Association. Format of the document requires some tweaking.

Plan is in place to review ballots at the Sept. meeting.

Next session need a computer project plus meeting room for 15 - 20 people.

K5: APPLICATION OF COMMON PROTECTIVE FUNCTIONS IN MULTI-FUNCTION RELAYS

Chair: Simon Chano

Vice Chair: Dean Miller

The working group met in one session with 16 persons showing interest in becoming members of the WG. 10 guests also attended the meeting.

The title and scope of the WG was discussed in detail and revised as follows.

Scope: "Develop a document that addresses the considerations in applying the auxiliary protection and control functions that are common in multiple function relays and the integration of these functions into the overall protection system"

Assignments were given out for the next meeting in September The WG agreed to have a two session meeting with a request for multi-member presentations discussing breaker failure applications and automatic reclosing.

The WG expressed the need to invite more utility people in becoming members of the WG.

Next meeting: two sessions, computer project for 40 people.

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 10

The Working Group met on Tuesday, May 18, 2004, in one session with 3 members and 1 guest. We discussed the changes in draft 10 that came about as a result of a pre-ballot editorial review conducted after the January meeting. This included cleaning up the References clause, adding an Abstract and Keywords, and adding a definitions clause. Draft 10 is ready to be converted to PDF and uploaded to the IEEE to begin the formation of a balloting body. The uploading will be done by June 1.

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 May 19, 2004, with 9-members and 1-guest in attendance. The chairman of K10, Bill Ferro, has apparently resigned based on his last email to the group, so the vice chairman Jerry Johnson held the meeting.

We reviewed the progress of P1547.1, .2, .3, and .4 (April meeting in San Francisco) and discussed how information should flow from the 1547 working groups to K10 and back.

- IEEE P1547.1- Draft Standard for Conformance Tests Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems, will be balloting their standard in the Aug Sept time frame.
- IEEE P1547.2- Application Guide for Interconnecting Distributed Resources with Electric Power Systems" draft 1 will be available for review in the Sept time frame.
- IEEE P1547.3 - Draft Guide For Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems draft 1 will "hopefully be available for review in Sept time frame.
- IEEE P1547.4 – Draft Guide for the Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems plans to have its first meeting at the August 1547 meeting.

We discussed the future of K10 and support of the membership. Support is still strong and people feel a need to continue the process as long as relaying decisions are being made in the SCC21 working group. We also want to set up presentations at future meeting that deal with the actual installation of DG on a utility system; what were the utility guidelines for connecting DG, how did it go, what has been the operating performance, what changes to feeder relaying had to occur to accommodate the DG, etc.

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

Working Group K13 met at 3:00 PM on Tuesday May 18. Seven members and three guests were present.

Draft 8.0 of the Guide was distributed. From the January meeting several members were asked to provide a final technical review of select sections of the Guide. Considerable discussion took place to clarify comments from this review to arrive at a consensus by the Working group. A few remaining issues will be addressed by WG members to be included in the final draft.

All of the comments and writing assignments will be included in the Final Draft. This draft will be balloted by the WG prior to the September meeting.

Liaison Reports:

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

Coordination Reports:

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

1.a) ANSI/IEEE Switchgear Standards F. Plumtre.

No update

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

No update

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. PC37.74 Standard Requirements for Subsurface Vault, and Padmounted Load-Interrupter Switchgear and Fused Load-Interrupter Switchgear for Alternating Current Systems up to 38 kV, Roger Hedding.

C37.74 was approved and published in 2003. The guide is available through IEEE for \$55.00.

Coordination with this group should end.

7. ANSI/IEEE Switchgear Standards, Vittal Rebbapragada

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

The document continues with Revision 15 to be posted to the IEEE website during June 2004. We expect to ballot this document before the next meeting in Tucson. Minor corrections to the format are being made for clarity of presentation.

The attendees at HVS discussed a proposal by the Chair concerning the next PAR. The Chair believes that a new PAR should be obtained after PC37.30.1 is approved to start work on a new document that will harmonize PC37.30.1 with existing IEC documents. We should obtain the IEC base documents and add the PC37.30.1 ratings, requirements, etc., to the IEC base document. The creation of the new document will highlight the areas that require harmonization.

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./ Frank Plumtre reported on concerns with tapped IPP connections on transmission lines. The basic problems are

a./ desensitization of ground relays if the IPP main transformer is a source of ground fault current.

b./ system overvoltages if the HV IPP connection is delta (made delta to resolve the first problem in a./)

Charlie Sufuna referred to a Con Ed 100 p book with IPP guidelines. In addition Vahid Madani, Pacific Gas and Electric; P. G. Mysore, Excel Energy; Simon Chano, Hydro Quebec; Dean Miller, PacificCorp agreed to provide relevant information to Frank Plumtre.

2./ Mike Thompson and Vahid Madani were welcomed as new sub-committee members.

3./ Steve Grier reported on experience with gel cel batteries. After 5 years in-service quite open cct'd cells. Need to do load tests. Gel cels can fail with out warning. Applications that Steve was referring to were part of circuit recloser installations.