



**POWER SYSTEM RELAYING COMMITTEE  
OF THE IEEE POWER and ENERGY SOCIETY  
MINUTES OF THE MEETING  
May 17, 2012  
New Orleans, LA**

**FINAL**

- I. Call to order / Introductions Bob Pettigrew**  
Chairman Bob Pettigrew called the meeting to order at 8:00 am  
After introductions, a quorum was verified (88 members – 148 total present) and Main Committee Attendance sheet was routed.
- II. Approval of Minutes & Financial Report Mike McDonald**  
The minutes of the Anaheim January 2012 meeting were approved as posted.  
Entergy's coffee break support was recognized.
- Chairman's Report Bob Pettigrew**  
**None**
- III. Reports of Interest**
- A. Technical Paper Coordinator's Report – Roger Hedding**
- 2012 T&D Conference: May 7 – 10, 2012 Orlando**  
The T&D Conference was held last week in Orlando. PSRC held a poster session. 11 papers showed out of the 14 that were invited. Consequences of not showing is to have your paper removed from IEEE Explore.
- 2012 General Meeting: July 22- 27, 2012 San Diego**  
48 papers were submitted for review to the PSRC for the 2012 general meeting. 8 were rejected. We will hold 3 paper sessions and 1 poster session at the General meeting. I'll need Session chairs. So if you are interested, let me know. Again thanks to all the reviewers who help make this job easier.
- New Paper Format**  
It was agreed by the Technical Council, and approved by the PES Board of Directors that the new length of conference papers will be 4 pages. See me for further details.
- Future Meetings**
- |                   |   |
|-------------------|---|
| Sept. 10-13, 2012 | Hilton Portland; Portland, OR                 |
| Jan 2013          | JTCM (TBD)                                    |
| May 12-16, 2013   | Tremont Plaza Hotel, Baltimore, MD            |
| Sept. 8 -12, 2013 | Hotel Albuquerque at Old Town Albuquerque, NM |
| Jan 2014          | JTCM  |
| May 11-15, 2014   | Hyatt at Pier 66 - Fort Lauderdale            |
- Futures places and dates are under development.
- B. CIGRE B5 Activities Report - Adamiak**  
No report submitted

**C. IAS Power System Protection Committee - Mozina**

No report.

**D. IEC Report - Eric Udren**

**TC 95, Measuring relays**

TC 95 drives IEC measuring relay standards – electrical and physical environment type testing, design, safety, and functional behavior. Technical work is carried out by Maintenance Teams (MTs) and by Working Groups.

The recently emerging suite of functional standards is developed by MT4. The Convenor of MT4 is Dr. Murty Yalla. MT4 has already published functional standards 60255-151 (Overcurrent relays) and 60255-127 (Over and undervoltage relays). Their current projects are 60255-121 (Functional standard for distance relays), 60255-149 (Thermal electrical relays), and 60255-187-1 (Functional standard for differential relays – generator and transformer differential). Current status of functional standards:

- 60255-121 – Distance relays - A Committee Draft for Voting (CDV) is on the verge of being posted; ask reporter for a prepublication review copy.
- 60255-149 – Thermal electrical relays - A Committee Draft for Voting (CDV) is on the verge of being posted; ask reporter for a prepublication review copy.
- 60255-187-1 – Functional requirements for biased (percentage) differential relays - differential protection of generators, motors, transformers and reactors. MT 4 expects a draft on May 30, 2012.

Other current TC 95 standards:

- 60255-24 COMTRADE standard is handled by a Dual Logo Maintenance Team (DLMT). After a behind-the scenes negotiation between certain European national committee voters and the PSRC WG, the IEEE draft was revised and a corresponding IEC voting draft (CDV) has been issued.
- 60255-118-1 IEC Synchrophasor measurement standard – a version identical to C37.118.1-2011 had been issued by TC 95 as CD and had brought only a few minor comments from the national committees who voted. IEEE SA is now negotiating with IEC TC 95 to see if IEC will issue 118.1 as dual logo in its current state, and recheck for need to revise periodically thereafter. It is too early to predict the outcome of that discussion.

Any PSRC attendee interested in reviewing circulated documents should contact Eric Udren for a copy.

The next TC 95 meeting will take place during the IEC meeting in Beijing, November 12-16. The TC 95 meeting itself takes place on November 13.

**TC 57, Power systems management and associated information exchange**

See TC 57 Liaison Report at the end of Subcommittee H minutes for many exciting developments in IEC 61850. Note in particular:

- 61850 Part 1 Edition 2, Introduction and Overview (a technical report), is out as a draft for NC commenting and is the definitive description of 61850.
- 61850 Part 3 – General Requirements standard draft is out for review, days after the May PSRC meeting.
- TC 57 is initiating a new project for 61850-90-14 - Using IEC 61850 to model FACTS control systems.
- Draft Technical Report 62351-10 on IEC cyber security architecture is now in circulation for commenting.

Let Eric Udren know if you would like to review, and submit comments for the USNC to consider.

**E. Standard Coordinators Report – Phil Winston**

**Standards Activities since the September, 2011 Meeting**

The status of standards activities that have taken place since the January 2012, meeting of the PSRC are as follows:

**RevCom Activity:**

**Standards Reaffirmed**

C37.90.3-2001 IEEE Standard Electrostatic Discharge Tests for Protective Relays  
C37.101-2006 IEEE Guide for Generator Ground Protection (Dec 2011)  
C37.109-2006 IEEE Guide for the Protection of Shunt Reactors  
C37.231-2006 IEEE Recommended Practice for Microprocessor-Based Protection Equipment  
Firmware Control  
C57.13.1-2006 IEEE Guide for Field Testing of Relaying Current Transformers

**Standards Approved**

**Standards submitted for approval**

C37.90.3-2001 IEEE Standard Electrostatic Discharge Tests for Protective Relays  
C37.104 IEEE Guide for Automatic Reclosing of Circuit Breakers for AC  
Distribution and  
Transmission Lines  
C37.109-2006 IEEE Guide for the Protection of Shunt Reactors  
C37.231-2006 IEEE Recommended Practice for Microprocessor-Based Protection Equipment  
Firmware Control  
C57.13.1-2006 IEEE Guide for Field Testing of Relaying Current Transformers

**Standards due for 10 year review**

None

**Ballot Activity:**

**Standards/Projects currently in Balloting (Sponsor Ballot, Comment Resolution, Recirculation)**

C37.90.1 Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems  
Associated with Electric Power Apparatus  
C37.99 Guide for the Protection of Shunt Capacitor Banks  
C37.102-2006 Guide for AC Generator Protection  
PC37.236 Guide for Power System Protective Relay Applications over Digital Communication  
Channels  
PC37.242 Guide for Synchronization, Calibration, Testing, and Installation of Phasor  
Measurement Units (PMU) for Power System Protection and Control

**Standards/Projects that completed Balloting and moved to RevCom**

PC37.90.3-2001 IEEE Standard Electrostatic Discharge Tests for Protective Relays  
PC37.231-2006 IEEE Recommended Practice for Microprocessor-Based Protection Equipment  
Firmware Control  
PC37.104 Guide for Automatic Reclosing of Circuit Breakers for AC Distribution and Transmission  
Lines

**NesCom Activity:**

**PARS applied for or submitted for approval**

PC37.103 Revision of Guide for Differential and Polarizing Relay Circuit Testing  
PC37.109 Revision of Guide for the Protection of Shunt Reactors  
C37.119 Revision of Guide for Breaker Failure Protection of Power Circuit Breakers  
PC37.245 Guide for the Application of Protective Relaying for Phase Shifting Transformers

**PARS approved**

C37.119 Revision of Guide for Breaker Failure Protection of Power Circuit Breakers

PC37.109 Guide for the Protection of Shunt Reactors

**PAR Extensions (applied for & approved)**

none

**Modified PAR approved**

PC37.98 Standard for Seismic Qualification Testing of Protective Relays and Auxiliaries for Nuclear Facilities (modification)

**Modified PAR submitted**

PC37.98 Standard for Seismic Qualification Testing of Protective Relays and Auxiliaries for Nuclear Facilities (modification)

**PARs Requested for Withdrawal**

None

**PARs Administratively Withdrawn**

None

**PARS expiring at the end of 2012**

PC37.90.1 Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus

C37.96 Guide for AC Motor Protection

PC37.98 Standard Seismic Testing of Relays

PC37.99 Guide for the Protection of Shunt Capacitor Banks

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

C37.236 Guide for Power System Protective Relay Applications over Digital Communication Channels

**PAR/Standard Submittal Deadlines & Standards Board Meeting Schedule:**

**Submittal Deadline**

July 20, 2012

October 15, 2012

**Meeting Date**

August 29, 2012

December 4, 2012

**F. C0: DATA ACQUISITION, PROCESSING, AND CONTROL SYSTEMS SUBCOMMITTEE**

**Chair: C. Preuss**

**Vice Chair: Vacant**

**Secretary: E. William Jr.**

SC did not meet in New Orleans.

**G. NERC Report – Phil Tatro**

1. SPCS Activities:

a. Order 754: NERC posted for comment a draft Section 1600 Request for Data or Information related to protection system single-points-of-failure to investigate concerns raised in FERC Order No. 754. The System Protection and Control Subcommittee (SPCS) and System Modeling and Analysis Subcommittee (SAMS) have supported NERC staff in responding to comments and a revised draft has been posted for a 45-day comment period through June 20. The Standards Committee has appointed a drafting team to address the Request for Interpretation of TPL-003 and TPL-004. The Request for Interpretation seeks clarification of the extent to which the planning standards require assessment of protection system single-points-of-failure.

b. Special Protection Systems (SPSs): The SPCS and SAMS continue work on an assessment of the definition of SPS, SPS-related protection and control (PRC) standards, and existing regional practices related to SPSs. Upon approval of the NERC Planning Committee the final report will be submitted to the NETC Standards Committee (SC) to serve as a reference document for a standard drafting team that will be assigned to review the definition and standards. The schedule for completion has been revised to submit a report to the NERC Planning Committee for consideration at their September 2012 meeting.

2. Standards Activities:

- a. Transmission Relay Loadability: On March 15, FERC issued Order No. 759 approving NERC Reliability Standard PRC-023-2. PRC-023-2 implements changes to address the directives in Order No. 733.
- b. Protection System Maintenance and Testing: PRC-005-2 was posted for comment and concurrent balloting through March 28. The standard passed ballot with a quorum of 84.32% and affirmative support of 73.93%. The team is currently modifying the standard based on stakeholder comments. The drafting team anticipates posting the standard and associated documents in May, 2012 for a 30-day formal comment period concurrent with a 10-day initial ballot.
- c. Protection System Definition: On February 3, FERC approved the revised definition of Protection System as developed by the Protection System Maintenance and Testing drafting team.
- d. Interpretation of PRC-005-1: On February 3, FERC issued Order No. 758 approving an interpretation of PRC-005-1, Requirement R1, and directed subsequent revisions to PRC-005-1 to address maintenance and testing of autoreclosing relays and protective relays that respond to non-electrical quantities. SAMS and SPCS are performing research to support the directed revisions.
- e. Underfrequency Load Shedding: On May 7, FERC issued Order No. 763 approving revised standards PRC-006-1 and EOP-003-2 and directing revision to clarify one requirement in PRC-006-1.
- f. Generator Relay Loadability: The project has been placed back in active development and the drafting team is meeting next week. A drafting team vacancy is posted seeking an individual with experience in generator protection systems from the FRCC or MRO region and either the cooperative or merchant electricity generator sector.

3. Other Activities:

- a. Protection System Misoperation Task Force: The Planning Committee has formed a Task Force to analyze misoperation data, research root causes, and develop recommendations. The key findings and recommendations will serve as technical input for industry actions to reduce future misoperations.
- b. September 8, 2011 Pacific Southwest Blackout: On May 1, the FERC and NERC issued a joint staff report on the September 8 blackout after a nearly eight-month inquiry. A presentation summarizing the findings will follow later on the agenda.

**IV. ADVISORY COMMITTEE REPORTS**

**Chair: Bob Pettigrew**  
**Vice Chair: Roger Hedding**

**B1: Awards and Technical Paper Recognition**

**Chair: Oscar Bolado**  
**Vice Chair: Solveig Ward**

The B1 Working Group met on May 15th, 2012 in New Orleans, LA, with 5 of its 7 members present (2 others attending ADCOM). Membership for the working group consists on the Vice-chairs of the PSRC subcommittees.

The minutes of the last meeting were reviewed and approved.

WG B1 provides Certificates of Appreciation for outgoing Chairs of disbanded working groups, outgoing Chairs of subcommittees, and Service Awards based on years of attendance to PSRC. Every year WG B1 selects candidates for the Outstanding Working Group Award, the Prize Paper Award, and the Distinguished Service Award. In addition, the group nominates candidates for PES awards, SA awards, and IEEE awards.

The WG is open to review nominations for additional awards and recognitions. Anybody interested in nominating an individual or group effort for recognition or award, please submit the nomination along a

list of the achievements for consideration. Please submit the nomination to the corresponding subcommittee Vice-chair, or to the WG B1 Chair.

The PES Technical Council has selected PSRC as the recipient of the PES Technical Committee-of-the-Year (TCOY) Award to be handed out in San Diego at the PES General Meeting. Thank you to all the PSRC participants for this achievement!

Awards presented at the May PSRC Main Committee Meeting:

Gold Service Award – 42 Years – Tom Beckwith  
Gold Service Award – 40 Years – Arun Phadke  
Silver Service Award – 25 Years – T.W. Cease  
Silver Service Award – 25 Years – T.E Wiedman  
Silver Service Award – 25 Years – W.P. Waudby  
Silver Service Award – 25 Years – M. Kezunovic

With no additional business to discuss the meeting was adjourned.

**B2: Fellows Awards**

**Chair: J.S. Thorp**

Group did not meet.

**B3: Membership Committee**

**Chair: M.J. Swanson**

**Attendance during the New Orleans PSRC meeting was 230, which is considered a healthy number for us.**

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

Two retention support letters were written. Both appeals were successful.

As a further note, if any attendee needs stronger management support for PSRC participation, we encourage them to let us know.

Service Awards were presented.

**B4: O & P Manual and WG Training**

**Chair: J Appleyard: O&P Manual: Did not meet.**

**Chair: R Hunt: WG Training: No report**

**B5: Bibliography and Publicity**

**Chair: T.S. Sidhu**

**Vice Chair: M. Nagpal**

Group did not meet.

**B8: Long Range Planning**

**Chair: Miriam Sanders**

No report.

**B9: PSRC Web Site**

**Chair: Russ Patterson**

Group did not meet.

**V. Items from the Main Committee meeting:**

- A. New Main Committee members announced:
  - Randy Cunico
  - Raphael Garcia
  - Gene Henneberg
  - Yi Hu
  - Farnoosh Rahmatian

Mukesh Nagpal

B. New Fellows were recognized:  
Christoph Brunner  
Farnoosh Rahmatian

C: The following motions were unanimously approved by the Committee:

*From the C SC:*

WG C4 (PC37.244) is preparing to go to ballot. This guide has been identified as a Fast Track, Smart Grid standard. The following motion was made at the main committee meeting:

- System Protection Subcommittee requests advance approval for transmittal of the WG C4 document "Guide for Functional Requirements for Phasor Data Concentrator" PC37.242 to the IEEE SA for balloting, following successful voting by the WG members. The Subcommittee Chair and the WG Chair will notify the PSRC officers when the document has been approved by the working group members and is ready for submittal to the IEEE SA. Provided the ballot is favorable, the proposal will be sent to the IEEE Standards Board for approval.

## VI. SUBCOMMITTEE REPORTS

### C: SYSTEM PROTECTION SUBCOMMITTEE

**Chair: S. Ward**

**Vice-Chair: J. O'Brien**

The C System Protection Subcommittee met on Wednesday, May 16, 2012 in New Orleans, LA with 23 members and 41 guests in attendance. Quorum was reached.

The meeting was led by Vice-Chair Jim O'Brien.

Minutes of January 2012 Subcommittee meeting were approved.

Rodger Hedding gave an update on the Advisory Committee items, one point of the new P&P is that all members working on a standard must also be a SA voting member.

Substation Committee will be meeting with the PSRC in September.

8 Working Groups and 1 Task Force met at this meeting.

PSCE liaison report: Nothing to report.

PSSC liaison report: Report is included in the CTF3 meeting minutes.

### OLD BUSINESS

None

### NEW BUSINESS

Eric Udren (H-SC Chair) proposed a Task Force for Phasor Data Concentrators (PDCs) from the H11 & H19 and C4 work. Motion was made and seconded to create a PDC standard. The SC voted to approve this. CTF19 will be formed with Vasudev Gharpure as the chair to begin this work.

## 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, Role of Protective Relaying in the Smart Grid, met in the Astor III meeting room in the Crown Plaza Hotel in New Orleans, LA USA on May 16, 2012 at 8:00 am. Individual introductions were made and attendance was taken. 13 members and 19 guests were in attendance.

The meeting began with a review and clarification of the group's assignment. The outline of the present draft report was reviewed and discussed.

A recap was done by Alex regarding the purpose of the report which should include features in protection relays that can be used for Smart Grid applications.

James Ariza discussed what he found out from CFE with regards to the use of relays for Synchrophasors. They don't believe they are used to their full potential. His contribution will be included in the document. James will coordinate with Alex on the next step.

Don Ware's contribution will be inserted at the beginning of the document to augment the introduction of the document that describes what smart grid is all about.

It was brought to the attention of the WG that the introduction of distributed generation in the distribution systems is creating challenges. There are solutions already in place and there are new applications being used today.

The report may have to address the future needs based on a report from NIST on what the Smart Grid will be in the future. The report should address distributed generation and the impact of electric vehicles.

The latest version of the document and the status of contributions will be posted in the website. Alex requested participants to review. Volunteers can sign up after the meeting should they want to contribute.

Alex advised the participants the he would like to hand the report to the subcommittee by the end of the year.

Writing assignments and contributions will be submitted to the chair and vice chair by August 15, 2012. A list of assignments and respective volunteers are attached to these minutes.

It was stressed that the working group and the contributors need to remain aware of the activities of Working Group H2 so as to not duplicate their efforts. It was also stressed that contributions adhere to the following:

1. Present and list the protection data that is available for use in the Smart Grid.
2. When possible, provide examples and proposed uses of protection data in the Smart Grid.
3. Do not provide detailed descriptions of protection functions or the method used to obtain and create the data that is available in protection devices.

The working group chair and vice chair will organize the submissions and post the revised draft. All members need to review the document before the next meeting, and come prepared with comments and contributions.



**C4: Guide for Phasor Data Concentrator Requirements for Power System Protection, Control, and Monitoring (PC37.244)**

**Chair: Galina Antonova**

**Vice Chair: Vasudev Gharpure**

**Output: Guide C37.244**

**Established: January, 2011**

**Estimated Completion Date: To be determined**

**Assignment:** Develop a guide for performance, functional, and information communication needs of Phasor Data Concentrators for power system protection, control, monitoring, and information management. The Guide will include system needs for PDC applications, configuration, and testing procedures.

Working Group C4 met on May 15, 2012 in New Orleans, LA in a double session with 44 attendees (18 members and 26 guests). Quorum was not achieved. January 2012 meeting minutes will be approved electronically.

After introductions, Working Group Chair presented IEEE Patent Policy slides and asked to bring up any patent issues. None were identified.

Working Group Chair updated the group on project status:

- Working PC37.244 draft is dated May 14, 2012
- Resolution of remaining technical and editorial comments to be completed in a week
- Final draft and Working Group vote planned for the end of May

Discussion on Working Group technical comments followed. All technical comments received on the whole draft, dated April 13, 2012 were resolved. Suggestions for resolution of Section 8 technical comments were made.

Working Group Chair reminded that the group has regular conference calls on Monday and Friday 10am – 11:15am Pacific time.

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

**Chair: Farnoosh Rahmatian**

**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 May 15, 2012 in a double session. Sessions were chaired by Farnoosh Rahmatian. There were participation from 9 members, 3 corresponding members, and 19 guests. We had quorum of members (9/17).

The IEEE-SA Patent Slides were presented in both sessions – there were no comments from the participants.

All participants introduced themselves.

The minutes of the January 2012 meeting were reviewed and approved in the first session with a quorum of members. (Motion for approval – V. Gharpure, seconded by M. Patel and V. Madani).

WG provided an update of activities since last PSRC meeting in January 2012. Summary of the activities includes:

- Sponsor Ballot took place from March 10 to April 9, 2012.
  - 115 registered to vote, and 95 people voted (82% participation, meeting IEEE-SA's 75% requirement).
  - 91% affirmative votes, 7 negative votes, 470 formal comments.
- The WG has been going through comments in several conference calls (several conf calls - large and small groups)
- Have gone through about half the comments so far (several repeat comments) and have edited the Draft accordingly.
- A smaller team from the WG group has gone through many calls / comments.
- All WG members and guests are encouraged to observe / comment on resolutions taken.
- Some comments were reserved for face to face discussion at this meeting
- Many comments were truncated through the IEEE-SA tools; the WG has been in contact with most commenters and has updated the master comments list.
- Comments are now organized by page / line numbers to improve review efficiency
- Draft 8.2d is edited during this session
- Will continue with edits through next few weeks

During both sessions, the WG continued with reviewing and resolving comments. Results were captured in the standard Excel comments file and changes were reflected in Draft 8.2e.

The WG is expected to be done with comments resolution in the next few weeks and initiate re-circulation ballot immediately thereafter.

The WG will continue with weekly conference calls to address/review remaining comments and changes – Action Farnoosh Rahmatian and Paul Myrda.

**C13: Undervoltage Load Shedding Protection**

**Chair: Miroslav Begovic**

**Vice Chair: Shinichi Imai**

**Output: IEEE Report**

**Established: September 2005**

**Expected Completion Date: May 2012**

The Working Group did not meet.

**C14: Use of Time Synchronized Measurements in Protective Relaying Applications**

**Chair: Jim O'Brien**

**Vice Chair: Alla Deronja**

**Output: IEEE Report**

**Established: May 2007**

**Expected Completion Date: Dec 2012**

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

Working group C14 met on May 15, 2012, in New Orleans, LA, in a single session chaired by Jim O'Brien with 10 members and 17 guests present.

The chair distributed the latest draft of the Report. The Report was balloted by the working group members and received over 75% approval. There was a number of comments needed to be addressed and a couple of negative ballots.

The chair compiled draft 6.4 of the Report incorporating editorial and some minor technical comments, which did not need the working group discussion.

The rest of the received technical comments were discussed during the meeting.

Most of the comments concerned clause 4.1.3 *Tokyo Electric's Predictive Out-Of-Step Protection*, which was added to the Report after the January meeting. The clause is very long and based on the IEEE paper, repeating a lot of the details from the source. It describes an application of synchronized measurements, not synchrophasors although this application could be used with synchrophasors.

It was decided to condense subsection 4.1.3 to 1 to 2 pages and move it to subsection 5.9 *New Trends in Adaptive Out-of-Step Protection*. Akira Ishibashi and Fumio Kawano are from Toshiba and familiar with the topic. They will re-write the clause. After that, it will be sent to Ken Martin, Demetrious Tziouvaras, and Jay Murphy for review.

Another comment was about the C37.118 references. The latest revisions to C37.118-2005 – C37.118.1-2011 and C37.118.2-2011 – were approved in December of 2011. The Report needs to be updated accordingly based on which standard's version clauses reference to: C37.118-2005 (stays for older applications), C37.118.1-2011, or C37.118.2-2011. Ken Martin will accomplish this task.

Demetrious Tziouvaras will update subsection 5.3 *Differential Relaying* based on the new standards C37.118.1-2011 and C37.118.2-2011. He will also see to combine subsection 5.3 with subsection 5.4 *Synchrophasor Application to Line Differential Protection* as they seemingly talk about the same subject.

Subsection 4.13 *Distance to Fault* was moved from Section 5 *Future Applications* to Section 4 *Present Applications* when, after the January meeting, Chin-Wen Liu contributed a writing assignment for the topic. Few figures were in Taiwanese language as the contributor is from Taiwan. It appeared that the subsection describes the synchronized measurements, not synchrophasors so there was a motion to remove it from the Report. The author, Chin-Wen Liu, will be contacted for further clarification before making the removal decision final. Harold Kirkham volunteered to help to make all the figures in the Report consistently represented and legible.

All the contributions are due in month, by June 15<sup>th</sup>, 2012.

The Report stays approved with comments by the working group.

The Report will be submitted to the Subcommittee C for approval later, by September of 2012. The volunteers from the WG members will be needed to put together a Power Point document for a presentation at one of the future PSRC Main Committee meetings.

#### **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)

Working group C-15 met on Tuesday, May 15, 2012 in New Orleans, LA, in single session chaired by Jonathan Sykes and Yi Hu with 11 members and 12 guests attending.

Jonathan Sykes provided an overview of the status of the report, acknowledgement for the efforts made by the editing team formed at the last meeting, and the working group email voting results. The report has been approved by the working group to be submitted to C subcommittee for its approval. A number of comments had been received during the email voting process. Most are editorial in nature and had been incorporated into the latest work version of the report. The working group members and guests then discussed and resolved all remaining comments that have not been resolved before this meeting.

The need for an annex to provide a list of abbreviations and acronyms to help readers of this report was raised during the comment resolution discussion. Stephan Brettschneider volunteered to review the report and prepare a list to be added to the report as an annex no later than June 15, 2012.

Working group chairs will incorporate this annex into the latest version of the report and submit it to C subcommittee no later than June 29, 2012 for its approval.

Several options to write a paper to publicize the report were discussed:

- Write an IEEE transaction paper
- Write conference papers and make presentations at one or more relaying conferences
- Publish an article at "Power & Energy" magazine

It was agreed that the working group chairs will explore these options and discuss this at the next meeting with working group members to make a final decision.

**Next step action summary:**

Planned next step actions before September 2012 PSRC C15 meeting are as follows:

- Working group chairs to send the latest version of the report to Stephan Brettschneider – done
- Stephan Brettschneider to send draft annex to working group chairs by June 15, 2012
- Working group chairs to finalize and submit the report to C subcommittee by June 29, 2012 for its approval before September meeting
- Working group chair to explore paper writing options for publicizing the report

The working group will meet at next PSRC meeting in one session to discuss the paper options.

**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.

Working Group C16 held its meeting on Wednesday morning with 10 members and 16 guests attending.

The working group discussed assignments received for draft 2.8 of the report.

The following assignments were made:

- Raluca Lascu will poll the group for other methods of detecting battery ground.
- Tony or Raluca will correct 4.4.1 by adding at the end of the last sentence "as discussed in 2.5.3". Brian Boysen will add test to 2.6.2 describing logic shown in the figures.
- Vajira Pathirana will review section 2.6.2 after Brian has completed his assignment.
- Rich Hunt will return assignments for 2.6.6 and 2.6.7. Tony Seegers will write the summary section.
- Ken Behrendt will add a figure to 1.2.1 showing a layout similar to the existing figure for microprocessor relays.

All assignments are due by June 16.

It is expected that if the above assignments are completed the draft will be complete and ready for review and comment from the working group before the next meeting in September.

**C17: Fault Current Contribution from Wind Plants**

**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 C17 Work Group met in a single session at the PSRC meeting in New Orleans, LA on Tuesday May 15, 2012 with 20 members (including 1 new volunteer) and 17 guests.

Steve Conrad discussed the new section 4 on Fault Equipment Interrupting Issues. It was noted that the fault contribution from the wind plants tended to be associated with delayed zero crossings. These may be modeled by commercial analysis programs such as ASPEN.

Dean Miller discussed revisions to section 7 resulting from additional analysis of the relay fault records from several fault events. Dean's revised analysis included the effect of load by preloading the fault study model before simulating the line faults. The positive sequence impedance of the wind turbine generator was adjusted in the fault study model to produce positive current flow values that matched the values from the relay fault records. This was after the zero and negative sequence values were calculated directly from the relay fault record data. Zero sequence contributions to the system are very well modeled from the wind farm step-up transformer model. Negative sequence wind parameters were relatively constant at about 0.22 - 0.23 pu for two Type 2 and 0.33 and 0.36 pu for two Type 3 machines wind plants. Positive sequence impedance varied more. The Type 2 wind machines at the two wind plants had Z1 of about 0.36 and 0.7 pu respectively. Whereas the Type 3 wind machines had Z1 of about 0.2 and 0.4 pu respectively. After the positive and negative sequence impedance of the generator was determined the terminal voltage at the generators was calculated using the fault study program.

Questions and observations were brought up during the discussion on the lack of data on the action of the crowbar circuit for the type 3 machines and the individual controls of the inverters of type 4 machines.

It was noted that in a couple of cases series compensated lines and Type 3 wind turbine generators have resonated at sub-synchronous frequencies which resulted in damage to both the series capacitors and wind turbine generators.

If there is a need to improve the models related to integrating controls through IEC 61850 applications, the standard can handle the data if the wind turbine owners and manufacturers can supply it.

Two more writing assignments still need to be completed: Section 3.3, Wind Turbine Generator's Response to Fault for Type 3 Generators; and Section 8, Conclusion. After these two sections are completed we can start the editorial and approval processes. It would be appreciated if those who have taken these writing assignments could have their work completed before the July meeting.

The next joint work group meeting will be at the PES Meeting in San Diego, CA, July 22-26, 2012.

#### **C18: Transmission to Generation Interconnection Protection Considerations**

**Chair: Alla Deronja**

**Vice-Chair:-**

**Output: IEEE Guide**

**Established: September 2011**

**Expected completion date: TBD**

**Assignment:** *Develop a Guide for Protection Systems of Transmission to Generation Interconnections.*

**Scope:** This Guide documents accepted protection practices for transmission to generation interconnections. It is intended to cover the protection system applications at the interconnections between the transmission systems and generation facilities.

**Purpose:** This document is intended to provide guidance to those who are responsible for the relay protection of electrical interconnections between transmission and generation facilities. This Guide is not intended to supplant specific transmission or generator owner practices, procedures, requirements, or any contractual agreement between the transmission and generator owners.

Working group C18 met on May 15, 2012, in New Orleans, LA, in a single session chaired by Alla Deronja with 4 members and 27 guests present. Two guests joined the working group as new members.

The issue of the WG group output – whether it would be first a report or guide – was voted on after the January meeting of the task force. From 14 potential WG members, 10 voted for a guide, 3 voted for a report, and one vote was not received.

A request for a PAR was then submitted to the PSRC officers. However, there was a problem with the proposed Scope of the Guide, namely, that it was referred to the Guide potentially containing information on recommended protection of transmission to generation interconnections. This appeared to be contradictory to the IEEE definition of a guide as a document offering suggestions for working with a technology.

Therefore, the Scope was revised as follows:

This Guide documents accepted protection practices for transmission to generation interconnections. It is intended to cover the protection system applications at the interconnections between the transmission systems and generation facilities.

The Purpose stays the same:

This document is intended to provide guidance to those who are responsible for the relay protection of electrical interconnections between transmission and generation facilities. This Guide is not intended to supplant specific transmission or generator owner practices, procedures, requirements, or any contractual agreement between the transmission and generator owners.

The chair resubmitted a request for a PAR to the PSRC officers. A decision to grant the PAR was deferred by the officers until the May PSRC meeting.

The purpose of this working group was again raised. The chair reiterated the need for an industry-wide IEEE Guide for the transmission to generation interconnections due to the following reasons:

1. Separate ownership of transmission and generation.
2. Power producers, being connected to the power grid, may fail to install the adequate protective equipment at the point of interconnection because of the limited expertise of their consultants and/or desire to install the facilities with the least possible cost.
3. Many utilities have interconnection agreements with power producers. Although independent and specific for different regions, they ought to have many commonalities, which can become a part of the industry-wide standard and drive the application consistency. At the same time, different acceptable practices will be also outlined in an industry-wide standard.
4. A wide-industry standard will make transmission to generation interconnection protection more consistent among the various utilities and will support NERC reliability standards since transmission entities will have a better means to protect their systems and customers from a negative effect of a failure of a single generator or generating facility.
5. The protection requirements in individual interconnection agreements will be based upon the industry-recognized standard.
6. Power producers and their consultants will be educated based on the industry-recognized standard rather than on individual interconnection agreements of various utilities.

At the meeting, the working group reviewed the Scope and Purpose of the future document. There was a proposal to add a note that generators, being connected to transmission, are greater than 20 MVA for a single generator and 75 MVA aggregate, per the NERC definition. It was proposed before and not approved. It was discussed and dropped again because, if there is an interconnection to transmission, small generators would not be considered for such an interconnection any way and a transmission owner would not amend their requirements based on a size of a generator or facility being connected to its grid.

The proposed Outline was distributed with the additions from the received comments before the May meeting and briefly discussed. More valuable comments were provided such as consideration of DC links and communication channel implications for the tap connections.

The Outline will be distributed with the meeting minutes to all participants. The chair asks to review it and provide further comments.

The working group was not ready for writing assignments and requested, for better understanding of the future document contents, to have presentations on different utilities' protection requirements for the interconnections with generation, desirably, from different geographical regions to note the consistencies and differences.

The list of presenters is as follows:

1. Alla Deronja (ATC)
2. Heather Malson (Xcel Energy)
3. Jon Sykes/Mike Jensen (PG&E)
4. Mohammed Zubair (HydroOne)
5. Doug Hunchuk (Alberta System Operator)
6. Joe Mooney (Power Engineers - consultant perspective)
7. Mukesh Nagpal (BC Hydro)

Any other volunteers to make a presentation from their utility or consulting perspective are welcome and should contact the chair of the working group ([aderonja@atcllc.com](mailto:aderonja@atcllc.com)) before the September meeting.

Participation of power producer representatives such as consulting firms is very encouraged as well as from many utilities. Please contact the chair ([aderonja@atcllc.com](mailto:aderonja@atcllc.com)) if interested to be included on the distribution list.

**CTF3: Joint meeting with Power System Dynamic Performance Committee (PSDP)**

**Chair: C. Henville**

**Vice-Chair:-**

**Output: Recommendations to the Subcommittee regarding possible joint activities**

**Established: January 2010**

**Expected completion date:-**

CTF3 met in New Orleans with two members and four guests present.

The revised paper on an update to "Protection issues during system restoration" for the joint panel session (on system restoration) with PSDP at the PES GM in July 2012 has been submitted to the PES General Meeting website. The slides for the presentation have not been prepared yet, but will be prepared in time for review by the Task Force members before the panel session in July.

The following presentations are tentatively scheduled for a special PSRC Activities Session at the 2012 GM.

- a) Protective relay performance during stressed system conditions (Pratap Mysore)
- b) Undervoltage load shedding (Miroslav Begovic)
- c) New synchrophasor standard developments (Farnoosh Rahmatian)
- d) Protection Redundancy Considerations (Solveig Ward)
- e) Fault current contributions from wind farms (Dean Miller) – subject to no conflict with the relevant working group meeting.

The following topics and/or activities for the 2013 General Meeting were discussed:

1. A proposal will be made to the Power System Dynamic Performance committee for a joint session on new Synchrophasor standards. The proposal is for representatives from the four PSRC working groups to make presentations on the work the working groups are doing (or have recently completed) in the area of synchrophasor standard development. The precise format or structure of the session will be discussed further with the PSDP Committee at the PES General meeting in July. Ken Martin agreed to lead the organization of this session from the PSRC side.
2. The possibility of joint activity with the Power System Instrumentation and Measurements (PISM) Committee regarding work on frequency measurement and definition was discussed. This issue will be pursued further with Harold Kirkham of the PISM.

**D: LINE PROTECTION SUBCOMMITTEE**

**Chair: R.W. Patterson**

**Vice Chair: G.L. Kobet**

The Subcommittee meeting was called to order at 3:00 p.m. with 28 members and 29 guests present.

Following introductions, a count of SC membership was made, and it was determined a quorum was present (27 out of 46 members present).

Minutes from the January 2012 meeting in Garden Grove CA were approved.

Mike McDonald, PSRC Secretary, made general PSRC announcements.

In the absence of Chairman Patterson, Vice-Chair Kobet reported 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**

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

Working Group D2 held its meeting in a short single session on Tuesday, May 15, 2012.

There were 15 WG members present and a quorum was not reached. 15 guests attended the meeting.

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

Since quorum was not reached, the WG members will review and approve the minutes from the January 2012 meeting and April 2012 WebEx by email.

Chair Kobet summarized the results of the recirculation ballot. All the comments had been previously addressed and draft 9 has been submitted and will be reviewed by RevCom during the June SASB meeting.

Fred Friend explained to the WG members that no method currently exists to correct existing definitions (i.e. synchronism check), so any definitions that were modified by the WG during the revision of C37.104 will result in an additional definition being added to the IEEE Dictionary. No action is required by the WG and Fred Friend will continue to encourage IEEE to address this situation. Soo Kim will also report our comments back to SA.

RevCom had identified that the Scope as it currently appears in draft 9 does not exactly match the PAR. The Scope will be modified to match the PAR prior to publishing and no action is required by the WG.

Chair Kobet opened the floor for comments. None were raised and the meeting was adjourned at 9:49am.

**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 2013**

**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 May 15, 2012, at 3:00 PM with 17 attendees, of which 10 are guests

Minutes from the Garden Grove 2012 meeting were approved with no changes.

Writing assignments assigned from the previous meetings were discussed.

The working group discussed the section on zero sequence power polarizing method. This polarizing method is applied to ungrounded system. The group decided this paper should only cover effective grounded system and this section shall be deleted.

Steven Turner presented his writing assignment on how different software programs model polarizing methods for differ relays. The working group made some minor revision to this section.

A section on impact of sub-synchronous resonance on directional element was briefly discussed in the meeting.

Elmo Price volunteered to look through all the figures in the report and investigate on consolidating all the figures into a similar format for this report.

Gary Kobet volunteered on the writing assignment of the introduction section for this paper.

Copy of draft report will be distributed to members and guests. They are asked to read through the paper and provide comments on the report before the next meeting.



The assigned writing assignments are due on July 31.

**D6: AC Transmission Line Model Parameter Validation**

**Chair: Tony Seegers**

**Vice Chair: Sam Sambasivan**

**Output: Report to PSRC**

**Established: January 2009**

**Expected completion date: May 2013**

**Draft: 1.6**

**Assignment:** The working group 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 focus primarily on the parameters of transmission line models used for relaying and will not include details of relay curve models or other similar relay modeling. The scope will not include specific EMTP modeling.

The D6 working group met on Wednesday, May 16, 2012 at 9.30 a.m. with 14 members and 7 guests present.

Revision 1.6 of the document was sent to the members prior to the meeting. Members and guests were asked to comment on the latest draft. There were detailed discussions on the contents of various sections and the following are the follow up actions.

- Modify all the drawings to have a common format and symbols using the standard Visio tools used by the other working groups.
- Review the section on "Other considerations affecting use of the model" and use only the relevant material applicable to transmission modeling .Joe Uciyama will provide a section on "Transmission modeling effects due to Transformer" .Joe Mooney will review and revise this complete section.
- Pratap Mysore will provide a contribution to add a section 4.3 Inaccuracies of Measurement.

Aaron Martin made a presentation on staged fault tests conducted by BPA on 500kV system.

All contributions are due by July1.

**D11: Effect of Distribution Automation on Relaying**

**Chair: Fred Friend**

**Vice Chair: Jerry Johnson**

**Output: Report to the PSRC**

**Established: May 2006**

**Expected Completion Date: May 2012**

**Draft 9.8**

**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 in a triple session on Tuesday and Wednesday with 13 members and 15 guests present. Minutes from the January meeting in Garden Grove were reviewed and approved without comment.

The 80+ comments from the working group ballot were reviewed with much discussion and many more changes.

John Tengdin will review and revise sections 2.2 and 2.3 on the history of Distribution Automation.

Juan Gers will modify section 3.1.1 Load Sectionalizing Device Locations and Figure 3.1.

Phil Waudby will revise Figure 3.5.

Fred Friend will contact Steven Hodder to discuss proposed changes to Annex A.

Contributions are requested by May 25, 2012. The report will then be sent to the working group members for re-balloting and upon approval to the Line Protection Subcommittee.

**D19: PC37.113, DRAFT Guide for Protective Relay Applications to Transmission Lines**

**Chair: Rick Taylor**

**Co-Chair: Don Lukach**

**Output: Revised IEEE Guide C37.113**

**Established: September 2011**

**Expected completion date: September 2013**

**Assignment:** Revise and update IEEE Standard C37.113-1999 (reaffirmed 2004) Guide for Protective Relay Applications to Transmission Lines

**Scope:** Concepts of transmission line protection are discussed in this guide. Applications of these concepts to various system configurations and line termination arrangements are presented. Many important issues, such as coordination of settings, operating times, characteristics of relays, impact of mutual coupling of lines on the protection systems, automatic reclosing and use of communication channels are examined. Special protection systems, multi-terminal lines and single phase tripping and reclosing are also included. The impact that system parameters and system performance have on the selection of relays and relay schemes is discussed as well.

The working group (WG) met with 13 balloting members out of 21, thus quorum was met. A total of 8 out of 18 corresponding members and 23 guests also attended. During the meeting, the membership changed to 24 Balloting Members and 24 Corresponding members.

The January, 2012 meeting minutes were approved with no changes.

The IEEE patent slides were shown and discussed per procedure.

At the January 2012 meeting, Draft 1.0 of the guide was divided up into sections for teams of three to four members to review. This process exceeded expectations as the teams provided a great response with nearly all sections submitted prior to the May 2012 meeting.

Team leaders gave a brief summary of their reviews, with an emphasis on technical issues.

All outstanding assignments are due by July 15, 2010, and are to be submitted in MS Word format to both the Chairman and Vice-Chairman.

The Chairman and Vice-Chairman will compile Draft 2.0 from all of the team submissions by August 15, 2012.

**D21: Supporting IEC Standard for Distance Relay Characteristics**

**Chair:** Alex Apostolov (aapostolov@ca.rr.com)

**Vice Chair:** Alla Deronja (aderonja@atcllc.com)

**Output:** IEEE/IEC Standard

**Established:** September 2006

**Expected Completion Date:** December 2012

**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.

WG did not meet.

**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 WG did not meet. The report has been submitted to the PSRC officers with a cover letter, to be transmitted to NERC SPCS.

No meeting is planned in September.

**D24: Transmission Line Applications of Directional Ground Overcurrent Relays**

**Chair: Don Lukach**

**Vice Chair: Rick Taylor**

**Outputs: Report to WG D19, PC37.113, Guide for Protective Relay Applications to Transmission Lines and Report to the PSRC**

**Established: May 2007**

**Expected Completion Date: September 2012**

**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 (WG) met with 15 members, 22 guests, for a total of 37.

The January, 2012 meeting minutes were approved as submitted.

The WG discussed the latest draft of the report, Draft J. This draft incorporated all outstanding comments to date.

Figures throughout the report are inconsistent and several members volunteered to provide a consistent format:

Mike Bloder	5.3.3, 5.6.1, 5.6.2
John Miller and Elmo Price	All others excluding 5.10.3, 5.10.4, 5.10.5

Draft J included a figure in the Summary section that will be modified to include quadrilateral elements and moved to the appropriate application section. Text that describes the figure, including mho expansion, will be added. Alexis Mezco and Normann Fischer have this action. Ken Behrendt originally submitted this figure.

Assignments are due June 15, 2012.

Draft K of the report is expected by July 15, 2012.

The output from the WG was originally an input into the D9 working group. The D9 group was disbanded, and a new WG D19 formed. Thus, the D24 WG will re-submit appropriate information to D19.

**D25: Distance Element Response to Distorted Waveforms**

**Chair: Karl Zimmerman**

**Vice Chair: Aaron Martin**

**Output: Technical Report to Line Protection Subcommittee**

**Established: January 2009**

**Expected completion date: January 2013**

**Latest Draft: 1.2**

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

WG D25 met with 7 members and 14 guests.

Karl provided a follow up to his presentation from January's meeting discussing a miss-operation resulting from an incorrect pickup of a directional element. A discussion followed regarding problems from applying high speed directional elements to older CVTs that require more burden than what modern relays provide.

Karl reviewed the CVT contribution existing in Draft 1.2 of paper.

Eli Pajuelo reviewed his CVT contribution to the paper. His contribution focused on the frequency response of the different types of CVTs. A lengthy discussion followed.

Joe Mooney, Eli Pajuelo, Normann Fisher, and Aaron Martin to work together to combine and edit CVT section of paper.

After the next round of edits, we will put the draft on the website.

**D26: Revision of C37.114 Fault Location Guide**

**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 chair reviewed the IEEE Patent Policy and attendee's were provided the opportunity to respond. There were no responses.

There were 25 attendees with 13 members and 12 guests. One guest requested membership as a Corresponding member. There are 27 members on the Working Group so a quorum was not achieved. Minutes from the January meeting in Garden Grove will be submitted for approval by email.

Joe Mooney presented the updated working group membership showing Balloting Members and Corresponding Members. The current working group membership stands at 18 Balloting members and 10 Corresponding members. Joe Mooney requested that working group members contact him if they have any concerns about their membership status.

The group now has an editable document located in the protected documents of the working group site. Joe has started adding the content that has been submitted. Joe also requested that working group members send him any new content and he will add it to the document.

Joe pointed out several key comment submission from the reaffirmation balloting. We need to make sure that those key comments are properly addressed. The first is in regards to the definition of error. The submission received at Garden Grove does a good job of addressing the previously noted issues. There was some discussion exactly where this material should be included. Since it is important to the rest of the guide, it should be included early in the document. One comment was that there were eight items in that submission that were sources of error. If those items are listed, shouldn't they each be individually addressed? Maybe this could be done in an annex.

There was discussion whether the several distribution fault location methods submitted should be included in the body of the guide or moved to an annex. The general consensus is that we should include it in the body initially. If necessary, we can move it an annex later.

Other comments expressed the need to add content regarding practical application of traveling wave systems to solve the series compensations issues. Additionally, the use of synchrophasors has recently been documented in a paper.

Normann Fischer, Rafael Garcia and Carl Zimmerman have volunteered to review the many references that have been identified for series-compensation, traveling wave applications and synchrophasor applications for fault location. The intent is to consolidate the material into a coherent section.

Amir Makki questioned the meaning of an angle that is left over from two-ended fault locating algorithm. He questioned if it could be quantified and to help identify the source of the error and possibly reduce the error by using an algorithm to minimize the angle. There are many possible causes of the angle in the error measurement. Tony Seegers opined that the angle error was relatively small and probably insignificant when you are trying to dispatch trouble men. Possibly a short write up could address it.

**D27: Guide for the Application of Digital Line Current Differential Protective Relays Using Digital Communications PC37.243**

**Chair: Ryland Revelle**  
**Vice Chair: Solveig Ward**  
**Output: IEEE Guide PC37.243**  
**Established: Sept 2010 (PAR approved)**  
**Expected Completion Date: December 2014 (PAR expires)**

**Assignment:** To write a "Guide for the Application of Digital Line Current Differential Relays using Digital Communications."

The D27 WG met Wednesday May 16th at 8:00 AM. The meeting was attended by 11 members and 18 guests. Quorum was reached (membership stands at 17) and the January meeting minutes were approved.

The IEEE patent requirement slides were presented and attendees were given the opportunity to identify any known patent claims related to the work of the WG. Demetrious Tziouvaras raised the possibility of that the draft contained patent related material related to the alpha plane characteristic. After the meeting, Demetrious approached the Chair and Vice Chair and reported back that after reviewing the draft during the meeting his earlier statement was incorrect; the draft does not contain patent material related to the alpha plane characteristic. Therefore, no patent claims essential to the work of the WG were identified at this meeting.

Draft 2.0 was created since the last January meeting incorporating both new and previously provided writing contributions. The WG discussed how to organize to review/edit the draft in its current form and decided to form three teams to review/edit/reorganize the three main sections of the draft.

Section four will be reviewed by Haile Gashaw, Joe Uchiyama, Mark Schroeder, Demetrious Tziouvaras, & Mani Sankaran. Section 5 will be reviewed by Bill Higinbotham, Solveig Ward, Jun Verzosa, & Ilia Voloh. Section 6 will be reviewed by Alla Deronja, Sam Sambasivan, Ian Tualla, & Vajira Pathirana.

The outstanding writing assignments for in-zone transformers and sensitivity considerations will be provided by May 30th. The new draft for use in the team reviews will then be provided to the WG by June 6th.

The three review teams will then review assigned sections and provide edited/revised working group chair & vice chair by August 6th.

#### **SC Motions to be made to Main Committee**

None

#### **Coordination Reports**

None

#### **Liaison Reports - Fred Friend**

No report. The next T&D Committee / Distribution Subcommittee meeting will be at the IEEE PES General Meeting in San Diego, CA, 22 – 26 July 2012.

#### **Old Business**

None

#### **New Business**

None

#### **General Discussion**

The Subcommittee welcomed three new members: Pratap Mysore, Jim O'Brien, and Adi Mulawarman. This brings the D-SC membership roster to 49. The Chair/Vice-Chair will review attendance records to see if any members need to be encouraged to continue attendance and participation.

Alla Deronja discussed the WG numbering system, which was also discussed by ADCOM. The consensus is that WG numbers should be continuous up to 99, so that the chance of using the same number will be effectively eliminated. Using the same WG number for different assignments within a few years has caused some confusion. Alla suggested that WG numbers for Standards documents be established and fixed; ADCOM will take this under advisement.

There was also some discussion on consistent style of figures in PSRC documents. Al Darlington's Visio library of figures was to be obtained and made available to all D-SC WGs. ADCOM is working on making this available for all PSRC subcommittees.

#### **Line Protection operations of interest**

Ken Behrendt made a presentation titled "Line Trips During Power Swings Near Wind Farms Following Three-Phase Faults". The presentation generated many questions with good discussion. The type of wind turbine was suspected to be Type 2 (induction machine) given the apparent response. The line relays were found to be tripping by zone 1 on apparent unstable swings. Simulation of the events was not possible given the difficulty in obtaining accurate modeling data from the wind farm owners.

Gary Kobet presented a case where a directional ground instantaneous element at one end of a networked 161kV line operated for what appears to be a step-impulse in A-phase current (reflected into the residual circuit), evidently caused by low-intensity lightning strikes. It was noted the line does not have shield wires for the majority of the line route. The possibly operation or lack thereof of line and station arresters was discussed.

The meeting was adjourned at 4:15 p.m.

## **H: RELAYING COMMUNICATIONS SUBCOMMITTEE**

**Chair: Eric Udren**

**Vice Chair: Eric Allen**

The Subcommittee met on May 16, 2012 with 29 members of 38 total, comprising a quorum. 36 guests were also present. Minutes of the January 2012 Anaheim, CA meeting were approved without objection.

The Subcommittee welcomed Didier Giarratano as a new member.

### WG business:

The H3 WG presented a scope statement to the Subcommittee for approval.

*The SC voted unanimously to approve the scope of the H3 working group.*

### Old business:

An inquiry was made into the current status of the dual logo process for C37.94. It was reported that C37.94 is presently being submitted to IEC for dual logo status.

### New business:

The SC discussed the formation of three new task forces:

1. Development of a new standard for Phasor Data Concentrators (PDCs). This task force will be created under the C Subcommittee.
2. Development of standard mapping between C37.118 and IEC 61850-90-5. To address this topic, the Subcommittee voted unanimously to create a new task force, HTF21, with Yi Hu as chair.
3. Continuation of the H18 work by possibly developing a guide for cyber security for protection related data files. To address this topic, the Subcommittee voted unanimously to create a new task force, HTF22, with Stephen Thompson as chair. This TF will be a joint effort with the Substations Committee.

Interest was expressed in submitting C37.232 (COMNAMES) for dual logo status. No task force is needed to do so.

Continuation of the work of the H10 WG (Automatic Naming of IEDs) was discussed.

## **Reports from the WG Chairs**

### **H1: PC37.236 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 11 members and 7 guests. After introductions, an agenda with the IEEE patent policy was distributed. We had a quorum and the January minutes were approved.

The first round of balloting was completed May 9. 197 comments were received. The meeting focused on addressing technical comments. Technical comments, referred to their spreadsheet column number for the purposes of this document, through comment 69 were addressed.

The following assignments were made:

Marc Benou: Technical comments 17, 21, 22, 28, 29, 43, 51, 52, 53, 59, 63, and all non-technical comments from 1 to 20.

Tom Dahlin: Technical comments 18, 25, 44, and all non-technical comments from 21 to 40.

Jim Ebrecht: All non-technical comments from 41 to 60.

Bob Ince: Technical comments 27, 28, 36, 37, 38, 42, and 45.

Mark Simon: Technical comments 19, 67, and all non-technical comments from 61 to 80.

Ken Fodero: All non-technical comments from 81 to 100.

Iliia Voloh: All non-technical comments from 101 to 120.

Mal Swanson: Technical comments 15, 16, 34, and all non-technical comments from 121 to 140.

Roger Ray: Technical comment 26, and all non-technical comments from 141 to 160.

Ray Young: All non-technical comments from 161 to 180.

Jerry Finley: All non-technical comments from 181 to 197.

It has been requested that the assigned comment replies be submitted within 3 weeks.

**H2: Relay Applications Using the Smart Grid Communications Infrastructure**

**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.

The working group did not meet in New Orleans, LA. Revisions based on concessions comments from the subcommittee have been integrated into the draft. The draft will be submitted to the working group for comments confined to the revisions. Subsequent changes may result. Upon agreement from the working group, the draft will be circulated to the H subcommittee for review of revisions.

Status: Draft under final revision. Awaiting submission to SG for consensus vote.

Scope: Done.

Outline: Done.

Draft: Draft Dec 7, 2011

Projected due date Sept 2012.

**H3: Time Tagging for Intelligent Electronic Devices (IEDs)**

**Chair: W. Dickerson**

**Vice Chair: J. Hackett**

**Substations C4 Co-Chair: M. Lacroix**

**Output: Standard**

**Assignment:** Develop an IEEE Standard for time tagging for power system IEDs. This will include common requirements for time tags, and show how to apply them to various classes of time sequence data. Requirements and methods for stating the resulting time accuracy will be included.

The WG met on Tuesday, May 15, 2012 with 11 members and 15 guests in attendance.

The old PAR was withdrawn in December and we will apply for a new PAR for the joint effort with a revised scope and purpose.

The meeting started with three presentations by Amir Makki, Harish Mehta and Chair Bill Dickerson. The chair emphasized that the main purpose of the sessions in New Orleans was to decide on the Scope and Purpose for a revised PAR. At the last meeting, the importance of adopting common time tag formats was suggested, and the first two presentations addressed this issue, since this would represent a change to the original scope.

In the second session, these issues were discussed and the members present developed a new Scope, adopting the proposal to include standard time tag formats; and decided to keep the Purpose which had been defined in the previous meeting in Garden Grove.

Proposed scope: **This standard establishes common requirements for associating time tags with data items recorded or transmitted by Intelligent Electronic Devices (IEDs). The standard specifies time-tag attributes and requirements for describing time-tag accuracy and determination.**

The Working Group requests that Subcommittee H approve the revised scope, and submit our request to the Standards Coordinator for approval to submit a new PAR to NesCom.

**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.

This standard is one of the critical standards identified by IEEE SA for Smart Grid activity.

The Group met on May 15, 2012, with 10 members present – all of them are voting members out of 22 voting members. Four guests were present which include Jodi Haasz (IEEE-SA).

The minutes of the previous meeting at Minneapolis could not be approved as circulated due to quorum.

IEEE- SA representative Jodi Haasz informed the group of the following during the meeting:

- 1) IEC CDV is going to be complete on July 27, 2012.
- 2) IEEE recirculation process will be complete before July 27, 2012.
- 3) Comments from IEC and IEEE recirculation need to be resolved.

Based on the above, working group decided the following activities:

- 1) Have a phone conference at the end of August 2012 to discuss IEC and IEEE comments. Chair will coordinate this activity.
- 2) The working group will have a double session in September 2012 meeting at Portland, Oregon to resolve all the comments.
- 3) Final document to be provided to IEEE by end of September 2012 for IEC final balloting which takes two months.
- 4) Based on IEC balloting, decisions will be taken in December 2012.

The WG will meet again at September, 2012 to complete the final document based on comments.

**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.

The working group met on the 15<sup>th</sup> of May with 10 members and 8 guests. After introductions, the working group discussed draft 9. After the discussion, the following items were identified as needing action:

1. Change references from the logical node ZLIN to the protective reference PDIS.
2. Change K0 to KN
3. Load blinder needs to get handled in a different logical note
4. Send references to the chair.
5. Perform final editing.

**H6: IEC 61850 Application Testing**

**Chair: C. Sufana**

**Vice Chair: B. Vandiver**



## **Output: Report**

**Assignment:** Write a report to the H Subcommittee on application testing of IEC-61850 based protection and control systems. Emphasis will be on the GOOSE functions.

Introductions were done after a welcome by Chairman Charlie Sufana. There were 13 members and 14 guests present.

The minutes from the Jan 2012 meeting were reviewed and approved with no comment.

Christoph Brunner provided a brief update on the status of IEC 61850 Edition 2 activities and ongoing work. Charlie then asked those attending for any new information on current projects that include IEC 61850 applications. Mohammad Zubair with Hydro One described their current project of a new station that is using GOOSE and a process bus implementation. Aaron Martin of BPA described a current RAS scheme being implemented there.

The PPT presentation that was to be made to the WG by Samuel Sciacca, Dominic Iadonisi, Tony Leszczynski was postponed as they were not in attendance. However, Benton Vandiver made a short presentation of a proposed GOOSE performance test method being considered in the UCA-IUG Test Committee for Edition 2 requirements. It showed an interesting statistical result of the effect of GOOSE loading on a network and its effect on the DUT performance. A short discussion followed on the implications to IED's and protection applications.

Charlie then reviewed the report outline assignment of the working group and led a discussion on the revised content. Writing assignments were made and accepted by several WG members. In addition, the topic of interval testing was added to the outline after a short discussion. A revised outline with assignments noted by the topics will be sent out next week to all attendees. Writing assignments are due July 16<sup>th</sup> 2012 for producing the first draft of the report.

### **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 May 15, 2012 in New Orleans, LA in a single session with 11 attendees (3 members and 8 guests). Quorum was not achieved. January 2012 meeting minutes will be approved electronically.

After introductions, co-chair presented IEEE IP policy slides and asked to bring any potential patent-related issues. None were identified.

Co-chair explained that the IEEE C37.238 standard was approved and published in 2011. Working Group's task now is to produce Summary Paper.

Co-chair provided the status:

- Summary paper was submitted to ISPCS on May 14, 2012
- Summary paper abstract was submitted to WPRC 2012

Acceptance dates were noted for current paper submissions. Possible other submissions and the content of the WPRC paper were discussed. Suggested for changes / additions were captured in the updated paper draft. Working Group agreed to have a teleconference on May 31 to continue work on the summary paper.

### **H9: Understanding Communications Technology for Protection**

**Chair: R. Midence**

**Vice Chair: M. Sachdev**

**Output: WG Paper**

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

Working Group H9, met on Wednesday May 16, 2012 at 9:30 am in Room Iberville, Crown Plaza Hotel, New Orleans, LA with 14 members and 8 guests.

The chair informed that that the report was submitted to subcommittee on April 10, 2012 for final review and approval. We are waiting for their comments or final approval.

The chair provided an over view of the final document and also indicated that there was no progress prior to this meeting with regards to the preparation of a promotional paper as recommended by the working group during the meeting of January 2012.

The participants confirmed that a paper and a tutorial or power point presentation should be prepared. An abstract for the paper was already submitted by Bruce Mackie prior to the meeting.

During last meeting Dominic Iadonisi volunteered to prepare a document outline and René Midence, Richard Harada, Bob Ince volunteered to assist.

During the meeting of May 2012, Juan Gers, James Ariza, Vajira Pathirana, Alfredo de la Quintana, and Chris Chelmecki volunteer to assist in the preparation of the paper and power point presentation.

**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 Monday, May 14, 2012 at 4:30 in a single session with 5 members and 17 guests. The attendees were reminded of the applicable IEEE intellectual property rules. The WG did not have a quorum and the January minutes will be approved by Email.

The chair reviewed the current standard status. It passed balloting and was published in December 2011. Some comments have been received regarding the performance requirements but as yet they have not been fully tested against products. At least one typo in a requirements table has been noted and several requirements have been called into question. Once it appears PMUs have been fully tested and comments have been received as to the achievability of the requirements, the WG will need to evaluate these comments and decide whether to apply for a PAR to make a revision or leave the requirements as they are. This should occur by the September meeting.

Comments were received by the Synchrophasor WG in IEC TC95 to the CD sent out in October. The comments were not of great impact, largely editorial. Since the resulting IEC standard would essentially be the IEEE standard, the IEEE-SA decided to withdraw from the joint development in favor of pursuing an adoption process. That action is still pending.

The current draft of the WG Transactions paper was reviewed. There are several sections still not completed. The figures are not yet submitted. These were all promised.

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

**Applications**

**Chair: E.A. Udren**

**Vice Chair: M. Zubair**

**Output: 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 May 16 with 38 attendees. The Chair provided an update on the status of the report – a new section on tunneling layer 2 GOOSE messages for inter-station communications will be added to the report.

The Chair then presented the GOOSE tunneling techniques (EoMPLS, L2TPv2 or v3, VPLS) that Southern California Edison has evaluated, as part of the Centralized-RAS project. The pros and cons of each tunneling approach were described, The presentation highlighted the benefit of using traffic shaping to reduce communication

latencies; this also served as a reminder that IT engineers and protection engineers need to work together to optimize P&C systems. The Chair also provided an update on the features of the recently published IEC-61850-90-5. The presentation will be sent to WG members and meeting attendees with the minutes.

**H13: Understanding Requirements and Applications of the Substation Cyber Security Standards (Joint Working Group Substations Committee C10 & PSRC H13)**

**Chair H13: S. Sciacca**

**Chair C10: Tim Tibbals**

**Vice Chair H13: C. Preuss**

**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.

Committee met. There were 12 members and 20 guests (quorum was not met). Note: This committee is working jointly with Substations C10 on P37.240. At the spring meeting, H13 and C10 meet separately, and the lack of quorum is largely expected. Some members of C10 were present so continuity was preserved.

IEEE Patent Policy slides presented.

The latest draft of the document was reviewed. Assignments for incomplete sections were made, some assignments for sections were referred to Substations C10 which will meet the following week in Raleigh. Writing meetings will continue by web conference over the next two months. The project schedule expects that we will request approval of the main committee to proceed with the sponsor ballot during the Sept. meeting.

**H17: Establishing links between COMTRADE, IEC 61850 and CIM**

**Chair: C. Brunner**

**Vice Chair: A. Apostolov**

**Output: Report**

**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.

Working Group H17 met on May 16, 2012, in New Orleans, LA, in single session chaired by Christoph Brunner, with 9 members and 10 guests present.

After the introduction of attendees, the participants focused on the main task of the meeting – review and discussions on the outline of the report and the contributions. The Chairman identified several members of the working group that have committed to contribute to the report, but have not submitted their contributions. They are requested to complete their assignments and submit them by the end of June 2012.

The issue of use cases was also discussed and it was suggested that some uses case developed by other PSRC working groups may be reused as a starting point for some of the use cases in the report.

Some of the discussions were related to contributions submitted after the January 2012 PSRC meeting, more specifically the harmonization between CIM and IEC 61850 and the need for some further explanations in contributions submitted for the report. The need for extensions in CIM and IEC 61850 was also discussed and will be covered in future contributions.

**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, May 16, 2012 in a single session with 6 members and 11 guests. The quorum was not reached so the January minutes will be approved by Email.

The present status was reviewed. The standard was completed and published in December 2011. At least one vendor has implemented the new config 3 message, and several others have reported progress on implementation. No comments have been received that indicate there are any problems with it. The WG will monitor the industry for problems and evaluate if action is needed to initiate revision to the standard.

The draft IEEE Transaction paper on the Standard was reviewed. All contributions have been received. The formats and styles do not match, so considerable editing is needed. There also is a lot of overlap in the content since sections have been written by different contributors.

Jay will expand backward compatibility section with contributions from Ken

Vasudev will add a figure

Overall section editing will be done for consistency:

Section 1 – Gustavo

Sections 2 & 3 – Ashish

Section 4 – Ken

Section 5 – Vasudev

All individual contributions are due to the chair by July 1 so overall section editors can start. Overall section editing is due back to chair by August 7. All other WG members are asked to review the draft as is and suggest areas that paper does not but should cover and figures that would improve the paper.

### ***Liaison Reports***

#### **PES Substations Committee**

**S. Sciacca**

John Tengdin supplied the following:

PES Substations has submitted a PAR (on the agenda for the June RevCom meeting) for IEEE 1613.1, *IEEE Standard Environmental and Testing Requirements for RF, PLC, and Ethernet Communications in Electric Power Facilities*. This is an extension of IEEE 1613-2009 for RF and PLC communications and broadens its scope from "Substations" to "Electric Utility Facilities."

#### **PES Communications Committee**

**S. Klein**

1591.3-2011 Standard for Qualifying Hardware for Helically-Applied Fiber Optic Cable Systems (WRAP Cable). Approved as a new standard by the IEEE-SA Standards Board on 10 September 2011.

P367-1996 (R2002) Recommended Practice for Determining the Electric Power Station Ground Potential Rise and Induced Voltage from a Power Fault, Approved March 2012.

487a Recommended Practice for the Protection of Wire-Line Communication Facilities Serving Electric Supply Locations Amendment 1 - Requirements and Conditions for Placing the Wire-Line-Fiber Cable Junction (CFJ) Inside the Zone of Influence Currently forming ballot pool.

In process with approved PAR:

P487.4 Standard for the Electrical Protection of Communication Facilities Serving Electric Supply Locations Through the Use of Neutralizing Transformers.

P487.5 Standard for the Electrical Protection of Communication Facilities Serving Electric Supply Locations Through the Use of Isolation Transformers.

P789 Standard Performance Requirements for Communications and Control Cables for Application in High Voltage Environments.

P1138-2009/Cor 1 Standard for Testing and Performance for Optical Ground Wire (OPGW) for Use on Electric Utility Power Lines - Corrigendum 1: Stress Strain Temperature Correction.

PC93.3 Standard for the Requirements for Power-Line Carrier Line Traps.

PC93.4 Standard for Power-Line Carrier Line-Tuning Equipment (30-500 kHz) Associated With Power Transmission Lines.

**IEC TC 57 WG 10, 17, 18, and 19**

**C. Brunner**

All IEC working groups related to IEC 61850 will meet next week in Berlin, Germany.

*IEC TC57 / WG10* has currently the following projects:

1. Finalisation of Edition 2 of IEC 61850:  
Parts 5 and 10 are being circulated as FDIS; Part 3 as CDV; Part 1 as DTR – the other parts are published.
2. Technical reports that are under preparation
  - IEC 61850-90-5 – using IEC 61850 to transmit synchrophasor data according to IEEE C37.118 has been published
  - IEC 61850-90-4 – network engineering guidelines is in circulation as DTR.
  - IEC 61850-90-3 – using IEC 61850 for condition monitoring – and IEC 61850-90-11 – modelling of logics – are still in preparation.
  - Technical reports IEC 61850-7-5 and -7-500 about the usage of the models to create application are still in preparation.
  - New work for reports has been started: IEC 61850-90-12 – Wide area network engineering guidelines and IEC 61850-90-14 – Using IEC 61850 for FACTS data modelling.
3. Additional work deals with Functional testing, System management and Alarm handling.
4. Preparation of a UML model of IEC 61850  
Work is well progressing. Many inconsistencies of the models could be fixed. Plan to issue an update of IEC 61850-7-4 that will be automatically generated from the UML model.

*IEC TC57 / WG17* is working on the following topics:

1. Technical reports that are under preparation
  - IEC 61850-90-7 – Photovoltaic and inverter based systems – DTR in circulation
  - IEC 61850-90-6 – use of IEC 61850 for distribution automation, IEC 61850-90-8 – Electrical vehicles, IEC 61850-90-9 – Storage batteries and IEC 61850-90-10 – Schedules: First WG drafts are available.
2. Modelling a generic electrical view of DERs  
Work is on-going to define a generic electrical view of a DER system towards the electrical grid

*IEC TC57 / WG18* is working on the following topics;

1. FDIS of IEC 61850-7-410, Ed 2
2. IEC 61850-90-13 – Extension of IEC 61850 information models to also include logical nodes and data models for steam and gas turbines
3. Interoperability tests for hydro equipment based on IEC 61850 and Communication network structures in hydro power plants

*IEC TC57 / WG19* with regard to IEC 61850 works on the preparation of IEC 61850-90-2 – Use of IEC 61850 for communication towards the control centre. First draft planned to be circulated within the next weeks.

**I: RELAYING PRACTICES SUBCOMMITTEE**

**Chair: R. Beresh**

**Vice Chair: J. Pond**

The I Subcommittee met on May 16, 2012 with over 24 members in attendance – a quorum was achieved.

- Approved minutes of I SC meeting held in Garden Grove CA, in January 2012
- Items of Interest
  - WG Chairs need to be SA members

- When balloting Standards, a cover letter can state that grammatical errors will be addressed by IEEE
- Consecutive numbering of WG's, Roll back to 1 after 99
- A request from WG I10 (Revision of C37.98 Standard for Seismic Testing of Relays) to go to ballot was presented to the Main Committee meeting and approved.

#### **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, chaired by Mal Swanson, met on Wednesday, May 16, 2012 with 8 members and 1 guest.

Minutes from the January meeting in Garden Grove were reviewed and approved.

Liaisons have been assigned for all working groups with a PAR to facilitate the development of new terms during the working group process. Reports were given on the status of each.

Words from approved Standards and Guides with a Section 3 (Definitions) have been incorporated into the IEEE database. An alphabetical listing of the words not in the database, but useful to the PSRC is posted on the web site under "TERMS" link.

All working group chair are reminded the database is available to them for use during their document development.

The chair will send a request to Matt Ceglia to initiate a process for updating words in the IEEE Dictionary. He will also compose a flowchart to illustrate the Terminology Review Working Group process.

##### **I4: IEC Advisory Working Group**

**Chair: E.A. Udren**

**Vice Chair: M. Yalla**

**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 May 15, 2012 with 8 members & 3 guests. The Chair and Vice Chair reviewed for the attendees the status of documents circulated from IEC during the last cycle:

- 60255-121 – Distance relays – Comments were incorporated in a new Committee Draft for Vote (CDV) which Murty Yalla, Convenor of MT 4, thinks is in good shape. This is perhaps the most massive and complex TC 95 standard draft to date. A pre-publication copy has been circulated to WG members and May guests. Comments will be solicited for the CDV when officially published by IEC.
- 60255-149 – Thermal electrical relays - A Committee Draft was circulated in Feb. 2011 and comments received from the IEC National Committees as documented in 95-291-CC. The comments were resolved and a CDV will be circulated shortly. A pre-publication copy has been circulated to WG members and May guests. Comments will be solicited for the CDV when officially published by IEC.
- MT4 is having a web meeting to review the preliminary draft of IEC 60255-187-1 *Functional requirements for biased (percentage) differential relays* on May 30, 2012. This standard covers differential protection of generators, motors, transformers and reactors.

There was a suggestion from Jack Chadwick to share the information about the IEEE PSRC activities with IEC TC95 Secretary, with some mechanism of sharing for IEC TC 95 member nations and MT participants. Eric and Murty will look into his suggestion.

The IEC TC95 plenary meeting is scheduled for Tuesday, Nov 13, 2012 and MT4 will be meeting from Wednesday Nov 14 to Friday Nov 16, 2012 in Beijing, China.

Other TC 95 activities discussed:

- 60255-24 COMTRADE standard is handled by a Dual Logo Maintenance Team (DLMT). After a behind-the-scenes negotiation between certain European national committee voters and the PSRC WG, the IEEE draft was revised and a corresponding IEC voting draft (CDV) has been issued.
- 60255-118-1 IEC Synchrophasor measurement standard – a version identical to C37.118.1-2011 had been issued by TC 95 as CD and had brought only a few minor comments from the national committees who voted. IEEE SA is now negotiating with IEC TC 95 to see if IEC will issue 118.1 as dual logo in its current state, and recheck for need to revise periodically thereafter. It is too early to predict the outcome of that discussion.

With regard to TC 57, the Chair had recirculated a copy of TC 57 draft Technical Report 62351-10 on IEC cyber security architecture, for the interest of the WG members, as well as a copy of IEC 61850-1 Edition 2 Introduction and Overview. On May 19, after the meeting, the CDV for Edition 2 of IEC 61850-3, General Requirements, became available and will be circulated by the Chair.

## **15      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.

Meeting #13, Tuesday, May 15, 2012, 1:30 pm, New Orleans, LA

The Working Group met at 1:30 with 11 members and 12 guests attending.

Chairman Kevin Donahoe opened the meeting with introductions, and reviewed our assignment.

The January meeting minutes were discussed and approved.

We went over the writing assignments from the last meeting:

1. Andre Uribe and Don Ware will correct the Protection Zone drawing. (Done)
2. John Csisek will rework the text to better incorporate the Protection Zone drawing. (In John's absence, Andre Uribe volunteered to take a shot.)
3. Kevin Donahoe will move drawings around so they are more closely associated with the related text.
4. Craig Preuss will provide an example of a communication block diagram that minimizes the clutter of the drawing.
5. John Csisek and Kevin Donahoe will draft a Conclusions section (Section VIII). (in progress)
6. Rich Young and Kevin Donahoe will take a shot at a References section (Section IX).

Joe Uchiyama mentioned that he had heard there was a new standard layout for drawing titles blocks, vertically along the side rather than horizontally along the bottom. Dean Miller agreed that his company has been changing drawings to comply. No one is aware of an actual standard covering drawing format. Joe will try to find out the source of the change.

Kevin discussed some of his thoughts for a conclusions section, lessons learned, and suggestions for anything that we haven't covered. New technologies affect the information shown on a single-line diagram. Need logic diagrams, communication block diagrams, LAN architecture, etc. Some don't attempt to represent logic in the schematics. That is covered in the settings documents. The increased complexity of schemes requires increased documentation vs. tribal knowledge. How do we share lessons learned when adopting new technologies?

Nilesh Bilimoria volunteered to provide an example of the "European" method of showing logic and wiring.

Our new goal is to have a paper ready for vote by next meeting. We hope to have a draft ready for members to review and comment before next meeting. For this effort, we could use page numbers and line numbers to make it easier to make clear comments.

The meeting was adjourned at 2:30.

For the next meeting, we request a room for 30 people and a video projector.

Review of assignments:

1. Andre Uribe will rework the text to better incorporate the Protection Zone drawing.
2. Kevin Donahoe will move drawings around so they are more closely associated with the related text.

3. Craig Preuss will provide an example of a communication block diagram that minimizes the clutter of the drawing.
4. John Csisek and Kevin Donahoe will finalize a Conclusions section (Section VIII).  
Rich Young and Kevin Donahoe will draft a References section (Section IX).

**I7: Revision of C37.103 Guide for Differential and Polarizing Circuit Testing**

**Chair: Gary Kobet**

**Vice Chair: Alex Lee**

**Output: IEEE Guide**

**Established: May 2012**

**Expected completion date: 2016**

**Assignment: Revise and update the IEEE Guide C37.103 – Guide for Differential and Polarizing Circuit Testing**

Working Group I7 held its meeting in a single session on Tuesday, May 15, 2012.

There were 6 of 7 WG members present and a quorum was reached. 1 guest attended the meeting.

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

This was the initial meeting for this working group.

The PAR application was presented as it was submitted to IEEE. NesCom approval is expected at the upcoming June 2012 meeting.

The WG reviewed the 21 comments from the 2009 reaffirmation ballot.

WG members are expected to review the current version of the document and make comments on how the Guide could be “modernized” for present-day testing techniques and available test equipment.

The WG Chair requested WG members share any recent relevant technical papers, as well as testing practices used by utilities and those recommended by test equipment manufacturers.

Requirements for the next meeting: Single session, meeting room for 15 people, and a computer projector.

**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: 2013**

**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 Burgundy, The Astor Crowne Plaza Hotel in New Orleans LA on May 15, 2012. Fourteen members were present.

The working group continued to edit Draft 1a. Several sections need updates. The Guide needs to better describe the differences between 60 Hz grounding and transient grounding applications. The GE 469 relay manual has examples of grounding which will be reviewed. Figures with new examples will be added. Annex E and Annex F will be updated.

Conference calls will be held in June to review the draft and prepare to get approval from the working group to request a IEEE-SA ballot body invitation.

The Working Group will meet in Portland OR in September 2012. We will require a room for 20 people and a computer projector.

**I9: Reaffirmation of C57.13.1 Guide for Field Testing of Relaying Current Transformers**



**Chair: Brian Mugalian**  
**Vice Chair: Bruce Magruder**  
**Output: Reaffirmation and review of comments received on IEEE C57.13.1**

**Assignment: Reaffirmation of IEEE C57.13.1 to determine whether a revision is needed**

Working group I9, Reaffirmation of C57.13.1 - Guide for Field Testing of Relaying Current Transformers, was held in Burgundy, The Astor Crowne Plaza Hotel in New Orleans LA on May 15, 2012. Seven members and four guests were present.

The reaffirmation was approved by IEEE-SA on March 29, 2012. There were 2 negative ballots and 32 comments received from the balloting body. The attendees reviewed the comments and determined which require further study. Assignments were made and a conference call will be held in June. At the September meeting, the working group will decide if a revision is needed – the initial perception is that there are new items that would benefit the document.

The Working Group will meet in September 2012 in Portland OR. We will require a room for 20 people and a computer projector.

**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

Attendance: Marie Nemier, Mario Ranieri, Jeff Burnworth & Suresh Channarasappa Conference call-in: Melanie Brown, Dan Mikow, & Sheila Ray and Guest: Bob Beresh, Phil Winston & John Tengdin.

1. Reviewed IEEE patent slides.
2. Reviewed and approved agenda & meeting minutes from previous conference call.
3. Prior to the meeting, Draft 5 Rev. A was sent to the members for comments. Comments were received from members on Section 4.4.2, 5.2.1 & 5.2.4. During the working group meeting, the sections were modified to incorporate the comments.
4. Suresh was assigned an action item to send Draft 5 Rev. B to the members after the meeting for comment which incorporates the changes from the meeting. This draft will be renamed Draft 5 Rev. 0 and submitted to SC-2 for comments.

**Action Item List**

<b>Action Item</b>	<b>Responsible Party</b>	<b>Due Date</b>
1. Incorporate comments from meeting into draft 5 Rev. B is issue to working group	Suresh Channarasappa	5/15/12
2. Issue Draft 5 Rev.0 to SC-2	Suresh Channarasappa	5/16/12
3. Develop bridge document comparing current revision to 1987 version	Arnold Offner	Prior to ballot

**NOTE: TO PARTICIPATE ON THE BALLOT FOR ANY STANDARD, YOU MUST BE A MEMBER OF IEEE STANDARDS ASSOCIATION. IF YOU ARE NOT CURRENTLY A MEMBER, PLEASE BE SURE TO JOIN BEFORE WE GO TO BALLOT.**

**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**

**Expected Completion Date: December 31, 2014**

**Assignment:** Develop Guide for “Application of Optical Instrument Transformers for Protective Relaying”

**Current draft= rev-1.5**

Following introductions, the meeting was opened with a review of the IEEE Copyright and WG Guidelines slides. There were 10 members and 6 guests present.

Harley discussed the Agenda, and the consolidation of the standalone sections of the Guide into Draft one by the task team lead by Farnish.

Farnish led a review and discussion of the current Draft 1.5 document.

Discussions included:

- Update and Status of the 11 Sections for the Guide:
- Strategy for the consolidation and review process:
- The WG task force members will review – provide feedback – and make needed corrections in concert with the Task Team and section team leaders
- All members will have an opportunity to review the material
- This process will be repeated as needed

**WG12: Quality and Control for Protection & Control Design.**

**Chair: Andre Uribe**

**Vice Chair: Mal Swanson**

**Output: Report**

**Assignment:** “To develop a special report outlining the best practices of quality control for protection and control design drawing packages from conception to final “as-built”.

The Working Group I-12 met on Tuesday, May 15, 2012, New Orleans, LA in single session chaired by Andre Uribe with a total of 29 attendees (10 members and 19 guests).

January meeting minutes were reviewed and approved.

In our meeting, the group covered the following:

1. New topics to include in the report
2. Shared topic related experiences
3. Assigned 13 new task to various members and guests
4. Kevin Donohue reported on “Processes, Issues, Trends and Quality Control of Relay Settings” to insure there are no overlaps on our report.
5. Emphasized that our report will be specific in nature and only address quality control in protection and control design package.

Assigned tasks:

Jay Sperl: Write up on the importance of logging in as-built drawings

Mike Bloder: Write up on the storing engineering drawings

Glenn Durie: Write up on revision process

George Gresko: Write up on revision process

Dom Fontana: Write up on establishing a check out policy for engineering drawings

Adi Mulwarman: Write up on design process

Roger Whitaker: Write up on how design standards improve the quality control process

Duane Buchanan: Write up on how QC can help with NERC compliance

John Miller: Write up on how QC can help with NERC compliance  
Vajira Pathirana: Write up on the importance of using the latest as-built drawings  
Phil Zinck: Write up on why planning needs to come up with realistic schedules  
Jay Sperl: Write up on the importance in utilizing industry standards, i.e.: Manufactures/IEEE  
Mike Bloder: Write up on the importance of properly unwiring before starting a design package  
Tony Seegers: Write up on Clouding vs Demolition on design drawings  
George Gresko: Write up on Clouding vs Demolition on design drawings

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

**Chair: Tom Beckwith**

**Vice Chair: Jeff Burnworth**

**Output:** Revision of C37.90.1 SWC Tests Standard

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

**Expected Completion Date:** September, 2010 (ready for ballot)

Meeting Minutes: May 15, 2012, New Orleans, LA

The 14<sup>th</sup> meeting of the Working Group (WG) I20 met on May 15, 2012, in a single session with 8 members and 3 guests. The meeting was chaired by Jeff Burnworth.

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

The minutes of meeting #13 on January 10, 2012, Garden Grove, CA was approved as submitted.

The recent working group (WG) ballot that was performed by email in April was reviewed. The ballot was to approve IEEE C37.90.1 Draft 6.0 dated 3/30/2012 to be submitted for ballot. The results of the WG ballot was 10 members approved to submit for rebalot with no changes, 2 balloted to include changes to section 6.4.2, 1 member indicated that the changes are desired, but to move forward towards completion, would agree to submit without changes, and 2 WG members did not respond. The final ballots result is that a WG majority agrees to proceed to submit Draft 6 for rebalot with no changes.

The remaining work required prior to submitting for rebalot, is to contact those balloters whose comments were rejected. The WG reviewed those negative ballots and completed the Resolution Detail column of the balloter comments spreadsheet. Assignments were made to contact those negative ballot submitters to advise and discuss the WG's decision for resolution. Those assignments are:

Jay Murphy to contact Gary Hoffman

Jeff Burnworth to contact David Gilmer, Michael Maytum, and Mark Bushnell

A motion will be made at the I subcommittee meeting on Wednesday, 5/16/12, to submit Draft 6 for recirculation. The target date for recirculation is Jun 7, 2012.

Requirement for the next meeting: Single Session for 15 people with a computer projector.

**I21: Analysis of IED System Waveforms and Event Data**

**Chair: Jerry Jodice**

**Vice Chair: George Moskos and Alex Lee**

**Output: Report**

Working Group I21 held its meeting in a double session on Wednesday, May 16, 2012.

Reviewed Last meeting Jan 2012 minutes. There were 10 members and 22 guests present and a quorum reached.

Members voted to remove the wording COMTRADE Format in the May 16, 2012 Agenda.

Amir Makki's presented "Waveform Signatures for Various Types of Transients" and also presented Tony Giuliant's "Using Event Recordings to Verify Protective Relay Operations".

Jeff Pond's Presentation: "Disturbance analysis process and data used by National Grid".

Rafael Garcia's Presentation: "Live on line demonstration of Oncor Electric Delivery's DFR Report Explorer and Report Viewer program."

Jerry indicated that

1. "MEMBERS" are those individuals who make Contributions and Commentary / Reviews as requested. Members may make contribution via email if they are unavailable to attend a session.
2. "Guest or Corresponding Members" are encouraged to participate the meeting session.

**Assignments:**

Working Group members and guests to submit Tabulated Criteria requirements for each of the assigned Topics.

Item	Topic	Name	E-Mail Address.
1	Restrikes	Rafeal Garcia	rafael.garcia@oncor.com
2	Arcing	Amir Makki	amir@softstuf.com
3	Fault magnitude	John R. Boyle	boyle114@comcast.net
4	Carrier System Reviews	John R. Boyle	boyle114@comcast.net
5	Breaker Clearing Times	Elmo Price	elmo.price@us.abb.com
6	Transformer Inrush	Ken Behrendt	Ken_Behrendt@selinc.com
7	CT Saturation	Amir Makki	amir@softstuf.com
8	Harmonic Analysis	Mark Taylor	mark@sensortechs.com
9	VT Saturation / Ferroresonance	Elmo Price	elmo.price@us.abb.com
10	CCVT Transient	Karl Zimmerman	karlzi@selinc.com
11	Frequency Analysis	Jay Murphy	jay.murphy@macrodyneusa.com
12	Site Testing –		
13	Fault Evolving	John (Jack) Chadwick	chadwick7747@bellsouth.net
14	Time synchronization	Eric Allen	eric.allen@nerc.net
15	Capacitor Ringing.	Amir Makki	amir@softstuf.com
16	Imbalance Conditions	Mike Bloder	mdbloder@cai-engr.com

Alex handed out CD's containing published papers related to Analysis Event and Disturbance. All the papers were contributed by members and guests from the last meeting Jan 2012.

The Working Group discussed whether "Analysis of IED System Waveform and Event Data" should be IEEE Report or IEEE Guide. Members are requested to submit their vote on this via e-mail.

Working Group Chair, Jerry noticed that there were more Guests than Members present in this meeting session. This indicates the lack of membership attendance and participation in this task.

**Reports from the TF Chairs**

Currently there are no TFs.

**Liaison Reports**

Instrument Transformer Sub Committee, Liaison Report

The Instrument transformer Committee met in Nashville March/2012. There are presently 2 WGs. One WG is writing a standard for CTs with mA secondaries. The second WG is reviewing a number of important changes to C57.13. Integration of C57.13.5 into C57.13 has run into major resistance. Consensus is to create a second class of instrument transformers (Class II). This class will incorporate the additional C57.13.5 extra HV tests etc. Class I would be the default class if Class II is not specified. An Appendix will include a large section on bushing CTs.

**Coordination Reports**

None

**Old Business**

None

**New Business**

Memberships – Alex Lee newest member of I Subcommittee

I SC Web Pages – Effort ongoing to make Subcommittee main pages consistent. Fred Friend Web Master

Approvals to request balloting of:

1. Revision of C37.98 Standard for Seismic Testing of Relays – Approved by majority vote

2. Revision of C37.90.1 - IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus – Approved by majority vote

Approved name change of I12 from Quality Control for P&C to Quality Control of Protection & Control Design.

The new subcommittee vice-chair will be announced at the September meeting.

**J: ROTATING MACHINERY PROTECTION SUBCOMMITTEE**

**Chair: M. Yalla**

**Vice Chair: M. Reichard**

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 Wednesday, January 11, 2012 with 16 members (achieving quorum) and 22 guests. There was a call for the approval of the minutes of the September 2011 meeting in Minneapolis, MN. Moved by P. Waudby, 2<sup>nd</sup> by C. Mozina, these minutes were unanimously 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.

1. The Working Group did not meet during this PSRC Committee meeting.
2. The Working Group has completed its assignment with the approval of the report by the IEEE PSRC Officers.
3. The report has been submitted to Russ Patterson for posting on the IEEE PSRC Website on the J Subcommittee reports page.
4. A summary version Transactions Paper has been produced and approved by the PSRC membership. Tom Farr coordinated this effort as the paper editor for the Working Group.
5. Tom Farr and Chuck Mozina will work together to arrange to have this summary paper presented at the IEEE Industry Applications Society (IAS) - I&CPS meeting.
6. The Working Group J1 Chairman would like to thank all contributors and participants for helping to develop this significant industry contribution.
7. The Working Group J1 Chairman requests to the J Subcommittee Chairman and Subcommittee that the Working Group be disbanded with the completion of the report and its assignment.

**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 is published on the PSRC website. Dale Finney has formatted the report into an IEEE-PES format for publication as a Transactions paper. Some additional editing of the figures is to be done before further proceeding with approvals and publication. Mike Reichard will contact Dale Finney regarding progress on the Transaction paper.

**J3: Power Plant and Transmission System Protection Coordination**

**Chair: Phil Waudby**  
**Vice Chair: Sungsoo Kim**  
**Established: 2010**  
**Output: TBD**  
**Expected Completion: TBD**  
**Status: 7th Meeting**

**Assignment:** [Proposed] The J3 Working Group is to provide a report containing recommendations to the J Subcommittee on coordination issues and other relevant matters gleaned from the NERC Technical Reference Document - Power Plant and Transmission System Protection Coordination to be used as a feeder material and technical additions for consideration in the next revisions of C37.101, C37.102, and C37.106. The WG will also provide an on-going interface with NERC for Technical Matters Pertaining to Generator and Power Plant Protection.

The seventh Working Group meeting was held on May 15, 2012 with 10 members and 21 guests in a single session.

Since the January 2012 meeting, the WG had balloted and approved the report, receiving 15 Approved, 9 Approved with Comments and no Disapproved votes. The 75% approval requirement was met for this ballot.

Changes were made to the report and the J Subcommittee was balloted, receiving 22 Approved, 2 Approved with Comments and 1 Disapprove votes. The 75% approval requirement was met for this ballot.

At this meeting, the WG discussed the Subcommittee comments and made modifications to the report. The report will be forwarded to the PSRC officers for their comments and approval.

Depending upon the officers' comments, the WG may require a single session for 40 people at the September meeting. A projector would be needed.

Once the report is approved, a cover letter will be drafted and it will be transmitted from the PSRC Officers to NERC.

**J5: Application of Out-of-Step Protection Schemes for Generators**

**Chair: Sudhir Thakur**  
**Vice Chair: Mukesh Nagpal**  
**Established: 2011**  
**Output: Report**  
**Expected Completion: TBD**  
**Status: Third Meeting**

**Assignment:** Produce a summary and full report to the "J" Subcommittee explaining the various schemes and setting guidelines in use for Out-of-Step protection for AC generators. The report (summary) should be in the format that could be used as feeder material into the next revision of C37.102-IEEE Guide for AC Generator Protection.

1. The WG meeting was held on 14 May 2012 with 16 members and 20 guests. Mani Sankaran became a new member of the WG. The minutes of the January 10 meeting were approved by WG. More than 50% of the members were present and the quorum was met.
2. The meeting was mostly devoted to the discussion on single binder scheme. All discussion items were recorded on the draft contribution. Steve Turner, who is author of this section, will go through these items and resubmit the revised draft for the next meeting. Some other assignments were made.
3. It is requested that the schedule conflict between J5 and K4 meetings be avoided. It will allow M. Nagpal who is Vice Chair of J5 and Chair of K4 to attend both meetings.

**J6: Protection issues Related to Pumped Storage Hydro Units**

**Chair: Joe Uchiyama**  
**Vice Chair: TBD**  
**Established: 2009**  
**Output: Transactions Paper**  
**Expected Completion: TBD**  
**Status: Seventh 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 WG met in New Orleans, LA on May 15, 2012 with five (5) members and eight (8) guests.

1. Members introduced themselves to one another.
2. Joe Uchiyama welcomed this WG and briefly explained the purpose and goal of this WG product. He distributed meeting agenda. Also, he mentioned Dale Finney volunteered to become the Vice Chairman.
3. Chairman stated to review the consolidate Survey Form which was balloted by J-subcommittee members. We met the Quorum with 85% responses.(Approved with comment-10). Entire session was devoted to the discussion of those comments. All comments were resolved except for one. Chairman has to ask a question to Phil Waudby to resolve the comment.
4. The final document will be submitted to PSRC Officers for "Permission for Survey."

As soon as the survey questionnaire is updated, Chairman will distribute the document to J6 WG.

#### **J7: Considerations for "AURORA" Protection**

**Chair: Mike Reichard**

**Established: 2011**

**Output: Report to Subcommittee**

**Expected Completion: 2014**

**Status: Second Meeting**

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

1. The WG met on Tuesday, May 15, 2012 with 13 members and 25 guests.
2. The January 10, 2012 J7 WG meeting minutes were adopted.
3. Steve Conrad volunteered to become the vice chairman of the WG.
4. Tim Roxy (ES-ISAC) will be invited to attend the September WG meeting. Phil Tatro will act as liaison to ES-ISAC.
5. Discussion focused on the ability to achieve the 0.5 pu power exchange between system and machines and how this could realistically be accomplished.
6. Gene Henneberg indicated he had done some evaluations and would like to discuss the findings at the upcoming September meeting.
7. The chair asked for contributors for writing assignments for the following topics:
  - a. HMDs pros and cons and GA Tech paper - Mozina
  - b. Blocking Timers - Poduraru
  - c. High-speed sync check- Henneberg
  - d. Synchrophasors-Reichard
  - e. System stiffness—is the system strong enough to cause damage - Henneberg
  - f. Can out-of-step closing currents be calculated and detected- Bukhala
  - g. Do the equipment owner's schemes respond to block wide angles-TBD
  - h. Do the machines lockout on load rejection (tripping)-TBD
  - i. DG/generator control systems-Bukhala

Assignments are due back to the chair before August 1, 2012.

#### **J9: Motor Bus Transfer**

**Chair: Jon Gardell**

**Vice Chair: Dale Fredrickson**

**Established: 2006**

**Output: Working group report**

**Expected Completion: 2011**

**Status: Draft 5.0**

**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.

1. The Working Group did not meet during this PSRC Committee meeting.
2. The Working Group has completed its assignment with the approval of the report by the IEEE PSRC Officers.

3. The report will be submitted to Russ Patterson for posting on the IEEE PSRC Website on the J Subcommittee reports page.
4. A final copy of the report will be sent to all Working Group J9 and J Subcommittee members.
5. The J9 Working Group J9 Chairman would like to thank all contributors and participants for helping to produce this significant industry contribution on the Motor Bus Transfer application.
6. The Working Group J9 Chairman requests to the J Subcommittee Chairman and Subcommittee that the Working Group be disbanded with the completion of the report and its assignment.

**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: 2012**

**Status: Draft 10.0**

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

The meeting was attended with 13 members and 5 guests. After the introductions, the Patent Slides were shown.

The Garden Grove meeting minutes was approved with a quorum.

The chair gave a status of the work accomplished. The IEEE editorial comments were resolved and draft 10 was ready for sponsor ballot-that was emailed to all WG members on 5/15. The sponsor ballot pool would be completed by May 16<sup>th</sup>. Once permission was received from the main committee the ballot process could start. To meet the current PAR completion 2012, the final recirculation ballots (after addressing sponsor ballot comments) would need to be completed by October to meet the last IEEE Revcom meeting of November.

Next meeting at Portland, and will need a triple session to potentially address sponsor ballot comments. We are in draft D10.

**Other Reports:**

**C17: Fault current contribution from wind farm plants**

Report given by Gene Henneberg. Continued progress reviewing Wind Farm faults and the resulting sequence currents. Fault interrupting equipment required to interrupt faults with no current zero crossing.

**Liaison Reports**

**Electric Machinery Committee (EMC)**

**C. J. Mozina**

The Committee met at PES General Meeting in Detroit--- July 24-29, 2011. The minutes for this meeting are not as yet posted on the EMC web site. The minutes of the 2010 meeting were recently posted on the EMC web site

Nothing new to report.

**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**

Nothing new to report.

**NERC (related to rotating machinery)**

**J. Uchiyama**

**SPCS met in April 24~26, 2011 at Phoenix, AZ (APS Hosted)**

1. **PRC-027** which is separated from PRC-001 (Too many subjects were involved in the original PRC-001 such as Personnel Training, Operations, etc.) - PRC-027 is concentrated into Protective Coordination, only.
2. **PRC-025 (Generator Relay Loadability)** which is finalized the last version of draft. The loadability is based on  $P+j1.5Q$  at the rated power factor (rated power generation= $P+jQ$ ).
3. **PRC-005-1** (Maintenance & Testing)



4. **PRC-005-2** (this was a part of FERC order 758, **including non-electrical/auxiliary relays** such as Reclosing & Sudden Pressure Relays)
    - Minimum Maintenance/Testing versus Maximum Maintenance Interval
    - Non-industry standards
    - Some utilities use as a part of the redundancy of differential relay
    - Faster than differential relay
    - A failure mode of 1979 incident
    - If a device is not initiating a trip, the device should not be listed.
    - Devices providing a protection against a fault(s) only
    - Definition of the protection system by NERC glossary
  5. **Report Form of Protection System Misoperations** – Misoperation Report Template was developed with all Regional Representative and Consolidated Report Form (Generator is included)
  6. **SPS/RAS** – Consolidated All Regional SPS/RAS to the Templates.
- Next meeting will be on **June 26-28, 2012 at San Francisco, CA** (PGE hosts)

**Coordination Reports**

None

**Old Business**

The reaffirmation ballot period for C37.101 Guide for Generator Ground Protection has closed. The standard received 98% approval but has two negative ballots. The negative ballot comments are being reviewed.

The reaffirmation ballot for C37.102 Guide for AC Generator protection has been started.

M. Thompson gave the following summary of the occurrences in which the J8 Tutorial was given:

The Tutorial on the Protection of Synchronous Generators has been presented at the following venues since being completed.

Date	Event	Location	Instructors	Attendees
9/2010	IAS, PCIC	San Antonio, TX	C. Mozina M. Thompson	≈80
6/2011	IAS, PPIC	Nashville, TN	C. Mozina M. Thompson	≈12
12/2011	PowerGEN	Las Vegas, NV	Z. Bukhala J. Johnson C. Ruckman	8
1/2012	PES, JTCM, 2012	Garden Grove, CA	C. Mozina S. Thakur T. Wiedman P. Kerrigan J. Gers S. Kim	≈75
3/2012	Washington State Hands On Relay School	Pullman, WA	C. Mozina M. Thompson	≈20
4/2012	Texas A&M University Conference for Protective Relay Engineers	College Station, TX	C. Mozina M. Thompson	50
5/2012	PES, T&D Show	Orlando, FL	W. Hartmann C. Mozina M. Thompson	26

**New Business**

**No new business**

**The meeting was adjourned**

**K: SUBSTATION PROTECTION SUBCOMMITTEE**

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

The K-Subcommittee met on Wednesday, May 16, 2012 in New Orleans, LA, with 19 members and 12 guests in attendance. A quorum was achieved to approve the minutes of the January 2012 subcommittee meeting.

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

#### **K1: GUIDE FOR THE APPLICATION OF PROTECTIVE RELAYING FOR PHASE SHIFTING TRANSFORMERS.**

**Chair: Arvind Chaudhary**  
**Vice Chair: Lubomir Sevov**  
**Established: Sept. 2011**  
**Output: Guide for the Application of Protective Relaying for Phase Shifting Transformers**  
**Expected Completion Date: Sept.2015**

**Assignment: To write a guide for the application of Protective Relaying for Phase Shifting Transformers (PSTs). The protection methods for different types of PST and operating conditions of PSTs will be reviewed. Representation of PST models to determine short circuit currents for relaying considerations will be considered. Protection CT sizing and location issues will be considered. Relay application and setting examples will be provided.**

The K1 working group met in a double session. Vice Chair, Lubomir Sevov ran the meeting because the chair was not present. Michael Thompson took the minutes of the meetings. There were 10 members in the first session and 9 members in the second session. There were 10 guests. Several guests signed up as members during the meetings. A call for quorum was made in the beginning of the second session with approval of the minutes from the January meeting.

During the first session, Eli Pajuelo did a presentation on the modeling and analysis on a 600MVA conventional two-core PST installed in Alberta, Canada. The presentation covered EMTP and 3D Finite Element Analysis (FEA). Several types of faults were examined and the expected response of the protective relays analyzed. The FEA analysis was used to understand problems with proximity effect for the CTs buried inside the PST tank. The presentation generated a lot of good discussion during the meeting.

Erin Spiewak of IEEE gave an update on the NESCOC recommendations on the PAR scope. The scope has been revised by Phil Winston and the WG Chair and will be considered at the next NESCOC meeting in June. The revised scope was briefly discussed and approved by the members present.

The second session started with a call for quorum. Quorum was achieved and the minutes from the January K1 meeting were approved. A typo mistake for the year on establishing the K1 group was found and corrected.

Michael Thompson made a presentation to the working group on the extended delta (single core) PST configuration. The presentation included definition of the configuration, discussion on the short circuit impedance characteristics, and various protection schemes that can be applied. The presentation included a patented method for PST protection that can be applied to PSTs of any configuration—including the subject extended delta PST.

Dean Miller made a presentation to the working group on the types of PSTs covered by C57.135. There are four PST types identified in this document. He also noted that the document includes protection recommendations that should be outside the scope of the transformer's committee. The names of the PST types covered by C57.135 were identified so that the working group could attempt to use consistent terminology in our guide.

It was also noted during the discussion that there are four variations of PSTs identified in CIGRE papers that were provided to the working group at the last meeting by Eli Pajuelo. Three of the configurations were determined to be variations on the conventional two core design. The fourth configuration works by injecting a 120° voltage instead of a quadrature voltage to affect the phase shift. It was determined that these variations can be mentioned in an informative annex. But, that the body of our guide would stick to the types covered by C57.135.

Finally, the outline of the guide was briefly discussed. No changes were made to the proposed outline and no writing assignments were made due to running out of time. Also, there were no assignments made for presentations on the delta/hex and the conventional two core PST protection practices and short circuit characteristics for the next meeting.

The presentations will be made available to working group members via the MENTOR web site. This system is undergoing some changes; so, they will not be set up and posted until the changes are complete in a few months.

**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: 2010.**

**Output: Papers – 1. Full Paper Report to the Sub Committee and Main Committee, and 2. Summary Transactions Paper**

**Draft 4.3; Transactions Summary paper 0**

**Expected Completion date: 2013**

**Assignment: To prepare a paper or a report on protection methods that reduce outage durations in substations with auto-restoration and communication techniques.**

Meeting was called to order May 15, 2012 with 4 members and 5 guests

Introductions were done and previous minutes were discussed.

We reviewed draft-4.3 of the paper, and made additional changes and writing assignments.

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

**Chairman: Mukesh Nagpal**

**Vice Chair: Chuck Mozina**

**Established: 2008**

**Output: Guide Revision**

**Draft 6**

**Expected Completion Date: 2012**

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

The working group met in a split double session on Monday and Tuesday May 14 & 15. A total of 7 members and 11 guests were present. A quorum was not present which has been a frequent occurrence. The chair discussed with the WG members removing members from the WG who are not active and have not contributed to the document to decrease the size of the WG so that a quorum could be more easily reached at future meetings. The WG group members agreed that the chair should proceed to notify inactive WG members that they will be drop from WG membership unless they plan to contribute at future meetings. The Chair will also review the date of the PAR to determine if a PAR extension is required.

*Review of progress on passed assignment.*

Figures 1-9 – Steve Conrad provided Visio drawings for Fig. 1-9 and incorporated changes discussed at the Jan. '12 meeting concerning "Point of Interconnection". All drawings in the document have been re-drawn in the Visio format.

Figure 12b -- Chuck Mozina removed 51N relay as discussed at the Jan.'12 meeting.

Figure 15&17 -- Chuck Mozina revised the drawings to add transfer trip protection to these interconnection examples.

New Draft -- The Chairman incorporated the above changes as well as those discussed at the Jan. '12 meeting in a new Draft 8 of the standard.

The bulk of the WG meetings were devoted to reviewing the changes to figures and reviewing word changes in the text of Draft 8 of the standard. Major changes included:

- The breaker by-pass switches shown in Figure 3 will be modified and a brief text statement on mobile substation use was added to the document.
- It was agreed that the term "low voltage transformer breaker" will be used throughout the document to describe the secondary transformer breaker at consumer installations.
- Circuit breakers in Figure 11 will be numbered (52-1, 2, 3) and referred to in the text by number to better explain consumer generation separation options.
- The "SEE TEXT" note will be removed for drawings in Figures 7, 8 & 9??
- The breaker disconnects shown in Figure 10 will be removed to be consistent with other drawings in the document.

- In Section 8.3.4 text was add to discuss the need to use a breaker 51a contact in the breaker failure scheme so that breaker failures for ground faults on the transmission system can be detected since no fault current will flow due to the consumer transformer delta primary winding.
- In Section 8.4.2 the text description of the use of lockout relays need to be revised. Also the term “lockout relay” needs to be added to the Definition Section of the document.
- The Definition Section of the document (Section 1.3) was reviewed and changes made to a number of definitions.

Assignments:

The Chair will provide Draft 8.2 of the document which reflects changes made during the WG meeting to key WG members.

- Steve Conrad agreed to be responsible for changes to the drawings in the document.
- Ken Behrendt agreed to review the entire document for consistence and to address the issues in Section 8.4.2&3 discussed above.
- Roger Whittaker from the Terminology Usage Review WG agreed to review Definition and Bibliography Section of the document.

These reviews are due to the chairman by July 31.

**K5: (PC 37.119.2005): IEEE Guide for Breaker Failure Protection of Power Circuit Breakers**

**Chairman: Roger Whittaker**

**Vice Chair: Adi Mulawarman**

**Established: 2012**

**Output: Revised C37.119-2005 – IEEE Guide for Breaker Failure Protection of Power Circuit Breakers**

**Draft : 1.0**

**Expected Completion Date: To Be Determined.**

**Assignment: To revise and update C37.119-2005 – IEEE Guide for Breaker Failure Protection of Power Circuit Breakers.**

The working group met on Wednesday, May 16th 2012. We had 35 attendees with 17 members and 18 guests present. The working group has 33 members so far.

The chair of the WG reported that the PAR has been approved.

The WG members discussed the next action plan. We will be reviewing other related papers, guides or standards to make sure we are not overlapping. We agreed that this guide should be comprehensive.

We reviewed possible new sections/topics and discussed some of the comments received during reaffirmation process. We decided to include a clause to describe the failure to close a generator breaker. Other new sections will include BFP of series breakers and also a section describing breaker differential.

It was decided that when revising section 6 Breaker Failure Modes, some monitoring functions may be described only in general in that they exist but details will not be provided. These might include ability of a breaker failure relay to measure and alarm for loss of pressure, slow operation, and re-ignition or re-striking.

A flashover scheme was discussed. Some mentioned that the primary protection would detect and clear this fault. Others note that some breaker failure relays have this scheme included.

It was mentioned that adding descriptions of these new schemes might cause the guide to violate the scope. Erin mentioned that the scope can be modified. Several mentioned that we are likely OK with the existing scope statement. The group decided to wait for now until the assignments are completed to re-evaluate if the scope is still appropriate.

We will be adding a few drawings to clarify some redundancy methods. These drawings will show how breaker failure protection can be applied to a breaker that serves a circuit element that is protected by redundant primary systems in a way that maintains electrical isolation and physical separation of the primary systems. Both for legacy electromechanical type systems where there might be only one relay output contact, and also for modern microprocessor based systems. These drawings will show the DC distribution ACB(s), the two trip coils, main 1 and main 2 relay contact outputs, breaker failure initiate measuring element, breaker failure retrip, and 86 relay.

A word document version of the existing standard has been posted in the Mentor website. It is available for member of the Working Group. We agreed to continue to post the documents to the mentor site for access. For those

reviewers that do not have access, the vice-chair will Email to them copies of the document. These copies and also the posted copy will have “track changes” feature enabled.

Several new members agreed to review sections. The chair asks that assignments be completed by the January 2013 meeting.

At the next PSRC meeting the group request 1 session, room for 40 people, and overhead projector.

Summary of scope/purpose.

**Scope:** This guide describes methods to protect a power system from faults that are not cleared because of failure of a power circuit breaker to operate or interrupt when called upon. The discussion is limited to those instances where the breaker does not clear the fault after a protective relay has issued a command to open (trip) the circuit. Failure to close and failure while closed are not discussed. The intent of this guide is not to give the reader methods of protecting a power circuit breaker from failing; rather, it is to give the reader a guide in how to detect that a breaker has failed to clear a fault, and how to electrically isolate the fault after the breaker has failed to clear the fault.

Also covered are recent practices which take advantage of new technologies.

**Purpose:** This guide is intended to help the relay engineer understand the application considerations when applying breaker failure protection (BFP) to power circuit breakers.

**K6: SUDDEN PRESSURE PROTECTION FOR TRANSFORMERS**

**Chair: Randy Crellin**

**Vice Chair: Don Lukach**

**Established: May 2005**

**Output: Report**

**Expected Completion Date: January 2013**

**Draft 6.0**

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

The working group met on Wednesday morning, May 16th, in a single session with 7 members and 11 guests. The working group currently has 14 members.

The meeting notes from the January 2012 meeting held in Garden Grove, CA were distributed and approved without modification.

After introductions and a brief discussion of the working group's progress, the working group reviewed the following writing assignments to incorporate specific portions of the survey result into the report:

- SPR Application – Charlie Sufana
- SPR Trip/Alarm – Pat Carroll
- SPR Types – Rafael Garcia
- SPR Operation – Greg Sessler
- SPR Testing and Maintenance – Don Ware

The current plan is to incorporate the above writing assignments into a new draft of the report, move the “History of Transformer Pressure Relay Applications” and the “Secondary Pressure Chamber Issues” sections to Appendix A, and move the entire detailed survey results to Appendix B. These changes will be completed by mid-August and the new draft emailed to the working group prior to the September meeting for review.

Phil Winston, Phil Tatro, and Jon Sykes, who are on the NERC SPC Subcommittee, attended the K6 working group meeting. They are working on Order 758, which addresses including SPR devices to the maintenance and testing requirements. Phil asked permission to use or reference the K6 survey data and the working group approved. He also asked the working group to be involved with reviewing their work and providing comments.

There was additional general discussion related to negative sequence differential relaying, SPR field testing, and the use of SPR devices in seismic areas.

**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 ??**

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

The Working group, K8 did not meet this time. Draft 6 was balloted and the comments are under resolution. It is expected to go out for recirculation with updated draft 7 by the end of May.

**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.**

Working group K10 met on Wednesday, May 16, 2012 in New Orleans, LA with 6 members and 5 guests in attendance. IEEE/1547.x working group activities were reviewed.

IEEE P1547.7 "Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection" is at draft 6.2. The ".7" writing teams met this week 5-14 and 15 in Piscataway NJ and the result of this work will be posted to the SCC21 web site as draft 7.0 by 6-16-12. Comments on 7.0 should be returned to Bob Saint by 7-23-12 and will be discussed at the Aug 1547 meeting.

IEEE P1547.8 "Recommended Practice for Establishing Methods and Procedures that Provide Supplemental Support for Implementation Strategies for Expanded Use of IEEE Standard 1547" is ongoing. I am involved with the committee working on Protective Relaying Best Practices which is presently planned to appear in Appendix C of the final document. There has been much activity by email and web conferences. ".8" will also meet at the Aug 1547 meeting.

There is an IEEE-SCC 1547 Workshop being held in Piscataway NJ 5-17 and 18 this week to begin outlining recommended changes to the Intertie Standard, IEEE 1547-2003, reaffirmed 2008. There will be more to come on this over the next few months.

The floor was opened to members and guests for discussion of wind, solar, and battery storage facilities/jobs going on in their areas. There was an excellent exchange from our guests and members. If anyone needs a password for .7 or .8 working groups please send me an email or give me your business card.

The next 1547 meeting is in San Francisco the week of 8-20-12.

**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:**

IAS Arc Flash - Chuck Mozina reported that new research is going on to better quantify fault energy incidence energy calculations. The research is being funded by various switch gear manufacturers.

**Old Business:**

C37.109, IEEE Guide for the Protection of Shunt Reactors has been reaffirmed.

**New Business:**

None.

**General Discussion:**

Mukesh Nagpal reported on an incident that occurred at GMS generating station on the BC Hydro system. There are three parallel lines connecting GMS to the BES. A testing error opened one of the lines. A breaker failed to clear on one phase resulting in a two pole open/one pole closed condition. This set up a resonant circuit between the line capacitance and the line reactors which caused overvoltage which caused a number of arresters to fail.

Sudhir Thakur reported on an incident at Byron Nuclear Generating Station where a section of 345kV bus open circuited the station service transformer. No protection detected the unbalance. Operators eventually switched out the bad source. This incident has prompted an industry wide review of protection for this type event.

**VII. PRESENTATIONS:**

Our meeting was enhanced with the following presentations:

IEEE Fellows – Charlie Henville

Applying the IEEE C37.238 Standard to Power System Applications – Galina Antonova & Christoph Brunner

NERC San Diego area blackout presentation – Phil Tatro and Eric Allen

**VIII. At 11:55 am the meeting was adjourned by Chairperson Bob Pettigrew**