POWER SYSTEM RELAYING COMMITTEE

OF THE IEEE POWER and ENERGY SOCIETY

MINUTES OF THE MEETING

Jan. 10–13, 2011

Atlanta, GA

Final

Power System Relaying Committee
Main Committee Meeting Agenda
Jan, 13, 2011
Atlanta, GA
12:30 – 4:30 PM

I. Call to order / Introductions	**Bob Pettigrew**
II. Approval of Minutes/Financial Report	**Mike McDonald**
III. Reports of Interest	**Bob Pettigrew**
A. Technical Paper Coordinator's Report / Future Meetings	**Roger Hedding**
B. CIGRE Report	**M. Adamiak**
C. IAS Power System Protection Committee	**Chuck Mozina**
D. IEC Report	**Eric Udren**
E. Standard Coordinator's Report	**Jeff Gilbert**
F. Substation Committee Report	**Craig Pruess**
G. NERC Report	**Eric Allen**
H. Other Reports of Interest	
IV. Advisory Committee Reports	**Bob Pettigrew**
B1. Awards/ Recognition	**Oscar Bolado**
V. Subcommittee Reports	**Bob Pettigrew**
C- System Protection	**Solveig Ward**
I - Relaying Practices	**Bob Beresh**
K - Substation Protection	**Pratap Mysore**
H - Relaying Communications	**Veselin Skendzik**
D - Line Protection	**Russ Patterson**
J - Rotating Machinery	**Kevin Stephan**
VI. Presentations	**Mike McDonald**

"Application of Common Protective Functions in Multifunction Relays"
Roger Whittaker

VII. Adjourn **Bob Pettigrew**

I. Call to order / Introductions – Bob Pettigrew

Chairman Bob Pettigrew called the meeting to order at 12:30 pm
After introductions, a quorum was verified.
New Main Committee members were acknowledged.

II. Approval of Minutes & Financial Report – Mike McDonald

The minutes of the Berkeley September 2010 meeting were approved noting the change required to the I SC leadership. We had no financial obligations at this meeting.

Chairman's Report – Bob Pettigrew

I am pleased to announce that 11 new main committee members have been appointed. These appointments are based on the individual's contribution to the PSRC and membership in a subcommittee. The new Main committee members are:
Eric Allen, Galina Antonova, Roy Ball, Rick Cornelison, Dominick Fontana, Meyer Kao, Sungsoo Kim, Aaron Martin, Sam Sambasivan, Sudhir Thakur, & Ilia Voloh
Congratulations to these new Main committee members.

I also want to recognize two of our members who were recently awarded the status of IEEE Fellow. Congratulations to Chuck Mozina and Rick Taylor.

Thanks again to everyone who slogged through the snow to get to the Atlanta meeting.

III Reports of Interest

A. Technical Paper Coordinator's Report – Roger Hedding

Power Systems Conference and Exposition (PSCE)

March 20-23, 2011 at the Wyndham Phoenix Downtown Hotel, Phoenix, AZ
Theme: "Next Generation Grid - Putting it All Together"

The paper submission site opened in July and 9 papers were submitted to PSRC for review. Based on the reviews five papers were accepted for presentation at PSCE in a poster session. The poster session will be held on Monday March 21st from 5 to 7PM. Vahid Madani has agreed to be the PSRC Session Chairman for the poster session.

Thanks to everyone who helped in the paper review process. If you are attending PSCE please stop by the Poster Session and chat with the authors.

PES General Meeting July 24-29, 2010 Detroit, MI

Theme: The Electrification of Transportation and the Grid of the Future

A total of 27 papers were submitted for the 2011 PES General Meeting. The paper review process is ongoing. Many reviews have been completed and the reviewer's comments will be sent to the authors shortly after this meeting.

There was a tremendous response to the Call for Reviewers with 4 or 5 reviewers assigned to every paper. All outstanding paper reviews are past due and needed ASAP.

Several volunteers will be needed to chair sessions at the 2011GM. If you will be attending the 2011 GM and would like to be a session chairman please email Roger Hedding.

Future Meetings

May 16-19, 2011 Renaissance Hotel, Asheville, NC

September 12-15, 2011	Hyatt Regency, Minneapolis, Minnesota
Jan 2012 - TBD	(JTCM) location TBD
May 13-17, 2012	Astor Crowne Plaza Hotel, New Orleans
September 10-13, 2012	Hilton Portland; Portland, OR

B. CIGRE B5 Activities Report – Mark Adamiak

No report submitted

C. IAS Power System Protection Committee – Chuck Mozina

The following are items of interest to the PSRC:

- **Color Book Reorganization Progress** – The IAS Industrial & Commercial Power System Dept. — I&CPS (responsible of the IAS color books) held its meeting at the IAS General Meeting – Oct 3-7 in Houston TX. This group is updating and converting the color book series into individual IEEE standards. The major item of interest for the PSRC is the Buff Book (Protection and Coordination of Industrial and Commercial Power Systems). Progress continues to be slow due to the lack of manpower.

- **Arc Flash –** The IAS is the home of IEEE standard 1584-2004, a key Arc Flash standard that is currently under revision. The WG that is updating this standard met at the Petroleum and Chemical Industry Committee Conference (PCIC) that was held in San Antonio, TX in Sept. Significant changes are being made to this standard.

- **Generator Protection Tutorial** – The IEEE Tutorial on the Protection of Synchronous Generator developed by the PSRC J-8 WG was presented at the Petroleum and Chemical Industry Committee Conference (PCIC) in San Antonio, TX on Sept. 23. Mike Thompson and Chuck Mozina presented the tutorial. This was the first presentation of the tutorial. Approximately 70 people attended the tutorial. The tutorial is scheduled to be presented at this year's IAS Pulp and Paper Conference (PPIC) on June 23, 2011 in Nashville, TN.

D. IEC Report - Eric Udren

TC 95, Measuring relays

TC 95 drives measuring relay standards – electrical and physical environment type testing, design, safety, and functional behavior. They have new interest in application guide development, not yet begun.

Technical work is carried out by Maintenance Teams (MTs) and Working Groups. The Convenor of MT4 is Murty Yalla – their current projects are 60255-121 (Functional standard for distance relays) and 60255-187-1 (Functional standard for differential relays – generator and transformer differential). They successfully completed Standards 60255-151 (Overcurrent relays) and 60255-127 (over and undervoltage relays).

TC 95 held its plenary meeting in conjunction with the IEC General Meeting in Seattle on October 14, 2010. The US Technical Advisory Group had raised funds to support this meeting. This is a meeting to manage strategy and development projects, not to do technical work. US National Committee delegates were Eric Udren (Technical Advisor to USNC; lead delegate), Murty Yalla (Convenor of MT4), and Jodi Haasz (IEEE Standards Liaison and joint working arrangements expert). IEC TC 95 leadership included Yaping Li (TC Chair; China), Serge Volut (Secretary; France) and Charles Jacquemart (IEC Central Office administration, Geneva). Gustavo Brunello and Dac Phuoc Bui represented Canada. Eleven other nations sent delegations. Detailed proceedings and minutes are available via request to this reporter. Of special interest to PSRC is the result achieved for synchrophasor measurement. In 2007, Christoph Brunner and Eric Udren developed a proposal to split IEEE C37.118 Synchrophasor Standard into separate measurement and data transfer/communications parts so that IEC could develop standards that are properly aligned with the IEEE work. The goal is a common IEEE-IEC measurement approach defined in IEC by TC 95, with an IEC 61850 based standard

for communications developed by TC 57 (now 61850-90-5 technical report under development), and an IEEE-only C37.188.2 standard for synchrophasor communications descended from existing C37.118 for legacy support. The US then proposed in 2010 to TC 95 that it adopt the new IEEE C37.118.1 measurement standard draft as a dual logo IEC-IEEE document. This proposal was discussed and voted at the TC 95 Seattle meeting.
Voting member nations were highly supportive of an IEC standard based on the IEEE work, but did not approve a Dual Logo Standard to be based on a draft they had not seen yet. They voted instead to create a Dual Logo Maintenance Team (DLMT) to issue a draft IEC Synchrophasor Standard. Speedy development is critical to IEEE-IEC alignment, since both IEEE and IEC are facing fast-track Smart Grid standards definition requirements of which this is a part. In post-meeting work, the US delegation with Ken Martin, Chair of the PSRC WG writing IEEE C37.118.1 proposed a working arrangement to TC 95 management that was accepted.

The December draft of C37.118.1 was released to TC 95 for circulation to member nations as part of a New Work Item Proposal (NWIP) to create the DLMT and issue the IEC version. Ken Martin is already appointed as Co-convenor if the project is approved. The US and other nations are to vote in support of the project by March, and to offer DLMT members. With a favorable vote of approval and proposal of members, which is expected, the first DLMT meeting will occur adjacent to the May PSRC meeting in Asheville, NC. The core of the meeting will occur on Monday, and will not be an open meeting – the team will be focused on handling any issues with the IEEE draft of concern to international participants, and issuing an IEC Committee Draft to start the international approval process. Any changes that are agreed quickly in Asheville can also be fed back into the parallel IEEE C37-118.1 standards approval process so the resulting IEEE and IEC standards will be identical or similar.

This is a major new chapter in the evolution of development processes in which the IEEE and IEC can be aligned for standards where alignment makes sense and helps with development of new technologies. We still face risk that the IEC process could diverge, although we are not aware at this time of any intent by IEC member nations to significantly alter what will become IEEE C37.118.1-2011.

Recent TC 95 documents:

- C37.111/60255-24 COMTRADE – the completed draft revision from PSRC WG H4 has been circulated to IEC member countries for Dual Logo acceptance. Vote due in February

CD of 60255-26, EMC (Comments due March 11)
Refer only to 61000-4 basic EMC standards.
Goal - eliminate entire layer of relay EMC standards 60255-22-X.
CD of 61850-3 Ed. 2 (Comments due March 25)
Coordination with 60255-26 and IEEE 1613 TBD.

TC 57, Power systems management and associated information exchange
See TC 57 liaison report at the end of SC H minutes.

E. Standard Coordinators Report - Jeff Gilbert

Important Information

The IEEE SASB is proposing a resolution to eliminate the 'Reaffirmation' and 'Stabilization' processes. Sponsors will have to complete a Revision on a maintained standard every 10 years, as opposed to starting a Reaffirmation every 5 years. This would be effective 2012. Comments are due by 2/28/2011.

Standards Activities since the September, 2010 Meeting

The status of standards activities that have taken place since the September, 2010 meeting of the PSRC are as follows.

1. Standards Published

PC37.105 IEEE Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

PC37.239 Standard Common Format for Event Data Exchange (COMFEDE) for Power Systems

2. Standards waiting to be Published

PC37.110/COR 1 Guide for the Applications of Current Transformers Used for Protective Relaying Purposes

3. Standards Reaffirmed

C37.93 Guide for Power System Protective Relay Applications of Audio Tones over Telephone Channels

C37.103 Guide for Differential and Polarizing Relay Circuit Testing

C37.119 Guide For Breaker Failure Protection of Power Circuit Breakers

4. Standards submitted for reaffirmation

C37.93 Guide for Power System Protective Relay Applications of Audio Tones over Telephone Channels

C37.103 Guide for Differential and Polarizing Relay Circuit Testing

C37.119 Guide For Breaker Failure Protection of Power Circuit Breakers

5. Standards approved

PC37.105 IEEE Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

PC37.110/COR 1 Guide for the Applications of Current Transformers Used for Protective Relaying Purposes

PC37.239 Standard Common Format for Event Data Exchange (COMFEDE) for Power Systems

6. Standards submitted for approval

PC37.105 IEEE Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

PC37.110/COR 1 Guide for the Applications of Current Transformers Used for Protective Relaying Purposes

PC37.239 Standard Common Format for Event Data Exchange (COMFEDE) for Power Systems

7. Standards to be submitted for approval

None

8. Submitted for Balloting/ Recirculation

C37.90 Standard for Relays and Relay Systems Associated with Electrical Power Apparatus

C37.103 Guide for Differential and Polarizing Relay Circuit Testing

PC37.110/COR 1 Guide for the Applications of Current Transformers Used for Protective Relaying Purposes

C37.119 Guide For Breaker Failure Protection of Power Circuit Breakers

9. Standards Balloted

C37.90 Standard for Relays and Relay Systems Associated with Electrical Power Apparatus

C37.92 Standard for Low Energy Analog Signal Inputs to Protective Relays

PC37.110/COR 1 Guide for the Applications of Current Transformers Used for Protective Relaying Purposes

PC37.238 Standard Profile for Use of IEEE Std. 1588 Precision Time Protocol in Power System Applications

PC37.239 Standard Common Format for Event Data Exchange (COMFEDE) for Power Systems

10. Standards Re-circulated

C37.93 Guide for Power System Protective Relay Applications of Audio Tones over Telephone Channels

C37.90 Standard for Relays and Relay Systems Associated with Electrical Power Apparatus

C37.103 Guide for Differential and Polarizing Relay Circuit Testing

C37.119 Guide For Breaker Failure Protection of Power Circuit Breakers

PC37.239 Standard Common Format for Event Data Exchange (COMFEDE) for Power Systems

11. Standards to be Re-circulated

None

12. Standards due for 5 year review /to be submitted for Re-affirmation

C37.90.3 Standard Electrostatic Discharge Tests for Protective Relays

C37.96 Guide for AC Motor Protection (active PAR)

C37.99 Guide for Protection of Shunt Capacitor Banks (active PAR)

C37.101 Guide for Generator Ground Protection

C37.102 Guide for AC Generator Protection

C37.109 Guide for the Protection of Shunt Reactors

C37.231 Recommended Practice for Microprocessor-based Protection Equipment Firmware Control

C57.13.1 Guide for Field Testing of Relaying Current Transformers

13. Standards withdrawn

PC37.115 Standard Test Methods for Use in the Evaluation of Message Communications between Intelligent Electronic Devices in an Integrated Substation Protection, Control and Data Acquisition System

14. New PARs applied for

PC37.232 Standard for Common Format for Naming Time Sequence Data Files (COMNAME)

PC37.240 Standard for Cyber Security Requirements for Substation Automation, Protection and Control Systems

15. New PARs approved

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

PC37.240 Standard for Cyber Security Requirements for Substation Automation, Protection and Control Systems

PC37.242 Guide for Synchronization, Calibration, Testing and Installation of Phasor Measurement Units for Power System Protection and Control

PC37.243 Guide for Application of Digital Line Current Differential Relays Using Digital Communication

16. PAR Extensions applied for

PC37.113 Guide for Protective Relay Applications of Transmission Lines

PC37.236 Guide for Power System Protective Relay Applications over Digital Communication Channels

17. PAR Extensions approved

PC37.113 Guide for Protective Relay Applications of Transmission Lines
PC37.236 Guide for Power System Protective Relay Applications over Digital Communication Channels

18. Modified PAR approved

PC37.113 Guide for Protective Relay Applications of Transmission Lines
PC37.118.1 Standard for Synchrophasor Measurements for Power Systems (PC37.118 modified)
PC37.239 Standard Common Format for Event Data Exchange (COMFEDE) for Power Systems

19. Modified PAR Submitted

PC37.113 Guide for Protective Relay Applications of Transmission Lines

20. PARs Withdrawn

PC37.115 Standard Test Methods for Use in the Evaluation of Message Communications between Intelligent Electronic Devices in an Integrated Substation Protection, Control and Data Acquisition Systems

21. PARs expiring at the end of 2011

PC37.96 Guide for AC Motor Protection
PC37.99 Guide for Protection of Shunt Capacitor Banks
PC37.111 Standard Common Format for Transient Data Exchange (COMTRADE) for Power Systems
PC37.237 Recommended Practice for Time Tagging of Power System Protection Events

SUBMITTAL DEADLINES & STANDARDS BOARD MEETING SCHEDULE

PAR/Standard Submittal Deadline	**Standards Board Meeting**
February 18, 2011	March 29, 2011
May 6, 2011	June 14, 2011
July 29, 2011	September 8, 201
October 17, 2011	December 6, 2011

F. Substations – Craig Pruess

No Report

G. NERC Report – Phil Tatro

No Report

H. Reports of interest

On Monday there was a joint meeting between the PSRC and the Power System Dynamic Performance Committee to share information with each other about activities that might interest both committees. Both committees and made presentations. In addition, the Excitations Systems and Controls Subcommittee of the Energy Development and Power Generation Committee had planned to send a representative who was prevented by the weather from attending. However, the slides he had prepared were presented and discussed.

Thirty eight people attended the meeting and considerable interest was generated about the possibility of joint activities in the future.

The presentations are posted on the PSRC website in the "What's New" page. Detailed minutes of the meeting are provided in the C and J Subcommittee minutes.

Submitted by Charles Henville.

IV. ADVISORY COMMITTEE REPORTS

Chair: Bob Pettigrew
Vice Chair: Roger Hedding

B1: Awards and Technical Paper Recognition

Chair: Oscar Bolado

No meeting.

B2: Fellows Awards

Chair: J.S. Thorp

No meeting.

B3: Membership Committee

Chair: M.J. Swanson

No meeting.

Attendance during the PSRC meeting was approximately 120. The storm in Atlanta prevented many from attending.

13 new attendees were in our Newcomers Orientation meeting on Tuesday.

No retention support letters were written. No Service Awards were presented.

B4: O & P Manual and WG Training

Chair: J Appleyard - O&P Manual
Chair: R Hunt - WG Training

No meeting.

B5: Bibliography and Publicity

Chair: T.S. Sidhu
Vice Chair: M. Nagpal

WG B5 met on Jan 10, 2011 with three members in attendance. 2008 and 2009 bibliography papers have been submitted to IEEE Trans. On Power Delivery and are under review. Assignments for preparing 2010 bibliography paper were made. Mel Swanson will prepare the publicity report when requested by the PSRC Chairman. Tarlochan Sidhu will check with Alex Apostolov and the PSRC webmaster on the status of bibliography database

B8: Long Range Planning

Chair: Miriam Sanders

No report.

B9: PSRC Web Site

Chair: Russ Patterson

No meeting.

V. SUBCOMMITTEE REPORTS

C: SYSTEM PROTECTION SUBCOMMITTEE

Chair: S. Ward
Vice-Chair: J. O'Brien

The C System Protection Subcommittee met on Thursday, January 13, 2011, in Atlanta, GA with 21 members and 36 guests in attendance. Quorum was not reached.

6 Working Groups and 2 Task Forces met at this meeting.

The members of the Subcommittee approved the minutes of the September 2010 meeting by email.

PSCE liaison report: Nothing to report.

PSSC liaison report: The Power System Dynamic Performance Subcommittee (PSDP) joined the PSRC on Monday January 10th. Details of that meeting are included in the CTF3 meeting minutes.

OLD BUSINESS

None

NEW BUSINESS

The Performance and Standards Task team (PSTT) of the NASPI has been working on multiple Application Guides related to the PDC and associated communication interfaces - The Smart Grid initiatives of the Department of Energy (DOE) and the need for expedited coherency in global standards and solutions supporting interoperability, has highlighted the need for fast developments of the internationally recognized standards. NASPI / PSTT in conjunction with National Institute of Standards and Technology (NIST) has been working diligently on some key initiatives that would benefit Smart Grid developments in particular those related to Synchronized Phasor technology.
Vahid Madani held an informal discussion prior to the subcommittee meeting to find out if there would be interest in PSRC to form a WG for "Functional Requirements for Phasor Data Concentrators for Power System Monitoring, Protection and Control" with a Guide as output. 13 people indicated that they would be interested in becoming members. The group will be assigned the number C4 and be Chaired by Galina Antonova.

The Assignment for WG C4 is: To develop a guide for functional requirements for Phasor Data Concentrator for power system protection, control and monitoring applications.

Reports from the WG Chairs

C2: Role of Protective Relaying in the Smart Grid

Chair: Alex Apostolov
Vice Chair: Mark Peterson
Output: IEEE Report
Established: January 2010

Expected Completion Date: To Be Determined

Assignment: Identify the functions and data available in Protective Relaying Devices that are used at different functional levels and different applications and can be used within a Smart Grid.

Describe the use of interoperable data formats for protection, control, monitoring, recording, and analysis.

Working group C2 did meet in Atlanta but with a substitute chair and no minutes were produced.

C5: Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units PC37.242

Chair: Jim Hackett
Vice Chair: Paul Myrda
Output: Guide C37.242
Established: May, 2010
Estimated Completion Date: June, 2011

Assignment: Develop a Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMU) for Power System Protection and Control

Scope: The document provides guidance for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMU) applied in Power System Protection and Control. The following are addressed in this Guide:

- Considerations for the installation of PMU devices based on application requirements and typical bus configurations
- Techniques focusing on the overall accuracy and availability of the time synchronization system
- Test and calibration procedures for phasor measurement units (PMUs) for laboratory and field applications
- Communication testing for connecting PMUs to other devices including Phasor Data Concentrators (PDC)

Purpose: This guide is intended to be used by power system protection professionals for PMU installation and covers the requirements for synchronization of field devices and connection to other devices including Phasor Data Concentrators (PDC)

.
The Working Group met on January 12, 2011 in a double session. The first session had 8 members and 24 guests and the second session had 3 members and 14 guests.

The IEEE-SA Patent Slides were shown.

The minutes of the September 15th meeting were approved in the first session with a quorum of members.

The two sessions were used to review the output of the Task Groups that were assigned (in the September meeting) to review and update: Section 2 (Synchronization Techniques), Section 3 (Measurement Accuracy Characterization), Section 11 (Installation, Commissioning and Maintenance), and Section 15 (System Testing and Calibration.

Several of the Task Groups made extensive use of conference calls to expedite work on their sections of the draft document.

By the beginning of next week, the chair will send the current draft of the four sections under revision to members and guests for review and comment. The comments (including appropriate markups of the drafts) are requested by the first week of February. These comments will be reviewed at the NASPI meeting in February.

In parallel with the above activity, the “Review/Update” teams will make appropriate changes to Sections 3, 11 and 15 based on the reviews completed today.

Review/Update Team Leaders:

- Section 2
    - Galina Antonova
        - Bill Dickerson (specific applications)
- Section 3
    - Alla Deronja
- Section 11
    - Vahid Mandani
- Section 15
    - Allen Goldstein

Following the NASPI meeting review, the vice chair & chair will expedite having the above revisions incorporated into Draft 1 of the Guide in IEEE format. This draft will then be made available to members and guest for additional review

IEEE SA staff (Noelle Humenick) offered administrative assistance to expedite the process of revising the draft document to comply with the IEEE Standards format. Noelle will arrange other assistance as required to expedite the completion of this standard. For example, assistance/services in setting up review webinars is available to the Review/Update Team Leaders. IEEE SA will provide a secretary for the next C5 meeting. PC37.242 is one of the standards that IEEE is expediting related to the SMART GRID initiative.

Draft 1 of the guide document will be posted on the C5 web page as soon as the draft is available. The chair will receive assistance in the web page setup and related activity from Russ Patterson and Noelle Humenick.

We are still planning on initiating the process to form a balloting pool in the April / May timeframe.

C13: <u>Undervoltage Load Shedding Protection</u>

Chair: Miroslav Begovic
Vice Chair: Shinichi Imai
Output: IEEE Report
Established: September 2005
Expected Completion Date: May 2011

The WG did not meet.

C14: <u>Use of Time Synchronized Measurements in Protective Relaying Applications</u>

Chair: Jim O'Brien (Jim.O'Brien@duke-energy.com)
Vice Chair: Alla Deronja (aderonja@atcllc.com)
Output: IEEE Report
Established: May 2007
Expected Completion Date: May 2011

Assignment: Produce a general report to PSRC Subcommittee C outlining practical protection applications using synchrophasors.

Working group C14 met on January 11, 2011, in Atlanta, GA, in a single session chaired by Jim O'Brien with 6 members and 21 guests present.

The chair distributed the latest draft of the Report, which was discussed.

The working group agreed to change numbering of report from Roman numerals and letters to all numeric as most reports are done.

The questions posed by Don Lukach in his editing of the "Future" section of the paper were discussed and resolved.

Rick Taylor is to provide a write up on a case study in New Orleans

Gustavo Brunello is to write a section on generators from the Chinese PMU Spec.

Yuchen Lu to revise section on Out of Step protection

Mahendra Patel is to provide info on Substation Task Force brainstorm for possible additional sections.

New writing assignments are due by March 1.

The chair will update the Report with this meetings comments and new writing assignments by April 1 and redistribute to the working group. The working group is asked to review the new draft so we can finalize and complete in 2011.

C15: Design and Testing of selected SIPS

Chair: J. Sykes
Vice-Chair: Y. Hu
Output: Report on industry practices in design and testing of selected SIPS
Established: September 2008
Expected Completion Date: December 2012

Assignment: Write a report in industry practices and testing of selected SIPS (System Integrity Protection Schemes)

C15 did met in Atlanta but no minutes were produced.

Requirements for the next meeting are as follows: single session, meeting room for 30 people with a computer projector and a power strip.

C16: Relay Scheme Design Using Microprocessor Relays

Chair: R. Lascu
Vice-Chair: T. Seegers
Output: Report
Established: September 2008
Expected Completion Date: To be determined

Assignment: Write a supplement to the existing 1999 relay trip circuit design paper as an IEEE report to address microprocessor relays.

Introductions were made with Rich Young presiding. The chair and vice-chair were unable to attend due to weather. 10 members (4 new) and 7 guests were in attendance.

Discussion of writing assignments:

Ken Behrendt discussed section 2.2.

The latest Draft 2.3 of the report was presented.
Section 5.1, 5.5 (from Jay S) was discussed.

Some parts (one example will be section 6.1 on Logic) may be similar to what WG I5 is working on so we need to make sure that they are in agreement.

Mansour Jalali asked if the report should include/mention dynamic testing in section 5. This working group needs to decide if there should be a mention/section for it.

Section 2.2 (from Ken B) was discussed.

K3 working group has a paper that may be available for section 3 for Don S.

A gentle reminder was given for other members to finish their writing contributions.

New Assignments were made and they are due by March 15, 2011. Authors are reminded to send their contributions to the chair of working group, Raluca Lascu. The outline document will need to be updated with the following changes.

- Vajira Pathirana volunteered to write Sections 2.6.2 and 4.4.2
- Bruce Pickett (bruce.a.pickett@fpl.com) volunteered to write Sections 1.1.1 and 1.1.2
- Martin Best (mbest@pike.com) volunteered to write Sections 1.2.1 and 1.2.2
- Mansour Jalali volunteered to write Sections 2.6.1 and 2.6.3

C17: <u>Fault Current Contribution from Wind Plants</u>

Chair: D. Miller
Vice-Chair: G. Henneberg
Output: Report by the Joint Working Group
Established: January 2009
Expected Completion Date: 2012

Joint WG Assignment: To characterize and quantify short circuit current contributions to faults from wind plants for the purposes of protective relaying and equipment rating, and to develop modeling and calculation guidelines for the same.

C-17 WG Assignment: To support the activities of the Joint Working Group on Fault Current Contributions from Wind Plants.

The Joint Work Group met in a single session at the PES Joint Technical Committee Meeting in Atlanta, GA on Wednesday January 11, 2011 with 10 members and 22 guests.

Dean Miller reviewed the status of the report and writing assignments. Dean is still looking for volunteers to describe several wind turbine types (I – V).

1. Introduction
2. Wind Plant Electrical Layout – Michael Stark, Travis Smith
3. Generator types and response to faults – Type I, Ron Harley, Michael Stark
   Type III, Zeeky Bukhala
   Types II, IV, V, Dean will work with the EMC people
4. Equipment Fault Current Interrupting – Steve Conrad
5. Protective Relay Response Issues – Jim Niemera and Dean Miller
6. Data Requirements – Charlie Henville (transmission), Doug Hunchuk (collector systems)
7. Actual Performance / Experience (new section) – Dean Miller
8. Conclusions

Dean Miller presented an analysis of a 230 kV fault on a line serving Marengo wind farm (117 Vesta V80 1.8 MW Type II machines). 105 units were on line producing 168 MW. Dean's detailed model included each unit of the wind farm. The initial fault was L-G, and the line automatically reclosed into a L-L fault (structure down due to a fire). Fault contributions seemed to be modeled better by transient than subtransient impedance. Fault resistance of 13Ω was modeled. The (-) and (0) sequence and faulted phase quantities matched the fault records quite well, as did (+) sequence current after recognizing that the initial load is not included in the fault model.

Dean Miller presented an analysis of a fault on a 115 kV line serving Casper wind farm (11 GE SLE 1.5 MW Type III machines. All units were on line at the time of the fault, producing above nameplate capacity at 17.7 MW. Dean's detailed model included each unit of the wind farm. The fault was L-G. Fault resistance of 2Ω was modeled. The initial impedances modeled (X_d"=0.2 pu, X_2=1.0 pu) did not provide a good correlation to the fault records, though X_1=X_2=0.3 pu seemed to work reasonably. The electronic unit controls limit the output current

to 2.0 pu, though this limit was not reached for this event. The sequence and faulted phase currents matched the fault model quite well.

CTF3: Joint meeting with Power System Stability Controls Subcommittee
Chair: C. Henville
Vice-Chair:-
Output: Proposals for working with Power System Dynamic Performance
Established: January 2010 Expected completion date:-

A joint meeting with the Power Systems Dynamic Performance Committee took place on Monday 10th January with 38 attendees present. The following PSRC presentations were made.

1. Undervoltage Load Shedding (Shinichi Imai for Miroslav Begovic)
2. Performance of Relaying during Wide-Area Stressed Conditions (Damir Novosel)
3. Global Industry Experience with System Integrity Protection Schemes (Vahid Madani)
4. Protection issues during system restoration (Tarlochan Sidhu)
5. Selected topics (related to power system dynamics) from C37.102 IEEE Guide for AC Generator protection (Murty Yalla). This presentation included discussion of issues related to Coordination of Generator Protection with Generator Excitation Control and Generator Capability
6. "Performance of Generator Protection During Major System Disturbances" (Subhash Patel)

PSDP officers made the following presentations on the activities of their Committee
1. Juan Sanchez Gasca – PSDP
2. Claudio Canizares, Chair, Power System Stability Controls Subcommittee. He also presented the activities of the Power System Stability Subcommittee for the Chair, Pouyan Pourbeik who was prevented from attending by severe weather.
3. Claudio also made a presentation (on behalf of Pouyan) on the PSDP Blackout Task Force report.

The Excitation Systems and Controls Subcommittee of the Energy Development and Power Generation (ED&PG) Committee were on the agenda to make a presentation, but the Past Chair, Mike Basler, was prevented from attending by the weather. He sent two PowerPoint presentations that were shown by Charlie Henville and were appreciated by all attendees.

All presentations from the meeting are available from the PSRC Website http://pes-psrc.org/ (click on the link to "What's New").

All presentations generated considerable discussion and interest in the activities of other technical committees and subcommittees. It was generally agreed that opportunities for expanded and continued inter-committee interaction should be pursued.

Going forward, the following actions were agreed to be set in motion, or actually accomplished.

1. Identified areas of common interest

System wide protection and control (wide area measurement and protection and control maybe using synchrophasors, and maybe including adaptive protection for improved security)

Dynamic machine and protection modeling. The power system consists of machines with dynamic characteristics and system protection and control devices with. Models are used for testing, and coordination of protective relays.

Wind farms stability and short circuit contributions.

System Restoration.

2. Establish Communications Mechanism (names and dates)

PSDP Power Systems Dynamics Measurement WG (Ken Martin is PSRC Liaison). PSDP and PSRC committee officers will look for volunteers for defining and planning super session for PES GM July 2012).

Power system restoration. Tarlochan Sidhu will contact Mike Adibi to discuss if and how the PSRC could work with the PSDP Restoration Dynamics WG in future. After that conversation, Tarlochan will discuss with PSRC officers if and how PSRC and PSDP might work together.

3. Define possible short and long term activities.

Short term. The possibility of a super panel session at PES GM 2012 will be investigated by both committees.

Longer term. Both committees will see how they can identify possible long term joint activities (eg. with respect to integrating protection and system models and/or to incorporate power system dynamics issues into PSRC guides). The PSRC task forces CTF3 and JTF4 will continue to coordinate the PSRC PSDP interactions, and JTF4 will also work at establishing liaison with the Excitation Systems and Controls Subcommittee of ED&PG Committee.

D: LINE PROTECTION SUBCOMMITTEE

Chair: R.W. Patterson
Vice Chair: G.L. Kobet

The Subcommittee meeting was called to order at 11:00 a.m. with 19 members and 24 guests present.

Following introductions, a count of SC membership was made, and it was determined a quorum was not present (19 out of 46 members present).

Chairman Patterson reported no items of interest from the Advisory Committee.

Reports from the WG Chairs:

D2: Revision of C37.104 Transmission and Distribution Reclosing Guide

Chair: Gary Kobet
Vice Chair: Greg Sessler
Output: IEEE Guide
Established: September 2008
Expected completion date: 2012
Draft 4

***Assignment**:* Revise and update the IEEE Guide C37.104 – Guide for Automatic Reclosing of Line Circuit Breakers and AC Distribution and Transmission Lines

Working group D2 held its meeting on Tuesday, January 11, double session. There were 10 of 33 members and 27 guests preset. One of the guests joined the working group as a new member. Since only 10 members were present, the working group did not have a quorum.

IEEE patent requirement slides were presented and attendees were given the opportunity to identify any known patent claims.

Meeting minutes from the September 2010 meeting held in Berkeley were present in the second session. However there was not a quorum thus it was not approved at the meeting.

Review of the approved PAR was read discussed in the second session. Note the PAR is open until December 2013.

Writing assignments from Ken Behrendt and Charlie Sufana for clause 4 were discussed. Ken and Charlie discussed the creation of Annex C where previous clause 4.2 timing nomenclature was located.

There was a discussion on a recent technology called pulse reclosing. Mike Meisinger volunteered to take a writing assignment on this subject. Since this is a patented method, it will be decided in future meetings on how and if this is to be incorporated in the guide.

There were some discussion on addition clauses regarding changing relay settings and reclosing based on weather, and single pole tripping/reclosing for distribution.

Phil Waudby and Martin Best volunteered to take on the assignment of reviewing clause 5.3 of the Reclosing guide against the Distribution Protection guide for conflicts.

Ken Behrendt took on the writing assignment on creating a diagram for clause 4.4.1 of Draft 3.0.

Minor revisions were incorporated in Draft 3.0 of the guide for clause 4.4. Rich Young took on the writing assignment of revising clause 4.4.2.

Clause 4.4.6 was discussed. There was a suggestion on moving this clause to the section specific to transmission application. Phil Tatro will revisit and review this section.

Writing assignments are due March 15th.

D3: Considerations in Choosing Directional Polarizing Methods for Ground Overcurrent Elements in Line Protection Applications

Chair: Meyer Kao
Vice Chair: Elmo Price
Output: Report to the Line Subcommittee of the PSRC
Established: September 2009
Expected completion date: Jan 2012

Assignment*:* Prepare a report to the Line Subcommittee of the PSRC on identifying different polarizing methods, address issues related to the application of different methods, and make recommendations in choosing the polarizing method.

D3 working group held its meeting on Tuesday January 11, 2011 at 3:30 PM with 17 attendees, of which 6 are members

The assignment of the working group was presented.

Minutes from the September 2010 meeting were approved with no changes.

Writing assignments assigned from the previous meetings were discussed.

The revised graphic representation on the location of polarization sources in the sequence network by Robert Frye was presented with all possible transformer configurations. John Appleyard took on the writing assignment on explaining the polarizing representation in the sequence network for the wye-wye-delta transformer where the polarizing current is the combination of the CTs off the two neutrals of the two wye windings.

Charlie Henville presented the section on transmission lines where the terminal is inherently directional. Various examples were presented, where no polarizing supervision is needed and in some cases preferred.

Section on criteria for specifying the CT and its ratio for current polarizing was discussed. Charlie Henville took on the writing assignment on expending the details of finding the minimum and the maximum fault current through the polarizing CT.

D6: AC Transmission Line Model Validation

Chair: Tony Seegers (not present)
Vice Chair: Sam Sambasivan ((Acting Chair)
Output: Report to PSRC
Established: January 2009
Expected completion date: May 2013

***Assignment**:* The WG will prepare a report to the main committee on the processes, issues, problems and methodology of validating software model parameters for AC transmission lines used for relaying. The report will not include details of relay curve models or other similar relay modeling. The report will also not include specific EMTP modeling.

The D6 working group met on Wednesday, January 12, 2011 at 1.30 p.m. with 5 members and 14 guests present. 2 new members joined the group and the WG stands at 27 members.

Draft 1.3 of the document was sent to the members prior to the meeting. Members and guests were asked to comment on the latest draft.

George Bartok volunteered to do section on Different Modeling types and assumptions, Aaron Martin will do the section 4.5 on Use of Staged Faults and Ken Behrandt will add a section 2.5 on Fault Location to his contribution. There was also a suggestion to rearrange the report with the section on Line Configuration as section 3.1 followed by Different Modeling types as section 3.2.

All the remaining and new assignments are due by March 15, 2011.

A completed draft 2.0 with all the missing sections will be sent out before the next meeting and we plan to take up the review of the report in the next meeting.

D9: Revision of C37.113-Guide for Protective Relay Applications to Transmission Lines

Chair: Mohindar Sachdev
Vice Chair: Simon Chano
Output: Revised IEEE Guide C37.113
Expected completion date: 2011
Draft 5

***Assignment**:* Revise and update IEEE Standard C37.113-1999 Guide for Protective Relay Applications to Transmission Lines

The WG met at 3:00 PM on January 12, 2011 in Georgia 2 Room of the Atlanta Sheraton Hotel, Atlanta, GA. Fourteen members and eleven guests were present. The minutes of the WG meeting held in Madison, WI could not be approved because of lack of quorum.

The Chair reported that three person group formed at the September 2010 meeting to review Draft 4 for technical inaccuracies indicated that Draft 4 does not seem to have technical errors but suggested a few modifications. The changes were made and Draft 5 was created.

The Chair submitted a revised PAR to the Standards Association so that the Abstract and Scope of the guide and PAR are identical. Also a PAR for extending the PAR to the end of 2011 was submitted to the Standards Association. These PAR requests were approved at the December 2010 meetings of the Standards Association.

Draft 5 was submitted to the WG with a ballot seeking approval for requesting the D Subcommittee to permit the SC Chair to seek approval of the PSRC to allow the WG to submit the guide to the Standards Association for starting the balloting of the guide. The Working Group agreed by a vote of 33 out of 33 to send the request to the Subcommittee. A request was sent to the Chair of the D Subcommittee. The D Subcommittee was balloting electronically; the Subcommittee approved the request of the WG. The Chair of the D Subcommittee submitted a request to the Chair of PSRC seeking permission of the PSRC to submit Draft 5 of the guide for balloting. The PSRC conducted an electronic ballot and approved the request for submitting Draft 5 of the guide for balloting.

After receiving approval from the PSRC, the chair submitted the Guide for editorial review. He also submitted to the Standards Association a request for forming the balloting group. The balloting pool has been formed and the editorial review is awaited. As soon as the editorial review is complete and an okay is received, a request for balloting will be submitted to the Standards Association.

At a request of the Chair a Ballot Response Group was formed. Martin Best, Randy Cunico, Pratap Mysore, Jim O'Brian, Dean Ouellette, Mohindar Sachdev and Rick Taylor volunteered to be members of the group. The Ballot Response Group will review the comments of the Balloters and will propose appropriate responses for consideration of the WG.

At the conclusion of this business the meeting was adjourned.

D11: Effect of Distribution Automation on Relaying

Chair: Fred Friend
Vice Chair: Jerry Johnson
Output: Report to the PSRC
Established: January 2005
Expected Completion Date: September 2011
Draft 5.1

Assignment: Prepare a special report to the PSRC that describes the effect of Distribution Automation on Protective Relaying.

The working group, chaired by Fred Friend, met on Wednesday with 13 members and 14 guests present, including 4 new members.

Minutes from the September meeting in Berkeley were reviewed and approved.

The document was reviewed, discussed, and changed with input from the working group:

Add reference to IEEE 1815 somewhere in the document.

Remove "SC" from table 1.5, add VVO to 1.5 and maybe DMS. Fred will do a search and add any other abbreviations or acronyms. Also John Tengdin joined our working group as a member and will review the document for abbreviations and acronyms.

Section 2.3 editorial changes.

Section 3 was reviewed with much discussion which resulted in the addition of a new section 3.5 to discuss protection schemes. Cheong and Mike Meisinger will add new information, Protection and Control- different or same.

Section 4.6.7 Charlie and Wayne Hartman Distributed resources:

Modified this section with input from Charlie Sufana; Jerry Johnson will provide input on communication reference, i.e. which 1547 standard. There was also discussion about the inability of inverters to supply fault current.

Section 4.6.7.2 was completed with just editorial changes.

Annex, figure numbers and references should be reviewed. Group decided to keep annex section as informative information.

Matt Black joined the working group and will review the entire document and provide feedback.

D21: Support of IEC Standard for Distance Relay Characteristics

Chair: Alex Apostolov
Vice Chair: Alla Deronja
Output: IEEE/IEC Standard
Established: September 2006
Expected Completion Date: December 2011

Assignment: Provide an IEEE/PSRC technical input to the ongoing development of IEC Standard 60255-121, dealing with distance relays to standardize impedance relay characteristics, performance, accuracy, and testing aspects.

Working Group D21 met on January 12, 2011, in Atlanta, GA, in single session chaired by Alex Apostolov.

Alex called the meeting to order and requested attendees to introduce themselves.

Alex requested Murty Yalla (chair of IEC TC95 MT4) to give a status report of the IEC 60255-121 work.

Murty Yalla reported that the IEC TC95 MT4 met in Seattle Washington, during Oct 10th - 13th, 2010. The meeting was also attended by PSRC members Normann Fisher and Bogdan Kasztenny to help resolving USNC/CANC comments. All the comments (total of 65 pages) have been addressed.

The revised draft with revisions from comments will be sent out by the end of January to IEC central office. A copy will be sent to D21 WG members. Murty requested that all members review the revised draft and submit any comments before the next IEC meeting which will be held during the first week of May 2011, in Austria.

D22: Performance Testing of Transmission Line Relays for Frequency Response

Chair: Tom Wiedman
Vice Chair: Jun Verzosa
Output: Report
Established: May 2007
Expected Completion Date: May 2011

Assignment: Investigate the feasibility of defining a range of frequency and rate-of-change of frequency to be used in a performance specification for protective relay functions. The WG will develop a test process for transmission line relays subjected to off-nominal frequency disturbance including the rate-of-change of frequency during stressed system conditions.

The D22 working group met Wednesday January 12, 2011 at 8:00 am at the Sheraton Hotel in Atlanta, Georgia with 6 members and 6 guests. WG stands at 24 members. Jun Verzosa, Vice Chair of the WG, conducted the meeting in the absence of WG Chair Tom Wiedman, who was unable to arrive in Atlanta due to extreme weather conditions.

The WG went over the balloting comments and which were incorporated into the draft report 5b. Bogdan Kasztenny's ballot comment in reference to Figure 4 of section 3.5 was discussed at length: "The signal model results in a step change of the rate-of-change of frequency which is not a physical event; this will make some relays to suspend tracking for a brief period yielding worst test results than what can happen in actual conditions; something to consider. One solution would be to use a quadratic glue between the two frequency lines; yes, the model will get a bit more complicated, but the test would be more realistic".

It was decided to implement Bogdan's suggestion to start the change in frequency as a smooth curve rather with one ramp to avoid abrupt changes. Draft 5b will be edited prior to the May 2011 meeting. Comments at the January meeting will be incorporated into Draft 6 and then submitted to the WG for Ballot. This will also be implemented in the COMTRADE Calculator.

D24: Transmission Line Applications of Directional Ground Overcurrent Relays

Chair: Don Lukach
Vice Chair: Rick Taylor
Outputs: Report to WG D9, PC37.113, Guide for Protective Relay Applications to Transmission Lines and Report to the PSRC
Established: May 2007
Expected Completion Date: September 2011

***Assignment**:* Prepare a report to the Transmission Line Guide revision working group and PSRC on the justifications and application criteria for directional ground overcurrent relays

The working group met with 8 members, 8 guests, for a total of 16. Three of the guests became members.

The September 2010 meeting minutes were approved as submitted.

Due to the absence of the chair caused by winter travel complications, Rick Taylor acted as chair. Rick informed the attendees that he would be preparing and presenting a conference paper for the Texas A&M Relay Conference and the Georgia Tech Conference for Protective Relaying Engineers based on the D24 investigations and the work Rick has been doing for his customers for several years. This conference paper will be simplified and much shorter than the report in order to highlight the basic concepts and the applications of these concepts of 50N and 51N protection.

D25: Distance Element Performance with Non-Sinusoidal Inputs

Chair: Karl Zimmerman
Vice Chair: Aaron Martin
Output: Technical Report to Line Protection Subcommittee
Established: January 2009
Expected completion date: January 2012
Latest Draft: 1.1

Assignment: Write a technical report to the Line Protection Subcommittee on the performance of distance elements with distorted waveforms.

The working group met in Atlanta on January 11, 2010 at 1:30 PM with 2 members and 13 guests.

After introductions a copy of the existing draft of the paper was handed out.

Because a projector was unavailable and a presenter was not present, two scheduled presentations were postponed for the next meeting.

A review of the current draft followed by a discussion on new contributions followed. Several guests volunteered to contribute writing assignments and some others volunteered to review the current draft.

Christian Peaduraru volunteered to contribute a section on Ferroresonance.
Damion Tholomier and Alex Lee volunteered to review paper as it exists and provide suggestions.
Eli pajuelo agreed to review section 3.1 on CCVTs.
Ian Tualla agreed to review to review section 3.2 on CT Saturation.
Don Sevcik volunteered to write a section on supervisory elements

Writing assignments are due by end of March.

D26: C37.114 Fault Locating Guide Revision

Chair: Joe Mooney
Vice Chair: Randall Cunico
Output: IEEE Standards Guide
Established: 14 Jan, 2010
Expected Completion Date: December 2014

Assignment: Update and revise C37.114: IEEE Guide for Determining Fault Location on AC Transmission and Distribution Lines to include new developments in fault locating methods and techniques.

The meeting convened at 4:30pm in room Georgia 7 with 8 members and 8 guests with vice-chair Randy Cunico presiding. Two guests became members during the meeting. There are now 24 members on the Working Group.

There was not a quorum present so the IEEE Patent Policy was not reviewed.

Minutes from the September meeting in Berkeley could not be approved so they will need to be approved by email.

The group had a good discussion on definition of error for fault locating. A subgroup (Rafael Garcia, Damier Novosel, Arvind Chaudhary and Mansour Jalali) has volunteered to further explore the issues such as traditional definition, the existing guide definition, applicability to both loop and distribution systems, and what is general industry practice.

Another subgroup (Rafael Garcia and Manour Jalali) volunteered to explore updates in methods and technologies for fault location on series compensated lines.

The need to expand the section pertaining to distribution fault location was discussed in light of the Smart Grid initiative. It was generally agreed there is a lot of room for significant expansion here. Mladen Kezunovic volunteered to draft a section on data sources for distribution fault location to be added; which will likely lead additional discussion and suggestions for expansion next meeting.

Mladen Kezunovic suggested the addition of a table outlining the pros and cons of the different fault location algorithms.

The fact that there are a significant number of proven advanced fault location techniques that may not be in wide application was discussed. It was generally agreed that it would be useful to users to include these techniques in a separate section with the qualification that they were not in general application at this time, possibly in an appendix.

George Bartok discussed advanced issues where non-homogeneous lines may lead to significant errors, issues he is including in the D6 report. He and Meyer Kao agreed write a section expanding on this.

Action Items for next meeting:

- Volunteers noted in the minutes, please provide assignments by May 1.
- All members READ THE GUIDE
- Steve Turner to present the results of his literature search for new technologies and techniques which he had intended to present at this meeting.
- Bring new ideas in fault locating.

D27: PC37.243 Line Current Differential Guide creation

Chair: Juergen Holbach
Vice Chair: Ryland Revelle
Output: IEEE Guide PC37.243
Established: May 2010
Expected Completion Date: February 2013

Assignment:

In the absence of the WG Chair and Vice Chair, WG D27 held an informal meeting on Tuesday 1/11 led by the WG member Solveig Ward, assisted by WG member Sam Sambasivan. The meeting was attended by 12 members and 8 guests.

Three guests signed up as new members: Alex Lee, Ian Tualla and Phil Beaumont.

The WG reviewed a draft document relating to current differential in order to develop an outline and define what should be included in the guide. While the focus of the guide will be digital current differential relaying over digital communications media, it was suggested that other line differential applications may be mentioned briefly for informational purposes. Examples could be analog electromechanical relays over digital channels or digital line differential relays over analog channels.

A draft to an outline was produced, where applications were discussed and writing assignments handed out. The outline is still lacking in regards to communications related issues.

Assignments due to the chair by mid April:
Differential principle (brief generic description) – Ilija Jankovic
Charging current compensation - Gustavo Brunello
CT saturation detection / compensation – Sam Sambasivan
Stub bus - Sam Sambasivan
GPS synchronization - Phil Beaumont

Solveig Ward has provided the outline draft to the WG chair.

Coordination Reports

None

Liaison Reports

Fred Friend reported there is a Distribution Automation Wiki page. Fred will provide the link in his report.

Old Business

None

New Business

None

General Discussion

Meyer Kao mentioned a J-SC task force regarding the details of setting out-of-step protection for generators. It was mentioned the D-SC had previously developed a WG report on OOS protection applied to transmission lines. The Chair will share this with the J-SC task force.

Line Protection operations of interest

Gary Kobet made a presentation regarding an operation involving two 161kV lines and a small hydro generator that was islanded and subsequently tied back to the system via high-speed and sync-check reclosing. A good discussion of the event followed, in particular the machine response, and the changes made to reclosing configuration.

The meeting was adjourned at 12:15 p.m.

H: RELAYING COMMUNICATIONS SUBCOMMITTEE

Chair: V. Skendzic
Vice Chair: Eric Udren

The Subcommittee met on January 13, 2011 with 18 members of 38 total, plus 33 guests. This was just short of a quorum. Minutes and other SC questions are to be approved in post-meeting e-mail voting.

The travel of the Chair was interrupted by weather; the Vice Chair conducted the meeting.

The ADCOM recommended no general announcements for the Atlanta meeting.

Old business:

No old business was brought before the Subcommittee in Atlanta.

The May 2010 minutes described the creation of a pipeline of new Task Force projects – a queue that gives visibility to planned or requested activities, when the PSRC schedule is too full to launch them. This helps with prioritization of new work. It also helps with solicitation of Task Force leadership and membership, and development of scope or assignment.

One queued activity was elevated to WG H20 at the Berkeley meeting. No new activities were proposed at this meeting. The list now comprises:

- Alex Apostolov – Functional testing of IEC 61850 based systems.
- Eric Udren - Object definitions (items of information to communicate) for condition monitoring of protection systems (secondary systems). The objects are intended for incorporation in IEC 61850-7 (or other communications means) to support compliance with a NERC PRC-005-2 or other condition based (failure self-reporting) maintenance program for a protection system.

New business:

WG H15, Coupling Redundancy for Protection Systems Using Power Line Carrier, has completed its paper, to be circulated for SC approval after the January meeting.

WG H20, Standard for Naming Time Sequence Data (TSD) Files, is submitting its Draft #2 of *IEEE Standard for Naming Time Sequence Data Files* for SC approval and Main Committee vote to transmit to IEEE SA.

Reports from the WG Chairs

H1: Guide for Power System Protective Relay Applications over Digital Communication Channels

Chair: Marc Benou
Vice Chair: Ilia Voloh
Output: Guide

Assignment: Develop a guide for application of digital communications for protective relaying systems and schemes, including transmitting and receiving equipment, digital channels, application principals, performance, installation, troubleshooting, testing and maintenance.

The H1 working group met with 3 members and 5 guests, including the guest chairman, M.P. Sanders. After introductions, an older agenda with the IEEE patent policy was distributed. Due to the weather issues with the meeting, quorum was not reached. Jim Ebrecht forwarded draft 2.6 to the guests present.
The extension of the PAR was successful, therefore will expire in 2012 now. The status of the guide is that most of it has been written and the WG needs to review the document in earnest. There is still one large section that we have asked Bryan Donaldson of BPA to write on audio circuits as he is an expert on this.
The members present agreed to try the monthly web meeting as proposed by Chairman Benou.
Repeating again from last meeting minutes is the reminder for assignments:
It was urged to the group that while reviewing, to please consider not only editing and content but also to point out if the section discusses the pros and cons of that section and to point out any references or items for the bibliography. Also, to make sure all units are in metric units first and English units as an secondary option.
The following sections were reviewed or in some way modified:

- Section 7.4
- Section 7.5 (need drawings review)
- Sections 7.6-8.
- Section 8 needs drawing (Mal to follow up) and also pilot wire and phase comparison sections need few sentences on how this can be accomplished via digital channels-Mark Simon agreed to write few sentences.
- Section planning is summarizing all channels available but it's not really talking about planning of these channels).
- Ken Fodero and Roger Ray were unable to attend and are asked to review sections 4 and 6 respectively to approve the changes that have been made to the sections they authored.
- Assignments from previous meeting were not accomplished. The assignments were as follows - we remind it again:
- Section 5, Current section 7.6(to become 7.4.5), and section 8 – Rene Midence
- Sections 3, 4, 6, 7.2-7.2.4, 7.3 – Mike Stojak
- Sections 3, 4, 6 – Sarah Bins
- Sections 5.3, 7.4 – Johan Van den Berg
- Sections 7-7.145, 7.8, 9 – Tom Dahlin
- Sections 7.5, 10.1, 10.2 – Jim Ebrecht
- Sections 7.7, 10 – Mark Simon
- Sections 7.7, 9 – Benou
- Sections 8, 10 – Bob Ince
- Section 9 – Solveig Ward

Anyone else willing to review and not able to attend the meeting is encouraged to do so.

H2: <u>Relay Applications Using the Smart Grid Communications Infrastructure</u>

Chair: M. Simon
Vice Chair: G. Antonova

Output: Report to the Subcommittee on title subject

Assignment: Create a working group report to the Relaying Communications Subcommittee that describes example protective relay applications that can make use of the communication infrastructure provided by the Smart Grid. Protective relay applications will include potential capabilities and the communication requirements necessary to provide suitable communication architectures, services, capabilities, and any other pertinent characteristics.

H2 met on Tuesday January 11th 2011 with 30 people in attendance - 10 members and 20 quests. This is not a standards effort that requires a quorum. But, we would like to see more members in attendance to achieve a higher level of consensus. Charles Sufana acted as the chair for the meeting as Mark Simon was not able to attend. Chris Huntley acted as the vice chair for Galina Antonova as she was not able to attend. Both Mark and Galina were able to be in on a conference call for the meeting and thus were able to address issues that popped up in the meeting.

The group quickly reviewed the purpose, outline and applications that will make up the document. The working group then proceeded to fill in a comparison matrix of the importance for the various functions being reported in the paper. Mark Simon was asked to provide a definition used in column 1 (application functions) of the matrix. After review of what was developed today for the matrix, Mark will provide the working group the final version as well as a list of definitions.
Anyone that would like to see a copy of the draft, please contact either the chair or vice-chair.

H3: Timetagging in Protection and Disturbance Recording IEDs

Chair: W. Dickerson
Vice Chair: J. Hackett
Output: Recommended Practice

Assignment: Develop a recommended practice for time tagging of power system protection event, analog, and derived data. This will include methodology for description of measurements and transport delays and for stating the resulting time accuracy.

The WG met on Tuesday January 11, 2011 with 9 members and 12 guests in attendance, including 2 guests from IEEE SA.
Most of the meeting was spent discussing the possibility of adding the Substations Committee as a co-sponsor. Tim Tibbals, Substations C7 Chair, expressed concern about the wide-ranging scope of the working group, and indicated that their willingness to participate was linked to modifying the scope and purpose to a more manageable level.
Considering our relative lack of progress, the repetitive nature of WG discussions and the priority status of this effort under SGIP, the WG decided to work on a modification to the PAR in accordance with the recommendations of the Substations Committee and our own experience. Tim Tibbals will work with the Chair and Vice Chair of the Working Group to accomplish this by the next meeting.

H4: Revision of C37.111 COMTRADE Standard

Chair: R. Das
Vice Chair: A. Makki
Output: Standard

Assignment: Revision of IEEE Std C37.111-1999 - IEEE Standard Common Format for Transient Data Exchange (COMTRADE) for Power Systems.

The WG did not meet in Atlanta due to travel challenges. No further report was provided. The Standard draft is completed (Draft 8.0). The standard is already in progress towards Dual Logo IEEE-IEC standard (C37.111 and 60255-24). The WG chair announced via e-mail during meeting week that the WG will organize a Web meeting or teleconference during the

first/second week of February to go over the ballot comments. The Chair will circulate the balloting results during January to be discussed during this meeting.

H5-a: Common Data Format for IED Configuration Data
Chair: J. Holbach
Vice Chair: D. P. Bui
Output: Report

Assignment: Define a common format for IED configuration data.

Due to travel challenges, the WG leadership could not reach Atlanta and no meeting was held. No further report was provided. The WG Chair proposed to schedule a phone conference shortly after the meeting to coordinate future activities.

H6: Substation Ethernet
Chair: C. Sufana
Vice Chair: TBD
Output: Report

Assignment: Investigate user requirements and provide recommendations for relay peer-to-peer communications in substations. Develop and define practices for the application and testing of IEC 61850 based Ethernet protocol in substation LAN peer-to-peer applications.

Introductions were done after a welcome by Vice Chairman Charles Sufana. There were 10 members and 18 guests present. The minutes from the September 2010 meeting were approved. Charles Sufana indicated that as John Burger will not be attending the PSRC meetings in the future, he will be taking over the chair for H6 with H sub-committee approval. Charlie also asked for someone to volunteer to be the vice chair but no one volunteered.
Christoph Brunner was able to give the working group the status of the IEC-61850 work that is on-going. Christoph indicated that the major work for edition 2 for the most part has been completed. Parts 6, 7.2, 7.3, and 7.4 have been issued. Part 7.1 is almost done. Working Group 10 (Condition Monitoring) is publishing Technical Report 90-3. Technical Report 90-5 on Synchrophasors is almost complete. A report on mapping GOOSE to a routable GOOSE is being prepared with the hopes to have a draft done by early March and the final draft near the end of April.
Christoph also updated everyone on several other working groups. Working Group 17 is developing models for distribution generation and automation with emphasis for smart grid. It is hoped to have a technical report on distribution automation published the first half of the year. Three major sections are being developed: inverters and scheduling, electrical vehicles, and batteries. Working Group 18 is working on edition 2 for a standard on hydro. Christoph has provided a more complete report to the H subcommittee and his more extensive notes will be found there.
Steve Thompson then gave a presentation on an Inter Operability Research Project. The project had several central objectives for interoperability: identify issues, standardization and guidelines. The project was from September 2008 to March 2010. Steve indicated that the test report is available; contact him if a copy is desired. The paper may also be found in PACworld magazine.
Steve indicated that for the most part, the testing was successful but that it did require coordinated engineering. The testers determined that the various manufacturers had different ways to interpret the applications and so there were some minor issues. He also indicated that they did forward comments to Working Group 10 of what they found.
During the course of Steve's presentation a gap was identified that perhaps H6 could do a report on. There seems to be a need to have testing procedures for Applications. Mladen Kezunovic commented that there is a need for how one specifies the test requirements. Charlie requested that everyone think about what a paper might have and to offer suggestions at the May meeting.
Other potential activities:

1. Pierre Martin reported that there is a report from Spain done by a group of utilities that is called E3 Group on IEC-61850. The group has been developing specification documents that may help IEC 61850 'get down-to-earth'. The link is https://sites.google.com/site/e3groupiec61850.

2. John Tengdin suggested that to make H6 more visible that some of the earlier published papers on Ethernet based substation control that various H6 members have done could be put on the website.

3. Christoph Brunner indicated that he might be able to present a future talk on what has been done in Australia.

4. Dean Ouellette from RTDS told H6 that there was an upcoming UCAIUG interoperability demonstration coming up in the very near future in Paris. The GOOSE messages will have different formats. Dean indicated that he might able to have a presentation on the demo at one of the future H6 meetings.

5. Stan Thompson from Megger indicated that he might have a presentation on GOOSE tests done in Mexico.

H7: IEEE 1588 Profile for Power System Applications

(Joint Working Group of Substations Committee C7 & PSRC H7)
H7 Chair: Galina Antonova Substations C7 Chair: Tim Tibbals
Vice-Chair: Bill Dickerson
Output: Standard

Assignment: Develop an IEEE Standard "IEEE Standard Profile for Use of IEEE 1588 Precision Time Protocol in Power System Applications" in close coordination with IEC TC57 WG10 and other technical committees with similar interests.

Joint WG H7/Sub C7 met on January 12, 2011 in Atlanta, GA in a double session with 40 attendees (13 members and 27 guests). Eight attendees (4 members and 4 guests) called in and participated via on-line meeting. Quorum was achieved.
After introductions, co-chair presented IEEE Patent Policy slides and asked to bring up any patent issues. None were identified. Minutes of September 2010 meeting were approved. Discussion on IEEE Sponsor ballot comments followed. The group agreed to

- IEEE 1588 TLV format for Alternative Timescale TLV
- One Alternative Timescale TLV (and consider the need and mechanism to support multiple such TLVs)
- Assign blocked MAC Address to Announce messages (also used for PDelay messages)
- Support TimeQuality attribute to be provided by all clocks.

Discussion on next steps and new items followed, including remaining comments resolution, recirculation and submission to RevCom for approval.

H8 Application of COMTRADE for Exchange of Synchrophasor Data

Chair: E. Allen
Vice Chairs: J. Ingleson, K. Narenda
Output: WG Paper

Assignment: Develop a paper on issues related to the use of COMTRADE for exchange of Synchrophasor Data. Develop a profile (scheme) to use COMTRADE for this purpose. Report on other formats that have been used such as ".dst". Address issues that would arise in converting .dst and other formats to COMTRADE.

This WG met on January 11 at 11:00 AM in Atlanta, GA. 4 of 15 Members were present. There were 17 guests, for a total attendance of 21. A winter storm across the South adversely affected the ability of WG members to reach the meeting.

The COMTRADE files provided by Ken Martin from the schema testing were reviewed. The file set represents a five minute period of ambient data. Frequent dropouts were observed in the data; however, it was found that the status channels specified by the schema (DTVLD and PMUERR in particular) adequately indicate the presence of those dropouts. However, it was noted that the ordering of the status channels in Ken's files did not conform to the schema. Ken agreed to modify the program used to generate the files so that the status channels would be numbered according to the specifications in the schema.
Benton Vandiver and Jay Murphy were unable to attend the meeting in person due to weather-related flight cancellations. Both reported progress in implementing the test of the schema prior to the meeting; however, they did not have COMTRADE file sets available for review at the meeting.
Stan Thompson of Megger offered to perform a test of the schema as well using Ken's phasor data. Ken will send those phasor data files to Stan.
Following are status reports on various outstanding assignments having to do with the publicizing of this Schema:
The submittal to the Texas Relay Conference was rejected by the selection committee. Mladen Kezunovic agreed to try to find out the reasons for the rejection by talking to members of the committee.
Eric Allen presented the schema to the Western Protective Relay Conference (WPRC) on October 21. The presentation appeared to be well received.
The version of the schema approved by H subcommittee on May 13 has been included as an informative annex of the new COMTRADE standard. It is believed, but not known for certain, that the recent problems with the COMTRADE draft having out-of-date and erroneous text have been corrected.
The WG will endeavor to complete the schema testing plan by e-mail in the next couple of months. If this is done, then the group's assignment will have been completed and the WG can vote by e-mail to disband prior to the May PSRC meeting in Asheville, NC; otherwise, a meeting of the WG will be held there.

H9: <u>Understanding Communications Technology for Protection</u>

Chair: M. Sachdev
Vice Chair: R. Midence
Output: WG Paper

Assignment: Prepare a document that would assist engineers in understanding the communications technology for protective relaying.

The Working Group met on January 12, 2011 at 9:30 am. Ten (10) members and four (4) guests were present. The notes of the previous meeting were presented and discussed.
Status of the Report: For the benefit of new participants that attended the meeting for the first time, René Midence provided and overview of the Report, and presented a list of comments made to Draft 4 distributed after the previous meeting.
The list of comments received to date was presented and discussed during the meeting. René Midence described the new material and how it contributed to resolve some of the comments; however there is still work to be done that require the skills of individuals with experience in communications with good understanding of protection and control.
It was agreed that the document may have content that does not necessarily meet the objective of this assignment, therefore it will be removed from the main document and will be placed in appendixes rather as reference or for additional information.
René requested those present to assist with contributions to cover the comments or to provide the contact information of individuals that can provide contributions.
It was agreed that all the participants on this meeting will be taking the task of:

- Reading the entire document
- Provide comments if needed
- Provide contributions to feel the gaps or identify resources capable of providing contributions.

It was suggested in the previous meeting that Acronyms and Glossary be moved to the beginning of the document. René will take care of this.
René presented a table identifying the assignments not received prior to this meeting. René will follow up the corresponding group members.
Lilliana Vulic provided contributions to the "*Section 1 – Digital Communications"* and *"Section 2 – Basic Issues"*. She also volunteered to provide material that will facilitate the flow of information and the relationship between local area and the wide area networks.
The following members volunteered in September 2010 to read the document. René will contact them for their contributions.

- Shoukat Khan
- John Beckwith
- Sam Sambasivan

René Midence will contact Solveig Ward for comments on the sections containing information on SONET.
Target Date: New contribution and comments are due on April 15, 2011.
Future Plan: It was agreed that the document will be finished by the next meeting to be held in May 2011.

H10: Naming Installed Intelligent Electronic Devices (IEDs)

Chair: R. Cornelison
Vice Chair: J. Hackett
Secretary: A. Makki
Output: WG Paper

Assignment: Create a PSRC Report that describes a convention to uniquely identify (name) installed Intelligent Electronic Devices (IEDs) including measured and calculated quantities for the purpose of sharing data collected by these devices.

The Working Group met on Tuesday January 11, 2011 with 2 members and 4 guests.
The purpose of this meeting was to disband since the Working Group Chair forwarded the completed paper to the Subcommittee Chair last week. The Working Group had been able to complete this work earlier than expected due to the extensive use of email reviews led by the Chair.

Due to a lack of quorum caused by the snow storm, we plan to poll the members by email to seek agreement to disband. The Chair will communicate the results to the Subcommittee Chair.

H11: C37.118.1 Standard for Synchrophasors for Power Systems

Chair: K. Martin
Vice Chair: B. Kasztenny
Output: Standard

Assignment: Create a new Synchrophasor Standard C37.118.1, using the measurement portion of the current standard, C37.118-2005, and adding dynamic phasor measurement and frequency measurement requirements according to the PAR issued 17 June 2010.

WG H11 met on Wednesday, January 12 in a double session with 11 members, 7 corresponding members, and 28 guests. The attendees were reminded of the applicable IEEE intellectual property rules. The WG did not have a quorum, so was unable to conduct formal business, so it will be done by Email.
The present state of the standard was reviewed. A task team has completed reference algorithms that are described in annex C and used these to confirm performance requirements. All the figures have been updated and will be put into the next draft. IEEE-SA has offered to edit the draft into standard IEEE format when it is ready.

Representatives of the IEEE synchrophasor WG and the Chinese synchrophasor standard met to discuss harmonization of their standards. The IEEE standard focuses on measurement and data transfer and the Chinese standard focuses on data transfer and system management. The Chinese intend to use the measurement provisions from 37.118.1. They provided translations of 4 sections from their standard for consideration of inclusion into the IEEE standards. Based on recommendations of the correspondence group, the WG considered the generator monitor section and agreed to add it as an annex with some edits. The issue of copyright was brought up and Ken will get a copyright release from the Chinese delegation. Gabriel mentioned that he is aware of patented methods for generator monitoring shaft sensors; he will investigate and report back to the WG.
IEEE proposed 37.118.1 to IEC TC95 for a dual logo adoption. They decided they preferred a joint development. Due to the advanced state of the draft and the Smart Grid Initiative urgency, it was decided for IEEE to continue completion of 37.118.1 and start the joint work with IEC at the same time. This is proposed to start in May 2011 if the new work item circulated by IEC is approved. If approved, the IEEE will need to recommend some names for the work group. If you are interested in taking part in this work, contact Ken Martin for details.
The chair mentioned that he hoped to bring the standard to a final approval vote at the meeting. It was mentioned that in the past, WGs have circulated a final draft along with the vote so members could examine and make final comments on the draft before it goes to the subcommittee. In this case, the issue was moot due to lack of quorum, but this will need clarification for the future. The current plan is to circulate the draft with the determined updates and then circulate again for final vote.
A few issues in the current draft were discussed and resolved including difficulty with computation of F and ROCOF, the term out-of-band, and some measurement limits.
The Chairman will provide an updated draft including these changes to the working group by January 31, 2011 and ask the WG for the comments and to motion the H Subcommittee for permission to send the draft for IEEE SA balloting.

H12: Configuring Ethernet Communications Equipment for Substation Protection and Control Applications

Chair: E.A. Udren
Vice Chair: J. Gould
Output: WG Report

Assignment: Develop a report to assist protection engineers in configuring Ethernet LANs and networking equipment when the network traffic includes critical protection messaging such as IEC 61850 GOOSE messaging. Topics include switch and router configuration, VLANs, security, priority queuing, traffic monitoring and control, and topology choices and redundancy.

The Working Group met on January 12, 2011 with 6 members and 14 guests. Attendees reviewed Draft 10 of the WG paper, with new additions and editing. The draft has a full body of material with a few identified spots to fill in. The WG reviewed the draft and identified remaining assignments, to be handled by volunteers in attendance and via prior assignments. Draft 10 is circulated after the meeting for WG review and these additions in March.
The schedule is to have the holes filled and issues addressed by May, with paper ready in September. All members and attendees are asked to review and mark up Draft 10.
Report work topics:

- Items still missing as identified in Draft 10.
- IEEE 1588 impact, advantages and disadvantages.
- Words on synchrophasors over Ethernet.
- Addition on approaches to multiport relays with bumpless network failure handling – PRP, HSR – digest from 61850-90-4 draft - Pierre Martin, Lars Frisk.
- Pointer to contents of new IEEE 1615 – Mike Dood
- 61850 stacks – layer 2 GOOSE and Sampled Values illustration versus 7-layer services – Schneider participant.

- Security aspects of IPv6 – Schneider participant
- Routers & dynamic routing – Richard Harada and Abdul Amin.

H13: Understanding Requirements and Applications of the Substation Cyber Security Standards (Joint Working Group Substations Committee C1 & PSRC H13)

Chair H13: Steven Kunsman Chair C1: Sam Sciacca
Vice Chair H13: Tuan Tran
Output: Standard

Assignment: Prepare a standard on "Cyber Security Requirements for Substation Automation, Protection and Control Systems." This document provides technical requirements for substation cyber security. It presents sound engineering practices that can be applied to achieve high levels of cyber security of automation, protection and control systems independent of voltage level or criticality of cyber assets. Cyber security includes trust and assurance of data in motion, data at rest and incident response.

The WG H13 and Substations WG C10 meeting was held on Wednesday, January with 30 attendees, 12 members and 18 guests, plus some IEEE-SA Staff. No quorum was established so the minutes will have to be approved via email. The group also went over the IEEE patent policy.
Updates were given by John Tengdin on IEEE-1711 (approved by IEEE-SA) and Sam Sciacca on IEEE-1686 (being opened for revision)
The PAR was approved in the December IEEE-SA Board meeting, and this effort has been identified as a candidate for accelerated IEEE-SA processing for NIST Smart Grid inclusion. Noelle Humenick indicated that assistance could be available, including a staffer to serve as the primary administrative functionary. Steve and Sam will discuss with Noelle the needs of the group to move the effort along.
A schedule of the effort was proposed which would have submittal to RevCom in September 2011. This will require teleconference meetings (possibly three) in advance of the May meeting.
The project will be set up in My Projects with a Mentor site to facilitate the accelerated effort. Writing assignments, reviews and other activity will be posted to Mentor with access by all WG members.
Draft 1 was circulated and additional writing assignments were made. The next 3 meetings will be teleconference meetings, with a possible fact-to-face in Piscataway in March.

H14: Revision of C37.115 Message Communications Between IEDs

Chair: J.T. Tengdin
Vice Chair: TBD
Output: Standard

Assignment: Recommend whether C37.115 is to be revised or retired.

H14 did not meet in Atlanta. H14 was placed in an inactive status at the prior September meeting, until the elapsed times (T1, T2, and T3) now in that standard's Figure 1 can be measured. A Working Group of the PES Substations Committee's C Subcommittee is beginning work on a method to measure these times (or their equivalent). IEEE C37.115 has been removed from Active status. Until a valid measurement method is defined, IEEE C37.115 will remain as Inactive.

H15: Coupling Redundancy for Protection Systems Using Power Line Carrier

Chair: R. Ray
Vice Chair: B. Pickett
Output: Paper

Assignment: To develop a working group report that discusses the various coupling schemes for power-line-carrier systems and the coupling schemes ability to provide for redundancy.

H15 did not meet at the January 2011 meeting.
The paper is complete and Draft #6 has been put out (via email) for a ballot from the working group. The working group has until January 28th to send in a response.
When I get approval from the working group I will ask the H subcommittee to do an email ballot. This has to be done long before the next meeting since this paper has been accepted for presentation at the 2011 Georgia Tech Conference.

H16: Common Format for Event Data Exchange (ComFEDE)

Chair: M. Adamiak
Vice Chair: P. Martin
Output: Standard

Assignment: Define a standard for a common format for the data files needed for the exchange of various types of power network events.

The IEEE Standard for a Common Format for Event Data Exchange – COMFEDE – IEEE C37.239 – is complete, approved, and published as a full standard. It is anticipated that updates to the Schema will be required over the course of the standard. The WG plans to create a Transaction paper and a Conference paper. A first-draft PowerPoint is already available. An outline has been prepared and writing assignments have been made. A draft is planned for mid-April with a final review at the May PSRC.

H17: Establishing links between COMTRADE, IEC 61850 and CIM

Chair: C. Brunner
Vice Chair: A. Apostolov

Assignment: Develop a standards approach to link IEC 61850, CIM and COMTRADE so that the COMTRADE channels can be associated to a node in the power network.

The meeting was held Tuesday afternoon as a single session and attended by 5 members and 11 guests. The Vice Chair was missing due to flight conditions into Atlanta as well as the video projector.
After introduction of attendees Christoph made a very short introduction of the scope of the working group since there attended a couple of new participants.
The scope was discussed and Mladen Kezunovic made the remark that COMFEDE should be considered as well. Mladen as well pointed out that we shall include migration scenarios – e.g. we shall show what users have to do to benefit from the approach even if they do not yet fully apply IEC 61850 or CIM.
In a next step, Christoph went through the outline of the draft that has been prepared at the last meeting. Mladen pointed out that a practical use case may involve the need to analyze data coming from different sources like data from relays in COMFEDE format, data from disturbance recorders in COMTRADE format and data from a file following the file naming convention that need to be merged with data from SCADA.
Then, existing assignments where reviewed and new assignments where made. As new assignment, a couple of members volunteered to provide a write-up:

- Mladen Kezunovic to describe the use case for fault location based on COMTRADE file analysis. He will incorporate into the presentation of that use case as well the issue of the need to analyze data from different sources as explained above.
- Jalali Mansour to describe the use case Condition monitoring / Analysis based on COMTRADE records of condition related information.
- Stan Thompson to describe the use case of System simulation and testing replaying COMTRADE information.
- Arvind Chaudhary to describe the use case of correlating COMTRADE data with any information recorded elsewhere like e.g. weather data.
- Pierre Martin to provide a short description of COMFEDE.

H18: Cyber Security for Protection Related Data Files

Chair: Amir Makki
Vice Chair: Stephen Thompson
Output: Report

Assignment: Develop a report on security for data files used for configuration, management, and analysis of protective relaying systems.

The H18 working group met on January 12th 2011 with 4 members and 8 guests present. The meeting was chaired by Stephen Thompson. Charles Sufana recorded the notes. Introductions were made and minutes of previous meeting were approved. A quick review of the table of writing assignments from the previous meeting took place. Individual writing assignments received since the last meeting were then reviewed. Most were accepted with some minor revisions required to some. Two new file types were added to the assignment list with a volunteer who will write a contribution for these. Additionally a section describing Role Based Access Control and its applicability to file security shall be added and a volunteer agreed to provide this. It is felt that this group is well on the way to complete the report by the next meeting in May 2011.

H19: C37.118.2 Standard for Synchrophasor Data Transfer for Power Systems

Chair: Ken E. Martin
Vice Chair: Gustavo Brunello

Scope: This standard defines a method for exchange of synchronized phasor measurement data between power system equipment. It specifies messaging including types, use, contents, and data formats for real-time communication between Phasor Measurement Units (PMU), Phasor Data Concentrators (PDC), and other applications.

WG H19 met on Wednesday, January 12, 2011 in a double session with 9 members and 18 guests. A quorum was not present. The participants were reminded of the applicable IEEE intellectual property rules. The chair gave a brief overview of this Standard, and its present status.
Config3 was approved by the WG via an electronic ballot last year with 2 negative votes and some other comments. The attendants to the meeting addressed these issues and after extensive discussions decided:

1. Latitude, Longitude and Elevation will be referenced to WGS84 and reported using IEEE 32-bit floating point.

2. Naming for Channel Name (CHNAM) and Station (STN) will be using UTF-8 coding that includes most current languages

3. Mark Adamiak will prepare an Informative Annex describing the use of a “Pseudo PMU” which captures PDC information so it can be forwarded along with PMU information in the data. Due date for Mark to submit it: Jan 26, 2011

4. Reporting Freq and ROCOF when they are out of the PMU measuring range were discussed. Some PMUs have settable reporting ranges and others quit reporting at fixed reporting limits. The suggestion to add the reporting limits to config3 was considered and declined.

5. The proposal to add informative Annex from the Chinese Synchrophasor Std was discussed. The attendants decided not to include any in this standard because they are more application specific or belong in C37.118.1.

6. There was extensive discussion about the PMU message Time Quality. The attendants decided to use Bits 6 – 9 of STAT field originally reserved for security. They would not be particularly useful with modern security codes and their use allows a fully backward compatible inclusion of time quality for each PMU that will also be aligned with modern timing systems. The WG chose a TQ code that is consistent with IRIG-B and 1588.

7. The addition of Locked Time Quality information for the IRIG-B profile in Annex F was debated. The proposal, developed with the help of H7 uses Bits P70 to P78 which are currently unused. Proposal A uses these bits only during the locked state and uses the existing TQ during an unlocked state. Proposal B uses these bits at all times to indicate TQ. The decision was to include this new TQ indication and follow Proposal B. This new TQ will be called CTL (Continuous Time Quality).

8. It was decided that the Annex E is no longer necessary and its content will be merged in Annex F.

The draft will be updated with these decisions and circulated to the WG for review. It there are no issues raised, the WG will be balloted for final approval.

H20: Standard for Naming Time Sequence Data (TSD) Files

Chair: Eric Allen
Vice Chair: Amir Makki
Output: Standard

Assignment: Elevate C37.232, *IEEE Recommended Practice for Naming Time Sequence Data Files,* to a standard.

The H20 WG met on January 11 at 9:30 AM in Atlanta, GA. 4 of 6 Members were present. 3 guests were also present, for a total attendance of 7.

The C37.232 document, with revisions to reflect the proposed change to a standard, was reviewed by the group. A motion was made to submit this document for ballot and address any issues as ballot comments are received. The motion was approved unanimously by all members present.

Liaison Reports

PES Substations Committee
S. Sciacca
Substations Committee C0 is currently working on the following topics:
1. C1: Starting work on updating IEEE 1686 Standard For Substation IED Cyber Security. This work will be coordinated with SUBS C10/PSRC H13.

2. C2: Continuing work on IEEE 1613 Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations to include better shock and vibration requirements. These new requirements the PSRC may want to consider adding to C37.90.

3. C3: Starting work on IEEE C37.1 Standard for SCADA and Automation Systems.

4. C4: Coordinating work with PSRC H3 for time tagging requirements of substation IEDs. This work came out of how to test compliance with 1646 and C37.115.

5. C8: Starting work on updating IEEE 1615 Recommended Practice for Network Communications in Substations. This work may be coordinated with PSRC H12.

6. C12: Continuing work on IEEE 1815 DNP3.

7. C14: Starting work on IEEE 1815.1 Standard for exchanging information between networks implementing IEC 61850 and IEEE Std 1815 (DNP3).

PES Communications Committee
S. Klein
No report.

IEC TC57, WG10, 17, 18 and 19
C. Brunner
IEC TC57 / WG10 is currently working on the following topics:

(1) Preparation of Edition 2 of IEC 61850:

The parts 4, 6, 7-1, 7-2, 7-3, 7-4, 8-1 and 9-2 are published or circulated / ready for circulation as FDIS. From a technical viewpoint, they are done.
CDs for part 1 and 3 are currently being circulated. A draft CDV for part 5 is ready. Currently the French translation is in preparation. The first draft for part 10 is under preparation.
(2) There are different task force working on preparing technical reports:

a. IEC 61850-90-3 – using IEC 61850 for condition monitoring

b. IEC 61850-90-4 – network engineering guidelines

c. IEC 61850-90-5 – using IEC 61850 to transmit synchrophaser data according to IEEE C37.118. This is a joint work with IEEE PSRC HTF3.

d. Modelling of logics

e. Functional testing

For IEC 61850-90-5, a draft has been circulated to the national committees; currently the comments are incorporated into a second draft. The work is expected to be finished the latest by summer 2011. Drafts of IEC 61850-90-3 and -90-4 are expected to be circulated following the WG meeting in March.
(3) A draft UML model for IEC 61850-7-4 and -7-3 has been generated and is currently in the process to be verified. It is intended that for the future, the UML model shall serve as a basis for the standardisation work.
(4) Technical reports IEC 61850-7-5 and -7-500 are in preparation. These reports shall provide additional explanation on the usage of the models defined in the standard.
IEC TC57 / WG17 is currently working on the following topics:
(1) A task force was created that shall prepare a technical report about the use of IEC 61850 for Distribution Automation. That task force will in a first step prepare a technical report IEC 61850-90-6, use of IEC 61850 for distribution automation.
(2) The WG is revising and extending the existing models for DER as they have been defined in Edition 1 of IEC 61850-7-420. Since some of these models have a high priority for Smart Grids, it was decided to start with the publication of technical reports with the new or extended models. Technical reports may be produced faster. The named space concept of IEC 61850 has been adopted so that technical reports can be identified as intermediate models.
The following technical reports are planned:
f. IEC 61850-90-7 – Photovoltaics and schedules
g. IEC 61850-90-8 – Electrical vehicles
h. IEC 61850-90-9 – Storage batteries

IEC TC57 / WG18 is preparing IEC 61850-7-510: use of the logical nodes defined in IEC 61850-7-410 to model applications for the control of hydro power plants. WG 18 also prepared a CDV of the second Edition of IEC 61850-7-410 which is currently being circulated. That work is focused on refining the different details of the logical nodes based on experience with first implementation considerations.

I: RELAYING PRACTICES SUBCOMMITTEE

Chair: R. Beresh
Vice Chair: J. Pond

The I Subcommittee met on January 13, 2011 with 17 members and 10 guests present – a quorum was not achieved.

- The importance and definition of quorums in the WG was emphasized

Reports from the WG Chairs

I2: C37.100 - Terminology Review

Chair: Mal Swanson

Vice Chair: Fred Friend
Output: Definitions for C37.100 and IEEE Std. 100

Assignment: Review drafts of PSRC publications for proper terminology, abbreviations and symbols; and to recommend additions and changes to the IEEE database as appropriate.

The I2 working group did not meet

I3: Relay Functional Type Testing

Chair: Jerry Jodice
Vice Chair: Bryan Gwyn
Output: Report
Completion Date: September 2011

Assignment: **"**A series of functional tests that could show a particular problem related to system events. Individual problems will be submitted by members of the Working Group and a test report developed for that issue. The individual test reports will then be collated into a Working Group report."

I3 met Monday with three members and three guests attending.

Draft 5 had been distributed last week courtesy of Amir Makki, with the request that contributors review their sections and provide comments of note.

Summary of Activities:

1. Contributions were reviewed briefly, and errors noted by TW Cease, Jeff Pond and Jerry Jodice. Steve Turner and Jeff Pond will add SC models as examples of how they created their test plans. These errors of omission will be documented by TW, and the contributors requested to complete their sections by the Chair.

2. To complete the Introduction, either a summary of, or the original NPCC letter to Bryan Gwynn [which was the genesis of the WG] should be included...

3. Corrections to the draft , integration of the contribution by Bob Beresh [an oversight] ,and the Introductions will be added by Amir Makki for distribution to contributors for comments by the end of November ,in order to complete the assignment & Report ,for the January 2011 meeting.

4. The IEEE and CIGRE reference documents will be incorporated within the body of the Report since they are no longer available.
.
5. One final request will be made to those who offered contributions but have not yet made their submissions .Should there be no further contributions the Report is expected to be available for submission to the I SC in January with the existing case studies.

I4: IEC Advisory Working Group

Chair: E.A. Udren
Vice Chair: M. Ranieri
Output: Comments and votes to USNC of IEC on TC 95 (Measuring Relays) Standards projects and drafts. Reports to PSRC on IEC standards development.
Meeting: WG meetings are continuing

Assignment: Develop comments and votes for USNC of IEC on TC 95 (Measuring Relays) Standards projects and drafts. Report to PSRC on IEC standards development. WG meetings are continuing.

The WG met on January 11, 2011 with 6 attendees and discussed recent TC 95 documents:

- Results from October 2010 Seattle Plenary Meeting of TC 95 sponsored by USNC. A major result from that meeting is the definition of the direction for the IEC synchrophasor measurement standard, as explained just below.
- CD of 60255-24, COMTRADE - Comments due February 18
- Based on PSRC C37.11 draft – the US must propose participants for a Dual Logo Maintenance Team (Murty Yalla, Convenor)
- New Work Item Proposal for 60255-37-118-1, *IEC Synchrophasor Standard* [measurement part only] – Vote and team proposal due on March 11. The US had requested that TC 95 adopt IEEE C37.118.1 as a dual logo standard. At the meeting, the other National Committees instead voted that a new WG be formed to review the draft, which they had not even seen. The US investigated after the meeting and agreed to support the IEC effort on a fast track, supplying its draft C37.118.1. The IEC has issued a New Work Item Proposal to form a WG, with attached incomplete IEEE draft. The proposal to create an IEC project is likely to be accepted and supported by the TC 95 members. The first meeting will occur in parallel with the PSRC May meeting in Asheville, NC, with Ken Martin as co-convenor. Both IEC and IEEE have Smart Grid standards deadlines that require the quick completion of what will likely be called IEC 60255-37-118-1!
- CD of 60255-26, EMC Requirements - Comments due March 11

A whole layer of IEC 60255-22-X environmental standards will be retired; this one new IEC relay requirements standard will refer only to IEC 61000-4-X series basic EMC standards. The attendees reviewed the draft in conjunction with the draft IEC 61850-3 Edition 2, also out for comments due on March 25. These documents are not harmonized, but should be. Both comments will propose that the development WGs meet or coordinate. Also, there is some obvious duplication or borrowing from IEEE 1613 that should be formalized. Some specific comments:

- Line 421 Table, A, B, C data communications – what are the meanings? Does loss of bits mean loss of data? What is really needed here?
- Zone A and Zone B definitions at beginning are not used anywhere.
- Do all tests require that communications be operating?
- Check coordination with 61850-3
- Check 61850-3 against 60255-1 and -26.
- 60255-121 – Distance relay functional standard – this project by MT 4 under Murty Yalla is officially rescheduled to allow for a body of new development work to be done on this big project.

I5: Schematic Representation of Power System Relaying

Chair: Kevin Donahoe
Vice Chair: Rich Young
Output: Report
Expected completion date: TBD

Assignment: Report on common practices in the representation of protection and control relaying. The report will identify methodology behind these practices. Present issues raised by the integration of microprocessor relays and the internal logic and external communication configurations. Detail approaches to these issues.

Minutes of Meeting #9: 1/12/2011, 1330

The Working Group met at 1330 on Wednesday, January 12, 2011 in Atlanta, GA in a single session with 8 members and 8 guests attending.

Introductions were given. Kevin mentioned that, although this WG will not be producing a standard, recommended practice, or guide, there may be proprietary information discussed and care must be made to avoid any patent issues.

Section II has been added by Jim Niemera on drawing types and hierarchy. It was noted that readers need to be aware of the differences between switching diagrams and 1-line diagrams.

Section IV has been added by John Appleyard on ac schematics, elementary diagrams, etc. Question was asked if phasing relationships should be shown. If shown, they must be shown correctly. The author will add a statement to address this item.

The impact of microprocessor relays was discussed. There is some overlap with the scope of WG C16. Rich Young attended that WG meeting today, and will continue with that WG to ensure conflicting information is not put forth.

Possible methods of indicating which elements of microprocessor relays are used were discussed, such as a list of functions being used, a small block diagram, some kind of text description, etc.

Metering functions – microprocessor relays are often used in replace of SCADA-type metering. How are these functions indicated on the drawings? Symbols and abbreviations are commonly used. Should the same identifications used on the 1-line be repeated on the 3-line? Differences of opinion were expressed. There is possible confusion if one of drawing gets changed, but not the other. Also, drawings need to agree with the setting sheets.

Kevin proposed to include a statement to consider the audience when deciding how many drawings will show duplicate information. IEC 61850 will force everyone to think about how to depict schemes. We discussed the use of lists, tables, logic diagrams, spreadsheets, etc., versus graphical representation of wires.

VII A and B were added from Adi Mulawarman. Adi mentioned a problem when communications drawings are included, but it is difficult to maintain when changes are made by the communications people. Changes need to be routed through all affected departments. Need to bring people together. Or eliminate the communications group.

We discussed whether we should add a section on quality control and as-builts? Whenever making modifications to existing schemes, one needs to verify that existing drawings correctly depict what is really there before making changes. It is a good idea for the original designer to review as-builts, but with a lack of resources, it is almost impossible to make this happen.

Kevin asked everyone to look through the entire paper and make suggestions on how to make it more readable, logical, and thorough. This is not a how to book, but an overview of different ways to depict schemes on drawings.

We plan to incorporate the remaining writing assignments before the May meeting and begin editing the overall document. Members are asked to review the draft and propose any modifications. Anyone who has some additional examples of documentation that might be appropriate to include in the report are asked to notify Kevin and Rich.

For reference by members and guests, the draft document, minutes, writing assignments, and presentations are posted on the WG I5 web page.

I6: Practical Aspects of Rogowski Coil Applications to Relaying

Chair: Ljubomir Kojovic
Vice Chair: Bob Beresh
Output: Special Report to the PSRC
Date: 13 January, 2010

Assignment: Produce a special report describing applications of Rogowski Coils used for protective relaying in electric power systems

The I6 WG did not meet

I8: Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

Chair: Brian Mugalian
Vice-Chair: Bruce Magruder
Established: 2009
Output: Revision of IEEE/ANSI C57.13.3-2005
Expected Completion Date: 2012

Assignment: Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

Working Group I8, Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases, was held in Georgia 8, Sheraton Atlanta Hotel, Atlanta GA on January 12, 2011. Seven members and four guests were present. A quorum was not met.

The spreadsheet of pertinent IEC standards was reviewed, and all volunteer assignments were completed. The spreadsheet and other documents including the existing Guide will be placed on the secured I8 web site for working group members to use.

Bruce Magruder will add his assignment on metering applications to Section 5 of the Guide. Rich Young volunteered to review the 2005 Guide for any grammatical or typographical errors and will notify the working group by email.

Don Sevcik will determine where in the Guide to place his IEC review assignment.
Bruce Pickett and Gary Kobet will provide their presentations to include in new Annex sections of the Guide. Brian Mugalian and Bruce Magruder will begin work on a first draft of the Guide for review at the May 2011 meeting. Expected due date to the members is March 15.
Brian Mugalian will contact other PSRC members to continue research into IEC and other grounding standards.

The Working Group will meet in May 2011 in Asheville, NC. We will require a room for 15 people and a computer projector.

I9: Revision of C37.105 Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

Chair: Sahib Usman
Vice Chair: Roy Ball
Output: Revision of Standard C37.105

Assignment: Review the applicability of the standard for all relays used in nuclear power plants, specifically digital relays and seismic qualification of the relays. Update the standard in conformance with the latest IEEE Style Manual, and incorporate field experience and state of the art developments.

The WG did not meet

I10: Revision of C37.98 Standard for Seismic Testing of Relays

Chair: Marie Nemier
Vice Chair: Munnu Bajpai
Suresh Channarasappa – Co –Chair SC-2
Output: Revision of Standard C37.98

Assignment: Revise and update C37.98

The WG did not meet

I11: PC37.241 - Guide for Application of Optical Current Transformers for Protective Relaying

Chair: Harland Gilleland
Vice Chair: Bruce Pickett
Established: March 25, 2010
Output: Guide PAR PC37.241 March 25, 2010
Expected Completion Date: December 31, 2014

Assignment: Develop Guide for "Application of Optical Instrument Transformers for Protective Relaying"

The WG did not meet

I17: <u>Trends in Protective Relaying Performance</u>

Chair: Mark Carpenter
Vice Chair:
Output: Periodic Reports to Subcommittee

The WG did not meet

I18: <u>Anomaly Checks for Relay Settings</u>

Chair: Peter McLaren
Vice Chair: Mukesh Nagpal
Output: Report to main committee

***Assignment*:** "The WG will produce a report on relay software features and setting practices which minimize the possibility of wrong settings being downloaded to a relay. The WG will commence its task by conducting a survey of relay manufacturers and utilities to get information on present practice."

Meeting # 11 – 01/11/11
The WG met for a single session with 4 members and 2 guests
The chairman indicated that he had circulated the final draft of the WG report and 11 of the 14 WG members had accepted it as being ready for submission to the sub-committee. The same 11 WG members had also accepted the Minutes of the May meeting and of the September meeting.
The WG will schedule a May meeting to await any comments from the sub-committee.

I20: <u>Revision of C37.90.1 - IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus</u>

Chair: Tom Beckwith
Vice Chair: Jeff Burnworth
Output: Revision of C37.90.1 SWC Tests Standard
Expected Completion Date: September, 2010 (ready for ballot)

***Assignment*:** To revise IEEE Std C37.90.1™-2002

The eleventh meeting of the Working Group (WG) I20 met on January 11, 2011, in a single session with 6 members and 1 guest. Since the present membership is at 14, we did not have a quorum. The meeting was chaired by Tom Beckwith.

The chair discussed the slides of the Highlights of the IEEE-SA Standards Board Bylaws on Patents in Standards.

As a quorum was not present, the minutes of meeting #10 in Berkeley, CA on September 14, 2010 were not able to be approved as submitted.

The Working Group discussed issues that remain with clause 5 of draft 4.2.

Although the 2002 SWC Test standard had the flaws in section 5 identified below, there was a valid reason for all information included in this section of the body of the standard.

The section 4 describes the waveforms starting with “The test voltage parameters for an open circuit generator condition at the generator terminals shall be:” The source impedance looking back into the generator is specified: “Source impedance: 50Ω (tolerance ± 20%) between 1 MHz and 100 MHz”.

There is an external coupling / decoupling network required in section 5 which no one seems to have a problem with, even though it contains series capacitors and shunt inductors hanging off the generator terminals.

What some members have issue with is that there is an additional series blocking capacitor specified in section 5, and that it is called out to be internal to the generator.

It turns out that an additional series capacitance is also specified in the IEC Standard for the higher frequency fast transient test only and will result in a reduction in the net series capacitance of the coupling network and also affect the source impedance.

The problems with section 5 in the IEEE SWC standard seem to be that A) this capacitor was specified for both fast transient and oscillatory tests AND B) the capacitance value was too high for the fast transient test AND C) the capacitor was called out to be internal to the test generator.

Removing section 5.3.1 (requirements common to both fast transient and oscillatory generators) and adding a revised new section 5.2.3 below (in the fast transient clause only) fixes the first two of the three problems and specifies the IEC mandated value which both Dr. Skendzic and Dr. Yalla have verified as correct in September of 2010.

5.2.3 Low frequency and DC blocking

A series blocking capacitor of 0.01μF shall be included internal to the test generator to allow application of the test to live relay input and output circuits without shorting or overloading the relay AC signal source or DC supply source during SWC testing.

If we leave the capacitor value out the body of the IEEE standard or allow it to be external to the tester, then testers designed to the IEEE standard will NOT meet the IEC standard, and we will have wasted a year trying to accomplish this goal only to have missed it.

If we just consider this capacitor as tuning the coupling / decoupling network for the higher frequency of the fast transient test versus the oscillatory test, then I think we can all get on with our lives.

This issue has adamant proponents on both sides.

The chairman of the working group has decided NOT to request that we commence the balloting process as this issue and that of the Annex E need to be resolved.

The minutes and comments were recorded by working group member Tom Beckwith.

ITF3: <u>Reaffirmation of C37.103, Guide for Differential and Polarizing Relay Circuit Testing</u>

Chair: Mohindar Sachdev
Vice Chair:
Output: Recommendation to the PSRC

The TF did not meet

ITF5: Reaffirmation of C37.92 - Analog Inputs to Protective Relays from Electronic Voltage and Current Transducers

Chair: Roger Whittaker
Vice Chair:
Output: Reaffirmation

Relaying Practices sub-committee task force ITF5 met Tuesday, January 11, 2011 with nine people attending. Results of the recent Ballot for Re-affirmation of IEEE standard C37.92, "IEEE Standard for Analog Inputs to Protective Relays from Electronic Voltage and Current Transducers", were presented for discussion. Of the 94 participants that joined the ballot body, 85 voted. Of the 85 voters, 3 abstained and 82 voted to affirm the standard. There were several comments that accompanied affirmative votes. There were no negative ballots

Each of the comments were individually presented for discussion. Several comments pointed out typographical errors. These typographical errors were not considered to be significant enough to detract from conveyance of understanding of the document. Task force chair, Roger Whittaker will find out if these minor errors can be corrected by or before final submittal to Revcom. Other comments suggested adding figures or footnotes for further elaboration. One suggested reference to IEC standard 61869. Another suggested that the document might be revised to better align it with, in general, IEC standards. Eric Udren advised: at the time the standard was written, C37.92 was specific in defining signal levels and that the IEC standards were not so specific. Also it was noted that it is not absolutely necessary that an IEEE standard be compliant to an IEC standard. The comments and suggestions were not considered by the group to be significant enough to delay or cancel re-affirmation. Further, it was suggested that if any person feels strongly that the standard should be revised then that person might approach the Relaying Practices Sub-Committee about forming a new taskforce to initiate revision.

Roger Whittaker will respond to the comments and will submit the standard to REVCOM for re-affirmation. The work of this taskforce will then be complete.

ITF10: Reaffirmation of C37.90 Standard for Relays and Relay Systems Associated with Electrical Power Apparatus.

Chair: Mario Ranieri
Vice Chair:
Output: Recommendation to the PSRC

The TF did not meet

Liaison Reports
None

Coordination Reports

None

Old Business

None

New Business

There are three standards that need to be re-affirmed:

- C37.90.3 - Standard Electrostatic Discharge Tests for Protective Relays
- C37.231 - Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control
- C57.13.1 - Guide for Field Testing of Relaying Current Transformers

Jerry Jodice requested that a TF be formed to discuss "Analysis of IED System Waveforms and Event Data"

J: ROTATING MACHINERY PROTECTION SUBCOMMITTEE

Chair: K. Stephan
Vice Chair: M. Yalla

Scope: Evaluate and report on protective relaying concepts and practices applicable to generators, motors, synchronous condensers, associated auxiliary systems, and performance of plant protective systems. Develop and maintain related relaying standards.

The Subcommittee met on Thursday, January 13, 2011 with 17 members (achieving quorum)

and 17 guests. There was a call for the approval of the minutes of the September 2011

meeting in Berkeley, CA. These minutes were approved by the subcommittee members.

Reports from the WG Chairs

J1: Adjustable Speed Drive Motor Protection Application and Issues

Chair: J. Gardell
Vice Chair: P. Kumar
Established: 2003
Output: Report to the Subcommittee
Expected Completion: Dec 2008
Status: Draft 8 (Final)

Assignment: Investigate and report to the Subcommittee motor protection issues related to motors utilizing variable speed (frequency) drives.

The Working Group met on Tuesday January 11, 2011 for single session with 5 Members and 5 Guests. This was the 17th meeting for this group. The main focus of this meeting was to discuss the Transactions Paper Draft that was reviewed by the J Subcommittee and Working Group Members. Editorial comments were provided by a few members. All received comments from the members were incorporated into the latest Draft # 3.
The group discussed various presentation venues and elected to pursue a Working Group Transactions Paper through PES to start.
One assignment taken on by Kevin Stephan is to propose a title adjustment and some brief text in the overview to emphasize that this paper is a summarized version of the larger already completed Working Group Report.
Prior to the IEEE submittal, the Working Group Chairman will send out to the PSRC Main Committee Members, the final draft of the paper for comments of substance and the IEEE PSRC Officers for Approval.

J2: Protection Considerations for Combustion Gas Turbine Static Starting

Chair: Mike Reichard
Vice Chair: Zeeky Bukhala
Established: 2005
Output: Report to the Subcommittee
Expected Completion: 2009
Status: Draft 2b (Final)

Assignment: Deliver a paper or report on special protection requirements on generators employing load commutating inverter (LCI) static starting.

The Working group did not meet at this meeting.
The report will soon be published on the PSRC website. Dale Finney volunteered to format the report into an IEEE transactions paper.

J3: Power Plant and Transmission System Protection Coordination

Chair: Jon Gardell
Vice Chair: Phil Waudby
Established: 2010
Output: TBD
Expected Completion: TBD
Status: 3rd Meeting

Assignment: [Proposed] To summarize and report to Subcommittee the results of a review of the pertinent information on generator protection from the most recent NERC Technical Reference Document (TRD) titled Power Plant and Transmission System Protection Coordination, for incorporation into PSRC Guides. To provide feedback from the Working Group to the NERC team responsible for maintaining the TRD.

The third Working Group (WG) meeting was held on January 11, 2011 with 16 members and 23 guests. Sudhir Thakur, Chuck Mozina, and Hasnain Ashrafi joined the WG. The meeting was a double session.
The main effort was to start reviewing and discussing the members review assignments of the NERC Technical Reference Document – Power Plant and Transmission System Protection Coordination. The group started to cover the following sections of the NERC document: ANSI Device Function Numbers – 24 (Volts per Hertz), 27 (Undervoltage), and 78 (Out of Step). The members that reviewed these sections provided good comments regarding the material for consideration of inclusion of the next revisions of the appropriate IEEE Guides. During the next meeting in May the WG will continue to review and discuss the assignments.
The chairman requests that the members with outstanding assignments submit them as soon as possible in preparation for the next meeting.
Another item of interest was also discussed; Jon Gardell had initiated contact with Mike Basler – IEEE Excitation Subcommittee Past Chairman to see if they would be interested in establishing Coordination with the Working Group. During earlier J Subcommittee and WG Meetings this was discussed and it was felt that this would also benefit future revision of the Guides addressing the generators. Mike Basler had recently responded back positively to Jon, additionally Mr. Robert Rausch attended this WG Meeting and is also a member of the Excitation Subcommittee. Bob indicated that there is an interest from them to interact with PSRC specifically the J Subcommittee. Kevin Stephan, the J Subcommittee Chairman, noted this and will respond back appropriately at the Subcommittee level. Specific to this Working Group, the drafts of the report will be shared with the Excitation Subcommittee for their review and comment.
The assignments are due no later than March 15, 2011.

J6: Protection issues Related to Pumped Storage Hydro Units

Chair: Joe Uchiyama
Vice Chair: Robert Frye
Established: 2009
Output: Transactions Paper
Expected Completion: TBD
Status: Fifth Meeting

Assignment: To review and summarize the trends of the last thirty-five (35) years of Pump Storage unit protection since PSRC presented the summary report in May/June 1975. The WG review is focused on: (1) Old protection/control, (2) New protection/control, (3) New experiences during protection rehabilitation and (3) any significant issues/concerns. Evaluate and report on protective relaying concepts and practices applicable to a combination of generator and motor, associated auxiliary systems, and performance of plant protective systems. Summarize the trend of Pump-Storage motor and generator protection for last thirty-five (35) years of industrial practices.

The working group met on Wednesday, January 12 with 6 members and 5 guests. The chair had prepared materials for the meeting including minutes of the previous meeting in Berkeley,

CA and a list of pumped storage units that the working group did not have contact persons for. Chuck Mozina, Mike Thompson, Jon Gardell, and Murty Yalla might have some contacts to at least start from.

The present draft of the survey on pumped storage protection was reviewed. There was much discussion on the survey questions because of the different configurations of pumped storage facilities. The present draft is designed with many "check box" answers and the working group felt that the survey needs to be more "essay" type. Also it would be extremely beneficial to ask for a one-line diagram from the respondents to help interpret the answers. It was felt this would lead to a more meaningful survey and since there the number of these facilities is limited, the job of reading essay answers may not be overbearing. The survey needs to take a "lessons learned" approach as well.

It was suggested to send the survey to consulting engineers as well as users. The working group briefly discussed but reaffirmed the need for a survey to get the present industry experience.

J8: Generator Tutorial Revision

Chair: Michael Thompson
Vice Chair: Chris Ruckman
Established: 2007
Output: Tutorial (published by PSRC)
Expected Completion: 2011
Status: ballot Phase I (document)

Assignment: Review and Revise 95-TP-102, "IEEE Tutorial on the Protection of Synchronous Generators."

The Working Group met for a double session on January 12. Session one included 17 members and 10 guests. Jerry Johnson served as acting vice chair and recorded the minutes to the meeting.

Output will be a special publication of the PSRC and published on the PSRC website. Phase two output will be an eight-hour tutorial presentation. An expected date of completion for phase 1 is February 2011. The expected date of completion for the tutorial slides is May 2011. We are presently on Final draft.

First session:

The minutes of the September 2010 meeting were approved as written.

Chuck Mozina was asked to do a generator tutorial for the 6-23-2011 IAS Pulp and Paper conference in Nashville. Mike and Chuck presented the tutorial for the PCIC last September to about 70 people. Chuck will do the presentation for P&P but would like a helper. John Boyle may be available and will let Chuck and Mike know.

Final ballot resolutions were discussed.

Chapter 3.5: Additions to the chapter regarding time delay settings for other than steam turbines was discussed and approved by the working group.

Chapter 3.1: An outstanding comment from Chuck Mozina was discussed by the working group. The paragraph of concern was deleted from the chapter because it did not add to the subject material.

All chapters: There were several comments about inconsistencies regarding ground overcurrent or ground overvoltage element subscripts (59G, 59N, 59GN for example) in the

various chapters. The chair consulted C37.102 and C37.101 and made all chapters consistent with C37.102.

Chapter 2.4 and 5.1. Kevin Stephan suggested that we discuss the idea of mentioning the option of using generator separation trip instead of simultaneous trip for long reach/long time delay backup element operation when the unit is capable of full load rejection without shutting down. This is contrary to the current recommendation in C37.102. The advent of multiple zones in multifunction relays has made it common to use a short and long reach backup element. The working group determined that this recommendation should be considered when C37.102 is reopened and that we would not modify the tutorial.

Chapter 2.5: This chapter is the only one remaining to have ballot comments resolved. S. Patel was present and discussed his concerns with figure 5. The working group discussed the figure at length. Z. Bukhala agreed to help C. Ruckman edit the text to resolve the ballot comment. It was determined to check C37.119 to see if the figure got into C37.102 from there. The chair requested that this chapter be resolved by 2/15/11.

The planned Bibliography was discussed. It was determined that no Bibliography should be included and that the introduction should be edited to direct readers to the Bibliography sections of the various Guides for further research.

Second session:

New-comers to the second session were given a brief review of the first session discussions. The invitation to teach the tutorial at the Pulp and Paper was issues a second time and no additional takers volunteered. The decision to remove the bibliography was also reviewed.

Kevin Stephan confirmed that the officers would have to approve the tutorial but that this is expected to be a yes or no vote without extensive comment resolution.

The list of chapters and the status of slide preparation was discussed. K. Stephan's slides on Chapter 5.1 were reviewed as an example of well-prepared slides. The need to add speaker notes was discussed. It would greatly enhance the ability of others to present the material if this information is added to the slides.

It was determined that the tutorial document will be available for download on our published reports but that the ppt files would only be available via secure ftp site to members who needed the material to present the tutorial.

Assignments were made to assist the original authors with several chapters;

Chapter 2.1 M. Nagpal will assist
Chapter 2.5 H. Monterrubio will assist

Slides are due by March 15, 2011.

The chair emphasized that we need to complete the slides in a timely manner—hopefully before the next meeting. Kim Sarff put in around 750 Hours to assist us and we need to complete the project and release her soon. Many working group members suggested that we be sure to give her credit for her service in the introduction to the tutorial.

J9: Motor Bus Transfer

Chair: Jon Gardell
Vice Chair: Dale Fredrickson
Established: 2006
Output: Working group report
Expected Completion: 2011
Status: Draft 4.0

Assignment: Investigate protection and control issues and phenomena impacting the effectiveness of safely transferring buses primarily consisting of motors from one power source to another source.

The Working Group (WG) met in a double session with 15 Members and 8 Guests on Tuesday, January 11, 2011. This was the fifteenth meeting.
Jon Gardell started the meeting with a status report on Draft IV and the field measurement plans at the TECO plants. The monitoring equipment at the TECO Big Bend Station was not installed as hoped earlier this year. The next opportunity will be at least one year away. TECO is still interested in the project. Based on discussions with J Subcommittee officers, the field measurements portion of this effort will be put on hold. A separate Working Group will be formed as the field aspect of this project develops. Working Group members will stay in communication with TECO in the interim.

The Working Group discussed the results of the informal ballot, which failed to reach 75% approval. **It is essential that all members who have not responded return their ballots to the Chairman by February 15 to meet the threshold for approval**. The Chairman will contact by e-mail those members that have not replied to request them to e-mail a response back to him.

A presentation was made by Dale Finney on the analysis of field data from a motor bus transfer application at the TECO Bayside combined cycle plant. The data was analyzed independently by Dale (using Matlab) and Derrick Haas (using Mathcad) to determine the motor air gap torque. The discrepancies in the torque calculations were caused by DC offset, and were resolved by appropriate filtering. Air-gap torque was found to be 6.5 per-unit and resultant volts per hertz was 1.20 per-unit. It was concluded from this effort that readily available software can be used to make the air-gap torque calculation, with suitable attention to the varying frequency during motor voltage decay.

Thanks to Dale and Derrick for their important analytical work.

Dale Finney also presented his revised summary of this report for inclusion in the Motor Guide revision work by the J10 Working Group. This summary material was expanded based on previous discussion, resulting in 15 pages of material.

The second session was spent reviewing the informal ballot comments on Draft IV of the report by Working Group members. Discussion resulted in some changes to the report. Further editing will take place as the remaining comments received to date are reviewed. An assignment was taken by Tom Beckwith to provide wording and proper location for comments from George Nail on the health of the new source and also to resolve comments from Phil Waudby to clarify the two cases of supervised and unsupervised Simultaneous Transfers.

After finishing the comment resolutions, a final draft of the report will be developed.

J10: PC 37.96 Guide for AC Motor Protection

Chair: Prem Kumar
Vice Chair: Dale Finney
Established: 2007
Output: Guide Revision C37.96
Expected Completion:
Status: Draft 4.0

Assignment: Review and revise C37.96-2000 as needed.

The meeting was attended with 8 members and 11 guests. After the introductions, the Patent Slides were shown. This was a double session with a presentation from WEG motors

The Berkeley meeting minutes were NOT circulated as there was not quorum. The meeting minutes had been sent electronically previously.

WEG Motors Ricardo Santori from Brazil gave a presentation on salient aspects of motor design that would of interest to relaying engineers. The topics covered were a) development of thermal overload curve of motor, b) the motors supplier interpretation of the 1.33 V/Hz requirement and c) RTD locations in motor windings.

Following are the follow up action items/assignments based on meeting. All remaining assignments/peer review are due by March 15th.

1) Prem will circulate a copy of the WEG presentation to the WG members.
2) Dale Finney and John Gardell finished a revised summary of the J9 work on motor bus transfer. This was as requested by the J9 group which was an enhanced version of the version in Berkeley meeting.
3) Tom Farr to peer review the section on the pros and cons of Motors RTD protection written by Suhag Patel (carry over from last meeting).
4) The D5 version would add the summary of J9 and high impedance motor write- up by Subash Patel and Pat Kerrigan.
5) As appropriate changes from review of the NERC Technical Reference Document in J3 by Mohamed Abdul Khalek will be considered by J10 in the next meeting.

Prem and Dale will work with the officers to request a PAR extension by one year (into 2012). The original J10 PAR ends in 2011.

JTF4: <u>Gen. Protection Issues-stability and dynamic control of Power Systems</u>

Chair: Kevin Stephan
Established: 2010
Output: Presentations to PSDP Committee
Expected Completion: 2011
Status: Completed

Assignment: To develop an agenda for J subcommittee presentations at a joint meeting with PSDP in January 2011.

The task force did not meet. A joint meeting with the Power Systems Dynamic Performance Committee took place on Monday 10th January with 38 attendees present. The following PSRC presentations were made.

7. Undervoltage Load Shedding (Shinichi Imai for Miroslav Begovic)
8. Performance of Relaying during Wide-Area Stressed Conditions (Damir Novosel)
9. Global Industry Experience with System Integrity Protection Schemes (Vahid Madani)
10. Protection issues during system restoration (Tarlochan Sidhu)
11. Selected topics (related to power system dynamics) from C37.102 IEEE Guide for AC Generator protection (Murty Yalla). This presentation included discussion of issues related to Coordination of Generator Protection with Generator Excitation Control and Generator Capability
12. "Performance of Generator Protection During Major System Disturbances" (Subhash Patel)

PSDP officers made the following presentations on the activities of their Committee

4. Juan Sanchez Gasca – PSDP
5. Claudio Canizares, Chair, Power System Stability Controls Subcommittee. He also presented the activities of the Power System Stability Subcommittee for the Chair, Pouyan Pourbeik who was prevented from attending by severe weather.
6. Claudio also made a presentation (on behalf of Pouyan) on the PSDP Blackout Task Force report.

The Excitation Systems and Controls Subcommittee of the Energy Development and Power Generation (ED&PG) Committee were on the agenda to make a presentation, but the Past Chair, Mike Basler, was prevented from attending by the weather. He sent two PowerPoint presentations that were shown by Charlie Henville and were appreciated by all attendees.
All presentations from the meeting are available from the PSRC Website http://pes-psrc.org/ (click on the link to "What's New").
All presentations generated considerable discussion and interest in the activities of other technical committees and subcommittees. It was generally agreed that opportunities for expanded and continued inter-committee interaction should be pursued.
Going forward, the following actions were agreed to be set in motion, or actually accomplished.

4. Identified areas of common interest

System wide protection and control (wide area measurement and protection and control maybe using synchrophasors, and maybe including adaptive protection for improved security)
Dynamic machine and protection modeling. The power system consists of machines with dynamic characteristics and system protection and control devices with. Models are used for testing, and coordination of protective relays.
Wind farms stability and short circuit contributions.
System Restoration.

5. Establish Communications Mechanism (names and dates)

PSDP Power Systems Dynamics Measurement WG (Ken Martin is PSRC Liaison). PSDP and PSRC committee officers will look for volunteers for defining and planning super session for PES GM July 2012).
Power system restoration. Tarlochan Sidhu will contact Mike Adibi to discuss if and how the PSRC could work with the PSDP Restoration Dynamics WG in future. After that conversation, Tarlochan will discuss with PSRC officers if and how PSRC and PSDP might work together.

6. Define possible short and long term activities.

Short term. The possibility of a super panel session at PES GM 2012 will be investigated by both committees.
Longer term. Both committees will see how they can identify possible long term joint activities (eg. with respect to integrating protection and system models and/or to incorporate power system dynamics issues into PSRC guides). The PSRC task forces CTF3 and JTF4 will continue to coordinate the PSRC PSDP interactions, and JTF4 will also work at establishing liaison with the Excitation Systems and Controls Subcommittee of ED&PG Committee.

[post-meeting note: A revised assignment for JTF4 has been proposed and is under consideration by the J sub-committee. The proposed assignment is: "[Develop] Proposals for working with Power System Dynamic Performance Committee and Excitation Systems Subcommittee."]

JTF7: Considerations for "AURORA" Protection

Chair: Mike Reichard
Established: 2010
Output: Report to Subcommittee
Expected Completion: 2011
Status: Second Meeting

Assignment: To review and provide comment on the protection and control vulnerability known as "AURORA".

1. The task force met with 12 members & 31 guests.

2. The Chair could not attend the meeting due to weather problems in Atlanta. The meeting was chaired by J subcommittee chair Kevin Stephan. Murty Yalla acted as vice-chair and took minutes.
3. Kevin indicated that PSRC officers have written to NERC requesting them to delay issuing the NERC Aurora alert until Feb 1, 2011 so that PSRC can comment on it. NERC could not delay the Aurora Alert due to their time schedule and released it in 2010.
4. Kevin Stephan gave a brief presentation of the Aurora NERC Alert. Detailed information on the alert could not be provided as the information is kept confidential by NERC and can only be given to NERC member companies. The Task Force (TF) has decided to request NERC through PSRC officers to obtain this information for use by the TF.
5. After the presentation the chair opened for discussion on whether to continue with the work or abandon the TF. Members and guests felt that there is a need in the industry to study if there is vulnerability for inadvertent or malicious reclosing of the sources connected to rotating equipment (generators or motors) thereby damaging the equipment.

Summary: The consensus of the Task Force meeting was to propose to the subcommittee to form a working group with an assignment as follows:
"Explore mitigation measures to prevent inadvertent or malicious reclosing of the sources connected to large rotating machines (generators or motors) which can damage these machines".
Output: Report to J subcommittee.
Discussion with the substations subcommittee will be held to see if this work can be a joint WG effort between J and K subcommittees. Also PSRC officers will be consulted to see if this can be a joint effort between the PSRC and substations committee.

Other Reports:

C17: Fault current contribution from wind farm plants

A verbal report was given on the C17 meeting and the minutes can be found in C subcommittee report.

Liaison Reports

Electric Machinery Committee (EMC) C. J. Mozina

The Committee met at PES General Meeting in Minneapolis --- July 25-29, 2010. The minutes from this meeting are not as yet posted on the EMC web site. However, the Generator Subcommittee did publish a summary report in June 2010 with the following items of interest:
Harmonization of IEC IEEE Standards Concerning C50 (WG8) – A table of differences was created by the WG in 2008. A review of the table indicates that there are many significant differences between the standards. Since C50.13 is due for re-affirmation in 2010, the WG is recommending that C50.13 be re-affirmed so the WG has more time to resolve the differences with various groups that support IEC. The WG will produce a paper, to be presented to CIGRE, explaining the work of the group and requesting support of committees within CIGRE to resolve these differences.
Grid Induced Torsional Vibrations (WG4) -- This working group was formed to determine how susceptible generators and their driving elements are to torsional forces created by transmission grid transients. At the last meeting an outline was put together to start developing a paper around these issues. Assignments were given to various members of the group and the paper will be developed.

Other EMC developments included publication of the Generator Rewind Guide, IEEE 1665 which won the PES Award for Best New Standard.

IAS I&CPS Committee C. J. Mozina

This report will be given at the main PSRC committee meeting. The written report is published under main committee liaison reports.

Nuclear 1E WG **P. Kumar**

This working group is planning a panel discussion on degraded voltage setpoints as applied to nuclear plants

NERC **J. Uchiyama**

Phil Tatro of the NERC staff reported.

The generator relay loadability drafting team is forming. The NERC SPCS needs people with generator protection experience.

A technical reference document on Plant Controls and System Protection is underway. This document will be a companion to the just-finished Technical Reference Document on Power Plant and Transmission System Coordination.

The reliability guidelines for Distance Backup Protection are about to be posted for a 45-day comment period. This action was based on an event in Florida.
An out-of-step relaying technical document is in progress to ultimately result in another drafting team.
NERC is preparing a "white paper" on the topic of sub-synchronous reactance (SSR) with series-compensated lines.

Coordination Reports

None

Old Business

None

New Business

Michael Thompson proposed a new J working group topic of out-of-step protection for generators. This stems from the existing C37.102 only covering in detail the single-blinder scheme and the amount of industry response suggesting out-of-step protection is avoided due to complexity of studies and inadequate understanding.

The proposal received much interest from the subcommittee attendees. Formation of a working group is under consideration by the J leadership.

K: SUBSTATION PROTECTION SUBCOMMITTEE

Chair: P.G. Mysore
Vice Chair: M. J. Thompson

The K-Subcommittee met on Thursday, January 13, 2011 in Atlanta, GA, with 14 members and 12 guests in attendance. A quorum was not achieved to approve the minutes of the May 2010 subcommittee meeting. Approval of the minutes came by email vote after the meeting.

ITEMS OF INTEREST FROM THE ADVISORY COMMITTEE MEETING: none

Reports from the WG Chairs

K3: REDUCING OUTAGES IN TRANSMISSION SUBSTATIONS

(subtitle: Reducing Outages Through Improved Protection, Monitoring, Diagnostics, And Auto restoration In Transmission Substations)
Chair: Bruce Pickett
Vice Chair: Paul Elkin
Established: 2011.
Output: Papers – 1. Full Paper Report to the Sub Committee and Main Committee, and 2. Summary Transactions Paper
Draft 0; Transactions Summary paper 0
Expected Completion date: 2013

***Assignment*: ??**

Meeting was called to order January 12, 2011 with 7 members and 3 guests

Introductions were done and previous minutes were discussed.

We began reviewing in detail the list of topics developed for transmission autorestoring topics and outage reduction topics at the last task force meeting and adjusted the list.

Three of the reclosing topics from the previous list that were covered in the C37-104 Reclosing Guide WG (D2) were removed from the list still leaving substantial subjects to cover.

K4: (PC 37.95.2002): GUIDE FOR PROTECTION CONSUMER UTILITY INTERFACE

Chairman: Mukesh Nagpal
Vice Chair: Chuck Mozina
Acting Vice Chair: Adi Mulawarman (sitting in for Chuck Mozina)
Established: 2008
Output: Guide Revision
Expected Completion Date: 2012

Assignment: To revise C37.95-2002 (R2007) – Guide for Protective relaying of Utility-Consumer Interconnections

The working group met on Tuesday, January 12th, with 8 members and 3 guests present, including 3 new members who accepted working group assignments. A quorum was not present.

After introductions, the chairman presented the minutes from the September, 2011 meeting. There were no changes suggested by the members in attendance. The chairman will request approval of the September meeting minutes via email because there was no quorum present.

The IEEE Patent slides could not be shown due to lack of overhead projector but were discussed.

The chairman called for the discussion on two new sections that were added in the January, 2011 draft.

Section 3.1:

Adi Mulawarman prepared the initial draft of this section. Chair requested for volunteers to help Adi to finish the definitions of consumer, utility, arc flash energy, stability study and motor operator disconnect. Gerry Johnson (new member) will help Adi with these missing definitions.

The WG agreed that the motor operated air break switch is not a correct term and it should be replaced with the motor operator disconnect. Dean Miller will go through the document and make changes from usage of motor operated air break switch to motor operator disconnect.

Steve Conrad pointed out that the term 'load-flow' is also incorrect usage and it should be change to 'power-flow'. Dean Miller will go through the document and will get all the wrong usage corrected.

Section 7: Consumers with Generators

Frank Plumptree and Mukesh Nagpal jointly prepared this new section. The section was presented to the working group and requested members to review. Mukesh pointed-out that the section mostly outlines BC Hydro practices. Dean Miller agreed to the lead review with help of Jeff Barsch and Joshua Park (new member).

Dr. Moh Sachdev (new member) offered to volunteer editorial review of the final draft.

Writing assignments are due to the chairman by 15th March 2011.

K6: SUDDEN PRESSURE PROTECTION FOR TRANSFORMERS

Chair: Randy Crellin
Vice Chair: Don Lukach
Established: May 2005
Output: Report
Expected Completion Date: January 2011
Draft 2.0

***Assignment*:** To complete a technical report to the Substation Protection subcommittee on the application of sudden pressure relaying in power transformers.

The working group did not met during the Atlanta meetings.
Randy Crellin and Gene Henneberg met informally to review and discuss the summary of survey responses that Gene Henneberg developed. We had formed a smaller group of volunteers (Gene Henneberg, Greg Sessler, Don Lukach, and Randy Crellin) to work on the summary, however due to cancelled flights Greg and Don were unable to attend the meeting. Our intentions are to have a conference call in mid February to finalize the summary, discuss report revisions, and then send the documents to the other working group members prior to the May meeting.

K8: GUIDE FOR THE PROTECTION OF SHUNT CAPACITORS

Chair: Pratap Mysore
Vice Chair: Ilia Voloh
Established, 2006
Output: Revision of IEEE C37.99-2000
Expected Completion date: 2011
Status: Draft 4.2

Assignment: Revise and update C37.99-2000 "Guide for the Protection of Shunt Capacitor Banks."

The Working group, K8, met on January 11, 2011 in one session with 7 members out of 26 and 4 guests in attendance. Meeting quorum requirements were not met. Meeting minutes will be sent out via e-mail for approval. After the introductions, IEEE Patent slides regarding the patent policy were shown. September 2010 meeting minutes will be approved via e-mail.
Bridge capacitor configuration that was included in clause 5.5 will be removed as this is not covered in the latest 1036 document and also this document did not cover protection methods used for this configuration.

Clause 7.2.2 will be renamed Bank over voltage protection and Bogdan's submittal on current integration method for over voltage protection will be included as 7.2.3
There were discussions on the theory of protection methods clause that was contributed by Bogdan. Bogdan expressed his concerns about misnamed schemes such as neutral voltage differential scheme that compares voltage developed across the resistor by zero sequence current with zero sequence voltage from the open delta on the bus side. He explained the operating principle of this scheme and suggested other working group members to review and comment on his submission. He also felt that the subsequent discussions in clause 8 following the theory of unbalance protection section may need to point out to the theory section. Members are requested to review the section following 8.2 and send in their comments to either Pratap or Ilia.
Action item from previous meeting - The referenced paper by John Harder included in the guide points out to an abstract of the paper instead of the paper. This was discussed with IEEE and they cannot find a copy and have not responded after the chair sent them a copy.
This will be resolved either posting it on the PSRC website or will be part of IEEE new site.
Updated draft will be sent out to members within two weeks and the chair requests active participation and quick response from members before the end of February.
It is the intent of the chair to have a ballot ready document by the end of March after incorporating the comments by members.

K10: SCC21 DISTRIBUTED RESOURCES STANDARD COORDINATION

Chair: Gerald Johnson
Vice Chair: TBA
Established, 1999
Output: Standard through the SCC 21
Expected Completion Date: 20xx

***Assignment*:** To interface with SCC21/P1547 in order to reduce unnecessary delays by getting PSRC input into the process without having to wait for after-the-fact coordination.

K10--SCC21 Distributed Resources Standard Coordination working group met Jan 11, 2011 with 3-members and 4-guests. Status of the active working groups in the 1547 series were reviewed as follows:
IEEE-1547.1-2005 "Standard Conformance Test Procedures for Interconnecting Distributed Energy Resources with Electric Power Systems" James Daley, Chair; Ben Kroposki, Secretary, was reaffirmed.
P1547.4 "Draft Guide for Design, Operation and Integration of Distributed Resource Island Systems with Electric Power Systems", was balloted in 2010 and was "affirmed". Comments are still being resolved.
P1547.5 "Draft Technical Guidelines for Interconnection of Electric Power Sources Greater than 10MVA to the Power Transmission Grid", no activity, no draft.
P1547.6 "Recommended Practice for Interconnecting Distributed Resources With Electric Power Systems Distribution Secondary Networks" was balloted in 2010 and "affirmed". Comments are still being resolved.
IEEE P1547.7 "Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection" draft 4.1 was posted on 12-15-10 and I notified K10 PSRC members by email for comments.
A new working group, IEEE P1547.8 "Recommended Practice for Establishing Methods and Procedures that Provide Supplemental Support for Implementation Strategies for Expanded Use of IEEE Standard 1547" met for the first time at the August 2010 meeting. As yet, no draft information is posted on the SCC21 web site.
The next P1547.x working group meetings will be the week of 2-7-11 in Las Vegas. If you have special interest in the progress of a particular SCC21 working group or would like to provide input, let me know and I will make sure the information gets to the right place.

KTF1: INVESTIGATE UPDATE OF PSRC REPORT, "PROTECTION OF PHASE ANGLE REGULATING TRANSFORMERS" DATED OCTOBER 21, 1999.

Chair: Arvind Chaudhary

Vice Chair: NA
Established: Sept. 2010
Output: Recommendation to K subcommittee on whether to form a working group
Expected Completion Date: TBA

Assignment: Investigate update of PSRC report, "Protection of Phase angle regulating transformers" dated October 21, 1999.

KTF1 met on January 11, 2011 with eight members and one guest. The group discussed the existing report and tabulated an increased number of phase shifting transformers were in use to control power flow in existing lines. The alternative method of controlling power flow is use of a AC-DC converter, a DC line, and a DC-AC inverter. The IEEE transformer committee has a new standard C57.135 for Phase Shifting Transformers, which is in the process of undergoing balloting. Based on the existence of C37.135 and we request K SubCommittee propose the formation of a WG to develop an IEEE Protective Relay Application Guide for the Protection of Phase Shifting Transformers. A draft of the scope of the WG was worked upon and needs to be completed. One topic for future consideration is modeling of PST's in short circuit programs. Bogdan Kastenny will obtain liaison with a CIGRE task force working on the protection of PSTs.

KTF4: JOINT TASK FORCE T & D CAPACITOR SUB-COMMITTEE, K13 SERIES CAPACITORS

Chair: Simon Chano
Vice Chair: Mark Mcvey
Established: October 2009
Output: jointly prepare a PAR to issue a corrigendum to the guide.
Expected Completion Date: TBA

Assignment: Coordinate PSRC standards activity with Capacitor Subcommittee

KTF4 did not meet at this meeting.

Liaison Reports:

1584 WG of IAS/PCI met at the Petrochemical Industry Conference PCIC in September, 2010. They are making significant changes in IEEE 1584 on how incipient energy levels are calculated.

Old Business:

C37.119 was affirmed. There were a number of comments of merit that came from the reaffirmation ballot. WG KTF5 will meet at the May meeting to discuss whether a PAR should be opened to start work on updating the guide to address the comments. C. Sufana agreed to chair the task force meeting pending approval by the officers.

New Business:

The substation committee had received a PAR on writing a guide for setting microprocessor based transformer protection relays. The PAR was rejected on the basis that the existing C37.91 and C37.233 already cover this to the extent that the IEEE can be specific. The chair will contact the person who submitted the PAR and invite her to come to PSRC and contribute to our guides when the open next.

C37.109 will need to be reaffirmed by the end of 2011.

VII. PRESENTATIONS:

Our main committee meeting is greatly enhanced by presentations by our members of the outputs of the different working groups. We always appreciate their efforts. Our presentations

at this meeting:

“Application of Common Protective Functions in Multifunction Relays”
Roger Whittaker

VIII. The meeting was adjourned by Chairperson Bob Pettigrew