POWER SYSTEM RELAYING COMMITTEE
OF THE IEEE POWER and ENERGY SOCIETY
MINUTES OF THE MEETING –Final-Approved
May 16, 2013
Baltimore, MD

I. Call to order / Introductions Roger Hedding

Chairman Roger Hedding called the meeting to order at 8:00 am
After introductions, a quorum was verified and Main Committee Attendance sheet was routed.

II. Approval of Minutes & Financial Report Pratap Mysore

Minutes of the January meeting in Memphis was approved. Power Grid LLC was recognized for their sponsorship of a coffee break.

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Chairman's Report Roger Hedding

I'm sad to report that one of our longtime members, mentors, and past chair, Jack Chadwick passed away this month. His presence at this meeting will be missed. Our prayers go out to his family. A donation was made to his church on behalf of Jack.

Matt Ceglia, IEEE- Standards Association Smart Grid Standards Coordinator, who has been attending our meetings and assisting our standards development for several years has informed us this will be his last meeting. He's on to bigger and better things. He leaves us in the capable hands of Erin Spiewak. Good luck Matt.

Mark Simon will no longer be attending our meetings as he has retired. We wish Mark a long and well deserved retirement.

Sorry for the stress the Tremont Plaza Suites has caused you during this meeting. When the hotel was booked over two years ago there was no mention of remodeling or switching to an Embassy Suites Hotel. The hotel has set up an international coffee bazaar during our morning break today as a token for the problems we've encountered. Thanks to Power Grid for sponsoring one of the coffee breaks.
22 newcomers attended the newcomer session Tuesday morning. This is a record number of attendees. Thanks to the new attendees. Hope to see you back next time in Albuquerque.

Damir Novosel, one of our PSRC members is running for PES President Elect in the upcoming PES elections. His term will commence in 2014. Please support him. He understands the importance of Technical Committees, and specifically, PSRC. Hopefully, he'll remember us if elected.
Our reorganization initiative to change our name and scope to include Protection and Automation is on hold pending a Technical Committee Task Force Report that is looking into the entire PES Technical Committee organization. In light of what we are being asked to assimilate into our committee, I'll resurrect the idea at the Technical Council meeting at the July General Meeting.

III. Reports of Interest

A. Technical Paper Coordinator's Report – Mike McDonald

2013 General Meeting – July 21-25, 2013 Vancouver, BC, CA

There were initially a total of 69 papers submitted for the 2013 General Meeting – six more were transferred to us on Tuesday January 15th. Of those papers, 6 were transaction papers, and 6 were for a panel session. 63 papers need to be reviewed. Once again the response to the request for review was overwhelming. At least three reviewers are assigned to each paper. In order to meet the final acceptance date of February 28th, the initial reviews must be completed by mid January to allow for rewriting. So, please get those reviews completed.

This year we are co-hosting a panel session with Power systems Dynamic Performance and Power System Instrumentation and Measurements subcommittees. The following presentations are planned:

IEEE Std C37.242 – Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units - Farnoosh Rahmatian

PC37.118.2 IEEE Standard for Synchrophasor Data Transfer in Power Systems - Vasudev Ghapure

PC37.118.2 Standard for Synchrophasor Measurements for Power Systems - Ken Martin

History of Phasor Measurement Unit development and emerging Wide Area Measurement Systems - Arun Phadke

Real-Time Data Mediation for Synchrophasor Application Development Compliant with IEEE C37.118.2 - Luigi VanFretti

PC37.244 Guide for Phasor Data Concentrator Requirements for Power System Protection, Control, and Monitoring - Galina Antonova

In addition, one of the Super Sessions " Innovation and Advancements in protection, Control, and Automation for Evolving Power Systems " will be chaired by one of our own, Charlie Henville. Charlie has been busy gathering papers for presentation at this session.

Future Meetings

Jan. 2014	JTCM Jan 12-16, New Orleans Marriott,
May 11-15, 2014	Hyatt at Pier 66 Fort Lauderdale
Sept. 8–11, 2014	Pfister Hotel - Milwaukee, WI

Futures places and dates are under development.

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B. CIGRE B5 Activities Report - Adamiak

The 2013 B5 Colloquium will be in Belo Horizonte, Brazil from August 25-31. The Preferential Subjects that will be discussed are:

1. Acceptance, Commissioning, and Field Testing for Protection and Automation Systems
2. Experience and Prospective of Protections and Automation connected to Non-conventional Instrument Transformers
3. Protection, monitoring and Control of Shunt Reactors and Special Transformers

Details of the meeting (including the conference hotel) can be found at: http://b5.cigre.org/Events/Cigre-Events

The 2nd Annual US CIGRE/EPRI-sponsored Grid of the Future Symposium will be held in Boston, MA from October 20-22, 2013. The Symposium will be hosted by National Grid. The theme will be "Technical Solutions to Regulatory Challenges". This is an opportunity to discuss everything from Smart Grid Deployments, Integration of Renewables in the Power System, to how to deal with new NERC requirements, issues with new protection and cyber technologies. The Call for Papers can be found at:

http://cigre-usnc.tamu.edu/meetings/grid/documents/CIGRE-EPRI%20Grid%20of%20the%20Future%20Symposium%20Call%20for%20Papers-2013.pdf

Full papers are due by July 19, 2013. The conference has reserved space for smart grid tutorials and panel sessions. If you are interested in organizing a tutorial or session, please contact John McDonald, Technical Program Chair at: johnd.mcdonald@ge.com

Make plans now for the CIGRE 2014 - August 24-30 in Paris! The B5 preferential subjects to be discussed are:

- IEC 61850 Clarify expectations between Users and Vendors
- New Protection schemes based on communication of information

For more information, check out the "new" CIGRE B5 webpage:
www.b5.cigre.org

C. IAS Power System Protection Committee - Mozina

Color Book Reorganization Progress – The IAS Industrial & Commercial Power System Dept. — I&CPS (responsible of the IAS color books) met on May 1-3, 2013 at the I&CPS Conference in Stone Mountain, GA. At this meeting Tom Farr presented a summary paper that was produced by the PSRC J-1 WG on the protection of adjustable speed drive motors. The paper was very well received.

This group is updating and converting the color book series into individual IEEE standards. The major item of interest for the PSRC is the Buff Book (Protection and Coordination of Industrial and Commercial Power Systems). Some progress is being made with five of the 13 standards being submitted for IEEE standards balloting. The Buff Book standards are numbered 3004.1 through 3004.13 if you want to be part of the balloting body.

I have been active in making sure that IAS WGs groups are aware of our C37 standard in the areas such as generator, transformer, motor and consumer interconnection protection which are also addressed by IAS 3004 standards.

Arc Flash – The IAS is the home of IEEE standard 1584, a key Arc Flash standard. The WG that is updating this standard met at the IAS Safety Workshop Mar. 11-15, 2013 in Dallas, TX. Lab tests are being conducted to refine the standard. The findings to date center around the impact of incident energy caused by the geometry around the enclosure where the arc flash has occurred. Other factors being addressed are heat and thermal effects, blast pressure, sound, toxicity and electromagnetic radiation. A joint collaborative research project has been formed with NFPA (National Fire Protection Association) to coordinate the research. The research is being funding by a number of industry companies which include switchgear manufactures, UL, consultant firms, companies that sell software to calculate arc flash energy as well as a few utilities.

The IAS has recognized the important role they are play in issues related to electrical safety and have elevated the Safety Subcommittee within the Petro-Chem Committee of the IAS (PCIC) to full Committee status. There annual meeting is at the Safety Workshop.

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 US National Committee TAG has one voting document at this time:

- 60255-149 – Thermal electrical relays - FDIS – developed by MT4 headed by PSRC colleague Dr. Murty Yalla. It's an excellent document on thermal protection of apparatus, with detailed models and relay design tests, plus tutorial annexes on thermal modeling and protection for your education. We plan a positive vote.

- IEC TC 95 has already successfully voted 60255-3 Edition 3, EMC requirements for relays. We have voted negatively based on what we view as weaknesses in RFI immunity testing, to no avail, so we still recommend that users add more thorough IEEE RFI tests in C37.90.2 and 1613.1 to test programs.
- IEC TC 95 has also successfully voted 60255-24, COMTRADE, which through back channel negotiations is identical to IEEE C37.111 COMTRADE. Congratulations to the PSRC H4 WG.

MT4 under Murty Yalla continues its development of three functional standards (60255-187-1, -2, -3) for differential relays in a variety of applications as described in prior IEC reports.

TC 95 has established an Ad Hoc WG to investigate the need for new measuring relay standards driven by Smart Grid applications (DER on distribution, etc.). We asked last time for US experts who would like to participate, and got inquiries but no volunteers. Dr. Murty Yalla, who is already traveling to the IEC meetings, is joining the WG, but we would like some US utility participation. We can still propose members. If you work in this area or want to influence the direction of international standards development that could impact your business, please contact Eric Udren right away.

TC 57, Power systems management and associated information exchange
See TC 57 Liaison Report at the end of Subcommittee H minutes for new developments in IEC 61850 and related standards from WG 10, 17, 18, and 19.

E. Standard Coordinators Report – Phil Winston

The status of standards activities that have taken place since the January 2013, meeting of the PSRC are as follows:

RevCom Activity:
Standards Approved

C37.111-2013	Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems
C37.236-2013	Guide for Power System Protective Relay Applications over Digital Communication Channels
C37.242-2013	Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMU) for Power System Protection and Control
C37.244- 2013	Guide for Phasor Data Concentrator Requirements for Power System Protection, Control, and Monitoring

Ballot Activity:

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

PC37.98	Standard Seismic Testing of Relays
PC37.240	Standard for Cyber Security Requirements for Substation Automation, Protection and Control Systems

NesCom Activity:
PARS approved

PC37.118.1a	Amendment- Standard for Synchrophasor Measurements for Power Systems
PC37.246	Guide for Protection Systems of Transmission to Generation Interconnections

PAR Extensions approved)

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

PARS expiring at the end of 2013

PC37.95	Guide for Protective Relaying of Utility-Consumer Interconnections
PC37.98	Standard Seismic Testing of Relays
PC57.13.3	Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

PARS expiring at the end of 2014

PC37.114	Guide for Determining Fault Location on AC Transmission and Distribution Lines
PC37.240	Reserved for Standard for Cyber Security Requirements for Substation Automation, Protection and Control Systems
PC37.243	Guide for Application of Digital Line Current Differential Relays Using Digital Communications

PAR/Standard Submittal Deadlines & Standards Board Meeting Schedule:

Submittal Deadline	**Meeting Date**
July12, 2013	August 22, 2013
October 21, 2013	December 10, 2013

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

Chair: C. Preuss
Vice Chair: Vacant
Secretary: Vacant

No report

G. NERC Report – Phil Tatro

1. System Protection and Control Subcommittee (SPCS) Activities

   a. Order 754: The Section 1600 Request for Data or Information associated with FERC Order No. 754 is in progress. Data for buses operated at 300 kV and higher is due October 2. NERC is developing a data entry system and will schedule a webinar to familiarize entities with the system.

      The interpretation of TPL-003 and TPL-004, clarifying the extent to which the planning standards require assessment of protection system single-points-of-failure, was adopted by the NERC Board of Trustees on February 7, 2013 and filed with FERC on April 12, 2013.

   b. Order 758: The SPCS is working on a report recommending minimum maintenance activities and maximum intervals for sudden pressure relays in response to FERC Order No. 758. The SPCS is consulting with the PSRC K6 Working Group, IEEE Transformer Committee, and North American Transmission Forum.

   c. Special Protection Systems (SPS): The NERC Planning Committee (PC) approved the SPCS and System Analysis and Modeling Subcommittee (SAMS) report assessing of the definition of SPS, SPS-related protection and control (PRC) standards, and existing regional practices related to SPS. The report will serve as a reference document for a standard drafting team that will be assigned to review the definition and standards.

   d. Protection System Commissioning: The NERC PC approved a SPCS report recommending actions to reduce protection system misoperations through improved commissioning practices. The report recommends, as an alternative to a standard, a series of reactive and proactive activities related to analysis of misoperations, sharing of lessons learned, and development of an industry reference document on protection system commissioning practices.

2. Standards Activities

   a. Protection System Maintenance and Testing: A draft of PRC-005-3 was posted for a 30-day formal comment period through May 6, 2013. The draft standard identifies applicability to specific autoreclosing applications, and establishes minimum maintenance activities and maximum intervals similar to protective relays. Proposed modifications are based on the SPCS

and SAMS report on considerations for maintenance and testing of autoreclosing relays in response to FERC Order No. 758.

b. Protection System Misoperations: A successive ballot concluded on February 20, 2013. The draft standard achieved a weighted-segment approval of 50.52%. The drafting team is responding to comments and revising the standard where they deem appropriate.

c. System Protection Coordination: The drafting team is responding to stakeholder comments from the posting and successive ballot of PRC-027-1 that ended December 17. The standard achieved a weighted segment approval of 33.23%.

d. Generator Relay Loadability: Draft 3 of the proposed PRC-025-1 is posted for a 30-day formal comment period through May 24, 2013 with a successive ballot in the last 10 days of the comment period. Draft 2 of PRC-023-3 is concurrently posted for a 30-day formal comment period. Revisions proposed in PRC-023-3 are necessary to assure there are no gaps or overlap between the transmission relay loadability and generator relay loadability standards.

e. Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection: PRC-019-1 was adopted by the NERC Board of Trustees on February 7, 2013 and is awaiting filing with regulatory authorities.

f. Generator Performance During Frequency and Voltage Excursions: PRC-024-1 was adopted by the NERC Board of Trustees on May 9, 2013 and is awaiting filing with regulatory authorities.

3. Other Protection System Activities

a. Protection System Misoperations: The PC approved the Protection System Misoperation Task Force report on April 8, 2013. The report includes analysis of relay misoperation data, discussion of root causes, and suggestions for improvement to reduce future relay misoperations. Since many entities already perform one or more of the identified activities, entities should consider these suggestions for improvement based on their particular circumstances.

IV. ADVISORY COMMITTEE REPORTS

Chair: Roger Hedding
Vice Chair: Mike McDonald

B1: Awards and Technical Paper Recognition

Chair: Oscar Bolado
Vice Chair: Solveig Ward

The B1 Working Group met on May 14th, 2013 in Memphis, TN, with 6 of its 7 members present. Membership for the working group consists on the Vice-chairs of the PSRC subcommittees.

The minutes of the last meeting were reviewed and approved.

Twelve (12) certificates for disbanded WG have been requested to IEEE PES. Requests for certificates is up to date up to January 2013.

Certificates presented at the May PSRC Main Committee Meeting:

PSRC Special Recognition – Mal Swanson - In recognition of his Dedicated and Enthusiastic Service in numerous ongoing activities promoting the Power System Relaying Committee

2013 Honorary Members – John Appleyard, Al Darlington, George Nail - In recognition of their Steadfast Dedication to the Power System Relaying Committee

PSRC Certificate of Appreciation – Mark Simon - In recognition of his Valuable Service to the Power System Relaying Committee

Upcoming nominations were reviewed and approved.

B2: Fellows Awards
Chair: C. Henville
No report.

B3, Membership Activity Report
Assignment: Assist in searching for new attendees.
Requesting support from attendees' employers.

Attendance during the Baltimore PSRC meeting was 208, which is considered a healthy number for us.

22 new attendees were in our Newcomers Orientation meeting on Tuesday.
One retention support letter was written. The appeal was successful.
As a further note, if any attendee needs stronger management support for PSRC participation, we encourage them to let us know.

No Service Awards were presented.

We invited local utility people to our meeting. Two engineers from Baltimore Gas & Electric attended.

B4: O & P Manual and WG Training
Chair: M.Sanders: 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. – is being reviewed for re-organization.

B8: Long Range Planning
Chair: Miriam Sanders
No report.

B9: PSRC Web Site
Chair: Russ Patterson
Russ met with webmasters to discuss secure methods to access PSRC servers and future plans for website

V. Items from the Main Committee meeting:

A. There were no new Main Committee members announced
B. There were no new Fellows announced

VI. SUBCOMMITTEE REPORTS

C: SYSTEM PROTECTION SUBCOMMITTEE

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

The C System Protection Subcommittee met on Wednesday, May 15, 2013 in Baltimore, MD with 20 members and 47 guests in attendance. Quorum was reached.

Minutes of the January 2013 Subcommittee meeting were approved.

8 Working Groups and 4 Task Forces met at this meeting.

PSCE liaison report: Nothing to report.

PSSC liaison report: Nothing to report.

OLD BUSINESS

None

NEW BUSINESS

Three working groups from NASPI are looking for a new home. C Subcommittee will set up a task force CTF23 to determine how to handle this. The task force will be called Synchrophasor Performance and Standards. Jim O'Brien agreed to chair the task force.

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 on May 15, 2013 at 9:30 am. Individual introductions were made and attendance was taken. 15 members and 8 guests were in attendance.

The meeting began with a review and clarification of the group's assignment. Contribution by Roy Moxley was presented, combining two sections of the document.

The present draft report was later reviewed.

Each section was discussed and members volunteered to review and add material where necessary.

After some discussions it was concluded that after the update of the existing draft of the report with new contributions (to be completed by the end of June 2013), it will be sent to the members of the working group for final review and comment. The goal is to finalize the report before the September 2013 meeting.

WG C2 Assignment and Volunteer List – May 16, 2012
Underlined names indicate that original or additional assigned material needs to be submitted.

Report Sections
1. Smart Grid Definition – Solveig Ward
2. Introduction – Rene Midence, Marco Janssen
3. Multifunction Protection Devices – Rene Midence
4. Protection Communications – Rene Midence, John Lane, Bob McFetridge
   1.1 WG2 H2 coordination
   1.2 No discussion of communications
   4.3 Determine communication requirements for Smart Grid
2. Impact of Protection on Smart Grid

5.1 Dynamic transformer loading – Aaron Martin

5.2 Adaptive protection – Juan Gers, Andre Uribe

5.3 Condition monitoring – Paul Myrda, Mansour Jalali

5.4 Relay load data used to supervise home device control – Charles Sufana

3. Use of Existing Protection Functions

3.1 Measurements - John Csisek

3.2 Synchrophasors - Mark Peterson

3.3 Status information - Rene Midence, Adi Mulawarman

3.4 Waveform, disturbance and event recording/reporting – Mark Peterson, Aaron Martin

3.5 Fault location – Aaron Martin, Sukumar Brahma

3.6 Volt/VAR relay interface – Tom Jauch, Bob McFetridge

3.7 PSL / Load Shedding – Sankura Subramanian

3.8 Numerical differential relays / phase shifting transformers - Sankura Subramanian

4. System Documentation – Kevin Donohoe

General Review - Read the current document and provide comments
Dean Ouellette, Athula Rajapakse, Vajira Pathirana, Mansour Jalali, Arvind Chaudhary, Chih-Wen Liu

Utility Users – List desired functions
Jack Jester, Paul Myrda, Don Parker, Stephen Trchian, James Ariza, George Gresko, Rafael Garcia, Don Ware

Protection Vendors – List available functions
Adam Gauci, Jay Sperl, Chris Chelmecki, Siman Richards, Phil Beaumont, Tim Day, Jim Ebrecht, Jakov Vico,

Review and Comment - Add relevancy and applicability comments
Tony Leszczynski, Fred Friend, Travis Smith, Vajira Pathirana

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 14, 2013 in Baltimore, MD in a single session with 24 attendees (10 members and 14 guests). Quorum was not achieved. January 2013 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: IEEE C37.244 was approved and published on May 10, 2013. The chair congratulated all contributors for their support and dedication. Upon completing the assignment, the group is required to present completed work to the Main Committee, and could publish summary paper(s) to present the work to the industry. Presentation at the Jan 2014 JTC was discussed, and supported. The group also agreed to write a transaction paper. Paper outline was discussed. Assignments were given. A plan to generate a paper draft by Sept PSRC meeting was proposed and agreed.

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 14, 2013 in a single session. The session was chaired by Paul Myrda. There were participation from 7 members and 18 guests. We did not have a quorum of members (7/17).

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

All participants introduced themselves.

The minutes of the January 2013 meeting were reviewed but not approved since we did not have a quorum of the members. Will be using the electronic approval process.

WG Vice Chair reviewed a proposed outline for an IEEE Transactions paper and solicited comments from the group.

The draft outline with assignments follows:

C37.242 Table of Contents

1. Introduction

4. Synchronization techniques, accuracy, and availability (Jay Murphy, Deb Henderson, Daniel Dotta)
5. Synchrophasor measurement accuracy characterization (Sakis Meliopoulos, Allen Goldstein, Gerry Stenbakken)
6. PMU installation, commissioning, and maintenance (Ken Martin, Paul Myrda, Anderson Oliveira)
7. Testing and calibration (James Ariza, Rich Hunt)

Summary
Annex A (informative) Bibliography
Annex B (informative) Responses of the reference signal processing model to test signals
Annex C (informative) Effects of signal channels
Annex D (informative) Examples of instrumentation channel impact on accuracy using approximate models
Annex E (informative) Example of commissioning tests and measurements – Todd Sampson
Figures – Harold Kirkham

The plan is to hold periodic conference call to expedite the overall paper development.

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.

Working Group is planning to meet in January 2014 to work on a transactions paper.

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.

The working group did not meet. The report has been completed and approved by the PSRC officers. It was presented at the Georga Tech Protective Relay Conference on May 8, 2013 and has been submitted to the Western Relay Conference for this fall. It will be presented to the PSRC main committee at the September 2013 meeting. It will also be submitted to the Texas A&M Relay Conference for April 2014.

The chair asked the subcommittee to disband the working group as their work has been completed and the request was approved.

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 C15 met on Tuesday, May 14, 2013 in Baltimore, Maryland, in single session chaired by Yi Hu with 4 members and 4 guests attending.

The working group members and guests reviewed the draft slides and comments provided by Vahid Madani, and then worked on revising the draft presentation slides to be presented at PSRC main

committee meeting. The WG was able to complete the revision of about half of the draft slides. The following are agreed as the follow on action items:

- WG Chairs to send the updated slides deck for review and comments to all WG members and guests who have volunteered to help the WG to review and provide comments on the draft slides – by May 20, 2013
- WG members and guests to provide comments by May 31, 2013
- After received the comments, the WG will work with each commenter to address their comments to produce the next revision of the slides – by June 28,2013
- The completed revision of the slides will be circulated to the WG members and guest for final review and approval – By July 2,2013
- One or more webinar or teleconference meeting may be organized, if necessary, during final review and approval process – before July 2, 2013

The working group will meet at next PSRC meeting in one session to work out a reduced version (about 10 to 15 slides) of the current presentation for PSRC main committee meeting. Per information from PSRC main committee, the earliest PSRC main committee meeting to present this report will be May 2014.

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 14 May 2013 Tuesday afternoon with 5 members and 11 guests attending

The working group discussed and reviewed comments received for draft 3.5 of the report.

The following assignments were made:

- Mike Thompson: - revise 1.1.2 to clarify that 3 to 8 msec pertain to output contact time not algorithm time
- Raluca Lascu to harmonize section 2.5.1 on this time reference
- Raluca Lascu and A. Mulawarman to revise figures
- R. C. Young volunteered to edit the paper
- Brian Boysen to revise 2.5.3 on trip coil monitoring

All assignments are due on 15 June 2013

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 C-17 Working Group met in conjunction with the PSRC meeting in Baltimore, MD on Tuesday May 14, 2013 with 14 members and 15 guests. Introductions were made and the assignment for the working group was presented. Minutes from the January, 2013 meeting were not discussed since C-17 only acts in support of the Joint working group.

The report has been approved by the Working Group members and comments incorporated in the report. The report was subsequently circulated for C Subcommittee for approval, which was accomplished with 31 responses, including 3 abstentions. C Subcommittee comments have been incorporated in draft 11.2. We have some minor clean-up to accomplish in section 3.2, a clarifying sentence or two in section 4.2 and additional clarification in the first paragraph of section 6.1.1. Sukumar Brahma and Gene Henneberg volunteered to provide these tweaks.

Edits will be incorporated in the next version of the report, 11.3, which should be available by the beginning of June for approval by the PSRC officers. The report will also be forwarded to the offices of the Electric Machinery and T&D Committees for their approval and comments. With the resolution of the comments from that review the report will be ready to be posted on the PSRC web site with links from the T&D and Electric Machinery committees' sites.

Charlie Henville volunteered to bring up the subject of presenting the report to appropriate industry meetings at the summer PES General meeting in July. Dean Miller has submitted an abstract proposal to provide a presentation at the Western Protective Relay Conference this October.

The next joint working group meeting will be in conjunction with the PES general meeting in Vancouver, BC, Canada, July 21-25, 2013. The next working group meeting in conjunction with the PSRC will be in September in Albuquerque, NM.

C18: <u>Transmission to Generation Interconnection Protection Considerations</u>

Chair: Alla Deronja
Vice-Chair: Russ Patterson
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 transmission systems and generation facilities greater than 10 MVA. This Guide does not cover distributed energy resources.

Purpose: This Guide is intended to provide guidance to those who are responsible for the protection of electrical interconnections between transmission systems and generation facilities greater than 10 MVA. It is not intended to supplant specific transmission or generator owner practices, procedures, requirements, or any contractual agreement between the transmission and generation owners.

Working group C18 met on May 15, 2013, in Baltimore, MD, in a double session chaired by Alla Deronja with 15 members and 32 guests present. Four guests joined the working group as new members.

The request for the PAR for the new guide was accepted by the IEEE-SA at the April 26th NesCom meeting, and the PAR was approved on May 10th until December 2017. The new Guide is PC37.246.

The chair displayed the IEEE patent slides as required for the working group with PAR related activities.

We had a presentation titled *Transmission System Protection Functions from the Generation Perspective* by Doaa Galal in the first session. Thank you, Doaa. This presentation will be posted on the PSRC WG website.

The rest of the first session of the meeting was dedicated to reviewing the Guide's Outline. Additional comments from the working group members were received and incorporated in the Outline's current version, and it is basically complete. First writing assignments were also made covering almost every section of the Guide's Outline, thanks to active members' and guests' participation and volunteering.

The second session was dedicated to a presentation on BC Hydro protection considerations on interconnections with non-utility generators by Mukesh Nagpal. The unique grounding system of BC Hydro presents many challenges for the IPP interconnections. Thank you, Mukesh. This presentation and the technical paper it is based on, which was presented at the 2012 Western Protective Relay conference, will be posted on the PSRC WG website.

The updated Outline, with the names of the writing contributors, will be sent out with the meeting minutes. The writing assignments are due August 15th, 2013. Please email them to the chair of the working group (**aderonja@atcllc.com**).

C19: Standard for Phasor Data Concentrators (PDC) for Power Systems

Chair: Vasudev Gharpure
Output: Standard

Working Group C19 met on May 14, 2013 in Baltimore, MD in a single session with 27 attendees (10 members and 17 guests). Quorum was achieved. This was the first meeting of the working group.

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

Considerable time was spent on completing the PAR document. The final version is included below. As the deadline for submitting this document is July 12th, the chair suggested that the working group review this document until about middle of June, when it would be submitted to the IEEE Standards Association.

The chair mentioned that most of the work would be done by telephone conferences, possibly twice a month.

PAR document contents:

WG Assignment
Develop a standard for Phasor Data Concentrators for power systems.

Chair: Vasudev Gharpure
Vice-chair: Mital Kanabar
Output: Standard

WG PAR proposal

Scope:
This standard specifies the requirements of Phasor Data Concentrators (PDCs) for power systems.

It includes requirements for
a) data aggregation,
b) processing of synchrophasors and other synchronized data,
c) data interfaces with other systems,
d) handling of commands, configuration and other meta-data,
e) performance - including latency, environmental, throughput.
f) testing

Purpose:
The purpose is to improve interoperability of devices, systems and applications that use synchrophasors and other synchronized data by standardizing requirements for PDCs.

C20: Impact of DC Transmission on Protective Relaying

Chair: Joe Mooney
Vice Chair: TBD
Output: TBD
Established: TBD
Expected Completion Date: TBD
Working Group Scope: TBD

The task force met with 10 attendees. Joe Mooney provided some background material concerning the need for developing a document concerning the impact of HVdc transmission on AC system protection.

Many of the attendees indicated that they would be interested in more information on HVdc technology and how it impacts AC system protection. Utilities are beginning to see more HVdc transmission systems applied on their systems. Many of these HVdc systems are used for interconnection renewable energy resources.

The C Subcommittee Chair (Solveig Ward) felt that there is enough interest in the topic that a working group should be formed. All of the attendees agreed and seven of the attendees stated that they would participate in the working group.

The group discussed that output of the proposed working group and all agreed that a report would be appropriate. The group proposes the following assignment:

"Develop a report to the PSRC describing HVdc technologies and their affect on the performance and requirements on local AC system protection"

C Subcommittee approved forming the C20 working group.

C21: Commission, Design and Operation of Large Scale Sips

Chair: Yi Hu
Output: ??

Task force purpose
Define the objective of the new working group for "Commissioning, design and operating large scale SIPS". Propose type of end product and its scope of work.

Working group CTF21 met on Wednesday, May 15, 2013 in Baltimore, Maryland, in single session chaired by Yi Hu with 14 people attending.

Task Force continued its discussion from last meeting to determine the objective and assignment of the new working group. The consensus of the task force is that there is a need to form a new working group to develop an IEEE guide for SIPS. The task force discussed the processes of establishing a new working group and the required PAR application/revision processes associated with the development of an IEEE guide, and worked on the initial scope of the assignment for the proposed new working group.

The following is the initial scope of assignment for the proposed new WG from the task force:

The assignment of the new working group is "to develop an IEEE Guide for Design, Commissioning, and Management of System Integrity Protection Schemes. The guide will address the general concepts for architecture and communication design to achieve the specified functionality and performance requirements. The guide will also address principles for commissioning processes and strategies for management."

The task force CTF21 made its proposal for establishing a new working group at the C subcommittee meeting with the above initial assignment. The proposal was accepted by C subcommittee, and the task force will conduct its business as the new WG C21 at the next PSRC meeting. The main task at the first WG C21 meeting will be to finalize the scope and assignment of the WG and submit it to C subcommittee for approval. The WG also plans to discuss and prepare the PAR for submitting to IEEE Standard Association for its approval to establish a new project for this development.

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 Did not meet.

CTF 22: C37.117-2007 "IEEE Guide for the Application of Protective Relays used for Abnormal Frequency Loadshedding and Restoration

Chair: Ken Behrendt

ASSIGNMENT: Review C37.117-2007 "IEEE Guide for the Application of Protective Relays used for Abnormal Frequency Loadshedding and Restoration" for revision or reaffirmation

The CTF22 met on May 15th with 8 attendees. Following introductions, the chairman discussed the purpose of the task force, which is to discuss the future status of IEEE guide C37.117, "IEEE Guide for the Application of Protective Relays used for Abnormal Frequency Loadshedding and Restoration". The guide is scheduled to expire in 2018. Options for controlling the future status of the guide were discussed. These include:

- **Form a working group to establish a PAR to revise C37.117, if major revisions are needed, and submit the revised document for approval through the balloting process in the Standards Association.**
- **Wait 2 years, form a working group to establish a PAR to submit the existing guide for reaffirmation with minor revisions (change date, etc.) through the balloting process in the Standards Association.**
- **Let C37.117 expire in 2018 and convert it to a Report to Main Committee**
- **Apply to withdraw guide before expiration and convert it to a Report to Main Committee**

The task force discussed these options considering that:

- The guide does not make any specific recommendations. The content of the document provides a collection of information about power system conditions that result in abnormal frequency, load shedding techniques used to arrest frequency decline, frequency measurement techniques employed by protective relays, etc.
- The task force does not know to what extent the industry uses the existing guide.
- The task force is not aware of any other standards that reference or rely on the existing guide.

The task force discussed some issues that are not included in the existing guide, including abnormal frequency conditions created by islands of distribute resources/generation, and the use of Synchrophasor Measurements for the detection and correction of abnormal frequency conditions. It was determined that these topics are probably outside the scope of the guide, and are too new and untested to be considered material for a guide.

Therefore, with no major revisions needed, the task force discussed recommended reaffirming the guide, or letting the guide expire and converting the document to a report to the PSRC Main Committee. While the latter option may diminish the status of the document, it would retain the availability of the document, and make it more accessible to the industry. Therefore, per the recommendation of the task force chairman, the task force agreed to recommend to the C Subcommittee that the IEEE Guide C37.117 be

allowed to expire in 2018, at which time the document should be updated and revised as necessary, and submitted for approval as a Report to the PSRC Main Committee at that time. The task force therefore recommends that no further action should be taken at this time.

The Subcommittee did not agree with letting the guide expire or withdrawing it and making it a report at this time. The task will be tabled and readdressed a year from now.

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 23 members and 38 guests present.

Following introductions, a count of SC membership was made, and it was determined a quorum was present (23 out of 45 members present).

Minutes from the January 2013 meeting in Memphis, TN were approved.

Chairman Patterson reported items of interest from the Advisory Committee:
- Working groups dealing with standards related materials need to add a roster of attendance into their minutes that includes affiliation.

Eight working groups gave reports on their activity.

Reports from the WG Chairs:

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: September 2013
Draft: 10.4

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 14th, 2013, at 3:00 PM with 19 attendees, of which 10 are guests.

Meeting minutes from the Memphis TN meeting was presented with no objection.

Assignments assigned from the previous meeting were discussed.

There were brief discussion of the definition of RCA and MTA.

Ken Behrendt brought up the subject of line trip under normal switching condition due to unequal pole opening in a pilot scheme. Elmo Price volunteered on writing a section on this subject. Members and guests of the working group then will decide if this section should be included in this report.

After Elmo's writing assignment is incorporated in the paper, all members and guests are asked to perform a final review of the whole document as this report is close being finished. Comments are due June 30, 2013.

D6: AC Transmission Line Model Parameter Validation
Chair: Tony Seegers
Vice Chair: Sam Sambasivan
Output: Report to PSRC
Established: January 2009
Expected completion date: January 2014
Draft: 6.8

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

The D6 working group met on Tuesday, May14, 2013 at 8.00 a.m. with 9 members and 12 guests present.

Revision 6.8 of the document was sent to the members prior to the meeting and was reviewed during the meeting. All sections have been completed and only a final review is needed. Members and guests were asked to comment on the latest draft. The following assignments were made based on the overall review of the draft report:

The need for section 5 on improving the model was questioned, which will be reviewed along with section 6 by Norman Fischer. The review of Section 4 will be done by Ian Tualla, Jim O'Brien and Mukesh Nagpal. John Miller and George Bartok will review section 3. A tele-conference will be set up to complete the reviews of these sections before the end of June.

The final version of the report will be sent out before the next meeting and a complete review of the final report will be taken up in the next meeting. We hope to complete the assignment and to have the final report ready for the subcommittee by January 2014.

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 2014
PAR Expiration Date: 2015
Draft: 3

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 D19 working group met in a single session on Tuesday, May 14, with 10 of 22 balloting members present. Also in attendance were 9 out of 25 corresponding members, and 14 guests. Quorum requirements were not met, but approval of the January 2013 minutes was accomplished via the ten balloting members in the WG meeting and four in the D subcommittee meeting. The balloting and correspondence member lists will be revised based on attendance.

Draft 3, was discussed at length. Changes were incorporated during the meeting. Specific writing and review assignments include the following and are due July 15th:

5.6.2.2 Sam Sambasivan/ Meyer Kao
Expand "special considerations" discussion

Fig 27	John Miller Revise Figure 27
5.11	Alla Deronja Include Zone 3 two-terminal configuration
Polarization	Jeff Barsch/ Joe Mooney/ Meyer Kao Review and recommend the level of detail that C37.113 should contain as D3 report very detailed.
LOP	Phil Tatro/ Alexis Mezco Review and recommend the level of detail that C37.113 should contain as the PSRC LOP report is very detailed.
SIR	Rick Taylor/ Mike Thompson/ Normann Fischer/ IanTualla/ Alla Deronja Review and recommend the level of detail that C37.113 should contain, technical accuracy, and inclusion of industry practices.

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 2013
Draft: L

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 14 members, 15 guests, for a total of 29.

The January, 2013 meeting minutes were approved as submitted.

The WG discussed the latest draft of the report, Draft L. The section on SIR was modified to remove specific discussions on the definition of SIR, as the subject is better addressed in C37.113.

The report is almost complete. The chairman will address the minor comments and have a final draft for review by the working group in June, with the intent to send the report to the sub-committee by August.

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: September 2013
Draft: 2.2

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

The working group met in Baltimore, MD January 15th at 11:00 AM with 6 members and 13 guests. Introductions were followed by a review of the January meeting minutes.

Introductions were made.

Karl Zimmerman was unable to attend the meeting, Aaron Martin chaired the meeting.

Paper has been submitted to D subcommittee for approval. Votes are due June 14th. Currently there are 8 approves with no comments, and one approve with comments.

We reviewed comments submitted as well as comments made during the meeting. Comments were editorial, equation element clarification, and background related details on transformer inrush and transformer, a CT/VT filtering section submitted prior to the New Orleans that is to be put in the Appendix and a conclusion will be added to the paper. All comments will be incorporated in Draft 2.3.

We did not meet the deadline to submit an abstract WPRC. We are planning to submit an abstract to the Texas A&M Relay Conference.

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
Draft: 2

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 Working Group Chair reviewed the IEEE Patent Policy and attendee's were provided the opportunity to respond. There were no responses.

There were 21 attendees with 10 members (9 Balloting & 1 Corresponding) and 11 guests. There are 18 balloting members on the Working Group, but quorum was not met at the time the count was taken. Minutes from the January 2013 meeting in Memphis will be approved by email vote.

The Working Group Chair reviewed the remaining activities that need to be completed before the guide can be submitted for balloting. Prior to balloting the guide must be approved the WG, the PSRC Terminology Usage committee must review the guide, and the IEEE Editorial Committee must review the guide. To get the guide submitted to ballot early next year (2014), the WG Chair will have WebEx sessions prior to the September 2013 meeting to move the WG towards approval of the guide.

The WG members and guests reviewed Draft 3 of the guide. Revisions have been made to clarify the definition of determining fault locating error, additional material has been added to applications in distribution fault location, discussion of travelling wave methods has been expanded, information on synchronize phasor applications has been included and techniques using synchronized sampling have been added.

The following suggestions and additions came out of the review:
1. Add "Clock Error" to the list of sources of error - Normann Fischer
2. Include material from Amir Maki on fault locating techniques - Joe Mooney
3. Determine if a reference to the report developed by WG C14 should be included in the guide - Joe Mooney

Submissions should be sent to Working Group Chairman by the end of May 2013.

The WG Chair will be scheduling WebEx session with the WG members from June through August 2013 to complete review and approval of the revised guide.

D27: Guide for the Application of Digital Line Current Differential Protective Relays Using Digital Communications PC37.243
Chair: Solveig Ward
Vice Chair: Bruce Mackie
Established: Sept 2010 (PAR approved)
Output: IEEE Guide PC37.243
PAR expiration date: Dec 31, 2014

Assignment: Write a "Guide for Line Current Differential Protective Relay Applications" to present practical line current differential schemes including operating principles, synchronization methods, channel requirements, current transformer requirements and external time reference requirements; provide specific guidelines for various application aspects including multi-terminal lines, line charging current, in-zone transformers and reactors, single-pole tripping and reclosing as well as channel and external time sources requirements; include backup considerations, testing considerations and troubleshooting.

Scope: This guide presents practical line current differential schemes using digital communication. Operating principles, synchronization methods, channel requirements, current transformer requirements, external time reference requirements, backup considerations, testing considerations and troubleshooting are included. It also provides specific guidelines for various application aspects including multi-terminal lines, series compensated lines, mutual coupled lines, line charging current, in-zone transformers and reactors, single-pole tripping and reclosing, as well as, channel and external time source requirements.

WG D27 met on Tuesday, May 14, 2013 at 9:30am EDT in a single session with 12 members and 22 guests. Since the current voting membership is 20, a quorum was established.

After introductions, the patent slides were shown and reviewed. Upon motion by Bill Higinbotham and second by Sam Sambasivan, the January 2013 meeting minutes were approved.

The scope of the PAR was reviewed.

The review of changes and issues to the document took place.

Bruce Mackie will change section 7.6.1 on Charging Currents to reflect North American standards.

Bill Higinbotham will search for a picture with better resolution for Figure 33.

Bruce Mackie will revise section 7.12 to reflect the removal of figure 35.

Acronyms should be included in the definitions. Mark Schroeder will review the document in regards to terminology and definitions.

The figures of Section 6 were reviewed.

Bob Ince will attempt to improve Figures 8, 9, 10 and 11.

Solveig Ward will work on Figure 14 and will add note to caption for Figure 16 that example is for internal fault.

Don Lukach sent an email in regards to section 6.10 that simplifies the section and address figures. The work has not been included in the document yet. A review webinar will be set up to review the suggested changes.

The missing Testing Section was discussed. Bill Higenbotham and Bob Ince will draft the section on testing with specifics on communications. Aaron Martin and Will Knapek will add system testing to the draft.

The future plan of the working group was discussed. Section 5 and 7 will be reviewed by the review team after the Vice-Chair makes the needed changes. In addition to changes previously mentioned in section 7, the contribution from Ilia Voloh on shunt reactor needs to be reviewed and added. Roy Moxley will be

added to the review team. The review team for section 6 will have a webinar to discuss the except from Don Lukach on section 6.10. In addition to the review team, Don Lukach, Ian Tualla, and Mark Schroeder will be included on the webinar.

All assignments are due by the middle of August.

DTF28: Review of C37.230 Guide for Protective Relay Applications to Distribution Lines
Chair: Brian Boysen
Established: May 2013

Assignment: Review the C37.230-2007 Guide to see if any major changes are necessary and make a recommendation to the SC on whether to apply for a PAR or to send the document to IEEE for balloting.

Meeting # 1

The task force met on May 14, 2013 with 25 participants. The chair Brian Boysen could not attend the meeting - Ratan Das volunteered to chair the meeting.

The assignment of the task force is to evaluate the need for revision of the current standard which can be re-affirmed till 2018 before it expires.

The participants discussed the comments received during the balloting process of the earlier standard published in 2007, which was followed by a general discussion. Following areas were identified for revision:

1. Arc flash protection based on ballot comment,
2. Fault location: reference to guide C37.114,
3. Protection changes required for distributed resources integration and close coordination with IEEE 1547 which is expected to go for balloting during 2013: Impact of longer ride through, inclusion of current differential protection and revising the transfer trip application are some of the issues,
4. Inclusion of voltage (RVD) and current (Rogowski coil, linear coupler) sensors in addition to conventional current and voltage transformers, and
5. Smart Grid related requirements: Reference to D11 paper, Reference to T&D Smart Distribution Application Guide P1854 and reconfiguration of circuits following disturbances are some of the issues to be addressed.

15 of the 25 participants voted to form a working group to revise the standard. If the proposal is approved, the task force will meet again in September and finalize the PAR for submission to IEEE before the October deadline. The working group will start meeting from January onwards once the PAR is approved.

SC Motions to be made to Main Committee

None

Coordination Reports

None

Liaison Reports - Fred Friend

The T&D Committee / Distribution Subcommittee met during the JTCM in Memphis, 14-16 January 2013.

Their next meeting will occur during the PES General Meeting in Vancouver, BC 21-25 July 2013.

The following are items of interest to the Line Protection Subcommittee:

Working Group on Distribution Automation http://grouper.ieee.org/groups/td/dist/da/
Larry Clark, Chair Bob Uluski, Vice-Chair Fred Friend, Secretary

Continued discussion on developing the Smart Distribution Application Guide, P1854
Scope: This guide categorizes important smart distribution applications, develops descriptions of the critical functions involved, defines important components of these systems, and provides examples of the systems that can be considered as part of distribution management systems or other smart distribution systems.

Four panel presentations planned for the General Meeting: 'Smart Distribution Control Center' (Larry Clark), 'Change Management Needed for Effective DMS Deployment' (Bob Uluski), and two sessions on 'Smart Distribution Analytics and Microgrids for Integration of DER (Avnaesh Jayantilal), in addition to the an updated DA Tutorial.

Volt-VAR Control Task Force
Discussion to create a guide for determining the effect of reduced voltage on electric power demand and energy consumption on electric power systems.

Distribution Management System (DMS) Task Force
Discussion regarding vision, scope, objective, and deliverable for DMS – begin with panel session at the 2013 IEEE PES General Meeting

Working Group on Switching & Overcurrent Protection http://grouper.ieee.org/groups/td/dist/sop/
Lee Taylor, Chair Casey Thompson, Vice Chair Fred Friend, Secretary

Continued work on P1806 "Guide for Placement of Overhead and Underground Switching and OCP Equipment"
Scope: This guide is to provide criteria for switching and protective device placement for distribution circuits.
Purpose: This standard develops a guide for where and when switching and overcurrent devices are placed on the distribution system.

Old Business

None

New Business

Previously it had been suggested that the SC consider working the 2005 D6 report titled "Power Swing and Out-of-Step Considerations for Transmission Lines" into a guide. After discussion, the SC agreed to establish a task force to investigate the need for producing an out-of-step TL guide. The task force will be DTF29 and will be chaired by Normann Fischer.

Alla Deronja had previously suggested the SC consider producing a report on protection considerations for multi-terminal lines. It was noted that the PSRC (D-SC) had in 1978 produced a document titled, "Protection Aspects of Multi-Terminal Lines" (document 79 TH0056-2-PWR dated March 1978. This document will be reviewed (along with any other more recent PSRC documents) by Alla and Gary Kobet and the item raised again at the September 2013 meeting. The citation will also be forwarded to Rick Taylor and Don Lukach who chair/vice-chair the D19 WG revising the C37.113 transmission line protection guide to see if anything needs to be enhanced in that guide.

General Discussion

Alla Deronja expressed thanks to SC members who participated in an informal survey she had conducted by e-mail concerning EHV line protection.

Fred Friend of the terminology WG of I-SC communicated that all WG chairs of SA-related documents

automatically have access to the online IEEE dictionary database, and that up to three additional WG members (vice-chair/secretary/technical editor) can also obtain such access.

Line Protection operations of interest

None

H: RELAYING COMMUNICATIONS SUBCOMMITTEE

Chair: Eric Udren
Vice Chair: Eric Allen

The Subcommittee met on May 15, 2013 with 23 members of 34 total, comprising a quorum. 29 guests were also present. Minutes of the January 2013 Memphis, TN meeting were approved without objection.

Attendees were reminded of the new procedures from SA for WGs involved in standards development:

- WG rosters must list name and affiliation of each WG and voting member. This procedure is to be enforced at future meetings.
- No PAR extensions will henceforth be granted.
- A replacement or re-approval of a given standard must be in place prior to the expiration date of that standard.
- For any given standard, the SC needs to have a TF look into developing an action plan 5 years prior to the expiration date of that standard. The SC will need to maintain a list of standards and corresponding expiration dates for which the SC is responsible.

SC members were reminded to consider the scope of the H SC and whether all of the WG are doing work that belongs under H SC.

SC members were reminded that a response to e-mail ballots is required as a condition of membership.

WG business:
The latest revision report of the H5-a working group, which incorporated comments received during a previous e-mail ballot of the SC, had been distributed to the SC prior to the meeting. Approval of this report was requested.

The SC voted unanimously to approve the report of the H5-a working group.

With this approval, the H5-a working group announced that it had completed its task and was disbanding.

The H19 working group announced that it had completed its task and was disbanding.

The H22 working group announced that it believes the issues involved with its task also fall under the scope of the Substations Committee, and accordingly the working group requested that they form a joint WG with the Substations Committee. The SC officers agreed with this request.

The SC voted unanimously to approve the creation of working group H23 with Rick Cornelison as chair, Eric Allen as vice-chair, and the following assignment: Develop an IEEE Guide for naming Intelligent Electronic Devices (IEDs) based on the report of Working Group H10.

The SC voted unanimously to approve the creation of working group H24 with Galina Antonova as chair and the following assignment: Develop a revision of the IEEE Standard C37.238-2011 “IEEE Standard Profile for Use of IEEE 1588 Precision Time Protocol in Power System Applications” based on the list of issues brought forth in close coordination with IEC TC57 WG10 and other technical committees with similar interests. The goal is to bring it to the IEEE Sponsor Ballot by January 2014..

Old business:

Alex Apostolov encouraged SC members to submit articles on recently completed PSRC work to PACWorld in order to promote the accomplishments of the PSRC working groups.

Roger Hedding announced that the next IEEE T&D Conference will be in Chicago in June 2014. This conference will be the 50th anniversary of the first T&D conference. SC members were reminded that this conference is another opportunity to publicize the accomplishments of the PSRC working groups.

Yi Hu and Roger Hedding discussed the possibility of a two-hour tutorial on IEC 61850 at the next PSRC meeting in Albuquerque, NM. A poll on interest in such a tutorial is expected.

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New business:

Members were encouraged to prepare presentations of their work for future meetings of the PSRC Main Committee. Slots are available starting in January 2014.

The formation of a working group under IEC TC57 to assess the impact of large scale integration of renewable generation was announced.

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
Established: 2006
Expected completion date: December 2013
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.

No Report

H3: Time Tagging for Intelligent Electronic Devices (IEDs)
Chair: W. Dickerson
Vice Chair: J. Hackett
Substations C4 Co-Chair: M. Lacroix
Output: Standard
Established: 2006
Expected completion date: December 2015
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. The patent policy slides were shown, and no issues were identified.

Minutes will be distributed and voted by email, due to the absence of the vice chair caused by an injury in the family. The vice chair has the latest membership list, and the group could not be sure that a quorum was present.

The meeting concentrated on a discussion of the latest draft of the standard. This draft contains many placeholder and 'straw man' clauses at this point, and quite a bit of useful discussion took place. We are working to integrate the needs of the Substation Committee into the original mission of this work under the PSRC. Several changes were made to the document and some assignments were made.

The WG is still planning to distribute the COMFEDE standard to the members. This standard includes the most recent implementation of time tag formats.

H4: Revision of C37.111 COMTRADE Standard
Chair: R. Das

Vice Chair: A. Makki
Output: Standard
Established: 2006
Expected completion date: June 2013
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 and the standard was published on April 30, 2013.

The Group met on May 14, 2013, with 10 voting members present out of 18 voting members. Four guests were also present. The minutes of the previous meeting held at Memphis were approved.

Chair thanked all members and guests for their support over the last 10 years. The working group members thanked PSRC members, officers and standard coordinators for their support. The working group also thanked IEEE SA, particularly Matt Ceglia and Jodi Haasz, for their support.

The working group will present a paper on the summary changes in the 2013 COMTRADE standard at the IEEE PES General Meeting in July. The draft presentation was discussed during the meeting and was revised based on the comments. Chair will circulate the draft presentation for further review by members. Bruce Pickett suggested to look into an IEEE Transaction paper for better archiving– chair agreed to look into this issue.

Ravi Subramanium, Technical Director of ICAP presented to the members about the IEEE Conformity Assessment Program and a proposal for IEEE C37.111conformity assessment program. Working group members had a discussion on this issue and agreed to request H-subcommittee to form a task force to look into the advantages and disadvantages of the conformity assessment program. Rick Cornelison agreed to chair the task force if the request is approved.

The WG will meet for the last time in September 2013 to evaluate the feedback from the IEEE presentation and prepare for the conference presentations. Amir Makki (WPRC), Jim Hackett (Fault and Disturbance Recording Conference at Georgia Tech) and Stan Thompson (Texas A&M Conference) agreed to present at various conferences.

H5-a: <u>Common Data Format for IED Configuration Data</u>
Chair: J. Holbach
Vice Chair: D. P. Bui
Output: Report
Established: 2003
Expected completion date: June 2013
Assignment: Define a common format for IED configuration data.

No Report

H6: <u>IEC 61850 Application Testing</u>
Chair: C. Sufana
Vice Chair: B. Vandiver
Output: Report
Established: 1999
Expected completion date: December 2014
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 9 members and 15 guests present.

The minutes from the January 2013 meeting were reviewed and approved with no comment.

The Chair then reviewed the report outline and assignments of the working group and discussed the lack of response on his last emails prior to the meeting. Some volunteers had changed jobs and are no

longer able to participate in the WG. Those assignments are to be redistributed – Alex Apostolov volunteered to provide several write ups on the various report topics. Jim Bougie's assignment on networks was discussed again.

Paul Myrda described the EPRI efforts on IEC 61850 – discussed the Test Beds that they have setup and the areas of focus within EPRI – Cyber Security, Smart Grid, and Substations. Test racks are deployed at EPRI facilities in Charlotte NC, Winter Springs FL, and soon Birmingham AL. Then the project headed by Yuchan Lu of "Testing and Maintenance of IEC 61850 – based P&C Systems" was discussed and the next meeting of that project was described by Aaron Martin. Phase 2 will be kicked off at the September workshop hosted by BPA in Portland OR. Utilities were invited to participate.

Alex Apostolov made an impromptu presentation of the PPT from the past EPRI workshop in New York; with a review of the Edition 2 changes to the old Test Bit in Edition 1. It further described the new Simulation Bit / LN states for "Test" and "Test/Blocked" / LN LPHD "Sim" and LN LTRK usage. A discussion on the lack of engineering tools prompted Paul Myrda to describe the similar state within CIGRE B5-39 WG and how the industry needs these developed to create the documentation and work experience in IEC 61850 top/down designs. Alex responded that this was also part of the B5 WG's goals.

Alex then related the ongoing proposals for future 61850 extensions for describing a device's I/O in LN's and Programmable Scheme Logic within the SCL.

Kevin Donahoe, chair of I5 WG volunteered to keep H6 apprised on common elements from his WG that apply to 61850 related schematics – obviously important to the testing topic.

Writing assignments were reconfirmed and are now requested to be provided by September 1, 2013.

H9: <u>Understanding Communications Technology for Protection</u>
Chair: R. Midence
Vice Chair: A. Oliveira
Output: WG Paper
Established: 2005
Expected completion date: June 2013
Assignment: Prepare a document that would assist engineers in understanding the communications technology for protective relaying.

The Working Group H09 met in the Chapters Room, Tremont Plaza Hotel, in Baltimore, MD, USA on May 15, 2013 at 9:30 am. Eleven (11) members and six (6) guests were present.

Discussion

For the benefit of new participants that attended the meeting for the first time, the chair provided and overview of activities of the working group to date in relationship to the Tutorial and Promotional Paper.

The chair informed that that the report was approved by the subcommittee and will be available in the IEEE PSRC website at http://www.pes-psrc.org/h/ under Link - H SC Working Groups, H9 Understanding Communication Technology for Protection Systems.

The second point of the agenda was to communicate to the participants the Anderson Oliveira has volunteered to become the vice-chair of the working group.

The chair indicated that contributions were received since last meeting in January 2013 for the production of a tutorial as recommended by the working group during the meeting of May 2012.
The chair also indicated that a draft of a promotional paper was produced and that it will be circulated for review. The promotional paper consists of a condensed version of Section 1 of the report with some content of the other sections. Bruce MacKie and Stephan Brettschneider volunteered to assist with this task.

The chair requested more volunteers to produce slides based on the content of one or more sections. The chair explained that now that the report is completed, contributing should be a straight forward task

of preparing presentation slides based on report content. All the sections of the report have a at least one volunteer to work on content for the tutorial. The contributions are expected to be submitted no later than August 15th, 2013. Upon request for contribution to the tutorial (presentation), the following were agreed:

- Tom Dahlin volunteered to work on item 10
- Stephan Brettschneider volunteered to work on items 3, 4 and 5
- Chris Chelmecki volunteered to work on item 13

Upon request for contribution to the Technical Paper to compact its current 32 pages, Bruce MacKie and Stephan Brettschneider volunteered to assist with this task. Bruce also suggested removing the refences from the current Technical Paper, leaving them on main report only:

- James Ariza volunteered to prepare an abstract based on the report for submission to technical conferences
- René Midence will send the current 32 version of the Technical Paper to the members

The working group suggested that abstracts should be submitted to the different technical conferences in order to be able to promote the report in 2014. René Midence will produce an abstract for consideration of the working group.

H11: C37.118.1 Standard for Synchrophasors for Power Systems
Chair: K. Martin
Vice Chair: Vacant
Output: Standard
Established: 2006
Expected completion date: December 2013
Assignment: Create a new Synchrophasor Standard C37.118.1, using the measurement portion of the current standard, C37.118-2005, and adding dynamic phasor measurement and frequency measurement requirements according to the PAR issued 17 June 2010.

WG H11 met on Wednesday, May 15, 2013 at 8:00 AM in a double session with 10 members and 23 guests. The attendees were reminded of the applicable IEEE intellectual property rules.

The WG applied for an amendment PAR to change the requirements as needed to make them consistent with the reference algorithms and uses. The PAR was approved in March and is guiding the present work.

The WG also applied for an amendment PAR to start the joint IEC-IEEE development of 60255-118-1 which will be a joint synchrophasor standard based on C37.118.1. The IEEE-SA prefers to wait until this amendment PAR is at least into ballot before approving the revision PAR, so it is anticipated that it will be approved soon.

A task force (TF) consisting of Ken Martin, Allen Goldstein, Veselin Skendzic, Bill Dickerson, Jerry Stenbakken, and Dean Ouellette has been working on the model, testing against limits and comparing results. This group isolated the areas where the present M-class algorithm fails and has made several recommendations to address them.

Several issues are typographic and correcting them is straightforward.

The ramp test needs a longer hold-out to allow for the M-class filter.

The combined AM-PM modulation test produces some mixing products that are difficult to model and make limit setting uncertain. The TF recommends doing the AM and PM separately.

The ROCOF measurement is little used and gives results that are unusable in many tests. The .01 Hz/s test limit is at the resolution limit leaving no variability for noise. The TF recommends reducing requirements so this parameter will not be a driving factor for implementation. To this end, reduce the minimum requirement to 0.1 Hz/s, increase other limits as needed, and suspend the requirement in places where it is not appropriate.

A central issue with the frequency measurement is the minimal phasor filtering, particularly with interfering signals and noise. The TF recommends increasing the filter length by 25% and changing

limits appropriately. This requires changing the filter parameters in Annex C and supporting information including several figures and associated text.

These proposals and their impacts were discussed by the WG. Several commented that it would be best to derive requirements from applications, but due to the existence of few well developed applications, little guidance is available. There were no objections or counter-proposals offered. The task team will finish with the details of the amendment changes and put them in the IEEE amendment format over the next 2 weeks. This will be distributed to the WG as it becomes available. The WG vote is anticipated within 2-3 weeks. After WG approval it will be submitted to SA for the editorial review and then to ballot. The ballot body formation was initiated on May 3 and sent out about May 12, so will be open until about June 12.

WG paper was completed and sent out for WG approval. It received several significant edits that required more ballots. It did not receive approval yet, so will be re-edited and sent out for approval again. Jay Murphy will be leading this work.

H12: Configuring Ethernet Communications Equipment for Substation Protection and Control Applications
Chair: E.A. Udren
Vice Chair: TBD
Output: Report
Established: 2008
Expected completion date: December 2013
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 13, 2013 with 6 members and 12 guests. The Chair shared a partial revision of the previous large previous report draft, to be circulated the first week in August.

Herb Falk of SISCO gave a brief presentation to the group on performance and conformance features of Ethernet switches and routers as revealed during interoperability tests run by the UCA International Users' Group to help with IEC 61850 implementations. One vendor's products had RSTP implementations that would not interact with other vendors' products in the required failover times. Some products had trouble negotiating RSTP status over uplinks. Other interoperability problems were found. Conformance testing and conformance statements are needed for switches and routers.

The attendees discussed the meaning of 61850 conformance for a switch. There has been Part 3, giving physical and environmental requirements only, in place for some time. Now, with Part 90-4, there are logical nodes (LNs) defined for networking devices, so a switch may or may not be compliant with that part. This relates to management of network configuration via IEC 61850-6 configuration process, as opposed to SNMP management of switches by established IT methods. GOOSE timing may be considered as a performance criterion, but test conditions need to be defined for this. The report will treat this on a high level only.

For the report, we will limit to recommending that configurations of switches should be lab tested with the rest of the P&C system before deployment; this is critically important if multiple vendors' products are combined in the configuration. Also, add some timing-specific criteria to the existing report wording on the choice among RSTP, PRP, and HSR for redundant reliable networks.

Herb Falk and Mark Adamiak described revision of IEEE 802.1 to define a deterministic version of Ethernet; they also discussed related new implementation of dynamic quality of service (QoS).

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
Established: 2008

Expected completion date: December 2013
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.

Meeting was held with 12 members and 5 guests. Quorum was not met, but this was expected as the spring PSRC meeting is not attended by the Substations Committee WG C10 which jointly sponsors the work.

IEEE Patent Policy discussed with the group.

Sam reported that the sponsor ballot on PC37.240 closed with both responses and affirmatives votes above the minimum for passing. The effort now begins to resolve the comments.

Sam will assemble the comments in a report format and circulate to the WG members. Shortly after that, a call will go out for interested WG members to participate in the ballot resolution process. Ballot resolution is expected to occur over a series of teleconference calls, with first recirculation targeted for July.

H17: Establishing links between COMTRADE, IEC 61850 and CIM
Chair: C. Brunner
Vice Chair: A. Apostolov
Output: Report
Established: 2010
Expected completion date: December 2013
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.

No Report

H19: C37.118.2 Standard for Synchrophasor Data Transfer for Power Systems
Chair: Ken E. Martin
Vice Chair: Gustavo Brunello
Output: Standard
Established: 2010
Expected completion date: December 2013
Assignment: 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 Tuesday, May 14, 2013 in a single session with 5 members and 13 guests. The January minutes had been approved by Email.

The present status was reviewed. The standard was completed and published in December 2011. No new comments have been received on issues with the standard, so the WG anticipates there is no need to continue the WG for this purpose. The IEEE Transactions paper was completed in February and submitted on March 17. It is listed on manuscripts page as "under review", though WG papers are not supposed to need to go through a peer review. If questions are received in regards to a review, the chair can contact WG members for resolution.

No further business was brought up. The question was raised about having the WG to revise the standard when it expires. The standard has a 10 year life and is due to expire in 2021. Matt from IEEE-SA pointed out that it will expire in 2021 and if PSRC wants to renew it, they should start the renewal process 2-3 years before expiration so the action can be completed before the standard expires.

With all the WG action completed, the WG will request to the subcommittee to disband. The meeting adjourned before 2 PM.

H21: Information Mapping between IEEE C37.118.2 and IEC 61850-90-5 systems
Chair: Yi Hu
Vice Chair: A. Goldstein
Output: Report
Established: September 2012
Expected completion date: December 2016
Assignment: Create an IEEE report documenting the mapping between IEEE C37.118 and IEC 61850-90-5 standards.

Working group H21 met on Tuesday, May 14, 2013 in double-session chaired by Yi Hu and Allen Goldstein with 41 people attending.

After reviewing working group's assignment, the working group proceeded to discuss comments regarding an IEC 61850-90-5 implementation agreement that was circulated after the last WG meeting. Several comments were discussed, which include:
- Field length after field code: not consistent, some have but some don't
- "STAT word" or "digital status word" still open for discussion
- Time-aligned and non-time-aligned data aggregation
- Use of sample value control block to communicate info about the sample values

The working group concluded that the implementation agreement could be used to help developing the WG report.

An overview presentation slides deck of IEEE Std P1815.1 provided by Substation Committee WG C14 co-chair Ron Farquharson was presented to the WG. P1815.1 is an IEEE, "Standard for exchanging information between networks implementing IEC 61850 and IEEE Std 1815 (DNP3)". The presentation provided the background, objective, architecture, use cases, and sample contents of the P1815.1 standard. The development work done by Substation Committee WG C14 provides good example for this working group, as the tasks are similar.

Working group then proceeded to discuss the draft outline of the report and the sign up of working group members to work on various discussed sections. The IEEE standard template will be used for developing this report. Discussion includes:
- Change from C37.118 to C37.118.2 to limit the scope of work
- Use similar conceptual architecture as 61850-DNP3 mapping
- Include non-time-aligned data aggregation

A total of 14 attendees had signed up as WG members and volunteered to work on the initial sections of the draft report. The WG will form a small task team to work on the use cases for the report, and plan to hold conference calls to work out the draft version of the use cases for discussion at next WG meeting.

A proposal was made that providing some introductory information about IEC 61850-90-5 will be very helpful for this working group and other PSRC members and guests who are interested to know more about this standard. Herb Falk has agreed to provide a SISCO document about MMS and ASN.1. Alex Apostolov has kindly agreed to provide an IEC 61850-90-5 tutorial for the WG. WG chair will work with Alex on the content of this tutorial and with PSRC main committee to schedule this tutorial before next PSRC meeting – tentatively on Monday before all sessions start.

H22: Guide for Cyber Security for Protection Related Data Files
Chair: Stephen Thompson
Vice Chair: Dylan Jenkins
Output: Guide
Established: September 2012
Expected completion date: December 2015
Assignment: Develop an IEEE Guide on security for data files used for configuration, management, and analysis of protective relaying systems.
Working Group met on May 14 2013 with 14 attendees, 8 of whom were members

Introductions were made.

Dylan Jenkins kindly agreed to act as Vice Chair

Background: H18 produced a report that discussed the need for cyber-security for data related files. H22 is to rework the report into a guide.

Minutes from previous meeting were reviewed and approved. With the exception of that statement that H13/18 is to reference H22 to be redrafted (H13 is in closing stages).

Discussion on WG title and scope. The protection of "data at rest" is intent of working group. Impact is that scope crosses across RTUs, gateways etc. Not just protection relays. Change to WG assignment may be necessary.

What we request the new assignment to be: "Develop and IEEE Guide on security for data files used for configuration, management and analysis of substation automation protection and control systems" and title to "Guide for cyber-security for protection and control related data files"

Discussed how the level of risk of modification changes depending on where the data file resides. Modification of a file that resides within an IED is much higher than that same file stored on the corporate network,

Identified need for stakeholders section in PAR and put together a proposed list.
Objective of next meeting will be to review proposed chapters of guide report and start work assignments

Actions
- Prepare and send minutes (DJ)
- Determine whether working group needs to be submitted as joint project with substation committee. (Stephen T to discuss with Sam).
- Recommend to SC that a modification is made to the assignment.
- Stephen Thompson to circulate the H18 WG report.

Meeting adjourned.

H23: <u>Guide for Naming Intelligent Electronic Devices (COMDEV)</u>
Chair: R. Cornelison
Vice Chair: E. Allen
Output: Guide
Established: January, 2013
Estimated Completion Date: January, 2017
Assignment: Develop an IEEE Guide for naming Intelligent Electronic Devices (IEDs) based on the report of Working Group H10.

The Working Group met on Tuesday May 14, 2013 with 6 members and 7 guests.

During discussions it was pointed out that a standard for channel names already existed in 61850 and so channel naming should not be defined by H23.

Some of the systems that this guide will affect were discussed. As a result, it was agreed that the WG request that our assignment be modified to:
Develop an IEEE Guide for naming Intelligent Electronic Devices (IEDs) based on the report of Working Group H10 and the impact on COMTRADE and other data exchange standards.

H24: <u>Investigate Need to Update C37.238</u>
Chair: G. Antonova
Vice Chair: TBD
Output: Standard
Established: January, 2013
Estimated Completion Date: May, 2014

Assignment: Develop a revision of the IEEE Standard C37.238-2011 "IEEE Standard Profile for Use of IEEE 1588 Precision Time Protocol in Power System Applications" based on the list of issues brought forth in close coordination with IEC TC57 WG10 and other technical committees with similar interests. The goal is to bring it to the IEEE Sponsor Ballot by January 2014.

No Report

HTF25: Review of C37.94
Chair: W. Hignbotham
Vice Chair: M. Benou
Output: Recommendation on formation of a Working Group
Established: January, 2013
Estimated Completion Date: December, 2013
Assignment: Determine if a working group should be formed to revise C37.94 or write a new standard to cover single fiber applications of C37.94 technology.

The task force met on 5/14 with 16 attendees. The need for revisions to C37.94 was discussed and it was decided to form a working group.

The purpose of the group will be to write a new stand alone standard (tentatively called "C34.94.1") that is very similar to the existing standard but will have details on a single mode fiber version. The existing standard will not be modified until after this work is complete but it expected that we will make very minor changes to the original and put it up for ballot as well.

Coordination with PSCC ((Co-sponsor of the original standard) will be investigated.

The task force will meet again in September with the main purpose to generate a PAR to form a working group.

Liaison Reports

PES Substations Committee
S. Sciacca

No report

PES Communications Committee
S. Klein

No report

IEC TC 57 WG 10, 17, 18, and 19
C. Brunner

No report

I: RELAYING PRACTICES SUBCOMMITTEE

Chair: J. Pond
Vice-Chair: B. Mugalian

The I Subcommittee met on May 15, 2013 with 23 members in attendance – a quorum was achieved.

- Approved minutes of ISC meeting held in Memphis TN in January 2013
- Items of Interest:
  - There will be a standard format created for reports
  - Working Group Chairs are to include both company and affiliation on attendance sheets for those groups working on standards development

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- A record number of newcomers for this meeting (22), and a total of 210 attending
- The PSRC O&P and Working Group O&P Manuals are being updated, with links on the PSRC web site

- Administrative items:
  - Double sessions are discouraged and should only be held when necessary; it is very difficult to schedule these without conflicts with other meetings of interest to members
  - Do not cancel a working group or task force meeting. If necessary, notify the Subcommittee officers one meeting ahead so other arrangements can be made, such as a substitute Chair
  - Membership reminder: attendance at the Subcommittee meeting level is tracked and members must attend two meetings per year. If this doesn't happen, the member will be asked to step down. A member can be reinstated upon resumption of regular participation.
  - Show IEEE patent slides at working group meetings
  - IEEE has a WebEx account for our working groups to use between meetings to continue progress on standards development
  - Email items to post on the I web page to Fred Friend, copy Jeff Pond and Brian Mugalian

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Reports from the WG Chairs

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I2: Terminology Review Working Group
Chair: M. Swanson
Vice Chair: F. Friend
Output: Definitions for IEEE Definition Database (formerly 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.

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The I2 working group, chaired by Mal Swanson, met on Tuesday, May 14, 2013 with 6 members and 3 guests.
Minutes from the January meeting in Memphis 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. Mal suggested the working group check that acronyms have a definition in the database during our review.
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.
The official name to be used when referencing the dictionary is the "IEEE Definition Database.

All working group chair are reminded the database is available to them for use during their document development. The IEEE staff reviewed the new process for accessing the database. All working group chair have access to the dictionary database through their MyProject account. They can also give permission for 3 additional officers: Vice Chair, Secretary, and Technical Editor.

Output from a working group in the form of a report does not need review of terms; however, any standards work with a PAR must be submitted for review and approval from I2

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I4: IEC Advisory Working Group
Chair: E.A. Udren
Vice Chair: M. Yalla
Output: IEC TC 95 USNC standards votes and PSRC status reports
Established: 1990
Expected completion date: 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.

The WG met on May 14, 2013 with 5 members & 2 guests. The Chair reviewed for the attendees the status of documents circulated from IEC during the last cycle, which had been sent to WG members and recent guests in advance:

- 60255-149 CDV – *Thermal electrical relays* – FDIS now circulated by Murty Yalla's MT4. US plans positive vote. Murty provided a walk-through of the standard contents, including valuable tutorial annexes on thermal modeling and protection basics.
- 60255-26 Ed. 3 EMC - restructured – discussed previously and FDIS recently passed. John Tengdin reminded us by e-mail that the same gaps we observed and complained about in the past continue to exist. In 7.2.5, Table 13 and Table 14 exclude tests on cables >3 meters in length. Also, in Tables 15 and 18, the exclusion is >10 meters. The EMI radiation level is still about 6 db below IEEE C37.90.2 or IEEE 1613. We see this as a weak standard that should be supplemented with IEEE test levels and requirements.
- 60255-24, COMTRADE - Back-room revisions between the PSRC WG H4 and some IEC voting nations in Europe fixed issues and led to a successful vote on a FDIS that matches IEEE C37.111 COMTRADE.
- Request for Smart Grid Protection experts for new WG (95/307) – announced in January; some PSRC nibbles but no volunteers in the end. Murty Yalla will participate for the USNC.
- IEC/IEEE 60255-118-1 Ed. 1, Part 118-1 Synchrophasor for power system measurements – Matt Ceglia reported on IEEE status of joint WG. The C37.118.1 revision PAR passed NESCOM. A revised draft of C37.118.1-2011, currently being worked on by WG H11, is expected to be circulated around September as the proposed first IEC CD along with a new project proposal (NP) for member country voting. We hope that work on the new joint standard project will start by the end of the year under Chair Ken Martin.
- 60255-121 CDV – F*unctional standard for distance relays* – Murty reports that draft of the FDIS has been submitted to IEC TC95 secretary. It is going through the translation process. It will be submitted for voting by July 2013. .
- IEC 60255-187-1 - *Functional requirements for biased (percentage) differential relays* – The development of this standard involves three different parts:
  1) IEC 60255-187-1 Differential protection for transformers, generators and motors.
  2) IEC 60255-187-2 Bus Differential protection.
  3) IEC 60255-187-3 Line current differential protection.

  The work on IEC 60255-187-2 and IEC 60255-187-3 will be started only after CDV is issued on IEC 60255-187-1. Presently an initial draft of IEC 60255-187-1 is produced and the comments will be discussed in Budapest meeting May 27th -30th, 2013. A CD is planned to be produced by Sept 2013; a CDV by April 2014 and FDIS by Dec 2014.

Veselin Skendzic is Chair of the TC 38 working group that is developing IEC 61869-9 merging unit standard, important for emergence of a single practical 61850 based interoperable process bus solution from multiple manufacturers. He reported on status – 250 comments from CDV voting cycle have been resolved and the draft is being edited for the next circulation – will be FDIS.

With regard to TC 57, vigorous IEC 61850 development activities by WG 10, 17, 18, and 19 are in Christoph Brunner's Liaison Report to Subcommittee H elsewhere in these minutes.

I5: <u>Schematic Representation of Power System Relaying</u>
Chair: Kevin Donahoe
Vice chair: Rich Young
Output: Report
Established: 2008
Expected Completion: 2013

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, external communication configurations, and detailed approaches to these issues.

The working group met with 6 members and 4 guests attending. Since Chair Kevin Donohoe could not attend, Vice Chair Rich Young opened the meeting with introductions. Minutes from the January meeting were reviewed and approved by consensus.

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Revised drawings submitted by Hasnain were reviewed.

Next steps were discussed. The paper is about ready to be voted on by the working group. The final draft and call for votes will be issued by email prior to the September meeting, at which time comments received will be discussed and resolved.

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: December 2016

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

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 14, 2013. This was the fourth meeting for this working group.
There were 5 members present and a quorum was reached. Five guests attended the meeting. Two new members signed up, Gerald F. Johnson and Cara Hutcherson. Membership stands at 10 members and 3 corresponding members.
The IEEE patent requirement slides were presented, and attendees were given the opportunity to identify any known patent claims.
January 2013 meeting minutes were reviewed. Meyer Kao and Rene Aguilar motioned to accept the January 2013 minutes and seconded by Alex Lee.
Draft 2.1 was distributed to working group members, reviewed all comments submitted.
Alex Lee will submit drawings for three phase primary current injection setup for section 9.1.3.

Working Group Assignments - Review sections 6 through 14, incorporate comments in Draft 2.1 as appropriate and to ensured the figures are inline with reference in the draft guide.
Section 6 - Power supplies for test – Cristian Padarau
Section 7 - Generator, motor, and reactor differential relaying – Gerald Johnson
Section 8 - Bus differential relaying – Gary Kobet
Section 9 - Transformer differential relaying – Meyer Kao
Section 10 - Potential-polarized phase relay – Rene Aguilar
Section 11 - Potential-polarized ground relays – Rene Aguilar
Section 12 - Neutral current polarized ground relays – Alex Lee
Section 13 - Tertiary current polarized ground relays – Alex Lee
Section 14 - Transformer ground differential relays – Rene Aguilar and Cara Hutcherson
Annex A – Meyer Kao.
Assignments are due June 30, 2013. Each team will post their contributions to the Central Desktop website under the "Contributions" folder.

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 C57.13.3-2005
Expected Completion Date: 2013

Assignment: Revision to IEEE C57.13.3 to include other types of transformers and other than North American grounding practices

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Working Group I8, Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases, was held in Concordia, Tremont Suites Hotel & Grand Historic Venue, Baltimore MD on May 14, 2013. Nine members and seven guests were present. A quorum was not achieved however not needed for this session.
The working group continued to edit Draft 4 of the Guide. Steve Conrad has provided updated figures that will be incorporated in the next draft. Other figures will be clarified.
On April 21, 2013, the working group achieved 75% approval to proceed to request permission from the I Subcommittee and from the PSRC Main Committee to create a balloting body. Approval numbers were 18 approve, 0 disapprove, 5 no response.
The working group has two words for review by Terminology Usage Review; "synchroscope" – listed in the old paper IEEE Std. 100 and will need to be added to the on-line dictionary. Brian will present this at working group I2 with Mal Swanson. The second word is resistive potential device. Since this is an S&C Electric product, the working group determined that resistive voltage transformer (or (RVT) is a better term. The I2 working group is following up on this.
After I2 approval, the working group will contact IEEE-SA for the MEC (Mandatory Editorial Coordination) in June via myProject, which will be done in parallel with the formation of the SA balloting body. We will contact Erin Spiewak if we have any open issues.
The working group has a Central Desktop workspace for any editing needs.
The working group expects to have the balloting completed and comments received before the September 2013 meeting. Because the PAR expires at the end of 2013, we plan to request a PAR extension for one year to wrap up the ballot comments; this request will be submitted no later than October 21, 2013 for approval at the December SASB meeting.

I10: **Revision of C37.98 Standard for Seismic Testing of Relays**
Chair: Marie Nemier/Suresh Channarasappa
Vice-Chair: Munnu Bajpai
Output: Revision of IEEE Std. C37.98

Working group I10 C37.98 did not meet, however a conference call was held to discuss comments received from the ballot.

I11: **PC37.241 – Guide for Application of Optical Current Transformers for Protective Relaying**
Chair: Harley Gilleland
Vice-Chair: Bruce Pickett
Established: 2010
Output: Guide PAR PC37.241
Expected Completion Date: 2014

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

Working group I11 C37.241 did not meet.

I12: **Quality Assurance for Protection and Control (P&C)**
Chair: Andre Uribe
Vice Chair: Mal Swanson
Established: 2011
Expected Completion Date: 2014

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 Wednesday, May 15, 2013, Baltimore, MD in single session chaired by Andre Uribe with a total of **19 attendees** (4 members and 15 guests).
September meeting minutes were reviewed and approved.
In our meeting, the group covered the following:

1. Reviewed the outstanding task and reassigned or deleted tasks found unnecessary
2. Reviewed each section for the report and assigned review task
3. Formed a team to review and comment on final draft

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4. Agreed that we are at final stage and plan to submit our report for Sub-committee approval in September

I21: Analysis of System Waveforms and Event Data
Chair: Jerry Jodice
Vice Chair: George Moskos
Output: Report
Established: 2012
Expected Completion Date:

Assignment: Prepare a report that will define a process for identifying and analyzing a fault incident. The process will include data collection, analyzing techniques, and methods of reporting.

Working Group I21, met in single session on May 14, 2013.
There were 5 Members and 10 Guests in attendance.

Eleven topics have been presented to date. They are listed in bold in the attached Table 1.

Seven topics remain to be presented.
They are shown in Red in Table 1.

For the September 2013 meeting, the following assigned topics are scheduled to be presented:
1. Evolving Fault – Yuan Liao
2. Fault Location – Yuan Liao
3. Frequency Analysis – Jay Murphy
4. Time Synchronization – Eric Allen

Three previously assigned topics still need to be submitted by May 31, 2013.
1. Breaker Clearing Time – Elmo Price
2. Harmonic Analysis – Mark Taylor
3. Imbalanced Conditions – Mike Bloder

All presentations submitted must conform to the reporting template.

DEADLINES:

May 31, 2013	The seven (7) remaining topics need to be submitted.
June 28, 2013	Edit your contribution to conform to the template.
August 01, 2013	Jerry, George and Alex will submit all topics to Amir Makki
September 01, 2013	First draft of the report. – Amir Makki

Table 1: Fault and Disturbance Record Analysis.

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***	*karlzimmerman@selinc.com*
11	Frequency Analysis	Jay Murphy	*jay.murphy@macrodyneusa.com*
12	Fault Evolving	Yuan Liao	*yliaouk@gmail.com*
13	Time synchronization	Eric Allen	*eric.allen@nerc.net*

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14	***Capacitor Ringing.***	***Amir Makki***	*amir@softstuf.com*
15	Imbalance Conditions	Mike Bloder	*mdbloder@cai-engr.com*
16	***PQ Monitor***	***Dan Sabin***	*d.sabin@ieee.org*
17	Fault Location	Yuan Liao	*yliaouk@gmail.com*
18	**Current Reversal**	***John R. Boyle***	*boyle114@comcast.net*

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I22: **End of Useful Life Assessment for P&C Devices**
Chair: Bob Beresh
Vice Chair: Bruce Mackie
Output: Report
Established: 2012
Expected Completion Date: 2014

Assignment: Prepare a PSRC report on the criteria for determining the end of life for protection, control, and monitoring devices including electromechanical, solid-state and microprocessor-based devices.

WG I22 met on Tuesday, May 14, 2013 at 11:00am EDT in a single session with 8 members and 15 guests.
After introductions, the previous meeting minutes were reviewed.
The outline of the document was reviewed. As part of the review, the assignment was changed by adding the word "useful" so that the new assignment is "Prepare a PSRC report on the criteria for determining the end of useful life for protection, control, and monitoring devices including electromechanical, solid-state and microprocessor-based devices." The title of the WG was also discussed and it was felt that a more descriptive name would be "Condition Assessment of P&C Devices". The WG name was changed accordingly.
Additional changes were made to the outline including adding "useful" to describe end of life, adding a statement that "benefits to changing relays are not a part of the scope", and that "documents and knowledge base are issues to be considered".
Based upon the outline, writing assignments were issued.

I23: **Revision of C57.13.1 – Guide for Field Testing of Relaying Current Transformers**
Chair: Bruce Magruder
Vice-Chair: Will Knapek
Output: Revision of Guide for Field Testing of Relaying Current Transformers
Established: May 2013
Expected Completion Date: 2018

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

Working Group I23, Revision of C57.13.1 - Guide for Field Testing of Relaying Current Transformers, was held in Veterans, Tremont Grand Plaza, Baltimore, MD, on May 15, 2013 at 9:30 am. Nine members and three guests were present.

January 2013 minutes were approved.

Vice Chair is Will Knapek, he needs to join IEEE-SA.

Scope updated and approved; will submit PAR after September meeting after reaffirmation comments review, no later than October 21 for SASB meeting.

Don Sevcik asked that we coordinate our sections on testing with Harley and I11, and other documents such as C37.235 on Rogowski Coils – avoid duplication.

The working group will plan to review IEC documents for any topics on field testing of relaying CTs.

Lee Bigham will review the NETA specs, he has a full set of books; we will not reference NETA in the next revision of the Guide.

Assigned work to research, address comments, and do general fixes from reaffirmation ballot.

Bruce M will update Central Desktop workspace to invite members of the working group – all must be SA members. Question on how to test window CTs needs further explanation, such as test set up, how to create primary winding, etc.

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Bruce M will set up a conference call for late August ahead of the September meeting, to review writing assignments and research. Figures may need to be redrawn.

The working group was asked to provide comments on the entire document

I24: **Use of Hall Effect Sensors for Protection and Monitoring Applications**
Chair: Jim Niemira
Vice-Chair: Jeff Long
Output: Develop a Report on the Use of Hall Effect Sensors for Protection and Monitoring Applications. The report will discuss the technology and compare with other sensing technologies.
Established: January 2013
Expected Completion Date: September 2014

The Working Group I-24 met for the first time on Wednesday, May 15, 2013, Baltimore, MD in single session chaired by Jim Niemira with a total of **16 attendees** (9 members and 7 guests).

In our first meeting, the group covered the following:

5. Dr. Amir Makki demonstrated a small experiment where he compared Hall Effect Sensors vs. a Split Core Current Transformer, and then analyzed the results
6. The group then came to a consensus that a Report should be written and submitted to the I Sub Committee
7. An Assignment Statement (above) was drafted and is being submitted to I Sub Committee for approval.
8. A draft outline for the paper was started and several writing assignments were made.

Since this is a report, it does not require Subcommittee approval

Reports from the TF Chairs

ITF25: Commissioning of Substation Protection and Control Devices
Chair: Rafael Garcia
Vice Chair: Kevin Donahoe
Established: January 2013
Expected Completion Date:

The group met on Wednesday May 15th with 14 signing up to be members and 18 guests. The group went over a NERC System Protection and Control Subcommittee (SPCS) response to NERC Standards Committee's request for research to support the Standard Development Process on the subject of "Protection System Commissioning Testing." The response document was dated March 5, 2013, in it NERC/SPCS recommended that IEEE/PSRC be asked to create a document to address commissioning of protection systems and control schemes. It was brought to the attention of the group that recently completed IEEE Guide C37.333 Guide for Power System Protection Testing should be reviewed by the group before the next meeting since this guide has a section on commissioning. Those in attendance will receive a copy of the guide's summary paper and a copy of a presentation on the guide. It was also suggested that the group review NERC Standard PRC-005-2 before the next meeting. The group will meet in September in Albuquerque and Heather Malson, Don Ware, Paul Elkin, and Luis Polanco volunteered to contribute outlines of commissioning practices at their companies and present at the next meeting.

ITF26: Review and Expand Transaction Paper on Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers
Chair: Amir Makki
Vice Chair: TBD
Output: Report
Established:
Expected Completion Date:

Further work is required to define the scope of this activity

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Liaison Reports
None

Coordination Reports
None

Old Business
None

New Business

The I Subcommittee welcomes the following new members:

Will Knapek
Jeff Long
Bruce Mackie
Jim Niemira

NERC PRC-002-2; Project 2007 DME (Disturbance Monitoring Equipment) Update

Jeff Pond reported that this group is looking for industry input. The standard is being revised. Sign up via the NERC web site if interested.

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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 J Subcommittee met on Wednesday, May 15, 2013 with 16 members (achieving quorum 16/26) and 22 guests. There was a call for the approval of the minutes of the January 2013 meeting in Memphis. These minutes were approved unanimously by the subcommittee members.

The J SC approved a motion to establish WG J8 Improved Generator Ground Fault Protection Schemes. Russ Patterson Chair. Dale Finney Vice Chair.

The J SC approved a motion to establish WG J10 Modeling of Loss of Field/Out of Step Protection Schemes with Generator Excitation Controls. Mike Thompson Chair. Phil Tatro Vice Chair.

Reports from the WG Chairs

J2: Protection Considerations for Combustion Gas Turbine Static Starting

Chair: Mike Reichard
Vice Chair: Zeeky Bukhala
Established: 2005
Output: Report to the Subcommittee
Completion: 2009
Status: 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. Mike Reichard will work with Rattan Das regarding progress on the Transaction paper. We will review this in September. No meeting for the next session.

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

Chair: Sudhir Thakur
Vice Chair: Mukesh Nagpal
Established: 2011
Output: Report
Expected Completion: December 2014
Status: Sixth 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.

The Working Group met for a double session with 15 members and 25 guests present.

Gene Henneberg made a presentation on Double Blinder Settings calculations in the first session. There was good discussion on this subject and the calculation and the basis for various settings of the relay.

Other sections of the report were also reviewed and discussed. The comments were received from the members and these were incorporated.

Mike Thompson brought up and discussed his concern with section 3.13 of the NERC TRD Power Plant and Transmission System Protection Coordination, which says, "Out-of-step protection should not be applied unless stability studies indicate that it is needed and should be applied in accordance with the results of those studies." The concern is that NERC is discouraging the use of out of step protection unless stability studies are performed. There was good discussion on this subject. Phil Tatro of NERC suggested that the working group send an email to the Chair of NERC SPCS to resolve this concern. Working group chair will be drafting this email and after review by the group will be sending the same to Chair of NERC SPCS.

A few new assignments for writing the sections and also for reviewing the sections which are already drafted were made. July 15 is the assigned date for completing and submitting the assignments.

A double session with space for 40 persons and a computer projector is requested for the September 2013 meeting. The sessions need to be scheduled so as not to have conflict with K4 working group, as K4 chair Mukesh Nagpal is vice chair of this working group.

J6: Protection issues Related to Pumped Storage Hydro Units

Chair: Joe Uchiyama
Vice Chair: TBD
Established: 2009
Output: Transactions Paper
Expected Completion: TBD
Status: Ninth Meeting

Assignment: To review and summarize the trends of the last thirty-five (35) years of Pumped 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 the last thirty-five (35) years of industrial practices.

The WG met in Baltimore, MD on May 15, 2013 with five (5) members and eight (8) guests.

Joe Uchiyama welcomed to WG attendees, and briefly explained the status & goal of this WG. The meeting agenda was distributed and discussed. January meeting Minutes from Memphis were approved.

The survey result is 22 completed out of the 49 requested. Chairman brought an issue to the WG what to do the rest of non-responded utilities.

Non-Responded utilities list: In order to get better response of the survey, WG decided to divide the non-responded utilities' contact personnel list to the volunteers.
Jon Gardell (AEPP-Smith Mtn, Bear Sqamp, Seneca Kinzua, LCA-Buchanan),
Wayne Hartman (Army CORP-Degray, Caters, Harry Truman, Clarence Cannon)
Dale Finney (OPG-Sir Adam Beck, LCA-Buchanan)
Murty Yalla (GPC-Walles Dam)
Bob Pettigrew (Northfield Utility-Northfield Mtn, Rocky River)
Subharsh Patel (Phil EC-Muddy Run)
Joe Uchiyama (CWR-O'Neill, WD-Waddell, Xcel-Cabin Creek, CA WD-Oroville, CA-Thermalito)

WG also discussed to the outcome paper including following items:
This survey is basically comparison of the original survey conducted in 1975. Therefore, the format of this survey result will be similar to the original one.
The analysis and conclusion is based on the survey (existing schemes).
Chairman will send contact information of non-responded utilities (names, E-mail address and telephone numbers).

Next meeting will be 15 people and one session with computer projector.

J7: Avoiding Unwanted Reclosing on Rotating Apparatus
Chair: Mike Reichard
Vice Chair: Steve Conrad
Established: 2011
Output: Report to Subcommittee
Status: Fifth Meeting – Writing Assignments

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

The WG group met with a total 11 Members and 45 Guest. The WG membership consists of 25 members.

The January Memphis, TN meeting minutes were approved as written.

Mike Reichard chaired the meeting on TUESDAY, May 14, 2013 in Baltimore, MD. A double session was held. The first session was devoted to presentations by NERC/ES-ISAC and FERC-OEIS. Time Roxey discussed the history and present updates on the status of the "Aurora" tests. Barry Kuehnle presented a discussion of the "Anatomy of a Hacker", which gave insight as to vulnerability of cyber attacks.

During the second session Gene Henneberg presented a discussion of the attributes of system stiffness. Christian Paduraru discussed the application of delaying breaker closing to aid in the mitigation of undesired closing of breakers. Chuck Mozina discussed the pros and cons of HMDs relating to the GA Tech paper.

Next meeting in Albuquerque,NM schedule a double session with a CP and seating for 40 people.

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.
A motion to close and disband the WG was approved by the J SC.

JTF8: Improved Generator Ground Fault Protection Schemes
Chair: TBD (Russ Patterson)
Vice Chair: TBD
Established: Jan 2013
Output: Report to subcommittee
Status: Recommend WG be created

Assignment: To review new methods related to generator ground fault protection.

The task force met in Baltimore, MD with 24 in attendance. 13 attendees indicated they would be members if a WG is formed. In general terms the chair described the ground fault protection acceleration scheme developed by CFE in Mexico as well as the use of negative sequence current to decrease tripping time for generator ground faults. There was good discussion on the issues and it was noted that if the final report contained information that should be included in C37.101 or C37.102 that those documents could be opened before their present expiration dates of 2021 and 2022 respectively. It was also noted that if the standards are opened that other aspects (such as loadability) could be improved as well.

The CFE engineers will be asked if they can attend the next working group meeting and give their presentation and provide details to the group so that details and limitations of the new scheme can be evaluated.

If the subcommittee approves creation of the working group then we will meet in September 2013, with the need for a single session, computer projector and seating for 30 people.

Task Force JTF9: Plant Issues Associated with Black Starting of Generators
Chair: Chris Ruchman
V Chair:
Established: September 2012
Output: Report to Subcommittee
Expected Completion: 2014
Status: Second Meeting

The task force met on Wednesday, May 15, 2013 with 6 members and 9 guests.

Assignment: TBD

The group engaged in a general discussion on recent changes in black start resources and an effort to use large combustion turbines for black start.

Resources available for more information on black start were discussed. C. Ruckman will forward papers available to date for review and discussion. C. Ruckman will also perform a literature search for black start. C. Mozina will review the Stan Horowitz "blue book" for black start references. J. Gardell will review GE training course documentation for similar references.

It was agreed that the Task Force will examine three general categories of black start machines (hydro, engine and combustion turbine) for protective elements that may be impacted during black start scenarios. Once the at risk elements are identified, mitigation strategies will be developed. For the next meeting, T. Sawatzky will provide a typical hydro one-line, C. Ruckman will provide a typical combustion turbine one-line and W. Hartmann will provide a typical engine one-line.

Based on the review of these one-lines it will be determined if a survey would be beneficial. There is a general opinion that, due to NERC CIP, generators may be hesitant to provide information regarding their facilities.

At the next session, C. Ruckman will provide a short presentation of GE 7FA black start case study.

Assignments should be submitted no later than August 16, 2013.

A single session is requested for the next meeting.

JTF10: Modeling of Loss of Field/Out of Step Protection Schemes with Generator Excitation Controls

Chair: Michael Thompson
Vice Chair: Phil Tatro

Scope: Investigate the modeling of out of step and loss of field conditions and the coordination of generator excitation control systems with protection systems with the help of the Excitation Systems and Controls Subcommittee (ESCS) of the Energy Development and Power Generation Committee (EDPG) and the Power Systems Dynamic Performance Committee (PSDP).

WG Report
The working group met with 20 members and 12 guests.

Minutes of the January 16, 2013 meeting were approved unanimously.

Task force members discussed the proposed scope, noting past experience of the J5 working group, and various models for engaging the ESCS and PSDP. The task force discussed the benefits of a joint effort such as the C17 working group on Fault Current Contribution from Wind Farm Plants versus a PSRC working group soliciting input from the other subcommittees, and concluded the draft scope provides flexibility for the working group to form whatever relationships are necessary. The task force also discussed options for joint meetings including using WebEx meeting capability available through IEEE.

The task force expanded the scope to include activities that are mutually beneficial to the three groups such as improving the modeling of protective relays in power dynamic stability modeling software, and defining cases and parameters that may be used for the purpose of ensuring coordination of controls with generator protective relays.

The task force unanimously approved the following name and assignment for a new working group for consideration by the chair of the J subcommittee.

J WG ##, Modeling of Generator Controls for Coordinating Generator Relays.
Work jointly with the Excitation Systems and Controls Subcommittee (ESCS) of the Energy Development and Power Generation Committee (EDPG) and the Power Systems Dynamic Performance Committee (PSDP) to improve cross discipline understanding. Create guidelines that can be used by planning and protection engineers to perform coordination checks of the timing and sensitivity of protective elements with generator control characteristics and settings while maintaining adequate protection of the generating system equipment. Improve the modeling of the dynamic response of generators and the characteristics of generator excitation control systems to disturbances and stressed system conditions. Improve the modeling of protective relays in power dynamic stability modeling software. Define cases and parameters that may be used for the purpose of ensuring coordination of controls with generator protective relays especially under dynamic conditions. Write a report summarizing guidelines.

The requirements for the next meeting, if the working group is approved by the J subcommittee, are a single session, a meeting room for 40 people, and a computer projector.

Other Reports:

C17: Fault current contribution from wind farm plants
Report given by Gene Henneberg. Final report being coordinated between PSRC, Electric Machiery Committee, and T&D Committee

Liaison Reports

Electric Machinery Committee (EMC) **C. J. Mozina**
The Committee met at PES General Meeting in San Diego, CA--- July 22-26, 2012. The minutes for this meeting are posted on the EMC web site. EMC has formed a new WG on renewable energy. Items of interest to the PSRC are:

Generator Subcommittee – met on July 26, 2012.
WG4: Grid Induced Torsional Vibration – The WG held a panel session at the PES General Meeting which pointed out the need to document the output of studies on the topic of shaft fatigue. Suggestions included engaging ASME.
WG8: Comparison of IEEE C50.13 and IEC Machine Standards – The standard will be out for ballot the end of the year (2012). Member suggested EMC register with NERC to provide comments on NERC standards develop relating to machines.

Motors Subcommittee - The subcommittee has three active WGs working on standards:

1112 – Test Procedure for Poly-phase Induction Motors
P1812 – Trial guide for PM motors
1415 – Guide for Induction Machinery Maintenance

Renewable Energy Subcommittee - two new WGs were formed and one new WG proposed:
Ancillary Services
Standard Coordination
Proposed WG on Fault Contributions of wind turbines (The PSRC has a WG (C-17) on the subject and EMC is one of three PES Committees evolved)

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**
No report

NERC (related to rotating machinery) **J. Uchiyama**
PRC-027 (Power System Relay Coordination) which is separated from PRC-001 (Too many subjects were involved such as Personnel Training, Operations, etc.) - PRC-027 is concentrated into Protective Coordination, which is based on Short-Circuit studies (greater than 10% or more).
PRC-005-2 (Maintenance & Testing) 2nd round formal comment period.
PRC-023-2(Transmission Line Relay Loadability) – Needed to modify & Rebaqllote.
PRC-025-1 (Generator Relay Loadability-Backup Relays such as 21, 51V, 51s, etc) 1st formal balloting was done and the result was pretty bad.
NERC is initiating Project 2010-13-3 – Phase 3 of Relay Loadability DT (Stable Power Swings) - Anybody interesting this Drafting Team, please call Scott Barfield at 404-446-9689.

Coordination Reports
None

Old Business
None

New Business
Gary Kobet informed the J SC that C50.13 states that unbalanced current protection should use an I2 quantity that measures all harmonics, which would infer the use of true rms measurement. Most modern relays use fundamental frequency measurement only.

K: SUBSTATION PROTECTION SUBCOMMITTEE

Chair: M. J. Thompson
Vice Chair: D. G Lukach

The K-Subcommittee met on Wednesday, May 15, 2013 in Baltimore, MD, with 18 of 27 members and 28 guests in attendance. A quorum was achieved. Steve Conrad motioned to approve the January, 2013 subcommittee meeting minutes. Paul Elkin seconded. Vote was unanimous to approve.

John Wang has been added to the K subcommittee membership roster.

Reports from the WG Chairs

K1: PC37.245, GUIDE FOR THE APPLICATION OF PROTECTIVE RELAYING FOR PHASE SHIFTING TRANSFORMERS.

Chair: Arvind Chaudhary
Vice Chair: Lubomir Sevov
Established: Jan. 2012
Output: PC37.245, Guide for the Application of Protective Relaying for Phase Shifting Transformers
Expected Completion Date: Dec.2016

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 single session. Lubo Sevov acted as chair in absence of Arvind Chaudhary, and Eli Pajuelo acted as vice chair. Nine members and eight guests were present. After the introduction, a call for quorum was made followed by approval of the minutes from the January, 2013 meeting in Memphis. Motion for approval of the minutes was made by Mike Thompson and second from Dean Miller, and the minutes were approved.
The IEEE Patent slides were shown.
Lubo highlighted that contributions are important to be completed on-time, so that we make a progress with working on the guide. He presented the draft outline version 3.0 of the guide for discussion. The group reviewed the assignments from the previous meeting.
Charlie Henville, explained his proposed write up for Section 5 – Application and Theory of PSTs. Basically this section focus on the need and use of PST to control load flow, either between utilities of within a utility network. With regard to this, Gene pointed out a correction to the figure example.
Paul Elkin indicated that he will provide contributions for next meeting in September 2013, about: a) review of C57.135, and b) experiences with PST protection applications.
Joe Mooney was not present to indicate status of his contribution.
Charlie Henville, Mike Thompson, Eli Pajuelo and Lubo Sevov, discussed about the interaction of PST protection with other adjacent zones, but it was decided that those protections do not need a separate subsection in the guide.

Robert Dempsey mentioned about an application where a PST is connected directly to a line without breaker. Charlie, Lubo, Mike and Dean, discussed this application and it was decided that it was not part of the scope of this group.
Mike, Lubo and Dean discussed about the types of PST to use as base cases in the guide. It was decided to use the two most typical PSTs, and provide all the variations in separate subsections.
Lubo made a presentation on a 138/138 kV PST application of typical double core design, with wye wye exciter and a series winding with delta secondary and tap at fifty percent. The objectives of this work were to properly setup the transformer differential relay. One important point he mentioned is that some relays do not have connection type 3 or 9 (90 degree or 270 degree phase shift), because it is not part of the

standard transformer connection types. In his presentation, secondary current magnitudes and phase angles were derived for balanced conditions on neutral and maximum taps, as well as for several unbalanced through fault conditions to validate the correctness of the settings. This work used RTDS modeling and also presented actual waveforms from the PST in operation.
Eli, Charlie, Mike and Lubo, discussed about the limitations of RTDS simulation, or any other simulation, given the limited amount of information available from PST manufacturers. Certain parameters beyond the requirement by current standards should improve the accuracy of fault calculations and reduce the present risk of applications that use margins that may not be adequate.
Charlie, Mike, Eli and Lubo discussed about a maloperation caused by stray flux, and Charlie proposed that an ideal approach would be the testing of the overall protection scheme at the transformer manufacturer facility. However it was highlighted that manufacturers typically do not have the capability to test energization of transformers, as this is not a requirement by the current power transformer standards.
Assignments:
Eli to contribute with the short circuit study subsection of the guide.
Dean and Mike will contribute with schematics and phase connections subsection.

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: Sept. 2010.
Output: Papers – 1. Full Paper Report to the Sub Committee and Main Committee, and 2. Summary Transactions Paper
Draft 8; 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, 2013 with 7 members and 3 guests
Introductions were done and previous minutes were discussed.
Approval of the paper was discussed, with email approvals at 87%, no negative ballots, two members not responding.
We reviewed the paper, and discovered that the Appendix section on Thermography had somehow been omitted. This has been corrected along with the acronym for sudden pressure relays. Patrick Carroll is going to do a full editorial review of the paper prior to submitting it.
Expectations are to request permission from the "K" Subcommittee to send the full paper to the Main Committee for posting to the Report Section on the website, and then start the Power Delivery Transactions Summary Paper.

K4: (PC 37.95.2002): GUIDE FOR PROTECTION CONSUMER UTILITY INTERFACE
Chairman: Mukesh Nagpal
Vice Chair: Chuck Mozina
Established: 2008
Output: Guide Revision
Draft 12
Expected Completion Date: 2013

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

The WG met in a single session on Tuesday May14. A total of 4 members and 6 guests were present. A quorum was not achieved. The minutes of the January WG meeting were approved as written. Since the January meeting the WG has conducted two Webinar sessions to resolves a negative WG ballot and address editing issues. A WG ballot of the final draft (Draft 13R1) resulted in 100% WG approval to submit the document to the IEEE Standard Association (SA) for balloting. The document has been review by

Terminology Usage WG. The Chair will ask for the approval of the K Subcommittee to forward the document to IEEE SA for balloting.
Much of the meeting was spent discussing the steps to move the document toward completion. The plan is to forward the document to the IEEE SA for balloting immediately after the May PSRC meeting and to resolve comments from the balloting at the September PSRC meeting. The PAR will expire at the end of 2013 and an extension is likely to be needed if all comments received for SA balloting cannot be resolved at the September PSRC meeting.

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: Dec. 2016

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

Introductions/ Sign up sheet/Patent Slides/
Patent Slides shown.
Sign up sheet handed out.
Agenda handed out.
Draft 1.6 handed out.
Quorum met (15 voting members attended the meeting; required 13 for quorum).
Total attendees : 47.
January 2013 from Memphis meeting minutes shown and approved. Mike T. and Ray Y. made a motion to approve the minutes.
Roger then gave an overview of the on-line meeting progress. The group agreed that Wednesdays at 8:00 am Pacific Daylight Time would be the best for future meetings.
Presentation from Mike Thompson on 50BF Fault Detector pickup/dropout issues. Michael made this presentation showing several slides about how the breaker failure relay fault detectors are designed and how they might respond to certain test conditions. He suggested separating within the draft the discussion about scheme favoring fault detector pick-up over drop-out, from the scheme showing the logic of the timer measuring only the BFI signal and not yet the 50BF until after expiration. He also mentioned torque control of an electromechanical relay, switching in a static relay, measuring unfiltered data in a numerical relay as possible methods.
Detail of sections review :
Section 6.3
To add sentence about fault detector. To move it to another section for fault detector & use Mike Thompson Figure from his presentation. There was some discussion on 50BF overcurrent as fault detector vs current detector.
Roger will attempt to add some clarification to these descriptions as part of next draft 1.7 to be further reviewed. He will include words provided by Wayne Hartmann to describe methods internal to the numerical relays used to accomplish this. Also Jacob Lien volunteered to further describe the scheme based upon only timer logic arrangement.
Section 6.5
Discussion on whether a seal in is important or not & need for inclusion. Eric Udren presented his write-up and commentary about warnings of possible problems from false BFI signals when seal-in is used.
Suggestion to rewrite for better clarification on when to use seal in and when not to use seal in. Eric Udren to provide additional figures related to 6.5 and 6.6 Roger will edit for further review.
Section 6.7
Discussion on when do we need to use this scheme. Phil Tatro will add a few sentences in regard to using 52aa contacts for independent pole breaker failure application. Comment on figure/photo before section 7. To add arrow to indicate Ground CT Connection.
Figure 16.
Comment on moving this figure to the appendix. Also add a note that says that these examples are not all inclusive.

Asking all members to review this section 7.5 and provide comments. Roger and Phil Zinck will update 7.5 prior to further review for draft 1.7.

K6: SUDDEN PRESSURE PROTECTION FOR TRANSFORMERS
Chair: Randy Crellin
Vice Chair: Don Lukach
Established: May 2005
Output: Report
Expected Completion Date: September 2013
Draft 3.0b

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 15th, in a single session with 7 members and 1 guest. The working group currently has 13 members.
After introductions, the working group reviewed and discussed the following new writing assignments:

- Revisions to the Introduction – Pat Carroll
- Using SPR operations as a diagnostic device – John Boyle
- Transformer winding/core movement – Dean Miller and Elmo Price

At the completion of the meeting it was decided that the Chair and Vice Chair would consolidate these new assignments into the document and submit Draft 4 of the report to the working group by the end of June for final review. Based on the number of review comments received, we may need to schedule a webinar to resolve. Our intent is to submit the final documents to the subcommittee for review in August and then address the subcommittee responses during the September meeting in Albuquerque.

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 14, 2013 in Baltimore, MD with 5 members and 1 guest in attendance. We covered the status of 1547.7 (approved) and .8 (on-going), and progress on 1547.a which is an "amendment" to the IEEE 1547-2003 with focus on three areas:
- Voltage regulation (IEEE Std 1547 clause 4.1 General requirements sub-clause 4.1.1 Voltage regulation).
- Voltage ride through (IEEE Std 1547 clause 4.2 Response to Area EPS abnormal conditions sub-clause 4.2.3 Voltage)
- Frequency ride through (IEEE Std 1547 clause 4.2 Response to Area EPS abnormal conditions sub-clause 4.2.4 Frequency).

We discussed the amendment topics including the new voltage and frequency ride through tables that were created at the last 1547.a meeting met in Santa Clara CA week of 2-11-13. The next meeting is in Denver 6-12, 13, 14. The minutes for the Feb meeting are on the SCC21 web site under 1547.a "logistics" for anyone that would like to review them.

We then had open discussion of recent DG activity in member regions. If you need a password for the active 1547.8 working group, email me at geraldjohnson@basler.com.

K11: Open Phase Detection for Nuclear Generating Stations
Chair: C. Sufana

Vice Chair: M. Urbina
Output: Report
Assignment: Write a report to the K Subcommittee entitled Methods for Analyzing and Detecting an Open Phase Condition of a Power Circuit to a Nuclear Plant Station Service or Startup Transformer.
Introductions were done after a welcome by Chairman Charlie Sufana. There were 14 members and 15 guests in attendance.
The minutes from the January 2013 KTF11 meeting were read and approved. The May meeting is the first time to meet as a working group.
Charlie reported on the NEI (Nuclear Energy Institute, http://www.nei.org) teleconferences that he has participated in and indicated that they have interest in our work. He offered the K11 working group's assistance to the NEI efforts.
NEI and EPRI documents relating to the topic were also discussed. Everyone is encouraged to download the material.
There was also a review of the proposed outline and there is a need for additional authors. The outline has been expanded since originally developed at the January meeting as a result of 3 WebEx meetings that the working group has had.
.Discussion followed as to fine tuning the assignment and scope for the working group. There was debate as to what exactly the report should cover. Topics that were debated included:
1. Devices that can detect open phase conditions
2. Location of the detection devices. How deep into the generating station aux power should we go?
3. Should we look at only unloaded or lightly loaded cases? Should we look at loaded cases?
4. Transformer types and their effect on detecting an open phase conditions.

In order to keep this report on a fast track, everyone was asked to develop a working group assignment and scope. The suggestions are due Friday May 24, 2013.

K12: P1032 Guide for Protecting Transmission Static Var Compensators.
Chair: John Wang
Vice Chair: TBD
Established: May. 2013
Output: P1032 Guide for Protecting Transmission Static Var Compensators
Expected Completion Date: Dec.2016

Assignment: To work jointly with Substations WG I9 to write a guide for protecting transmission static var compensators. PSRC WG K12 will provide guidance and review on topics that are already covered in other IEEE guides to prevent overlap and identify areas where interpretation of existing guides is necessary to meet the specific application challenges unique to transmissions static var compensators.
IEEE approved project P1032 in December 2012, to develop a Guide for Protecting Transmission Static Var Compensators. The PAR was approved as a joint project between Substation committee and PSRC.
At the January, Nashville meeting, PSRC and K subcommittee officers decided to start the K12 working group to co-sponsor P1032, which was started under Substation WG-I9.
Substation WG-I9 meets JTCM in January, has a half-day meeting in April and a full-day meeting at PES summer general meeting.
K12 had its first meeting on Tuesday morning, May 11, 2013. 10 people attended. 6 volunteered to be members.
The chairman described the need to develop this guide. IEEE patent slides were shown.
The chairman attended the Substations WG I9 meeting on 04/29/2013 and described that it appears that I9 working group intends to develop a complete protection guide so future users of this document do not need to look for information elsewhere. It is the PSRC's position that the new document should not repeat information available in other existing IEEE standards or guides.
We briefly reviewed the latest draft/outline provided by the I9 working group and made initial assignments either to review material or, where sections are not yet written, to write some paragraphs to convey PSRC guidance on what scope is appropriate for the various chapters in the outline that fall under our technical scope.
The writing sections of the I9 outline that were discussed are summarized as follows along with writing assignments that accepted by members:
1. The approved scope of this guide sounds fine.
2. Normative References – We need to make sure all appropriate standards or guides are included. We also briefly discussed references and bibliography.
3. Definitions -Need to talk to Mal Swanson about this section. Need to add a list of acronyms.

4. No discussion
5. Calculation of Fault Current – Eli Pajuelo will review and provides comments
6. Instrument transformers – Martin Best will write something regarding to the use of magnetic VT versus CVT. Metering accuracy CT and VT may be needed for controller.
7. SVC protection - Casilla Nestor will provide some writings.
8. No discussion
9. Thyristor protection – Satish Samineni will provide initial writing.

The chair urged all that will be at the IEEE PES summer meeting at Vancouver in July, to try to attend Substation WG-I9's one full day meeting.
Last but not least, the working group needs a vice chair. Any one interested, please contact me, Mike, or Don.
K12 members may need to join as a corresponding member of WG-I9 to gain direct access to I9.

New Business:

Working group K1's chairman, Arvind Chaudhary has been unable to attend regularly and has resigned. We thank Arvind for his contributions. Lubomir Sevov will replace Arvind as Chairman. Charlie Henville will serve as vice chair.

The subcommittee discussed planning methodologies for the multiple Guides within the K scope that will be expiring within the next few years. The consensus is to spread the work out over time, but leave enough time to finish the Guides before the PARs expire. Results of the discussion led to two new Task Forces and one Guide that will be reviewed in the future:

KTF13 **PC37.116 IEEE Guide for Protective Relay Application to Transmission-Line Series Capacitor Banks** (Chairman Ilia Voloh, Vice-Chair Joshua Park)

KTF14 **PC37.91 IEEE Guide for Protecting Power Transformers**
(Chairman Will English, Vice-Chair Steve Conrad)

C37.112-1996 IEEE Standard Inverse-Time Characteristic Equations for Overcurrent Relays. Charlie Sufana commented that the 2009 reaffirmation had very high approval percentages and very few comments. Thus, a high level of confidence exists to reviewed it at a later time.
Ratan Das proposed that a Task Force be developed on centralized substation protection and control. It is not clear that the work belongs in K. Thus, the proposal was placed on hold pending officer discussion. A total of four attendees were interested in the topic,

Old Business:

No Old Business was discussed.

General Discussion:

No general discussion took place.

VII. PRESENTATIONS:

There were two presentations:

- Ilia Voloh - WG K8 -C37.99-2012, "Guide for the protection of Shunt Capacitor Banks"
- Bruce Mackie - WG D2: C37.104-2012 "Guide for Automatic Reclosing of Line circuit Breaker for AC Distribution and Transmission Lines"

VIII. The meeting was adjourned by Chairman Roger Hedding at 11:30 AM.