



**POWER SYSTEM RELAYING COMMITTEE
OF THE IEEE POWER and ENERGY SOCIETY
MINUTES OF THE MEETING
January 15, 2015
Garden Grove, CA
Final**

I. Call to order/ Introductions Mike McDonald

Chairman Mike McDonald called the meeting to order at 8:00 am

After introductions, a quorum was verified. Main Committee Attendance sheet was routed.

II. Approval of Minutes & Financial Report Pratap Mysore

Motion to approve Minutes of the September 2014 meeting in Milwaukee, WI was moved by Mike Thompson and seconded by Gene Henneberg and was approved unanimously.

The financial status of PSRC is in good standing.

III. Chairman's Report Mike McDonald

"I am happy to announce that the following 6 people were welcomed as the newest members of the Main Committee: Juan Gers, Jeff Long, Jim Niemira, Bruce Mackie, Bruce Magruder and John Wang.

We also extend congratulations to long time Main Committee member Chuck Mozina who has announced his retirement and will no longer regularly attend our meetings. Chuck requested and has been awarded Honorary Membership in the Main Committee.

Congratulations were extended to two of our members who were awarded Standard Medallions at the Thirteenth Annual IEEE Standards Association 2014 Awards Ceremony:

- Philip Winston "*For the continuous advancement with outstanding dedication of power system relaying standards*"
- Ken Martin "*For excellence and leadership in the development, implementation and standardization of Synchrophasor technology*"

Philip Winston has graciously accepted taking over the chairing the O&P Manual update. Anyone wishing to contribute to making the documents easier for our members to understand please contact Phil directly. Lastly, the PSRC is actively participating in the efforts to insure that IEEE is positioned to meet ever changing technical challenges. We are studying what is best for the industry – while maintaining the strong leadership that the PSRC has provided for many years. We fully intend to have our Committee continue to be a leader and we will seek to engage our membership in the process .

Best regards,
Mike
PSRC Chair"

IV. Reports of Interest

A. Report from the Vice- Chair – Pratap Mysore

a. Technical Paper Coordinator's Report.

Technical Paper reviews:

The 2015 PES General Meeting will be held at the Sheraton Denver Downtown Hotel July 26-30, 2015. The PSRC had 74 submitted Conference papers and an additional 11 Transaction Papers which are presently under review. Of the 74 papers, the PSRC should have an allotment of about 37 papers.

Thanks to all of the 79 people that volunteered to reviewed papers.

b. Future Meetings

We are working on the contract for a Denver location for the May 2016 meeting. We are actively pursuing September 2016 locations. The availability of hotels that can accommodate our meeting requirements while keeping the costs at historical levels is becoming very challenging and time consuming. If anyone has a suggestion for a location please contact the Vice Chair or any of the Officers.

B. CIGRE B5 Activities Report – Rich Hunt

Cigre Study Committee B5 will meet in Nanjing China the week of September 20, 2015. For more information: <http://www.cigre-scb5-nanjing2015.com/>

For more information, check out the “new” CIGRE B5 webpage: <http://b5.cigre.org>

C. IAS Power System Protection Committee - Mozina

No information available.

D. IEC Report - Eric Udren

TC 95, Measuring relays

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

The US National Committee of IEC hosted the biennial plenary meeting of TC 95 in Clearwater Beach, FL on December 5, 2014. Arrangements were handled by Dr. Murty Yalla and his Beckwith support staff. In line with earlier announcements, it was confirmed at the TC 95 Plenary that Murty Yalla will become the new Chair of TC 95 (internationally) in early 2015, replacing the outgoing Lily Yaping of China.

Full TC 95 plenary meeting minutes and copies of presentations given there are available on request from Eric Udren. Charles Jacquemart of IEC Central Office in Geneva congratulated TC 95 for its high level of standards project completions. At that meeting, Eric gave a presentation on the work of Ken Martin's PSRC/IEC TC 95 JWG developing IEC Synchrophasor Measurement Standard 60255-118-1.

Other TC 95 AHG and MT development meetings were held in Clearwater Beach the same week, in advance of the Plenary Meeting:

- Ad Hoc Working Group (AHG) 2, New protection requirements for the smart grid, held its wrap-up meeting on Monday, December 1. We will report output when available.
- Maintenance Team (MT 4), Measuring relays and protection equipment – Functional standards under Murty Yalla, is still working on the first draft of IEC 60255-187-1, *Functional requirements for biased (percentage) differential relays - Differential protection for transformers, generators and motors*. MT4 met Tuesday-Thursday, December 2-4 for drafting work. The group is driving for completion of a Committee Draft (CD) by mid-2015.

Continuing the situation from the Fall, all other type testing, physical design, and safety standards for relays are stable and there are no projects running.

TC 57, Power systems management and associated information exchange

TC 57 WG 10 continues development of parts of IEC 61850. At a November Tokyo meeting, WG 10 decided to define a standard basic application profile for IEEE 1588/IEC 61588 Ethernet network precision time protocol (PTP). This Level 1 profile will serve as the basis for a revised IEEE C37.238 Level 2 profile, and separately as a base for industrial profiles created by SC65C. The WG is working on UML machine-readable description of the data models that will lead to what is being called Edition 2.1 – this should improve standardized behavior of products and interoperability, as well as simplifying product development. There is a long list of new parts under development – the list will keep on growing and our industry creates new applications for power system protection, control, & monitoring – see the full detailed TC 57 Liaison Report from WG 10 Convenor Christoph Brunner under the Relaying Communications Subcommittee H report below.

SMB reorganization of IEC communications-related standards responsibilities

We learned from the Standards Management Board (SMB) in document SMB/5461/R that IEC is looking at a major reorganization of standards responsibilities related to communications technologies, broader than but similar to the PES reorganization of PSRC and other TCs as we define the new TC X. IEC is looking at its liaison relationships with all standards developers outside IEC during this deliberation, including IEEE. Sam Sciacca of IEEE SA will serve as our monitor and liaison for this process, starting with an upcoming SMB meeting in February which he will attend.

E. Standard Coordinators Report – Phil Winston

The status of standards activities that have taken place since the September 2014 meeting of the PSRC are as follows:

RevCom Activity:

Standards Approved:

C37.114	Revision	Guide for Determining Fault Location on AC Transmission and Distribution Lines
C37.240	New	Standard for Cyber Security Requirements for Substation Automation, Protection and Control Systems
C57.13.3	Revision	Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

Standards submitted for approval; Standards due for 10 year review

None

Ballot Activity:

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

PC37.103	Guide for Differential and Polarizing Relay Circuit Testing
PC37.113	Guide for Protective Relay Applications to Transmission Lines
PC37.238	Standard Profile for Use of IEEE 1588 Precision Time Protocol in Power System Applications
PC37.243	Guide for Application of Digital Line Current Differential Relays Using Digital Communication

NesCom Activity:

PARS approved:

PC37.241	Ext till 12/16	Guide for Application of Optical Instrument Transformers for Protective Relaying
PC37.243	Ext till 12/16	Guide for Application of Digital Line Current Differential Relays Using Digital Communications

New or Modified PAR submitted; PAR Extensions (applied for); PARs Requested for Withdrawal; or PARs Administratively Withdrawn

None

PARS expiring at the end of 2015

PC37.113 Guide for Protective Relay Applications to Transmission Lines

PARS expiring at the end of 2016

PC37.103 Guide for Differential and Polarizing Relay Circuit Testing
PC37.119 Guide for Breaker Failure Protection of Power Circuit Breakers
PC37.237 Standard Requirements for Time Tags Created by Intelligent Electronic Devices - COMTAG(TM)
PC37.241 Guide for Application of Optical Instrument Transformers for Protective Relaying
PC37.243 Guide for Application of Digital Line Current Differential Relays Using Digital Communications
PC37.245 Guide for the Application of Protective Relaying for Phase Shifting Transformers

PARS expiring at the end of 2017

PC37.116 Guide for Protective Relay Application to Transmission-Line Series Capacitor Banks
P60255-118-1 Standard for Synchrophasor Measurements for Power Systems
PC37.238 Standard Profile for Use of IEEE 1588 Precision Time Protocol in Power System Applications
PC37.246 Guide for Protection Systems of Transmission to Generation Interconnection
PC37.247 Standard for Phasor Data Concentrators for Power Systems
PC37.248 Guide for Common Format for Naming Intelligent Electronic Devices (COMDEV)
PC57.13.1 Guide for Field Testing of Relaying Current Transformers

PAR/Standard Submittal Deadlines & Standards Board Meeting Schedule:

Submittal Deadline	Meeting Date
February 13, 2015	March 25, 2015
April 24, 2015	June 05, 2015 (telecon)
July 17, 2015	September 02, 2015
September 4, 2015	October 16, 2015 (telecon)
October 23, 2015	December 4, 2015

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

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

Working Group Reports (See below)

A. We had limited success using the join.me conferencing service provided by IEEE-SA.

B. New working groups

a. C0 created the new working group C20 working on databases based upon PSRC C23 providing files and C37.1 text on databases. During the meeting working group officers were filled by volunteers and the PAR title, scope, and purpose were edited for the PAR submittal.

b. C0 is working to create a new WG C18 to become joint with PSRC H23 Guide for Naming IEDs (COMDEV).

c. C0 is working to create a new WG C21 to become joint with PSRC H27 Standard file format for IED configuration Data (COMSET).

C. C0 is still supporting PSRC TF K15 Centralized substation protection and control

D. SG C01 is working on a recommendation on how to split C37.1 into separate C37.1.x standards, such as one for databases

C1 : IEEE 1686 Standard For Substation IED Cyber Security

Chair: S. Sciacca

Vice Chair: M. LaCroix

Secretary:

Output: Standard

Expected Completion Date: Done

Did not meet.

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:

Met to discuss a corrigenda to include "port powered devices" within the scope of the standard.

C2: IEEE 1613.1 Standard Environmental and Testing Requirements for Intelligent Electronic Devices Installed in Transmission and Distribution Facilities

Chair: J. Tengdin

Vice Chair: J. Ramie

Secretary:

Output: Standard Update

Expected Completion Date: TBD

Met to discuss the edits to the current draft:

- Clarify copyright issue with Erin the IEEE-SA liaison.
- Add explanation for the 6 GHz frequency testing.
- Add definition of intended use since IEEE dictionary has several and the text needs to indicate the proper definition desired by the WG. Should be ready to go to ballot in the near future.

C3: IEEE PC37.1 .1 Standard for Input and Output Requirements and Testing Methodology for Intelligent Electronic Devices (IEDs)

Chair: C. Preuss

Vice Chair:

Secretary: C. Bryant

Output: Standard

Reviewed work to develop requirements for the physical inputs and outputs of IEDs, focusing first on digital inputs/outputs, DC analog inputs/outputs, and AC analog inputs. The plan is to complete the draft via bi-weekly meetings and have working group approval to go to ballot before the May meeting. At that point if it looks like we can not meet the PAR schedule, we will request an extension.

C4: IEEE PC37.237 Time Tagging for Intelligent Electronic Devices (IEDs) – COMTAG

Joint with PSRC

Chair: M. LaCroix

Vice Chair:

Output: Standard

C4 met jointly with PSRC H3. See the PSRC report.

C5: IEEE PC37.2 Draft Standard for Electrical Power System Device Function Numbers and Contact Designation

Chair: M. Dood

Vice Chair: B. Ackerman

Output: Standard update

Established: 01/2015

Expected Completion Date: 12-31 -2018

PAR is approved and expires 12/31/2018. Reviewed history of work to date and accepted new working group members. Plans are to send out updated draft to working group members for review. The working group needs to request IEC 61850-5 for working group use in order to update the cross reference with IEC 61850.

Much discussion took place about merging unit as a new term. The proposal was to start by using

the definition in IEC 61850, which resulted in much discussion around copyright and function versus physical device.

C6 Standard for Serial SCADA Protection Protocol (SSPP) (P1711 .1)

Chair: D. Whitehead

Vice-Chair: A. Wright

Output: Standard

Established:

Expected Completion Date:

Reviewed the steps necessary to go to ballot:

1. The PAR needs to be updated to change the number
2. Delete the text from the standard about why protecting serial communications is important.
3. Submit a new PAR for the new 1711 sometime after the approval of the PAR revision in the first item, with the text deleted from the original 1711 as the start for the new text for the umbrella standard.

C7 IEEE 1588 Profile for Power System Applications

Chair: T. Tibbals

Vice Chair: M. Dood

Output: Standard update

Established: 2013

Expected Completion Date:

Subs C7 met jointly with PSRC H24. Please see PSRC report.

C8 IEEE 1615 Recommended Practice for Network Communications in Substations

Chair: Kevin Easley

Vice Chair:

Secretary:

Output: Standard

Established: 2011

Expected Completion Date: 12/2016

Reviewed present draft and what to include in it, including coordination with the output report of PSRC H12. Discussed the schedule to complete the work.

C9: IEEE 1646 IEEE Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation

Chair:

Vice Chair:

Output:

Established:

Expected Completion Date:

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: End of 2014

Met joint with PSRC H13. See PSRC report.

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

Reviewed present draft and discussed system maintenance concepts. The present clause 5 will be split to remove design related text and relocated to clause 6 on design, which does not have a lot of text.

C12: IEEE 1815 IEEE Standard for Electric Power Systems Communications Distributed Network Protocol (DNP3)
Chair: R. Farquharson
Vice Chair: A. West
Output: Study Group recommendation for PAR or not
Established: TBD
Expected Completion Date: TBD

1. Reviewed DNP3 technical committee work resulting in the study group recommending that a PAR be developed to revise IEEE 1815.

2. Reviewed the results of the EPRI demonstration project for secure authentication in DNP3. The EPRI report is available for free from the EPRI website as report 3002003736.

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
Chair:
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)
Chair: L. Smith
Vice Chair: R. Farquharson
Output: Standard
Established: 2010
Expected Completion Date: 2015

Continued work with finalizing the review of comments from ballot. Decided to use IEC 61850-7-3 as the only baseline document for mapping in 1815.1. PAR expires 12/2015, so a schedule was discussed on how to complete the work by then. Calls will be held to final all comment

responses so that a working group vote can soon take place on going to recirculation. Options on different scheduling approaches were discussed.

C15: PC2030.100 Recommended Practice for Implementing IEC 61 850 Substation Automation Systems

Chair: R. Liposchak

Vice Chair:

Output: Standard

Established: 2012

Expected Completion Date: 12/2016

Reviewed the present status of the draft and discussed schedule to complete work before PAR expires.

C16: PC2030.102.1 Interoperability of IPSEC Utilized within Utility Control Systems

Chair: Vacant

Vice Chair: B. Smith

Output: Standard

Established: 2013

Expected Completion Date: 2015

PAR was revised to align with the present draft and is on the January NesCom agenda. Reviewed remaining outstanding working group comments on the draft.

C17: P1711.2 Standard for Secure SCADA Communications Protocol (SSCP)

Chair: M. Hadley

Vice Chair:

Output: Standard

Established: 2013

Expected Completion Date: 2014

The WG reviewed the harmonization effort with P1711.1. Decided to use octet and not byte. Discussed SHA-1. Revisited compliance testing, what tools are presently available and how the testing plan might be developed after the standard is published.

C18: PC37.248 Common Format for Naming Intelligent Electronic Devices (COMDEV)

joint with PSRC H23

Chair:

Vice Chair:

Output: Standard

Established: 2015

Expected Completion Date: 2016

New, did not meet. C0 meeting later today will get effort underway.

C19: Security for Protection and Automation Related Data Files

Chair: D. Holstein

Vice Chair:

Output: Standard

Established: 2014

Expected Completion Date: TBD

Met joint with PSRC H22. See PSRC report.

C20: PC37.1.2 Databases Associated with Substation Automation Systems

Chair:

Vice Chair:

Output: Standard

Established: 2015

Expected Completion Date: TBD

Working group just forming in Substations Committee as a result of PSRC C23 outreach and SUBS Study Group C1 recommending the split of databases out from C37.1. A draft of the standard was reviewed, including the title, scope and purpose for the PAR.

**C21: PC37.248 Common Format for Naming Intelligent Electronic Devices (COMDEV)
joint with PSRC H27**

Chair:

Vice Chair:

Output: Standard

Established: 2015

Expected Completion Date: 2016

New, did not meet. C0 meeting later today will get effort underway.

G. NERC Report - Bob Cummings

1. System Protection and Control Subcommittee (SPCS) Activities

No report

2. Protection-Related Standards Activities

- a. Protection System Maintenance and Testing: The NERC Board of Trustees adopted PRC-005-4 on November 13, 2014.
- b. System Protection Coordination: An informal comment period for PRC-027-1 concluded on October 21. Nominations are being solicited for a separate Standard Drafting Team that will address Phase 2 of the System Protection Coordination project through January 20.
- c. Disturbance Monitoring: The draft standard uses a results-based approach to establish requirements for Dynamic Disturbance Recording (DDR), Fault Recording (FR), and Sequence of Events Recording (SOER). The NERC Board of Trustees adopted PRC-002-2 on November 13, 2014.
- d. Protection System Response to Power Swings: This project responds to a FERC directive in Order No. 733 that NERC establish a standard addressing protection system response to stable power swings. The NERC Board of Trustees adopted PRC-026-1 on December 17, 2014.
- e. Special Protection Systems: This project will revise the definition of Special Protection System (SPS)/Remedial Action Scheme (RAS) and revise several SPS-related Reliability Standards. The *Revised Definition of Remedial Action Scheme* was adopted by the NERC Board of Trustees November 13, 2014 and is pending regulatory approval.
- f. Undervoltage Load Shedding: This project consolidates four existing standards into one revised standard, PRC-010-1 and proposes a new defined term, Undervoltage Load Shedding Program (UVLS Program). The drafting team is coordinating with the Protection System Misoperations and SPS drafting teams. The NERC Board of Trustees adopted PRC-010-1 on November 13, 2014.
- g. Underfrequency Load Shedding: This project addresses a FERC directive to make explicit that the Planning Coordinator must establish a schedule when UFLS program changes are required, and will assess whether any other changes are necessary. The NERC Board of Trustees adopted PRC-006-2 on November 13, 2014.
- h. Standards Applicability for Dispersed Power Producing Resources: This project has been initiated in response to a stakeholder-submitted (Standards Authorization Request (SAR) to review applicability of NERC Reliability Standards to dispersed power producing resources. The

drafting team has posted a white paper to inform industry of proposed applicability changes and revised three high-priority standards. An informal comment period for this white paper is open through January 20. The high priority standards include PRC-004 and PRC-005. The NERC Board of Trustees adopted PRC-004-2.1(i)a, PRC-004-4, PRC-005-2(i), and PRC-005-3(i) November 13, 2014. PRC-005-5 is posted for a 45-day formal comment period and 10-day initial ballot period through January 22. This version is posted for an initial comment and ballot period because changes previously commented on were superseded by non-DGR standard drafting projects that made substantive changes to PRC-005. The version posted for comment includes all substantive changes recently approved by the Board of Trustees. PRC-001-1.1(ii), PRC-019-2, and PRC-024-2 are open for a 10-day final ballot period through January 22.

V. ADVISORY COMMITTEE REPORTS

Chair: Mike McDonald
Vice Chair: Pratap Mysore

B1: Awards and Technical Paper Recognition

Chair: Hugo Monterrubio
Vice Chair: Solveig Ward

The B1 Working Group met on Jan 13th, 2015 in Garden Grove, CA with 7 of its 7 members. The group didn't meet in September so there were no minutes to review or approve. Hugo Monterrubio began his service as Chairman for the B1 WG. The following items were discussed during the meeting:

- The WG did a review of scope and internal procedures for the B1 working group. As part of this review the group would like to propose making the group Vice-Chair a permanent position like the Chair position, nominating and selecting a candidate from outside the group. This will help ensure future continuity and long term operation of the B1 WG. The group would like to request the PSRC officers to comment and approve this change in the operating procedure.
- The group also discussed and requesting a change to the WG meeting time to allow for the group to meet and have the Chair be able to report and participates in the ADCOM meetings. Upon consultation with PSRC officers it was recommended and accepted that moving forward the group will meet Monday at 3:00 PM in a meeting to run parallel to the PSRC SC Chair Coordination Meeting.
- Candidates for PES and PSRC WG Recognition Awards and Prize Papers were reviewed and nominations were selected. Nominations will be submitted to the IEEE PES before the deadline (1/15/15) and the awards will be announced in the May main committee meeting.
- The group agreed to resubmit the nomination of Vahid Madani for the IEEE Daniel E. Noble award for emerging technologies. In 2014 the endorsers were Damir Novosel, Mark Adamiak and Solveig Ward. The B1 Chair will discuss with Damir the possibility to get two more endorsers to increase the possibility of success in 2015.
- From the WG May 2014 meeting minutes all requests for certificates and awards presented should be up to date to May 2014. The group will work to identify and document any additional completed and disbanded WG's for 2014 as well as any missed awards since May 2014. The corresponding awards and certificates will be delivered during our next meeting in San Antonio.

With no additional business to discuss the meeting was adjourned.

The following awards were presented at the Main Committee meeting on January 15, 2015:

IEEE PES Technical Committee – PSRC Distinguished Individual Service Award
Roger Hedding - For Distinguished Service to the Power System Relaying Committee – 2014

IEEE PES Joint Technical Committee – Distinguished Individual Service Award

Charlie Henville - For Distinguished Services to the Joint Technical Committee

IEEE-SA Standards Medallion Award

On December 7 during the 2014 IEEE-SA Awards ceremony Phil Winston and Ken Martin were awarded the IEEE-SA Silver Medallion Award.

Phil Winston - For major contributions to the development of standards

Ken Martin - For major contributions to the development of standards

<http://standards.ieee.org/news/2014/awards.html#sthash.Q83DStBZ.dpuf>

(Announcement)

On December 7 during the 2014 IEEE-SA Awards ceremony Phil Winston and Ken Martin were awarded the IEEE-SA Silver Medallion Award for major contributions to the development of standards. [Hhttp://standards.ieee.org/news/2014/awards.html#sthash.Q83DStBZ.dpuf](http://standards.ieee.org/news/2014/awards.html#sthash.Q83DStBZ.dpuf)

PSRC Bronze Service Award

Amir Makki – For 15 years of service and contributions to the PSRC

PSRC Bronze Service Award

Arvind A.K.S. Chaudhary – For 15 years of service and contributions to the PSRC

PSRC Silver Service Award

Gabriel Benmouyal – For 25 years of service and contributions to the PSRC

B2: Fellows Awards

Chair: C. Henville

IEEE Fellows

Charlie Henville announced that two PSRC members have been elevated to IEEE Fellows.

IEEE announcement: http://www.ieee.org/2015_updated_fellows.pdf

Yi Hu - for leadership in wide-area synchronized measurement systems

Jerry Jodice - for contributions to the testing of protective relays

B3, Membership Activity Report

Chair: M. Swanson

Assignment: Assist in searching for new attendees, Requesting support from attendees' employers.

Attendance during the Milwaukee meeting was 216, which is considered a healthy number for us.

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

No management support letters were written. As a further note, if any attendee needs stronger management support for PSRC participation, we encourage them to let us know.

B4: O & P Manual and WG Training

Chair: M.Sanders: O&P Manual:

Did not meet.

Chair: R Hunt: WG Training:

No report

B8: Long Range Planning

Chair: Bob Pettigrew

No report.

B9: PSRC Web Site
Chair: Russ Patterson
No report.

VI. Items from the Main Committee meeting:

No Items to report

VII. SUBCOMMITTEE REPORTS

C. SYSTEM PROTECTION SUBCOMMITTEE

Chair: J. O'Brien
Vice-Chair: G. Henneberg

Systems Protection Subcommittee Scope

Evaluate protection system responses to abnormal power system states. Evaluate and report on special protection schemes, remedial actions schemes, monitoring and control systems and their performance during abnormal power system conditions. Recommend corrective strategies and develop appropriate standards, guides, or special publications. Evaluate and report on new technologies which may have a bearing on protection system performance during abnormal power system conditions.

Meeting Minutes

The Systems Protection Subcommittee of the PSRC met January 14 in Garden Grove, California in conjunction with the PES JCTM. The participants introduced themselves. A quorum was achieved and the September 2014 minutes were approved.

Advisory Committee Items of Interest

Timely submittal of WG minutes is important to be able to assemble both the subcommittee and main committee meeting minutes. Most WG chairs already deliver the reports from their computers during these subcommittee meetings. Jim requested that WG chairs submit their minutes by Wednesday, January 21 to both himself and Gene Henneberg.

Working Group Reports

The minutes of the Working Groups are attached.

The C4 Working Group has completed its work and the subcommittee voted to disband it. The WG did not meet at the January 2015 PSRC meeting, so there are no WG minutes.

The C5 Working Group has completed its work and the subcommittee voted to disband it. The WG's final meeting minutes are part of this report.

The subcommittee approved the assignment of WG C-25:

C25: Protection of Wind Electric Plants

Assignment: Write a report to provide guidance on relay protection and coordination at wind electric plants. This report will cover protection of generator step up transformers, collector system feeders, grounding transformers, collector buses, reactors, capacitors, main station transformers, tie lines and points of interconnection, and associated arc flash issues. Although the report will address coordination with wind turbine generator protective devices and static var sources, the protection of the wind turbine generators and static var sources will not be included.

New Business

The C37.242, IEEE Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units was completed in 2013 and the responsible WG was disbanded at this January 2015 meeting. However,

the technology in this field is advancing rapidly and the section on testing seems to be dated. After a substantial discussion, the subcommittee voted to form a new task force (CTF-28) to determine whether to update the relevant section of the Guide. CTF-28 will meet at the May 2015 meeting in San Antonio, TX.

C-2: Role of Protective Relays in the Smart Grid

Detailed Minutes 1/14/15

13 Members and 11 Guests

Chair: Alex Apostolov

Vice chair: Roy Moxley

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.

Document comments and assignments made as follows:

- Jay Anderson will highlight and suggest changes to all “unsubstantiated and subjective” comments.
- Alex Apostolov will closely examine section 10 for commercialism, fix and clarify figure 23, and address “organizational challenges” and “stakeholders” suggestion for the final section.
- Catherine Dalton will remove “shall, should, and must” statements, check and properly use acronyms, and work with Paul Myrda to create an index.
- Roy Moxley will remove the “scheme” from “programmable scheme logic”, combine synchrophasor sections, combine figures 9 and 16 sections if appropriate and work on style and format edits.
- Paul Myrda will combine sections 13 and 14 and work with Catherine Dalton on the Table of Contents,
- Vijay Shanmugasundaram will remove pictures of actual products from figures.

A room for 30 with projector was requested for the next meeting with the objective of approving the final document for re-submission to the subcommittee.

C5: IEEE PC37.242 - Minutes, Jan 13, 2015, 9:30-10:45 AM, Garden Grove, CA

WG Chair: Farnoosh Rahmatian

WG Vice-Chair: Paul Myrda

Output: Guide

Established: May 2010, Completion of the Guide: March 6, 2013

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)

Notes:

The Working Group met on Jan 13, 2015 in a single session. The session was chaired by Farnoosh Rahmatian. There were participation from 11 members and 9 guests. We had quorum.

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

All participants introduced themselves.

The minutes of the January, May, and September 2014 meetings were approved (motioned by Ken Martin, seconded by Sakis Meliopoulos).

The topic of the need for a transaction/conference paper was discussed. After a short review and discussion of the need and intent of a summary paper, the attendees decided that there is no need for further publications or papers. It was moved and approved to not pursue writing any papers on C37.242 by the WG.

The work of the WG is considered complete. It was moved and seconded and all approved to ask the C Subcommittee to disband WG C5 as its work is concluded.

The meeting adjourned at 10:40 AM.

Respectfully submitted,

Farnoosh Rahmatian and Paul Myrda, Chair/Vice-Chair

C-17: Joint Working Group: Fault Current Contributions from Wind Plants

Transmission and Distribution Committee (T&DC): Reigh Walling, Chair
Electric Machinery Committee (EMC): Ron Harley, Chair
Power System Relaying Committee (PSRC): Dean Miller, Chair
Gene Henneberg, Vice Chair

Established: 2008

Output: Report Completion date: 2013 Final Report

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.

Dean Miller chaired the session.

The Joint Working Group met in Garden Grove, CA on Tuesday, January 13, 2015 with 8 members and 8 guests. Introductions were made and the assignment for the working group was presented. Minutes from the September JWG meeting were discussed.

The report is posted on the PSRC website. The tutorial was presented on Monday, morning January 12. It was well received. The same tutorial is scheduled to be presented at the PES General meeting in July in Denver. We had a brief discussion on possible changes to the tutorial.

The following Relay Conference presentations are also scheduled: Marion Cooper at Georgia Tech and Raphael Garcia at Texas A&M.

Alex Apostolov noted that he is scheduling an article in the PAC World magazine March issue base on the JWG report. Dustin Howard volunteered to help prepare this article.

Alex also noted that he would like to have a presentation based on the report at the PAC Work conference in Raleigh, NC in September. Alex will be preparing the presentation from the tutorial presentation files.

Mr. Miller reminded the group that later during this PSRC meeting working groups for C-24 on modeling of wind turbines in commercial fault calculation programs and C-25 on protection of wind plants will be meeting.

The C-17 WG will not meet at the May 2015 PSRC meeting. The joint work group will meet at the PES general meeting in July in Denver. It is yet to be determined whether the JWG will meet at the September PSRC meeting. The assignment for the C-17 WG is substantially completed, but we will postpone the decision to disband the WG until after the July PES meeting.

Respectfully submitted,
Gene Henneberg

C18: Transmission to Generation Interconnection Protection Considerations

Chair: Alla Deronja (aderonja@atcllc.com)
Vice Chair: Keith Houser (keith.houser@dom.com)
Output: IEEE Guide PC37.246
Established: September 2011
Expected Completion Date: December 2017

Write an IEEE Guide for Protection Systems of Transmission to Generation Interconnections.

Scope:

This Guide documents accepted protection practices for transmission to generation interconnections. It is intended to cover the protection system applications at the interconnections between transmission systems and generation facilities greater than 10 MVA. This Guide does not cover distributed energy resources.

Purpose:

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

Working group C18 met January 14, 2015, with 12 voting members, 2 corresponding members, and 5 guests present. 1 guest joined the WG as a corresponding member. The quorum was reached, and the September 2014 meeting minutes were voted on and approved.

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

The chair reviewed the sign-in/access procedure and layout of Central Desktop and illustrated the various sections within Central Desktop.

The status of the latest writing assignments was reviewed. All of the previously assigned writing assignments were received.

The Section 4 review sub-teams have completed their review assignments and provided comments back to the chair.

The WG will begin webcast meetings in 2015, with at least two of them initially planned to occur before the May 2015 meeting. The goal is to resolve the comments for Section 4. Thursday was suggested as the day of the week for the web-sessions. The WG chair will set up the first web-session on a Thursday in mid-February. The comment form was suggested as the means for receiving all comment/feedback on the guide.

Sections 5 and 6 were assigned to sub-teams for review.

The review sub-teams were for Section 5:

Mike Jensen [Lead] (mxj3@pge.com)
Nathan Gulczynski (ngulczynski@atcllc.com)
Jeff Barsch (jabarsch@aep.com)

The review sub-teams were for Section 6:

Keith Houser [Lead] (keith.houser@dom.com)

Jerry Johnson (geraldjohnson@basler.com).
Dominic Fontana (fontadg@nu.com)
Ian Tualla (ian.tualla@duke-energy.com)

The Working Group proceeded to review the latest Guide's draft 3.0.

Comments on the current draft were then reviewed.

In clause 4.1, Mike Jensen raised the question about the statement of a generator interconnection study being performed to determine how much generation is needed. From the California perspective, the issue is not how much generation is needed, but where the developer wants to build it. Also, there are renewable energy generation mandates as well. The thought is that as the renewable movement continues through other states, it will likely be similar. Mike will propose a solution to his concern.

Another comment was about the point of demarcation between the generator owned facilities and transmission system. Mike Jensen explained that there must be a definite point of demarcation between Generation Owner (GO) and Transmission Owner (TO) and it is to be negotiated between them. This was agreed upon by the WG members.

In the title of sub-clause 4.2.1.1.2., word "requirements" will be changed to "considerations".

There is no bus differential relay, 87B, which can be present at a switchyard installed after the interconnection intertie line and belonging to GO, in any of our figures for typical interconnection configurations. This bus protection would operate for faults in the generation facility and, thus, disconnect it from the interconnection. Mike Jensen will update one of figures 3, 4, or 5 to include the 87B.

The figures will be reviewed (Mike Jensen) for consistency with existing IEEE standards to assure ANSI designations are used correctly and consistently.

A note will be added to clarify that when coordinating a 21 and 51-V; the engineer should verify that proper/adequate coordination margins are maintained.

The Review Teams are to complete their review, consolidate the comments, and submit comments/recommended changes to Chair (aderonja@atcllc.com) by April 15, 2015.

Chapter 7 review will be assigned during next meeting. Please consider volunteering to review these chapters if you have not contributed to the writing of some/any of these sections.

Requirements for the next meeting: single session, meeting room for 25-30 people with a computer projector.

C19: Standard for Phasor Data Concentrators for Power Systems

Chair: Vasudev Gharpure

Vice-chair: Mital Kanabar

Assignment:

Develop a standard for Phasor Data Concentrators for power systems.

Attendees: 19 (10 members, 4 corresponding members and 5 guests attended the meeting. A copy of the signup sheet is appended {not part of C subcommittee minutes}). Three new working group members one new corresponding member have signed up. The WG now comprises 13 members.

- Patent/IP slides were shown.
- Introductions were performed.
- There was quorum. However, previous meeting minutes had already been approved electronically.
- WG C19 PAR, Assignment, Purpose, and Scope were presented
- The WG's task status was presented.
 - o The project duration and the web meeting / teleconference frequency and schedule.

- o The WG started with the functions in the PDC Guide. The WG has taken the approach that the essential data transfer / validation type functions are to be included in the standard. Application dependent data processing functions and system / site dependent functions are to be excluded.
- o Most of the functions in the Guide, currently not supported by the standards (IEEE C37.118.2-2011 and IEC/TR 61850 (90-5)), are also to be excluded.
- Function Update: The status of some of the functions has undergone a change since the last meeting. These were described.
 - o Format and coordinate conversion – conversion to floating point / polar coordinates to be included as mandatory. No other conversion will be “required”. This is the preferred format for most of the applications, and the industry is moving in this direction for use of synchrophasor data.
 - o Data Latency Calculation – This function was originally excluded from the standard, as being an advanced function. However, there has been a strong representation to include this function, since a PDC may be the only spot in the system that will allow this measurement. This will permit users to detect transmission delays for diagnosis, and allow them to set wait times correctly. This function is yet to be considered by the working group.
 - o Phase adjustment – Magnitude adjustment was removed. Only phase adjustment is a required function, to facilitate differences in phase nominations for the same phase in different systems, or for phase rotations associated with symmetrical components. This adjustment is not intended to be used for minute phase adjustments such as may be required due to calibration errors.
 - o Performance monitoring – This function was originally intended to be included together with the performance requirements section. This was an error, and will be corrected. A function description for this function will be included.
 - o Data retransmission requests – these are not currently supported by the 118 standards, although these were deemed to be necessary. This function can be implemented using user defined command codes, and will be included as an informative annex. This could become the standard at the next update, depending on how it gets used.
 - o Cyber Security – The original decision was to exclude this function, since it deemed to be a system level function. There were representations to include access control functions at the least, and these will be included in the standard. It was mentioned that some cyber security must be met as a NERC / CIP requirements. The WG has taken the approach that these are not a part of the synchrophasor related functions defined in this standard, and must be met as outside requirements (such as environmental).
 - o It was emphasized that advanced functions in the Guide, not deemed essential, and thus not included in the standard, are not forbidden. Vendors can implement them and claim a better PDC.
- Status of Performance Requirements section was presented.
 - o PDC latency, Robustness and Processing requirements were to be included in the standard.
 - o Reliability, Availability and Environmental requirements were to be excluded. These are considered to be system / site / application specific, and are expected to be specified and met independent of this standard.
- Processing Delay
 - o During the discussion on PDC Latency, it was explained that the term does not include the wait time. It was evident that the word “Latency” used here may cause some confusion, and should be changed to “Processing Delay”. This is the delay in the PDC after all the data to be assembled has reached the PDC.
 - o A question was put before the meeting – whether the standard should specify absolute time delay requirements, or simply require a manufacturer to specify the delay, and that tests be performed in accordance.
 - o The meeting suggested “Classes” of delays, such as 2 ms, 4/5 ms, 10 ms etc, and let the manufacturer specify the class it meets.
 - o It was also suggested that the tests be carried out with the PDC loaded to its maximum input and output data capacity specified by the manufacturer.
 - o Another possibility suggested was a percentage (such as 10%) of the transmission duration. However, a transmission rate of 1 Hz would allow the PDC a delay of 100 ms, which did not make sense. This may also cause a difficulty for higher data rates such as 240 Hz. This would require a 416 microsecond delay, which may be difficult to achieve. A possibility may be a minimum and a maximum delay limit, and a percentage of the transmission delay in between. An example may be (1 ms minimum, 10 ms maximum, 10% of transmission delay in between).
- Robustness
 - o The approach adapted for robustness was explained. Primarily, it is the ability of the PDC to recover communications after adverse conditions. It should not require human intervention to resume communications after an interruption.

- o After a discussion, the following broad requirements were identified
 - The PDC should resume communications after a reboot / restart
 - The PDC may cease communications during a disturbance. The cessation may be intermittent or continuous. The communications must resume after the disturbance stops.
 - The PDC should raise an alarm when a disturbance is noticed.
 - A recovery time duration may be specified.
 - What happens if the device reboots? Would the recovery duration include reboot time? Could the standard require that the device not reboot for the specified test duration?
- o Possible Disturbance definition(s)
 - To permit consistent testing, disturbance conditions should be defined in the standard. The WG should solicit realistic examples from users.
 - These cannot be limited by the capacity of the communications channel used, but be defined in terms of the function / device capacity claimed by the manufacturer.
 - Data bursts – if the data is held up in a blocked channel, and all the data arrives in quick succession at the PDC
 - Too much incoming data – valid data, intended for other PDCs, due to an error in output settings of other device(s).
 - Data arriving too early? (Data arriving too late would be rejected due to wait time expiry).
 - Data with bad time stamps? Are there any test systems that can perform these tests?
 - Non-synchrophasor data – other Ethernet traffic?
 - Network disruptions – a pulled Ethernet cable, a power cycle on a switch / router
 - Time source errors – there were no clear examples of these, and may be excluded unless some realistic examples are found.
- o The data quality error bits (14/15 etc.) handling does not belong in the robustness section, and should be handled elsewhere.
- Processing accuracy
 - o The computations needed are for format conversion to floating / polar, and for phase angle adjustments.
 - o The errors are dependent on the quality of math libraries used for the conversion.
 - o A requirement of 0.01% seems reasonable / achievable to impose on all devices.
 - o These should be assessed at nominal conditions.
- Other business
 - o A suggestion was made, as described below.
 - o Long term loss of a PMU results in the PDC waiting the full wait time for each data transmission. This is unnecessary. A PDC could detect a missing PMU and remove it from the outgoing stream. This will reduce the overall latency for the PMUs that remain in service.
 - o A discussion followed. The following points were made.
 - This could not be a “one strike and you’re out” situation. There must be a setting for when / how long should a PDC should allow a PMU to be OFF before dropping it.
 - There must be a recovery mechanism. It could not be a “one non-strike and you are in” situation.
 - The WG will consider this suggestion during subsequent deliberations

C20: Impact of VSC HVdc Transmission on AC Protective Relaying

WG Chair: Joe Mooney

Vice Chair: Ian Tualla

Output: PSRC Report

Expected Completion Date: May 2016

Working Group Scope: Develop a report to the PSRC describing Voltage Source Converter (VSC) HVdc systems and the impact on local AC system protection.

The Working Group met with 28 attendees; 10 members and 18 guests.

WG chair discussed last meeting & presentation by Dr. Brian Johnson. WG chair also discussed a slight change to the Scope which the WG members had no objections to the revision. The title of the working report is:

“Impact of Voltage Source Converter (VSC) HVdc Systems on AC System Protection”

The WG discussed the report outline and made writing assignments. The chair recommended moving the completion date out one year. The WG agreed to this time frame.

Report Outline and Assignments

1. Introduction to HVdc Technology – Joe M.
2. Reasons for using HVdc – Keith H.
3. VSC Description/Technology – Brian J./Harold K.
 - a. Converter Technology
 - b. Harmonics and Filtering
 - c. Control systems, start-up and shut-down
 - d. HVdc response to AC system faults
 - e. AC system response DC faults
3. AC System Protection -
 - a. Converter Terminal AC Protection (converter transformer, bus, filter banks) - ??
 - b. AC line protection (overcurrent, distance, differential) – Normann F.
 - c. Communications related to line protection - ??
4. Field Experience – Tapan M.
5. Communication between HVdc and AC systems - ??

WG also discussed a US utility that has recently put in service a back-to-back VSC HVdc system. The US utility had issues with damage the Power Line Carrier equipment and will try to provide data to the WG.

Next meeting: one session, 30 attendees, computer projector.

C-21: Guide for Engineering, Implementation and Management of System Integrity Protection Schemes (PC37.250)

Chair: Yi Hu
Vice Chair: Gene Henneberg
Assignment: Develop An IEEE Guide for Engineering, Implementation, and Management of System Integrity Protection Schemes
Established: September 2013
Completion: December 2018

SCOPE: This document provides guidance for engineering and management of System Integrity Protection Schemes (SIPS). General concepts for architecture and communication design to achieve functionality and performance requirements are addressed. The document also addresses principles for commissioning processes and strategies for life cycle management.

Working group C21 met on Tuesday, January 13, 2015 in Garden Grove, California in single session chaired by Yi Hu and Gene Henneberg with 13 members and 2 guests attending. Four of these members joined at this meeting, including one new corresponding member. The meeting was started by introductions and display IEEE Patent Policy slides to inform all attendees and the WG of any known potential patent issues (none identified).

The September 2014 meeting minutes have been approved electronically, and no further questions were raised from the meeting attendees. WG Chair Yi Hu reviewed the status of the writing assignments for the Guide. A couple of writing assignments were provided last week and have been incorporated in the most recent draft 0.06, which was distributed electronically to WG members on Sunday, January 10.

Both Yi and Gene led a discussion of the project schedule. The PAR will expire at the end of 2018. After discussion with knowledgeable people, we expect to need a minimum of one year to complete the IEEE balloting process. There may be several rounds of ballots and comments; all comments will need responses. We need approval from the Working Group, C Subcommittee, and should obtain approval from the main committee of PSRC before beginning the IEEE balloting process. Therefore we are targeting WG approval by the January 2017 meeting. We expect to use double sessions, beginning at the May 2015 meeting.

The anticipated editing process was discussed. Yi and Gene expect to act as the primary editors. Assuming satisfactory technical content, the main objects of the editing process will be to make sure that the Guide uses standard American English and reads in the writing style of a single author, rather than multiple authors. Authors should use the IEEE Style Guide to the extent possible. Yi and Gene anticipate beginning the review/editing process in time to have some results for the May 2015 meeting using the normal PSRC commenting format, with the initial comments provided by them. Eric Allen also volunteered as part of the editing team.

Yi reviewed the present draft for sections which still need authors, resulting in the following volunteers and sections:

- 5.1.3 – Tony Johnson
- 5.2.7 – Tony Johnson
- 6.1 – Gene Henneberg
- 7.1 – Gene Henneberg, Tony Johnson
- 7.2 – Gene Henneberg

WG Chairs will send the January 2015 meeting minutes to WG members for electronic approval.

Requirements for next meeting: Room for 30, double session and projector.

C23: Coordination of Synchrophasor Related Activities

Garden Grove, CA, January 13, 2015

Chair: Anthony Johnson (anthony.johnson@sce.com)

Vice Chair: Allen Goldstein

Assignment:

The ongoing task force provides three main functions:

- Liason with NASPI (North American Synchrophasor Initiative) (specifically the PRSVTT (Performance Requirements, Standards and Verification Task Team)) to keep the PSRC in sync with the changes and needs in the industry with respect to the development and usage of PMU devices. Formalize transfer process of PRSVTT developed documents to PES PSRC including making recommendations which PRSVTT activities should be transferred to IEEE reports, guides and standards.
- Make recommendations to PSRC for assignments that would require the creation of working groups in PSRC and also recommend what the output of those working groups might be (Guides, reports, etc.) based on the needs of the industry.
- Coordinate related activities with other IEEE PES committees.

Meeting Agenda

1. Introductions
2. Approved of the September 2014 meeting minutes
3. NASPI Update
 - a. Next Meeting will be on March 23-25 in Burlingame CA Focus will be research.
4. IEEE Workgroup Activity

	Title	Status
C19	Standard for Phasor Data Concentrators (PDC) for Power Systems	In Progress
H11	Revision of C37.118 Synchrophasor Standard Joint with IEC	In Progress
H21	Development of standard Mapping between C37.118 and IEC61850-90-5	In Progress

5. Discussion on Data Archival
 - a. New Substation work group C20 - Recommended Practice for Databases used in SAS, Wed., Jan 14

6. SCASC C37.118.1 Conformance Assessment has been completed, published and available for purchase.

Dear All,

The IEEE-SA issued a press release this morning announcing the availability of the Synchrophasor Test Suite Specification (TSS). Congratulations to all members of the Synchrophasor Conformity Assessment Steering Committee (SCASC) on this pioneering effort. You can view the full press release by clicking the link below.

<http://shar.es/1bX7HG>

7. Other updates
 - a. We need to inform NASPI that it is only possible to post document links.
8. Future work
 - a. Future work: IEEE SCSAC is investigating the possibility of C37.118.2-2011 (PMU data transmission protocol) conformance testing. There will be an open call for members.
 - b. Future work: Guide/Report of PMUs in Multifunction Devices
 - c. Future work: Recommendation to study the revision of C37.242. A task force will be formed at the May PSRC meeting. Allen intends to propose that section on testing be replaced with some of the text from the NASPI report of Task Force on Testing and Certification, Oct 2013.
9. Adjourn

Requirements for next meeting: Single Session, Meeting room for 25 people with a computer projector. 10 Members and 10 Guests

C-24: Modification of Commercial Fault Calculation Programs for Wind Turbine Generator

Minutes January 13, 2015, Tuesday, 3–4:15 pm, 4:30–5:45 pm.
Royal D room, Hyatt Regency Orange County, Garden Grove, CA.

Assignment: 1) To survey WTG manufacturers to determine what parameters they could provide that could be used by steady state short circuit program developers in various time frames. 2) Use the result of this survey to prepare a report that can be used by steady state program developers to refine their models.

WG C24 met in back to back sessions on Tuesday from 3 – 4:15 pm, and 4:30 – 5:45 pm with 10 members and 14 guests. George Bartok cannot continue as vice chair; Evangelos Farantatos of EPRI is the new vice chair.

Following presentations were made:

Session 1:

1. “Phasor Domain Modeling of Converter Interfaced Renewables for Protection Studies”, by Dr. Evangelos Farantatos, EPRI.
2. “Short--Circuit Behavior of Type III and Type IV Wind Turbine Generators”, by Mr. Reigh Walling, Walling Energy Systems Consulting.

Session 2:

1. “Simulating Wind and Solar Plants in a Short Circuit Program”, by Dr. Sherman Chan, ASPEN.
2. “Modeling Wind Generation for Fault Analysis in CAPE”, by Dr. Sandro Aquiles--- Perez, Electrocon.

The presentations helped the attendees learn about the work EPRI is carrying out on the short circuit modeling of wind farms. The software developers did indicate a need for more information and data to refine and validate their models. Despite the control dependency of the short circuit response of Type III and Type IV WTGs, at this point there is optimism that reasonably accurate generic models for protection requirement and breaker selection can be developed.

For the next meeting in May 2015, we need a room with capacity of 30 and a computer projector. Please avoid conflict with WG C25.

C-25: Protection of Wind Electric Plants

Chair: Martin Best

Vice Chair: Keith Houser

Assignment: Write a report to provide guidance on relay protection and coordination at wind electric plants. This report will cover protection of generator step up transformers, collector system feeders, grounding transformers, collector buses, reactors, capacitors, main station transformers, tie lines and points of interconnection, and associated arc flash issues. Although the report will address coordination with wind turbine generator protective devices and static var sources, the protection of the wind turbine generators and static var sources will not be included.

Working Group C25 met on January 14, 2015 with 13 members and 6 guests.

After introductions, the WG approved the CTF25 Meeting Minutes from the September 2014 meeting in Milwaukee.

The WG began by identifying specific topics to be included in the report. Topics including wind energy plant sizes, voltage levels, number of wind turbine generators on the collector system, and types of equipment to be considered for relay protection were discussed. The WG decided to include the topic of coordination with wind turbine generator and static var protective devices in the report, but not the protection of the wind turbine generators and static var sources themselves.

The WG revised the Assignment statement based on the group's discussion and approved it for submittal to the System Protection C Subcommittee. (Working Group C25 received Assignment approval from the C Subcommittee later the same day.)

The next step for the C25 WG is to draft an outline of the report for discussion at the May meeting in San Antonio. The draft outline will be circulated among WG members to obtain their input before presentation at the May meeting. It is anticipated that some writing assignments can be made at the May meeting.

The group requests a meeting room for 25 at the May meeting with a computer projector. It is requested that the meeting time for C25 avoid conflicts with the meeting times for the C18 and C24 working groups, if possible.

Submitted 1-14-15,

Raluca Lascu and Martin Best

CTF-26: Revision of C37.233, IEEE Guide for Power System Protection Testing

Chair: Gene Henneberg

Established: January 2015

Completion: TBD

Assignment: TBD

The CTF26 Task force met in Garden Grove, CA on Tuesday, January 13. This was the initial TF meeting and attended by 12 people who signed up as members plus 8 guests.

After introductions and the IEEE PATENT slides, Gene Henneberg took notes.

The correct description of this standards process is revision and re-balloting, rather than re-affirmation.

The existing C237.233, IEEE Guide for Power System Protection Testing was approved in 2009. It will be withdrawn unless revised (as needed) and approved through the normal IEEE standards process prior to the end

of 2019. If necessary a PAR can be extended. But if the Guide has not been approved by the expiration date, it would be withdrawn pending completion of the scope of the PAR.

The purpose of the CTF-26 is to explore the interest in carrying the Guide through the development and approval process. With sufficient interest, the task force would be converted to a Working Group to accomplish this task.

An attendee noted that, while the Guide does cover a lot of ground, the scope of the subject is so wide that not much detail is provided in any single area and noted that a discussion of the existing scope could be helpful.

C37.233 SCOPE

This guide covers suggested test requirements for power system protection scheme testing, system application tests, the scope and level of tests based on the application, and benefits of the overall protective schemes testing. This guide encompasses overall system testing procedures (generators, line, line reactors, transformer, capacitors, special protection schemes, end-to-end testing, distributed application within substation, etc.) and data collection requirements, as well as the test procedure definitions. This guide describes the methods, extent, and types of system tests for protection applications at various voltage levels. Control functions inherent to the protective systems are included. Importance of line testing, indirect trip applications, open/closed-loop tests, and dynamic/nonlinear tests are also covered.

It was noted that the Guide's intent was to provide an overview of protection scheme testing, rather than a detailed manual of how to perform testing for individual relays, functions, or equipment.

It was suggested that several volunteers would review individual, assigned sections of the Guide and report back to the TF at the May PRSC meeting. The following individuals volunteered to review the indicated sections"

Phil Winston	Sections 1-4, pages 1-26
Gordie Halt	Section 6.1 – 6.4, pages 31-56
Sunghoo Kim	Section 6.5-6.10, pages 56-70
Raphael Garcia	Sections 7-8, pages 74-89
Kevin Donahoe	Section 9, pages 90-96
Luis Polanco and Craig Bryant	Annex B-E, pages 100-112

The Task Force will meet at the May 2015 meeting in San Antonio, TX. We will need a room for 25 with a computer projector.

CTF27: Status of C37.117 Guide for Abnormal Frequency Load Shedding

TF Chair: Joe Mooney

Vice Chair: NA

Output: NA

Expected Completion Date: NA

The task force met with 7 attendees.

After introductions Joe Mooney provided some background the status of C37.117. The guide expires in 2018. This Task Force is to determine what action to take concerning the future of the guide. There are three options:

1. Let the guide expire.
2. Renew the guide. This requires opening a PAR, assembling a working group and submitting the guide for ballot.
3. Issue a report via IEEE Industry Connections using the material in the guide.

Jim O'Brien mentioned that a task force had met previously concerning this guide and recommended letting the guide expire. Letting the guide expire means that it will be administratively removed and will not be maintained. The guide would still be available for purchase but it would be identified as "inactive" and "use at your own risk".

The Industry Connections report development process is similar to writing a report within the PSRC. The report would not be balloted but it would be approved by the Industry Connections membership. The report may or may not be offered for free depending upon the level of effort required by IEEE to develop and publish the report. The expectation is that the material in the existing guide would be used to create a six to twelve page report of the material that is of benefit to the industry.

The Task Force proposed reviewing the guide to determine if the content was worth converting to an Industry Connections report. Joe Mooney, Jack Wilson, and Matt Black will review and provide a recommendation at the next PSRC meeting in May.

Next meeting: one session, 20 attendees, computer projector.

D: LINE PROTECTION SUBCOMMITTEE

Chair: G.L. Kobet

Vice Chair: K.V. Zimmerman

The Subcommittee meeting was called to order on Wednesday, January 14, 2015 at 4:30 p.m. with 31 members and 30 guests present.

Following introductions, a count of SC membership was made, and it was determined a quorum was present (31 out of 43 members present).

Minutes from the September 2014 meeting in Milwaukee were approved.

The Chair reviewed items of interest from the Advisory Committee.

Working groups gave reports on their activity.

Reports from the WG Chairs:

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

Chair: Meyer Kao

Vice Chair: Elmo Price

Output: Report to the Line Subcommittee of the PSRC

Established: September 2009

Expected completion date: MAY 2014

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 13th, 2015, at 8:00 AM with 14 attendees, of which 8 are guests.

The final report has been completed, approved and posted on the PSRC publication Web page. A draft of the presentation on this paper was emailed to the members of the working group for comments prior to this meeting. After revisions were made to address the comments, the final draft of the presentation was present to the members and the guests during this meeting. There was no objection and the presentation shall be deemed as final.

The D3 working group will not meet in the future. The chairperson made a motion to the Line subcommittee to disband the working group, which was approved by the Subcommittee.

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

Chair: Rick Taylor

Vice Chair: Don Lukach

Established: September, 2011

Expected Completion Date: September 2015

PAR Expiration Date: December 2015

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 Draft Guide (Draft 7.2)

The D19 working group met in a single session on Tuesday, January 13, with 15 of 20 (75%) balloting members present. Also in attendance were 4 corresponding members, and 24 guests. All present voted to approve the May, 2014 meeting minutes. The working group did not meet in September as Draft 7.1 was in ballot. One corresponding member was moved to a voting member.

Ballot results Draft 7.1: 104 Balloters, 92 Votes, 5 Abstain, 7 Negative
88% response rate (need >75%), 91% approval rate (need >75%)
329 comments

All of the ballot comments were either incorporated into Draft 7.2 to the extent possible, or were rejected, with most of the more critical comments discussed with the balloters prior to the meeting. A list of specific comments were then discussed at this PSRC meeting. The following lists the major decisions of the WG:

- i-76 Section will remain as-is with 3 terminal example
- i-60 The figure will be changed to show an additional acceptable polarization quantity
- i-58 Section will be removed
- i-78 Clause 6.6.4 will be slightly changed to reference the PSRC LOV paper.
Clauses 6.6.4.1 and 6.6.4.2 will be deleted.

i-205, i-210, and i-211 all deal with ECHO inclusion into the pilot section.

Mike Thompson(lead), Walter McCannon, and Jim Obrien volunteered to resolve the ballot comment by including the appropriate information. The due date is February, 15, 2015

Webinars, or the sort, will be set up to continue discussion of ballot comments on
Wednesdays, 10AM CST, JAN 28, FEB11, FEB 25, MAR 11, MAR 25, APR 8, APR 22

D26: Revision of C37.114 Fault Location Guide

Chair: Joe Mooney

Vice Chair: Randall Cunico

Output: IEEE Standards Guide

Established: 14 Jan, 2010

WG Completed: December 2014

Working Group Scope: 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 WG did not meet. A resolution was submitted to disband the working group, which was accepted by the Subcommittee.

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

Chair: Solveig Ward

Vice Chair: Bruce Mackie

Established: September 2010

Output: IEEE Guide PC37.243

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

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

Par expiration date: Dec 31, 2016

Draft: 4.2

WG D27 met on Wednesday, January 14, 2015 at 9:30am PST in a single session with 6 voting members and 13 guests. A quorum was not achieved so the past minutes will be approved via email.

After introductions, the patent slides were shown and reviewed. The minutes for the September meeting and October webinar will be sent to members via email for approval.

The scope of the PAR was reviewed.

134 comments were received from the initial ballot. The remaining comments were reviewed with the following highlights:

- Aaron Martin agreed to write a contribution on open CT detection which will be added to the document in section 7.5. He will submit the contribution by March 1.

The plan was discussed to finalize the document and resend to the group for approval to go to re-ballot. Based on the new contribution, the document should be finalized in early March.

D28: (PC37.230): Guide for Protective Relay Applications to Distribution Lines

Chairman: Brian Boysen

Vice Chair: Claire Patti

Established: 2013

Output: C37.230 – Guide for Breaker Protective Relay Applications to Distribution Lines

Draft :1.4

Expected Completion Date: 2018

Assignment: To review and revise C37.230-2007, “Guide for Protective Relay Applications to Distribution Lines” to correct errors and address additional distribution line protection related topics.

The working group met in Garden Grove, CA on Tuesday, January 13th 2015, 3:00 pm PST. There were members 21 and guests 10. The attendance list is attached.

The working group minutes from the September meeting were presented and approved.

The patent slides were presented.

The working group reviewed the comments submitted by the review teams for section 6 of the draft. The review was completed through section 6.2 and will continue starting with section 6.3 in May.

Brian Boysen made a presentation on Arc Flash Protection of Distribution Lines. The slides will be uploaded to Central Desktop.

Jack Wilson will clarify section 6.2.1 to address fuse saving as it relates to transformer fuses.
Brian will incorporate his comments on section 6.2.2 in the next version of the draft.

Assignments:

Assignments were made to add or revise the following sections:

- Claire Patti will address the use of pulseclosing and pulsefinding throughout the document per the guidance provided by Mike Meisinger.
- Jack Wilson will clarify section 6.2.1 to address fuse saving as it relates to transformer fuses.
- Brian will incorporate his comments on section 6.2.2 in the next version of the draft.
- Joe Mooney will review and provide comments on 6.3 and 6.4.
- Martin Best, Don Lukach, and Chris Walker will review and provide comments on section 7.1. They will also consider adding information from the previously removed section 6.1.1 and 6.1.2 as necessary.
- Jack Wilson and Mike Higginson will review and provide comments on section 7.2. They will also consider adding information from the previously removed section 6.1.1 and 6.1.2 as necessary.
- Shalini Bhat and Joe Mooney will review and provided comments on section 7.3.

All assignments are due April 17. Word format is preferred.

Old Business:

Mike Meisinger recommended adding a section on intentional miscoordination. It is suggested that it be included in section 7. This section will be assigned at a later date.

It has been noted that the existing guide is inconsistent in the use of terminology. It was pointed out that it uses both sense and detect. We will maintain a list these terminology issues and address them as we work through the guide.

- Sense vs. detect
- Line vs. phase , such as double-line and two-phase
- High side vs. high voltage
- Load capability vs line rating

D29: Tutorial on Setting Impedance-Based Power Swing Blocking and Out-Of-Step Tripping Functions on Transmission Lines

Chair: Normann Fischer

Vice chair: Kevin W. Jones

Assignment:

The tutorial will focus on methods of setting impedance-based power swing blocking and out-of-step tripping functions. Specific relay setting examples will be provided. Other methods of detecting an out-of-step condition do exist but will not be discussed.

Attendees: 13 members, 13 guests

Normann Fischer started the meeting by giving an overview of the agenda, followed by introductions.

Gene Henneberg gave a presentation detailing the static out-of-step settings calculation spreadsheet used by NV Energy. Gene started with a high-level presentation giving and overview of the spreadsheet and its usage. Next, he illustrated a detailed D29 test system example of the use of the spreadsheet. The example showed the various inputs and outputs of the spreadsheet, and showed how you apply power swing block settings using basic system data.

Joe Mooney gave a presentation showing the D29 test system modeled in RTDS. The test data provided by Kevin Jones transferred well, but a couple of generator parameters had to be tweaked to get the system to run correctly. Joe showed an overview of how the system was modeled, then he connected to the RTDS system at the University of Idaho Moscow campus. Joe showed that the power flow results were almost identical to the results supplied by Kevin. He also mentioned that 115 kV 3-phase faults wouldn't go unstable up to one second, but 230 kV 3-phase bus faults at Fir would go unstable at around 9 cycles. Kevin mentioned that the PSS/E studies he ran with a fault at the same location went unstable at about 5 cycles. Kevin also mentioned that the inertia constants for the system equivalents may need to be increased to better represent an interconnection with a large system.

Normann then mentioned that he wanted junior members of the work group to pair up with senior members to complete the writing assignment.

D30: Tutorial on Application and Setting of Ground Distance Elements on Transmission Lines

Chair: Karl Zimmerman

Vice-Chair: Ted Warren

Established: Jan 2014

Working Group Assignment: Write a tutorial on factors affecting the application and setting of ground mho and quadrilateral distance elements on transmission lines

The working group met in Garden Grove CA on January 13, 2015 with 12 members and 19 guests. Four new members joined the working group: Hillmon Ladner, Jay Gosalia, Joshua Park, and Don Burkart.

The WG Chair reviewed the minutes, mainly feedback from D Subcommittee, which objected to the assignment since it was too similar to the previous D25 working group (Distance Element Response to Distorted Waveforms). So, the purpose of this meeting was to review the existing assignment and modify as needed.

To help with this process, three excellent presentations were made. Joshua Park delivered a presentation RTDS modeling and setting distance elements on a series compensated line at SoCal Edison. Ted Warren delivered a presentation on a Zone 1 overreach event caused in part by a CVT transient. Finally, Charlie Henville delivered a presentation showing some undesired operations of distance element when applying ground distance protection, and showing a comparison of ground mho and quadrilateral elements.

The result of this discussion was to modify the assignment and reset the direction of the working group. The revised assignment is:

Write a tutorial on factors affecting the application and setting of ground mho and quadrilateral distance elements on transmission lines.

The revised WG title is:

Tutorial on Application and Setting of Ground Distance Elements on Transmission Lines

Coordination Reports

None

T&D Committee / Distribution Subcommittee

The T&D Committee / Distribution Subcommittee next meeting will occur during the PES General Meeting in Denver, CO, 26-30 July 2015.

The Distribution Subcommittee is comprised of working groups focused on Distribution Reliability, Switching and Overcurrent Protection, Smart Distribution, Distributed Resource Integration, and Voltages at Publicly and Privately Accessible Locations. Additional information can be found at the following link:

<http://grouper.ieee.org/groups/td/dist/>

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

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

Continued discussion on developing the Smart Distribution Application Guide, P1854

Scope: This guide categorizes important smart distribution applications, develops descriptions of the critical functions involved, defines important components of these systems, and provides examples of the systems that can be considered as part of distribution management systems or other smart distribution systems.

The 'Smart Distribution Systems' tutorial (1/2 day version working with the IEEE PES IGCC) is to be performed on Tuesday, February 17, 2015 at the ISGT meeting in Washington, DC.

A panel session on 'Smart Distribution Applications', Chaired by Shay Bahramirad is also planned for the ISGT meeting on February 18, 2015.

The '*Smart Distribution Systems*' tutorial (Full day, 8-hour course) is to be performed on Sunday, July 26, 2015 at the GM in Denver, CO. The tutorial is an update of the 2010-11 presentations of the SDS Tutorial.

The Smart Distribution Working group is sponsoring 3 invited panel sessions at the 2015 GM in Denver, CO. The 3 panel topics are '*Role of DERMS/DMS in managing Distributed Energy Resources (DERs)*', Chair: Bob Uluski; '*Volt/VAR Control in the Era of the Smart Grid*', Chair: Le Xu; and '*Protection design for Smart Distribution*', Chair: Nouredine Hadjsaid and Georges Simard.

Volt-VAR Control Task Force

Work continues on P1885 'Guide for Assessing, Measuring and Verifying Volt-Var Control Optimization (VVO) on Distribution Systems'. There is a desire and/or need to add more VVO topics. Content volunteers are needed. The Measurement & Verification section has not been written and needs an author.

A tutorial on Distribution Volt-Var Control and Optimization is planned for the 2015 GM in Denver. The tutorial will cover basic principles, approaches, challenges, results as well as case studies from GA Power, BC Hydro, and Duke Energy.

Distribution Management System (DMS) Task Force

Continued discussion regarding DMS issues and the output for the Task Force.

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

The PAR for P1806 "Guide for Reliability Based Placement of Overhead and Underground Switching and Overcurrent Protection Equipment" was approved.

Scope: This guide provides analytical techniques to assist in the placement of switching and overcurrent protection devices on medium voltage distribution circuits for reliability purposes.

Purpose: This guide provides means and methodologies for proper placement of switches and protective devices to achieve the desired performance characteristics and reliability for medium voltage distribution circuits, including feeder and branch line equipment, with operating voltages up to and including 38 kV. Drivers for device placement, such as reliability and operational considerations are identified. Various types of switching and overcurrent equipment are covered such as: manual switches, automated switches, reclosers, sectionalizers, and fuses. Impacts on reliability and device placement are addressed for factors such as fault rate, interruption duration, exposure miles, customers affected and distribution automation.

Working Group on Voltages at Publicly and Privately Accessible Locations

<http://grouper.ieee.org/groups/td/dist/stray/>

Chuck DeNardo, Chair Jim Bouford, Vice Chair Scott Kruse, Secretary

P1695, "Guide to Understanding, Diagnosing and Mitigating Stray and Contact Voltage" is being finalized for balloting.

Old Business

We discussed possible changes to device numbers 68 and 78. The consensus is that the existing definitions are used in a variety of ways, which makes any change problematic. For example, one utility uses 78 for phase comparison relays since it is phase angle measuring device. At this time, no definition changes will be proposed.

New Business

Line Protection Subcommittee received a request from the Switchgear Committee/RODE Subcommittee to review their Technical Report "*Design considerations for Microprocessor Based Controls for Distribution Padmount, Pole-mount and dry vault Switchgear from 1kV to 38kV*". This request was discussed and determined that D Subcommittee is not the best fit to review the report. The request was referred to the Main Committee for the best group to take action, which most likely will be Relay Practices Subcommittee (I).

The Subcommittee discussed and agreed to create Task Force DTF31, with Joe Mooney as Chair, to determine whether a working group should be created to prepare a summary paper and presentation for the just completed Fault Location guide.

Alex Apostolov proposed creating a Working Group on using IEC 61850 communication links for line protection. This was discussed, and motioned, but the Subcommittee rejected this since this is not substantially a line protection issue, but really using a new channel media.

General Discussion

None

Line Protection operations of interest

None

The meeting was adjourned at 4:45 p.m.

H: RELAYING COMMUNICATIONS SUBCOMMITTEE

Chair: Eric Allen

Vice Chair: Marc Benou

The Subcommittee met on January 14, 2015 with 29 members of 38 total, comprising a quorum. 35 guests were also present. Minutes of the September 2014 meeting were approved without objection.

The SC welcomed Tony Bell as a new member.

The Chair presented several announcements:

- WG and TF Chairs were reminded that Minutes are due to the Vice Chair within one week after the SC meeting. Four working groups never submitted their minutes after the September PSRC meeting.
- ADCOM is looking for presentations for the May main committee meeting.
- There will be a special presentation at the next PSRC meeting on Monday at 1 PM: "A History of the Development of the World's Electric Power Industry" by Dr. Robert B. Schainker.
- WG chairs were warned to make sure that extensions are becoming difficult to come by, so every attempt should be made to finish their work on time.
- Double sessions are discouraged due to scheduling difficulties.
- WG chairs are reminded to review the latest policy and procedure manuals on the PSRC website, in the knowledge base section. It is under the heading, Manuals.
- The standard format for vote mailings by the SC was shown. Working groups are encouraged to use the same format. It was pointed out that voters should not change the subject line of the email when they respond or risk not having their vote counted.

WG business:

None; see WG reports.

Old business:

None

New business:

Mital Kamabar has volunteered to chair the new HTF31, which will explore Common Protection and Control Parameters for COMSET. The assignment of HTF31 is to identify parameters of widely used protection and control functions across different implementations and suggest improvements to IEC-61850 7-4 data models. Ken Fodero asked to form a task force to look at telecommunications over Ethernet. Ken will be chair of HTF32. It was announced that most of the working groups in the H SC along with the PSCC and a few select working groups from other sub-committees may be reorganized into a new committee named Grid Communications and Cyber Security.

Reports from the WG Chairs

H1: PC37.236 Guide for Power System Protective Relay Applications over Digital Communication Channels

Chair: Marc Benou

Vice Chair: Ilia Voloh

Output: Guide

Established: 2006

Expected completion date: December 2013

Assignment: Develop a summary paper of C37.236.

The H1 working group did not have an official meeting.

The goal remains to add a real world case involving problems using audio FSK over digital lines. The chair will contact Bryan Donaldson to find out if he is willing to participate.

The chair will create a paper and distribute it to the members and guests to review and comment. Craig Palmer has volunteered to help write the paper.

Mal Swanson has volunteered has also volunteered to help prepare the first draft.

Requirements for the next meeting: 1 session, meeting room for 15 people.

Status: Draft 1

H3: Time Tagging for Intelligent Electronic Devices (COMTAG)

Chair: W. Dickerson

Vice Chair: J. Hackett

Substations C4 Co-Chair: M. Lacroix

Output: Standard

Established: 2006

Expected completion date: December 2016

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, with 10 members and 7 guests in attendance, with a quorum. After calling attendance and verifying a quorum, the meeting was called to order by Chair Bill Dickerson.

The patent policy slides were shown, and no issues were identified. Minutes from the preceding meeting in Ft. Lauderdale were approved – Mark Adamiak moved approval; Chris Huntley seconded; approved unanimously.

Old Business: None at this meeting.

New Business: There were two presentations. Marc Lacroix made a presentation regarding data elements to be included in records time tagged for the purpose of analyzing message flow in systems such as IEC 61850. The group consensus was that this is important and interesting work, but there is a question regarding whether this is in scope for our standard. Conclusion was that Marc was encouraged to continue with preparing an annex based on this concept, and if it does not fit in this document, it should be included elsewhere or used as a starting point for a new document.

Mark Adamiak gave a presentation showing a method to extend COMFEDE, C37.239, to include the required data elements from COMTAG. Since COMFEDE is based on XML, it is easily extensible to accomplish this. Since COMFEDE will not be revised for several more years, it is appropriate to include this information in COMTAG as an annex.

Once business was complete, Mark Adamiak moved to adjourn.

For the next meeting: a single session jointly with SubC4, for 30 attendees and computer projector. The existing slot (4:30 on Tuesday) worked out well with manageable conflicts.

H6: IEC 61850 Application Testing

Chair: C. Sufana

Vice Chair: B. Vandiver

Output: Report

Established: 1999

Expected completion date: December 2014

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

Introductions were done after a welcome by Chair Charlie Sufana. There were 19 members and 9 guests present for the Jan 13, 2015 meeting.

The minutes from the Sept 2014 meeting were reviewed and approved with no comment.

No new contributions were received before the meeting. Aaron Martin did prepare and present a presentation on "Network Isolation & Monitoring Technique for IEC 61850 Applications". A project to create an IEC 61850 Lab in BPA to explore the technology. One application they use is a RAS scheme utilizing GOOSE messages. But the core justification is the possibility to use 61850 to fulfill the monitoring requirements of PRC-005. The goal is to use the Edition 2 test bits and quality bits to verify the same conditions that manual reconfigurations using Edition 1 do now.

A discussion followed to explore the practical applications. Then the chair walked through the report and had the group comment on suitability and any new information that should be included or excluded.

Remaining writing assignments are requested to be provided by April 15, 2015.

Jay Anderson, Jun Verzosa, Vijay Shanmugasundaram, and Farel Becker requested to be members and were accepted by the chair. Robert Thornton-Jones was accepted as a corresponding member.

For the next meeting a single session for 30 plus PC projector is requested.

H9: Understanding Communications Technology for Protection

Chair: R. Midence

Vice Chair: A. Oliveira

Output: Report

Established: 2005

Expected completion date: June 2013 (Completed)

Assignment: Develop a paper and tutorial based on the report.

The Working Group H09 met in Room Royal C, Hyatt Regency Orange County Hotel, Garden Grove, CA, USA on January 13, 2015 at 15:30 hours. Five (5) members and seven (7) guests were present.

Discussion

Tutorial

The chair provided updates on the abstracts submitted to conferences, indicating that the tutorial had been offered to the following conferences/shows with no positive response from the respective conference technical committees:

- PAC World America

- DistribuTech
- WPRC

And also to:

- IEEE General Meeting 2015
- Innovative Smart Grid Technologies (ISGT) Conference

The response from the technical committee of both conferences was that there was no interest for a Tutorial on Communications for Protection and Control Engineers for both events.

It was agreed that no more tutorial abstracts will be submitted. Eric Allen was present and the Chair advised that the tutorial could be offered upon request by the H Subcommittee. René Midence offered to coordinate the efforts to deliver the tutorial. It was pointed out that the Tutorial Outline will have to be discussed with the party requesting the tutorial.

The Chair will submit to the H Subcommittee a copy of the Power Point Presentations that were prepared for Texas A&M in March 2014.

Promotional Paper

It was decided that the group should not pursue to shrink down the current 32 page version of the paper.

It was suggested to submit the paper to conferences that no longer pay attention to the size of the document. Conferences that were mentioned were GATech, PAC World, and WPRC, Texas A&M.

No action items were assigned with regards to this matter due to the uncertainty of the future of the working group as explained below.

Future of the Working Group

The Chair informed to those present during the meeting that the future of the working group is uncertain. Participation by registered members has reduced in the last 2 years to the point that the group roster could be reduced to less than 10 members. In addition, the Chair expressed his desire to step down as Chair of the working group to devote his contributions to working groups more in line with his personal interests.

There was no quorum during the meeting to make a decision with regards to the future of the working group. The options that were tabled during the meeting are:

1. Transfer the leadership to a group member interested in finishing the production of the promotional paper and continue with any new assignments
2. Disband the working group

The chair will communicate the options to the current members of the working group and will request a vote. The results of the vote will be communicated prior to the next meeting in May 2015.

H11: C37.118.1 Standard for Synchrophasors for Power Systems

Chair: K. Martin

Vice Chair: A. Goldstein

Output: Standard

Established: 2006

Expected completion date: December 2017

Assignment: Develop a joint IEC/IEEE standard for synchrophasor measurements based on the IEEE Stds. C37.118.1-2011 and C37.118.1a-2014 according to the PAR issued June 2013.

WG H11 met on Wednesday, January 14, 2015 at 9:30 AM in a double session with 11 voting members and 15 corresponding members & guests. Attendees introduced themselves and the IEEE patent rules were reviewed.

The current status was reviewed:

The Working Group summary paper was accepted for publication in Transactions on Power Delivery. The paper went through 2 rounds of review and revision. The final draft will be submitted for publication this month (January).

The existing committee draft (CD) of IEC/IEEE 60255-118-1 was fully updated to the latest C37.118.1 and C37.118.1a drafts in September. The first round of updates was added by the relevant task team during October and November. Most of these additions were reviewed and refined and accepted or rejected at a web meeting in early December.

Since there was a quorum, a vote was taken to approve the September minutes; they were approved. A list of items that are proposed for inclusion in this new standard was reviewed. Two of these items are left over from last January and the remaining 8 are items that have been suggested by various interested people. There was some discussion of these points, particularly how much we can continue to consider and still keep the project on schedule. It was noted that the C37.118.1 standards are complete and not in need of revision; based on this there is no reason to rush this standard to completion. The WG will consider all requests for additions and make an effort to incorporate all clauses that are necessary to assure that the standard is current with existing technology and industry needs at the time of completion. These issues are:

1. PMUs with digital inputs.
2. Changes for the reference model (15 to 16 samples per cycle). Allen (and others) should test any changes to the model. Allen proposes we eliminate the annex entirely.
3. Should we have other limits other than TVE?
4. Should we establish performance classes within P and M classes?
5. Should we have performance limits on the suspended frequency and ROCOF limits (harmonic, OOB interfering signals tests) and tighten the relaxed limits?
6. Should we require all nominal frequencies and reporting rates? Should there be any required reporting rate?
7. Should we have modulation test flatness limits?
8. Why do we test all harmonics to 50th?
9. We do not test for power system extremes (e.g. dead bus to nominal), should we?
10. Should we modify some definitions:
 - a. frequency as the derivative of phase angle
 - b. rocof as second derivative
 - c. FE and RFE as signed values and should they sign be inverted?
11. Measurement bandwidth (modulation) could measure the bandwidth by increasing the modulation frequency until $TVE > 3\%$ (which it does not do today).

Membership and meetings were discussed. It is not required that IEC members join IEEE or vice versa. Members for both groups are invited to all meetings and calls. Draft changes (of CD) have to be accepted by vote of the full WG. The IEC and IEEE will each take the same document and try to pass it through voting. Any changes requested by either group will then have to be reconciled by the other. The proposed schedule will take the CD to ballot in October 2015 and then a 2nd CD to ballot in March 2016. The first IEEE ballot is proposed for March 2016 as it is anticipated at least 2 CD ballots will be required. The CDV is anticipated for December 2016. Murty Yalla, the IEC TC95 chair, said it should not be difficult to change the IEC schedule if needed.

Murty also reported on the TC95 plenary in December. They set up an ad-hoc group to look at smart grid related functions. From this work, a new working group, MT4, will start in March to work on a standard, 60255-181, for frequency that will cover frequency & ROCOF. As these are both defined in the synchrophasor standard, we will need to coordinate with this WG. The next TC95 meeting is in Chendu, China. Having a JWG1 meeting there was discussed, but until we have a longer block of work to do, it would not be very successful. We will continue to use web meetings and target a meeting outside of N. America for resolving CD comments.

The WG reviewed the current draft and attempted to complete review of the proposed changes introduced in November. Discussion of the test parameters for the OOB test focused on whether we were including of test requirements or test procedures. It was decided to reword the section and move parts to the definitions. It was also decided to include the table of harmonic sequences in the testing annex rather than in the requirements where it was.

For the next meeting - a double session with room for 30 people and a CP is requested.

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

Chair: E.A. Udren
Vice Chair: R. Beresh
Output: Report
Established: 2008
Expected completion date: December 2014

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.

Introductions were completed after a welcome by Chair Eric Udren. There were 7 members and 16 guests present for the Jan 13, 2015 meeting. Benton Vandiver volunteered to be Vice-Chair since Bob Beresh no longer attends.

Eric related that the report is nearly finished and that Chris Huntley had performed a thorough review and edit of the report. This report is being coordinated with Substation C8 – IEEE 1615.

Eric then reviewed the comments and edits by Chris with the group to confirm those changes. A discussion brought forward other edits and refinements concerning TCP and UDP to clarify the wording. Another topic centered on the merits of SONET/SDH versus emerging telecom technologies to replace it. Wording was adapted to balance the message to the reader.

Aaron Martin suggested to add VLAN testing to section 7.5 or 10.3, and will provide Eric the write up for consideration. Deepak Maragal offered to review section 10.5 and optimize the content.

Other clarifications were added to the report which will be reviewed by the WG members before a final vote. Remaining writing assignments are requested to be provided by Feb 28, 2015.

Deepak Maragal was added as a Member.

For the next meeting a single session for 30 attendees is requested.

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

Chair H13: S. Sciacca

Chair C10: Tim Tibbals

Vice Chair H13: C. Preuss

Output: Standard

Established: 2008

Expected completion date: December 2013

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

The WG did not meet. The standard was completed in December 2014. There will be no future meetings of H13 until/unless C37.240 requires revision.

H17: Establishing links between COMTRADE, IEC 61850 and CIM

Chair: C. Brunner

Vice Chair: A. Apostolov

Output: Report

Established: 2010

Expected completion date: December 2013

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

6 members and 12 guests were present.

Christoph Brunner presented the WG work so far. The current version of the report has been sent to the participants prior to the meeting.

There was a discussion regarding Chapter 6 – XML version of COMTRADE configuration file including topology information. It was decided that this should be taken out because of a new task force HTF28 covering this subject and chaired by Mark Adamiak.

Herb Falk described and demonstrated the changes going on in the CIM model that impact the work on the document. This will require an update of Chapter 4.

We then went through open assignments. Chapter 2 which describes the use cases is still missing the description of some of the use cases. It was decided to describe all the use cases using a standard template that is as well used in other areas. Christoph Brunner will send out that template. Assignments to write the missing use cases were made or reconfirmed (see list of assignments). Chapter 3 presenting the related standards has as well some open points.

It was further discussed that engineering aspects need to be considered – Alex will add this to the introduction chapter he has to provide.

We as well need to start with the analysis work which goes in chapter 5. Chapter 5 shall describe how the use cases can be realized based on the standards and where we have missing gaps. The last part of the work is then to prepare the chapter about future requirements.

We defined the following work schedule:

- Have final input on chapter 2 and 3 prior to the May 2015 meeting so that after that the first part of the document (chapters 2 -4) providing the basics is ready
- Have final version of input on chapter 5 prior to the January 2016 meeting such that thereafter the second part of the document providing the analysis is ready
- Have final chapters providing the recommendations completed prior to the January 2017 meeting such that the report can be released after that meeting

A room for 30 people and projector will be needed for the meeting in May 2015.

H21: Information Mapping between IEEE C37.118.2 and IEC 61850-90-5 systems

Chair: Yi Hu

Vice Chair: A. Goldstein

Output: Report

Established: September 2012

Expected completion date: December 2016

Assignment: Create an IEEE report documenting the mapping between IEEE C37.118 and IEC 61850-90-5 standards.

Working group H21 met on Tuesday, January 13, 2015 in single-session chaired by Yi Hu and Allen Goldstein with 23 people (10 members and 13 guests) attending.

The working group focused the discussion on the use cases and the high level conceptual architecture that should be adopted for standard mapping between the IEEE C37.118.2 and IEC 61850-90-5. Mark Adamiak presented a short write-up of some use cases for WG to consider and discuss. These use cases originated from the NASPInet document and are now adopted as part of 61850-90-5. These use cases have been summarized into 7 or 8 one-line descriptions.

Some topics discussed include:

- Question: How does (C37.118) time quality map into (90-5) sampled values? – This will be addressed in the detailed mapping step, not in the high level use case and conceptual architecture discussion
- Question: Should we be discussing multicast as a use case? – C37.118.2 does not mandate multicast (or other transmission protocols). Discussion ended with statement that transmission protocols (TCP, Multicast, etc.) is not in the scope of this working group.
- Discussion of "PDC in the proposed use cases" – After some discussion, PDC is too specific but represents one possible server/client or producer/consumer or "publisher/subscriber". Use case can be made more abstract.

The latest use case diagrams were shown to the WG attendees. The use cases and the conceptual architecture for DNP/61850 mapping, which was the starting point for the use case diagram development, were also shown.

A discussion regarding whether mapping of the Digital Word between C37.118.2 and 90-5 must also include 61850 GOOSE messages since they also can carry binary information. Including GOOSE message mapping could expand the scope of mapping from 90-5 to 61850 mapping. It is important to discuss this in this mapping document. Generally agrees that when binary information are received via GOOSE the latest value is sent via C37.118.2 since GOOSE is asynchronous and multiple status change can occur between C37.118 data frames. Digital words in 37.118.2 should be mapped into 90-5 as defined in 90-5. Question for discussion, when the bit status in a digital word changes in C37.118.2, should a GOOSE message be sent from the gateway? This will be discussed in more detail once the use cases and conceptual architecture of the mapping is determined.

Review and discussion of the latest use case diagram – Only data frame "mapping" was shown in detail and C37.118 config to 61850 IID file shown without detail. Furthermore, no flow of command data was shown. It was noted that the term "mapping" has a particular meaning in 61850. For data frames to/from 90-5, "mapping" was changed to "repacking". For 118 config frames to IID files, a "mapping" function was added and for 118 command frames to 61850 control block writes a "command translation" function was added.

WG Chair will organize follow-on conference calls and web meetings to finish the revision of the use cases and the conceptual architecture for mapping between C37.118.2 and 61850-90-5, and distribute it to WG members and guests before next face-to-face meeting.

For next meeting, WG H21 requests a single session, a room for 35 people and a PC projector
Draft # D0.03

H22: PC 37.249 Guide for Categorizing Security Needs for Protection Related Data Files (Joint Working Group Substations Committee C19 & PSRC H22)

Chair: Caitlin Martin

Chair C19: Denis Holstein

Vice Chair: Dylan Jenkins

Output: Guide

Established: September 2012

Expected completion date: January 2019

Assignment: Develop an IEEE Guide on security for data files used for configuration, management, and analysis of protective relaying systems.

Working group met with 12 members and 5 guests.

After introductions the minutes from the previous meeting were approved.

Caitlin Martin began the meeting by explaining the work she had done since September in converting the existing C19 report into a draft guide. The working group reviewed this work and paid particular attention to defining which file types and device types should be within/out of scope.

The current report ranks the risk of file types as low, medium and high but provides no information on what risk assessment methodology was followed to come up with these rankings. The new guide shall also include what the impact of compromise for each file type, currently some of these details are contained in the comments column but specific information will now be required to prepare the risk assessments.

The draft guide and other documents will be put onto Central Desktop.

Assignments were made to read existing guides and standards and report a summary of how they apply to our project at the May 2015 meeting (10 minutes each):

- NIST SP 800-30 Guide for Conducting Risk Assessments – Dylan Jenkins
- NIST FIPS 199 Standards for Categorization of Federal Information and Information Systems – Chris Chelmecki
- ISO/IEC 27002 – Security Practices
- ISO/IEC 27019 – Utility Security Practices
- NERC CIP Version 5 – Mike Dood
- IEEE C37.240 – Steve Kunsman
- Cryptographic Protection Report – Dennis Holstein
- Definitions: Availability, integrity, etc. – Dennis to share with group
- Security Techniques PowerPoint – Dider Giarratano (needs 15 minutes)

Requirements for the next meeting: 1 session, meeting room for 20 people.

H23: Guide for Naming Intelligent Electronic Devices (COMDEV)

Chair: R. Cornelison

Vice Chair: E. Allen

Output: Guide

Established: January, 2013

Estimated Completion Date: January, 2017

Assignment: Develop an IEEE Guide for naming Intelligent Electronic Devices (IEDs) based on the report of Working Group H10 and the impact on COMTRADE and other data exchange standards.

The Working Group met on Tuesday January 13, 2015 with 7 members and 1 guest.

Draft 1.7-1 was distributed prior to and at the meeting.

The document [http://www.NERC.com/comm/oc/isn related files/dewg/archives/mird_spec.doc](http://www.NERC.com/comm/oc/isn%20related%20files/dewg/archives/mird_spec.doc) was identified as a document that should be reviewed for its impact on our document. COMFEDE also contains information which will be useful in finishing our document.

It was decided to suggest using the NERC Company IDs for North American companies.

Assignments were made and are Due February 14.

A room for 20 people is requested for the May meeting.

H24: Investigate Need to Update C37.238 (Joint Working Group Substations Committee C7 & PSRC H24)

Chair: G. Antonova

Chair SubC7: Tim Tibbals

Vice Chair: Bill Dickerson

Output: Standard

Established: January, 2013

Estimated Completion Date: May, 2014

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

Working Group H24/SubC7 met on January 14, 2015 in Garden Grove, CA in a single session with 31 attendees (7 members, 2 corresponding members, 22 guests). After introductions, Galina Antonova, the H24 co-chair, presented IEEE IP policy slides and asked to identify any potential pattern issues related to this work. None were identified. The quorum was achieved. Tim Tibbals, the C7 co-chair, moved to approve September 2014 meeting minutes. Christoph Brunner, the IEC TC57 WG10 convener, seconded. There was no discussion. September 2014 meeting minutes were approved unanimously.

The H24 co-chair provided an update on project status:

- IEEE Sponsor ballot comments resolution is on-going
- Top priority was assigned to resolving repeated TC57 WG10 comments (45% of all ballot comments)
- Major progress was made at IEC TC57 WG10 meeting in Tokyo in November 2014, it was agreed
 - To split the profile into Power Profile Level 1 and Power Profile Level 2
 - That Power Profile Level 1 specifies a common set/denominator of features of Power and Utility profiles
- Agreements on feature differences were achieved
- In Nov-Dec 2014 IEC TC57 WG10 and IEEE PSRC H24/SubC7 developed an agreed specification of Power Profile Level 1 – IEC 61850-9-3
- IEC 61850-9-3 Dec 15, 2014 draft was submitted to IEC in Geneva for French translation on Dec 18, 2014

The H24 co-chair presented three approaches for going forward:

1. An adoption of IEC 61850-9-3 by IEEE after its approval and publication, as discussed in Tokyo
2. A joint development that bonds both IEEE and IEC to the same exact specification for Power Profile Level 1
3. One IEEE document that includes IEC 61850 9-3

Discussion on the options followed. The H24 co-chair stated and IEEE-SA officers Erin Spiewak, Bill Ash and Sam Sciacca supported that joint development is still possible without delaying the IEC approval process. Joint development will result in a single document in the IEC template. As the agreed IEC 61850-9-3 draft will be used, no technical changes are expected.

The H24 co-chair asked the group to state their preferences. The joint development (option 2) was supported. A request to outline the process and the schedule was made.

The process and the schedule for the joint development were discussed next. As IEC 61850-9-3 draft was developed as a response / resolution to the IEEE PC37.238 sponsor ballot comments, it was suggested by H Subcommittee Officers in a pre-meeting discussion to submit a PAR change to narrow down the scope to the Power Profile Level 1 and indicate the joint development process. Erin Spiewak confirmed and informed that the next IEEE NesCom submission deadline is February 13, 2015. PAR change approval is subject to IEC TC57 WG10 agreement. Upon PAR approval at the March 15, 2015 NesCom meeting, the agreed IEC 61850-9-3 draft to be circulated for a 30-day recirculation ballot. Comments to be received by April 15, 2015. Christoph Brunner outlined the IEC 61850-9-3 schedule: a French translation to be completed by the end of February 2015, National Committees voting on the IEC 61850-9-3 CDV to be completed by the end of May 2015. Thus, the IEEE comments will arrive 1.5 months before the CDV comments. It was noted that it is critical to resolve all comments jointly and agree on the same changes to the document, if any. Bill Ash explained that it is still possible to part and continue with separate documents at this stage, if agreements could not be reached.

The motion to support joint development (option 2) was moved by Christoph Brunner. Tim Tibbals seconded. There was no discussion. The motion was approved unanimously.

Eric Allen, the H Subcommittee chair, moved to adjourn the meeting. The meeting was adjourned at 12:17pm.

Requirements for the next meeting: single session, meeting room for 30 people with a computer projector.

H25: Review of C37.94

Chair: M. Benou

PSCC Co-Chair: Roger Ray

Vice Chair: D. Jenkins

Output: Standard

Established: September 2013

Estimated Completion Date: December 2015

Assignment: Revise IEEE Standard C37.94-2008, *IEEE Standard for N Times 64 Kilobit Per Second Optical Fiber Interfaces Between Teleprotection and Multiplexer Equipment*.

H25 met with 9 members and 3 guests. After introductions the September minutes were approved. There was a quorum.

Dylan Jenkins had completed making the changes to the original standard and the first draft of the revision was presented to the working group for review. The following observations and assignments were made:

- Mal Swanson will determine if the words Singlemode and Multimode should be one word or two. He will also try to find better definitions for those words
- Ken Fodero will look at the ITU standard for singlemode attenuation to see if it differs from the proposed levels already in the draft.
- A2, add Multimode to the title
- B2 should be B3
- Table B2 should be B1

- Table A3 should be B2

The goal of the WG is to have, with the help of IEEE, the first final draft completed and approved by the May meeting.

Draft 1

Requirements for the next meeting: 1 session, meeting room for 20 people.

H26: COMTRADE Conformity Assessment

Chair: R. Cornelison

Vice Chair: J. Gosalia

Output: Report

Established: September 2013

Estimated Completion Date: January 2015

Assignment: Develop a plan that can be used to test COMTRADE files for conformity to the IEC 60255-24 Ed 2.0 and IEEE Std C37.111-2013 standards.

The Working Group did not meet during the January 2015 PSRC Meeting. The report has been sent to the H Subcommittee. We are awaiting approval or comments from the subcommittee members. A room is not required for the May meeting.

H27: Standard File Format for IED Configuration Data (COMSET)

Chair: C. Chelmecki

Vice Chair: Dylan Jenkins

Output: Standard

Established: September 2013

Estimated Completion Date: September 2017

Assignment: Develop a standard XML based file format for exchange of protection and control configuration data between engineering tools and asset management tools. The modeling and naming conventions should be based on the definitions and extension rules defined in IEC 61850.

The working group met on January 13, 2015. There were 12 members and 7 guests present. After introductions, the group discussed the previous progress of the group.

Chris began the meeting with a discussion of the proposed PAR scope. Chris summarized the concerns of several group members that had performed an initial review of the work to be completed.

The concern was that additions to the settings model of IEC 61850 should not be included within our standard and should instead be forwarded to the IEC TC 57. Christoph Brunner (representing IEC TC 57 WG10) agreed that he would prefer any additions to the settings model be forwarded directly to the IEC rather than included in an IEEE standard.

A proposal was made to split the WG activity into two parts:

1. Review the existing IEC 61850-7-4 protection settings model and suggest improvements
2. A standard detailing how to utilise SCL files to represent any device (including non-61850 devices) into a standardized file. Any extensions should follow IEC61850 extension modelling, not be an extension to the COMSET file itself.

A motion was made that WG H27 focus only on (2), and (1) will require the formation of a new working group.

The PAR was reviewed by the WG with minor changes, and a motion to accept the PAR was approved.

The group also discussed what restrictions and other guidance the new standard would include. Some ideas included:

- Hierarchy of the settings model
- Portions of 61850 SCL that should be omitted

- Guidance that all settings, even those not modelled by IEC61850 should be included. Non-standard settings may be included within a custom namespace.

The following assignments were made:

- Alex A is to prepare a presentation for the next meeting of how 61850 can model settings
- Dylan J will build a presentation of the contents of a standard CID file on what parts should be included/excluded for WG discussion

Requirements for the next meeting: 1 session, meeting room for 30 people

HTF28: XML COMTRADE Conformity Assessment

Chair: M. Adamiak

Output: Recommendation on formation of a Working Group

Established: January, 2014

Estimated Completion Date: September, 2014

Original Assignment: Investigate the creation of an XML-based format for COMTRADE.

Expanded Assignment: Identify potential COMTRADE upgrades

The Task Force met 4 times to address the originally defined assignment of creating an XML-based COMTRADE format. During the first meeting, the discussion quickly evolved to include other potential upgrades to COMTRADE. A number of the early comments did ask the question “why” make this change. Several reasons for migration to an XML-based format were identified, specifically:

- Ability to open a COMTRADE file in a browser and view immediately view channel data and Header data
- Well-defined support for Unicode (multi-language)
- Record security – specifically for data in Translation (
- Inclusion of Fault Reports and Images in the Header file
- Better alliance with the IEC61850 configuration language
- Support of a Schema to automatically detect file format errors

A number of proposed changes to COMTRADE were identified, specifically:

- Incorporation of the Synchrophasor Schema into COMTRADE
- Clear identification of the file Trigger source
- Support for Sequence components (similar to storage of Synchrophasors)
- Support for different rate signal incorporation in the same file
- Support for “sparse” data
- Creation of a template to enable direct migration of a COMTRADE into EXCEL
- Support for Harmonics (e.g. – Complex Variable support)
- Inclusion of Substation State Estimation data
- Inclusion of Setting file (or relevant pieces or setting version number
- Active setting group
- Inclusion of the substation configuration at the time of the trigger event
- Support for Calculated Data Channels
- Attachment of “APPS” to a COMTRADE record. An APP might compute fault clearing time, breaker operate time, breaker wear, etc.
- Support for automatic time alignment of multiple COMTRADE files (e.g. – support for inclusion of the Time Offset needed to be added to a record to reconcile a record with Absolute Time
- Support for Digital Signal quality (e.g. – allocate 2 bits for all Digitals or addition of a Quality flag for each Digital)
- Inclusion of an XML format
- Inclusion of Analog Data Quality flags with channel information
- Conveyance of a unique channel identifier

- Addition of GPS coordinates
- Security for files (note: 61351 has defined “security for XML files”)
- Ability to comment in the data and and CFG files
- Maintain the ability to separate a combined COMTRADE file into its respective pieces
- Add coordination with COMTAG – the new TQ field

Other comments included:

- Why not adopt PQDIF?
- Don't lose the transient data aspect of COMTRADE
- New name proposal: Common Format for Data Exchange
- Identified as a need for linkage with IEC61850
- Concern over any major changes to COMTRADE in general

TF Recommendation: Conclude the TF on XML COMTRADE and Upgrades; present the collected information to the H Subcommittee; decide if a new “standard” WG should be started to implement the identified upgrades.

HTF29: Conformity Test Plan for PC37.240

Chair: S. Sciacca

Output: Recommendation on formation of a Working Group

Established: January, 2014

Estimated Completion Date: September, 2014

Assignment: To explore the feasibility of developing a test plan for conformity assessment of the C37.240 standard.

The Task Force met with 14 people in attendance (9 members, 5 guests). This was the meeting where the TF was to decide if/how to continue the effort.

The group recapped the effort to date and some of the issues that have been discussed over the past year. After some discussion, it was agreed to that a compliance effort for IEEE C37.240 was desirable. Two possible directions were proposed:

1. Ask Subcommittee H for the permission to form a working group and undertake the work as a standards development activity.
2. Undertake the work separately following the model used by the Synchrophasor Steering Committee whereby the effort takes place under the Conformity Assessment group of IEEE-SA.

The group (some of whom have participated in the Synchrophasor Steering Committee) felt the Steering Committee approach would provide the most time-efficient mechanism to undertake this effort, and it was decided to recommend to Subcommittee H that the Task Force be disbanded.

It was further noted that since the Steering Committee work is intricately entwined with IEEE C37.240, and that many of the members of PSRC and Substations would be involved, that the new steering committee request permission to hold it's meetings in conjunction with future PSRC meetings.

HTF30: IEC 61850 User Feedback

Chair: D. Maragal

Output: Recommendation on formation of a Working Group

Established: September, 2014

Estimated Completion Date: September, 2015

Assignment: Collect user feedback from utilities and consultants for designing and implementing IEC-61850 based substation automation system. Prepare a report outlining the experienced issues and suggest enhancements to IEC-61850 standard and manufacturer implementations.

Attendance:

6 members and 9 guests attended this 1st task force session on 01-14-2015.

Minutes:

- Purpose and scope of this task force was described. Specific challenges encountered in IEC-61850 testing and configurations were discussed as examples.
- Following suggestions were made by working group attendees
 - Classifying the issues for those associated with IEC-61850 standard and manufacturer implementations separately.
 - Coordinate with other H workgroups such for capturing the difficulties experienced by them.

Future tasks:

TF Chair to contact utilities and consultants primarily those located in North America to collect feedback.

Requirements for the next meeting: 1 session, meeting room for 30 people

Liaison Reports

PES Substations Committee

C. Preuss

A brief report of the work in Substations Committee was presented at the PSRC H Subcommittee meeting on 1/14/2015

C5: IEEE PC37.2 Draft Standard for Electrical Power System Device Function Numbers and Contact Designation

Chair: M. Dood

Vice Chair: B. Ackerman

Output: Standard update

Established:

Expected Completion Date:

PAR is approved and expires 12/31/2018. Reviewed history of work to date and accepted new working group members. Plans are to send out updated draft to working group members for review. The working group needs to request IEC 61850-5 for working group use in order to update the cross reference with IEC 61850.

C15: PC2030.100 Recommended Practice for Implementing IEC 61850 Substation Automation Systems

Chair: R. Liposchak

Vice Chair:

Output: Standard

Established: 2012

Expected Completion Date: 12/2016

Reviewed the present status of the draft and discussed schedule to complete work before PAR expires.

C18: PC37.248 Common Format for Naming Intelligent Electronic Devices (COMDEV) joint with PSRC H23

Chair:

Vice Chair:

Output: Standard

Established: 2015

Expected Completion Date: 2016

New, did not meet. C0 meeting later today will get effort underway.

C20: PC37.1.2 Databases Associated with Substation Automation Systems

Chair:

Vice Chair:

Output: Standard

Established: 2015

Expected Completion Date: TBD

Working group just forming in Substations Committee as a result of PSRC C23 outreach and SUBS Study Group C1 recommending the split of databases out from C37.1.

C21: PC37.248 Common Format for Naming Intelligent Electronic Devices (COMDEV) joint with PSRC H27

Chair:

Vice Chair:

Output: Standard

Established: 2015

Expected Completion Date: 2016

New, did not meet. C0 meeting later today will get effort underway.

PES Communications Committee

D. Nordell

No report

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

C. Brunner

IEC TC57 / WG10 will meet in February in Stockholm, Sweden. WG10 has currently the following projects:

1. Finalisation of Edition 2 of IEC 61850:

All parts except part 2 (Glossary) have been published as second Edition. The work on part 2 has only started.

2. Preparation of an Edition 2.1 of IEC 61850 for some of the major parts

The work to create the Edition 2 based on the UML model of the IEC 61850 logical nodes and data is in the final stage. We expect to have drafts of the Amendments for parts 6, 7-2, 7-3 and 7-4 officially circulating this spring or early summer.

3. Technical reports that are under preparation

- IEC 61850-90-3 – using IEC 61850 for condition monitoring has been circulated as DTR.
- IEC 61850-90-12 – Wide area network engineering guidelines has been circulated as DTR.
- Work on IEC 61850-90-11 – modelling of logics, IEC 61850-90-14 – Using IEC 61850 for FACTS data modelling and IEC 61850-90-17 – Power Quality are ongoing.
- A technical report on functional testing is in preparation.
- Work on revision of report IEC 61850-7-500 about the usage of the Logical Nodes to model applications for substation automation based on comments received on first DC and on the report IEC 61850-7-5 explaining the more generic concepts is in ongoing.

4. Additional task forces address issues of Alarm handling and function modelling in SCL.

5. A few technical specifications for mappings between IEC 61850 and other protocols are worked on. Mapping with DLSP/COSEM (TS IEC 61850-80-4) has been circulated as CD, mapping on Modbus data (TS IEC 61850-80-5) is ongoing and for the mapping on 60870-5-101/-104 (TS IEC 61850-80-1), a revision has been started to be in line with Ed 2 of IEC 61850-7-3.

6. New work has been started to create a guideline how to define basic application profiles for IEC 61850.

7. A New work item proposal with a draft as CDV attached has been submitted for the precision time protocol profile for power utility automation has been submitted.

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

1. Technical reports that are under preparation
 - IEC 61850-90-8 – use of IEC 61850 for modelling of Electrical vehicles has been circulated as a first DC. DTR is in preparation
 - IEC 61850-90-10 – modelling of schedules, has been circulated as DC; comments received will be treated during the meeting next week.
 - IEC 61850-90-6 – use of IEC 61850 for distribution automation, IEC 61850-90-9 – Storage batteries and IEC 61850-90-15, Modelling a generic electrical view of DERs: First WG drafts are available.

2. Mapping on web technologies

The TF agreed on the approach to use MMS/XER over XMPP. Work on the part 61850-8-2 is in the finalisation stage.

IEC TC57 / WG18 is working on the following topics;

1. Extension of IEC 61850 information models to also include logical nodes and data models for steam and gas turbines as an amendment to IEC 61850-7-420 is in CDV stage.
2. Interoperability tests for hydro equipment based on IEC 61850 and Communication network structures in hydro power plants have been prepared as CD; harmonisation with other IEC 61850 standards has been requested
3. Communication network structures for hydro power plants

IEC TC57 / WG19 with regard to IEC 61850 works on the preparation of IEC 61850-90-2 – Use of IEC 61850 for communication towards the control centre. The comments on the circulated draft have been addressed and will now be integrated in a second draft.

WG19 is as well working on a harmonized model of IEC 61850 and CIM. A CD of a technical specification IEC 62361-102 has been circulated in January 2015.

I. RELAYING PRACTICES SUBCOMMITTEE

Chair: J. Pond

Vice-Chair: B. Mugalian

Scope: Develop, recommend and establish standards on protective relaying practices which are compatible with the electrical environment, including but, not limited to; relay withstand capabilities to electromagnetic interference, characteristics and performance of instrument transformers, testing procedures, applications, performance criteria, and definitions of relays and relay systems. Evaluate and report on pertinent aspects of protective relaying not addressed by other PSRC Subcommittees. Maintain applicable protective relaying standards.

The I Subcommittee met on January 14, 2015 with 19 members in attendance – a quorum was not achieved.

- Minutes of the I Subcommittee meeting held in Milwaukee WI in September 2014 will be approved by email
- Coordination & Advisory Committee Meeting Items of Interest:

- Working Group Chairs should provide their pertinent information to Jeff Pond and Brian Mugalian. Russ Patterson and Rick Gamble will post information for your working group. Email your content to: webmaintenance@pes-psrc.org
- Future PSRC Meetings
 - May 2015 – San Antonio TX
 - September 2015 – La Jolla CA
 - January 2016 – searching for East Coast venue
 - May 2016 – Tentatively Denver CO
- PSRC is looking for presentations for the May 2015 meeting
- On the Monday of the May 2015 PSRC meeting, there will be a presentation from 1 to 3 p.m. on the Pictorial History of the Development of the Electrical Industry by Dr. Robert Schainker
- Working Group Chair Training to be held by Rich Hunt at the May or September 2015 meeting
- Administrative items:
 - Working Group rosters were submitted in a timely manner for the directory – thank you!
 - For working group agendas and minutes, please use the format attached to the meeting agenda
 - IEEE Patent Slides are available on the PSRC web site for presentation at the beginning of each meeting
 - Review scope with Working Group members and achieve approval before submitting a PAR to the IEEE-SA
 - Working Group Chairs developing or revising guides need to attend the Standards Coordinator meeting on Tuesday morning
 - Email items to post on the I web pages to Jeff Pond and Brian Mugalian

Reports from the WG Chairs

I2: Terminology Review Working Group

Chair: M. Swanson

Vice Chair: F. Friend

Output: Definitions for IEEE Definition Database (formerly IEEE Std. 100)

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

The I2 working group, chaired by Mal Swanson, met on Wednesday, January 14, 2015 with 9 members and no guests.

Minutes from the September meeting in Milwaukee, WI were reviewed and approved and quorum was achieved.

Liaisons have been assigned for all working groups with a PAR to facilitate the development of new terms during the working group process.

Updates were given on the status of each of the standards giving attention that acronyms also have a definition.

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

All working group chair are reminded the database is available to them for use during their document development. The IEEE staff reviewed the new process for accessing the database. All IEEE members have access to the dictionary database through their MyProject account (click on "Dictionary Database" from the dropdown menu).

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

I4: IEC Advisory Working Group

Chair: E.A. Udren

Vice Chair: M. Yalla

Output: IEC TC 95 USNC standards votes and PSRC status reports

Established: 1990

Expected completion date: Meetings are continuing

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

The WG met on January 6, 2015 with 5 members & 2 guests to review TC 95 standards activities. There are no standards projects requiring review attention at this time. See below for ongoing standards development activities.

The Chair and Vice Chair reported that the US National Committee hosted the plenary meeting of TC 95 in Clearwater Beach, FL on December 5, 2014. Arrangements were handled by Murty Yalla and his Beckwith support staff. In line with earlier announcements, it was confirmed at the TC 95 Plenary that Dr. Murty Yalla will become the new Chair of TC 95 (internationally) in early 2015, replacing the outgoing Lily Yaping of China.

Full meeting minutes and copies of presentations are available on request from Eric Udren. At the meeting, Eric gave a presentation on the work of Ken Martin's PSRC/IEC TC 95 JWG developing IEC Synchrophasor Measurement Standard 60255-118-1.

Other TC 95 AHG and MT development meetings were held in Clearwater Beach the same week, in advance of the Plenary Meeting:

- Ad Hoc Working Group (AHG) 2, *New protection requirements for the smart grid*, held its wrap-up meeting on Monday, December 1. We will report output when available.
- Maintenance Team (MT 4), *Measuring relays and protection equipment – Functional standards* under Murty Yalla, is writing the first draft of IEC 60255-187-1, *Functional requirements for biased (percentage) differential relays - Differential protection for transformers, generators and motors*. MT4 met Tuesday-Thursday, December 2-4 for drafting work. Contact Murty Yalla for participation. The group is driving for completion of a Committee Draft (CD) by mid-2015.

The WG discussed an IEC proposed communications standards reorganization per 95/325/AC, in parallel with PES reorganization over the same issues. Sam Sciacca of IEEE SA will track and engage for PSRC and any new PES technical committee as required.

The WG discussed the standardization conflicts and resolution for precision time protocol (PTP) profile standards by H24 (IEEE C37.238), IEC 61850-9-3 (TC 57 WG 10), and IEC SC65C (62439-3 Annex B) which pushed into the same space where IEC and PSRC are cooperating.

Finally, the WG reviewed a presentation of the status of TC 57 WG 10 developments for IEC 61850, provided by Christoph Brunner.

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

Chair: Gary Kobet

Vice Chair: Alex Lee

Output: IEEE Guide

Established: May 2012

Expected completion date: December 2016

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

Working Group 17 held its meeting in a single session on Tuesday, January 13, 2015. This was the ninth meeting for this working group.

There were 5 members present and a quorum was reached. Nine guests attended the meeting. Membership stands at 10 members and 5 corresponding members.

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

September 2014 meeting minutes were reviewed and approved. Meyer Kao motioned to accept the May 2014 minutes and seconded by Jason Buneo.

Minutes from the teleconference held October 2, 2014 were also reviewed and approved (same motion/second by M Kao/J Buneo).

At this meeting, comments 47 through 66 were reviewed, most of which were editorial. In particular, in an attempt to address several comments, the WG decided to delete subclauses 5.2.1 through 5.2.5 and 6.4 describing current transformer tests and demagnetization and instead added a pointer to the IEEE Std C57.13.1™ Guide for Field Testing of Relaying Current Transformers.

Working Group requested the members to review the remaining comments. Teleconference meetings will be conducted in the coming months to discuss and review the remaining comments.

- I8: Revision of C57.13.3 – Guide for Grounding of Instrument Transformer Secondary Circuits and Cases**
Chair: Brian Mugalian
Vice-Chair: Bruce Magruder
Established: 2009
Output: Revision of IEEE C57.13.3-2005
Expected Completion Date: 2013

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

Working Group I8, Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases has completed its assignment. The Guide was edited by IEEE and published on January 23, 2015. Thanks to the working group members for their hard work on this revision.

A request to disband Working Group I8 will be made at the May 2015 Relaying Practices Subcommittee meeting, as no quorum was achieved at this meeting.

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

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

The Working Group met on January 14, 2015 in a single session. The session was chaired by Farnoosh Rahmatian. There were participation from 9 members and 1 guest. We had quorum.

The IEEE-SA Patent and Copyright slides were presented – there were no comments from the participants.

The minutes of the September 2014 meetings were approved.

Chair updated the attendees on the status of PAR extension. The PAR for PC37.241 was extended on December 12, 2014 for another two years, to expire by December 31st, 2016.

Chair led review of action items from the previous meeting:

1. Chair to apply for PAR extension. Status: Complete.
2. WG members to complete review of the document. Status: On-going to January 30th, 2015.
3. Sections 4.1 - 4.8 would be edited to move the chapter references in parenthesis from the section titles into the body of the sections, using cross-references. Status: Complete.

The text provided for session 7.3 by Christoph Brunner (thanks Christoph) was briefly reviewed during the meeting.

Actions:

1. Farnoosh to review text in clause 7.3, to edit for consistency with the rest of the document, and to share the revised version (Draft D4.2) with the WG by January 30th, 2015.
2. WG members to review and provide feedback on the draft Guide, rev D4.2, by Feb 28, 2015.
3. Plan to start the formal survey of the WG members on March 1st, 2015 for readiness to go for balloting.

I12: Quality Assurance for Protection and Control (P&C)

Chair: Andre Uribe

Vice Chair: Mal Swanson

Established: 2011

Expected Completion Date: 2014

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

The Working Group I-12 did not meet. The paper was submitted after the September 2014 meeting and will be approved by the I Subcommittee officers before being submitted to the web site.

A request to disband I12 will be made at the May 2015 Relaying Practices Subcommittee meeting.

I21: Analysis of System Waveforms and Event Data

Chair: Jerry Jodice

Vice Chair: George Moskos

Output: Report

Established: 2012

Expected Completion Date:

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

Working Group I21 met on January 13, 2015 with four members and eight guests.

Our assignment resulted in a report containing seventeen system events waveforms and event data. Each case study is discussed in the text. A bibliography of 23 relevant technical papers and reports presented at IEEE and other protection venues are included.

The report was approved by 100 percent of the working group members (16 members) and will be submitted to the I Subcommittee during the week of February 2.

A request to disband I21 will be made at the May 2015 Relaying Practices Subcommittee meeting.

I22: End of Useful Life Assessment for P&C Devices

Chair: Bob Beresh

Vice Chair: Bruce Mackie

Output: Report

Established: 2012

Expected Completion Date: 2014

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

WG I22 met on Tuesday, January 13, 2015 at 11:00am PST in a single session with 9 members and 15 guests.

After introductions, the current status of the document was reviewed. Charlie Henville discussed the concerns with the term safety in the document.

The process for finalizing the document was discussed. The latest draft will be sent to the working group in the next few days. The working group will have to the end of February to review the document and submit their vote to submit the document to the sub-committee. If approved, the document will be submitted to the sub-committee for their approval.

The outline of the document was reviewed as well as the location on the PSRC website.

I23: Revision of C57.13.1 – Guide for Field Testing of Relaying Current Transformers

Chair: Bruce Magruder

Vice-Chair: Will Knapek

Output: Revision of Guide for Field Testing of Relaying Current Transformers

Established: May 2013

Expected Completion Date: 2018

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

Working Group I23, Revision of C57.13.1 - Guide for Field Testing of Relaying Current Transformers, was held in Regal Room, Hyatt Hotel, Garden Grove, CA, on January 14, 2015 at 9:30 am. Seven members and one guest were present and a quorum was met.

Patent Conflict slides were shown.

September 2014 minutes reviewed and approved.

Welcome two new members, Gordie Halt and Craig Bryant. 4 members were changed to guest status.

Review of draft version 3 was conducted.

1. Jeff Brunsworth drawing updates were reviewed after changes recommend from last meeting and approved.
2. Reviewed figures submitted by Rene Aguilar.
3. Reviewed figures and writing submission provided by Gordie Halt.
 - a. Need to add new figure around Figure 13 to show a good CT curve.
 - b. Figure 15 needs a connection diagram for the oscilloscope.
 - c. Will look at moving excitation evaluation section to Annex B since results of tests were limited to a single CT.
4. Edits to Chapter 16 were made.
 - a. Gordie Halt will upgrade drawings.
5. A new section on "Modern Test sets" will be added. Don Sevcik and Will Knapek will meet in February to work on tbrhis section.
6. Section 5 was edited to add reference to other standards on CT Magnetization.

I24: Use of Hall Effect Sensors for Protection and Monitoring Applications

Chair: Jim Niemira

Vice-Chair: Jeff Long

Output: Develop a Report on the Use of Hall Effect Sensors for Protection and Monitoring Applications. The report will discuss the technology and compare with other sensing technologies.

Established: January 2013

Expected Completion Date: September 2014

The Working Group I-24 met on Tuesday, January 13, 2015, at Garden Grove in single session chaired by Jim Niemira with a total of **9 attendees** (5 members and 4 guests). Quorum was met after determining the latest membership is 10 (Phil Zinck and Alex Stanojevic have dropped out of active membership and will continue as corresponding members).

Meeting was brought to order at 3pm. The IEEE patent slides were presented and reviewed.

Mark Taylor motioned to accept the minutes from the last meeting and John Buffington seconded the motion. The minutes were accepted.

Mark Taylor made a presentation on Electronic Current Transformer (ECT) Comprehensive Test Report to demonstrate its accuracy. The presentation describes the testing performed on Hall Effect sensors to test their accuracy and benchmark their performance against traditional current transformers and a resistive current shunt.

Mark Taylor noted that Amir Makki would make a version of the presentation available to the working group for reference before the next meeting.

It was noted that several writing assignments are still missing from Amir Makki, Joe Perez, Jeff Long, George Semati and Vessalin Skendzik.

Jim Niemira will contact the individuals to provide their contributions for the report.

Jeff Long will incorporate additional theory information into the report using the presentation from Vincent Moser as a reference document.

Jeff Burnworth brought up the issue of copyright law for material (specifically, pictures taken from the internet) that are used in the report. Jim Niemira will bring this issue up to the I-subcommittee leadership and seek guidance as to whether we need to get formal permission or whether we just need to reference the source and give credit.

John Buffington will take on Advantages and Limitations sections and will include a table of advantages and disadvantages of Hall Effect sensors vs. other current sensing technologies in this section. John Buffington and Jim Niemira will review the presentation given by Vincent Mosser for material that may be used for the report, focusing on practical applications for the protection and control audience.

Mark Taylor will add DFR applications to the report.
Mark Taylor will review the entire document for fluency.

Final writing assignments are due Feb 19th.

Web-based meeting will be scheduled for April 9th to discuss and wordsmith the report.

I25: Commissioning of Substation Protection and Control Devices
Chair: Rafael Garcia
Vice Chair: Kevin Donahoe
Output: Report: Provide guidance in the commissioning of power system protection systems
Established: January 2014
Expected Completion Date:

Working Group I-25 met today Sept. 10, 2014 in Milwaukee, WI with 16 members and 4 guests.

Working Group I-25 met today Jan. 14, 2015 in Garden Grove, CA with 11 members and 12 guests.

The assignment of the working group was discussed. The following standard approach was proposed for the sections on relay schemes:

1. Introduce the subject
2. Define the subject
3. Refer to the common procedures

4. Detail those aspects that are unique to the subject
5. Address common errors associated with the subject

It was pointed out that the subject should be defined but care should be taken not to include too detailed of an explanation. For the purpose of this document, it is assumed that the audience is familiar with the schemes themselves but need guidance on how to test their associated pieces. Since the paper covers a lot of schemes there won't be room to explain all these schemes.

It was proposed that there be a section that addressed the common approach that leads effective commissioning. A section was added titled Commonalities between schemes. Documentation was discussed as a necessary section of this paper. Eric Shock with First Energy, volunteered to provide wording for this section in the next couple of weeks since it will help set the tone for the rest of the paper. Further assignments will be made after Eric provides his section so that we can try to establish a pattern for writing the rest of the paper to avoid duplications, instructions will be sent out.

The document will not be addressing if the settings were properly created but that the settings were installed and tested as they were designed for the specific installation. It was pointed out that anything identified as a "best practice" could end up as a NERC standard and this should be kept in mind while writing this report.

Since there is plenty of work to do and a short period of time to do it we plan on scheduling teleconference meetings between now and May meeting to speed up the process.

I26: Review and Expand Transaction Paper on Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers

Chair: Mike Meisinger

Vice Chair: Alex Lee

Output: Report: Revise Transactions Paper

Established: January 2014

Expected Completion Date: December 2018

Assignment: Recommendation to update or expand Mathematical models of instrument transformers [1] and transducers, including interface electronics such as merging units, for use in both off-line and real time EMTP studies. In addition to improved models for conventional CT's, PT's and CVT's there are now new transducer types such as optical, Hall effect, Rogowski coils.

1. "Mathematical Models for Current, Voltage, and Coupling Capacitor Voltage Transformers." , Working Group C5 of the IEEE PSRC, Chairman D.

Tziouvaras, Vice-chairman **P.G. McLaren**, et al., IEEE Transactions on Power Delivery, January 2000, Vol. 15, No. 1, p62.

I26 met on Tuesday, January 13th with 3 members and 5 guests with Jack Wilson joining the WG as a member. Due to the low turnout and no projector, the Chair described the content of the previous WG report.

The Chair then asked that all members and interested guests review and compare the previous WG report and transaction paper between now and the next meeting, and provide written comments to all those addressed in this email. This assignment is to be completed by April 17th.

Additionally, the WG is looking for a volunteer to review the Jiles Atherton core model as Peter McLaren indicates it is out of date and will require updating.

It would also be helpful if Yaun Liao could provide the WG with an update on the latest work on the subject matter of instrument transformer modeling.

I27: Investigation of Protective Relay Self-Monitoring Capabilities

Chair: Bob Beresh

Vice Chair: Yuchen Lu

Established: 2014

Output: Report

Assignment: Prepare a technical report to the PSRC main committee on the enumeration, performance and efficacy of self-monitoring capabilities within protective relays in order to determine the extent and degree of self-monitoring.

Expected Completion Date: 2015

31 Were in attendance

- There was a fairly heated discussion on the need to focus on relay monitoring and not extending into the power system. This requires balance as power supply monitor is impacted by the battery and A/D monitor is impacted by CT / VT.
- Assignments were accepted to include real-world examples of practices / impacts / mitigation of relay failures.
- A request was made to add CPU usage to monitored functions in relays. We may add a “wish list” section to the report.
-
- We are looking for a vice-chair and secretary for the working group.

I29: Revision of C37.110 Guide for Application of Current Transformers for Protective Relaying Purposes

Chair: Joseph Valenzuela

Vice Chair: Jeff Long

Output: Revision of the Guide

Established: September 2014

Expected Completion Date: January 2018

The Working Group I-29 met on Tuesday, Jan 13th, 2015, at Garden Grove, CA in single session chaired by Jeff Long (sitting in for Joseph Valenzuela) with a total of **18 attendees** (9 members, 1 corresponding member and 8 guests). Quorum was met. Michael Higginson subbed as Vice Chair for this meeting.

Meeting was brought to order at 1:35 pm.

It was noted there were assignment errors in the minutes from the last meeting. Will Knapek was added to the review of Annex A & C. Charles (Chip) White was removed from review of Annex C.

Therefore, after implementing the changes, the following members have been assigned to review the following sections prior to the next meeting and give a report on their findings:

Section 1: Gordie Halt

Section 2: Chip White

Section 3: Chip White

Section 4: Gordie Halt, Lee Bigham and Kevin Donahoe

Section 5: Mike Higginson and Alex Lee

Section 6: Jack Wilson, Phil Zinck and Alla Deronja

Section 7: Eric Monson and Alla Deronja

Annex A: Tapan Manna & Will Knapek

Annex B: not assigned at this time

Annex C: Will Knapek

Annex D: Jack Wilson

Annex E: All members to check their sections to ensure the referenced materials in Annex E are still applicable to the guide.

A motion from Mike Higginson to accept the minutes was made. Chip White seconded the motion. Motion passed and the minutes were accepted with the changes mentioned above.

It was noted that Joseph Valenzuela had submitted for PAR on October 20, 2014, but was rejected after review by NESCOM. The reason for rejection was that the PAR had not been thoroughly reviewed and approved by the I-29 working group.

A thorough review of the PAR request was performed by the group. It was decided by the working group to do the following actions for the PAR:

- 1) Section 3.1 Working Group: Add Vice Chair contact information
- 2) Section 3.2 Sponsoring Society: Update the contact information for Sponsor Chair and Standards Representative
- 3) Section 5.5 Need for Project: Change the phrase from “New theories and applications *must* be addressed...” to “New theories and applications *will* be addressed...”
- 4) Section 5.6 Stakeholders: Change the phrase to read “Stakeholders include electrical engineers and equipment manufacturers in the power industry.”

Approval of the PAR with the changes suggested above was unanimously agreed upon.

Joseph Valenzuela shall make updates to the PAR based on the decisions of the working group and shall resubmit for REVCOM approval.

The working group discussed how to review and compile comments made to the current revision of C37.110. Jeff Long and Joseph Valenzuela will develop an excel spreadsheet used to track the comments and proposed changes to the guide.

Once the PAR has been approved, Joseph Valenzuela will contact Erin Spiewak to obtain a word document version of the guide that will be uploaded to central desktop. If possible, it will be made available to members of the working group to check in/out.

The working group shall convene via webex in a month and a half to discuss comments made during the initial review of the current revision of C37.110. We will target a Wednesday to hold the meeting.

Lee Bigham moved to adjourn the meeting. Will Knappek seconded. Meeting adjourned at 2:45pm.

Members in attendance at the meeting were:

Member	Company
Jeff Long (Vice Chair)	Kiewit Engineering & Design, Co.
Lee Bigham	Instrument Transformer Equipment Corp
Kevin Donahoe	GE
Gordie Halt	ITC
Michael Higginson	S&C Electric
Will Knappek	Omicron
Sudhir Thakur	Exelon Generation
Charles White	Beta Engineering
Jack Wilson	Ameren
Corresponding Member	Company
Alla Deronja	American Transmission Company

I30: Revision of C37.235 Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes

Chair: Ljubomir Kojovic

Vice Chair: Tapan Manna

Output: Revision of the Guide

Established: September 2014

Expected Completion Date: December 2018

Working Group I30 held its meeting in a single session today, chaired by Tapan Manna. There were eleven members and guests and received comments on the new scopes.

Today's agenda included:

- Introduction
- PAR Update – not approved, need to resubmit with new scopes (to be approved by all attendees) by March 2015.

- Presentation on RC Application (original slides by Ljubo)
- Received comments from all members and guests: major suggestions include pro's and con's of RC technology including the application coverage.
- Received comments from Jeff and Erin on the current PAR status and the PAR process.
- Adjourn

As discussed during the meeting could you all please provide your comments (to ljubomirakojevic@eaton.com or me) on the scope coverage. This will then allow us to make necessary amendments to the scope as appropriate prior PAR submission.

I31/Subs C2: Environmental and Testing Requirements for Communications Networking Devices; IEEE 1613/1613.1

Chair: TBD

Vice Chair: TBD

Output: Revision

Established: September 2014

Expected Completion Date: TBD

At the Relaying Practices Subcommittee Meeting, John Tengdin introduced the plans for Substation Committee Working Group C2 and their effort to revise IEEE 1613/1613.1. This is a Joint Sponsored Agreement between T&D, Substation, and PSR Committees. At this time, there is discussion between Brian Mugalian and John Tengdin regarding the first draft of the document, specifically regarding the C37.90 family of standards and their placement in the P1613.1 document. An on-line meeting will be held in March to review the latest version of the draft.

Liaison Reports

a. Instrument Transformer Subcommittee (Fred Friend):

The spring meeting of the Instrument Transformer Sub Committee will be in San Antonio, TX, 12 – 16, April 2015.

There are three active working groups.

PC57.13 Standard Requirements for Instrument Transformers is being revised.

PC57.13.7 Standard for Instrument Transformer with max output of 250ma is being developed.

PC57.13.8 Standard for Station Service Voltage Transformers is being developed.

Coordination Reports

None

Old Business

Recommended a Task Force to determine if a working group is needed to define relay testing terms. See recommendation from Amir Makki. Amir will discuss at the May 2015 meeting.

Dear Jeff and Brian,

As promised I have prepared the following description for discussion during the I Subcommittee meeting in Minneapolis:

We would like to discuss the forming of a new Task Force to determine whether a Working Group should be formed to define the terms used to describe the various types of relay testing techniques applied in our industry. Examples of testing terms include but are not limited to: **element, scheme, system, state, dynamic, transient, and end to end**. The output of the Task force would be a recommendation to the subcommittee.

The work is needed because there is a whole family of relay testing terms that are not defined in the IEEE dictionary. The terms are not uniformly used and mean different things to different producers and users. Providing standard definitions for these terms will help eliminate any confusion. The resulting standard definitions should also be submitted to the I2 Working Group for inclusion in the IEEE dictionary.

Thanks,
Amir Makki

New Business

The I Subcommittee bids farewell to the following contributors/members:

Bob Beresh
Oscar Bolado
Del Weers

The I Subcommittee welcomed two new members to the group:

Roy Moxley
Farnoosh Rahmatian

J: ROTATING MACHINERY PROTECTION SUBCOMMITTEE

Chair: M. Yalla

Vice Chair: M. Reichard

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

The J Subcommittee met on Jan 14, 2015 with 15 members (achieving quorum 15/26) and 15 guests. There was a call for the approval of the minutes of the Sep 2014 meeting in Milwaukee, WI. These minutes were approved unanimously by the subcommittee members.

Reports from the WG Chairs

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

Chair: Sudhir Thakur
Vice Chair: Manish Das
Established: 2011
Output: Report to Subcommittee
Status: 10th Meeting

Expected Completion Date: 2016

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 group met on 1/14/2015 in Garden Grove, CA for a double session with 12 members and 15 guests in attendance.

The Chair announced that due to personal reasons, Vice Chair Mukesh Nagpal will no longer be able to attend these meetings. Manish Das was nominated and accepted as the new Vice Chair.

The meeting started with Jun Verzosa making a presentation on Testing of Out-of-Step Protection. There were several questions and good discussions following the presentation.

Dr. Rama Gokaraju presented an example of Equal Area Criterion Scheme. A detailed discussion was held on the applicability of x_d'' vs. x_d in the simulation. It was recommended that the equal area curve be re-evaluated by the usage of x_d'' .

Gene Henneberg presented Triple Lens Scheme.

Sudhir Thakur presented the draft D4 version of the paper as it stands today. He discussed the NERC TRD recommendation to not set the out of step protection unless stability studies have been performed and a section was added in the paper to document J subcommittee position.

There were no formal assignments made. The team agreed that the paper as it stands today has good content and would now be formatted and reviewed in entirety by three reviewers and the individual contributors would be reviewing their sections.

The minutes from the Sep 2014 meeting was approved.

The working group will have its 11th meeting in May 2015, with the need for a single session, computer projector and seating for 35 people.

J6: Protection Issues Related To Pumped Storage Generation

Chair: Joe Uchiyama

Vice Chair: Dale Finney

Established: January 2011

Output: IEEE Transaction Paper

Assignment: Based on the industrial survey, evaluate and report on protective relaying concepts and practices applicable to a combination of generator and motor, and performance of plant protective systems. To summarize a report of the trend of the last thirty-five (35) years of Pump Storage unit protection since PSRC presented the summary report in May/June 1975.

Scope: Summarize the trend of Pump-Storage motor and generator protection for last thirty-five (35) years of industry practices.

Draft: 5.0

The J6 WG met on Tuesday, Jan 13, 2015 at 4:30 p.m., in Garden Grove, CA in a single session with seven (7) members and eight (8) guests. A quorum was met so the September minute was approved.

After introductions, Chairman reported the results of J-subcommittee ballot and distributed the agenda, list of comments, draft 4.0 which was used for J-subcommittee ballot.

The comments on the draft-3.2 were reviewed and the following topics were discussed:

- Topic-1 (Device 27TH) Third Harmonic Undervoltage Relay/Element

In general, most units will generate 1% or more 3rd harmonic voltage. If the reduced or no 3rd harmonic voltage at the neutral is detected, it determines as a short circuit between a stator winding(s) and ground. 27TH 3rdharmonic under-voltage relay/element detects this condition. 100% ground fault detection is achieved by the combination of a fundamental frequency overvoltage relay/element (59G covering 85~95% of the stator windings from unit terminal) and a 3rd harmonic undervoltage relay/element (27TH covering 90~100% of stator windings)."

- Topic 2 (Device 78) Out of step Relay /Element

During a loss-of-synchronism (aka out-of-step) between a unit and a system, the apparent impedance at the unit terminal will vary as function of the unit and system. This variation in impedance may be readily detected by out-of-step relay. See C37.102 for the details.

- Topic-3 (Title of Paper)

"Protection Practices for Pumped Storage Generation"

- Topic-4 (various typos & Clarifications)

The document was cleaned up with the basis of J-subcommittee ballot comments. Dale Finney (Vice Chair) will review the document and make any editorial corrections.

- Next step :

- ✓ As soon as Dale returns the reviewed document to the chairman, he will update the document and send to WG members for the final review.

- ✓ If there will not indicate the substantial comments from the WG, chairman will submit to PSRC officer for their approval.
- ✓ Upon of the PSRC officers' approval, the chairman will submit to IEEE for their editorial review and followed by final submission after addressing the comments.

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

J7: Avoiding Unwanted Reclosing on Rotating Apparatus

Chair: Mike Reichard

Vice Chair: Steve Conrad

Output: Report to the Rotating Machinery Protection Subcommittee of the PSRC

Established: 2011

Tenth meeting Expected Completion 2015

Status Draft 1.0

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

WG Chairman Mike Reichard is presently deployed; Vice Chair Steve Conrad conducted the meeting and thanked Mike for his military service.

The working group met with 3 members and 14 Guests (not achieving quorum) on January 13, 2015 in the Regency-Hyatt.

The meeting minutes from the September meeting were not approved as the quorum was not met, vice chair will call for email approval. The chair discussed the assignment of the WG and summarized draft 1 of the report.

Zeeky Bukhala agreed to write both the Abstract and Conclusion and submit each prior to February 15, 2015. The VC will incorporate these and request the WG review the draft 2 for comments prior to the May meeting. The intent of the WG is to submit the report to the SC after the May meeting.

Next meeting requirements: Single meeting, room for 30, computer projector.

Avoid conflicts with K16 and J7 – Steve is VC of both WG

J12: Improved Generator Ground Fault Protection Schemes

Chair: Dale Finney

Vice Chair: Manish Das

Established: Jan 2013

Output: Report to subcommittee

Status: 5th Meeting

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

The group met on 1/14/2015 in Garden Grove, CA with 6 members and 9 guests in attendance.

The minutes from Sept 2014 meeting were approved.

The meeting began with a review of two working group assignments.

Fundamental Generator Protection Relay Deficiencies on Large Generators (Maughan Paper).

The key aspects of the paper were identified. It was agreed that a discussion on faults originating from stator conductor fractures should be captured for ultimate inclusion into the next revisions of C37.101 and C37.102.

A Practical Improvement to Stator Ground Fault Protection Using Negative Sequence Current (Patterson Paper)

Key aspects of the paper were identified. Several attendees commented on coordination issues related to the VT fuses. There was a discussion on the need to secure the subharmonic injection scheme for VT secondary faults.

Russ Patterson raised the question of whether the report would include a section on resonant grounding of generators.

Nate Klingerman discussed a recent experience of an intermittent ground on a large thermal unit. Nate will collect some data for this event to share with the working group.

The chair shared a proposed outline of the paper. No formal assignments were made. However the working group members were urged to review the outline and consider writing assignments for the next meeting.

The working group will have its 6th meeting in May 2015, with the need for a single session, computer projector and seating for 25 people.

Avoid conflict with K11 WG meeting.

J13 : Modeling of Generator Controls for Coordinating Generator Relays

Chair: Juan Gers

Vice Chair: Phil Tatro

Established: September 2012

Output: Report to Subcommittee

Expected Completion: 2016

Status: 7th Meeting

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

WG Report

The working group met with 16 members and 8 guests present. A quorum was achieved.

The working group approved minutes of the September 9, 2014 meeting as presented. Phil Tatro reported that minutes of the May 13, 2014 meeting were approved by email ballot subsequent to the September meeting.

Sandro Aquiles-Perez presented a summary of methods available for modeling protective relays in transient stability programs and the advantages and disadvantages of each method. The methods presented include manually modeling the expected operation of the relays and use of generic models or detailed models that respond to voltage and current phasor data calculated by the program. He also discussed transient stability program limitations such as only having positive sequence data available. Sandro presented information on a third approach to provide a link between the transient stability program and protective relay software. In this approach the positive sequence solution is exported to the protective relay software which then solves the negative and zero sequence networks and assess the relay operation using a detailed relay model. The protective relay software then exports the relay state back to the transient stability program to determine any switching to be modeled in the next time step solution. An example was provided for a generator loss-of-field event. Working group members

discussed limitations of converting the generator capability curve from the P-Q plane to the R-X plane which requires an assumed voltage.

Dale Finney illustrated the formulation to calculate the critical angle and critical clearing time for a balanced three-phase fault. For this he used an example from the book by Grainger and Stevenson that considers a three-phase fault in a system with a generator swinging against an infinite bus. This method can provide a first order approximation to verify whether transient stability results are in the right range. He validated the results by using a Matlab Simulink software that replicated the example. Working group members discussed interest in repeating with a local networked system modeled for which the critical angle is based on a fault and tripping one of the local networked lines.

Robert Thornton-Jones provided a liaison report for ESCS. He reported present activity is focused on bringing standards up-to-date to support validation and testing under NERC requirements. The next meeting is at the July 2015 Power & Energy Society meeting in Denver. Charlie Henville indicated he will attend the meeting. Juan Gers requested that others consider attending as it would be good to have two or three working group members attend. Robert will provide a presentation to the working group at the next meeting in May 2015, subject to ability to attend.

Juan Gers reviewed the draft outline for the working group report and requested volunteers to work on drafting sections of the report. Juan and Phil will work on compiling the draft sections into a first draft. Volunteers so far include:

- Introduction to the paper and discussion on disturbances and stressed system conditions – Dale Finney and Juan Gers
- Characteristics of PSS control systems and relationship with generator protective systems – Mike Basler
- Operating characteristics, settings, and coordination of overexcitation and underexcitation limiters – Normann Fischer
- Modeling of protective relays in power dynamic stability modeling software. Sandro Aquiles-Perez, Deepak Maragal
- Coordination checks of the timing and sensitivity of protective elements with generator control characteristics. – Normann Fischer
- Modeling tripping of the generator and delaying tripping of the excitation system – Charlie Henville

The requirements for the next meeting are a single session, a meeting room for 40 people, and a computer projector.

J14: Plant Protection Issues Associated with Black Starting of Generators

Chair: Chris Ruckman

V Chair: Zeeky Bukhala

Established: May 2014

Output: Report to Subcommittee

Expected Completion: May 2016

Status: 3rd Meeting

The working group held its third meeting on Tuesday, January 13th, 2015 with 9 members and 9 guests in attendance

Assignment: Investigate and report to the J Subcommittee on plant protection issues associated with black start.

- I. Chair kicked off the meeting with introductions and a brief review of the assignment and background of the working group.

- II. Minutes from the September 2014 meeting were approved.
- III. Assignments from the September meeting were reviewed
 - a. Chris Ruckman continues to have discussions with ISO-New England to find any information that they have regarding the restoration process following the 2003 Northeast blackout.
 - b. Chris Ruckman shared an updated combustion turbine oneline that included the addition of a diesel generator (DG) to the low voltage (LV) distribution system. Working group agreed there was no need to show other LV loads other than noting their existence in the text. Chris will also include protection associated with the DG to the oneline
 - c. Dale Finney shared an updated hydro oneline that included inputs from Sungsoo Kim and Russ Patterson. Working group recommended removing the redundant protection packages to maintain consistency with the other onelines. Nathan Klingerman will send his inputs to Dale.
 - d. Chris Ruckman's literature search on emergency power (DC and UPS) during black start identified two papers published in 1995 and 2005 that only had cursory observations on the subject. Working group agreed there is a need to include a discussion on the importance of emergency power during unit trips and/or shutdowns and some guidance around battery sizing.
 - e. Matt Basler reported that he is continuing to research the identification of potential issues with excitation during black start. During discussion the following items were suggested.
 - i. Manual versus automatic regulation during black start. Deepak Maragal shared his experience that led to the use of manual regulation during black start operations.
 - ii. Limiter and protections during manual regulation
 - iii. Careful review of unit online or offline status as indicated to the exciter during black start and its impact on exciter control (this also applies to turbine control).
 - f. Additional discussion generated during the assignment review included:
 - i. It was agreed that there was no need to address protective elements by application, i.e., diesel, combustion turbine, etc. The paper will outline protections across all plant types and highlight any differences in application.
 - ii. There should be a short discussion on steam turbine black start plants focusing on the start sequence and highlighting any protection differences.
 - iii. The onelines will highlight any elements requiring special attention.
 - iv. Members shared experience with transformer in-rush and its impact on differential protection. Dale Finney indicated he has some oscillography illustrating this phenomenon.
 - v. Reduced fault contribution has an adverse impact on some protective elements, particularly current elements.
- IV. Next Steps.
 - a. The following tasks were assigned
 - i. Combustion turbine black start write up – Chris Ruckman
 - ii. Hydro turbine black start write up – OPEN
 - iii. Other plant startups (steam turbine, VSC HVDC, distributed power, etc.) – OPEN
 - iv. Protection element write ups. Chair pointed out that there are existing write-ups on most functions in the existing literature:
 - 27, 59 – Dale Fredrickson
 - 46 – Derrick Haas
 - 50, 51 (station service), 87SP – Sungsoo Kim
 - 87 – Dale Finney
 - Inadvertent energization – Nick Hoch
 - Chair and Vice-Chair will draft the remaining elements.
 - b. Chair appealed to members to look for cases of when system restoration has been applied, Dale Fredrickson also appealed to members to find actual System Restoration Plans for consideration.

J-15: Investigation of the Criteria for the Transfer of Motor Buses

Chair: Wayne Hartmann

Vice Chair: Joseph Valenzuela

Established: 2015 (1/15)

Output: Report

Status: 1st Meeting

Assignment:

1. Review, compare and contrast NEMA MG-1 with ANSI C50.41-2012 regarding transfer criteria.
2. Investigate existing open-transition motor bus transfer (MBT) actual data from multiple events at the medium voltage level. Examine for current versus Volts/Hz at transfer periods to see if there is a correlation.
3. Examine published reports and papers on motor bus transfer criteria to reconcile the conclusions with field results and C50.41 and NEMA MG-1.
4. Study motor protection oscillography voltage and current to identify which motors are generating and which are motoring. Examine v/Hz and reacceleration current of composite bus and individual motors.

Activity:

1. The WG met January 13, 2015, with 15 members and 5 guests. Chris Ruckman served as Vice Chair. This was the 1st meeting of the WG after 2 TF meetings.
2. Chair reviewed history of TF and reviewed assignment for members and guests.
3. Chair stated now the TF has turned into a WG, the intent is to produce a written Report to Subcommittee.
4. Tom Beckwith presented [1] Test Results and observations from testing of MBT relays under IEEE defined inertia (bus decay) values for frequency and voltage and [2] Field Results of actual unplanned Fast and In-Phase transfers from multiple power and industrial plants.

Discussion:

1. It was noted on the last C37.96 update that the WG had difficulty determining origin/rationale of the 1.33 V/Hz transfer limit in C50.41. It was noted that the 10 cycle synchronous transfer time limit in C50.41 also needs origin/rationale investigation.
2. The Test Results and Field Results called the 1.33 V/Hz and 10 cycle maximum synchronous transfer limits into question. The Field Results demonstrated there is no corollary of V/Hz to current pickup at transfer (I_{MAX}/I_{FLA}).
3. Comment to Test Results was voltage and frequency may not decay as per the 2012 IEEE Report defined rates. It was noted that the IEEE designated decay rates (inertias) provide a standard per IEEE designated decay rates as a baseline for characterization of MBT equipment performance.
4. Suggestion made that WG attempt to examine aggregate motor bus observed characteristics at transfer and see if torque approximation for aggregate motor bus determined.

Assignments:

1. Chair to investigate use of web for document management for WG.
2. Russ Patterson to report on development of motor manufacturers list to be used to contact these manufacturers about their input on motor torque capabilities versus the C50.41 standard.
3. Wayne Hartmann, Norman Fischer and Derrick Haas to create suggestions for plant monitoring (individual motor relay triggering) so oscillographic information can be captured from individual MV motors when a bus transfer is made.
4. Dale Finney and Prem Kumar to forward information of 1.33 V/Hz origins made during the latest C37.96 revision to the Chair.

5. Murty Yalla and Dale Finney to investigate to examine Field Results data and see if air gap torque could be calculated or approximated.
6. Chris Ruckman volunteered to write up a discussion of changes in the C50.41 2002/2012 documents.
7. Norman Fischer and Derrick Haas to review Test Results and Field Results to further comment on observations given at Meeting.
8. Chair to draft outline of Report.
9. Chair to send link for pertinent paper and report download by WG so volunteer for review of papers and reports made with the lens of comparing and contrasting of transfer recommendations in C50.41 and NEMA MG-1. Chair will call for volunteers WG members have had a chance to review paper and report collection.
 - Assignments 1-7 are to be reported to the Chair by April 15, 2015, for exploration at the May 2015 Meeting.
 - Norman Fischer, Derrick Haas and Nate Klingerman were welcomed as new WG members

Next Meeting:

- Single session; projector, 30 people

Other Reports:

C17: Fault current contribution from wind farm plants

G. Hennenberg did not attend the J SC meeting

Liaison Reports

None

Electric Machinery Committee (EMC)

C. Mozina will not be attending PSRC meetings in the future, Zeeky Bukhala will act as a Liason

IAS I&CPS Committee

C. Mozina will not be attending PSRC meetings in the future

Need to find a Liason

Nuclear 1E WG

Standard 741 will be split into two parts. Prem will provide details in the next meeting.

P. Kumar

NERC (related to rotating machinery)

J. Uchiyama

PRC025-1 was approved in July
When will it be effective – October 2014. It covers 21 and 51V, etc.

PRC026 is finally approved after many ballots

Chair instructed Juan and Sudhir to check this document and report it at the next subcommittee meeting on its impact on J subcommittee documents.

PRC027

It is expected that 027 will replace PRC 001

Any system change that increases fault current by 10% requires a new coordination study

Coordination Reports

None

Old Business

J SC to investigate with D SC Device 78 definition C37.2 – 2008 to change it to Loss-of-Synchronism protection. Gary Kobet will be the point of contact.

The proposal from Gary Kobet was discussed and it was decided by the subcommittee to modify the present write up in C37.2 as follows:

Device number 68—blocking or “out-of-step” **blocking** relay

A device that initiates a pilot signal for blocking of tripping on external faults in a transmission line or in other apparatus under predetermined conditions, or cooperates with other devices to block tripping or reclosing on an out-of-step condition or on power swings.

Device number 78 — phase-angle measuring **or out-of-step tripping relay**

A device that functions at a predetermined phase angle between two voltages, between two currents, or between a voltage and a current **or a device which initiates tripping on an out-of-step condition.**

New Business

New J Subcommittee Members

Chair announced that the following are appointed as J subcommittee members

1. Chris Ruckman
2. Hugo Monterrubio
3. Manish Das

New Chair and Vice Chair of J Subcommittee

Chair Murty Yalla thanked all the subcommittee members for their contributions during his term for the past 6 years and announced that this is his last meeting as a J subcommittee chair and Michael Reichard will take over the responsibility as a Chair of the J subcommittee from May 2015 meeting.

Chair also announced that the new Vice Chair of the J subcommittee is Dale Finney.

The meeting was adjourned

K: SUBSTATION PROTECTION SUBCOMMITTEE

Chair: M. J. Thompson

Vice Chair: D. G Lukach

The K-Subcommittee met on Wednesday, January 14, 2015 in Garden Grove, CA, with 18 of 32 members and 26 guests in attendance. A quorum was achieved. Steve Conrad motioned to approve the September, 2014 subcommittee meeting minutes. Roger Hedding seconded. Vote was unanimous to approve.

The K subcommittee welcomed Qun Qui and Martin Best as members. Chuck Mozina has resigned from the subcommittee with his retirement and we thanked him for his service.

Reports from the WG Chairs

K1: PC 37.245 GUIDE FOR THE APPLICATION OF PROTECTIVE RELAYING FOR PHASE SHIFTING TRANSFORMERS.

Garden Grove, CA 13th January, 2015

Chair: Lubomir Sevov

Vice Chair: Brandon Davies

Established: Jan. 2012

**Output: PC37.245 Guide for the Application of Protective Relaying for Phase Shifting Transformers
Draft 5.1a**

Expected Completion Date: Dec.2016

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

The K1 working group met in a single session. Brandon Davis acted as Vice chair, filling in for Charles Henville. 7 members and 5 guests were present. After the introduction, a call for quorum was made. Quorum was not achieved. The minutes from the September K1 WG meeting were circulated via e-mail by the WG Chair, and the minutes were approved.

The IEEE Patent disclosure slides were presented.

Current draft of the document is 4.3a. After this meeting, the next draft will be 5.1a

The following items were discussed:

- Delta Hex PST connections shown in C57.135 guide were discussed. Lubo Sevov discussed with the Transformer Committee working group chair and confirmed that the Delta Hex PST connections shown in C37.135 were incorrect. He also discussed the name of a PST type from Section 4.5.2, and Table 1 from Section 4.6.3 "Single Core with 3 two phase LTC units" and confirmed that the preferred name would be "Single Core with two LTC units per phase". The transformers committee WG chair promised to address the findings on their next meeting in April.
- The group discussed providing a list of items to be added/modified in the C37.135 guide for consistency with the PC37.245 guide. Michael Thompson volunteered to attend the transformer Committee WG meeting in April, and deliver/discuss these items.
- Tony Seegers volunteered to be our liaison with the terminology working group.
- Charlie Henville reviewed his comments on the short circuit study performed by Eli Pajuelo. The group discussed adding details to this section regarding the modeling of zero sequence shunt impedances in the fault models.
- Michael Thompson discussed the sequence component differential protection with variable phase compensation. He agreed to support the protection method with diagrams. The inclusion or exclusion of a specific restraint calculation method to this section was also discussed, and he agreed to review it, if it can be made more generic.
- The updated figures provided by Brandon Davies were reviewed. Lubo provided a comment on section 11.1.1 regarding the discussion of the winding Ampere-Turns Balance differential relay angle compensation. Brandon Davies to review this section and provide clarification.
- Abu Bapary reviewed his contribution on voltage transformers.

Assignments

- Brandon Davies and Stephen Conrad volunteered to review the C57.135 guide and coordinate with Mike on a list of items to discuss with the Transformer committee working group.
- Lubo Sevov to contact Eli Pajuelo to see if he will be available to provide more input and updates to the section on transformer fault model.
- Charlie Henville to add discussion regarding modeling of PST zero sequence shunt admittance to Section 10.
- Michael Thompson to add figures to section 11.7 to the sequence component differential protection, and review the part discussing the restraint current.
- Abu to review and expand the section of VTs used for PST protection and control purposes.
- Michael Thompson to add more on PST through faults, and PST overload in section 11 "Introduction to PST Protection"

Authors are requested to provide contributions by March 15th.

Request for next meeting is a double session, room for 30 attendees and a projector.

K1 WG leadership matters:

Charlie Henville expressed willing to step-down from his position as Vice Chair of the group, and proposed Brandon Davis to take this position. The proposal was accepted by the Chair of the WG, and the Chair of the K subcommittee, and an offer to Brandon was made. Brandon Davis accepted, so the Vice Chair for the next meeting will be Brandon Davis.

K3: Reducing Outages Through Improved Protection, Monitoring, Diagnostics, And Auto restoration In Transmission Substations – 69kv and above

Chair: Bruce Pickett

Vice Chair: Paul Elkin

Established: Sept. 2010.

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

Expected Completion date of WG: December, 2015

1. Paper-Draft 13- Final; 2. Transactions Summary paper- Final

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

K3 did not meet at the January meeting.

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

Draft : 2.0

Expected Completion Date: Dec. 2016

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

1. Introductions/ Sign up sheet/Patent slides/ Quorum?

15 members attended out of 27 members, and 23 guests attended. A quorum was attained.

2. Approve Milwaukee meeting minutes

Mike T - motioned

Brian B and Ray Y - seconded

The minutes were approved.

3. Approve October 28 on-line meeting minutes.

Adi – motioned

Claire – seconded

The minutes were approved.

4. Request-go-to-ballot results: 27 members, 14 voted, 13 approving

We decided to recirculate the draft to the members that have not responded and gave January 31st as the new deadline for them to respond. The line by line review of the document is complete and a new “clean draft” is being circulated for voting members to comment on and vote whether or not to seek permission to send the draft to IEEE SA for balloting. Thus far, of 27 total voting members only 14 have voted. The K5 workgroup would like to get 100% participation if at all possible.

5. Discuss comments, review final draft

Roger has/will be incorporating the comments received and response made into one large spreadsheet.

Also a final “clean draft2” is being prepared as a result of comments received from the workgroup.

6. Breaker failure events?Adjourns

None presented/reported.

K6: SUDDEN PRESSURE PROTECTION FOR TRANSFORMERS

Chair: Randy Crellin

Vice Chair: Don Lukach

Established: May 2005

Output: Report (including utility survey)

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

The working group met on Tuesday morning, January 13th, in a single session with 6 members and 2 guests. After introductions, the working group discussed the current status of the document:

- We have posted the completed report on the PSRC website last December. It is located in the Knowledge Base area, under Published Reports K Subcommittee.
- We are scheduled to give a presentation to the Main Committee at the May meeting in San Antonio.
- We are pursuing the opportunities of presenting at the WPRC, MIPSYCON, Texas A&M, Georgia Tech, and other PES conferences and also submitting an article to the PAC World magazine.
- We will email a copy of the final report to the utility survey participants.

At this time, we would like to request permission from the K Subcommittee to disband the working group.

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 Jan 13, 2014 in Garden Grove, CA with 5 members and 13 guests in attendance. We covered the status of 1547a - 2014 which is the amendment to 1547-2003 that includes changes to voltage and frequency ride through and voltage regulation. The document is available for purchase and cost \$42 for IEEE members. P1547.1a is an amendment to the conformance testing standard to match up with the changes in 1547a-2014. This standard is presently in recirculation and will be closing soon. P1547.8, "Recommended Practice for Establishing Methods and Procedures that Provide Supplemental Support for Implementation Strategies for Expanded Use of IEEE Standard 1547" completed its first ballot and is in the process of resolving comments.

P1547 met at the NERC office in Atlanta in Nov 4 through 7 to continue work on P1547. Many utility representatives were present for this meeting as well as consultants and Inverter manufacturers. All minutes for working group meetings are posted on the SCC21 web site under "logistics" of the particular document. All revisions to P1547 must be completed by 2018. If you are interested in participating in the revision of P1547, please check the SCC21 web site for meeting information. The next meeting will be at the NRECA headquarters in Washington DC Feb 10, 11, and 12 and will focus on P1547.

Ray Walling attended our meeting and the topic of grounding or not grounding inverters came up. Ray led a lively discussion on why he thinks grounding should not be required, but in the end there seemed to be no unanimous agreement.

K11: Open Phase Detection for Nuclear Generating Stations

Chair: Charlie Sufana

Vice Chair: M. Urbina

Output: Report

Draft 1.40

Assignment: Write a report to the K Subcommittee entitled Methods for Analyzing and Detecting an Open Phase Condition of a Power Circuit to a Nuclear Plant Station Service or Startup Transformer.

Introductions were done after a welcome by Chairman Charlie Sufana. There were 12 members and 6 guests in attendance for the January 14, 2015 meeting.

The minutes from the September 2014 K11 meeting were read and approved.

Mike Urbina reported on the NEI meeting on open phase that was held in Warrenville, IL in September. There is also an NRC public meeting on open phase taking place currently.

Discussion next continued on the existing draft as there were several additions since the last working group meeting. New sections were received from Tony Sleva, Dale Finney, Bob Pettigrew, and Charlie Sufana.

Changes made or to be done following the meeting to the draft included:

- A. Edited out company name on picture of relay
- B. New addition from Tony Sleva, Definitions and Key Abbreviations and Acronyms
- C. Proposed changing title of section 2 to "Bibliography"
- D. Discussed addition by Tony Sleva (section 3)
- E. Charlie Sufana added current differential scheme (section 4.1.1)
- F. Tony Sleva added "Sequence Voltage and Current Magnitude - Phase Comparison (Section 4.1.7)
- G. Charlie Sufana proposed removing Single End and Double End sections (4.4.2 and 4.4.3)
- H. Sections 4.9.1 and 4.9.2 will be removed

Bob Pettigrew pointed out that he would like to get the actual paper for sections 2.6 and 2.7 rather than just the PowerPoint. Jerry Johnson will provide the papers. Jerry is also going to check on the latest Basler URL for the paper in section 2.8

Mike Urbina indicated that he will be able to get the latest version of the NEI report.

There was a lively discussion on the new EPRI relay. It is hoped that EPRI or PSSTech (the commercializer for the EPRI open phase detection relay) will be able to provide a write-up on how the system works as neither company was present. Apparently the scheme injects a 90 Hz signal into a neutral CT and monitors the current and harmonics. Prem Kumar indicated that PSSTech is the relay manufacturer and he will see if he can get a contact name for the working group.

The chair also presented an announcement from Dale Finney that showed a new offering from SEL using the SEL-487E. The relay has two different CTs inputs (1A and 5A) to provide different sensitivities. Caitlin Martin and Aaron Martin of BPA indicated that BPA is developing an open phase detection scheme. They will check to see if they can provide any insight to the working group on this custom programmed algorithm.

It was discussed that Alstom is working on using a fiber optic CT for open phase detection, and that the working group would like to include a section on this for the report. Mike Urbina will contact the engineers at Alstom to invite them to contribute to this report.

The working group was encouraged to provide any additional writing contributions so that the report can be finalized by the end of January. It is hoped that the first version of the report to be submitted to the PSRC webpage will be done right after the May meeting; possibly before the May meeting. The report is somewhat leading edge and new technologies are popping up rapidly. Thus the PSRC webpage report may actually be a series of periodic updates as technology advances. To meet this goal, the working group is encouraged to review the document and submit any changes or additions by January 31, 2015.

K12: P1032 Guide for Protecting Transmission Static Var Compensators.

Chair: John Wang

Vice Chair: Martin Best

Established: May 2013

Output: Guide for Protecting Transmission Static Var Compensators

Expected Completion Date: December 2016

Draft 8.0

Assignment: To work jointly with Substations WG I9 to write a guide for protecting transmission static var compensators. PSRC WG K12 will provide guidance and review on topics that are already covered in other IEEE guides to prevent overlap and identify areas where interpretation of existing

guides is necessary to meet the specific application challenges unique to transmissions static var compensators.

PSRC K12 had its second joint meeting with the SC-I9 working group all day on Monday, January 12, 2015. Joe Warner of SC-I9 led the meeting. K12 had 7 members and 8 guests (many of whom were I9 members) present. Quorum was met. One guest volunteered to be a member.

IEEE patent slides were shown.

The joint working group is working with IEEE standard association for future IEEE-SA postings.

The K12 meeting minutes from Milwaukee and the December 17, 2014 web meeting were reviewed and approved. After September meeting, K12 WG members reviewed draft 7 and substantial contributions were received. We reviewed and consolidated the contributions and sent an interim draft document to SC-I9.

In the Jan 12 meeting, the joint working group reviewed consolidated K12 comments and completed revisions to Sections 2.0 - 6.1.1.1 of the draft provided by K12. SC-I9 may plan to continue reviewing the remaining K12 comments through email.

WG K12 plans to have another web meeting possibly in March, hopefully jointly with SC-I9.

The next in person K12 meeting will be May, 2015 in San Antonio, TX. The requirements are a single session, a meeting room for 20 people, and a computer projector. The next I9 meeting is one week after K12 May meeting in Minneapolis, MN.

K13 PC37.116 IEEE Guide for Protective Relay Application to Transmission-Line Series Capacitor Banks

Chair: Ilia Voloh

Vice Chair: Joshua Park

Assignment: Revise IEEE C37.116 “Guide for Protective Relay Application to Transmission-Line Series Capacitor Banks”.

Draft 1.3

1. WG met on Tuesday, Jan 12th, 2015 with 6 members and 4 guests.

2. WG Chair Ilia Voloh had a schedule conflict and was unable to attend this meeting. WG Vice-Chair Joshua Park presided over this meeting.

3. IEEE Patent slides were introduced.

4. There was no quorum to approve September 2014 Meeting Minutes. Therefore, Meeting Minutes approval was done by chair via emails.

5. Review of Prior Assignments:

- Reviewed some comments incorporated from last meeting. Due to some lengthy discussions, we were unable to cover beyond Section 4.2.1. Members agreed to review and prepare for discussion before next meeting in May 2015.

- A new draft version of Section 3.2.3 “Line Harmonics” was provided by Tapan Manna right before this session.

- Additional assignments were not provided, members will be reminded to contribute

6. New Assignments

- Add to Section 5.1.1 on high speed reclosing after a fault clearance with capacitor not by-passed. Lauri Latipaa will provide a write-up for the capacitor bank portion.

- Add new section on capacitor bank modeling and lab testing. Joshua Park will write this based on his experiences with RTDS testing on series compensated line protection.

- Add a new section on the typical bank protective functions, which will show layout of the CTs through bank sections/segments and protective functions. Paul Marken will contribute on this area.

- Expand SSR section 4.2.7 with latest information in this area.

K15: Centralized Substation Protection and Control

Chair: Ratan Das

Vice-Chair: Mital Kanabar

Assignment: Write a PSRC report describing and analyzing existing and emerging technologies for centralized protection and control within a substation

Draft 3.0

The working group met on Jan 14, 2015 with 24 participants (12 members and 13 guests). One guest joined the group as a member after the meeting.

Minutes of the Sep meeting approved by email stands final without any correction.

We had a presentation by Alex Apostolov focusing on Centralized protection and control implementation in Russia and Brazil. We had discussions on Sections 4.2, and 4.4 – Summary of discussions is enclosed in the annexure along with the distribution of assignments.

It was decided to submit an extended abstract for a summary paper based on the report for the IEEE PWRD Special publication. We encourage members to submit their assignments by March 30. Updated draft will be circulated by April 17 for discussions during the next meeting.

K16 PC37.91 Revision of IEEE Guide for Protecting Power Transformers

Chair: Will English

Vice Chair: Steve Conrad

Output: Revised IEEE C37.91 Standard -Guide for Protecting Power Transformers

Established: May 2014

PAR Expires: December 2018

Draft: 1

Assignment: To revise and update C37.91, IEEE Guide for Protecting Power Transformers to correct errors and address additional protection related topics.

The working group met with 19 members and 12 Guests on 14 January 2015, at the Hyatt Regency-Garden Grove, CA. The working group consists of 36 members. Quorum was achieved at this meeting. The minutes from the September – Milwaukee meeting were motioned for approval by Don Lukach and second Chris Walker, motion/minutes were approved. The chair reviewed and displayed the required patent information slides related to PAR activity of the WG, and provided opportunity for participants to identify patent claims. The assignment of the WG was also discussed. As a requirement of standards development work all participants are required to indicate both their Company and Affiliation. The attendance sheet was circulated to collect the required information of each participant.

The chairman led discussions on submitted assignments. Discussion focused on submitted revisions/comment incorporated in Draft 1.

Clauses discussed were as follows:

- i. 11.3.3. Mike Thompson to revise last paragraph
- ii. 12.0 Claire Patti to revise third paragraph
- iii. Annex A – Meyer Kao review shift factor discussion
- iv. Annex A – Brian Boson to develop chart to explain per unit currents for various fault types
- v. Annex C –Meyer Kao to revise 1.2.3 and 2.2.7
- vi. Annex D Rene Midence to provide comment back to WG
- vii. Annex E Randy Hamilton to provide comment back to WG

The chair will upload the draft 1 to the IEEE restricted web-site.

Avoid WG conflicts with K16 and J7

K17 Geomagnetic Disturbances (GMD)

Chair: Qun Qiu

Vice-Chair: Luis Polanco

Assignment: To submit a WG report to the PSRC K Substation Subcommittee evaluating the performance of protection systems during Geomagnetic Disturbances

Draft: Outline

Meeting Dates: January 12, 2015: One session: 13:30-14:45 &
January 13, 2015 two sessions: 13:30-14:45 & 15:00-16:15
Garden Grove (Anaheim), CA

1. K17 met on Monday January 12th with a special presentation about GMD effects on Generators by Reigh Walling, with 53 participants (44 guests and 9 signed members) and on Tuesday January 13th with 2 sessions, the first with a special presentation about GMD effect on Shunt capacitors by Mark McVey, with 53 participants (44 guests and 9 signed members), and a second session were the K17 WG officially meet for the first time as a WG with 27 participants (21 guests and 6 signed members.)

On K17 WG January 13, 2015 First WG Meeting (15:00-16:15):

2. Chair presented agenda for the 1st meeting of the K17 WG to all participants.
3. Minutes of the KTF17 last meeting was presented from September 2014 in Milwaukee, WI, before becoming an official WG, but there were not enough quorums for approval and chair will send email to all members to request approval via email.
4. Chair indicated that NERC approved the TPL-007 GMD Reliability Standards Requirements related to P&C that requires guideline for planners to determine system susceptibility to GMD and how to evaluate GMD impacts on Protection Systems and now it official. This standard was approved on December 2014 by NERC and is to be filed to FERC in January 2015.
5. Chair briefly talked about possible contributions from K17 WG on developing an IEEE report and later presented a detail proposed report outline that was briefly discussed with all the participants, members and guests to gather inputs and discuss items.
6. Chair went over all sessions from the proposed Report outline and looked for volunteers for written assignments to provide initial 1 or 2 paragraphs on some of the topics. Even it appear to not be so much interaction on proposed outline, 6 people volunteer to provide initial assignments on some of the topics on initial report outline presented:
7. Chair will continue to promote open discussions on proposed outline to update (add/remove) Items and content as needed, and this will be pursue on next K17 WG meeting. Purpose is to strengthen and define a report outline with more inputs and involvement from members/future members and guests.
8. Chair presented references to all participants on recent documents published by NERC and CIGRE on GMD topic as well as mentioned IEEE PSRC (1996) transaction paper as one that it will need to be looked as well.
9. Chair motivated group of members/future members and guests to actively participate on defining/writing or sharing any inputs via email if they would like to contribute to ongoing efforts.

KTF18 PC37.108, Guide for Protection of Network Transformers

Chair: Adi Mulawarman

Vice Chair: Surarat Pavavicharn

Established: May 2014

Assignment: To give a report to K Subcommittee on the need to revise C37.108 2002 – IEEE Guide for The Protection of Network Transformer.

Number of attendees: 16

Recommendation choices:

1. submit as is with no change
2. submit with changes addressing reaffirmation comments
3. not do anything and let it expired

A PAR needs to be submitted regardless.

Result of discussion from meeting:

The task force members voted to recommend to submit with changes addressing reaffirmation comments and update/improve the existing standard. We are considering expanding the scope.

We will extend the invitation to the attendees of the last two task force meetings to become a member of the newly created WG. We want to also encourage utilities that own network transformer & protectors to be involved. We will try to invite manufacturer of this equipment to participate and do a presentation at the next couple meetings. We also want to include some more detail sections on protection coordination of this equipment.

Discussion

C57.12.44 latest review incorporate (need to find liaison who is involved with the last revision March 2014; transformer committee)

1547.6 review and how it can be referenced back to this guide

May want to include more information on protection coordination with surrounding LZOP.

Next is our 1st WG meeting and we should discuss presentations and also reviewing the scope of existing guide as well as reviewing of the 2 updated guide mentioned above as reference for updating C37.108.

Old Business:

No Old Business was discussed.

New Business:

The subcommittee voted to disband working group K6 on Sudden Pressure Relays. Their work is complete and the report is published on the PSRC website. Randy Crellin, the Chairman, will be presenting at the May, 2015 Main Committee Meeting, and possibly at other conferences.

The subcommittee voted to form working group K18 to revise C37.108, Guide for Protection of Network Transformers. Adi Mulawarman motioned, Steve Conrad seconded, and the motion carried unanimously. Adi Mulawarman will be the Chairman and Surarat Pavavicharn (Poom) volunteered to be the Vice Chairman. The assignment is to submit C37.108 with changes, addressing reaffirmation comments and update/ improve the existing guide.

Steve Conrad initiated discussion about the possible harmonization of different committees to resolve impacted standards better, especially for apparatus that the Substation Subcommittee (K) provides protection standards for, but does not necessarily have any other control over. The example given was the transformer and network protectors. The K subcommittee use to liaison with the Transformer Committee and it may be desirable to do so again.

Chuck Mozina, our IAS liaison, retired. Surarat Pavavicharn (Poom) stated that she was now going to the IAS and would check into what the liaison position would entail.

General Discussion:

Charlie Henville initiated discussion about transformer damage curves and their association with cumulative effects of faults.

VIII. Presentations: There was only one presentation at this meeting.
WG D11 – Effect of Distribution Automation on Protective Relaying - Fred Friend

IX. Adjourn: Meeting was adjourned by the chair at 11:30 AM.