**POWER SYSTEM RELAYING COMMITTEE**
**OF THE IEEE POWER and ENERGY SOCIETY**
**MINUTES OF THE MEETING –Final-Approved**
**January 17 2013**
**Memphis, TN**

**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 September meeting in Portland was approved with noted corrections. January meeting was a joint meeting with T&D and there were no financial obligations from PSRC.

.

**Chairman's Report Roger Hedding**

There was no report from the chairman

**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**

| | |
|---|---|
| May 12-16, 2013 | Tremont Plaza Hotel, Baltimore, MD |
| Sept. 8 -12, 2013 | Hotel Albuquerque at Old Town Albuquerque, NM |
| Jan. 2014 | JTCM |
| May 11-15, 2014 | Hyatt at Pier 66 Fort Lauderdale |
| Sept. 8–11, 2014 | Pfister Hotel - Milwaukee, WI |

Futures places and dates are under development.
.

## B. CIGRE B5 Activities Report - Adamiak

The CIGRE US Grid of the Future symposium was held from Oct 28-30, 2012 – during Hurricane Sandy. As per the title, preferential subjects included all aspects of power systems in the future.

The 2013 B5 Colloquium in Belo Horizonte, Brazil from August 25-31. The Preferential Subjects (around which papers are requested) 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

Those wishing to offer a paper as contribution to the Colloquium addressing one of the Preferential Subjects are invited to send the synopsis of the proposed paper to the Secretary of the Study Committee B5, Mrs. Rannveig Loken (rannveig.loken@statnett.no) before January 31st, 2013. Details of the meeting can be found at:

http://b5.cigre.org/Events/Cigre-Events

The Preferential Subjects for Paris 2014 (for those who like to plan ahead) 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) will meet on May 1-3, 2013 at the I&CPS Conference in Stone Mountain, GA. 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.

**Arc Flash –** The IAS is the home of IEEE standard 1584, a key Arc Flash standard. The WG that is updating this standard will meet at the IAS Safety Workshop Mar. 11-15, 2013 in Dallas, TX. There is a CD-ROM available on IEEE Explorer web site that corrects errors in the original 1584 incident energy calculations. Future changes in the standard are being driven by results of Lab. Tests. 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 manufacture 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 with Danny Ligget of DuPont as the first Committee chair.

**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 no voting documents in front of it at the moment, and nothing controversial is expected in the near future. TC 95 has a plenary meeting in Beijing in November, attended by Murty Yalla for the US National Committee.

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 need to propose US experts who would like to participate. 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 95 *functional* standards are developed by MT4 under Murty Yalla. MT4 published functional standards 60255-151 (overcurrent relays – updated and international upgrade of C37.111) and 60255-127 (over- and under voltage relays). Current status of new functional standards:

- 60255-121 – Distance relay functional requirements – ready for early 2013 circulation as FDIS – final draft International Standard for vote of member nations. This has been reviewed and heavily commented by PSRC WG D21 and issues have all been resolved in prior comment cycles.
- 60255-149 – Thermal electrical relays - ready for early 2013 circulation as FDIS – draft International Standard for final vote of member nations.
- 60255-187-1 – Functional requirements for biased (percentage) differential relays - differential protection of generators, motors, transformers and reactors. This won't be ready for member nation comments until later in 2013. Parts 2 and 3 on bus and line differential respectively are due in 2014.

Other current TC 95 standards:

- 60255-26 Edition 2 – EMC Requirements for Relays – November CDV passed, with only the US voting negatively due the IEC's weak radiated EMI test thresholds, a least 6 db below IEEE levels. We knew this won't be fixed, and the FDIS will be out in 2013 Q1.
- 60255-27 Edition 2 – *Product Safety for Relays* – the December CDV passed and the FDIS will be out in 2013Q1.
- 60255-24 COMTRADE standard - After behind-the scenes negotiations between certain European national committee voters and the PSRC WG, the IEEE draft was revised and passed; a corresponding IEC voting draft (CDV) has been successfully balloted by national committees. So IEEE and IEC versions of COMTRADE remain separate documents that are, through back-channel efforts, technically identical and the IEC version will be going for FDIS vote.
- 60255-118-1 Synchrophasor measurement standard – a joint IEEE-IEC WG has been agreed and will begin its work with a new version of IEEE C37.118.1 measurement standard now being updated by PSRC WG H11.

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

**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 September 2012, meeting of the PSRC are as follows:

**RevCom Activity:**

***Standards Approved***

| | |
|---|---|
| C37.96 | Guide for AC Motor Protection |
| C37.99 | Guide for the Protection of Shunt Capacitor Banks |
| C37.102 | Guide for AC Generator Protection |

***Standards submitted for approval***

| | |
|---|---|
| C37.111 | Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems |
| PC37.236 | Guide for Power System Protective Relay Applications over Digital Communication Channels |
| PC37.242 | Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMU) for Power System Protection and Control |

***Standards due for 10 year review***

None

**Ballot Activity:**

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

| | |
|---|---|
| PC37.98 | Standard Seismic Testing of Relays |
| PC37.244 | Guide for Phasor Data Concentrator Requirements for Power System Protection, Control, and Monitoring |

**NesCom Activity:**

***PARS approved***

| | |
|---|---|
| PC37.237 | Standard Requirements for Time Tags Created by Intelligent Electronic Devices - COMTAG(TM) |

***PAR Extensions (applied for)***

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

***PAR Extensions approved)***

| | |
|---|---|
| PC37.98 | Standard Seismic Testing of Relays |
| PC37.236 | Guide for Power System Protective Relay Applications over Digital Communication Channels |

***PARS expiring at the end of 2013***

| | |
|---|---|
| C37.95 | Guide for Protective Relaying of Utility-Consumer Interconnections |
| PC37.98 | Standard Seismic Testing of Relays |
| PC37.236 | Guide for Power System Protective Relay Applications over Digital Communication Channels |
| C57.13.3 | 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 |
| PC37.241 | Guide for the Application of Optical Instrument Transformers for Protective Relaying |

| | |
|---|---|
| PC37.242 | Guide for Synchronization, Calibration, Testing and Installation of Phasor Measurement Units for Power System Protection and Control |
| PC37.243 | Guide for Application of Digital Line Current Differential Relays Using Digital Communications |

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

| Submittal Deadline | Meeting Date |
|---|---|
| January 24, 2013 | March 5, 2013 |
| May 03, 2013 | June 13, 2013 |
| July12, 2013 | August 22, 20134 |
| October 21, 2013 | December 10, 2013 |

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

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

**Working Group Reports (See below)**
**New Business**

- Discussed potential structure for new standard based upon LEMNOS, which had started at 1711.4, but discussion changed that to 2030.102.x for each profile. It is ok for a working group to manage more than one standard.
- Secretaries are needed for working groups. While vice chairs are important in SUBS P&Ps, the secretary is required for IEEE SA. If no volunteers, it is suggested that existing vice chairs be secretaries and other chairs volunteer to vice chair other working groups.
- Next meetings
  - April 28 - May 2, 2013
- Substations Annual Meeting
- Pittsburgh, PA
  - September 8-12, 2013
- Joint Meeting with PSRC
- Albuquerque, New Mexico
- C37.238 will be revised and we have requested PSRC H to agree to joint sponsorship again
- Look at splitting C37.1 into one standard and one guide
- PAR to be submitted for 1613.2 to address AC surges on phone lines. Marc LaCroix has agreed to chair.

**C1: IEEE 1686 Standard For Substation IED Cyber Security**
**Chair: S. Sciacca**
**Vice Chair: M. LaCroix**
**Secretary:**
**Output: Standard**
**Expected Completion Date:**

- Ballot comment review was started.

**C2: IEEE 1613 Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations**
**Chair: J. Tengdin**
**Vice Chair: L. Smith**
**Secretary:**
**Output: Standard update**
**Expected Completion Date:**

Did not meet.

**C2.1: IEEE 1613.1 Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Transmission and Distribution Facilities**

**Chair: J. Tengdin**
**Vice Chair: L. Smith**
**Secretary:**
**Output: New Standard**
**Expected Completion Date:**

Reviewed draft and preparing to go to ballot.
Presentation by Jerry Ramie from ARC Technical about closing gaps in the IEEE Transient Test Standards while communication is underway

1. Surge Immunity Tests (per IEC 61000-4-5)
2. Immunity to conducted disturbances induced by radio frequency fields (equivalent to IEC 61000-4-6)
3. Power frequency magnetic field immunity test (equivalent to IEC 61000-4-8)
4. Pulsed magnetic field tests (equivalent to IEC 61000-4-10)
5. Test for immunity to common mode disturbances in the frequency range of 0 Hz to 150 kHz (equivalent to 61000-4-16)

**C3: IEEE C37.1 Standard for SCADA and Automation Systems**
**Chair: C. Preuss**
**Vice Chair:**
**Secretary: Vacant**
**Output: Standard**

1. Reviewed IEC 62351-10:2011, "Security Architecture Guidelines"

2. 20 months to go until ballot – what to work on?

    a. Interfaces that include IEC 61850 and update NIST IR 7628

    b. Table alarm management

    c. What to do with the I/O requirements: 1613.2?

    d. Handling controls from multiple masters

    e. Logging of high speed data

    f. USB ruggedness

    g. Communication cables being handled in IEEE 525 update

    h. HMI ergonomics

    i. Substation gateway/server comparison

    j. FAT/SAT

    k. System point count and handling

**C4: IEEE XXXX Draft Standard for SOE Time Stamping Requirements for Substation IEDs**
**Joint with PSRC**
**Chair: M. LaCroix**
**Vice Chair:**
**Output: Standard**

**Discussion over initial draft.**

**C5:** **IEEE C37.2 Draft Standard for Electrical Power System Device Function Numbers and Contact Designation**
**Chair: M. Dood**
**Vice Chair:**
**Output: Standard update**

Discussed ideas for changes

1. Discussion of device 16
    a. Is management a requirement?
    b. What is a terminal server (serial server, port server, etc) – decided on 16EP with definition of P as a second suffix for terminal server (serial server, port server, etc)
2. SEC for security gateway
3. Additional logical node cross references in Annex D. 61850-5 has a cross-reference, too, and edition 2 is in the process of being published. It refers to C37.2-2008.
4. RIO – clear up what the intent is of "repository" and whether it is required or not will help define whether a merging unit should be considered
5. Discussed CCM (close circuit monitor) as complement to TCM (trip circuit monitor)
6. FDC – fault data concentrator, agreed it would be added because seen as a trend
7. Looking into DDR definition, what we have may be too specific given other industry definitions

**C6** **Trial Use Standard for a Cryptographic Protocol for Cyber Security of Substation Serial Links (P1711)**
**Chair: D. Whitehead**
**Vice-Chair: Andrew Wright**
**Output: Standard**

The C6 working group met under new work to revise the standard to account for known issues. PAR needs to be modified from trial use to full use standard.

The agreed upon approach for PAR is the following:

1. Submit a new PAR for 1711 to address PNNL concerns about "hygiene"
2. Later modify the PAR.
3. The submit other PARs for 1711.1 and .3.

**C7** **IEEE 1588 Profile for Power System Applications**
**Chair: T. Tibbals**
**Vice Chair: M. Dood**
**Output: Standard**
**Established: 2013**

SUBS requested to be joint with PSRC again on the revision to this standard. See the PSRC report.

**C8** **IEEE 1615 Recommended Practice for Network Communications in Substations**
**Chair: J. Gould**
**Vice Chair:**
**Secretary:**
**Output: Standard**
**Established: 2011**

Working group met and reviewed the present draft.

**C9: IEEE 1646 IEEE Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation**
**Chair: J. Tengdin**
**Vice Chair: D. Holstein**
**Output: Standard**
**Established: 2009**
**Expected Completion Date: 2010.**

The C9 working group did not meet.

**C10: IEEE PC37.240 Standard for Cyber Security Requirements for Substation Automation, Protection and Control Systems**
**Joint Chair: T. Tibbals**
**Vice Chair:**
**Output: Standard joint with PSRC H13**
**Established: 2008**
**Expected Completion Date: 12/2012**

Met joint with PSRC and the working group is getting ready to go to ballot. See PSRC report.

**C11: PC2030.101 IEEE Recommended Practice for the Design and Implementation of Time Synchronization Distribution Systems for Substation Automation**
**Chair: J. Bougie**
**Vice Chair:**
**Output: Standard**
**Established: 2012**
**Expected Completion Date:**

The chair was unable to attend so meeting was chaired by Craig Preuss. Reviewed the approved PAR. Most of the discussion centered around the scope's assumption that the clock and IED are accurate, leaving the scope's focus of the "black box" of the distribution system. The problem identified that proper testing of the distribution network will require certain features in the clocks and end devices to be used. To remain as is, this recommended practice needs to reference a standard(s) for clocks and end devices that does not exist. Another approach discussed is to "swap" the scope, making it a standard with informative annexes about how to do the design.

**C12: IEEE 1815 IEEE Standard for Electric Power Systems Communications - Distributed Network Protocol (DNP3)**
**Joint Chair: L. Smith**
**Vice Chair: A. West**
**Output: Standard**
**Established: 2009**

Met and discussed the recent and planned work of the DNP3 tech committee:

1. Many editorial changes

2. Technical bulletin TB2012-001 that includes simplified support for broadcast messages to address cyber security concerns

3. Change to start up sequences, tightening them up a bit

4. Updated XML schema available from website and encouraged its adoption

5. Application note for PV control

6. Worked on test procedures

7. Worked on secure authentication update

8. Worked on master station tests

Discussed DNP3 technical notes and what exists versus creating new guide(s) as 1815.3+. The DNP3 tech committee is concerned only with the protocol itself, and not system implementation issues. It was agreed to solicit requests from the DNP3 users on areas that would benefit from the creation of such a guide. Methods of asking for these ideas were discussed and agreed upon.

**C13:** **IEEE C37.115 IEEE Standard Test Method for Use in the Evaluation of Message Communications between Intelligent Electronic Devices in an Integrated Substation Protection, Control, and Data Acquisition System**
**Joint Chair: J. Tengdin**
**Vice Chair:**
**Output: Standard**
**Established:**
**Expected Completion Date:.**

The C13 working group did not meet.

**C14:** **IEEE P1815.1 Draft Standard for Exchanging Information between networks Implementing IEC 61850 and IEEE Std 1815 (DNP3)**
**Joint Chair: L. Smith**
**Vice Chair: R. Farquharson**
**Output: Standard**
**Established: 2010**
**Expected Completion Date: 2012**

The working group is presently balloting the standard. Comments were reviewed.

**C15:** **PC2030.100 Recommended Practice for Implementing IEC 61850 Substation Automation Systems**
**Joint Chair: R. Liposchak**
**Vice Chair:**
**Output: Standard**
**Established: 2012**
**Expected Completion Date:**

The working group reviewed the present draft and what direction the work needs to go.

**C16:** **XX.XX LEMNOS**

**Joint Chair: J. McGuire**
**Vice Chair:**
**Output: Standard**
**Established: 2013**
**Expected Completion Date:**

A meeting was held to discuss the PAR being developed. A brief overview of LEMNOS was provided. Discussed how to move forward, since LEMNOS has a couple of profiles complete, but knows others would quickly follow. Discussion also centered on getting the standard developed quickly, which seemed to go against having all profiles in one standard. Numbering approaches were discussed, with recognition of 802.11a/b/g/n familiarity in the industry but no one understood how that numbering scheme developed. Assigning multiple standards to C16 was also discussed and seemed to be a non-issue as long as it was OK with IEEE-SA and C0. It was decided to approach IEEE-SA at the C0 meeting to discuss numbering approaches.

## 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. Six-month status reports are due from Transmission Planners on March 4. Data for buses 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. A draft interpretation of TPL-003 and TPL-004, clarifying the extent to which the planning standards require assessment of protection system single-points-of-failure achieved 72.57% industry approval on its initial ballot. The drafting team is considering and responding to comments and, if no substantive changes are made, a recirculation ballot will occur in late-January or early-February.

b. Order 758: The NERC Planning Committee approved the SPCS and System Analysis and Modeling Subcommittee (SAMS) report on considerations for maintenance and testing of autoreclosing relays. In response to FERC Order No. 758, this report recommends specific autoreclosing applications for inclusion in a future revision of PRC-005, as well as minimum maintenance activities and maximum intervals that are similar to those in PRC-005-2 for protective relays of similar design. The SPCS is also working on a report recommending minimum maintenance activities and maximum intervals for sudden pressure relays and is consulting with the PSRC K6 Working Group, IEEE Transformer Committee, and North American Transmission Forum.

c. Special Protection Systems (SPS): The SPCS and SAMS presented a draft report on their assessment of the definition of SPS, SPS-related protection and control (PRC) standards, and existing regional practices related to SPS. SPCS and SAMS will review comments, update the report, and submit a final draft for PC approval at their March meeting. 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 SPCS submitted a draft report to the PC in December 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. A final draft will be submitted for approval in March.

2. Standards Activities

a. Protection System Maintenance and Testing: The standard was adopted by the NERC Board of Trustees on November 7 and will be filed with the appropriate regulatory authorities.

b. Protection System Misoperations: The drafting team has revised the standard and responded to comments from the 45-day formal comment and initial ballot period that ended September 7. The standard will be posted in January for a 30-day formal comment period and concurrent ballot during the last 10 days of the posting.

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 quorum of 76.47% and a weighted segment approval of 33.23%.

d. Generator Relay Loadability: The standard was posted for a 30-day formal comment period ending November 5. The drafting team is responding to stakeholder comments and the standard will be posted in late-January or early-February for a 45-day formal comment period and concurrent initial ballot during the last 10 days of the posting.

e. Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection: PRC-019-1 was posted for a 30-day formal comment and recirculation ballot period that ended December 21. The successive ballot achieved quorum of 85.87% and weighted segment approval of 73.63%. The standard will be presented to the NERC Board of Trustees for adoption and then filed with the appropriate regulatory authorities

f. Generator Performance During Frequency and Voltage Excursions: PRC-024-1 was posted for a 30-day formal comment and successive ballot period that ended January 11. The successive ballot achieved quorum of 77.85% and weighted segment approval of 60.47%. The drafting team will consider all comments received during the formal comment period to determine next steps.

3. Other Protection System Activities

a. Protection System Misoperations: The PC formed a task force to analyze relay misoperation data, research root causes, and develop industry recommendations to reduce future relay misoperations. A report will be presented to the PC in March.

## 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 did not met on January 15th, 2013 in Memphis, TN.

The minutes of the last meeting were reviewed and approved via email.

**Awards to be presented at Memphis were: (note not all persons were there to receive)**

2011 Distinguished Service Award – Tarlochan Sidhu
2012 Distinguished Service Award – Bob Pettigrew
2012 PSRC Outstanding WG – Bus Guide
2012 PSRC Prize Paper – SIPS
2012 Special Recognition – Mal Swanson

WG C37.234: Guide for Protective relay Applications to Power System Buses

Kasztenny, B. (Chair); Conrad, S.(Vice Chair); Beaumont, P.; Behrendt, K.; Bolado, O.; Boyle, J.; Brunello, G.; Burger, J.; Calero, F.; Chano, S.; Dalke, G.; Darlington, A.; DoCarmo, H.; Fontana, D.; Gajic, Z.; Holbach, J.; Kojovic, L.; Lopez, F.; Lukach, D.; McGinn, D.; Miller, J.; Mysore, P.; O'Brien, J.; Pickett, B.; Sambasivan, S.; Sessler, G.; Skendzic, V.; Smith, J.; Tholomier, D.; Thompson, M.; Uchiyama, J.; Ware, D.; Weers, D.; Whittaker, R.; Young, R.; Zocholl, S.

H16: PC 37.239 Common Format for Event Data Exchange (ComFEDE) Chair: M. Adamiak
H20: IEEE Standard for Naming Time Sequence Data Files Chair: E. Allen
J9: Motor Bus Transfer Chair: J. Gardell
H18: Cyber Security for Protection Related Data Files Chair: A. Makki
I3: Relay Functional Type Testing Chair: Jerry Jodice
C11: 37.233 Guide for Protection System Testing Chair: Vahid Madani
H8: Application of COMTRADE for Exchange of Synchrophasor Data Chair: E. Allen
H10: Naming Installed Intelligent Electronic Devices (IEDs) Chair: R. Cornelison
H15: Coupling Redundancy for Protection Systems Using Power Line Carrier Chair: R. Ray
I6: Practical Aspects of Rogowski Coil Applications to Relaying Chair: Ljubomir Kojovic
I17: Trends in Protective Relaying Performance Chair: Mark Carpenter
J8: Generator Tutorial Revision Chair: Michael Thompson
K5: Application Of Common Protective Functions In Multi-Function Relays Chair: Simon Chano

I Subcommittee Chair: B. Beresh
K Subcommittee Chair: P. Mysore
H Subcommittee Chair: Veselin Skendzic
J Subcommittee Chair: K Stephan

**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 Memphis PSRC meeting was 200, which is considered a healthy number for us.

19 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, local PES chapter and university people to attend. Two engineers from Memphis Gas, Light and Water 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**
Group did not meet.

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

A. There were no new Main Committee members announced
B. There were no new Fellows announced
C: Motion to get conditional approval to proceed for balloting of the H13 WG output: "Understanding Requirements and Applications of the Substation Cyber Security Standards", was requested by Eric Udren, The was moved by Jerry Jodice and seconded by Steve Conrad. And was approved unanimously.

## VI. SUBCOMMITTEE REPORTS

### C: SYSTEM PROTECTION SUBCOMMITTEE

**Chair: S. Ward**
**Vice-Chair: J. O'Brien**
The C System Protection Subcommittee met on Wednesday, January 16, 2013 in Memphis, TN with 22 members and 36 guests in attendance. Quorum was reached.

Minutes of the September 2012 Subcommittee meeting were approved.

Three new members to the subcommittee; Bui Dac-Phuoc, Fred Friend and Vasudev Gharpure, were introduced.

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

PSCE liaison report: Nothing to report.

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

**OLD BUSINESS**

None

**NEW BUSINESS**

C37.117 *Guide for the Application of Protective Relays Used for Abnormal Frequency Load Shedding and Restoration* will expire in 2018. The subcommittee agreed to form a task force to start the revision process. Ken Behrent 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 January 16, 2013 at 8:00 am. Individual introductions were made and attendance was taken. 15 members and 16 guests were in attendance.

The meeting began with a review and clarification of the group's assignment. The present draft report was reviewed.
Each section was discussed and members volunteered to review and add material where necessary.

Contributions by Phil Beaumont and Roy Moxley were presented, complementing several sections of the document.

After some discussions it was concluded that after the update of the existing draft of the report (to be completed by the end of February 2013), it will be posted on the working group web-page so the members of the working group can review and comment. The goal is to finalize the report to be uploaded on the web-page before the end of April 2013.

**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 January 15, 2013 in Memphis, TN in a double session with 32 attendees (21 members and 11 guests) in the first session and 16 attendees (12 members and 4 guests). Quorum was achieved in the first session. September 2012 meeting minutes were approved.

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:
- PC37.244 first recirculation was completed
- 4 negative votes changed, 2 negative votes remain (one with no comments)
- Next recirculation to be started as soon as received comments are addressed

Comments resolution followed. Comments from Craig Preuss and Ken Martin were discussed. Resolutions to technical comments were agreed by the group, modifications were captured in the updated PC37.244 draft.

Working Group officers stated that the updated draft will be circulated to the Working Group Members shortly for review and vote on proceeding to the next recirculation. The goal is to meet January 24, 2013 IEEE RevCom submission deadline.

**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 January 16, 2013 in a single session. The session was chaired by Farnoosh Rahmatian. There were participation from 11 members and 4 guests. We had quorum of members (11/17).

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

All participants introduced themselves.

The minutes of the Sep 2012 meeting were reviewed and approved with a quorum of the members. (Motion for approval – A. Goldstein seconded by J. Murphy).

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

- Held several teleconferences to resolve the comments received during the second and third re-circulations.
  - All comments have been resolved
- Draft 12 has been voted on with no negative ballots
- D12 is submitted to RevCom for Jan 23, 2013 session.
- Presumably, we will have some editorial work before publication

Will focus the effort of the WG in the coming months on preparing a summary Transaction paper and presentations for industry events (including IEEE PES GM 2013). J. Murphy, A. Goldstein, and S. Meliopoulos volunteered to help with the table of content for the transaction paper.

### 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 not planning a meeting in May 2013.

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

**Chair: Jim O'Brien**
**Vice Chair: Alla Deronja**
**Output: IEEE Report**
**Established: May 2007**
**Expected Completion Date: Dec 2012**

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

Working group C14 met on January 15, 2013, in Memphis, TN, in a single session chaired by Jim O'Brien with 8 members and 17 guests present. One guest joint a working group as a member.

The report was previously approved by the working group and sent for balloting by Subcommittee C. Most of the members of the Subcommittee approved the Report and submitted their comments. One person disapproved the Report, and few did not vote.

The latest draft of the Report and the list of the compiled comments provided by the Subcommittee C members were distributed. The chair has resolved most of the comments before the meeting; at the meeting, the working group addressed the remaining comments.

A couple of the writing assignments were made in the result of the ensuing discussion:

1. Allen Goldstein will add to section 2.5 on impact of reporting rates and latency to provide explanation which additional or different criteria are needed for protection systems and why.
2. Ken Martin will add explanation for table 3.1 as to what phasors, both analog and digital, are comprised of.

Other notable revisions will include adding a section listing all the acronyms used in the report and moving the informative, but not protection, applications described in sections 4.3, 4.5, 4.6.2, and 4.12 to an Appendix.

All new assignments are due by February 4th, 2013.

The Report was accepted by Georgia Tech for the May 2013 relay conference. Alla Deronja will prepare a Power Point presentation for this conference and one of the future PSRC Main Committee meetings.

## C15: Design and Testing of selected SIPS

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

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

Working group C15 met on Tuesday, January 15, 2013 in Memphis, TN, in single session chaired by Yi Hu with 4 members and 4 guests attending.

Yi Hu reported the approval of the report by PSRC officers to the working group, and the results of initial paper submission activities. Working group members reviewed and edited the summary of the report, and decided on the following action items:

- Working group chairs to distribute the edited summary to working group members for review and comments. Then finalize it for submit to targeted conferences.
- Start the preparation of presentation slides in preparation for reporting at main committee meeting and targeted conferences.

- Working group chairs will send request to contributors to relevant sections of the report to initiate the process
  - Draft slides will be reviewed and discussed at next WG C15 meeting
- Follow-on with conference submission and PAC magazine announcement

The working group will meet at next PSRC meeting in one session to review and finalize the draft presentation slides and the paper submission status.

**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 13 Jan 2013 Monday afternoon with 7 members and 12 guests attending

The working group discussed review comments received for draft 3.2 of the report. Draft 3.3 was issued just prior to the meeting.

All assignments due on 15 April 2013

The following assignments were made:
Mike Thompson: - revise 1.1.2
Kevin Donahoe: - revise paragraph 2 of 1.1.3
Raluca Lascu: - revise figures
Tony Seegers: - revise 1.2.1 per comment on line 22
Ken Behrendt: - revise 2.3
Brian Boysen: revise 2.6.3

**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 Joint Working Group met in conjunction with the PSRC meeting in Memphis, TN on Tuesday January 15, 2013 with 17 members and 27 guests. Introductions were made and the assignment for the working group presented. Minutes from the September 10, 2012 meeting were distributed. These minutes had been emailed to the working group members prior to the meeting. The minutes were approved.

The report was emailed earlier for WG members' approval, which requires at least 75% of members to vote affirmatively. To date only 65% of the members have participated; at least four more votes are needed. Dean Miller knows who has not voted and will be making direct contacts to obtain the needed participation.

Substantial progress has been made in editing the comments into the report. Almost all changes are incorporated in the new version 9.02 (distributed to members by email prior to this meeting). There were six additional comments/issues discussed during this meeting:

a. Section 3.1, add a diagram similar to Figure 3-15
b. Section 3.2.1, incorrect labels for rotor resistance
c. Section 3.2.1, reference for equation 3.8
d. Section 3.2.1, controls for rotor resistance
e. Section 3.2.2, how to obtain V' from PSCAP
f. Section 6.2.3, concern about ideal current source model

WG members provided direction to resolve these issues. Edits will be incorporated in the next version of the report, which should be available by March to be forwarded to the PSRC System Protection "C" subcommittee for membership review and balloting.

The revised report incorporating "C" subcommittee comments will then be passed to the officers of the PSRC, Electric Machinery Committee, and T&D Committee 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 to the T&D and Electric Machinery committees' sites.

The next C-17 meeting will be during the PSRC meeting, May 13-16, 2013, in Baltimore, MD.

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

**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 January 16, 2013, in Memphis, TN, in a double session chaired by Alla Deronja with 11 members and 30 guests present. Two guests joined the working group as new members.

The purpose of this working group is to write and industry-wide IEEE Guide for the transmission to generation interconnections driven by the following reasons:

1. Separate ownership of transmission and generation.
2. Power producers, being connected to the power grid, may fail to install the adequate protective equipment at the point of interconnection because of the limited expertise of their consultants and/or desire to install the facilities with the least possible cost.
3. Many utilities have interconnection agreements with power producers. Although independent and specific for different regions, they ought to have many commonalities, which can become a

part of the industry-wide standard and drive the application consistency. At the same time, different acceptable practices will be also outlined in an industry-wide standard.
4. An industry-wide standard will make transmission to generation interconnection protection more consistent among the various utilities and will support NERC reliability standards.
5. Transmission entities will have a better reference – the industry-wide standard - to justify their requirements to protect their systems and customers from a negative effect of a failure of a single generator or generating facility.
6. The protection requirements in individual interconnection agreements will be based upon the industry-recognized standard.
7. Power producers and their consultants will be educated based on the industry-recognized standard rather than on individual interconnection agreements of various utilities.

In the first session, the working group concentrated on addressing the issue with the present Scope and Purpose of the future Guide. The absence of the generator MVA limit (greater than 10 MVA) and voltage limit for transmission system from the Guide's Scope caused a concern with the IEEE SCC21 Standards Coordinating Committee on Fuel Cells, Photovoltaics, Dispersed Generation, and Energy Storage as potentially infringing on the work of the 1547 Series of Interconnection Standards, which deal with interconnecting distributed resources with electric power systems. Therefore, obtaining the PAR for the Guide was put on hold.

The previously added statement to the Guide's Scope and Purpose - ***This Guide does not cover distributed energy resources*** – was not enough to satisfy the SCC21 members. A suggestion to the working group was to write a report first and then convert it to a guide later. However, the underlying problem with the all-inclusive Scope would remain and the industry guide is long overdue.

Therefore, the chair proposed to include the generator MVA limits in the Scope and Purpose, and the working group members concurred. While we place a boundary in the future Guide, we retain 95-99% of its Scope.

Another issue was which voltage level limit to specify for the transmission systems. The previously proposed 23 kV and above limit was questioned as to its source and also appeared to cause tensions with the SCC21 because 23 kV is perceived to be a distribution system voltage level. The industry does not appear to have clear definitions on the voltage levels for the transmission vs. distribution systems. It is, however, generally considered that sub-transmission system voltages are 46 kV and above.

According to Phil Winston, the voltage limit did not need to be included in the Scope. The working group has made a decision that the Guide would be generally applicable to sub-transmission and transmission systems 46 kV and above.

The revised proposed Scope and Purpose for the Guide are as follows:

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.*

The chair will re-submit a request for a PAR to the IEEE SA as soon as possible.

The working group, and the chair personally, would like to extend sincere gratitude to Phil Winston, in particular, and Subcommittee C chair Solveig Ward and Gerry Johnson for their tremendous help with

finalizing the Scope and Purpose of the future Guide and guidance to the working group through this difficult process.

We had a presentation on protection requirements for the interconnections with generation by Joe Mooney, from the Power Engineers - consultant perspective. Thank you, Joe. This presentation will be posted on the PSRC WG website.

The end of the first and all the second session of the meeting were dedicated to reviewing the Guide's Outline. Many good comments from the working group members were received and incorporated in the Outline's current version. It will be sent out with the meeting minutes, and we will continue its review at the May meeting.

We also plan more presentations at the May 2013 meeting as follows:

1. Mohammed Zubair (HydroOne)
2. Doug Hunchuk (Alberta System Operator)
3. Mukesh Nagpal (BC Hydro)

Any other volunteers to make a presentation from their utility or consulting perspective are welcome and should contact the chair of the working group (aderonja@atcllc.com) before the May meeting. A commitment to make a presentation is requested because a no-show may jeopardize the meeting agenda.

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

**Chair: C. Henville**
**Vice-Chair:-**
**Output: Recommendations to the Subcommittee regarding possible joint activities**
**Established: January 2010**
**Expected completion date:-**

CTF3 met in Memphis with four attendees present. Preparations for a joint panel session on Synchrophasor standards at the PES General Meeting in July 2013 are in hand. The session will be jointly sponsored by PSRC and Power Systems Instrumentation and Measurements Committee. The session will be presented at a meeting combined with a meeting of the Power System Dynamics Measurement Working Group (DMWG). There will be five presentations from PSRC attendees.

1. Arun Phadke "The history of Phasor Measurement Unit development and the emerging Wide Area Measurement Systems"
2. Ken Martin PC37.118.1 "Standard for Synchrophasor Measurements for Power Systems"
3. Vasudev Gharpure "PC37.118.2 IEEE Standard for Synchrophasor Data Transfer for Power Systems"
4. Farnoosh Rahmatian "IEEE Std. C37.242™ - Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMU)"
5. Galina Antonova "PC37.244 Guide for Phasor Data Concentrator Requirements for Power System Protection, Control and Monitoring".

There will also be two other presentations, one by the DMWG, and one by an independent presenter.

JTF3 also met in Memphis and is starting work associated with CTF3, but reported separately.

**CTF19: Standard for Phasor Data Concentrators (PDC) for Power Systems**

**Chair: Vasudev Gharpure**
**Output: Standard**

**Task force purpose**
**Should C4 activity (PC37.244) continue to become a standard?**

Task force CTF19 met on January 15, 2013 in Memphis, TN in a single session with 17 attendees. This was the second meeting for this task force.

The meeting started with introductions. A list of attendees is included at the end of this document.

The minutes of the previous meeting were distributed. As there is no formal working group as yet, approval of minutes was not sought.

Galina Antonova (the C4 WG chair) provided status of the PDC Guide. The first meeting for the WG was held in May 2011. The IEEE ballot was held in August 2012. After comment resolutions, a recirculation ballot was held, which closed On January 14th. A second recirculation ballot is to be held before the next Revcom meeting on January 24th. Once the Revcom approves the document, the Standard WG can consider it as the final document.

The task force continued its deliberations. A WG assignment proposal had been accepted during the previous meeting. The task force worked on the purpose and scope statements for the PAR proposal, and settled on the following after several editorial changes. However, these may be modified further after discussions.

Purpose: The purpose of this standard is to specify the functional and performance requirements, and to define testing, for Phasor Data Concentrators.

Scope: This standard describes the functional and performance requirements of Phasor Data Concentrators (PDCs) for power systems. It includes functional requirements for aggregation of data, synchrophasor and other synchronized data processing, data interfaces with other systems, handling of Configuration and other meta-data and control. It includes testing for PDCs.

The discussion continued on the strategy to use after the PDC Guide is ready. During the discussion on synchrophasor protocols (C37.118.2-2011 and IEC 61850-90-5), Allen Goldstein commented that it may be difficult to exclude explicit references to them while dealing with data interfaces. Mark Adamiak commented that this would be the case while discussing security as well.

Gabriel Benmouyal mentioned that the group should look at existing commercial implementations, as the standard may impact them significantly. Vasudev Gharpure responded that it is hoped that PDC vendors would participate in the WG to prevent an adverse impact on existing systems. Jay Murphy mentioned that the standard may obsolete some of the existing products, and that the WG should be aware of this. Allen Goldstein mentioned that the WG should work with vendors / end users of existing PDC products, preferably to get an agreement on which functions are mandatory.

Questions came-up during discussion: whether PDC is a function (reside within a device) or a device (dedicated PDC box)? Should standard be protocol free (applicable to existing, C37.118-2005, C37.118.2-2011, IEC 61850-90-5; and any possible future communication standards)?

Action:
- Vasudev Gharpure to circulate a minutes and the draft for the scope and purpose of the working group, to the attendees.
- Attendees to comment on the draft.

**CTF20: <u>Impact of DC Transmission on Protective Relaying</u>**

**Chair: Joe Mooney**
**Output: ??**

**Task force purpose**
**Determine if there is enough substance and interest exists for a working group to be formed.**

Task force CTF20 met on January 15, 2013 in Memphis, TN in a single session with 9 attendees. The meeting was presided by Jim O'Brien.

Joe Mooney and Peter McLaren discussed their knowledge of the subject. No others in attendance had any experience.

This was the second meeting of the Task Force and the early Tuesday morning timeslot has not been conducive to attendance. It was decided to try meeting one more time at the Baltimore PSRC meeting in May during a different timeslot to see if more interest could exist. Joe Mooney agreed to chair the Task Force going forward.

**CTF21: <u>Commission, Design and Operation of Large Scale Sips</u>**

**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.**

Task Force CTF21 met on Tuesday, January 15, 2013 in Memphis, TN, in single session chaired by Yi Hu with thirteen attendees.

Task Force Chair Yi Hu led the discussion with Gene Henneberg helping with the note taking. Yi explained the differences in WG processes depending on whether the end product is intended to be a report to the main PSRC verses an IEEE Standard, IEEE Guide, or IEEE Recommended Practices. The later three types of documents are developed under the IEEE Standards process and require an approved PAR with a detailed, firm assignment and completion date. Reports have more flexibility, requiring only approval by the PSRC and with no firm completion date.

It was also clarified that the current task force title may not be used AS IS for a new WG. The new WG title will be based on the scope of work for a new working group and the proposed assignment language decided by the task force.

Attendees agreed that SIPS design, commission and management processes seem mostly are "invent your own" processes by each organization, since there is a lack of specific standards for them. For example, there is no defined method to determine the availability of a SIPS design. But the concern was also expressed that, given the variety of SIPS and complexity in SIPS design, commission and management, it could be a major undertaking to develop a document to cover all these areas that must also follow the standard development process.

There was a discussion of the present effort at NERC in the area of Special Protection Systems (SPS). NERC's focus on SPS is somewhat narrower than the IEEE definition of SIPS. SPS include several specific exclusions, such as UV and UF load shedding that are part of SIPS. NERC is drafting a white paper to update their SPS definition and provide a knowledge base with direction to rewrite the existing SPS standards.

Attendees reviewed and discussed a preliminary outline of topic areas provided by Mr. Fumio Kawano and his colleagues based on the current task force title. They would like these areas / topics to be considered / discussed by the task force. They could also make contributions to these areas / topics for those selected by the task force. It was agreed that this is a very useful start point, but will need to be "boiled down" to turn it into a specific assignment.

An approach was proposed to consider developing an IEEE guide for SIPS with multiple parts (e.g. Part 1 – Guide for SIPS design; Part 2 – Guide for SIPS Commission; and Part 3 – Guide for SIPS Management). However, it is not clear to task force how this should be approached. Task force chair will check with C subcommittee regarding how to plan for the development of a multi-part standard and how to structure the working group.

It was agreed that task force chair distribute the outline reviewed at the meeting to all attendees and WG C15 members to gather feedback and suggestions for discussion at next task force meeting.

## 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 27 members and 27 guests present.

Following introductions, a count of SC membership was made, and it was determined a quorum was present (27 out of 47 members present).

Minutes from the September 2012 meeting in Portland, OR 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.
- Need to encourage web-ex and apparently IEEE has a WebEx account we can use.
- Reviewed Section 7.2 of the WG P&P manual

Ten working groups gave reports on their activity. Two working groups have concluded their work and were disbanded at this meeting:
- D11, Effect of Distribution Automation on Protective Relaying chaired by Fred Friend
- D21, Supporting IEC Standard for Distance Relay Characteristics chaired by Alex Apostolov.

The chair expects to form a task force in May regarding C37.230 - Guide for Protective Relay Applications to Distribution Lines.

**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**

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 15th, 2013, at 3:00 PM with 17 attendees, of which 7 are guests, and one new member.

Meeting minutes from the Portland OR meeting was presented with no objection.

Assignments assigned from the previous meetings were discussed.

Section 6.0 on developing recommendations matrix in choosing the polarizing methods were discussed. Several inconsistencies and errors were identified and corrected. Elmo Price volunteered to clarify section 3.3.1 and corresponding figures.

Members and guests agree Sections 3, 4 and 5 are to be reviewed for technical accuracy. Demetrios Tziouvaras and Jeff Barsch volunteered to review section 3. Sam Sambasivan and Michael Fleck volunteered to review section 4. The working group chairman shall appoint several members of the working group to review section 5.

Assignments are due March 15, 2013. After the writing assignments are submitted and incorporated in the report, the copy of the draft report will then be distributed to members and guests for more comments.

**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: 6.6**

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, January 15, 2013 at 8.00 a.m. with 12 members and 15 guests present.

Revision 6.6 of the document was sent to the members prior to the meeting. 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:

Based on the discussions during the meeting, the introduction section will be modified to clarify that the scope of the report is to cover the transmission line model only at power system frequency as there was some misunderstanding on the scope. Alex Apostolov has agreed to review the section on Direct Measurement and to further clarify on some of the equations and methods used. The summary section will also be completed with the next revision.

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 by January 2014.

**D11: Effect of Distribution Automation on Relaying**
**Chair: Fred Friend**
**Vice Chair: Jerry Johnson**
**Output: Report to the PSRC**
**Established: May 2006**
**Completion Date: January 2013**
**Draft: Final**

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

The working group, chaired by Fred Friend, met in a single session on Tuesday with 13 members and 14 guests present. Minutes from the September meeting were approved without comment.

The subcommittee re-ballot results were discussed:
91% approval
no negative ballots
3 comments were submitted

The comments were reviewed with much discussion, as usual, and changes were made.
Section 1.2 deleted sentence
Section 1.4 changed definition
Bibliography not changed

The working group approved sending the paper to the D-line subcommittee for publication. There was discussion about preparing a summary presentation and lessons learned. The chair will prepare a draft presentation and circulate it to the working group members for comment. Kevin Donahoe will investigate presenting at the Western Protective Relay Conference and Jerry Johnson will propose for both the Georgia Tech and Texas A&M Conferences.

The working group approved the motion to disband since all work has been completed.

**D19: PC37.113, DRAFT Guide for Protective Relay Applications to Transmission Lines**
**Chair: Rick Taylor**
**Co-Chair: Don Lukach**
**Output: Revised IEEE Guide C37.113**
**Established: September 2011**
**Expected completion date: September 2013**
**Draft: 2.1**

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 Wednesday, September 15, with a quorum of 14 of 22 Balloting Members present. Also in attendance were 9 Corresponding Members, and 24 Guests.

The May 2012 and September 2012 meeting minutes were approved.

Draft 2.1, from the editorial/ document flow review team, was discussed at length. Several changes were incorporated during the meeting. Technical comments will be discussed at the next meeting. Draft 2.2, from the drawing and figure review team, will be incorporated later as it was too much information to easily incorporate with Draft 2.1. Specific writing and review assignments include the following and are due February 12th:

| | |
|---|---|
| 5.6.2.2 | Elmo Price to revise/ clarify |
| 5.11 | Joe Mooney and Claire Patti to condense with 1-2 paragraphs |
| 6.3.7 and 4.5 | Alla Deronja and Phil Tatro to review for duplication of information and provide recommendations |
| Polarization | Jeff Barsch, Joe Mooney, and Meyer Kao to review and recommend the level of detail that C37.113 should contain as D3 report very detailed. |
| 6.5.3.6 | Elmo Price and Don Lukach to revise/ clarify last sentence. |
| 6.6.2 | Joe Mooney to revise/ clarify |

John Miller is leading the drawing and figure consistency team. Comments are due at the May, 2013 meeting. Don Lukach to review Figure 57f and Figure 57D.

Draft 3.0 of the Draft Guide is expected to be issued to the working group by March 15, 2013, with the intent of asking for a working group review prior to the May, 2013 meeting.

**D21: Supporting IEC Standard for Distance Relay Characteristics**
**Chair: Alex Apostolov (aapostolov@ca.rr.com)**
**Vice Chair: Alla Deronja (aderonja@atcllc.com)**
**Output: IEEE/IEC Standard**
**Established: September 2006**
**Expected Completion Date: December 2012**

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

Working Group D21 met on January 16, 2016, in Memphis, TN, in single session chaired by the chair, Alex Apostolov, with 6 members present.

Murty Yalla, the chair of the IEC TC95 MT4, reported that the IEC 60255-121 standard has been approved by 91% of the balloting body. Only one negative ballot was from Hungary.

No more technical comments are accepted. There is some editorial work left before the standard is published later this year.

The final draft of the standard (FDIS) will be circulated to the members of the working group.

The working group has completed its task and will ask permission from Line Protection Subcommittee D to be disbanded.

**D22: Performance Testing of Transmission Line Relays for Frequency Response**
**Chair: Tom Wiedman**
**Vice Chair: Jun Verzosa**
**Output: Report**
**Established: May 2007**
**Completion Date: September 2012**

D22 did not meet. The WG assignment is complete and the report has been submitted to the NERC SPCS. The D22 WG will be disbanded. If NERC SPCS subsequently asks questions, the D-SC will consider forming a small task force to address at that time.

**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: K**

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, 12 guests, for a total of 26.

The September, 2012 meeting minutes were approved as submitted.

The WG discussed the latest draft of the report, Draft K. The report is almost complete. During the discussion, a member informed the group that the ground overcurrent nomenclature of Ig and In was not consistent with IEEE C37.2 guidance. The chairman will review the report and make necessary corrections, as applicable.

The intended time-line is to issue Draft L of the report by mid-February, working group members to provide a final review by mid-April, and have the report ready for SC D submission by the end of the May, 2013 meeting.

**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: 2.1**

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

The working group met in Memphis, TN January 16th at 11:00 AM with 7 members and 6 guests. Introductions were followed by a review of the September meeting minutes.

Introductions were made.

Karl Zimmerman began the meeting discussing changes to the latest draft 2.1.

Final revision is to commence and attempt to be balloted by May meeting.

Joe Mooney (WG Member) suggested we submit an abstract to the 2013 Western Protective Relaying Conference by the April 22nd deadline. He believes it would have high interest at the conference. Since the actual meeting to select papers is in May (after the next PSRC meeting), he can advise the WPRC selection if the report is not going to complete in time.

Joe Mooney also presented his contribution on quadrilateral characteristic, polarizing quantity, and supervising elements.

Aaron Martin agreed to add example waveforms to series compensation compensated section. The WG discussed removing time domain response of distance elements with CVT transients from the paper. Interesting work, but not a good fit for this paper.

Dean Miller proposed improving the series compensation to include impact of subharmonic frequencies. Aaron Martin to revise and rewrite the series compensation to focus on effects of Sub-harmonic frequencies and the non-linear resistance from MOVs.

Each section editor will add or bring out application and setting guidelines to each application section.

Working group members were asked to hand in their comments and edits by Mid March.

Karl Zimmerman will add conclusions session and work with Aaron Martin to edit/review before next draft. Next draft will be sent concurrently to WG and SC members for approval and comments.

**D26: <u>Revision of C37.114 Fault Location Guide</u>**
**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 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) including 1 new member 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 September 2012 meeting in Portland will be approved by email vote.

The IEEE Patent Policy was reviewed with the group. The chair provided an opportunity for the group to identify patent issues. There was no response from the group.

The Working Group Chair reviewed progress of the working group. Remaining material should be submitted prior to the May meeting. A final review of all new material and the entire document for flow and content will a team to be identified at the May 2013 meeting. The goal is to finalize changes following the May 2013 meeting to be ready for working group vote. Any comments will be incorporated for the September 2013 meeting with the goal of notifying the D Subcommittee Chairman that the guide is ready balloting at the September 2013 or January 2014 meeting.

The chair reviewed the working assignments from the September 2012 meeting. All assignments have been received with the exception of the series compensated lines material.

All submitted material received as of last week has been added to Draft 2. The additions were discussed during the meeting. A revised draft will be sent out following this meeting with the addition of new material and changes that were discussed during the meeting. The added material should be reviewed by the working group and comments submitted to the Working Group Chair by March, 15, 2013.

Additional new material due by March 15, 2013:
Don Sabin - New material on Distribution Fault Location.
Normann Fischer, Rafael Garcia, Damier Novosel - Series Compensated Lines
Gabriel Benmouyal, Dan Sabin - Dependency of Sample Rate on Accuracy

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

**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 Monday, January 14, 2013 at 4:30pm CST in a single session with 12 members and 13 guests. Since the current membership is 28, a quorum was not established. Necessary approvals will be handled in email.

After introductions, the patent slides were shown and reviewed.

The scope of the PAR was reviewed. The chair asked representatives of IEEE if wording of the scope is changed, does the PAR need to be revised. It was determined that the PAR would need to be revised if the scope is changed. At this time the scope will not be revised even though it is shown changed on the latest draft. After the meeting, SA clarified that editorial changes that do not change the scope may be made if agreed on by the WG members so this item will be revisited at the May meeting.

After a short discussion regarding the schedule of the PAR and the need to expedite reviews, the review of completed and outstanding assignments took place.

> Illa Voloh completed a contribution on shunt reactors that was not included in the latest draft. It will be added.
>
> Section 7 on testing has not been completed and Bill Higinbotham expressed concern about timing and the need for this section. Andre Uribe will work with his colleagues to

determine if a section on testing will be helpful to the document.

Don Lukach is working on several figures in the section on redundancy. He will work with Ian Tualla and Mark Schroeder to develop figures within six weeks. He will also address the figure on tapped loads.

Sam Sambasivan believed he had sent his contribution on ancillary functions to the previous chair. He will check and resend if necessary.

The contribution from Alex Lee on shunt capacitor applications has not been received. The chair will check on this.

The remainder of assignments had been completed.

Review teams for the document were established with a teleconference or webEx to review each portion to be held by March 1. The teams were as follows:

Section 1 to 5: Ian Tualla, Sam Sambasivan, Bruce Mackie

Section 6: Bill Higinbotham, Illa Voloh, Solveig Ward, Adrian Sovarck

Section 7: Alla Deronja, Sam Sambasivan, Ian Tualla, Vajira Pathirana, Bruce Mackie

The review teams are also to identify figures that need to be modified (US versus IEC symbols).

**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**

Alex Apostolov indicated IEC 60255-187 will soon be up for review/comment, similar to 60255-121 which was reviewed by the D21 working group. IEC 60255-187 is for differential relays and will be divided into three parts: transformer/generator differential, bus differential, and line differential, with line differential to be covered first. When these documents are posted by the IEC, Alex recommended the D-SC create task forces to review them similar to what D21 did for the 121 document.

Gary Kobet pointed out that the C37.230-2007 Guide for Protective Relay Applications to Distribution Lines will expire December 31, 2018. At Phil Winston's advice, in order to provide adequate time for a possible PAR for revision (4 year PAR), a task force was recommended to begin work immediately to review the document to see if any major changes are necessary, and to recommend next steps. Brian Boysen volunteered to chair the task force (DTF28), which will meet in May 2013 in Baltimore. Volunteers to assist include Fred Friend, Karl Zimmerman, Ken Behrendt, Phil Winston, Joe Mooney, Bruce Mackie, Claire Patti, and Ratan Das. Erin Spiewak of IEEE-SA agreed to work with Brian to provide TF members a copy of the document for review prior to the May 2013 TF meeting. The DTF28 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."*

**General Discussion**

Gary Kobet requested someone from the recently approved revision to the C37.104 reclosing guide create summary slides for presentation at the May 2013 Main Committee meeting. Bruce Mackie volunteered to cover this request pending company approval of his attendance of the May 2023 meeting.

**Line Protection operations of interest**

None

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

## H: RELAYING COMMUNICATIONS SUBCOMMITTEE

**Chair: Eric Udren**
**Vice Chair: Eric Allen**

The Subcommittee met on January 16, 2013 with 24 members of 38 total, comprising a quorum. 31 guests were also present. Minutes of the September 2012 Portland, OR meeting were approved without objection.

New procedures from SA for WGs involved in standards development were announced:

- 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 are asked to consider the scope of the H SC and whether all of the WG are doing work that belongs under H SC.

WG chairs and vice-chairs are reminded to manage the rosters of their WGs.

SC members are reminded that a response to e-mail ballots is required.

WG business:
The H2 working group has completed its assignment and requested SC approval to disband.

*The SC voted unanimously to approve* the disbanding of the H2 working group.

The H7 working group has completed its assignment and requested SC approval to disband.

*The SC voted unanimously to approve* the disbanding of the H7 working group.

In the course of a previous e-mail ballot of the SC, 3 comments on the report from the H9 working group were received. Those comments were incorporated into the report, and H9 asked the SC to approve the report as revised. The WG will submit a proposal for the development of a tutorial based on the report.

*The SC voted unanimously to approve* the report of the H9 working group.

The H13 working group asked for SC approval to move to ballot subject to the condition that the WG approve its document prior to the May meeting of the H SC.

*The SC voted unanimously to conditionally approve* the balloting of the draft standard of the H13 working group.

*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:
IEEE C37.94 has achieved dual-logo status as IEC 61850-85-1.
.

New business:
IEEE Standard C37.94 expires in 2018 and hence will need to be reviewed by H SC starting this year.

*The SC voted unanimously to approve* the creation of the HTF25 task force to start the renewal process for this standard.

**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.

The H1 working group met with 7 members and 3 guests. After introductions, it was explained that the guide was submitted to RevCom and is on their March agenda. The members discussed forming a task force to discuss possible changes to C37.94.

**H2: Relay Applications Using the Smart Grid Communications Infrastructure**
**Chair: M. Simon**
**Vice Chair: G. Antonova**
**Output: Report to the Subcommittee on title subject**
**Established: 2006**
**Expected completion date: September 2012**
**Assignment:** Create a working group report to the Relaying Communications Subcommittee that describes example protective relay applications that can make use of the communication infrastructure provided by the Smart Grid. Protective relay applications will include potential capabilities and the communication requirements necessary to provide suitable communication architectures, services, capabilities, and any other pertinent characteristics.

The working group has completed their assignment and has disbanded. The document has been posted on the PSRC web site.

The link is:
http://www.pes-psrc.org/Reports/Protection_using_the_SG%20FINAL_10_1_2012.pdf

**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 with 10 members and 12 guests in attendance. The patent policy slides were shown, and no issues were identified.

The WG discussed the issue of time tag attributes at some length – what data items are necessary in a time tag. Alex Apostolov made a suggestion to get a copy of COMFEDE (the most recent PSRC standard to include time tags) to distribute to WG members, for consideration as a starting point. Other

issues, discussed at the September meeting, are still on the table and the volunteers did not make much progress in addressing them between meetings.

Jim Hackett will work with Kristi Gluchowski from IEEE SA to get us a copy of the COMFEDE standard. Due to new SA rules, this standard, as well as the work in progress of our group, can only be distributed to active working group members. Guests can see only copies of material, such as minutes, which are publicly available on the PSRC website.
Jim will distribute the COMFEDE standard, along with the work completed under the previous PAR, which was collated into IEEE format by Marc Lacroix, to the members. Members were asked to read both documents and we expect an on-line discussion to follow.

The meeting was completed in a single session, due to a conflict with the newly-created HTF-24 which met at 4:30. This was, however, adequate; and we intend to schedule future meetings for a single session to help PSRC officers minimize conflicts. More of the discussion and work will be completed via email.

**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.

Meeting # 23

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

The Group met on January 15, 2013, with 11 members present – 9 of them are voting members out of 17 voting members. Four guests were also present which include Krista Gluchoski (IEEE-SA). The minutes of the previous meeting held at Portland were approved.

Murty Yalla updated the working group about the status of IEC FDIS circulation which is expected before January 31, 2013. Krista Gluchoski from IEEE SA confirmed that C37.111 draft approval is in the agenda of RevCom meeting scheduled on Jan 23, 2013. If the IEC FDIS is circulated after the Jan 2013 RevCom meeting then the C37.111 draft approval will be moved to the March RevCom meeting. C37.111 PAR extension will be taken up during the January NesCom meeting.

Chair updated the working members about the summary paper submitted for IEEE PES summer meeting. Coordinators were identified for the summary paper to be submitted for relay conferences – Scott Anderson (WPRC), Jim Hackett (Fault and Disturbance Recording Conference at Georgia Tech) and Stan Thompson (Texas A&M Conference) graciously agreed to coordinate the activity based on the final paper for the IEEE PES summer meeting.

Ravi Subramaniam from IEEE suggested exploring certification of device and COMTRADE reader based on the latest standard. The issue was discussed during the working group meeting. It was decided to explore the issue further during the May meeting as this activity can also be taken up after the standard approval.

The WG will meet again in May 2013 to evaluate the progress of the standard publication and to discuss about the summary paper for different meetings/conferences.

**H5-a: Common Data Format for IED Configuration Data**
**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.

The WG H5 did not meet in Memphis. The working group report is in the process of being approved by the working group.

**H6: IEC 61850 Application Testing**
**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 18 members and 10 guests present.

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

Charlie then reviewed the report outline and assignments of the working group and led a discussion on the writing assignments that were submitted since the September 2012 meeting. Jim Bougie's assignment discussing typical substation networks was then presented.

Rene Aguilar next presented discussion on testing for the network reconfiguration time. Rene's paper described how to determine switch dead time and the network reconfiguration time. He also gave a brief explanation of the reconfiguration times based on RSTP (Rapid Spanning Tree Protocol) and STP (Spanning Tree Protocol).

Charlie presented a PowerPoint that he had just received from Mark Adamiak that discussed Parallel Redundancy Protocol (PRP) and High-availability Seamless Ring (HSR). Mark indicates that RSTP is slow for real time applications and self-healing communication networks are required. He describes a PRP Network Architecture that uses two separate Ethernet networks that operate in parallel and thus should a fault in one LAN occur, then communications is not disrupted. He also explained an HSR network that uses a single ring with each node having two interfaces.

Remaining writing assignments were reconfirmed and are requested to be provided by March 1, 2013.

**H7: IEEE 1588 Profile for Power System Applications**
**(Joint Working Group of Substations Committee C7 & PSRC H7)**
**H7 Chair: Galina Antonova Substations C7 Chair: Tim Tibbals**
**Vice-Chair: Bill Dickerson**
**Output: Standard**
**Established: 2008**
**Expected completion date: December 2013**
**Assignment:** Develop an IEEE Standard "IEEE Standard Profile for Use of IEEE 1588 Precision Time Protocol in Power System Applications" in close coordination with IEC TC57 WG10 and other technical committees with similar interests.

Joint WG H7/Sub C7 met on January 15, 2013 in Memphis, TN, in a single session with 22 attendees (11 members and 11 guests). Quorum was achieved. September 2013 meeting minutes were approved.

After introductions, co-chair presented meeting agenda and opened a discussion on summary paper.

Working Group paper was presented at multiple industry conferences in 2012. Next presentation is planned for Distributech 2013. Rene Midence volunteered to present, this was supported by the group. It was suggested to present the paper at the IEEE PES General Meeting in Vancouver. The paper shall not exceed 5 pages. It was agreed to generate a 5-page version from the existing 6-page version. Alex Apostolov volunteered to help. Volunteers were obtained for several presentations at industry conferences in 2013.

Co-chair invited participants to HTF-24 meeting. This group was tasked to investigate the need for IEEE C37.238 revision.

Co-chair invited attendees to participate in the revision of the IEEE 1588-2008 standard, to be started soon.

As Working Group completed its assignment, it was suggested to recommend to H Subcommittee to disband this Working Group. Christoph Brunner moved, Veselin Skendzic seconded. After discussion, a vote followed. Working Group vote passed unanimously with one abstention.

**H9: Understanding Communications Technology for Protection**
**Chair: R. Midence**
**Vice Chair: Vacant**
**Output: Report**
**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 Salon Natchez, Memphis Marriott Downtown, in Memphis, TN, USA on January 15, 2013 at 9:30 am. Eight (8) members and thirteen (13) guests were present.

Discussion

For the benefit of new participants that attended the meeting for the first time, the chair provided an overview of the Report. The chair informed that that the report was submitted to subcommittee and it was approved with comments, which were already incorporated in the last document. The final document will be re-submitted as final after the meeting. Since most of the comments were editorial comments, all present agreed that the final document can be re-submitted after the meeting and request that the assignment is considered completed.

The chair indicated that contributions were received since last meeting in September 2012 for the production of a tutorial as recommended by the working group during the meeting of May 2012. The working group recommended discussing this initiative with the Sub-committee as it is not part of the original assignment for working group H09.

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.

The following members are listed as volunteers to work on the Tutorial: Juan Gers, James Ariza, Vajira Pathirana, Alfredo de la Quintana, Chris Chelmecki, Emmanuel Duvelson, André Uribe, Tony Bell and Ed McHale.

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.

**H11: C37.118.1 Standard for Synchrophasors for Power Systems**
**Chair: K. Martin**
**Vice Chair: B. Kasztenny**
**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, January 16, 2013 at 8:00 AM in a double session with 10 members and 15 guests. The attendees were reminded of the applicable IEEE intellectual property rules.

The chair introduced the proposal from IEEE to restart the joint IEEE-IEC working group to develop the 60255-118-1 standard. The project was originally started 2 years ago but the IEEE withdrew from the project after a year. Murty Yalla explained that the IEC TC95 was proposing to develop their own synchrophasor standard if we do not go ahead with the joint project. The joint project will keep the organizations harmonized and allows IEEE direct participation. The work will probably involve 1-3 meetings outside the US and will take 2-3 years. After discussion, the WG voted unanimously with a scant quorum to proceed as a joint project. The group reviewed the current PAR and suggested a couple minor changes (which will have to be done on-line). Once done, the PAR can be submitted.

The chair introduced the other major issue that there are requirements in the current standard that are difficult or impossible to meet. Ken Martin and Allen Goldstein have each implemented the M class model presented in Annex C with which they are testing all the requirements for compliance. It has become apparent that the model does not meet some of the requirements, which is supposed to. In discussions with several vendors who are also trying to create projects that will meet the model, they have found similar problems. After a discussion, ken showed the results of his testing so far, which includes results that have been corroborated by Allen. The WG would like to correct these problems right away so they can produce PMUs that will comply with the spec rather than waiting for the full revision. Erin from IEEE-SA explained the means of modifying the standard using a corrigendum or an amendment. Either one only opens the PAR to a limited scope which is what the WG would like to do. Erin also confirmed that we can have one of these limited PARs open at the same time as a revision PAR. The WG elected to submit an amendment PAR that will only address a selected set of tables where the numbers are not reasonably realizable. In the meantime Allen and Ken will finish their tests using the reference algorithm and come up with a way to modify them to meet the requirements. This will be distributed to the WG, and include all vendors who want to participate. All will be able to provide their comments on the proposed or other changes. The proposals will then be considered by the WG; at the May meeting the WG anticipates being able to finalize the decision for ballot. The process can then be completed as quickly as the balloting and resolution process will allow, probably a total of 10 months.

The chair mentioned that the WG paper is almost finished, lacking only a conclusion. There was not enough time to consider what needs to be done to finish the paper.

**H12: <u>Configuring Ethernet Communications Equipment for Substation Protection and Control Applications</u>**
**Chair: E.A. Udren**
**Vice Chair: M. Zubair**
**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 January 16, 2013 with 8 members and 24 guests. The Chair went over Revision 12 of the report, in which detailed sections were moved to an appendix. Members and guests accepted specific assignments for supplying or reviewing specific sections of the report:

1. Introduction and overview of substation Ethernet (Rene Midence)
   a. Add fibers
   b. Add Functional mapping
   c. Add 61850 example
2. Reliable redundant networks (Christoph Brunner)
3. Switches and routers (Richard Harada)
4. Large LANs (Mark Adamiak)
5. Security (volunteer TBD by Chair)
6. Practical design considerations (EAU)

The Chair will supply the new revision for editing by these and the other WG members by February 22.

**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.

Presentation was made by Steve Mix from NERC on the main differences between CIP version 4 and 5. This was well received by the group and forward referenced his more detailed presentation to the Main committee on Thursday.

All writing assignments for the document have been completed, except for Section 7, which was a recommended section by Stan Klein. Nothing has been created by Stan for this section, and it was brought up by Dan Nordell that in fact Stan has been ill, which is the reason we have not had communications with him.

We will plan on doing an email circulation of the document, to the WG members, to get comments to all completed sections, in addition to recommendations on keeping the final uncompleted section or dropping it from the document.

The WG would like the H subcommittee to consider giving conditional approval to move the document to sponsor ballot, given email approval of the final document by the WG. Without this conditional approval by the H subcommittee, sponsor ballot approval would be delayed until the Sept PSRC meeting, the next joint meeting between PSRC and Substations.

**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.

8 members and 14 guests were present.

After introduction of the attendees, Christoph Brunner reviewed with the participants the scope of the working group, including what CIM is and how it relates to COMTRADE and IEC 61850.

The outline of the document was later discussed. Some new volunteers are going to contribute to some sections of the document as reflected in the updated outline.

This was followed by a presentation by Christoph Brunner of his contribution on the relationship between IEC 61850 and COMTRADE based on the IEEE PSRC WG H5c report.

Some comments during the discussion included a proposal to add a table about extensions in COMTRADE based on IEC 61850. The use of this approach to support double ended fault location calculations based on COMTRADE files was also discussed.

**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, January 15, 2013 in a single session with 4 members and 7 guests. The quorum was not reached so the September minutes will be 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 draft IEEE Transaction paper on the Standard was reviewed. It has been completely reviewed and edited again since the September meeting. The WG reviewed and completed the conclusion, the only remaining part of the paper to complete. The paper will be balloted by the WG and then presented to PSRC for committee approval.

Further action by the WG in support of the WG for a PDC standard or other support of the 118.2 standard was discussed. It was decided to leave the issue open and postpone the dissolution of the WG until further action establishing the PDC WG has occurred. The WG also should remain in place until the paper has completed all the required reviews.

The WG does not expect to meet again.

**H21: Communications Mapping between IEEE C37.118.2 and IEC 61850-90-5**
**Chair: Yi Hu**
**Vice Chair: TBD**
**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 Monday, January 14, 2013 in single session chaired by Yi Hu and Allen Goldstein with 22 people attending.

After reviewing working group's assignment, the working group proceeded to discuss the scope of work of the report. Working group had agreed that the scope of work of the report shall include:
- Bi-directional mapping between IEEE C37.118-2005, IEEE C37.118.2-2011 and IEC 61850-90-5 standards, and
- Testing as part of the document

Mark Adamiak provided a presentation of an IEC 61850-90-5 implementation agreement that had been implemented by several vendors. After a brief discussion, the working group agreed that it will need more time to review and discuss the presented implementation agreement before developing a detailed outline of the report.

Working group chairs will distribute the current version of the IEC 61850-90-5 implementation agreement and the presentation to all meeting participants, who will review and provide feedback and comments before next working group meeting. Working group H21 will meet at next PSRC meeting in May 2013 to review and discuss received feedback, and discuss and develop an outline of the reports.

**H22: Guide for Cyber Security for Protection Related Data Files**
**Chair: Stephen Thompson**
**Vice Chair: TBD**
**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 January 15 2013 with 16 attendees

Introductions were made. Kevin Easley agreed to take the minutes.

H22 is providing a guide to file security that will be used in conjunction with the work completed by H18.

There was discussion of what H18 has completed. Example standards for cyber security include: NERC CIP-002 through CIP-011; NIST Cyber Security for Smart Grid; IEEE P1711 Cryptography for SCADA; IEEE 1686 Cyber Security for IEDs; IEC 61850 Security Impact on Automation; and IEC 62351 Data and Communication Security. Protection related data file types identified by the H18 Report include: Manuals, ratings, settings, measurements, access, testing, generator dispatch orders, maintenance schedules, and programs (p. 4).

H22 should consider analysis of risks by file type, and recommendations and observations.

Statement of purpose of H22: Develop a guide on security of data files for protection. The scope of this working group will be defined so that a PAR can be raised. It is clear that H22 will consider protection files only. A PAR must be produced by the chair by mid-February 2013 and discussed within the group by the first week of March, to get onto the June agenda for approval. See the H18 report, page 1 for its purpose: "3 Major Areas". Note that these are NOT requirements for H22, but may be valuable to help define H22's scope and PAR. A CIP standard requirement justifies this work. PAR must state how much time is required.

1. The guide should be able to assist the reader in developing an information protection policy that supports the cyber security of the information that they have
2. The guide should include the "why" for security to aid the reader in justifying the language of their cyber security policy
3. The guide should discuss differing approaches to information security and cyber security, acknowledging that different information should have different protections based on the sensitivity of the particular information

Only files stored outside the protective relay will be considered. Responsibility of data stored within the IED is considered to be within the IED's security measures.

A request for thoughts of major topic headings produced encryption, access, and transmission of files.

We may reference standards; note "standard vs. guide terminology". We should expect the H18 standard to reference our guide (if left as a guide). We need to determine if this is acceptable.

Discussion of scope of HTF22:
Must include which types of files we want to include, and what type of protection for each file type
Must include what functions to include, and what type of protection for each function
Should we reference NERC-CIP, or other?
NERC representative does not recommend linking to NERC-CIP
Should not specify any password scheme, due to aging of schemes and technology changes
Consider that archived files must remain accessible through password and technology changes
Consideration of inter-company and intra-company file transfer and accessibility requirements
Consideration of file accessibility by different personnel groups within a company
Explain "why" requirements are important to aid understanding and adoption.
Example: incorrect settings are chief causes of mis-operations. Who is making changes?
Say why settings files are more sensitive than fault reports.
Consider work flow as files move between creators and users. Provide use cases, etc.
How handled, who by, and associated risks in order to understand security implications.
File must often exist "outside of encryption" for upload/download. Consider "clean-up"
Recommend how to mitigate associated risks.
Key management – consider old files, old encryption mechanisms, where the key is maintained
Schemes for these will not be defined; direction will be provided to existing standards.

Configuration management tools could be discussed as they may be used in managing security.
Consider controls around logging of access to files – who receives copies, etc.
Should require file-protection procedure to maintain the application of security.

There was general consensus for members to read the base documents and be prepared to better discuss at the next meeting. The H18 report will be sent to persons on the sign-in sheet for this meeting.

A request was made for volunteers to consider each type of file. Please email Stephen Thompson with file type(s) to volunteer.

There needs to be liaison with NERC/FERC, and possibly other groups to provide consistency and avoid duplication of effort.

**HTF23: Standard or Guide for Naming IEDs (COMDEV)**
**Chair: R. Cornelison**
**Vice Chair: TBD**
**Output: WG**
**Established: January, 2013**
**Estimated Completion Date: January, 2013**
**Assignment:** Determine how the work started by WG H10 is to progress.

The Task Force met on Wednesday January 16, 2013 with 8 attendees.

The purpose of this meeting was to determine whether or not the work started by WG H10 should continue and if so, what should be the assignment of the new Working Group.

During the dicussions, Eric Allen asked if a trial use of the naming convention recommended by WG H10 had been implemented. Amir Makki mentioned that some limited use has been used. Rick Cornelison volunteered to provide some files that use the recommended naming convention. The group plans to provide such examples throughout the work of the proposed Working Group.

A suggestion was made to include information to relate the monitored lines to help in double ended fault locations.

The attendees agreed to recommend that a working group named “Guide for Naming Intelligent Electronic Devices (COMDEV)” should be formed whose assignment is “Develop an IEEE Guide for naming Intelligent Electronic Devices (IEDs) based on the report of WG H10” with Rick Cornelison to serve as Chair, Eric Allen as Vice-Chair, and Amir Makki as Secretary.

Seven of the eight attendees volunteered to be members of the Working Group.
**HTF24: Investigate Need to Update C37.238**
**Chair: G. Antonova**
**Vice Chair: TBD**
**Output: WG**
**Established: January, 2013**
**Estimated Completion Date: January, 2013**
**Assignment:** Investigate need to update C37.238.

HTF24 met on January 15, 2013 in Memphis, TN, in a single session with 23 attendees. 16 attendees indicated that they would like to be members.

After introductions, Chair provided the status of IEEE C37.238 and IEEE 1588
- C37.238 was approved in June 2011
- A revision of IEEE 1588 will be started in 2013

A number of possible corrections to the C37.238 were suggested, in particular, IEC TC57 WG10 requested to make the following 3 requirements optional:
- IEEE 802.1Q tags support
- TLV check for BMCA purposes
- SNMP MIB support by grandmaster-capable devices.

It was discussed and agreed that C37.238 should be updated. A discussion on possible approaches followed. Corrigendum, Amendment and Revision were discussed. Advantages and disadvantages of Amendment and Revision were discussed in length. Finally, an agreement was reached to recommend to Subcommittee H to form a Working Group and proceed with a Revision. Working Group Assignment was discussed and agreed.

***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**

IEC TC57 / WG10 will meet first week of February in Mexico City. WG10 has currently the following projects:

1. Finalization of Edition 2 of IEC 61850:
Parts 1 and 5 are in the publication phase; part 3 in preparation as CDV, Part 2 has not yet been initiated – the other parts are published.

2. Preparation of an Edition 2.1 of IEC 61850 for some of the major parts
As the work to create a UML model of the IEC 61850 logical nodes and data is more or less completed for the parts 7-3 and 7-4, it is now planned to issue the first set of auto generated documents of these parts as Edition 2.1. The Edition 2.1 will include the TISSUE resolution up to the date of publication of these parts. Also, a Edition 2.1 of Part 6 is planned. A WG draft for that is currently available. That will reflect the latest schema changes and extensions that have been made based on TISSUES. The associated schema version shall be the basis for Ed 2 conformance testing.

3. Technical reports that are under preparation
- IEC 61850-90-4 – network engineering guidelines is in preparation to be published.
- IEC 61850-90-3 – using IEC 61850 for condition monitoring shall be released for circulation as a first draft following the meeting in Mexico City.
- Work on IEC 61850-90-11 – modeling of logics, IEC 61850-90-12 – Wide area network engineering guidelines and IEC 61850-90-14 – Using IEC 61850 for FACTS data modeling is ongoing.
- A technical report IEC 61850-100-1 on functional testing is in preparation.
- Technical reports IEC 61850-7-5 and -7-500 about the usage of the models to create application are still in preparation. It is planned to release the IEC 61850-7-5 to be circulated as a first draft after the meeting in Mexico City.

4. Additional task forces address issues of System management and Alarm handling. In Mexico City, we will have as well a new task force dealing with usage of IPv6 in the future.

5. SCL has been extended with regard to the modeling of the functional part of a system. So far, the functional part was limited to model a substation with a single line diagram. This has been extended to model as well other functionality like e.g. Hydro power plants or wind farms. Also, an enhanced way to describe structured functions has been added. As part of this, function names and models of functions may be standardized in the future. A task force will investigate in the requirements during the meeting in Mexico City.

6. The new work to define mapping between DLSM/COSEM (IEC 62056) data and IEC 61850 has been accepted. A new task force will handle this and prepare a TS IEC 61850-80-4.

7. Response to user feedback

Recently, some user organizations like the ENTSO-E have raised concerns on the usage of IEC 61850. To address these concerns, a TF within WG10 under utility user leadership has been created. The task of that TF is, to classify and prioritize the raised issues and to propose solutions how to address the issues.

IEC TC57 / WG17 will meet next week in Denver CO, US and is working on the following topics:

1. Technical reports that are under preparation

• IEC 61850-90-8 – use of IEC 61850 for modeling of Electrical vehicles has been circulated as a first DC. DTR is in preparation

• IEC 61850-90-6 – use of IEC 61850 for distribution automation, IEC 61850-90-9 – Storage batteries, IEC 61850-90-10 – Schedules and IEC 61850-90-15, Modeling a generic electrical view of DERs: First WG drafts are available.

2. Mapping on web services

Before starting with the preparation of the new mapping IEC 61850-8-2, the WG did an analysis of the requirements for various applications. These requirements have recently been published as draft TR IEC 61850-80-3. Currently, the WG deals with the comments received.

IEC TC57 / WG18 will meet in March as part of the TC57 plenary in Nice, France. The WG is working on the following topics;

1. IEC 61850-90-13 – Extension of IEC 61850 information models to also include logical nodes and data models for steam and gas turbines

2. Interoperability tests for hydro equipment based on IEC 61850 and Communication network structures in hydro power plants

IEC TC57 / WG19 with regard to IEC 61850 works on the preparation of IEC 61850-90-2 – Use of IEC 61850 for communication towards the control center. The comments on the circulated draft have been received and will be addressed during the upcoming meeting with WG10 in Mexico City.

IEC TC57 / General:
TC57 will have its plenary meeting in March in Nice, France.

## I: RELAYING PRACTICES SUBCOMMITTEE

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

The I Subcommittee met on January 16, 2013 with 24 members in attendance – a quorum was achieved.

- Approved minutes of ISC meeting held in Portland OR in September 2012
- Items of Interest
    - Reviewed new standards process. A reaffirmation is no longer performed and a standard is valid for ten years
    - PAR time limit is four years with extensions no longer allowed
    - PSRC would have to start any revision process at year 5 of an active standard and if no revision occurs, then the standard is withdrawn
    - PSRC web site is being redesigned. Russ Patterson will have a meeting in May 2013 with all Subcommittee web masters to see the new design
    - Working Group Chairs must maintain a complete list of their members and their affiliations.

- Jeff Pond will email a template with the January 2013 Subcommittee meeting minutes
- 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

**Reports from the WG Chairs**

**I2: <u>Terminology Review Working Group</u>**
**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.

The I2 working group, chaired by Mal Swanson, met on Wednesday, January 16, 2013 with 11 members and 4 guests, including two new members: Matt Black and John Miller.

Minutes from the September meeting in Portland 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.

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

New words from C37.95, WG K4, were reviewed with comments for the working group. Previously, new words from C37.236, C37.242 and C37.244 were reviewed and approved.

The liaison process was discussed with the working group members. Andre volunteered to create a flowchart to illustrate the process. The official name to be used when referencing the dictionary is the "IEEE Definition Database.

**I4: <u>IEC Advisory Working Group</u>**
**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 January 14, 2013 with 5 members & 4 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:

- Results of the meeting of TC 95 in Beijing from 12th to 16th November 2012 (95/304). 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 should propose US experts who would like to participate. The WG Chair solicits volunteers, and has one inquiry after the meeting.

- TC 95 Program of Work after Beijing meeting (95/303).
- IEC/IEEE 60255-118-1 Ed. 1, Part 118-1 Synchrophasor for power system measurements – status of IEEE and IEC Joint WG, which will start work by circulating as its first CD a revised version of C37.118.1-2011 that is to be quickly (we all hope) created by WG H11 under an addendum PAR first. Ken Martin, Chair of both IEEE and IEC WGs, feels certain technical requirements are in need of updating.
- 60255-24, COMTRADE from 95/293/CDV (95/302). 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 draft that matches IEEE C37.111 COMTRADE. The US voted in favor, as did most others, and the CDV will proceed to FDIS vote in months.
- 60255-26 Edition 2 – EMC Requirements for Relays – November CDV passed, with only the US voting negatively due the IEC's weak radiated EMI test thresholds, a least 6 db below IEEE levels. We knew this won't be fixed, and the FDIS will be out in 2013 Q1.
- 60255-27 Ed. 2 CDV – *Product Safety for Relays* – the December CDV passed and the FDIS will be out in 2013Q1.60255-27 Edition 2 – *Product Safety for Relays* – the December CDV passed and the FDIS will be out in 2013Q1.
- 60255-121 CDV – F*unctional standard for distance relays* – ready for early 2013 circulation as FDIS – final draft International Standard for vote of member nations.
- 60255-149 CDV – *Thermal electrical relays* – CDV passed; ready for early 2013 circulation as FDIS.
- IEC 60255-187-1 - *Functional requirements for biased (percentage) differential relays* – this CD and upcoming CDs for parts -2 and -3 on bus and line differential relays will all be in drafting for multiple meeting cycles yet.

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 9 members and 7 guests attending. The meeting opened with introductions. The agenda for the meeting was discussed. Minutes from the September meeting were reviewed and approved.

The paper is ready to be voted on by the working group, an email call for votes will be sent next week. Kevin Donahoe presented an overview of the paper with an emphasis on issues raised at September's meeting and sections added since the last revision including the Commissioning Documents and Conclusions. Hasnain Ashrafi volunteered to provide a wiring diagram of a relay panel that would be easier to read.

**I7: <u>Revision of C37.103 Guide for Differential and Polarizing Circuit Testing</u>**
**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

Working Group I7 held its meeting in a single session on Monday, January 14, 2013. This was the third meeting for this working group.

There were 5 members present and a quorum was reached. Two guests attended the meeting.

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

September 2012 meeting minutes were reviewed. Jason Buneo motioned to accept the September minutes and seconded by Alex Lee.

Draft 1.0 was distributed to working group members, with all comments received to-date included.

Gary Kobet made the following general comments:

- All figures as shown existing C37.103-2004 needs to be professionally re-drawn. Renee Stoll agreed to become a corresponding member and redraw the figures. Gary will check the IEEE Style Guide to determine the required graphic file format (.wmf).
- Recommended to include samples calculations to determine primary current injection test set KVA requirement (Alex Lee submitted first draft of such a section with an Excel spreadsheet).
- Section 14 – Transformer ground Differential. Required revision or add details description as require.
- Test Set – revise or add description to reflect modern microprocessor driven test set.

Gary Kobet will see about posting "IEEE PES Special Report, Publication No. 96TP 115-0, Relay Performance Testing, 1996" and Transaction papers, on the IEEE Central Desktop C37.103 WG site for members to access.

Working Group Assignments - Review sections 6 through 14, incorporate comments in Draft 1 as appropriate, revise/update figures as necessary, revise/update for modern microprocessor relays and test sets

Section 6 - Power supplies for test - Jason Buneo, Rene Tuballa
Section 7 - Generator, motor, and reactor differential relaying - Alex Lee, Mark Schroeder
Section 8 - Bus differential relaying - Alex Lee, JC Tan
Section 9 - Transformer differential relaying - Rene Aguilar, Larry Oxford
Section 10 - Potential-polarized phase relay - Renee Stoll, Cristian Padararu
Section 11 - Potential-polarized ground relays - Renee Stoll, Cristian Padararu
Section 12 - Neutral current polarized ground relays - Meyer Kao, Gary Kobet
Section 13 - Tertiary current polarized ground relays - Meyer Kao, Gary Kobet
Section 14 - Transformer ground differential relays - Meyer Kao, Gary Kobet

Assignments are due March 31, 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

Working Group I8, Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases, was held in Executive, Hilton Portland and Executive Tower, Portland OR on September 11, 2012. Twelve members and six guests were present.

The working group continued to edit Draft 3 of the Guide. Sections 6 and 8 were discussed. Section 6 adds a new detail on "filter" grounding, where electronic devices have surge, case, and EMI filter grounding terminals. Bruce Magruder submitted CT drawings for Annex A. Del Weers will review and update Annex A for the next version of the draft. Brian Mugalian will ask Moh Sachdev to provide a write up on utility practice regarding groups responsible for grounding in the substation yard versus in the control house. The GE 469 relay manual has examples of grounding which will be reviewed by Bruce Magruder.

The working group will set up a public and private collaboration space in Central Desktop to check-out/check-in the draft for editing. Brian Mugalian has contacted IEEE-SA. Each working group member will be contacted and will need to create a member profile in order to gain access to the public and private sites.

Conference calls will be held in November to review the draft and get approval from the working group to request from the Relaying Practices Subcommittee permission to form an IEEE-SA balloting body. The PAR expires at the end of 2013. An invitation to ballot would be submitted after the January meeting, with receipt of ballots/comments before the May 2013 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, and they are balloting.

**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"

Following introductions, the meeting was opened with a review of the IEEE Copyright and WG Guidelines slides. There were 11 members and 5 guests present. Having a quorum, the minutes of the previous meeting were approved.

Harley discussed the Agenda, and the consolidation of the standalone sections of the Guide into the current Draft distributed by Farnoosh 1/14/13.

Farnoosh led an overall review of the document, and updated the current Draft 1.7 of 1-14-13 of the document. The WG concentrated on revising section 11 of the document.

Discussions included:

- Update and Status of the 11 Sections for the Guide:

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

**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, January 16, 2013, Memphis, TN in single session chaired by Andre Uribe with a total of **29 attendees** (8 members and 21 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. Decided that Quality Assurance should be used in lieu of Quality Control
4. Total of 15 tasks were assigned to members and guests

**I21: <u>Analysis of System Waveforms and Event Data</u>**
**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 double session on Jan 15, 2013.
There were 12 Members and 23 Guests in attendance.

11 topics were presented to date and 7 topics remain to be presented

Session 1 and 2 Presentations are below:

A. Amir Maki's Presentation: "Arcing and Capacitor Ringing"
B. Elmo Price's Presentation: "Ferroresonance"
C. John Boyle's Presentation: "Fault Magnitude and Carrier System Characteristics"

Presentations included signature waveforms for Arcing, Capacitor Ringing, Ferroresonance, Fault Magnitude and Carrier Systems.

Eleven topics have been presented to date. Seven topics remain to be presented.

A new template summarizing each topic is being developed.

A draft template will be sent to the working group members by March 29, 2013. Writing assignments for completed topics need to be submitted in draft template form by April 26, 2013.

**Reports from the TF Chairs**

**ITF22: <u>End of Life Assessment for P&C Devices</u>**
**Chair: Bob Beresh**
**Vice Chair: TBD**
**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.

The TF met with 19 people. It was felt this was an important topic and that we should proceed to form a WG and prepare a PSRC report on this topic. An assignment statement was prepared and homework passed out.
Topics:

a. Define end-of-life (Ratan Das)
b. Indicators of end-of-life (Ratan Das, Jim Hackett, Roy Moxley)
    i. Technology trends.
    ii. Failure rates, performance, change in failure rates (statistical data).

iii. Incompatibilities/non-interoperability with other technology.
iv. Lack of support by vendors.
v. Lack of spares.
vi. Lack of functionality (self-check, DFR, event records, setting ranges, elements).
vii. Can self-reporting be used as an indicator of end-of life?
viii. Can as-found characteristics be used for end-of-life?
ix. Use miss-op reports as input?
x. Manufacturer recommendations (service bulletins).
xi. Cost of maintenance/repair compared with replacement.

c. How to quantify or express end-of-life?
d. Motivations for determining end-of-life.
e. Impact of end-of-life on reliability and redundancy.
f. Use of end-of-life criteria/evaluation in asset management.
g. How to record.
h. NERC/FERC implications (Aaron Martin).
i. Transmission vs Distribution.
j. How to manage.
k. Is there a similar doc/report in nuclear industry? (Jim O'Brian)
l. Doble relay data base (service bulletins) (Bruce Mackie)
m. Compare C37.90 for definition (Fred Friend)

Keep in mind two perspectives: forward looking to determine what end-of-life may be (predictive) and backwards looking to determine what end-of-life is. Examine overall device performance – is device still functional in spite of reaching end-of-life? Look at positive side as well – maybe device performance is better than expected.

The TF requests WG status from the I SC.

**ITF23: Review of C57.13.1 – Guide for Field Testing of Relaying Current Transformers**
**Chair: Bruce A. Magruder**
**Vice-Chair: TBD**
**Output: Recommendation to I Subcommittee**
**Established: 2013**
**Expected Completion Date: 2013**

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

Task Force ITF23, Review of C57.13.1 - Guide for Field Testing of Relaying Current Transformers, was held in Natchez, Memphis Marriott Downtown, Memphis, TN, on January 15, 2013 at 3:00 pm. Ten members and two guests were present.

The Task Force agreed that there is enough new material, test equipment, methods, and technology on field testing of relaying current transformers that a revision to the Guide would be a benefit to users.

The Task Force will inform the Relaying Practices I Subcommittee that the Task Force assignment has been completed and that the Task Force should disband. And, request that a Working Group should be formed to revise the Guide. There was discussion regarding the wording of the Scope in the existing Guide. The Task Force questioned as to why the Annex's were listed the scope.

**ITF24: Use of Hall Effect Sensors for Protection and Monitoring Applications**
**Chair: Amir Makki**
**Vice-Chair: TBD**
**Output: Recommend future subcommittee activities in support of using Hall Effect sensors for measurement of electromagnetic fields and use of such measurements for monitoring, testing and analysis of protection systems performance as compared to using conventional CT's**
**Established: 2013**
**Expected Completion Date: 2013**

Meeting # 1

The first and final meeting of the task force was held on time with 24 members and guests present. The focus of the meeting was on discussing the basics of Hall Effect technology and how utilities are using them for monitoring protection systems performance especially electromechanical equipment. Each attendee, in turn, had an opportunity to share their knowledge and thoughts about the technology and whether or not its use should be addressed by the subcommittee or even at the PSRC.

The discussions where lively and represented a wide spectrum of thoughts varying from this should not be addressed by the PSRC to it should be. A consensus was reached to recommend the formation of a new working group to address this subject in a formal report or guide identifying the benefits and pitfalls of using the technology for protection and monitoring applications and making performance comparisons to using CTs including optical CTs.

The Task Force has completed its work and the group was disbanded. The appropriate recommendations were made at the subcommittee meeting and Jim Niemira volunteered to serve as the Chair of the new working group.

**Liaison Reports**

Report to PSRC, I-5, Subcommittee, Liaison Instrument Transformer Subcommittee

The Instrument Transformer Subcommittee met Wednesday October 24, 2012.

They have an active working group responsible for the revisions to C57.13 the basic Instrument Transformer Standard. They are discussing a number of suggested additions and appendix items.

A task Force is studying partial discharge in bushing VTs and CT. This effort will help decide how or what to include in C57.13 standard from C57.13.5 which deals primarily with testing aspects of the standards.

The Working Group on the mA output CTs C57.13.7 chair was not present so there was just a little discussion.

*Coordination Reports*
None

*Old Business*

NERC request for a report for commissioning for substation protection and control schemes was discussed. What does SC think? The expertise and topic is within the scope of the I SC. A new task force will begin at the May 2013 ITF25, with output as a report or guide for commissioning of substation protection and control schemes. Chair is Rafael Garcia; Vice-Chair is Kevin Donahoe.

*New Business*

I12 Chair Andre Uribe requests a change in the working group name from quality control to quality assurance for protection and control design. The Subcommittee approved request as their output is a report.

ITF22 is End of Life Assessment of P&C devices: Bob Beresh requests that a working group be created at the May 2013 for a report. It will be working group I22. Chair and vice-chair will be assigned before the May meeting.

ITF23 is changed to working group I23 to revise C57.13.1 with Bruce Magruder as Chair starting at May 2013 meeting.

ITF24 is changed to working group I24 to write a report to the Subcommittee on protection and monitoring using Hall Effect sensing devices, with Jim Niemira as Chair starting at May 2013 meeting. Working group name will be, “Use of Hall Effect sensors for protection and monitoring applications”.

The Subcommittee discussed the IEEE paper on mathematical models of instrument transformers where an IEEE paper was published in 2002. There are new techniques and programs for this process. The CT

saturation calculator located on the web site could also be updated. A report would be more suited as there are page limits on a transactions paper. Waveforms could be generated to test systems in a lab environment and we can build on previous work. A Task Force will be formed and will be ITF26, with an output to "Expand Transactions Paper on mathematical models.

For documents to be posted on the I Subcommittee web site, contact Fred Friend, and copy Jeff Pond and Brian Mugalian.

Jeff Pond asked for any suggestions on presentations to the Main Committee at future meetings on those working group outputs that have been completed. Send any suggestions to Pratap Mysore. One possibility is the output of working group I3 as a presentation in May 2013. Bob Pettigrew also mentions that anything that the working groups produce can be presented to the Main Committee.

Mario Ranieri asked whether the Relay Service Letter Database which is presently at Doble should be returned to the PSRC. The decision was to not relocate it.

## 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, 16, 2013 with 17 members (achieving quorum 17/28) and 20 guests. There was a call for the approval of the minutes of the September 2012 meeting in Portland. These minutes were approved unanimously by the subcommittee members.

**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 contact Dale Finney regarding progress on the Transaction paper. No meeting for the next session.

Rattan Das has expressed interest in writing a Transaction Paper on this report. It will be sent to him. We will review this in May.

### 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: Fifth 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 15 guests present.

Gene Henneberg made a presentation on Single 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.

Dr. Rama Gokaraju presented his assignment on application of the Equal Area Criterion and Frequency Deviation of Voltage in the second session. The method identifies stable and unstable swings at the generator through monitoring the machine angular velocity and angular acceleration. This is a new technique which is apparently available (so far) in one manufacturer's relays. The method appears to have the advantage of simplicity and looks like is should be secure against false out of step trips. There was extended member discussion on this as well as Equal area criterion. Dr. Rama will be revising these sections based on the feedback from the session.

A few new assignments were made. March 15 is the assigned date for submitting the assignments.

A double session with space for 30 persons and a computer projector is requested for the May 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: Eighth 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 Memphis, TN on January 15, 2013 with eight (8) members and eleven (11) guests.

Joe Uchiyama welcomed to WG attendees, and briefly explained the status & goal of this WG. He reported that the status of the survey document and contact person list was forwarded to IEEE for the survey. Also, he had distributed & discussed this meeting agenda and September (Portland) minutes.

The chairman had stated that the remaining *item* was the contact persons for two PS Plants. We

discussed the status of IEEE survey for the remaining times as following items:

Chuck Mozina had indicated that he may know a contact person of the **"Seneca PG Plant/PA."** Chuck will forward to the chairman information of the contact person as soon as return to his office.

Does anyone have contact information of **"Yard Creek/NJ", "Seneca PG Plant/PA"?** If so, contact Joe

Uchiyama.

Chairman will contact IEEE for the survey status. Find the non-responding utilities and list them up.

Distribute the non-responding utilities to WG members for checking/encouraging finish the IEEE survey.

Will English had indicated that Phil Waudby (Consumer Energy) will no longer attend PSRC meeting and Will take over Phil's position. Since Phil had been a great contributor, the chairman will request Phil to continue as a corresponding member.
Next meeting will be 20 people, single session with a computer projector.

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

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

Mike Reichard chaired the meeting on MONDAY, January 13, 2013 in Memphis, TN.
The WG group met with 11 Members and 14 Guest. Sudhir Thakur joined the WG. The WG membership consists of 25 members.

The September New Orleans meeting minutes were approved as written. The chair stated that the material presented at the September meeting by Jeff Roberts as well as other pertained papers have been uploaded to the J7 WG-PSRC secured area.
The WG discussed the mechanical aspects of modern power circuit breaker pertaining to the number of stored energy closes that can be made. Generally the breakers are capable of C-O-C cycling until recharged.

Gene Henneberg presented a discussion on the dynamic aspects of several vendors' sync-check relays. The write-up material is also on the J7 website for consideration for inclusion in the paper. Gene will also present a discussion of the material discussing "System stiffness". Other discussions slated for the May meeting include Blocking Timers – Paduraru**,** A review of the HMDs pros and cons and GA Tech paper – Mozina and DG Generator Control Systems – Bukhala/Reichard.

Next meeting in Baltimore, 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.

Rev Com has approved the guide and the revised guide is expected to be published in March 2013. No meeting is planned for the next session.

**JTF8: Improved Generator Ground Fault Protection Schemes**
Chair: TBD (Russ Patterson)
Vice Chair: TBD
Established: Jan 2013
Output: TBD (likely a report to subcommittee)
Status: Will have a 2nd meeting in May

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

The task force met in Memphis, TN with 19 in attendance. 10 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 some interest in further evaluating these ideas for a possible report to the subcommittee that may be used to modify C37.101 when it is next opened.

The CFE engineers will be asked if they can give a presentation and provide details to the task force at the May meeting in Baltimore so that details and limitations of the new scheme can be evaluated.

The task force will meet in Baltimore in May 2013, with the need for a single session, computer projector and seating for 25 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: First Meeting**

The task force met on Wednesday, January 16, 2013 with 17 members and 15 guests.

***Assignment:*** TBD

Meeting chaired by Murty Yalla due to absence of Chris Ruckman.

Members were asked to review and comment on three papers sent from C. Ruckman to M. Yalla and M. Reichard; Protection_Issues_restoration.pdf, An Update to Protection Issues During System Restoration-Final version.pdf, Adibi-etal-1995_paper.pdf.

A survey on Generator Black Start Issues is to be developed and sent to a targeted population. Joe Uchiyama can provide information on how to conduct surveys using the IEEE procedures and tools. A suggestion was made to review the PSRC mailing list for utility members who may be involved with Black Starting of Generators.

Murty requested members to volunteer for Vice Chair. Zeeky Bukhala volunteered.

Assignments should be sent to Chris Ruckman no later than March 15, 2013.

The task force will meet in Baltimore in May 2013, with the need for a single session, computer projector and seating for 25 people.

**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 29 members and 11 guests. As this was the first meeting, a quorum was achieved with 29 out of 29 members present.

The Chair provided an overview of the origin and objectives of the task force and discussed contacts made with members of the ESCS and the PSDP. He noted that collaboration with these two groups provides access to knowledge of dynamic response of control systems and the potential for mutual learning opportunities and benefit.

A number of technical papers have been provided by Mike Fogarty of ESCS and papers will be made available to task force members through password protected web access.

Members discussed areas of interest that may form part of the scope for a working group:

- Coordination of the exciter overexcitation protection and limiter settings and protection on the exciter transformer
- Coordination of the underexcitation limiter with underexcitation protection and loss of field protection
- Coordination of the V/Hz overexcitation protection and limiter
- Field-forcing and its impact on the apparent impedance at the generator terminals and load responsive relays
- Establish a common understanding of data provided by the generator and excitation manufacturers to promote better communication among the generator manufacturer, excitation manufacturer, and protection engineer; develop a guide on how to apply the data to protection settings

Consensus was reached that the J Subcommittee should form a working group. Subsequent discussion focused on the work product and the merits of producing a guide vs. a report. Members agreed a report would be more expedient and provide additional time to decide whether a guide would be appropriate when more information is available. Information from the report could be incorporated into existing guides, a new guide, or both.

Members also discussed the relation between this work and relevant NERC standards:
- PRC-019-1 – Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection. This standard has been adopted by the NERC Board of Trustees and will be filed for regulatory approval.
- PRC-024-1 – Generator Performance During Frequency and Voltage Excursions. This standard is under development.
- PRC-025-1 – Generator Relay Loadability. This standard addresses loadability issues with load responsive phase protection applied to generators, generator step-up transformers, and certain auxiliary transformers and is under development.
- PRC-027-1 – Protection System Coordination for Performance During Faults. This standard addresses, in part, coordination of protection systems between generator and transmission owners and is under development.

Members discussed various models for the working group. The C17 working group, Fault Current Contribution from Wind Plants, is a joint working group of PSRC, the Electric Machinery Committee, and the T&D Committee and could serve as a model.

Members also discussed how the scope of this working group may expand beyond previous work. Members noted the need to balance potential improvements in coordination through stability studies with the need to provide practical methods for setting relays.

Members agreed to develop a draft scope for discussion at the May meeting. A list of potential topics will be circulated with the minutes of this meeting. Members will be asked to provide additional topics when the minutes are distributed.

The Chair solicited interest in a Chair for the working group.

The requirements for the next meeting 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. New material added to draft concerning expected output from types 3 and 4 machines

**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 not as yet posted on the EMC web site. The last minutes posted on the EMC web site were the 2010. Based on 2010 minutes one working group (WG4 within the Generation Subcommittee) was formed to determine how susceptible generators and their driving elements are to torsional forces created by transmission grid transients. This is an area of interest to the PSRC since it involves transmissions system faults and automatic reclosing. The WG finding was that transient characteristics are somewhat unknown. The WG had several meetings and determined that they did not have enough information to proceed with the development of a technical paper. The objective of the group was changed to write a paper on the following:

- Description of backgrounds of known events
- Problems in getting information on the events
- Grid components that contribute to the events
- Concerns rising from the events
- Required instrumentation to capture data of a future event

At the last meeting for which I have minutes an outline was put together to start developing a paper around these issues. Assignments were given to various members of the group and the paper will be developed.

**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**
IEEE 741 protection of 1E systems want to revise guidelines for the degraded voltage settings. It is presently shown as an annex in 741. They want to have a new standard for which the PAR has been submitted that will be called voltage monitoring that will include revised guidelines for degraded voltage settings and also they will remove existing guidelines from the IEEE 741.

**NERC (related to rotating machinery) J. Uchiyama**
SPCS support for many NERC Activities

a. PRC Standards under development.-
   - PRC-001-2 (Generator & Transmission protection coordination) will be replaced with PRC-027, drafting teamis working on this standard for the last two years.
   - PRC-005-2 (Protection system maintenance & Testing)
     Just finished official comment period: – (a) 12 years if relays are monitoring. (b) 6 years for microprocessor relay(s), (c) maintenance of Batteries, etc.

- PRC-023-2 (Line relay Loadability)- Utilities just went-through this process
- PRC-025-1 (Generator Relay Loadability)
  Devices 21, 51V, 51R, 51T-Basis of Name Plate Rate versus Reporting Rate

b. Special Protection Review – Misoperation Report template was finalized. – Generator Misoperation will be reported by HV side GSU.
c. SPS & RAS were consolidated to one – "Gen-Drop Scheme" is only related to J-Subcommittee
d. There is an issue/concern for "Reclosing" document. Reclosing relating to this group is only near Power Plants for this group (Shaft fatigue).

Next Meeting: October in Chicago, IL.

**Coordination Reports**

None

**Old Business**
The reaffirmation ballot for C37.102 Guide for AC Generator protection has been completed. It received approval at Dec 14th 2012 Rev Com meeting. Now it has a 10 tear life.

**New Business**
There was a discussion on the application of VT primary fuses at the generating stations. The discussion was led by Gary Kobet.

**The meeting was adjourned**

## K: SUBSTATION PROTECTION SUBCOMMITTEE

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

The K-Subcommittee met on Wednesday, January 16, 2012 in Memphis, TN, with 21 of 28 members and 16 guests in attendance. A quorum was achieved to approve the minutes of the September 2012 subcommittee meeting.

**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. Eight members and one guest were presented. After the introduction, a call for quorum was made followed by approval of the minutes from the September, 2012 meeting in Portland. Three members approved the minutes by e-mail. The IEEE Patent slides were shown.

The session continued with discussion on the type of PSTs. Tom Wiedman identified four types of PSTs. Lubo Sevov mentioned about five types of PSTs referencing to the IEEE report "Protection of Phase Angle Transformers" published October, 1999. Mike Thompson and Arvind Chaudhary suggested that we shall follow the three types of PSTs defined in the IEEE 57.135 Guide for the Application, Specification, and Testing of Phase Shifting Transformers.

Tom Wiedman presented a case on protecting a PST with delta/wye exciting unit, with two tap changers: one for changing the phase angle between the source and load voltages, and another one for adding of up to 5% in phase voltage to the source voltage and hence changing the load side voltage. Another point Tom made in the presentation was on whether or not the CTs on the tapped series winding leads need be used for the differential protection. After extensive fault analysis, he came to the conclusion, that the PST would have better coverage on detecting faults, and been stable on external fault, if these CTs are not used. The CTs from the source and load sides would only be used.

Tom Wiedman and Paul Elkin agreed to review the 57.135 in detail, and have better input for the next meeting. .

**Assignments:**

Tom will provide the Powerpoint on the PSTs to be made available to the group

Paul to provide some experience on PST protection (from Sept. 2012 meeting)

Charlie Henville volunteered to provide a write up on PST applications (from Sept. 2012 meeting)

Joe Mooney will work on PST types following the ones from the C57.135 guide (from Sept. 2012 meeting)

**K3: <u>REDUCING OUTAGES IN TRANSMISSION SUBSTATIONS</u>**
**(subtitle: <u>Reducing Outages Through Improved Protection, Monitoring, Diagnostics, And Auto restoration In Transmission Substations)</u>**

**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 6; 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 Jan 15, 2013 with 7 members and 11 guests

Introductions were done and previous minutes were discussed.

We reviewed draft-5 of the paper, and made additional changes and writing assignments.

Expectations are to complete the full paper and send out to the WG before the next May meeting, and then to start the 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 working group met in a double session on Wednesday Jan.16. In the absence of the chair the WG meeting was chaired by the Vice Chair Chuck Mozina with Ken Behrendt acting as Vice Chair. A total of 7 members and 10 guests were present. For the first time since the WG was formed a quorum was present for the first session. The minutes of both the September meeting and the Webinar meeting held on Jan. 8 were approved as written. Since the September meeting the WG has done a review of the entire document and also conducted a Webinar to resolve major issues. The assignments from the Webinar were reviewed at the meeting. Most of the assignments addressed clerical revisions to the document. However, the section on detection of ground faults on an ungrounded system which results after the utility tripping takes place where the consumer installation has a source such as a generator or closed bus tie were significant. All members agreed the write-up provided by Ken Behrendt improved the clarity of the document and also consolidated information that had been repeated in two different sections of the document into a single section.

Almost all the assignments from the January 9 Webinar are completed with only one exception which addresses a clerical issue. The Chairmen plans to issue Draft 12 of the document with all changes for WG balloting by Feb. 8 with ballots due back the end of Feb. The goal by the end of the May WG meeting is to have WG approval of the document. Keista Gluchoski of the IEEE standards association attended part of the second session and provide a time line to complete the documents by the end of the year.

Assignments:

Complete the assignment not yet completed from the January 9 Webinar meeting.

— WG member to complete the WG ballot by deadline set by the Chairmen.

**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.

The working group met on Tuesday, January 15, 2013 at the Downtown Marriott, Heritage-Salon II room, in Memphis, Tennessee, USA.

1. Introductions/ Sign up sheet/Patent Slides/

   Quorum met (16 voting members attended the meeting; required 12 for quorum).

   Total attendees : 29.

   2 new guests become voting member bring membership from 23 to 25. Claire Pattie and Eric Udren.

2. Approve minutes- September 2012 meeting minutes shown and approved.

3.Revised scope vote

Mike Thompson made the motion to revise the scope to expand it.

New scope was approved by the working group. 14 in favor, none opposed.

4. Assignments: due by January 2013

4a. Reviews

- Overview, Scope, and Purpose (Roger Whittaker, Adi Mulawarman)
- Definitions, Acronyms, and Abbreviations (Mike Fleck, Craig Hiemenz)
- The Need for Breaker Failure Protection ( Mike Thompson)
- Backup Protection (Jeff Barsch, Johan Van Den Berg)
- Breaker failure Modes (Rich Young, Brian Boysen)
- BFP Schemes (Alla Deronja, Dean Miller, George Tsai, Mani Sankarin)
- Breaker Failure Design Considerations (Alla Deronja, George Tsai)
- Factors Influencing Settings (Ian Tualla, John Wang)
- Communications Based Breaker Failure Protection (Charlie Sufana)
- Breaker Failure Relay Testing (Don Ware, Jun Verzosa)
- Normative References and Informative Bibliography (Volunteer?)
- Appendix-Breaker Failure Setting Example (Adi Mulawarman)

4b. New Sections

- BFP of series sectionalizing breakers (Sam Sambasivan)
- Generator breaker failure to close (Mike Thompson)
- How to apply BFP to redundant primary (Phil Zinck, Roger Whittaker, Michael Wright)
- Breaker differential (Aaron Martin)
- Flashover (Roger Whittaker)
- Common Grnd ProtectionC37.234, free CT live tank (Don Ware, Chuck Mozina)
- 52 a switch input to BFP scheme/ information from NERC (Eric Udren)

5.Review Sections

6.Breaker failure events? Other business……..Adjourn

Roger will contact the lead of outstanding section reviews or new sections to see if and when the information might be turned in.

Roger to request 2 sessions at the next meeting.

**New scope statement:**

This guide describes methods to protect a power system from faults that are not cleared because of failure of a power circuit breaker to operate or interrupt when called upon by a protective relay, The intent is to give the reader a guide in how to detect that a breaker has failed to clear a fault, and how to electrically isolate the fault after the breaker has failed to clear the fault. Additionally, schemes which provide primary protection of the power system from performance failures of the power circuit breaker other than fault clearing failures such as failure to operate, either tripping or closing, manual or automatic, are also described. Such schemes when applied are typically integrated as a part of the overall breaker failure protection scheme.

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

Additional discussions:

Roger went over additional sections to include schematic presentation for breaker failure tripping.

Lots of discussion on single point of failure when designing the scheme.

Eric Udren explained his comments. Will be put in 7.7.

Gave an overview of what we have so far in the document.

We will also review C16 to see if there is any discussion on redundancy of breaker failure initiate and tripping.

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

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

The working group met on Tuesday morning, January 15th, in a single session with 11 members and 10 guests. The working group currently has 13 members.

1. After introductions, the working group reviewed the writing assignments from Pat Carroll (Introduction) and Mark Schroeder (expanding the earthquake related section). We also discussed the status of Don Ware's assignment to investigate and expand the section on transducer based devices. During our discussions, we made the following two new writing assignments:

2.

- Transformer winding movement during faults – Dean Miller and Elmo Price
- Using SPR operations as a diagnostic device – John Boyle

3.

All writing assignments are due by the end of February. Draft 4 of the report will be sent to the working group by the end of March for review and final discussions during our May meeting in Baltimore. Our intent is to submit the documents to the subcommittee for comments in June.

Phil Winston and Phil Tatro, who are on the NERC SPC Subcommittee, attended this working group meeting. They are involved with Order 758 and addressing transmission and generation SPR devices in the maintenance and testing requirements. After contacting and surveying many Transmission Owners and Generation Owners across all operation regions regarding their SPR usage, they found there was a substantial percentage of utilities that use SPR devices for tripping. Phil indicated their feed back to the drafting team is to recommend that if utilities use SPR devices for tripping, they should as a minimum verify proper pressure actuator and tripping contact operation. The K6 working group voted unanimously to support this recommendation.

**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 Jan 16, 2013 in Memphis, TN with 7 members and 8 guests in attendance. We covered the status of 1547.7 and .8, 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).

The first meeting of 1547.a was held Nov-30 & 31 at the Piscataway NJ Embassy Suites and the minutes are attached. The minutes are also on the SCC21 web site under 1547.a "logistics" for anyone that would like to review them.

IEEE P1547.7 "Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection" Robert Saint, Chair; Tom Basso, Secretary. Ballot group is forming and tomorrow Jan 17 is the last day to join the ballot pool

IEEE P1547.8 Recommended Practice for Establishing Methods and Procedures that Provide Supplemental Support for Implementation Strategies for Expanded Use of IEEE Standard 1547. Writing groups providing input for the latest draft which should be out soon since the next meeting is the week of Feb 11, 2013 in Santa Clara CA.

—

We then had open discussion of recent DG activity in member regions. If you need a password for the active 1547.x working groups, give me your business card after the meeting and I will email.

**KTF11: Open Phase Detection for Nuclear Generating Stations**
**Chair: Charlie Sufana**
**Vice Chair: Mike Urbina**
**Established: September, 2012**
**Output: Recommendation to the subcommittee**
**Expected Completion Date: January, 2012**

***Assignment:*** Investigate whether the topic is in scope of the K subcommittee and if there is sufficient interest in the topic to form a working group, as well as possible outputs that the working group could produce.

Introductions were done after a welcome by Chairman Charlie Sufana. There were 33 in attendance. Nineteen volunteered to be a member if a Working Group is formed.

This was the first meeting of Task Force KTF11. The task force met to discuss a recently issued NRC Information Notice 2012-03. This notice concerned the tripping of nuclear station aux power busses as the result of an offsite power circuit experiencing the loss of one phase. The problem is that no line protection detected this condition and the motors tripped on their own relay protection and there was a reactor scram. Detection of this type condition is also impaired by the type of aux power transformer design

Charlie Sufana presented a PowerPoint that briefly explained the situation. Gary Kobet supplied several figures that were incorporated into the presentation. The NRC report was also briefly presented.

Mike Urbina then discussed a little about the Byron incident that was in the NRC document.

Pratap Mysore presented several slides illustrating how a three phase core transformer design can still provide voltage and current even though one phase is open.

After some discussion by the Task Force it was decided to apply to be a Working Group. As it was felt that the NRC would be looking for comments as soon as possible, it was felt that a report to the K Subcommittee would be the fastest approach. In order to speed up the process, it was also proposed that web conferences be exploited.

A proposed scope for this proposed Working Group is:

Methods for Analyzing and Detecting an Open Phase Condition of a Power Circuit to a Nuclear Plant Station Service or Startup Transformer.

**New Business:**

**Guide on Static VAR Compensator Protection**

I9 in the Substations Committee received a PAR to write a guide on static VAR compensator (SVC) protection. Mike Thompson met with the I9 Chairman and John Wang attended their meeting. The subcommittee members discussed concerns with the "protection" wording in the I9 title. The Subcommittee Chairman is to follow up with the PSRC officers and Standards Coordinator to assess the situation. Mike Thompson made a motion to form a joint working group chaired by John Wang. John commented that his chairman's position was pending approval of his management. Gene Henneberg seconded the motion. Motion carried with 19 for and 2 opposed. The working group will be K12.

**KTF11 Open Phase Detection for Nuclear Generating Stations**

Charlie Sufana motioned to form Working Group K11 from the Task Force KTF11. The motion was seconded by Gene Henneberg. Motion carried unanimously. The output will be a report to the K Subcommittee with a scope as stated in the KTF11 minutes.

**Old Business:**

Working group K8: Revision of IEEE C37.99 GUIDE FOR THE PROTECTION OF SHUNT CAPACITORS, chaired by Pratap Mysore, is complete. Charlie Sufana motioned to disband Working Group K8. The motion was seconded by Gene Henneberg. Motion carried unanimously.

**General Discussion:**

There was no general discussion.

**VII. PRESENTATIONS:**

There were two presentations:

- Standard Profile for Use of IEEE Std 1588-2008 Precision Time Protocol (PTP) in Power System Application - Galina Antonova
- NERC CYBER Security – Scott Mix, NERC

**VIII.** At 11:55 am the meeting was adjourned by Chairman Roger Hedding