



**POWER SYSTEM RELAYING COMMITTEE
OF THE IEEE POWER and ENERGY SOCIETY
MINUTES OF THE MEETING
January 9-12, 2012
Garden Grove, CA
Final**

I. Call to order / Introductions Bob Pettigrew

Chairman Bob Pettigrew called the meeting to order at 8:00 am
After introductions, a quorum was verified (88 members – 148 total present) and Main Committee Attendance sheet was routed.

II. Approval of Minutes & Financial Report Mike McDonald

The minutes of the Minneapolis September 2011 meeting were approved as posted.
The PSRC had no financial responsibility for this meeting.

Chairman's Report Bob Pettigrew
None

III. Reports of Interest

A. Technical Paper Coordinator's Report – Roger Hedding

2012 T&D Conference, May 7 – 10, 2012 Orlando

The theme is "Making Innovation work for Tomorrow". 14 papers were submitted for the conference. 13 were accepted, 1 was rejected. All the papers will be at the poster session Wednesday evening. Thanks to all the reviewers who helped review these papers.

2012 General Meeting, July 22- 27, 2012 San Diego

49 papers were submitted for review to the PSRC for the 2012 general meeting. Reviews are to be completed by January 23rd. To date 3 papers have been accepted, and 3 rejected. We will sponsor 4 -5 paper sessions for this meeting. I'll need Session chairs. So if you are interested, let me know.

Paper Approval Criteria

More information on this as task force results are presented. Nothing to report as of this date.

Future Meetings

May 13-17, 2012	Astor Crowne Plaza Hotel, New Orleans
Sept. 10-13, 2012	Hilton Portland; Portland, OR
Jan 2013	JTCM (TBD)
May 12-16, 2013	Tremont Plaza Hotel, Baltimore, MD
Sept. 8 -12, 2013	Hotel Albuquerque at Old Town Albuquerque, NM

Futures places and dates are under development.

B. CIGRE B5 Activities Report - Adamiak

No report submitted

C. IAS Power System Protection Committee - Mozina

The following are items of interest to the PSRC:

- **Color Book Reorganization Progress** – The IAS Industrial & Commercial Power System Dept. — I&CPS (responsible of the IAS color books) held its meeting at the IAS General Meeting – Oct. 9-10 in Orlando, FL 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 three of the 13 standards being submitted for IEEE standards balloting. I&CPS will meet on May 20-24, 2012 in Louisville, KY.
- **Arc Flash** – The IAS is the home of IEEE standard 1584-2004, a key Arc Flash standard that is currently under revision. The WG that is updating this standard met at the Petroleum and Chemical Industry Committee Conference (PCIC) that was held in Toronto in Sept. Changes in the standard are a result of Lab. Tests conducted at a major university.

D. IEC Report - Eric Udren

TC 95, Measuring relays

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

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

- 60255-121 – Distance relays - A Committee Draft #2 was circulated in Feb. 2011 and comments were received from the IEC National Committees as documented in 95-290-CC. The comments were resolved and a CDV will be circulated in March.
- 60255-149 – Thermal electrical relays - A Committee Draft was circulated in Feb. 2011 and comments received from the IEC National Committees as documented in 95-291-CC. The comments were resolved and a CDV will be circulated in March.

For both of these, any informal comments should be submitted through MT4 Convenor Murty Yalla by the end of January. IEC TC 95 design and type testing standards currently circulated from IEC Central Office in Geneva for US National Committee comment:

- 60255-24 COMTRADE standard is handled by a Dual Logo Maintenance Team (DLMT). Certain European participants informally sent IEEE PSRC WG H4 some issues that could lead to some negative NC votes when CDV is circulated. H4 is developing fixes and will be forwarding to the informal commenters, to be sure the upcoming CDV is acceptable. The CDV will probably be issued in March.
- 60255-118-1 IEC Synchrophasor measurement standard – a version identical to C37.118.1 has been issued by TC 95 as CD, with comments due by Feb. 10 according to a previously agreed dual logo process.
- 60255-26 EMC Tests is the restructured specification that now rests directly on 61000-4 series standards and eliminates the 60255-22-X series. The CDV requires a vote by Feb. 10.

Any PSRC attendee interested in reviewing 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. There is also a draft Technical Report 62351-10 on IEC cyber security architecture now in circulation for commenting.

E. Standard Coordinators Report – Phil Winston

Standards Activities since the September, 2011 Meeting

The status of standards activities that have taken place since the September 2011 meeting of the PSRC are as follows:

RevCom Activity:

Standards Reaffirmed

C37.101-2006 IEEE Guide for Generator Ground Protection

Standards Approved & Published

PC37.232 Standard for Common Format for Naming Time Sequence Data

PC37.118.1 Standard for Synchrophasor Measurements for Power Systems

PC37.118.2 Standard for Synchrophasor Data Transfer for Power Systems

Standards approved and waiting to be Published

None

Standards submitted for approval (on March's RevCom Agenda)

PC37.90.3-2001 IEEE Standard Electrostatic Discharge Tests for Proactive Relays

PC37.231-2006 IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control

Standards to be submitted for approval

None

Standards due for 10 year review

None

Ballot Activity:

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

C37.90.1 Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems
Associated with Electric Power Apparatus

C37.102-2006 Guide for AC Generator Protection

C37.109-2006 IEEE Guide for the Protection of Shunt Reactors

C37.231-2006 IEEE Recommended Practice for Microprocessor-Based Protection
Equipment Firmware Control

C57.13.1-2006 IEEE Guide for Field Testing of Relaying Current Transformers

C37.99 Guide for the Protection of Shunt Capacitor Banks

Standards/Projects that completed Balloting and moved to RevCom

PC37.232 Standard for Common Format for Naming Time Sequence Data

PC37.118.1 Standard for Synchrophasor Measurements for Power Systems

PC37.118.2 Standard for Synchrophasor Data Transfer for Power Systems

PC37.90.3-2001 IEEE Standard Electrostatic Discharge Tests for Proactive Relays

PC37.231-2006 IEEE Recommended Practice for Microprocessor-Based Protection Equipment
Firmware Control

C37.101-2006 IEEE Guide for Generator Ground Protection

NesCom Activity:

New PARS applied for

PC37.113 Guide for Protective Relay Applications to Transmission Lines

PAR Extensions (applied for & approved)

PC37.96 Guide for AC Motor Protection

PC37.111 Standard for Common Format for Transient Data Exchange (COMTRADE) for Power
Systems

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

Modified PAR approved

None

Modified PAR submitted

None

PARs Requested for Withdrawal

PC37.113 Guide for Protective Relay Applications to Transmission Lines

PARs Administratively Withdrawn

PC37.237 Recommended Practice for Time Tagging of Power System Protection Events

PARS expiring at the end of 2012

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

PC37.98 Standard Seismic Testing of Relays

PC37.99 Guide for the Protection of Shunt capacitor Banks

PARS to be approved (on NesCom agenda)

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

PAR/Standard Submittal Deadlines & Standards Board Meeting Schedule:

Submittal Deadline

February 17, 2012

April 27, 2012

July 20, 2012

October 15, 2012

Meeting Date

March 28, 2012

June 7, 2012

August 29, 2012

December 4, 2012

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

Chair: C. Preuss

Vice Chair: Vacant

Secretary: E. William Jr.

Presentations

- Sequi: Tien Van - Implementation of 1711. The presentation will be uploaded to the C0 website.
- Southern California Edison: Bob Yinger - Presentation on Smart Grid Project. SCE indicated that the presentation can not be distributed because it is being updated.

New Business

- Matt Ceglia - Waiting to hear back from PSRC to get PAR into new System. All WG is worked through PSRC.
- Future meetings
 - May 20-24, 2012: PES Substations Annual Meeting in Raleigh, NC
 - September 10-12, 2012: PSRC September meeting in Portland, OR
 - January 2013: PES JTCM has not been announced yet
- Future Meeting presentations.
 - Raleigh - Michael Dood may know a few people in the area. ABB, Progress Energy
 - Portland - Craig knows BPA, Portland General, Grant County PUD, Snohomish County PUD
- 1711 is a trial use standard published in 2010. To get to a full standard, there is no ballot. The chair needs to contact Erin at IEEE SA requesting the standard go from trial use to full use and IEEE SA will change the title.

Notes

- The PSRC can not use 123SignUp but emails can be exported from 123Signup for PSRC's use to support joint working group emails
- Mike Dood will arrange online tutorial of 123SignUp for the C0 working group officers.

C1: IEEE 1686 Standard For Substation IED Cyber Security

Chair: S. Sciacca Sub: C. Preuss

Vice Chair: M. LaCroix

Secretary: E. William

Output: Standard

Expected Completion Date:

The work is moving along and the chair will be starting writing meetings. The biggest issue is bringing in something for authentication. There is no problem getting to sponsor ballot by end of 2012, except that writers need to deliver their promised assignments. There is now joint sponsorship with T&D, PSRC, and PSCC; with SGIP involvement.

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:

At the September meeting, the chair was advised that importing sections from other standards was not allowed. John created a skeleton document and the ballot failed in a working group vote. The IEEE SA requested a formal letter from the chair to the PSRC chair requesting PSRC approval. A meeting was held with PSRC ADCOM yesterday at JTCM. PSRC advised John today that the request failed to be approved by the PSRC. The C0 chair requested John to obtain a formal response back from PSRC. John Tengdin is on NIST EMI WG and 1613 is on their list of standards along with C37.90 series.

C3: IEEE C37.1 Standard for SCADA and Automation Systems

Chair: C. Preuss

Vice Chair:

Secretary: E. William

Output: Standard

The WG is under PAR to update the standard. The meeting talked about spaghetti diagram for smart grid. Much of the meeting was spent looking at the draft update to the NIST spaghetti diagram with much discussion at the meeting. The group will look at IEC 61850 interfaces for support. This will be coordinated with PC37.240 and NIST.

C4: IEEE XXXX Draft Standard for SOE Time Stamping Requirements for Substation IEDs

Chair: M. LaCroix

Vice Chair:

Output: Standard

The standard has a new title. The WG will draft a new standard concerned with how to time tag something. The scope was discussed at the joint meeting. Next week the chair will contact members and keep discussion running by email. There is a meeting this afternoon to discuss matter further.

C5: IEEE C37.2 Draft Standard for Electrical Power System Device Function Numbers and Contact Designation

Chair: J. Tengdin

Vice Chair: W. Ackerman

Output: Standard

The C5 working group did not meet.

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 did not meet.

C7 IEEE 1588 Profile for Power System Applications

Chair: T. Tibbals

Vice Chair: M. Dood

Output: Standard

Established: 2009

Much of the meeting was spent discussing the summary paper along with future revision topics: time inaccuracy, security and wireless. The WG needs to understand how to meet specific requirements from the NIST SGIP cyber security, but these must be addressed in 1588. Ron Farquharson is on the NIST SGIP and will talk with Matt Ceglia to get in touch with the right person working on 1588 so security requirements can be provided.

C8 IEEE 1615 Recommended Practice for Network Communications in Substations

Chair: J. Gould

Vice Chair:

Secretary:

Output: Standard

Established: 2011

Joe Gould could not attend, so meeting was chaired by Craig Preuss. Joe is still tentatively interested in being Chair. There still is no active PAR.

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

Sam represented C10, but Steve Kunsman had to resign from H13. Sam was accepted as the new chair from PSRC. However, PSRC was not happy with dual chair role with Substations. Sam recruited a replacement chair (Tim Tibbals). Sam will remain chair of H13. Tim Tibbals formally accepted the position of chair at the request of the C0 chair. The WG is on track with sponsor ballot for the year. Everything was covered during the meeting. Sam will start bi-weekly writing group meetings by teleconference.

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

Expected Completion Date: 2012

The initial publication was in 2010. Work is progressing on update and clean-up. Security improvements include update for authentication from version 2 to 5. The WG changed PAR because DNP3 now has 4 levels and changed security. The WG voted to continue on to balloting process. There will be 60 days for balloting.

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

Title is now for mapping between 1815 to IEC 61850. WG had to add in cyber security requirements based upon SGIP CSWG feedback. The PAR now has cyber security requirement.

G. NERC Report – Phil Tatro

1. SPCS Activities:

a. Order 754: NERC staff and industry subject matter experts participated in a FERC technical conference in September 2011 regarding the study of the non-operation of non-redundant primary protection systems; e.g., the study of a single point of failure on protection systems. The System Protection and Control Subcommittee (SPCS) and System Modeling and Analysis Subcommittee (SAMS) are working with NERC staff to develop a Section 1600 Request for Data or Information to collect information from industry to assess whether there is a further system protection issue that needs to be addressed. The draft data request is posted for comment through February 6 and a webinar will be held on January 20. The SPCS and SAMS also are participating in developing an Interpretation Request to clarify the extent to which the study of a single point of failure is required in the existing TPL standards.

b. Special Protection Systems (SPSs): The SPCS and SAMS are conducting an assessment of the definition of SPS, SPS-related protection and control (PRC) standards, and existing regional practices related to SPSs. Findings will be reported to the NERC Planning Committee in a report that can serve as a reference document for a standard drafting team that will be assigned to review the definition and standards. The SPCS and SAMS continue work on this assignment and plan to submit a report to the NERC Planning Committee for consideration at their June 2012 meeting.

2. Standards Activities (active projects only):

a. Transmission Relay Loadability: On September 15 FERC issued a Notice of Proposed Rulemaking (NOPR) proposing to approve NERC Reliability Standard PRC-023-2. The proposed Reliability Standard modifies the existing standard (PRC-023-1) to address the directives in Order 733. Comments were filed by NERC and other entities prior to the November 21 filing deadline. A final rule is pending.

b. Interpretation of PRC-004 and PRC-005: On September 26 FERC issued an Order approving the NERC interpretation of the phrase “transmission Protection System” as it is used in Requirements R1 and R3 of PRC-004-1 and Requirements R1 and R2 of PRC-005-1.

c. Underfrequency Load Shedding: On October 10 FERC issued a NOPR proposing to approve NERC Reliability Standards PRC-006-1 and EOP-003-2 addressing Automatic Underfrequency Load Shedding and Load Shedding Plans and seeking input on a number of matters related to the standard. Comments were filed by NERC and other entities prior to the December 27 filing deadline. A final rule is pending.

d. Protection System Maintenance and Testing: PRC-005-2 was posted for comment through September 29, with a concurrent 10-day initial ballot the last 10 days of the comment period. The standard received 61.1% approval. The standard drafting team is addressing comments and revising the standard. The drafting team is expecting to post the standard in mid-to-late March.

e. System Protection Coordination: The drafting team is developing a new standard that will be specific to protection system coordination for faults. The non-fault protection requirements of PRC-001 will remain intact, and be retired as they are appropriately transferred to other standards. The drafting team is expecting to post the standards late February.

f. Protection System Misoperations: This drafting team will develop a revision to PRC-004-3 to establish uniform requirements for identifying and investigating protection system misoperations. This revised standard PRC-004-3 will replace the existing PRC-003 (requires regional procedures to address misoperations) and PRC-004 (requires entities to follow regional procedures). The drafting team is expecting to post the standard Late March/early April.

IV. ADVISORY COMMITTEE REPORTS

Chair: Bob Pettigrew

Vice Chair: Roger Hedding

B1: Awards and Technical Paper Recognition

Chair: Oscar Bolado

Vice Chair: Solveig Ward

The B1 Working Group met on January 10th, 2012 in Garden Grove, CA, with all its 7 Members present. Membership for the working group consists on the Vice-chairs of the PSRC subcommittees.

The minutes of the last meeting were reviewed and approved.

The group welcomed 2 new members, and selected a new Vice Chair. Jeff Pond with the I subcommittee was nominated and accepted the assignment.

The 2011 Distinguished Service Award selection was finalized. Additional criteria have been included to nominate candidates. The award will be given out in the May meeting.

The list of upcoming certificates was reviewed. We expect to have a number of certificates for presentation at the May meeting

A request to include awards given out in the Minutes of the Meeting was received. The group agreed to include this list for future meetings.

A request to extend certificates of appreciation to Task Force Chairs was received. In the past no certificates were given to TF Chairs and it has been agreed not to change this practice.

With no additional business to discuss the meeting was adjourned.

B2: Fellows Awards

Chair: J.S. Thorp

Group did not meet.

B3: Membership Committee

Chair: M.J. Swanson

Attendance during the Garden Grove PSRC meeting was approximately 250, which is a record for us.

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

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

B4: O & P Manual and WG Training

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

Chair: R Hunt: WG Training: No report

B5: Bibliography and Publicity

Chair: T.S. Sidhu

Vice Chair: M. Nagpal

Group did not meet.

B8: Long Range Planning

Chair: Miriam Sanders

No report.

B9: PSRC Web Site

Chair: Russ Patterson

Group did not meet.

V. Items from the Main Committee meeting:

A. New Main Committee members announced:

Randy Cunico

Raphael Garcia

Gene Henneberg

Yi Hu

Farnoosh Rahmatian

Mukesh Nagpal

B. New Fellows were recognized:

Christoph Brunner

Farnoosh Rahmatian

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

From the C SC:

System Protection Subcommittee requests approval for transmittal of the WG C5 document "Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units" PC37.242 to the IEEE SA for balloting. Provided the ballot is favorable, the proposal will be sent to the IEEE Standards Board for approval.

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

From the D SC:

"Mr. Chair, pending WG resolution of the few remaining comments as noted, the D subcommittee requests approval for transmittal of the Guide for Automatic Reclosing of Line Circuit Breakers and AC Distribution and Transmission Lines, PC37.104-2012, to the IEEE

SA for balloting. Provided the ballot is favorable, the proposal will be sent to the IEEE Standards Board for approval."

From the H SC:

"Mr. Chairman, the Relaying Communications Subcommittee H requests approval for transmittal of the Guide for Application of Digital Teleprotection, proposed IEEE C37.236-2012, to IEEE Standards Association for Balloting."

VI. SUBCOMMITTEE REPORTS

C: SYSTEM PROTECTION SUBCOMMITTEE

Chair: S. Ward

Vice-Chair: J. O'Brien

The C System Protection Subcommittee met on Thursday, January 12, 2012 in Garden Grove, CA with 27 members and 33 guests in attendance. Quorum was reached.

Minutes of September 2011 Subcommittee meeting were approved.

8 Working Groups and 2 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

None

Reports from the WG Chairs

C2: Role of Protective Relaying in the Smart Grid

Chair: Alex Apostolov

Vice Chair: Mark Peterson

Output: IEEE Report

Established: January 2010

Expected Completion Date: To Be Determined

Assignment: Identify the functions and data available in Protective Relaying Devices that are used at different functional levels and different applications and can be used within a Smart Grid. Describe the use of interoperable data formats for protection, control, monitoring, recording, and analysis.

Working Group C2, Role of Protective Relaying in the Smart Grid, met in the Royal D meeting room in the Hyatt Regency Hotel in Garden Grove, CA USA on January 10, 2012 at 3:00 pm. Individual introductions were made and attendance was taken. 20 members and 34 guests were in attendance.

The meeting began with a review and clarification of the group's assignment. The outline of the present draft report was reviewed and discussed. A group of volunteers were established to complete unfinished sections of the report, and to provide additional materials to existing sections.

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

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

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

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

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

Chair: Galina Antonova

Vice Chair: Vasudev Gharpure

Output: Guide C37.244

Established: January, 2011

Estimated Completion Date: To be determined

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

Working Group C4 met on January 10, 2012 in Garden Grove, CA in a double session with 35 attendees (19 members and 16 guests). Quorum was achieved. May 2011 and September 2011 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:

- Working PC37.244 draft is dated January 05, 2012
- A projected time line for targets for the next four months was outlined
- The plan is to have a completed document at the end of Jan 2012, and Working Group vote by end of February 2012
- Latency annex status was given: an agreement was reached on several open items in a sub-group meeting

Solveig Ward cautioned the group against copying material from other standards, This will be considered while working on section 4 (overview).

Discussion on section 6 followed.

- It was agreed to remove the Diagnostics as a PDC function and incorporate it into the performance monitoring function.
- Performance monitoring function description was modified per member comments. More discussion needed
- The aggregation function was discussed. Agreements were reached on definitions for aggregation and pass through.

- It was agreed to remove the Gateway as a separate function, and to include a proxy server as a part of security section.

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

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 11, 2012 in a double session. Sessions were co-chaired by Farnoosh Rahmatian and Paul Myrda. The first session had 12 members, 2 corresponding members, and 23 guests and the second session had 9 members, 4 corresponding members, and 12 guests. We had quorum of members at both sessions.

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

The minutes of the September 2011 meeting were approved in the first session with a quorum of members. (Motion for approval – P. Myrda, seconded by J. Murphy).

WG provided an updated of WG activities since last PSRC in September 2011, including:

- Have held over 20 WG conference calls working on the Draft
- Have held over 30 smaller focus-group editing sessions
- WG has voted on Draft 4.0 in December 2011 with approval to initiate the IEEE Sponsor ballot
- All comments are continuing to be addressed through the WG (conference calls in late December as well as this meeting)
- Draft 6.0 has been shared with C Subcommittee for feedback – some comments are received and being addressed
- Draft 6.1 is edited during this session
- We are requesting PSRC Main Committee approval on 1/12/2012 to initiate IEEE SA Sponsor Ballot Process
- Will continue with edits through IEEE-SA Ballot Group formation

During both sessions, the comments received through the WG ballot process, Subcommittee review,

and Terminology/Definition Group Review were discussed and addressed. Results were captured in the standard Excel comments file and changes were reflected in Draft 6.2.

Motion (V. Madani) to keep the definitions of “Phasor” and “Synchrophasor” in section 3 as it stands in the existing Guide (only reference to C37.118.1 as opposed to repeating the definition in PC37.242). Seconded by J. Hackett. No objections. No abstains.

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

Some of the items to be addressed:

- Improvements made to the Annexes to be reviewed.
- Review for “use of” and “reference to” IEC 61850-90-5 and C37.118.2.
- Consider adding a paragraph on “PMU placement strategy.”
- Follow up on Actions captured in the “Excel Comments file.”

C13: Undervoltage Load Shedding Protection

Chair: Miroslav Begovic

Vice Chair: Shinichi Imai

Output: IEEE Report

Established: September 2005

Expected Completion Date: May 2012

The WG meet on January 11, 2012, in one session, attended by 2 members and 8 guests.

The WG report was discussed and Mr. Shinichi Imai presented the report overview prepared for the Main Committee meeting

As most of the editorial changes are of non-substantive nature, re-balloting will not be needed upon corrections. It will be needed, however, to obtain 75 percent of the SC membership votes as multiple emails have not yet resulted in sufficient number of ballots being received.

Working Group is planning a meeting in a single session in May 2012 to plan the summary papers. Should the work on the papers proceed well via email, the group may opt to forgo meeting (the Chair will inform the PSRC leadership about the decision). Room will be needed for 15 attendees and a video projector.

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 10, 2012, in Garden Grove, CA, in a single session chaired by Jim O'Brien with 4 members and 24 guests present.

The chair distributed the latest draft of the Report. The draft was sent out in December of 2011 to the working group members for balloting. 75% WG member approval is needed. Out of 26 members, we received only 4 responses.

Some of the received comments were discussed during the meeting.

One of the comments related to the word “encroachment” of the relay trip characteristic. Because the described event occurred in the early 80s, it could not refer to the modern relaying term “load encroachment”; therefore, it was decided to leave word “encroachment” as is.

The chair will get in contact with Del Weers, who questioned the curves in Figure 2.1, and the section’s original contributor, Juergen Holbach, to address the issue.

Accuracy of time stamping appears to be a separate issue from latency of reporting in subsection 2.5. Dan Nordell volunteered to add the related material.

Dan Nordell will also clarify the statement of the data loss due to errors, dropouts, or unavailability as related to its being 0.1% or less in subsection 3.1.

The chair will check with Ken Martin about whose experience he is referring to for the data loss due to errors, dropouts, and unavailability, per one of the comments received.

The chair will clarify the issue with the line reclosing selectivity by one utility, REE, with the original contributor, Solveig Ward, in subsection 4.4.

A good comment received during the meeting referred to the usage of a special vendor-related term “Meter PM command”, which was used in the Report. It will be replaced with a more generic term in the next draft.

A comment concerning Figure 5.8 was unclear and will be clarified with the commentator, Sukumar Brahma.

Finally, the topic *Distance to Fault* (subsection 5.8), currently included in *Future Applications*, was recommended to move to the section *Present Applications*. Chin-Wen Liu will provide the related information for this application, and then it will be moved to *Present Applications*.

The writing contributions are due in month, by February 15th, 2012.

The chair will incorporate the latest changes, edit, and recirculate the latest Report draft for approval by the WG members. The response from the WG members is required whether they have additional comments or not. Reminders will be sent. If we do not get 75% of WG member responses, we may need to drop non-responsive members from the WG membership.

The Report will be submitted to the Subcommittee C, and we target May of 2012 for this purpose. The volunteers from the WG members are needed to put together Power Point document for a presentation at one of the future PSRC Main Committee meetings.

C15: Design and Testing of selected SIPS

Chair: J. Sykes

Vice-Chair: Y. Hu

Output: Report on industry practices in design and testing of selected SIPS

Established: September 2008

Expected Completion Date: December 2012

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

Working group C-15 met on Tuesday, January 10, 2012 in Garden Grove, CA, in single session chaired by Jonathan Sykes and Yi Hu with 7 members and 12 guests attending.

Yi Hu provided an overview of the latest draft of the report distributed to the working group members and review team members. The major changes of the report from last revision were reported as follows:

- Chapter 2: Major parts of previous Chapter 4 contents are moved to Chapter 2 to become section 2.1 and 2.6 based the comments received – these contents have not been fully edited to make them consistent with other Chapter 2 contents (these were originally contributed for Chapter 4)
- Chapter 2: Added section 2.5 contributions
- Chapter 3: Replaced entire Chapter 3 with updated contents received after last revision
- Chapter 4: Replaced entire contents with new contributions for an implemented load rejection scheme
- Chapter 7: Added testing part contents for Chapter 7 received after last revision
- Unified heading and paragraph formats for all contents
- Adjusted the figure numbering to make it consistent across the whole document

Mr. Alfredo De La Quintana presented the load rejection scheme example at the meeting, and discussed many aspects of the scheme with the meeting attendees.

The remaining work of the report was discussed and concluded that other than the following areas the majority contents of report is ready for final edits

- Revision of new section 2.1 and 2.6 in Chapter 2 moved from previous Chapter 4
- Revision of new Chapter 4 contents
- Adding final conclusion of the report

The next steps for finalize the report for approval by the working group and C subcommittee for publication of the report was discussed. It was decided to form an editing team from working group members. The following working group members have agreed to be part of the editing team: Jonathan Sykes, Yi Hu, Dean Miller, Gene Henneberg, and Roger Whittaker. Alfredo De La Quintana will assist the editing team to finalize the new chapter 4 contents.

Three people (highlighted) attending the meeting also agreed to join the current review team. The review team now consists of: Art Buanno, Yuan Liao, Steve Kunsman, Stephan Brettschneider, Joshua Park, Alla Deronja, Mohammad Zubair, Yutaka Kokai, Mike Agudo, and Herb Falk.

The working group chairs will send an email to request all working group members and review team members to review the current draft report and provide their comments back by mid February 2012. The editing team will work on to complete all major revisions and editorial work through several revision-review cycles from January 2012 to late April 2012. The finalized report will be distributed to working group members three weeks prior to next C15 meeting for working group approval at next meeting.

Next step actions:

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

- WG Chairs to send email to working group members and review team members requesting comments on current draft report
- WG editing team to create interim revisions of the report for review by review team and final version for approval by working group members
- WG members review and approve final report at next C15 meeting

The working group will meet at next PSRC meeting in one session to review and approve the report for submission to C subcommittee for its review and approval

C16: Relay Scheme Design Using Microprocessor Relays

Chair: R. Lascu

Vice-Chair: T. Seegers

Output: Report

Established: September 2008

Expected Completion Date: To be determined

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

Working Group C16 held its meeting on Wednesday morning with 10 members and 11 guests attending.

The working group discussed assignments received for draft 2.7 of the report. The need for some additional figures was identified. These will be added for the next draft
The following assignments were made:

Rich Hunt – add sections to 2.6 and add figures
Jay Sperl – revise text of section 2.6.2 (add figure)
Raluca Lascu – review and revise sections 4.3 and 4.4
Tony Seegers – review and revise sections 3 and 3.1
Ken Behrendt – revise section 4.4

All assignments are due by March 15.

If the assignments are received, a completed draft can be circulated to the working group for review before the May meeting. If this is accomplished, it can be recirculated to the working group and sent to the subcommittee for review and comment following the May meeting.

Request that the meeting does not conflict with the D6 and the I5 working group whose assignment is complementary to this working group.

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 Work Group met in a single session at the PES meeting in Garden Grove, CA on Tuesday January 10, 2012 with 16 members (plus 2 new volunteers) and 13 guests.

Dean Miller provided paper copies of draft 5.0 and reviewed the status of the report and writing assignments. Only the assignments for Wind Turbine Generator's Response to Faults of Type 3 Generators and Equipment Fault Current Interrupting Issues are still pending. Dean has drafted an Introduction. Phil Waudby and Rich Young will draft the Conclusion.

Sukumar Brahma reviewed section 3.2 on Performance of Type 2 machines. The analysis has been coordinated to provide a logical technical extension from the Type 1 machines with the inclusion of wound rotor resistors for induction machines. Calculated 3-phase fault currents are within about 4%

comparing “reactance only” and with the inclusion of resistance. The three phase fault also includes a substantial DC offset where the AC currents decay before the DC offset (no current zeros). Mr. Brahma also analyzed fault contributions from a specific Type 2 wind farm for L-G faults. Transmission contributions were not significantly affected whether or not the model included the collector 34.5 kV lines. However, the collector system model was important to the model results for faults on the collector system.

Isabelle Snyder discussed section 3.4 on Performance of Type 4 machines for a specific (but unidentified) manufacturer. Within the assumptions of the model, the results were consistent and predictable. Reigh Walling observed that the specific results were very dependent on the converter control design, which varies among manufacturers.

Dean Miller described his (and Charlie Henville’s) analysis in section 7 of several actual transmission system faults records for four fault events that allowed calculation of the sequence parameters of the four wind farms. Zero sequence was essentially contributed by the plant step up transformer alone. Negative and positive sequence calculations are more complex, the method is described in the paper.

The next joint work group meeting will be at the PES Meeting in San Diego, CA, July 22-26, 2012. The next C-17 Working group meeting will be at the May 14-17 meeting in New Orleans, LA.

CTF3: Joint meeting with Power System Stability Controls Subcommittee

Chair: C. Henville

Vice-Chair:-

Output: Proposals for working with Power System Dynamic Performance

Established: January 2010 Expected completion date:-

CTF3 met in Garden Grove with two members and four guests present.

A paper on an update to “Protection issues during system restoration” for the joint panel session (on system restoration) with PSDP at the PES GM in July 2012 has now been drafted and submitted to the PES General Meeting website. An addition to the paper providing an example for the use of adaptive settings was discussed and agreed upon. Pratap Mysore agreed to provide some figures for this paper. The revised draft will be re-submitted to the PES GM website by 27th January 2012. Alex Apostolov will be presenting this paper.

In addition, since there will be a four hour session available to the PSRC during the PES General Meeting, it was agreed (during the meeting and in post meeting discussions) that the PSDP would be specially invited to the following presentations on PSRC activities that would be of interest to PSDP members and that would be presented at the PES 2012 GM

Protective relay performance during stressed system conditions (Pratap Mysore)

Undervoltage load shedding (Miroslav Begovic)

New synchrophasor standard developments (Farnoosh Rahmatian)

Protection Redundancy Considerations (Solveig Ward)

Fault current contributions from wind farms (Dean Miller)

At the May meeting, slides for the panel session presentation will be reviewed, and additional topics and/or activities for the 2012 General Meeting will be discussed.

CTF18: Transmission to Generation Interconnection Protection Considerations

Chair: Alla Deronja

Vice-Chair:-

Output: IEEE Guide

Established: September 2011

Expected completion date:- TBD

Task Force CTF18 met on January 11, 2012, in Garden Grove, CA, in single session chaired by Alla Deronja. Original 4 potential members in presence were joined by 6 new members and 22 guests.

The chair reviewed the task aiming at writing an IEEE Guide for the transmission to generation interconnections. The purpose of the new Guide is driven by the fact that many 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 or desire to decrease the cost of the facilities.

An outstanding issue of potential conflict with SCC21 IEEE P1547.5 Draft *Technical Guidelines for Interconnection of Electric Power Sources Greater than 10MVA to the Power Transmission Grid* has been successfully resolved. Thanks to Gerry Johnson, who got in contact with P1547.5 chair and secretary and received their agreement to move forward this PSRC C-subcommittee project. Gerry will act as a liaison between the new Working Group and P1547.5.

The title for the future document, if cleared for progress, was approved to be *IEEE Guide for Protection Systems of Transmission to Generation Interconnections*. Also, the scope and purpose, which were created at the previous Task Force meeting, were re-visited and discussed. They stand as follows at this time:

Scope:

This Guide contains information on recommended protection of transmission to generation interconnections. It is intended to cover the protection system applications at the interconnections between the transmission systems and generation facilities.

Purpose:

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

The proposed outline of the document was presented and thoroughly discussed. Several good comments and additions were incorporated. The revised outline will be distributed to the members and guests for further comments.

The Task Force approved the motion to approach the Subcommittee C with a request to form a Working Group. The output of the new Working Group was debated whether it was going to be an IEEE guide or, first, a technical report, which would be converted into a Guide in the future. The direction from the Subcommittee C is being sought.

The assignment of the new Working Group would be as follows: to write an IEEE Guide for Protection Systems of Transmission to Generation Interconnections.

D: LINE PROTECTION SUBCOMMITTEE

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

The Subcommittee meeting was called to order at 1:30 p.m. with 26 members and 44 guests present.

Following introductions, a count of SC membership was made, and it was determined a quorum was present (26 out of 46 members present).

Minutes from the September 2011 meeting in Minneapolis were approved.

Chairman Patterson reported items of interest from the Advisory Committee.

Reports from the WG Chairs:

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

Chair: Gary Kobet

Vice Chair: Greg Sessler

Output: IEEE Guide

Established: September 2008

Expected completion date: 2012

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

Working Group D2 held its meeting in a double session on Tuesday, January 10, 2012. There were 23 WG members present and a quorum was achieved. 22 guests attended the meetings.

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

The D2 meeting notes from the September 2011 meeting held in Minneapolis, MN were reviewed and approved without modification. In addition, notes from five web conferences that were held in October/November 2011 were also reviewed and approved without modification.

Chair Kobet reviewed the timeline and stated that the hope is to finalize the guide by the completion of this double session so that the Sponsor Ballot can open in January 2012. Revised time-line given below.

Chair Kobet reviewed the results of the 2nd working group ballot of version 6.0 of the guide. There were 29 WG members that approved the document, 1 working group member disapproved, and 3 working group members abstained. This met the 75% working group approval rate required by the O&P manual to proceed with the sponsor ballot.

The ballot resulted in 142 comments, most of which were editorial. The editorial comments were incorporated into the guide prior to this meeting, and the remaining 22 technical comments were reviewed during the meeting. Chair Kobet recorded many of the resolutions of comments in draft 6.1 of the guide -- other specific comments that require follow-up include the following:
Determine if the bibliography needs to be reordered alphabetically by the last name of the first author
Modify Figure 9 to change terminology from "Follow" to "Follower" to match the clause text
Determine if the normative references in clause 2 should include revision dates
Modify Figure 13 to remove the time-line and the Rtx labels located below the breakers
Fred Friend is doing the terminology review concurrent with WG review of the document
A teleconference will be scheduled for Friday January 20 to complete review of the technical comments on version 6.2 of the guide.

The Working Group recommends the D-SC chair proceed with reporting completion of the document (pending comment resolution as noted above) and request approval for its transmittal to the IEEE SA for balloting.

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

Chair: Meyer Kao

Vice Chair: Elmo Price

Output: Report to the Line Subcommittee of the PSRC

Established: September 2009

Expected completion date: Jan 2013

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

D3 working group held its meeting on Tuesday January 10th, 2012 at 8:00 AM with 26 attendees, of which 16 are guests

Minutes from the Minneapolis September 2011 meeting were approved with minor changes.

Writing assignments assigned from the previous meetings were discussed.

Suhag Patel discussed his writing assignment regarding polarizing issues on series compensated lines. Galbriel Benmouyal will work with Suhag on the expending this section regarding effect of subsynchronous resonance. Suhag will also try to produce a figure showing point of voltage inversion where polarizing will be a problem.

The technical paper on mis-operation regarding mismatch of relays in Australia provided by Normann Fischer were discussed. It was decided the section on polarizing in the paper does not pertain to the subject of polarizing issues, thus will be not included in the report.

Writing assignment on zero sequence power polarizing method was discussed. The working group requested more details for this section be provided for this section, such as the need of sensitive core balance CT. Charistian Paduraru and David Purpura will work with Shyam Musunuri to provide more details for this writing assignment.

Russ Patterson discussed the writing assignment of polarizing issue during single pole open condition on the faulted line.

Steve Turner has volunteered to take on the writing assignment of how various short circuit software, such as Aspen and CAPE, model the polarizing methods for different relays

Gary Kobet presented different current polarizing setups regarding parallel transformers where the low sides of the two transformers are electrically isolated. The working group has decided to include this section in the report and investigate which setup would provide the correct polarizing reference. This subject shall be farther discussed in the next meeting.

Gary Kobet has volunteered on writing assignment of a brief section on Installation and verification test of the directional element. The working group has decided this section shall be short and reference to the IEEE Guide on polarizing verification testing.

The assigned writing assignments are due on March 15.

D6: AC Transmission Line Model Validation

Chair: Tony Seegers

Vice Chair: Sam Sambasivan

Output: Report to PSRC

Established: January 2009

Expected completion date: May 2013

Draft: 6.0

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

The D6 working group met on Tuesday, January 2012 at 3.00 p.m. with 9 members and 18 guests present. The WG stands at 27 members.

The draft version 6.0 was sent to all the members prior to the meeting.

Discussion took place regarding the missing sections and the contributions required to make the report complete.

John Miller will provide contribution for the Section on "Required accuracy" and Bruce Mackie will provide the contribution for the section 3.1 on "Effect of Modeling assumptions". Demetrius Tziouvarus will review the section 3.7 on Special concerns with modeling cable. Steve Turner will provide a contribution for section 4- Model Verification methods using comparison with Measured Results .John Wang will also provide a contribution to the same section by describing the use of synchrophasor measurement.

Joe Uchiyama will resend the shortened version for the Section on "Other considerations affecting use of the Model".

All contributions are due by March 15. The final draft of the report will be sent to all the members prior to the next meeting. The review of the final draft will be taken up during the next meeting.

D11: Effect of Distribution Automation on Relaying

Chair: Fred Friend

Vice Chair: Jerry Johnson

Output: Report to the PSRC

Established: January 2005

Expected Completion Date: September 2011

Draft 7.8

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

The working group, chaired by Fred Friend, met on Tuesday with 14 members and 10 guests present. Minutes from the September meeting in Minneapolis were reviewed and approved without comment.

The document was reviewed with much discussion and many changes.

1.4 Definitions

2.2 History of Line Distribution Automation

3.1.1 Criteria to define location of switches

Annex B Automatic Coordination with Adaptive Overcurrent-Delete

The chair will attempt to resolve the few remaining comments via email.

3.1.1 Criteria to define location of switches Juan Gers

3.6.2 Fault Locating Wayne Hartman

Annex B History at Duquesne Light Company Claire Patti

The chair will check entire document for formatting/ figure corrections and then send it to the working group members for balloting.

Proposed Timeline:

January 31: Comments due (Draft 7.8)

Week of February 6: Web Conference and send out for WG ballot

February 29, 2012: Ballot due (Draft 8.0)

Early March: Web Conference to discuss comments

Early April: Send to Line Protection Subcommittee for comments/ approval

May Meeting: Address comments, if needed

D19: Revision of C37.113 - Guide for Protective Relay Applications to Transmission Lines

Chair: Rick Taylor

Co-Chair: Don Lukach

Output: Revised IEEE Guide C37.113

Established: September 2011

Expected completion date: September 2013

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

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

WG Report

The working group (WG) met with 13 balloting members out of 18, 6 corresponding members out of 12, and 18 guests, for a total of 37. Quorum was met.

The IEEE patent slides were shown and discussed per procedure.

During meeting membership changed and additional attendees arrived, for a total of 44. placing the final membership totals as such:

22 Balloting Members

17 Corresponding members

The Vice Chairman, Mohindar Sachdev, stepped down into a corresponding member and Don Lukach accepted the Vice Chairman position going forward.

The chairman discussed the history of the former WG D9 and the focus of our new WG D19. The WG has an approved PAR and expects to finish within about 18 months. The last draft (5.6.2) of the WG D9 will be broken into sections that teams of two or three WG members will review. Discussions will first take place among the review teams, then with the whole WG at the May, 2012 meeting. This process is necessary due to the number of comments received on the last D9 draft, and to speed up the review.

The teams are organized as such:

<u>Page or Section</u>	<u>Team members</u>	
p.1-7	Walter McCannon Tom Austin Randy Cunico	wpmccann@southernco.com tfaustin@southernco.com rwcunico@southernco.com
p. 8-23	Dean Miller Jim O'Brien Greg Sessler	dean.miller@pacificorp.com jim.o'brien@duke-energy.com gessler@atcllc.com
5.1 to 5.5	Gustavo Brunello Dean Ouellette Zhiying Zhang	gustavo.brunello@ge.com dean@rtds.com zhiying.zhang@ge.com
5.6 to 5.11	Mukesh Nagpal Tom Weidman Demetrios Tziouvaras	mukesh.nagpal@bchydro.com twieds@aol.com demetz@selinc.com
6.1 to 6.3	Joe Mooney Alexis Mexco James Deaton	joe.mooney@powereng.com alexismexco@gmail.com jhdeaton@southernco.com
6.4 to 6.6	Sam Sambasivan Elmo Price Alla Deronja	sambasivans@coned.com elmo.price@us.abb.com aderonja@atcllc.com
6.7 to 6.10	Solveig Ward Roger Wittaker	sward@quanta-technology.com rlwittaker@bpa.gov

	Ian Tualla Damien Tholomier	ian.tualla@duke-energy.com damian.tholomier@schneider-electric.com
Annex A	Jeff Barsch Randy Cunico	jabarsch@aep.com rwcunico@southernco.com
Annex B	Guergan Holbach Nastor Casilla	jholbach@quanta-technology.com n.casilla@doble.com

D21: Supporting IEC Standard for Distance Relay Characteristics

Chair: Alex Apostolov

Vice Chair: Alla Deronja

Output: IEEE/IEC Standard

Established: September 2006

Expected Completion Date: December 2011

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

Working Group D21 met on January 11, 2012, in Garden Grove, CA, in single session chaired by the chair, Alex Apostolov, with 5 members and 4 guests present.

Murty Yalla, the chair of the IEC TC95 MT4, provided an update on the IEC 60255-121 standard development progress.

The second committee draft CD2 was produced after more than 100 pages of comments have been received from the IEC member national committees, many of which were from the USA (contributed, collected, and provided by the working group D21) and Canada national committees. After the MT4 May 2011 meeting in Austria, additional 27 pages of comments were received, which were resolved during the December 2011 meeting in London.

The final draft CDV of the standard should be ready by the end of the week of January 16th. It will be translated in French, which would take about two months before it would be ready for circulating among the IEC member national committees for balloting.

The final CDV draft will be also distributed to the WG D21 members for review and any additional comments at the time that it is being translated in French. Everyone, who has significant technical comments or issues with the standard, is encouraged to submit them immediately to the WG vice-chair (aderonja@atcllc.com) so they can be sent to Murty for consideration. However, minor and editorial comments will no longer be considered.

The votes from the balloting members will be received by the July-August timeframe of 2012. Upon the 75% of the positive votes, the standard will be published by the end of 2012.

The WG will be kept until the standard is ready for publishing, which is expected to occur in the end of 2012; however, it will not hold the next meeting in May of 2012.

D22: Performance Testing of Transmission Line Relays for Frequency Response

Chair: Tom Wiedman

Vice Chair: Jun Verzosa

Output: Report

Established: May 2007

Expected Completion Date: May 2011

Assignment: Investigate the feasibility of defining a range of frequency and rate-of-change of frequency to be used in a performance specification for protective relay functions. The WG will

develop a test process for transmission line relays subjected to off-nominal frequency disturbance including the rate-of-change of frequency during stressed system conditions.

The D22 working group met Wednesday January 11, 2012 at 8:00 am at the Hyatt Regency Orange County with 6 members and 4 guests. WG stands at 26 members.

WG discussed the new Special Report status of the report with the D SC chair, Russ Patterson. This new status will allow the WG to seek comments of substance from the PSRC Main Committee members. There will be no requirement to seek help from the Terminology Usage WG. The WG chair will provide the PSRC Officers with the report and the latest version of the Comtrade Calculator for them to send to the PSRC members. These documents will be sent to the Main Committee members for their comments. A two week turnaround will be sought per the O and P manual.

Jun and Tom went through a dry run of the report presentation. The attendees offered great questions and suggestions for the scheduled Thursday presentation.

D24: Transmission Line Applications of Directional Ground Overcurrent Relays

Chair: Don Lukach

Vice Chair: Rick Taylor

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

Established: May 2007

Expected Completion Date: September 2012

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

The working group (WG) met with 14 members, 14 guests, for a total of 28.

The September, 2011 meeting minutes were approved as submitted.

The WG discussed the latest draft of the report, Draft H. Section 5.10 on Ground Source Issues will be moved to the front of section 5, with all following sections renumbered. Al Darlington will be contacted in order to possibly revise the figures for consistency. The section on the use of a negative sequence application for tapped transformers will be revisited. Additional editorial comments were submitted by members.

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

D25: Distance Relay Response to Distorted Waveforms

Chair: Karl Zimmerman

Vice Chair: Aaron Martin

Output: Technical Report to Line Protection Subcommittee

Established: January 2009

Expected completion date: January 2013

Latest Draft: 1.2

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

The working group met in Garden Grove on January 10, 2012 at 11:00 AM with 10 members and 11 guests. Introductions were followed by a review of the September meeting minutes.

Karl reported receiving several working assignments the day of the meeting.

Aaron Martin presented a fault case on a series compensated line and a tapped transformer with multiple and different wave distortions.

Joe Mooney presented his contribution to section 2 distance element design. His contribution added separate descriptions of quadrilateral elements, directional elements, and supervising conditions.

Joe Mooney also presented test cases on CT saturation effects.

Karl Zimmerman presented an interesting case of an external fault causing a directional element to misoperate possibly due to CVT performance.

Karl also presented on a misoperation of a directional element for an external fault for a series compensated line.

Group Discussed assignments. Paper is under review.

Joe agreed to review Eli's edit/contribution for CVT section.

Next draft to be sent out to members February 15th, possible will be made available on website in PDF form for guests.

D26: C37.114 Fault Locating Guide Revision

Chair: Joe Mooney

Vice Chair: Randall Cunico

Output: IEEE Standards Guide

Established: 14 Jan, 2010

Expected Completion Date: December 2014

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

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

There were 33 attendees with 15 members including, 1 new member, and 18 guests. There are 26 members on the Working Group so a quorum was achieved.

Minutes from the May meeting in Minneapolis were approved by the attending members.

The slides 1-4 of the IEEE Patent Policy were reviewed by the group. The chair provided an opportunity for the group to identify patent issues. There was no response from the group.

Joe Mooney introduced the concept of Balloting Members versus Corresponding Members. Following D19's lead, he discussed his intent to implement this procedure to address the pitfall of being unable to reach a quorum to conduct business. Corresponding members can participate at all levels except the ability to cast a vote. Balloting membership is intended only for those members who can attend regularly.

Most of the action items from the last meeting have been at least partially submitted. Each of the submitters present briefly described their submissions.

- Brian Boysen, Randy Cunico and Dan Sabin all described distribution fault location techniques in use by separate utilities. All used similar, but different techniques and had achieved a high level of success.
- Damir Novosel worked with Carl Zimmerman and Rafael Garcia on the error calculation issue. He presented three different approaches with a brief description of advantages of each and proposed the user determine which to use depending on their needs. **The chair asked the team to expand the reasons a user may choose one approach over another.**

- Rafael Garcia presented references for several methods for fault locating on series compensated lines and a brief description of those methods. **He will investigate how this might be integrated into the guide.**
- Mladen Kezunovic summarized two papers submitted. These papers describe different methods for fault locating and algorithms. The papers discuss the roles of different data sources, data sampling and processing, and synchronization of those different sources. Also discussed is the selection of the optimal fault location solutions. Amir Makki elaborated on the effects of sampling methods on location accuracy of two ended algorithms on transmission lines. He emphasized that an equation can be developed to compensate for these differences. **Amir and Mladen proposed a section be added to the guide discussing the different issues of the integration and application of different devices.**
- Meyer Kao and George Bartok submitted a section to WG D6 on the affects of non-homogeneous lines on accuracy. **The intent is to condense and summarize the submission for a clause in this guide.**
- **Rafael Garcia and Sukumar Brahma will collaborate on a section on the use of Synchrophasor technology for fault locating.** Rafael's company is actively pursuing this technology.
- The group discussed the use of foreign applications in guide. It was learned through WG C-14 that there are synchrophasor fault location installations in China and Taiwan. It was agreed that as long as there are useful references, it will be welcome.
 - **Dan Sabin:** At the writing of these minutes, Dan has already submitted a paper and discussion on the application and experience of one utility's distribution fault location strategy.
 - **Rafael Garcia, Damier Novosel, Arvind Chaudhary and Mansour Jalali:** Expand on a discussion of why a user may choose one method over another.
 - **Rafael Garcia and Mansour Jalali:** Review how to integrate the new information in the guide.
 - **George Bartok:** Summarize the section submitted to WG D6 on errors introduced by nonhomogeneous lines for a clause for the guide.
 - **Rafael Garcia and Sukumar Brahma:** Develop a clause discussing the active development of a synchrophasor fault location system for application in the US.

D27: PC37.243 Line Current Differential Guide creation

Chair: Ryland Revelle

Vice Chair: Solvieg Ward

Output: IEEE Guide PC37.243

Established: Sept 2010 (PAR approved)

Expected Completion Date: December 2014 (PAR expires)

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

The D27 WG met Tuesday January 10th at 4:30 PM. The meeting was attended by 12 members and 20 guests. Quorum was reached (membership stands at 20) and the September meeting minutes were approved.

The IEEE patent requirement slides were presented and attendees were given the opportunity to identify any known patent claims. No patent claims essential to the work of the group were identified.

Draft 1.0 was created since the last September meeting incorporating both new and previously provided writing contributions into the IEEE template format.

Draft 1.0 was reviewed and sections re-organized. There is duplication and repetition in several sections. Assignments were given to identify the duplications, involve the original authors and eliminate them. The identification of duplications is due within 4 weeks.

Assignments for modifications, additions and reviews for various sections were handed out. These assignments are due to the Chair by April 1.

The Chair reminded members to sign up for the IEEE SA MyProject/Mentor site as drafts will be posted on this site.

SC Motions to be made to Main Committee

Regarding Working Group D2 C37.104 revision, the D-SC chair will make a motion in the Main Committee meeting to proceed with reporting completion of the document (pending comment resolution as noted above) and request approval for its transmittal to the IEEE SA for balloting. The motion to be made in the Main Committee meeting is as follows: "Mr. Chair, pending WG resolution of the few remaining comments as noted, the D subcommittee requests approval for transmittal of the Guide for Automatic Reclosing of Line Circuit Breakers and AC Distribution and Transmission Lines, PC37.104-2012, to the IEEE SA for balloting. Provided the ballot is favorable, the proposal will be sent to the IEEE Standards Board for approval."

Coordination Reports

None

Liaison Reports - Fred Friend

T&D Committee / Distribution Subcommittee

The next T&D Committee / Distribution Subcommittee meeting will be at the IEEE PES General Meeting in San Diego, CA, 22 – 26 July 2012.

The following are items of interest to the Line Protection Subcommittee from the 2012 IEEE Joint Technical Meeting in Garden Grove, CA:

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

Panel Sessions for IEEE T&D 2012 Orlando May 7 -10, 2012:

Session 1: "Smart Initiatives produce Smart Innovations"; Chair : Larry Clark ; Smart Distribution Grid initiatives throughout the industry are producing Smart Grid Innovations. Projects are leveraging existing applications and developing new applications to achieve Smart Distribution Grid goals and objectives. These smart initiatives are modernizing the distribution grid and producing smart innovations to increase the utilization of the distribution assets and strengthen the distribution grid for future load growth. Following panellists are confirmed:Chris McCarthy (S&C Electric); Alan McMorran (Open Grid Systems); Dr. George Karady (Arizona State University); Dr. Jignesh Solanki or Sarika Khushalani-Solanki (West Virginia University)

Session 2: "Application of Self-Healing Technologies on Power Distribution Systems (2012TD0208); chair: Julio Romero Aguero, The objective of this panel is to discuss recent experiences, advances and trends in the application of self-healing technologies on power distribution systems. Panelists will be Bob Uluski (EPRI), Dean Craig (Enmax), Joe Loporto (Pepco), and Bob Yinger (SCE).

Proposed panel session at the 2012 General Meeting in San Diego:

Session 1: 'Future ICT Infrastructures for Smart Distribution Grids' Chair Gareth Taylor

Session 2: "Smart Distribution Analytics for Integration of Distributed Energy Resources (DER)".
Chair: Avnaesh Jayantilal

H: RELAYING COMMUNICATIONS SUBCOMMITTEE

Chair: Eric Udren

Vice Chair: Eric Allen

The Subcommittee met on January 11, 2012 with 28 members of 37 total, comprising a quorum. 35 guests were also present. Minutes of the September 2011 Minneapolis, MN meeting were approved.

The SC welcomed Steven Thompson as a new member.

The SC asked two members – Mohindar Sachdev and John Burger – to accept that their membership status be suspended due to an extended period of non-attendance. Suspension of membership status for non-active members is essential to meet quorum requirements at PSRC meetings and conduct business. If and when suspended members are able to resume regular attendance, their membership status will be reinstated.

Training sessions for new WG chairs and vice-chairs are conducted on Monday mornings at future PSRC meetings.

Chairs of working groups that are conducting standards development are reminded of the requirement to present the IEEE patent slides at the start of each meeting.

Any new standard under development that cites material in an existing standard must identify the existing standard by number and name only; it is not permissible to copy text from an existing standard into a new standard.

It is customary to have presentations on completed projects at the PSRC Main Committee. Several recently concluded WGs of the H SC that have not made presentations at the Main Committee include H16 COMFEDE, H18, H15, H1, and H20.

The PSRC will conduct a four-hour informational session at the PES General Meeting in San Diego in July. SC activities will be reported. Contributions are solicited from SC working groups.

WG chairs presenting minutes at meetings have been asked by the SC Chair to trim the public minutes presentations to about 90 seconds maximum, describing highlights of project progress only. This will leave time for SC business and technical discussions of interest, which have fallen off the end of the available time slot in recent years. Common activities like voting on minutes or announcing patent policy *must not* be verbally reported. WG chairs are discouraged from giving blow-by-blow reports of WG discussions or reviewing issues of membership. Details can go into the written report, although many of these items are not even needed in the written record. (This process was applied at the January 11 meeting and allowed the SC to complete all its reporting, business, and discussions while concluding on schedule).

WG business:

The H1 WG will request that the Main Committee approve a transmittal of their draft to the IEEE SA for balloting.

The SC voted unanimously to approve the report of the H18 working group.

Old business:

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

The SC had previously discussed the creation of two new task forces on hold in this queue:

- HTF1 – Functional testing of IEC 61850 based systems

- HTF2 - Condition Based Maintenance in IEC 61850 – Definition of Protection System (Secondary System) Models

Functional testing of IEC 61850 systems will now be taken up in WG H6 with its newly approved assignment (see below), leaving only the 61850 condition monitoring models as an activity that is truly needed – leaders for this work must be identified to proceed.

Many SC H working groups completed their work and disbanded – H8, H10, H14, H15 and H18. With pipeline space cleared, these can begin when leadership and topic are defined. Also see new possible TF under *New Business*.

New business:

The SC discussed follow-up work to the H18 report. Members expressed concern that the material in the report may be “sliced and diced” in an undesirable manner. Development of an IEEE Guide from the report was suggested, with Stephen Thompson chairing the effort. Coordination with the H13 WG (C37.240) was also mentioned.

An XML security project currently underway by IEC was also discussed briefly. This project may be a candidate for dual logo status.

Reports from the WG Chairs

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

Chair: Marc Benou

Vice Chair: Ilia Voloh

Output: Guide

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

The H1 working group met with 7 members and 3 guests. After introductions, an agenda with the IEEE patent policy was distributed. We had a quorum and the September minutes were approved.

The WG received an extension in December 2011 for another year.

Prior to the meeting the working group voted unanimously to go to ballot with the latest version of the guide, version 3.1. The attending members were invited to make any changes before requesting the H SC Chair to ask the main committee for the WG to go to ballot. There were no changes.

H2: Relay Applications Using the Smart Grid Communications Infrastructure

Chair: M. Simon

Vice Chair: G. Antonova

Output: Report to the Subcommittee on title subject

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

The working group did not meet in Garden Grove, CA. During the week prior to the meeting the working group successfully achieved 75% approval to send the document to the H Subcommittee. During the working group consensus ballot several editorial comments were provided which will be incorporated into the document.

During the H Subcommittee meeting on January 12, members approved sending the final draft document (designated "Draft Dec 7,2011") for consensus ballot to the subcommittee. This is expected to take place by mid February. Comments received will be incorporated while items deemed technical will go back to the working group for resolution prior to submission to the PSRC officers and WEB publication.

No meeting is planned for May. The draft is under final revision and awaiting submission to SC for consensus vote. The projected due date is June 2012.

H3: Time Tagging for Intelligent Electronic Devices (IEDs)

Chair: W. Dickerson

Vice Chair: J. Hackett

Substations C4 Co-Chair: M. Lacroix

Output: Standard

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

The WG met on Tuesday, January 10, 2012 with 14 members and 16 guests in attendance.

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

Both PSRC and Substations Committee have approved joint working group status. PSRC will be the lead sponsor and Substations the co-sponsor.

The meeting started with a presentation of the proposed scope and purpose, and a recap of the history of the previous effort and a discussion of where it got off track. The chair proposed that the WG should first concentrate on the common requirements for time tags, for all applications, and only then apply the requirements to specific classes of data. This would avoid getting bogged down with discussions of specifics in great detail, as happened before.

The WG decided to abandon the term "event" since it has so many different, strongly-held meanings to different audiences, and instead we have tentatively decided to use the term 'time sequence data.' This term has been defined in other standards activity, and is compatible with our needs. The scope of the proposed standard will include any IED data with a time tag. This could consist of individual data records with a single time tag, or a collection of data with sequential time tags.

Two participants independently brought forward the idea that the scope of the effort should be expanded to include requirements for formatting a time tag, noting that existing standards do not always provide the complete set of information needed by users.

A. Makki volunteered to provide the WG with a summary and recommendation regarding existing time tag formats and proposed requirements, and S. Sciacca volunteered to work on a proposal for common requirements for time tags.

We had planned to ask for approval in Garden Grove to submit a revised PAR for this re-started joint effort. Considering the open question respecting expanding the scope, the chair proposes (with the consent of the Subcommittee) to delay this action until the open question is resolved.

H4: Revision of C37.111 COMTRADE Standard

Chair: R. Das

Vice Chair: A. Makki

Output: Standard

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

Meeting # 20

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

Member (Voting/Non-voting/new) list was updated and Dr. Marty Yalla joined the working group for his past activity with the group and his current coordination effort with IEC.

The Group met on January 10, 2012, 2011 with 11 out of 17 voting members were present. Eleven guests were present which include Matt Ceglia (IEEE-SA), PSRC officers Robert Pettigrew and Roger Hedding, standards coordinator Phil Winston and H subcommittee chair Eric Udren.

The minutes of the previous meeting at Minneapolis were approved as circulated.

The group reviewed the informal comments from IEC received through Marty Yalla on January 6, 2012. Vice-chair prepared a tentative response which was provided to Marty Yalla on January 8, 2012. Another round of feedback received from IEC on January 10 before the working group meeting. All e-mail exchanges between IEC and WG were reviewed by working group members in detail.

The following action items were discussed:

- 1) All IEC comments received on January 6 and 10 were agreed by working group members except one which was proposed by vice-chair Amir Makki.
- 2) Vice-chair will revise the Draft document based on the agreed comments and provide to chair for further review. Chair will send the modified document to Matt Ceglia (IEEE- SA) by Jan 17, 2012. Matt will review the document further and provide the required document to Marty and Ratan by Jan 19 for forwarding to IEC and IEEE WG members respectively. Members will review the change and provide any comments within 7 days of receiving the draft.
- 3) WG members requested Marty Yalla to explore the possibility of completing the IEC CDV process before the next IEEE meeting so that any comment from IEC members can be addressed.

The WG will meet again at the May meeting to complete round 2 of the balloting process.

H5-a: Common Data Format for IED Configuration Data

Chair: J. Holbach

Vice Chair: D. P. Bui

Output: Report

Assignment: Define a common format for IED configuration data

The working group met on the 11th of January and had 6 members and 17 guests. The working group reviewed the draft 9 with a revised introduction, with a new load blinder chapter and new reference section.

It was agreed on that the load blinder characteristic needs to be described by a new logical node and not be assumed as part of the PDIS logical node. In general any function with an on and off setting should be considered as a separate logical node. The presented lode blinder model need to become extended by a setting for an under voltage controlled load blinder.

The CD of working group D21 needs to become added to the reference list.

The description of the ko factor was reviewed and it was agreed on that the positive impedance and zero sequence impedance settings needs to be part of the PDIS logical node and not of the line description ZLIN.

The section on the trip logic settings were found as not complete and need to become extended.

Several members volunteered for a technical writing review of the next draft 10.

H6: IEC 61850 Application Testing

Chair: C. Sufana

Vice Chair: B. Vandiver

Output: Report

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

Introductions were done after a welcome by Chairman Charlie Sufana. There were 17 members and 31 guests present.

The minutes from the Sept 2011 meeting were reviewed and approved with no comment.

There were no updates on IEC-61850 activities. Charlie reviewed the assignment of the working group and led a discussion on the report outline as determined from the Sept meeting. Many issues and needs were identified as desirable content for the report as a review of past, present, and future testing practices was discussed as related to IEC 61850 applications. This posed the question of "what does the standard state or imply about testing?" which was added to the outline as a to-do.

Other topics added to the outline included; the need for definitions of testing – acceptance, factory, site, lab, etc...and what they entail; differentiating between "Greenfield" and existing networks; how will NERC testing requirements be fulfilled?; need for simplified diagrams to explain the testing concepts; and a comparison of conventional network testing tools and 61850 network testing needs. The later was proposed as a presentation to the WG that would be jointly made by Samuel Sciacca, Dominic Iadonisi, Tony Leszczynski at the next meeting.

Some topics stimulated long discussions – handling firmware updates, depth of testing when changes are made, and security issues.

Some writing assignments were made on the topic of test cases, physical lock out devices and practices, testing SV, and difference between published editions. A revised outline will be sent out next week to all attendees and further requests for comments solicited.

Footnote: Working Group H6 has been in existence for many years. It has produced several reports and transaction papers but for the last several years has been a technical forum for all things IEC-61850.

H7: IEEE 1588 Profile for Power System Applications (Joint Working Group of Substations Committee C7 & PSRC H7)

H7 Chair: Galina Antonova

Substations C7 Chair: Tim Tibbals

Vice-Chair: Bill Dickerson

Output: Standard

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

Joint WG H7/Sub C7 met on January 10, 2012 in Garden Grove, CA in a single session with 14 attendees (8 members and 6 guests). Quorum was not achieved. September 2011 meeting minutes will be approved electronically.

Co-chair gave a project update:

- IEEE C37.238-2011 was published on July 14, 2011
- The standard is approved for the US Smart Grid
- Group task now is to produce a summary paper
- Discussions on wireless support have started

Discussion on the summary paper followed. Bodgan Popescu presented his paper contribution on Time Inaccuracy. It covers a possible use case for this parameter. Paper outline was reviewed, assignments were confirmed. Assignments are due in 2 weeks. Possible paper submission venues

were discussed. It was suggested to generate an abstract and list of possible submission venues first. A conference call on summary paper is to be scheduled at the end of January 2012.

Co-chair updated the group on wireless discussions. IEEE 802.1AS-2011 standard describes a mechanism for mapping IEEE 1588 messages into IEEE 802.11v media. This mechanism could also be used for IEEE C37.238 messages. It was suggested to continue these discussions. Next conference call on wireless topic is proposed for Jan 23, 2012.

H9: Understanding Communications Technology for Protection

Chair: R. Midence

Vice Chair: M. Sachdev

Output: WG Paper

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

Working Group H9, met on Wednesday January 11, 2012 at 8:00 am in Room Royal D, with 10 members and 14 guests.

Since there was no quorum to approve the notes of meeting the chair will follow up with an e-mail for an electronic vote.

The chair informed that that the report should be considered completed and prior to the meeting, via an E-mail, the report was submitted for final review and approval by the members.

Jim Niemira suggested that the final approval should be conditioned to revisions to the document for grammar, spelling and minor editorial changes. The working group agreed with the suggestion. The following participants volunteered to review the final document:

1. Randy Hamilton (M)
2. Ed McHale (M)
3. Tim Tibbels (G)
4. Jim Bougle (G)
5. Mark Teetsel (G)
6. Brian Wilkin (G)
7. Kevin Easley (G)
8. Chirs Chelmecki (G)
9. Demetrios Tziouvaras (G)
10. Alfredo De La Quintana (G)
11. John Anderson (G)
12. Alex Lee (G)
13. Stanley Horowitz (G)
14. Calin Micu (G)

It was agreed that mark ups or comments shall be submitted in three weeks, February 1, 2012.

The working group suggested the preparation of a technical paper about the report to be presented at trade shows. The motion was approved by the working group. Bruce Mackie volunteered to prepare an abstract and Dominic Iadonisi volunteered to prepare a document outline and René Midence, Richard Harada, Bob Ince volunteered to assist.

H11: C37.118.1 Standard for Synchrophasors for Power Systems

Chair: K. Martin

Vice Chair: B. Kasztenny

Output: Standard

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

WG H11 met on Wednesday, January 11, 2012 in a single session with 8 members and 25 guests. The attendees were reminded of the applicable IEEE intellectual property rules. The WG did not have a quorum and the September minutes will be approved by Email.

The chair reviewed the current standard status. It passed the recirculation ballot that closed September 24. It was approved by RevCom and published in December 2011. The draft was provided to the Synchrophasor WG in IEC TC95 and sent out as a second CD in October. That circulation will close in February 2012, and the IEC WG will need to resolve comments.

The status of the proposed WG Transactions paper was reviewed. There are only 2 sections submitted, so it was too early to start editing. The remaining contributions are due to the Chair by March 23, 2012. We should be able to get the first review by the next meeting.

Several comments and questions on the standard have been received. One has pointed out what is probably an error due to a typo and others on interpretation of the requirements. Handling of this feedback was discussed, particularly in light of the new IEEE policy that interpretations will no longer be used. IEEE pointed out the only way to make any changes is with a corrigendum or a revision. Both require a PAR and go through the whole approval and ballot process, probably taking a minimum of 6 months. The WG decided that since none of the issues raised so far create a serious deficiency for use, to hold off on any action at least until the May meeting. It is possible that more errors will be located as implementation proceeds over the next few months, and these can all be resolved together.

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

Chair: E.A. Udren

Vice Chair: M. Zubair

Output: Report

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

The Working Group met on January 10 with 11 members and 38 guests. The session began with an interesting presentation by Herb Falk of SISCO on UDP multicast data streaming applications. The presentation painted a clear picture of how proper understanding of Ethernet applications, operating system idiosyncrasies, and troubleshooting procedures can lead to real and effective solutions in situations where, superficially, a UDP based synchrophasor streaming protocol was not performing as expected. The presentation will be sent to WG members and meeting attendees with the minutes, and a later version will be provided by Herb for the web site.

The Chair reviewed outstanding items in Draft 10.2 of the WG paper, and attendees took or renewed assignments for filling these holes:

- Section 16, settings file management importance – David Purpura
- Section 14.2 – IEEE 1615 overview – Mike Dood and Craig Preuss felt that maybe there is no conflict or need to have this section; Mike will confirm.
- Intersubstation applications (per IEC 61850-90-1 and 61850-90-5 – Richard Harada
- New 61869-9 profile for sampled values – just an overview of what this means to users – volunteer to be found (Veselin Skendzic is Chair of IEC WG creating it).

Leftover prior assignments:

- IEEE 1588 impact, advantages and disadvantages – Galina Antonova to update that part that appears on P. 49.
- Synchrophasors over Ethernet - Eric.
- Addition on approaches to multiport relays with bumpless network failure handling – PRP, HSR – digest from 61850-90-4 draft – Clemens Hoga will fill in for former assignees. This

needs to be very high level – just so readers know that these methods exist, overview of what is happening, benefits & drawbacks.

- Security aspects of IPv6 – Didier Giarratano – check to see if it is covered.
- Routers & dynamic routing – Richard Harada and Abdul Amin.
- Need to explain about IT department assigning static IP address. Relays don't implement DHCP – security and stability versus the convenience of DHCP general IT applications. Also for wide area network access and management.

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

Chair H13: S. Sciacca

Chair C10: Tim Tibbals

Vice Chair H13: C. Preuss

Output: Standard

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

Meeting was called to order – There were 14 members and 40 guests. The patent slides were reviewed and the minutes from the Sept 2011 meeting were reviewed. The working group membership process through MyProjects was reviewed. Sam announced that Tuan Tran asked to be relieved as Vice Chair as workload was preventing him from traveling to meetings. Tim Tibbals, chair of substations C10, will be the vice chair of the joint effort.

Draft 2.2 was reviewed and open writing assignment made. Sam asked for expression of interest in holding remote (teleconference writing sessions to move the document along. Enough people seem to agree to give this a try. A doodle poll will be sent out for a session in February. H18's report on security of data files was discussed. It was determined that we could either extrapolate information for inclusion in PC37.240, or if the H18 report evolved into a standard effort, the reference could be cited.

Soft copies of draft 2.2, and the H18 report will be sent to the membership in preparation of the writing meetings. Our goal is to go to sponsor ballot before the end of the calendar year.

H17: Establishing links between COMTRADE, IEC 61850 and CIM

Chair: C. Brunner

Vice Chair: A. Apostolov

Output: Report

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

The meeting was held Tuesday morning and attended by 13 members and 18 guests.

Since many new participants were present, the scope of the WG and the technical background were briefly presented again by Christoph. Slides were presented providing overview and relationship between IEC 61850 and COMTRADE and IEC 61850 and CIM and how that is intended to be used. Outline for the report, with previous assignments was then reviewed. Another example for a use case was brought up for using COMTRADE data for voltage sag analysis, calculating voltage sag indices. (Dan Sabin). H8 report on mapping of synchrophasor data into COMTRADE file format (Schema for phasor data using COMTRADE file standard, May 13, 2010) shall be considered and briefly described as well.

In the outline, a use case "model validation" was mentioned. It was clarified that the model here is the power system model.

Planning of work of the WG:

- Drafts of the write-ups shall be available for review at the next PSRC meeting in May
- Once the first sections (use cases, summary of the concerned standards and reports) are available, the WG can step into the second part, which is the analysis work to investigate how the standards can be applied to realize the use cases and if extensions are required.

As an action item, Christoph will circulate the EPRI report on the harmonization of CIM and 61850.

H18: Cyber Security for Protection Related Data Files

Chair: Amir Makki

Vice Chair: Stephen Thompson

Output: Report

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

The H18 working group has completed its work.

The final Report was approved by the working group members and circulated to the H subcommittee prior to the January meeting. The Report was voted on by the H subcommittee members and was unanimously approved. The Report will now be posted and submitted to the main committee.

No further meetings of the working group are needed. The group stands disbanded.

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

Chair: Ken E. Martin

Vice Chair: Gustavo Brunello

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.

- 1) The WG H19 met on Tuesday, January 10, 2012 in a single session with 7 members and 19 guests. No quorum was reached.
- 2) The participants were reminded of the applicable IEEE intellectual property rules.
- 3) Ken Martin informed the working group that the Std has been officially issued by the IEEE during December 2011.
- 4) The working group has decided to prepare an IEEE Transaction paper on the Standard. The paper layout was prepared and assignments for the different section of it were given. The writing assignments are due March 23, 2012. Please submit in Word document form directly to the WG chair.

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

Chair: Eric Allen

Vice Chair: Amir Makki

Output: Standard

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

A recirculation ballot was completed in September. One negative ballot was received and was resolved as a restatement of a previous negative ballot. The standard was approved by the IEEE-SA Standards Board on October 31, 2011. The standard was published as C37.232-2011 on November 9, 2011.

With the completion of its assignment, H20 is disbanding.

Liaison Reports

PES Substations Committee

S. Sciacca

No report – see Reports of Interest near beginning of PSRC Minutes

PES Communications Committee

S. Klein

No Report

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

C. Brunner

IEC TC57 / WG10 will meet end of January in Porto, Portugal and is currently working on the following topics:

1. Finalisation of Edition 2 of IEC 61850:
Parts 3, 5 and 10 are in the CDV / FDIS stage – the other parts are published or on the way to be published
2. From the different technical reports that are currently under preparation, the status is as follows:
 - IEC 61850-90-5 – using IEC 61850 to transmit synchrophasor data according to IEEE C37.118 has been completed. Publishing still outstanding.
 - IEC 61850-90-4 – network engineering guidelines is ready to be circulated as DTR.
 - IEC 61850-90-3 – using IEC 61850 for condition monitoring – and IEC 61850-90-11 – modelling of logics – are still in preparation.
3. Additional work deals with Functional testing and System management.
4. The process to prepare a UML model of IEC 61850 for all the different domains is ongoing and progressing according to schedule. Discussions with IEC about publishing the standard in the future as a web based accessible database as well as publishing models electronically have been started
5. Technical reports IEC 61850-7-5 and -7-500 are still in preparation. These reports shall provide additional explanation on the usage of the models defined in the standard.

IEC TC57 / WG17 will meet next week in San Diego and is currently working on the following topics:

1. A task force was created that shall prepare a technical report about the use of IEC 61850 for Distribution Automation. That task force will in a first step prepare a technical report IEC 61850-90-6, use of IEC 61850 for distribution automation.
2. Task forces are working on preparing the following technical reports as a first step to an Edition 2 of IEC 61850-7-420:
 - IEC 61850-90-7 – Photovoltaics and inverter based systems
 - IEC 61850-90-8 – Electrical vehicles
 - IEC 61850-90-9 – Storage batteries
 - IEC 61850-90-10 – Schedules. Note that this has been taken out of the part 90-7 and it has been decided to create a separate part instead.

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

1. Prepare the FDIS of IEC 61850-7-410, Ed 2 including feedback from the UML modelling which allowed to clean up the standard
2. The report IEC 61850-7-510 is ready to be published
3. A new work item proposal for a Technical Specification for interoperability testing was approved.

I: RELAYING PRACTICES SUBCOMMITTEE

Chair: R. Beresh

Vice Chair: J. Pond

The I Subcommittee met on January 11, 2012 with 24 members and 19 guests present – a quorum was achieved.

- Approved minutes of I SC meeting held in Minneapolis MN September, 2011.
- Items of Interest
 - Sub-Committee members were reminded of the importance of voting on reports
- WG I3 Report on Relay Functional Type Testing was not approved by the SC after several ballot attempts. Comments were received and the report will be revised and submitted to Executive Committee for approval.

Reports from the WG Chairs

I2: C37.100 - Terminology Review

Chair: Mal Swanson

Vice Chair: Fred Friend

Output: Definitions for C37.100 and IEEE Std. 100

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

The I2 working group, chaired by Mal Swanson, met on Wednesday, January 11, 2012 with 9 members and no guests with the reactivation of Barb Anderson as a member.

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

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

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

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

I4: IEC Advisory Working Group

Chair: E.A. Udren

Vice Chair: M. Yalla

Output: Comments and votes to USNC of IEC on TC 95 (Measuring Relays) Standards projects and drafts. Reports to PSRC on IEC standards development.

Meeting: WG meetings are continuing

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

The WG met on January 11, 2012 with 7 members & 1 guest. The Chair and Vice Chair reviewed for the attendees the status of documents circulated from IEC during the last cycle:

- 60255-121 – Distance relays - A Committee Draft #2 was circulated in Feb. 2011 and comments were received from the IEC National Committees as documented in 95-290-CC. The comments were resolved and a CDV will be circulated in March.
- 60255-149 – Thermal electrical relays - A Committee Draft was circulated in Feb. 2011 and comments received from the IEC National Committees as documented in 95-291-CC. The comments were resolved and a CDV will be circulated in March.

For both of these, any informal comments should be submitted through MT4 Convenor Murty Yalla by the end of January.

- 60255-24 COMTRADE standard is handled by a Dual Logo Maintenance Team (DLMT). Certain European participants informally sent IEEE PSRC WG H4 some issues that could lead to some negative NC votes when CDV is circulated. H4 is developing fixes and will be forwarding to the informal commenters, to be sure the upcoming CDV is acceptable. The CDV will probably be issued in March.
- 60255-118-1 IEC Synchrophasor measurement standard – a version identical to C37.118.1 has been issued by TC 95 as CD, with comments due by Feb. 10 according to a previously agreed dual logo process.
- 60255-26 EMC Tests is the restructured specification that now rests directly on 61000-4 series standards and eliminates the 60255-22-X series. The CDV was circulated multiple times in recent months and requires a vote by Feb. 10.

The chair also circulated a copy of TC 57 draft Technical Report 62351-10 on IEC cyber security architecture, for the interest of the WG members.

15 Schematic Representation of Power System Relaying

Chair: Kevin Donahoe

Vice Chair: Rich Young

Output: Report

Expected completion date: TBD

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

The Working Group met at 9:30 on January 11, 2012 with 16 members and 8 guests attending. Due to significant contributions, one guest was made a member.

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

The September meeting minutes were discussed and approved.

Writing assignments from the last meeting were presented and discussed.

The protection zone diagram was discussed. It was pointed out that this drawing is more than just a planning tool, as mentioned in the minutes. Some inconsistencies with the diagram legend were noted. Andre Uribe and Don Ware will correct it. Kevin will move some diagrams to be more closely associated with the text. John Csisek will work on the text (Section 3) to incorporate the Protection Zone diagram.

Craig Preuss presented material on communication block diagrams (Section VII.) It is important to know what ports are used, which ones are available, the type of connectors and cables, where they go, etc. Craig will provide another example which shows how they reduce the clutter of the drawings. Device number 16 for communication devices was mentioned. Some are using it, but Craig did not use it on these diagrams. We may want to make it clear that this is intended for internal communications, as opposed to station-to-station communications. We may want to refer to the work of Working Group H1, "A guide for the application of digital teleprotection."

Testing documentation material has not been provided. Do we really need it? Our scope does not say anything about testing. Kevin proposed that we drop it. Members agreed. Subsequently, Karl Zimmerman provided input to the report. Editing will need to be done to incorporate into the report. Still need conclusion and references. Kevin asked for volunteers. John Csisek and Kevin will take a shot at writing a Conclusions section. Rich and Kevin will take a look at a References section. We are pushing to complete the report by the May, 2012 meeting, so it is important that the assignments are submitted promptly. We ask that the assigned tasks be submitted by April 15. We hope to be able to vote on the paper between May and September. Members are invited to bring thoughts on the next step.

The meeting was adjourned at 10:40.

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

Review of assignments:

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

Everyone will consider next steps.

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

Chair: Brian Mugalian

Vice-Chair: Bruce Magruder

Established: 2009

Output: Revision of IEEE/ANSI C57.13.3-2005

Expected Completion Date: 2012

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

Working Group I8, Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases, was held in Madrid (South Tower), Hyatt Regency Orange County, Garden Grove CA on January 10, 2012. Twelve members and one guest were present.

The working group reviewed Draft 1a of the Guide and has more editorial and technical changes. Any new figures that show manufacturers' trademarks will be cropped to only show pertinent data or waveforms. The Guide needs to better describe the differences between 60 Hz grounding and transient grounding applications. Annex E will also be updated.

The draft will be revised for discussion at the May 2012 meeting as Draft 2.

Comments on Draft 2 are to be submitted no later than April 20, 2012.

The Working Group will meet in May 2012 in New Orleans LA. We will require a room for 20 people and a computer projector.

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

Chair: Marie Nemier

Vice Chair: Munnu Bajpai

Suresh Channarasappa – Co –Chair SC-2

Output: Revision of Standard C37.98

Assignment: Revise and update C37.98

The WG met on January 10, 2012

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

1. Reviewed IEEE patent slides.
2. Reviewed and approved agenda & meeting minutes from previous conference call.
3. Section 5.2.1 (previously 4.3.1) was discussed by the group and Mario Ranieri brought up his concern that the contact monitoring has been revised to no longer require monitoring of all contacts. The current draft on requires monitoring of one contact determined to be the most severe. Dan Mikow & Marie Nemier agreed to rewrite the section to address Mario's concern. This action item is due 1/20/12.
4. Mario also had concern that that IEC standard harmonization may not be complete. Mario agreed as an action item that he will review Table A-1 in Annex A. This action is due prior to the next call, 1/31/12.
5. Suresh confirmed that the current revision is draft 4 rev 5B. Suresh will send a copy of this standard to all members. Action completed 1/11/12.
6. Suresh will follow up with Arnold Offner the status of the bridge document.
7. The next topic discussed was the PAR revision. The revised PAR shall be submitted for approval prior to the deadline of 2/17/12. Marie Nemier has an action item to submit the PAR through the IEEE my project process. Previously, the working group has unanimously voted approval of the PAR revision. It has also been approved by PSRC, NPEC and SC-2.
8. The PAR due date of 12/31/12 was discussed. Marie Nemier has an action item to contact IEEE and ask if a PAR extension is required if the standard is in ballot when the PAR expires. If a PAR extension is required, Marie Nemier will have an action item to complete the extension request through the IEEE my project process.
9. It was agreed that the next meeting will be a conference call on January 31, 2012 at 2:00pm EST. Suresh will send the invitation.

Action Items:

1. Revise Section 5.2.1; Marie Nemier and Dan Mikow, due 1/20/12
2. Review Table A-1 in Annex A; Mario Ranieri. Due 1/30/12
3. Send to group Draft 4 Rev 5B; Suresh Channarasappa, Completed
4. Submit revised PAR through IEEE My Project; Marie Nemier, Completed
5. Inquire to IEEE regarding need for PAR extension; Marie Nemier, Completed
6. Develop bridge document comparing current revision to 1987 version; Arnold Offner, Prior to Ballot
7. Send invitation for next meeting; Suresh Channarasappa, due 1/20/12

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

Chair: Harland Gilleland

Vice Chair: Bruce Pickett

Established: March 25, 2010

Output: Guide PAR PC37.241

Expected Completion Date: December 31, 2014

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

Following introductions, the meeting was opened with a review of the IEEE Copyright and WG Guidelines slides. There were 12 members and 7 guests present.

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

Farnish led a review and discussion of the current Draft 1 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
 - There was discussion on the future need for a password for the WG web site- this was discussed with Bob Beresh

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

Chair: Tom Beckwith

Vice Chair: Jeff Burnworth

Output: Revision of C37.90.1 SWC Tests Standard

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

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

Meeting Minutes: January 10, 2012, Garden Grove, CA.

The 13th meeting of the Working Group (WG) I20 met on January 10, 2012, in a single session with 11 members and 13 guests.

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

The minutes of meeting #12 on May 17, 2011, Asheville, NC were approved as submitted.

The recent ballot results of C37.90.1 Draft 5 were reviewed. The ballot results were:

- 81 balloters
- 87% return
- 72 affirmative
- 5 negative
- 93% affirmative

138 comments were received from 10 balloters. 11 of the comments were identified as actually being technical, with the balance being categorized as either grammatical or editorial. The WG balloted all the comments that were not simply editorial (spacings, spellings, etc.), including a number of editorial comments from one balloter whose computer apparently did not display some characters in the draft. In all, 22 comments (8 Technical, 14 Editorial or General) were balloted and rejected.

By ballot of the WG, it was agreed that all editorial and grammatical comments will be addressed by Jeff Burnworth, and reviewed by the members in Draft 6.

Of the 11 technical comments, 2 were accepted and resolved by simply revising a sentence or word to clarify. The remaining 9 technical comments were addressed by extended discussions and ballots of the WG with one additional technical comment being accepted.

The following table lists all comments that were rejected by the WG (ref: Ballot comment results spreadsheet).

Comment ID	Balloter Name
1341020002	Hoffman, Gary
1341000002	Hoffman, Gary
1340990002	Hoffman, Gary

1340960002	Hoffman, Gary
1340950002	Hoffman, Gary
1340930002	Hoffman, Gary
1340830002	Gilmer, David
1340820002	Gilmer, David
1340810002	Gilmer, David
1340800002	Gilmer, David
1340780002	Gilmer, David
1340770002	Gilmer, David
1340760002	Gilmer, David
1340750002	Gilmer, David
1340740002	Gilmer, David
1340730002	Gilmer, David
1340720002	Gilmer, David
1340710002	Gilmer, David
1340680002	Gilmer, David
1340630002	Mugalian, Brian
1338720002	Bushnell, Mark
1328850002	Tengdin, John

Comment ID # 13288500023, provided by John Tengdin, was the subject of extended discussion. John's concerns include the lack of specific statements stating that communications must be active during the tests. Following the Working Group's rejection of his comment (1-in favor, 8-oppose), a following motion and proposal was made to add a sentence to clause 7.3.1 stating that communications must be active. A WG ballot on the proposal resulted in rejecting the proposal (3-in favor, 6-oppose). Many of the WG members suggested that the communications requirement should be included in IEEE C37.90 as part of the definition of normal operating conditions for all tests, including C37.90.1 and C37.90.2. It was concluded that this suggestion to revise C37.90 to include communications as part of the normal operating condition will be discussed at the I subcommittee meeting on Wednesday.

A second motion and proposal was made to simply include IEEE 1613-2009 in the informative bibliography. A ballot of the WG resulted in the proposal being accepted (7-in favor, 2-oppose).

Action Items:

Jeff Burnworth is to create Draft 6, addressing all comments. Draft 6 will then be provided to the WG for approval prior to recirculation for ballot.

The minutes were recorded by Jeff Burnworth.

I21: Analysis of IED System Waveforms and Event Data

Chair: Jerry Jodice

Vice Chair: George Moskos

Output: Report

Working Group I21 met with 14 members and 14 guests.

The Working Group assignment was reviewed. It was the consensus of the group to prepare an IEEE Report. The report will define a process for identifying and analyzing a fault incident. The process will include data collection, analyzing techniques and methods of reporting.

Prior to the meeting 15 disturbance analysis reference papers were submitted for Working Group review. The reference papers will be placed in the Working Group I21 Website. A preliminary work assignment outline was prepared at this meeting. Members of the working group were asked to review and comment on the contents of the outline prior to the next PSRC meeting May 2012.

There will be four presentations on various disturbance analysis papers at the next PSRC meeting. The presenters will include Jeff Pond, Amir Makki, Tony Giuliante, and Rafael Garcia. As the results of these four presentations the working group is requesting a double session at the next meeting for 35 people. A projector will be required.

ITF4 Reaffirmation of C57.13.1 Guide for Field Testing of Relaying Current Transformers

Chair: Brian Mugalian

Vice Chair: Bruce Magruder

Output: Reaffirmation and review of comments received on IEEE C57.13.1

Task Force ITF4, Reaffirmation of C57.13.1 - Guide for Field Testing of Relaying Current Transformers, was held in Regal (South Tower), Hyatt Regency Orange County, Garden Grove CA on January 11, 2012. Seven members and six guests were present.

The reaffirmation ballot results were reviewed (the ballot closed on November 27, 2011). The minimum requirements for responses were met. There were 2 negative ballots and 32 comments received from the balloting body. The attendees reviewed the comments and determined that many require further study. It was agreed that we would complete the reaffirmation ballot process with a recirculation, along with a letter to the balloting body stating that the Task Force plans to form into a Working Group starting at the May 2012 meeting to begin work on revising the Guide.

A PAR will be submitted by February 17, 2012 for the March 28 NesCom meeting.

At the I Subcommittee meeting on January 11, the working group was assigned I9.

ITF10: Quality and Control for P & C.

Chair: TBD

Vice Chair: TBD

Output: TBD

The Task Force ITF10 met on Tuesday, January 10, 2012 in Anaheim, CA, in single session chaired by Andre Uribe with 27 attendees.

September meeting minutes were reviewed and approved.

In our discussions, the group shared some of their challenges experienced between the engineering design package and its transition to the field.

1. Design errors
2. To many revisions
3. Last minute scope changes
4. Poor documentation for testing engineer
5. Errors in the submitted "as-built"

Yuchen Lu brought up to the group's attention that there is a working group report written on "QC for Settings Configuration" called "Process, Issues, Trends and Quality Control of Relay Settings" back in 2007 chaired by Steven Kunsman.

Kevin Donohue volunteered to make a presentation of the paper at the next working group meeting since he was a working member of that committee.

The group agreed that our scope of work should be to write a paper on this subject and collectively came up with a scope of work:

“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 group agreed that this paper should be specific in nature and only address quality control on the design package.

Tasks were assigned:

1. George Tsai: The importance of defining the scope of work
2. Don/George/Duane: field challenge/issue samples
3. Division of responsibility
4. Juan: Coordination Studies
5. Andre: Define “Quality Control”
6. Walter: Redundancy and single point of failure
7. George Moskos: Importance of site visits
8. All to read: “Process, Issues, Trends and Quality Control of Relay Settings
9. George Tsai: Appendix: check list, RFI

Liaison Reports

RE: Instrument Transformer Sub Committee, Liaison Report

The Instrument Transformer Sub Committee fall meeting was in Boston, Nov. 2.

There are two working groups. One is writing a standard for CTs with a mill-amp secondary.

The second working group is reviewing a number of important proposed changes for C57.13. The integration of C57.13.5 into C57.13 has run into major resistance. The consensus is to create a second class of instrument transformers. Class II will incorporate the additional C57.13.5 extra HV tests etc. Class I will be the default class if you do not specify Class II.

The appendix will include a large section on bushing CTs.

Coordination Reports

None

Old Business

I SC Web Pages; Fred Friend is new Web Master

New Business

Bruce McGruder voted new member to I Sub-committee.

Motion to Revise C37.90 approved.

Recommendation to form a working group to revise C57.13.1 approved. ITF4 Reaffirmation of C57.13.1 Guide for Field Testing of Relaying Current Transformers will be WG I9.

Recommendation to form a working group to produce a report on Quality Control for P&C approved.

ITF10: Quality and Control for P & C will be WG I11.

J: ROTATING MACHINERY PROTECTION SUBCOMMITTEE

Chair: M. Yalla

Vice Chair: M. Reichard

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

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

Reports from the WG Chairs

J1: Adjustable Speed Drive Motor Protection Application and Issues

Chair: J. Gardell

Vice Chair: P. Kumar

Established: 2003

Output: Report to the Subcommittee

Expected Completion: Dec 2008

Status: Draft 8 (Final)

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

The Working Group did not meet this session. The report is published on the PSRC website. A summary version Transactions Paper draft has received necessary PSRC approval and was submitted to IEEE Manuscript Central. Publication in IEEE Transactions on Power Delivery was declined administratively as the content was deemed better suited to the IAS or Industrial Electronics. The PSRC officers will pursue another attempt to submit of IEEE Transactions on Power Delivery. Chuck Mozina offered to get IAS contact information to the J officers. The IAS requires a presentation of the paper before it gets published in IAS transactions.

J2: Protection Considerations for Combustion Gas Turbine Static Starting

Chair: Mike Reichard

Vice Chair: Zeeky Bukhala

Established: 2005

Output: Report to the Subcommittee

Expected Completion: 2009

Status: Draft 2b (Final)

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

The Working group did not meet at this meeting. The report is published on the PSRC website. Dale Finney has formatted the report into an IEEE-PES format for publication as a Transactions paper. Some additional editing of the figures is to be done before further proceeding with approvals and publication.

J3: Power Plant and Transmission System Protection Coordination

Chair: Phil Waudby

Vice Chair: Sungsoo Kim

Established: 2010

Output: Report to J Subcommittee

Expected Completion: 2012

Status: 6th Meeting

Assignment: The J3 Working Group is to provide a report containing recommendations to the J Subcommittee on coordination issues and other relevant matters gleaned from the NERC Technical Reference Document - Power Plant and Transmission System Protection Coordination to be used as a feeder material and technical additions for consideration in the next revisions of IEEE C37.91, C37.96, C37.101, C37.102, and C37.106.

The sixth Working Group meeting was held on January 10, 2012 with 16 members and 22 guests. The meeting was scheduled as a double session; however they completed their work in one session.

The WG reviewed the first draft of the report. Several changes were made to the Abstract, Introduction, Contents page and the comment tables. The WG members will ballot the modified report via e-mail during the month of February. The members' are to respond by March 1st. If 75% of the members approve the report, the report will be submitted to the J Subcommittee for their comments and approval. If there are Subcommittee comments, they will be discussed at the May meeting. If a 75% approval is obtained by the J Subcommittee, the report will be forwarded to the PSRC officers for their comments and approval.

The WG requires a single session for 40 people at the May meeting. A projector will be needed.

Question about part of the assignment: "The WG will also provide an On-Going Liaison with NERC for Technical Matters Pertaining to Generator and Power Plant Protection." Is this what the SC wants? It was decided at the subcommittee report that Joe Uchiyama continue to provide the Liaison with the NERC SPCS.

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

Chair: Sudhir Thakur

Vice Chair: Mukesh Nagpal

Established: 2011

Output: Report

Expected Completion: 2015

Status: 2nd 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 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 on January 10, for a single session with 18 members and 26 guests. This was our second meeting. The introductions were done. Minutes of the last meeting held on September 13, 2011 were approved.

The outline of the report was discussed. Working group suggested many additions, and the outline was finalized. The Chair will be sending the revised outline to the members.

There was good technical discussion on the details to be included in the document.

Writing assignments were made.

We will meet in next meeting for one session and need a room for 50 people with a projector.

J6: Protection issues Related to Pumped Storage Hydro Units

Chair: Joe Uchiyama

Vice Chair: Dale Finney

Established: 2009

Output: Transactions Paper

Expected Completion: TBD

Status: 7th 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 trends of Pumped-Storage motor and generator protection for last thirty-five (35) years of industrial practices.

The WG met in Garden Grove, CA on January 10, 2012 with ten (10) members and eight (8) guests.

1. Members introduced themselves to one another.

2. Joe Uchiyama welcomed the WG and briefly explained the purpose and goal of this WG. He had distributed meeting agenda, updated questionnaire list & September meeting minutes. Vice Chairman (Bob Frye) will no longer be able to attend PSRC meeting. Dale Finney volunteered becoming the Vice Chairman.
3. WG reviewed the comments on the consolidated Survey Form.
4. WG members had the following questions/changes:
 - a. Adding CT switching,
 - b. NERC requirements,
 - c. Existing protection versus current standard guidelines
 - d. Blocking elements during start-up motor operation
 - e. Deletion of manufacturer specific logic examples
5. WG had spent most of the time discussing the separation of the section-3 into "Reason for changing relays" and "Reason for selecting relays." Hence, the section No. 3 was split into the reason to change and select the relays as following:
 Section 3 - "Why did you upgrade the P/G unit protection?" with the following answer options:
 - a. Relay misoperation(s),
 - b. Gain maintenance efficiency,
 - c. Lack of manufacturer's support,
 - d. Repair parts unavailable,
 - e. Regulatory requirements, and
 - f. Others.
 Section 4 was kept as "Reason for selecting relays."

As soon as the survey questionnaires are updated, Chairman will distribute to J subcommittee members for balloting.

J7: Avoiding Unwanted Reclosing on Rotating Apparatus

Chair: Mike Reichard
Established: January 2012
Output: Report to Subcommittee
Expected Completion: 2014
Status: First Meeting

Members Present (11)	Other Members(11)	Guests (12)
Mike Reichard	Gabriel Benmouyal	Raluca Lascu
Steve Conrad	John Tengdin	James Deaton
Zeeky Bukhala	Jon Gardell	Bruce Picket
Rafael Garcia	Greg Hataway	Prem Kumar
Matt Basler	Dale Fredrickson	Calin Micu
Chuck Mozina	Gene Henneberg	Cristian Poduraru
Dhiren Patel	Daryl Hammond	Michael Thompson
Pratap Mysore	Phil Waudby	Miriam Sanders
Dale Finney	Tom Wiedman	John Csisek
Juergen Holbach	Joe Uchiyama	John Anderson
Gerald Johnson	Bob Pettigrew	Chul-Hwan Kim
		Murty Yalla

Assignment: (Draft) Deliver a report to the J Subcommittee which discusses the hazards of rotating apparatus out-of-phase circuit breaker closing, scenarios leading to out-of-phase circuit breaker closing, and how to mitigate these findings.

The task force met on Tuesday, January 10, 2012 with 11 members and 12 guests.

The September 13, 2011 JTF7 meeting minutes were adopted.

The chair petitioned the attendees to volunteer for WG Vice-Chair. There were none. Attendees suggested chair contact NERC's Phil Tatro to volunteer. Chair will make that attempt.

Session discussions focused on a rough outline for a report consisting of the following:

1. Hazards/Damage of out-of-phase closing
2. Scenarios which can cause out-of-phase closing
 - a. Breakers near machines
 - b. Breakers electrically far from machines
 - c. Protection against wide-angle closing
 - d. Protection against repetitive closing
3. Mitigation concepts of out-of-phase closing
 - a. HMDs pros and cons
 - b. Blocking Timers
 - c. High-speed sync check
 - d. Synchrophasors
 - e. System stiffness—is the system strong enough to cause damage?
 - f. Can out-of-step closing current be calculated and detected?
 - g. Do the equipment owner's schemes respond to block wide angles?
 - h. Do the machines lockout on load rejection (tripping)?
 - i. DG/generator control systems

J8: Generator Tutorial Revision

Chair: Michael Thompson

Vice Chair: Chris Ruckman

Established: 2007

Output: Tutorial (published by PSRC)

Expected Completion: 2011

Status: Completed

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

The Working Group completed presentation of the tutorial on Monday Jan 9, 2012

J9: Motor Bus Transfer

Chair: Jon Gardell

Vice Chair: Dale Fredrickson

Established: 2006

Output: Working group report

Expected Completion: 2011

Status: Draft 5.0

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

The Working Group did not meet in Garden Grove.

Status: Draft 5 of the report to the J Subcommittee is complete in terms of technical content, and is being edited for format and organization by Steve Conrad. Upon completion, the report will be sent electronically to Working Group members for final approval. There will not be a formal ballot. The Working Group will not meet in May 2012.

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 8.0

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

The meeting was attended with 14 members and 6 guests. After the introductions, the Patent Slides were shown. This meeting was originally intended to be double session but was completed in one session. The Minneapolis meeting minutes was approved with a quorum.

The various section wise editorial comments and few technical comments were reviewed by the WG. There was a consensus from the WG on path forward for the various comments that were reviewed.

The chair would send out draft 8 with various comments incorporated for WG approval by end of January. The WG will be given one month to approve, or approve the document with final comments. After the WG comments incorporated the intent was to start the balloting process by April/May time frame.

No/section	Assignment	By	Reviewer
1 Sect 5	Information on failure mechanisms for motors. They would summarize data from gold book, IEEE 352 . The intent of failure data is to emphasis the reasons for having specific protections	J Gardell	W.Hartman-
2 Sect 8.2	Understanding motor data sheet interpretation and translation into motor relay settings such as motor cooling time constants and motor running time constants [cooling time constant vs. cooling time, running vs. stopped cooling time, starts per hour, empirical determination of cooling time, relay determination of cooling time	D .Frederickson	D.Finney /P.Kumar
3 Annex A2	Relevant tutorial type material that helps with derivation of relay settings such as explanation of motor speed-torque curves [voltage vs. torque with regard to starting requirements, breakdown/pull up torque	J.Gardell	W.Hartman
Annex A3	Inclusion of setting examples using protection elements similar to the annex of C37.102-2006. Enhance 21 element section of the present guide	Prem Kumar	Chris Ruckman Subash Patel Pat Kerrigan
5 Sect 7.2.10.1	Coordination/application considerations for fuses over relay such as used with fused contactor applications [instantaneous considerations, phase fault clearing limitations	Larry/Tom Farr	Suhag Patel Sudhir Thakhur
6 Sect 5.2.7	Considerations for settings derivations for reduced voltage starting	Tom Farr	Mike Reichard
7 Sect 6.5.1	Placement considerations of power factor correction capacitors relative to motor relay sensing CTs	Tom Farr	Pat Kerrigan
8 Sect 4.4 Sect 6.3	Summarize ASD powered motor protection considerations from Rotating Machinery Subcommittee paper effort (J1 Report)	Dale Finney	Pat Kerrigan
9 Sect 6.4	Motor bus transfer protection considerations from Rotating Machinery Subcommittee paper effort	Dale Finney	John Gardell
10 Sect 7.2.10.6	Elaborate reasons for delay on ground fault protection using toroidal CT [capacitance from cables, motor inrush phase current differences, surge caps]	Tom Farr	Suhag Patel Sudhir Thakhur
11 Sect 5.9	Add information on how to apply surge capacitors (protection). There is material available for review from last C37.96 effort. Check if any other guides exist to address the subject in addition to C62. We should write then have reviewed by liaison	J.Gardell	S.Thakhur
12 Sect 5.4.3	Considerations for application low ratio CTs, high ratio retrofit	Prem Kumar	Dale Finney
13 Sect 7.2.11	Use of dedicated BF on small motors to ensure clearing	Dale Finney	Prem Kumar
14 Sect 5.2.1.1	Explanations of insulation class and setting relevance. Bearing temperature also	J. Uchiyama.	Suhag Patel
15 Sect 5.2.1.2 5.2.1.3	Add information from Buff Book that contains useful NEMA MG-1 content (design types, insulation class, etc.). Need to review to see if permission is required to use this data	J. Uchiyama.	Suhag Patel

Other Reports:

C17: Fault current contribution from wind farm plants
No report was given.

Liaison Reports**Electric Machinery Committee (EMC)****C. J. Mozina**

The Committee met at PES General Meeting in Detroit-- July 24-29, 2011. The minutes for this meeting are not yet posted on the EMC web site. Nothing new to report.

IAS I&CPS Committee**C. J. Mozina**

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

Nuclear 1E WG**P. Kumar**

Nothing new to report.

NERC (related to rotating machinery)**J. Uchiyama****Coordination Reports**

None

Old Business

The reaffirmation ballot period for C37.101 Guide for Generator Ground Protection has Been approved for ten years. As part of the approval K. Stephan and P. Waudby will work to create the corrigenda for submission to SA.

The reaffirmation ballot for C37.102 Guide for AC Generator protection received several comments with one negative ballot. The response to the comments will be prepared by M. Yalla and M. Reichard. The recirculation ballot will be submitted before the May meeting.

New Business

None

K: SUBSTATION PROTECTION SUBCOMMITTEE**Chair: P.G. Mysore****Vice Chair: M. J. Thompson**

The K-Subcommittee met on Wednesday, January 11, 2012 in Garden Grove, CA, with 21 members and 37 guests in attendance. A quorum was achieved to approve the minutes of the September 2011 subcommittee meeting.

One new member joined the K subcommittee: Gene Henneberg. The committee membership presently stands at 32 members.

The following Task Forces were elevated to Working Groups starting at the January 2012 Meeting: KTF1 has become WG K1.

Reports from the WG Chairs:

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

Chair: Arvind Chaudhary

Vice Chair: Lubomir Sevov

Established: Sept. 2011

Output: Guide for the Application of Protective Relaying for Phase Shifting Transformers

Expected Completion Date: Sept.2015

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

The K1 working group met for a single session on January 9, 2012 at 8:00 am with a total of 18 attendees. Attendees included 11 WG members and 7 guests present. Lubo Sevov had an excused absence.

- The K1 WG meeting started with introduction of the attendees and review and approval of the meeting notes from the K1 WG meeting in Minneapolis, MN in September, 2012.
- Eli Pajuelo reported on the types of PSTs that are not mentioned in C57.135. There are four other types of PSTs not mentioned in C57.135 which shall be listed in the Annex of the Guide for completeness.
- Eli Pajuelo provided a list of references on PSTs.
- Electrocon (EII) software CAPE has capability to model PSTs in their short circuit program. The details of modeling capability of CAPE will be shared with the WG Members upon obtaining permission from EII.
- Michael Thompson volunteered to discuss PST modeling capability of RTDS equipment.
- Arvind Chaudhary submitted the PAR on January 17, 2012 after the meeting. The PSRC officers granted an extension beyond the required 6 months between starting the working group and submitting the PAR.
- All WG members actively discussed the details of the data required to calculate short circuit currents in the PST to determine relay settings. This data will be covered in a Separate Annex of the Guide. Arvind Chaudhary referenced that testing of PSTs is covered in C53.12.90 Clause 11.2, "Special Tests for PSTs".
- All members of the WG also participated in improving the first draft outline of the Guide. Arvind and Lubo to take action and add individual subsections to the outline and distribute it to the Members of the WG for comments by February 15th, 2012.
- For the May 2012 meeting the following WG members volunteered to present: Dean Miller and Eli Pajuelo "Tutorial on the Different Types of PSTs"; Michael Thompson on "Protection of Extended Delta PSTs"; David Bisel on "Conventional PST protection design".

K3: REDUCING OUTAGES IN TRANSMISSION SUBSTATIONS

(subtitle: Reducing Outages Through Improved Protection, Monitoring, Diagnostics, And Auto restoration In Transmission Substations)

Chair: Bruce Pickett

Vice Chair: Paul Elkin

Established: 2010.

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

Draft 3.2; 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 January 11, 2012 with 6 members and 8 guests

Introductions were done and previous minutes were discussed.

We reviewed draft-3.1 of the paper.

Reiterated that any specific topics that were fully covered in the D2-WG for the C37-104 Reclosing Guide would not be covered in any detail in this paper.

We reviewed the current draft, and made additional changes and writing assignments.

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

Chairman: Mukesh Nagpal

Vice Chair: Chuck Mozina

Established: 2008

Output: Guide Revision

Draft 6

Expected Completion Date: 2012

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

The working group met in double session on Tuesday January 10, with 9 members and 11 guests present. A quorum was not present.

After introductions the IEEE Patent Slides were shown.

The chairman presented the minutes from the September, 2011 meeting and updated the WG on status of the revisions to C37.95.

Review of progress on passed assignment.

Section 7.3 A drawing was added to help explain consumer generator separation options for utility supply faults where the customer is not exporting power to the utility. Minor changes will be made to labeling of circuit breakers in the drawing.

Section 7&8 Drawing in this section was completed in Visio and revisions made in both the write-up and within the drawings to reflect discusses held at the September 2011 WG meeting. These sections address consumers with generation.

Section 8 Breaker failure was added to the interconnection transformer secondary breaker at consumer facilities where fault current can be supplied to utility system faults either through a parallel source or consumer's generation.

The bulk of the WG meeting was devoted to reviewing the changes to Section 7 & 8. Major changes were made in this section which included:

- Adding the word "Typical" to the figures 12 -17 which shown examples of interconnection relay protection.

- Transfer Trip will be added to all cases when there is a source of fault current contribution to utility faults either through a parallel source or consumer's generation.
- Reasons for the removal of the 51N relay on the low voltage breaker of the consumer interconnection transformer were discussed and why this relay is not generally applied at consumer installation where the fault current are limited by a neutral grounding resistor.
- Figure 12b will be changed by Chuck Mozina to reflect this removal.
- Voltage rating requirements for the potential transformers used in broken delta connections were clarified in Section 8.4.4
- Consumer bus and feeder protection will be retained in the document since written description of typical protection are already in the document and provided a more complete description the protection that is generally installed.

Other sections of the document were also reviewed and resulted in the following changes:

- Section 5.2.4.1 The description of current supervision of sudden pressure relays was removed from the document. A sentence was added about the limitation of fuses to provide adequate consumer transformer low-voltage protection where current is limited by a neutral grounding resistor.
- Section 4.3 The discussion of arc-flash was removed as not relevant to the document.
- Figures 1-9 were reviewed and proposed changes were identified to the sketches in draft 6 of the document.

Assignments:

The Chair will provide a 7.1 draft of the document reflecting changes made during the meeting to key WG members.

Figures 1-9 – Steve Conrad and Jeff Barsch will provide Visio drawing for Fig. 1-9 and incorporate changes discussed at the meeting concerning “Point of Interconnection”

Figure 12 Dean Miller will re-label breakers in the drawing and refer to them in the written description within the text.

Figure 12b -- Chuck Mozina will remove 51N relay and incorporate changes in Section 7 & 8 discussed at the meeting.

The above assignments are due to the chairmen by Feb. 15.

The entire draft with the above changes will be reviewed by Ken Behrendt and Moh Sachdev.

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

Chairman: Roger Whittaker

Vice Chair: Adi Mulawarman

Established: 2011

Output: Revised Guide

Draft : None

Expected Completion Date: To Be Determined.

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

The working group met on Wednesday, January 11th 2012. We had 34 attendees with 17 members and 17 guests present. The working group has 33 members so far.

The chair submitted the PAR application on January 2nd, 2012. No words back on whether it has been approved. After it has been approved, we plan to have schedules/milestones.

The WG members discussed the next action plan. We reviewed existing sections and volunteered to review the sections. No due date was given because the PAR has not been officially approved yet.

There was discussion about how the group plans to go about revising the document. The idea about adding new sections was discussed. It was decided that review of existing sections will occur concurrent with the decision making process and writing of approved new sections.

A comment was made that, although it is considered backup protection, a breaker failure scheme is the only main protection of the power circuit breaker itself when the breaker fails.

Roger Whittaker presented a scheme describing a method to automatically isolate a failed power circuit breaker. Also a breaker differential scheme was described.

The vice chair will follow up with Erin Spiwak on getting the IEEE Mentor website setup for posting the existing standard document. The chair will see about getting the word document that can be edited.

The reaffirmation comments will be posted in the K5 PSRC website.

K6: SUDDEN PRESSURE PROTECTION FOR TRANSFORMERS

Chair: Randy Crellin

Vice Chair: Don Lukach

Established: May 2005

Output: Report

Expected Completion Date: January 2011

Draft 6.0

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

The working group met on Tuesday, January 10, 2012, in a single session with 9 members and 3 guests.

The meeting notes from the September 2011 meeting held in Minneapolis, MN were reviewed and approved without modification.

After introductions and a brief review of the working group progress to date, the group reviewed three assignments that were submitted since the last meeting. An introduction for the report and a section on turn-to-turn fault detection using sensitive negative-sequence differential elements were accepted without revision and will be incorporated into the report. An overview of the survey was also reviewed and portions of this document will be incorporated into the report.

The group reviewed draft 1.0 of the report and decided to make the following revisions:

- Move the section "A History of Transformer Pressure Relay Applications" to Appendix A
- Add the detailed survey results to Appendix B
- Move the section "Secondary Pressure Chamber Issues" to Appendix A (incorporate into the history information)

The WG chair and vice-chair will work to make these changes by the end January 2012 and forward draft 2.0 of the report to the working group members.

Don Ware offered to provide a section covering testing and maintenance aspects of sudden pressure relay systems. This will be provided by April 1, 2012.

Working group members volunteered to review draft 2.0 of the report and incorporate specific portions of the survey result summary information into the report:

- SPR Application – Charlie Sufana
- SPR Trip/Alarm – Pat Carroll
- SPR Types – Rafael Garcia
- SPR Maintenance – Arvin Chaudhary
- SPR Diagnostics – Mark Teetsel

- SPR Operation – Greg Sessler

All working group member assignments are due to the chair by April 1, 2012.

K8: GUIDE FOR THE PROTECTION OF SHUNT CAPACITORS

Chair: Pratap Mysore

Vice Chair: Ilia Voloh

Established, 2006

Output: Revision of IEEE C37.99-2000

Expected Completion date: 2011

Status: Draft ??

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

The Working group, K8, met on Jan 10, 2012 in one session with seven members and two guests in attendance.

The chair informed the group that the balloting of draft 6 was completed in December 2011 and ballot comments were received.

The results of the ballot are:- Return rate of Ballots -76% (just scraped through the 75% requirement); 387 comments received, 313 editorial, 64 technical comments; Approval 91%; Number of negative ballots -8. Most of the editorial comments were due to PDF conversion problem that resulted in words with overlapping letters

Teleconference and WebEx will be set up by the vice-chair, Ilia Voloh to address technical comments. The chair proposed to use the mentor site to post revisions in the future. The recirculation is expected to be completed before the May meeting.

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 Tuesday, January 10, 2012 in Garden Grove CA, with 4 members and 7 guests in attendance. IEEE/1547.x working group activities were reviewed.

Draft 6.0 of IEEE P1547.7 “Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection” was posted on 12-12-11 with a target of having comments back to the chair Bob Saint by 1-7-12. Comments will be discussed at the 2-12 1547 meeting and the plan is to have a ballot ready document after this meeting.

IEEE P1547.8 “Recommended Practice for Establishing Methods and Procedures that Provide Supplemental Support for Implementation Strategies for Expanded Use of IEEE Standard 1547” is ongoing. I am involved with the committee working on Protective Relaying Best Practices which is presently planned to appear in Appendix C of the final document. Six phone meetings were held in the last 3 months working on the development of this section.

The floor was opened to members and guests for discussion wind, solar, and battery storage facilities/jobs going on in their areas. There was an excellent exchange from our guests and members. If anyone needs passwords for the working groups send me an email.

The next 1547 meeting is in Atlanta the week of 2-6-12.

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

Chair: Simon Chano

Vice Chair: Mark Mcvey

Established: October 2009

Output: jointly prepare a PAR to issue a corrigendum to the guide.
Expected Completion Date: TBA

Assignment: Coordinate PSRC standards activity with Capacitor Subcommittee

KTF4 did not meet at this meeting.

Liaison Reports:

IAS Arc Flash - Chuck Mozina reported IEEE 1584 –Guide for performing arc flash hazard calculations is revised. He will pass on the details as soon as they are available.

Capacitor Subcommittee-

- Clause 8.3 on testing of MOV in the IEEE guide C37.116 on series capacitor protection was reviewed by Capacitor subcommittee and Surge protector subcommittee chairs. The working group is waiting for input from the Capacitor Subcommittee. They have solicited input from the manufacturers on their recommendations for series capacitor installations.
- IEEE 18 is under revision
- A paper on “Inductor applications for capacitor switching technologies” is worked on as a joint switchgear committee and capacitor subcommittee output.

Old Business:

C37.109, IEEE Guide for the Protection of Shunt Reactors has completed ballot for reaffirmation. There were no negative ballots. The document has been submitted to REVCOM for reaffirmation.

New Business:

Adi Mulawaraman has agreed to be the new web master for the K subcommittee. Charlie Sufana has served as the web master for several years. We thank Charlie for his years of service.

IEEE PES Substation committee: There is a new WG I9 - IEEE Recommended Practice of a Modern Protection System for Static Var Compensators Chaired by M. Halonen. The document will cover protection aspects integrated with controls in SVC. Pratap met with the working group at the joint meeting this week and informed them of the various PSRC guides that are in existence so that they could make sure that they only write on topics outside of existing guides and reference the appropriate documents as required.

Steve Conrad asked the group if anyone has seen new circuit breakers with the CTs mounted with the polarity opposite to what was shown on the nameplate diagram. They have had a number of breakers with this problem from one manufacturer. No one else had seen this problem. Steve cautioned everyone to make sure that they perform polarity tests on new equipment so that they will find this type of error should it occur.

VII. PRESENTATIONS:

Our meeting was enhanced with the following presentations:

IEEE PES Scholarship Program - Pat Ryan

WG D22 Special Publication on a Performance Specification and Testing of Transmission Line Relay for Frequency Response and the accompanying COMTRADE Creator for Off Frequency/Voltage testing - Tom Wiedman / Jun Vervosa

WG C13 report "Undervoltage Load Shedding" - Shinichi Imai

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