



POWER SYSTEM RELAYING COMMITTEE

OF THE

IEEE POWER ENGINEERING SOCIETY

MINUTES OF THE MEETING

May 11– 14, 2009

Pittsburgh, PA

First Draft

**Power System Relaying Committee
Main Committee Meeting Agenda**

May 14, 2009

Pittsburgh, PA

8:00 AM – 11:30 AM

- | | |
|--|-------------------------|
| I. Call to order / Introduction | Miriam Sanders |
| II. Approval of Minutes/Financial Report | Roger Hedding |
| III. Reports of Interest | Miriam Sanders |
| A. Technical Paper Coordinator's Report/Future Meetings | Bob Pettigrew |
| B. PES Report- points of interest | Rick Taylor |
| C. CIGRE Report | Mark Adamiak |
| D. UCA Report | John Burger |
| E. EPRI Report | John Hughes |
| F. IAS Power System Protection Committee | Chuck Mozina |
| G. IEC Report | Eric Udren |
| H. Standard Coordinator's Report | Jeff Gilbert |
| I. Substation Committee Report | Craig Pruess |
| J. NERC Report | Bob Cummings |
| K. Other Reports of Interest | |
| IV. Advisory Committee Reports | Miriam Sanders |
| B1. Awards/ Recognition | Bob Beresh |
| V. Subcommittee Reports | Miriam Sanders |
| C- System Protection | Rich Hunt |
| I - Relaying Practices | Tarlochan Sidhu |
| K - Substation Protection | Frank Plumptre |
| H - Relaying Communications | Veselin Skendzik |
| D - Line Protection | Mike McDonald |
| J - Rotating Machinery | Kevin Stephan |
| VI. Presentations | Roger Hedding |
| VII. Adjourn | Miriam Sanders |

I. Call to order / Introductions Sanders

Chairman Miriam Sanders called the meeting to order at 8:05 am.

II. Approval of Minutes (January Meeting) & Financial Report Hedding

The minutes of the Atlanta (Jan 2009) meeting were approved with corrections as given by Chairman Sanders. We had no financial risk for the Atlanta Meeting since it was a joint meeting organized by PES, This meeting will show an expected loss. The exact figures aren't known yet.

III Chairman's Report Sanders

Meeting was called to order at 8:00 am, Thursday May 14, 2009. After introductions, all main committee members were asked to stand and were counted. Of the 124 Main Committee members, 69 were present, meeting a quorum.

In light of quorum requirements, you are strongly encouraged to attend the Main Committee meeting, the Subcommittee meetings and the Working Group meetings of which you are members. During the Main Committee meeting, the attendees were reminded that if you have a desire to be a member of the Main Committee, you first must be a Subcommittee member for at least one year. What this means is that if you are active in a working group of a particular Subcommittee and have illustrated your commitment to participate, solicit the Subcommittee Chair for membership of that Subcommittee. Main Committee members are nominated at the end of each year, and announced at the January meeting.

Why should you become a member of Main Committee? What does it do for your or your organization? You are counted in the quorum, responsible for voting and approving processes going forward in the committee and having an input into the industry. You are recognized by your peers. While it is very intangible and difficult to quantify, the industry networking that naturally takes place is for the "better good" of the industry.

In spite of the H1N1 flu scare by the CDC, we had an unusually large May meeting contention. There were in excess of 190 attendees at our 2 and ½ day meeting. This particular meeting was not in conjunction with other groups; however there were a couple that followed our meeting. We do have a very strong organization, due to your participation and we all appreciate that.

And speaking of quorums, of our 6 subcommittees, we only had half met quorum. Please if you are member of a subcommittee, attend that meeting.

Reports of Interest

A. Technical Paper Coordinator's Report Pettigrew

The IEEE PES 2009 General Meeting is in Calgary July 26-30, 2009. The paper review process is completed. We had 67 papers submitted of which 56 were accepted. The IEEE PES 2009 General Meeting in Calgary registration is ongoing.

There is one regular paper session scheduled on Wednesday morning, one poster session on Monday evening and three paper forum sessions scheduled for Wednesday afternoon. The paper forum is a hybrid session of the paper session and poster session, to allow authors to present the abstract of their paper in a formal session, and then have opportunity to discuss in detail to all interested parties. There will be 17 papers presented in this new session type.

Future Meetings

September 2009 – Arlington, TX September 14-17th at the Sheraton Arlington Hotel.

January 2010 – PES Joint Technical Committee Meeting, location not announced.

May 2010 – Madison, WI

B PES Report

Wanda Reeder

No Report submitted.

C. CIGRE B5 Activities Report

Adamiak

A joint IEEE/CIGRE Symposium on “Integration of Wide Scale Renewable Resources into the Power Delivery System” will be held in conjunction with the PES General Meeting in Calgary, Canada from July 29 – 21.

The papers for the CIGRE general meeting in 2010 have been submitted and acceptance of such should be forthcoming within the month.

The CIGRE B5 Colloquium will be held in conjunction with the Advanced Power system Automation and Protection (APAP) conference from October 18 – 24, 2009 on Jeju Island off the southern coast of Korea.

A new joint WG on Wide Area Protection has been started. Anyone interested in being considered for membership should contact Mark Adamiak.

D. UCA Report

Burger

No Report

E. EPRI Report

Hughes

No Report.

F. IAS Power System Protection Committee

Mozina

The following are items of interest to the PSRC:

- **Color Book Reorganization Progress** – The IAS Industrial & Commercial Power System Dept. (responsible of the IAS color books) held it’s meeting on May 3-7 in Calgary, AB. One of the major undertakings was the updating and converting the color book series into individual IEEE standards. The major item of interest for the PSRC is the Buff Book (Protection and Coordination of Industrial and Commercial Power Systems). The goal is to break out the chapters, which address protection of individual areas (transformers, generator, cables, est.) into individual IEEE standards. Each individual charter (a total of 13) will be assigned a PAR and will be a “stand allow” standards documents. Progress has been slow due to the lack of manpower with only one new standard currently ready for balloting. At the Calgary meeting Chuck Mozina, Murty Yalla and John Tengdin presented papers.
- **Generator Grounding and Ground Fault Protection WG** – This WG investigated potential transient overvoltages associated with hybrid generator grounding. This effort was completed last year with the completion and presentation of the WG paper. The WG group chairman will represent the paper at the upcoming Pulp and Paper Conference in Birmingham in June. The WG is continuing its efforts to investigate grounding at MV industrial faculties with multiple ground sources. The goal is to produce a WG IAS transaction paper providing guidelines/recommendation for determining the optimum level of ground current in MV industrial system with multiple ground sources. Relaying plays a key role in determining how low you can reduce ground current and still have the required sensitivity to detect ground faults.
- **Arc Flash** – The IAS is the home of IEEE standard 1584-2004, a key Arc Flash standard that is currently under revision. The WG that is revising the standard meets twice a year with its next meeting at the IAS

PCIC Conference in September. I will attend this meeting and try to establish coordination with PSRC Subcommittee K.

G. IEC Report

Udren

TC 95, Measuring relays

TC 95 is the IEC Technical Committee on measuring relays. Typically this report lists TC 95 standards drafts, requiring assessment and vote from the US National Committee (USNC) Technical Advisory Group (TAG) that meets as WG I4. In this cycle, there have been no new standards for electrical environment testing or product design, but development continues. IEC 60255-26 will now be the single container for the full suite of electrical environment tests. 60255-1 will have all of the product design requirements (like C37.90 but more comprehensive), and the completed 60255-27 contains all safety requirements.

Development of functional standards is the latest area of TC 95 standardization. Murty Yalla's Maintenance Team (MT) 4 of TC 95 reports the following progress on specific standards projects:

- 60255-151 – Functional standard for over/under current protection – ready for final draft international standard (FDIS).
- 60255-127 - Functional standard for over/under voltage protection - a single curve implementation similar to -151, ready for CDV.
- 60255-121 – Functional standard for distance protection – a draft for an elaborate scheme of testing – almost 1000 standard tests over the full range of operating conditions – to demonstrate proper performance of a distance relay or function.
- 60255-149 – Functional standard for thermal relays – not yet begun – to update 60255-8.
- 60255-187-1,2, etc. family of standards - Functional standard for differential protection – bus, transformer, line, etc. – not yet begun, and needs more definition. We might expect tests under a full range of operating conditions as is now being developed for 60255-121.

For TC 95 would to meet at the IEC General Meeting in Seattle in October 2010, the USNC was asked to raise \$18,000 to cover hosting costs. The Technical Advisor to USNC for TC 95 carried out a successful fundraising campaign with the help of Murty Yalla, obtaining pledges from vendors and other relay industry organizations, so the meeting is now committed. Donors will have name and logo posting as supporters at this large international meeting.

TC 57, Power systems management and associated information exchange

See TC 57 liaison report at the end of SC H minutes.

H. Standard Coordinators Report

Gilbert

Standards Activities Since The January, 2009 Meeting

The status of the standards activities, which have taken place since the January, 2009, meeting of the PSRC, are as follows.

Standards Published

None

Standards waiting to be Published

None

Standards Reaffirmed

C37.106 Guide for Abnormal Frequency Protection for Power Generating Plants

Standards submitted for reaffirmation

None

Standards approved

None

Standards submitted for approval

None

Standards to be submitted for approval

None

Submitted for Balloting/ Recirculation

C37.114 Guide for Determining Fault Location on AC Transmission and Distribution Lines

PC37.234 Guide for Protective Relay Applications to Power System Buses

Standards Balloted

C37.114 Guide for Determining Fault Location on AC Transmission and Distribution Lines

PC37.234 Guide for Protective Relay Applications to Power System Buses

Standards Re-circulated

C37.106 Guide for Abnormal Frequency Protection for Power Generating Plants

Standards to be Re-circulated

PC37.105 IEEE Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

C37.114 Guide for Determining Fault Location on AC Transmission and Distribution Lines

C37.115 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

PC37.234 Guide for Protective Relay Applications to Power System Buses

Standards due for 5 year review /to be submitted for Re-affirmation

C37.93 Guide for Power System Protective Relay Applications of Audio Tones over Telephone Channels

C37.103 Guide for Differential and Polarizing Relay Circuit Testing

C37.114 Guide for Determining Fault Location on AC Transmission and Distribution Lines

C37.115 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

Standards withdrawn

None

New PARs applied for

PC37.104 Guide for Automatic Reclosing of Line Circuit Breakers for AC Distribution and Transmission Lines

PC37.95 Guide for Protective Relaying of Utility-Consumer Interconnections

New PARs approved

None

PAR Extensions applied for

None

PAR Extensions approved

None

Modified PAR approved

PC37.238 Standard Profile for Use of IEEE 1588 Precision Time Protocol in Power System Protection

Modified PAR Submitted

PC37.105 IEEE Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

PC37.238 Standard Profile for Use of IEEE 1588 Precision Time Protocol in Power System Protection

PARs Withdrawn

None

PARs expiring at the end of 2009

PC37.105 IEEE Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

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

PC37.233 Guide For Power System Protection Testing

PC37.234 Guide for Protective Relay Applications to Power System Buses

SUBMITTAL DEADLINES & STANDARDS BOARD MEETING SCHEDULE

PAR/Standard Submittal Deadline Standards Board Meeting

May 7, 2009

June 16, 2009

July 31, 2009

September 10, 2009

October 19, 2009

December 8, 2009

J. NERC Report

Cummings

No Report

IV. B. ADVISORY COMMITTEE REPORTS

Sanders

Chair: Miriam Sanders

Vice Chair: Bob Pettigrew

B1: Awards and Technical Paper Recognition

Chair: Bob Beresh

Vice Chair: Solveig Ward

The B1 SC met and discussed the transition of leadership from Bob Beresh to Oscar Bolado. Oscar will take over the chair of B1 in January of 2010. The recipient of the 2008 Career Service Award was discussed and was presented to the ADCOM committee for approval. Oscar has reviewed some of the past PSRC minutes to determine what awards were previously given out. It seems that some awards were issued that are no longer issued and Oscar will review these and consideration will be give to the possible re-starting of the distribution of these awards. One award in particular that needs to be reconsidered is that for outstanding WG. The importance of updating the documentation referring to all awards and the award recognition requirements was discussed. Mal Swanson will provide service awards for the Sept Meeting. Mal's behind-the-scenes labour in doing this is greatly appreciated.

B2: Fellows Awards

Chair: J.S. Thorp

No Report

B3: Membership Committee

Chair: M.J. Swanson

Attendance during the PSRC meeting was approximately 190. This is considered good for a May meeting.

12 new attendees were in our Newcomers Orientation meeting on Tuesday, Three management support letters are in process. No new Service Awards were created, as several awards were given during the Main Committee Meeting.

B4: O & P Manual and WG Training

Chair: J Appleyard O&P Manual

Chair: R Hunt WG Training

No working group chair training session was held.

B5: Bibliography and Publicity

Chair: T.S. Sidhu

Vice Chair: M. Nagpal

The WG B5 met on May 12, 2009. WG meeting was chaired by Peter McLaren in absence of the Chair, Tarlochan Sidhu. Minutes of the Jan, 2009 meeting were accepted. It was informed that the 2007 bibliography paper has been accepted for publication. Assignments for preparing the 2008 paper were made.

B8: Long Range Planning

Chair: Charlie Henville

B9: PSRC Web Site

Chair: Russ Patterson

Working Group B9 did not meet.

V. SUBCOMMITTEE REPORTS

C: SYSTEM PROTECTION SUBCOMMITTEE

Chair: R. Hunt

Vice-Chair: S. Ward

The C System Protection Subcommittee met on Wednesday, May 13, 2009, in Pittsburgh with 13 members and 28 guests in attendance. Quorum was not reached and approvals were achieved by email after the meeting.

9 Working Groups met at this meeting. The members of the Subcommittee approved the minutes of the January 2009 meeting, via email vote.

WG C11, Guide for protection System Testing, will be submitted for re-ballot. The WG has worked on resolving comments.

WG C9 did not meet but asked the Subcommittee members to review a summary paper before the September meeting. It will be distributed with voting forms.

WG C12, Performance of Relaying During Stressed Conditions, has completed the work and was disbanded. A report was posted on the PSRC web site one year ago and presentations have been made at several relay conferences. A transaction paper has been approved without comments. The group was asked to produce a summary for the PAC Magazine but this will be handled outside the WG.

A new Task Force was formed for "The Role of Protective Relaying in Smart Grid." CTF2 will meet in September, chaired by Alex Apostolov.

New members: None at this meeting.
PSCE liaison report: Nothing to report.
PSSC liaison report: Nothing to report.

Reports from the WG Chairs

C4: Global Industry Experience with System Integrity Protection Schemes (SIPS)

Chair: Vahid Madani
Vice Chair: Miroslav Begovic
Output: Survey
Established: September 2004
Expected Completion Date for the Survey: May 2009

Assignment - Conduct a survey of power systems professionals worldwide to accumulate experience with SIPS. This survey will complement and expand upon the previously published IEEE/CIGRE paper "Industry Experience with Special Protection Schemes" by P.M. Anderson and B.K. LeReverend (IEEE Transaction on Power Systems, Vol. II, No. 3, August 1996). The survey will be conducted via an internet-based questionnaire with the assistance of, and be available to, other interested parties; (e.g. IEEE, CIGRE, PES, EPRI, etc.). The survey should be concluded by September 2008 and will be presented in a report to the "C" Subcommittee and a Summary Transactions paper.

WG C-4 met on May 12 in one session with total of 15 in attendance (7 Members, 8 Guests).

The WG members reviewed the draft detailed report and discussed various sections. The WG members and attendees also reviewed the results of the survey, and the analysis descriptions summarized by the WG members. We have also received some additional electronic comments from Charlie Henville which will be incorporated.

The plan is to have the final detailed report for C subcommittee review before the September meeting and also have a draft summary paper. Work on the summary paper will start with an outline.

Because we plan to have a transaction paper, we need to delay publishing any other reports pending IEEE transaction paper is processed.

The latest version of the detailed report will be posted on the PSRC Working Group web site. The survey, which contains the names of the individual companies, is not posted on the site, but has been circulated among the WG members.

Vahid solicits the names of Transaction paper contributors.

| | |
|------------------|---------------------|
| Mark Adamiak | Vahid Madani (Lead) |
| Alex Apostolov | Damir Novosel |
| George Bartok | Tevik Sezi |
| Miroslav Begovic | Eric Udren |
| Stan Horowitz | John Fitch |

Next Meeting – 25 People, 1 Session, Projector, Power strip

C9: Appl. of Prot. Relays used for Abnormal Freq. Load Shed. & Restoration

Chair: A. Apostolov
Vice-Chair: K. Behrendt

Assignment

The project will develop a Guide for the application of protective relays used for load shedding and restoration during electric power system abnormal conditions. It will present background information, bibliography, and recommendations. It discusses abnormal frequency power system behavior, existing load shedding and restoration practices, the abnormal frequency of typical protective relays, and possible new methods for improving load shedding and restoration. This project is limited to electric power system applications and will not include Abnormal Frequency Protection for Power generating Plants

The working group did not meet. The draft of the summary paper that has been completed will be sent to SC members for review and comments before the September meeting.

The working group expects to meet in single session at the next PSRC meeting, and needs a room for 25 with a projector, projector screen and outlet strip.

C11: Guide for Protection System Testing (PC 37.233)

Chair: Vahid Madani

Vice Chair: Hyder DoCarmo

Output: Guide

Established: May 2005

Expected Completion Date – Balloting Body: August 2008

PAR Approved through: December 2009

Assignment

This guide is intended for power system protection professionals. It will include a reference listing of type tests for protective devices as well as overall protection scheme performance tests for various types of protection schemes. The Guide will describe the methods, extent, and types of protection scheme tests. Interlocking and control functions inherent to the protective schemes are included. This assignment encompasses overall system testing procedures, data collection requirements, as well as the test procedure definitions.

WG C-11 met on May 12 in a single session with total 27 in attendance (18 M, 9 G). Quorum was established – More than 50% WG members present (total 34 members).

This Guide is under PAR – C 37.233

Balloting body has been established with 144 balloting body members.

Comments received during open period – 420

After review of the patent slides, the WG members and attendees reviewed. The attendees briefly discussed the updated section that Eric Udren, coordinated on behalf of the WG with NERC maintenance drafting team (PSMSDT), who also participated in the balloting and turned in a negative ballot. In particular, TBM (Time based maintenance), PBM (Performance based maintenance), and CBM (Condition based maintenance). Eric suggested that sections 1 and 2 of the Guide to incorporate the specific text reflecting the coordination of the efforts between PSMSDT and PSRC.

The WG members and attendees then reviewed all the comments that required attention. Total of 420 comments were turned in during balloting process. Vahid also indicated that Chair and Vice Chair (Hyder) have reviewed several additional comments received shortly after balloting closed. Form the 420 comments, approximately 20 comments needed to be discussed with the WG members. All the comments were individually reviewed and discussed as needed. All the comments that were indicated as a “must be satisfied” were reviewed and addressed. Some of the sections or phrases were updated as a result.

The draft Guide will be re-circulated for a second round. Based on discussions with the IEEE staff, we anticipate the work to be completed on schedule. No extensions needed at this time.

Next Meeting – 30 People, 1 Session, Projector, Power strip

C12: Performance of Relaying During Wide-Area Stressed System Conditions

Chair: Damir Novosel
Vice Chair: George Bartok
Output: Working Group Report and IEEE Summary Paper
Established: 2004
Expected Completion Date: 2008

Assignment

Create a working group report and a summary IEEE paper that will describe performance of protective relays during stressed power system conditions. The work will not cover System Integrity Protection Schemes (SIPS).

The working group report has been completed and published on PSRC's website. The report has been presented at two relay conferences (Mipsycon and Texas A&M) and has been submitted to WRPC. An IEEE transaction paper has been approved without comments. The working was disbanded. A request to write a summary for the PAC Magazine will be handled outside the WG.

C13: Undervoltage Load Shedding

Chair: M. Begovic
Vice-Chair: S. Imai
Output: IEEE Report
Established: September 2005
Expected Completion Date: September 2009

Assignment

This working group produces a report on the implementation of undervoltage load shedding (UVLS) in electric power systems. It presents background information, guidance in implementing UVLS schemes and a bibliography. Voltage instability, voltage and reactive power management, emergency actions to avoid load shedding, UVLS philosophy and methods, voltage collapse detection, existing practices, settings and coordination between UVLS and UFLS are discussed

The WG met on May 13, 2009, in one session, attended by 4 members and 3 guests.

New contributions have now been included from Thierry Van Cutsem and Costas Vournas, whose related work in the area of voltage stability ties nicely to the objectives of the report.

Report (content-wise and style-wise) has been completely reformatted by Greg Henry. All references are now placed in the back matter of the report and a number of redundant entries have been corrected.

Besides a few minor action items, the report is now nearly complete. The list of editors, who will proofread it before August 1, 2009, is: Miroslav Begovic, Shinichi Imai, Greg Henry, Vahid Madani, Damir Novosel, Art Buanno and Charlie Henville. The meeting in September will serve to resolve any outstanding issues which may arise in the process of proofreading and to start work on the summary paper.

Action items:

- Charlie Henville will provide a brief synopsis of the 2001 incident in Peru (p.62 report).
- Vahid Madani will
 - (p.43) send the text about maintenance and testing of UVLS schemes.
 - (p.59) provide a brief text (or a pointer to a source) on the incident in France in 1987.
 - verify that the changes made to the report on pp. 9, 12, 25, 30, 35 are correct

- Miroslav Begovic will
- redo equations on p.49 and verify the relationship of the text to PC37.117
- contact Steve Conrad for a brief synopsis on ICLSS centralized scheme
- verify that Shinichi addresses the comment on p.40 of the report

Proofreading and editing to be done by August 1, 2009 by:

Miroslav Begovic
 Shinichi Imai
 Greg Henry
 Vahid Madani
 Damir Novosel
 Art Buanno
 Charlie Henville

Working Group is planning a meeting in a single session in September 2009. Room will be needed for 20 attendees and a video projector.

C14: Use of Time Synchronized Measurements in Protective Relaying Applications

Chair: Jim O'Brien
Vice Chair: Alla Deronja
Output: IEEE Report
Established: May 2007
Expected Completion Date: December 2010

Assignment:

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

Scope:

Develop a report that identifies synchrophasor data and parameters that are useful for improving protection schemes and analyzing protective relay performance. The report will not include deployment of devices to acquire time synchronized measurements.

Working group C14 met on May 12, 2009, in Pittsburgh, PA, in a single session chaired by Jim O'Brien with 10 members and 31 guests. 1 guest joined the working group as a member.

The chair distributed the latest draft of the proposed Outline, which was discussed by the group during the meeting.

A topic in Section II, Advantages of Using Synchrophasor Measurements by Utilities, was earlier proposed and discussed as being relevant to the report. Jian-Cheng Tan will contribute a write-up on the topic.

In Section III Present Applications, it was requested to reference publications describing the use of synchrophasor measurements for power swing detection.

A topic of Generator Rejection was proposed to be added, and Jian-Cheng Tan will contribute a write-up on it.

Gary Kobet will come up with a new title for Alarm for Generator Control to make it more obvious that this topic belongs to protection applications.

For Section IV Communication Infrastructure, a write-up contributed by Ken Martin was presented and discussed. There are suggestions to add to the section 61850 communication protocol and sampling rates of communication for synchrophasors.

In Section V Future Applications (C37.118 Format), a comment was implemented to remove the mention of the C37.118 format so as to not limit the future synchrophasor applications to a certain standard.

A topic of Distance Protection was proposed to be added to Section V. Sinan Saygin will contribute a write-up.

Another future topic, System Integrity Protection Systems (SIPS), was added as a future application. Alex Apostolov will contribute a write-up.

Several previous writing assignments are outstanding. Please email the assignments to Jim.O'Brien@duke-energy.com by July 15, 2009.

Requirements for the next meeting are as follows: single session, meeting room for 40 people with a computer projector.

C15: Design and Testing of selected SIPS

Chair: J. Sykes

Vice-Chair: Y. Hu

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

Established: September 2008

Expected Completion Date: December 2012

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

Working group C-15 held a meeting on Tuesday, May 12, 2009 in single session with a total of 14 people in attendance (6 members and 8 guests). The working group reviewed the meeting minutes of the January 13, 2009's meeting; reiterated the scope of the working group; spent most of the time discussing the progresses made since last meeting on the draft report outline; and areas need to be further addressed in the proposed report. There were considerable discussions regarding the content for various sections. Additional members were added to group.

Various Writing Assignment and Action Items were updated as the results of the discussion:

Distribute the updated report outline with comments and recommendations to all working group members – Yi Hu

Check SCE if some contents of a SIPS whitepaper by SCE may be used for this report – Mark Adamiak/Yi Hu

Ensure information from C4 and C11 working groups are considered and properly referenced – Vahid Madani

Provide a draft of generic SIPS scheme and architecture – Mark Adamiak

Provide an update for discussions about communications used in SIPS – Jim Ebrecht

Provide an example of a generation rejection scheme – Shinichi Imai

Provide a draft for generation rejection scheme section – Gene Henneberg/Dean Miller

Provide a discussion about testing of SIPS including testing for failed components – Tevfik Sezi

Provide some example about practical system separation scheme – Alla Deronja

The working group will meet at next PSRC meeting in one session to continue development of the outline and review of assignments.

Next Meeting – 25 People, 1 Session, Projector, Power strip

C16: Relay Scheme Design Using Microprocessor Relays

Chair: K. Birt
Vice-Chair: R. Lascu
Output: IEEE Guide
Established: September 2008
Expected Completion Date: To be determined

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

- Exclude: AC voltage and current inputs
 - Goose
 - Internals of relays
 - IRIG and communication issues
- Include: signaling between protective elements such as relays, breakers, etc. primarily as it applies to trip and control circuits

Working Group C16 held its meeting on Wednesday morning with 21 attendees. Six working group members were in attendance. With the chair absent, the meeting was chaired by Tony Seegers with the assistance of vice chair Raluca Lascu.

A presentation was given by R. Frye from TVA titled Fused Overcurrent Protection of Relaying, Potential and Control Circuits. Another presentation was given by Don Sevcik from Central Point Electric on lessons learned in control circuit design.

J. Platt, J. Sperl and J. Stojak have been added as members of the group.

The working group outline was discussed. Writing assignments were issued and they are due by mid August.

Next meeting requirements: Single meeting, 25 persons, computer projector.

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

C17: Fault Current Contribution from Wind Plants

Chair: D. Miller
Vice-Chair: G. Henneberg
Output: Report by the Joint Working Group
Established: January 2009
Expected Completion Date: 2011

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." The assignment for the System Protection Subcommittee Working Group will be: To support the activities of the Joint Working Group on Fault Current Contributions from Wind Plants in the production of a report that characterizes and quantifies the short circuit current contributions to faults from wind plants for the purposes of determining protective relay settings and fault interrupting equipment ratings. The report will provide guidelines on the modeling and calculations for that purpose.

The Work Group met in a single session on Tuesday May 12, 2009 in Pittsburgh, PA with 18 members and 15 guests.

After introductions, Dean Miller reminded everyone that the next joint work group meeting (of which C-17 is a part) will be at the PES general meeting in Calgary, Alberta in July.

The WG reviewed and approved the minutes from the January meeting in Atlanta. The plan is to provide the presentations from the January meeting to all the attendees. Reigh Walling's presentation, though based on GE's proprietary material, is apparently available legitimately through the Texas Tech relay conference.

Steve Conrad of Public Service of New Mexico presented PNM's experience with modeling data collection for three on-line wind farms totaling about 400 MW. PNM uses differential protection on the line between the line tap substation and the plant GSU due to the low and variable fault contributions available from a wind farm. They have done substantial work to develop system equivalent collector models including the machines, converters, switched shunt capacitors, etc. They ran a staged 34.5 kV fault test with about 60% of the 200 MW wind farm on line. They have data from one 345 kV L-G fault remote from the wind farm for which the recorded and calculated contributions were close (145 A actual, 155 A calculated).

Dean Miller described PacifiCorp's wind farm experience with modeling data collection on about 12 wind farms in five states. PacifiCorp models each wind generator, e.g. 100 separate generators for a 150 MW wind farm, all the distribution lines, step up transformer and tie into the transmission system.

Both Dean Miller and Steve Conrad provided sample lists of modeling data required before energization. Both presentations will be provided to attendees.

Charlie Henville suggested that the WG develop a series of questions to help guide modeling and volunteered to provide a draft.

Companies that provide popular short circuit modeling programs (CAPE, ASPEN) are developing tools for modeling wind turbine/generators for their programs

The next joint work group meeting (of which C-17 is a part) will be at the PES general meeting in Calgary, Alberta in July. The C-17 WG will meet at the PSRC September meeting in Arlington, Texas

Requirements: single session with room for 40-50 and computer projector.

D: LINE PROTECTION SUBCOMMITTEE

Chair: M.J. McDonald

Vice Chair: Russ Patterson

The meeting was called to order at 4:30 PM on May 13, 2009.

After introductions, a quorum was verified with 26 members and 19 guests present.

The January 2009 meeting minutes were approved without comment.

The chair announced that beginning in the September meeting that the SC meetings would be on Thursday morning followed by the Main Committee meeting Thursday afternoon. This change allows for greater flexibility in meeting scheduling.

The Chair reminded working group chairmen to have their assignment at the beginning of their reports.

General items during the meeting:

1. DTF3 on Polarizing requested approval to form a working group. This was approved and with subsequent officer approval will convene in September with Meyer Kao as chair. Output will be a paper to the PSRC.
2. DTF25 on Distance Relay Response to Distorted Waveforms requested approval to form a working group. This was approved and with subsequent officer approval will convene in September with Karl Zimmerman as chair. Output will be a technical report to the PSRC.

Coordination Reports

None

Old Business

None

New Business

The chair reported that re-affirmation of C37.114 is progressing with the initial ballot completed with approximately 27 negative comments which are being evaluated to determine the need of revising the Guide.

Line Protection operations of interest

None

The meeting was adjourned at 5:15 pm.

Reports from the WG Chairs:

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

Chair: Gary Kobet
Vice Chair: Greg Sessler
Output: IEEE Guide
Established: September 2008
Expected completion date: To be determined

D2 did not meet in May.

DTF3: Considerations in Choosing Ground Polarizing Methods

Chair: Meyer Kao
Vice Chair: Elmo Price
Output: Report
Established: January 2009
Expected completion date: To be determined

Assignment: The task force is to evaluate the need for a working group to prepare a report on considerations in choosing polarizing methods for transmission line ground directional elements

DTF3 task force held its meeting on Tuesday May 12, 2009 at 3:00 PM with 31 attendees.

Minutes from the Jan 09 were approved with no changes.

There was a discussion about adding phase directional element to the scope of this possible working group. After discussion, this was defeated and the task force will stay focused on line ground directional overcurrent elements.

The task force discussed the draft outline of the report with very good inputs from the attendees

The attendees worked on the title of the possible working group report. The proposed title is "Considerations in Choosing Directional Polarizing Methods for Ground Overcurrent Elements in Line Protection Applications"

By general consensus of the attendees, the assignment of this possible working group would be to produce a report to the PSRC on subject at hand. The objectives of the assignment are

- Identifying different polarizing methods
- Address issues related to the application of different methods
- Make recommendations in choosing the polarizing method

Chairman of D24 WG, Transmission Line Applications of Direction Ground Overcurrent Relays, Don Lukach, mentioned some of the discussion points in the draft outline may overlap with the D24 WG assignment. The two chairpersons of the two groups shall work together and review their work and avoid overlaps.

Stan Horowitz suggested adding Blackburn's paper on "ground relaying" to the reference section.

Writing assignments were assigned for part I of the draft outline. The writing assignments are due July 1st, 2009.

Next meeting requirements: Single meeting, 30 persons, computer projector.

D6: Transmission Line Model Validation

Chair: Tony Seegers

Vice Chair: Sam Sambasivan

Output: Report

Established: September 2008

Expected completion date: To be determined

Assignment: The WG will prepare a report to the main committee on the processes, issues, problems and methodology of validating software model parameters for AC transmission lines used for relaying.

The D6 working group met on Wednesday, May 13, 2009 at 9.30 am with 11 members and 16 guests present. 6 New members joined the group and WG stands at 14 members. This was the WG's first meeting.

The report will not include details of relay curve models or other similar relay modeling. The report will also not include specific EMTP modeling.

The outline of the assignment was distributed and the assignment/outline were discussed. Based on the discussions, it was decided to limit the assignment to the issues related to transmission line modeling only and briefly cover the other issues under a section titled as "other considerations". A new outline document will be prepared and distributed for discussion in the next meeting.

Two presentations will be organized for the next meeting one by Charlie Henville on this subject and the other by Hyder De Carmo of Omicron on the work done by their company on direct measurement of transmission line parameters.

For the September 2009 meeting, a single session is requested. WG also requests a meeting room for 30 with a computer projector and a power cord.

D9: Revision of C37.113 – Guide for Protective Relay Applications to Transmission Lines

Chair: Mohindar Sachdev

Vice Chair: Simon Chano

Output: Revised IEEE Guide C37.113

Expected completion date: 2009

Status: Draft 2

Assignment: Revise and Update the IEEE Guide C37.113 - Guide for Protective Relay Applications to Transmission Lines reaffirmed in 2004

Working Group D9 met at 11:00 AM on May 13, 2009 in Pittsburgh, PA; seven members and two guests were present.

Pratap Mysore chaired the meeting in the absence of the chair and vice chair. The information from the IEEE patent requirement slides was shared with those in attendance.

Pratap reported that the WG Chair has completed revisions of the guide and will be sending Draft 3 to all working group members by May 15, 2009 for review. Comments will be requested from the WG members and it is expected that WG balloting of the draft guide will be completed prior to the September WG meeting.

The remainder of the WG meeting was spent reviewing Annex B of the guide, which contains examples of line relay settings. Among a number of detailed comments, it was felt that additional descriptive text of setting philosophies would be useful, and that all vendor specific relay references should be removed. WG members are to provide detailed comments and suggested changes for the setting examples during their individual review of Draft 3 of the guide.

Next meeting requirements: The WG will meet in one session, with room for 45 persons and a computer projector.

D11: Effect of Distribution Automation on Protective Relaying

Chair: Fred Friend

Vice Chair: Jerry Johnson

Output: Report to the PSRC

Established: January 2005

Expected Completion Date: January 2011

Status: Draft 3

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

The working group, chaired by Fred Friend, met on Tuesday in a double session with 12 members and 20 guests present. The WG membership is now 23 with the addition of two new members, Charles Sufana and Mike Meisinger.

Minutes from the Atlanta meeting were reviewed and approved. The WG agreed to revise the expected completion date from January 2010 to January 2011. Clauses 2.0, 6.1, 6.4, 6.5, 6.6, 6.7, and 6.8 and were reviewed and suggested changes will be made. The following writing assignments were graciously accepted and are due by August 1, 2009:

Clause 3. Pat Carroll will start the definition section

Clause 6.1.1 moved to Appendix, replaced by a summary – Mike Meisinger

Clause 6.2 incorporate changes (previous meeting) – Don Parker

Clause 6.4 incorporate changes – Daniel Goodrich

Clause 6.5 incorporate changes – Daniel Goodrich

Clause 6.6 incorporate changes – Don Parker

Clause 6.10 Charles Sufana will write about Distributed Resources

It was re-emphasized the focus is on the effect automation has on protective relaying. The next meeting will be utilized to bring the document in line with the focus and determine the relative topics to be included in the paper. Please send suggestions for the logical order of topics (re-arrange the outline) and any missing components. Also submit any ideas you have on Clause 6.8 Voltage – what is the context? Is it over/ under voltage or something else? Is there an effect on relaying? A generic DA one-line figure was provided for illustrations.

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

D21: Investigate Supporting IEC Std for Distance Relay Characteristics

Chair: Alex Apostolov

Vice Chair: Alla Deronja

Output: Input to IEEE/IEC Standard

Established: September 2006

Expected Completion Date: December 2009

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

Working Group D21 met on May 13, 2009, in Pittsburgh, PA, in a single session chaired by Alex Apostolov with 5 members and 4 guests present. One guest joined the working group as a member.

Murty Yalla provided an update on the current draft of the IEC standard 60255-121, which is being developed by the IEC TC95 Maintenance Team 4. The standard draft 5 for Section 4 *Specifications of Function* and Section 5 *Performance Specification* and draft 3 for Section 6 *Functional Tests* had been circulated for comments, including the IEEE. MT4 received 25 pages of comments, including just a few comments from the PSRC, and started addressing them at the recent April meeting.

The standard's draft 6 for sections 4 and 5 and draft 4 for Section 6, along with the present comments resolution page, will be distributed in a couple of weeks to the D-subcommittee members, in addition to the working group members and guests. They are requested to review the draft and provide comments to the group chair so that the WG comments may be brought to MT4 for consideration. The deadline for submitting the comments will be provided for the purpose of having them by the next MT4 meeting in September.

Jurgen Holbach provided an update on the work being done by Subcommittee H working group H5A on common file format for distance relay settings aiming at a consistent and full representation of distance relay settings and terminology. He presented some complex distance characteristics, which can be described by a set of standard parameters. This is a report, which will be an input to the IEC standard 60255-121 and TC57 WG 10, and the working group will create a respective standard after the report is complete.

Requirements for the next meeting are as follows: single session, meeting room for 20 people with a computer projector.

D22: Performance Testing of Transmission Line Relays for Frequency Response

Chair: Tom Wiedman

Vice Chair: Jun Verzosa

Output: Report

Established: May 2007

Expected completion date: To be determined

The D22 working group met Wednesday, May 13, 2009 at 8:00 am with 7 members and 10 guests present. WG stands at 23 members. This was the WG's sixth meeting.

Assignment: Investigate the feasibility of defining a range of frequency and rate of change of frequency to be using in a performance specification for protective relaying functions. If this proves feasible then the WG will pursue the feasibility of developing a test process for transmission line relays subjected to off frequency disturbance including rate of change of frequency conditions during stressed system conditions.

The Working Group discussed a power point presentation containing the test text from Section 9 of Draft 3. Much clarification and agreement resulted from the discussions and re-drafting of the test text.

The revised test methodology will be incorporated into draft 3A to be sent to the WG members and guests this week. Draft 3 content is in near final form. Draft 4 will be formatted and sent to the WG and guests for comments. It is the intention of the WG chair with permission from the SC chair to send Draft 5 to the SC for their comments prior to the January 2010 meeting.

For the May 2009 meeting, a single session is requested. WG also requests a meeting room for 25 with a computer projector and a power cord.

D24: Transmission Line Applications of Directional Ground Overcurrent Relays

Chair: Don Lukach

Vice Chair: Rick Taylor

Outputs: Report to WG D9, PC37.113, Guide for Protective Relay Applications to Transmission Lines and Report to the PSRC

Established: May 2007

Expected Completion Date: May 2010

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

The working group met with 13 members (one new) and 10 guests.

The January, 2009 meeting minutes were approved with no changes.

The working group discussed Draft E of the outline and specific writing assignments that had been received. The first topic of discussion included the effects that geology can have on resistivity and fault impedance assumptions. Next, the group discussed coordination at the Zone 1 or instantaneous break point on the line. This led to a good discussion on instantaneous overcurrent setting philosophy, with certain companies completely opposite in their approach to setting these elements. Effects of reclosing were then discussed, followed by adaptive capabilities. The group decided that adaptive capabilities associated with operating quantities be expanded upon. Conversely, adaptive capabilities associated with polarization is not part of this group's assignment. The last topic briefly discussed was on negative sequence elements. However, time did not permit full discussion.

Several writing assignments are outstanding. The chairman will be requesting submissions by July 4, 2009, with the plan to discuss them at the September meeting.

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

DTF25: Distance Relay Response to Distorted Waveforms

Chair: Karl Zimmerman

Vice Chair: TBD

Output: Technical Report to Line Protection Subcommittee

Established: January 2009

Expected completion date:

Assignment: Determine if a WG is warranted to report on the effect of distorted waveforms on distance relay response.

The task force met on May 12, 2009 at 1:30 PM with 24 attendees, 10 of whom would like to join the working group. The group decided that the best way to proceed is to begin writing a technical report, with the possibility of eventually creating a guide. However, at this time, the proposed assignment is: "Write a technical report to the Line Protection Subcommittee on the performance of distance elements with distorted waveforms."

Next, the group developed a brief outline and some assignments have been made.

Preliminary Outline

Introduction (Zimmerman)

Distance Element Design (Mooney)

- Filtering
- Polarizing, Operating Quantities, etc
- Supervising Elements

Applications:

- CVT Transients (Fischer)
- CT Saturation (Mooney, Holbach)
- Transformer Energization
- Series Compensated Lines (Aaron Martin)
- Nonlinear Loads
- Windpower and other nonconventional sources
- AC/DC Conversion (Inverters, Rectifiers)
- Ferroresonance
- Fault and Other Transients

The plan is to have two writers for each section – one as a primary author and one as reviewer. Also, we proposed the following approach for each of the application sections:

- Describe the structure, model, and/or transient
- Describe the distance element response and factors that affect the relay response
- Review solutions, with examples as needed.

Some writing assignments have been accepted and WG members will be contacted by the Chair for other writing assignments. Assignments are due September 1, 2009.

WG members and guests are invited to present system events that demonstrate distance relay responses (correct or incorrect) due to distorted waveforms.

Next meeting requirements: Single meeting, 30 persons, computer projector.

H: RELAYING COMMUNICATIONS SUBCOMMITTEE

Chair: V. Skendzic

Vice Chair: Eric Udren

The Subcommittee met on May 13, 2009 with 63 members and guests. Minutes from the September meeting could not be approved on site due to lack of a quorum. Approval of minutes is being gathered by e-mail correspondence.

The subcommittee must have 75% of its members approve WG reports – an action item for the SC officers.

The subcommittee welcomes Ilia Voloh and Sam Sciacca as new members.

10 existing members who have not attended subcommittee meetings since September 2006 will be notified of our intent to remove them from the Subcommittee membership roles unless they commit to attend upcoming meetings.

Reports from the WG Chairs

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

Chair: Marc Benou
Vice Chair: Ilia Voloh
Output: Guide

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

The H1 working group met with 10 members and 4 guests in attendance chaired by Marc Benou and Ilia Voloh as vice chair. The agenda with the IEEE patent policy was also distributed

The January meeting minutes were distributed. Draft 2.2 with latest submittals were distributed.

The following was discussed:

- Harmonization and referencing with other standards
- Section 4.7 Environmental issues, references to Mark Simon's WG report on standards. Need to get a copy and decide.
- Section 6.1.4 not completed but Bob Ince will complete
- Unassigned sections: 8, 9 including subsections, preferably utility personnel. Need volunteers. Tom Dahlin volunteered to write section 9.1 and 9.2. Mal Swanson will write section 4.5.
- Interoperability needs to be added. This includes interoperability between manufacturers equipment or their lack there of, and different protocols. Marc Benou will add these sections
- Section 8.2 will be removed.
- We now have 4volunteers to review the document John Miller, Tom Dahlin, Chris Huntley and Roger Ray,
- Tom Dahlin made a comment about switched rings time, section 6.4.3.4. He will correct statement.
- Mal Swanson wants to insert section 3 "Definitions" and introduce "teleprotection" as a word.
- Group concentrated on the section 4.3.3. Decide to keep all connectors as it is.
- Dispersion, retransmission and amplifying of optical signal to be addressed in optical budget section. Marc Benou will add a couple of sentences.
- Section 6.1, Marc to change 0.5 to 0.2.
- Section 6 name was discussed, leave as it is. Proposed to write introduction, Marc will do it.
- Single-mode C37.94 is used in spite of not being officially in the standard. Tom Dahlin volunteered to reference its use to section 6.1.3.
- Section 6.4.1 words "30 years ago" should be re-phrased or removed. Tom Dahlin volunteered to rewrite the sentence.
- Section 6.4.2 needs E1 because SDH is mentioned or remove last paragraph at all, Tom Dahlin will add it.

Other than these specific changes, Chris Huntley handed in several pages of corrections that will be made for the next version of the draft guide. The missing sections, 3 to be written by Ken Fodero, 5 to be written by Roger Ray, should be completed for the next meeting. Mark Simon will also be reminded by email to please submit 4.4 through 4.6 since he was unable to attend the meeting. Roger Ray volunteered to write section 5 which had previously been assigned to Mark Simon. Tim Phillippe was also unable to attend and will be asked to finish section 6.2 on digital microwaves. The only unassigned sections that remain are the introduction to sections 8 and 9, and section 9.5. Section 9.5 is the maintenance section, which the group feels, should be written by a user and not a manufacturer. There were no volunteers at the meeting but Mark Simon's name was brought up as a good person for the assignment. He will be contacted between meetings.

The group reviewed the document up to 6.4.4. The changes will be made for the next draft.

H2: Relay Applications Using the Smart Grid Communications Infrastructure

Chair: M. Simon

Vice Chair: TBD

Output: Report to the Subcommittee on title subject

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

H2 Met on May 11 with 14 members and guests. Meeting was chaired by V. Skendzic who substituted for the chair. Discussion started with the attempt to define the Smart Grid, and the WG scope as it relates to the Smart Grid Communications Infrastructure. It was proposed that the WG should concentrate on the new communication options directly linked with the Smart Grid developments. Standard communications (such as SONET) should be excluded.

John Burger stated that AEP has deployed a BPL pilot on their 34.5kV system and is working towards 64kV. John reported having encountered some issues at full load. He could not provide additional details at this time (confidentiality), but offered to give a presentation at one of the future meetings.

Excel Energy has several Smart Grid projects (Smart Grid City).

Oncor and Centerpoint are working on it as well.

Towards the end, it was emphasized that the group can talk what equipment would do, but should not define the procedures. Group needs to stay focused and avoid feature creep.

H3: Timetagging in Protection and Disturbance Recording IEDs

Chair: W. Dickerson

Vice Chair: J. Hackett

Output: Recommended Practice

Assignment: Develop a recommended practice for time tagging of power system protection event, analog, and derived data. This will include methodology for description of measurements and transport delays and for stating the resulting time accuracy.

The WG met at 11 AM on Tuesday May 11 with 7 members and 9 guests in attendance.

The chair presented a proposal of a possible test method, which would allow vendors and users of IEDs with time-tagging capabilities to demonstrate compliance with stated performance specifications. The chair asked for comments respecting whether this was an appropriate item to include in the R.P.

Lively discussion ensued. During the discussion, four conclusions were reached:

1. Testing methods are a good idea and should be included in the R.P. These methods will need to be expanded to cover digital (binary) inputs; analog inputs; derived (calculated) quantities such as rms voltage and power – watts and VARs for example; and triggers.
2. Information regarding de-bouncing and other processing delays should be made available to users in a concise manner.
3. UTC should be used for all (data management layer) communications and data storage (examples: COMTRADE, IEC-61850). Local time should be deprecated at this layer. Instead, visualization tools should apply local offsets as desired at the data presentation layer, in control centers or wherever the data is eventually viewed. This could include the front panel of an IED, if desired.
4. The chair will expand the test methods and collate the submissions received so far into a single draft document to be distributed to WG members prior to the next meeting.

No other assignments were made.

H4: Revision of C37.111 COMTRADE Standard

Chair: R. Das

Vice Chair: A. Makki

Output: Standard

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

The Working Group met on May 12, 2009 with 24 attendees (14 members and 10 guests). Informal balloting was conducted on Draft 6 among WG members just prior to this meeting. 30 ballots were received out of possible 34. 4 ballots were negative, and the comments associated with the negative ballots were

discussed and resolved during the meeting. Draft 7 will be revised based on the resolution and will be circulated among the members for review of the modification only with a two-week review period. Draft standard will then be submitted for review by subcommittee members. Draft 7 will also be provided to IEEE for editorial comments and formation of balloting body.

Chair will provide Draft 7 to Marty Yalla for circulation to the IEC members for comments.

The WG will meet in Arlington to review the results of subcommittee balloting and feedback from IEC.

H5-a: Common Data Format for IED Configuration Data

Chair: J. Holbach

Vice Chair: D. P. Bui

Output: Report

Assignment: Define a common format for IED configuration data.

The configuration data described in this common format should allow only one unique interpretation how they are used in a given application. The format must be powerful enough to convert any practical IED configuration into this format. The conversion from this common format into a specific IED configuration data set depends on the IED ability to support the described application requirements and may not be possible in all cases. The common format can be used to exchange IED data between different data sources and receivers. Sources and receivers can be IED configuration programs, net study programs, data bases, coordination programs and automated test programs.

The group met in Pittsburgh on May the 13th with 9 members and 5 guests. 2 members participated via phone.

The input from Dr. Steinhauser was reviewed and reflected to the latest setting format the working group developed so far. It was decided that the Cardioids characteristic should be added to the characteristic catalog if we can find it in actual relay implementations.

The distance characteristic can now be represented by a number of lines and arc elements that is not fixed. The first element starts at the R-axis between the first and fourth quadrant. All further elements are listed in a counter clockwise order. Each element needs to be described with the logic where it starts or ends.

The outline of the report was reviewed and volunteers assigned to the chapters.

The working group will try to finish the working group report by end of 2009. To archive this goal we will continue to work on the report also between this and the next IEEE-PSRC meeting in September. It is planned to have a phone meeting every two weeks! The first phone meeting is planned for May 28th at 7PM US east coast time.

H6 Substation Ethernet

Chair: J. Burger

Vice Chair: C. Sufana

Output: Report

Assignment: Investigate user requirements and provide recommendations for relay peer-to-peer communications in substations. Develop and define practices for the application and testing of IEC 61850 based Ethernet protocol in substation LAN peer-to-peer applications.

Output: reports to the PSRC, transaction papers

The meeting was called to order by John Burger with 12 members and 25 guests present.

Minutes from the Atlanta meeting were approved as presented.

Christoph Brunner gave an update on IEC61850. Edition 2 is still being edited. There is hope that sections 6 and 7-1 to 7-4 will be finalized after June meeting for official publication by the end of the year. There are also several technical reports being developed. One technical report is on how to use 61850 between substations. Another report is on using 61840 for a control center and another report is for condition monitoring. There is also a task force on network conditions, including redundancy and Ethernet. Christoph also mentioned that edition 2 will also have sections on communication redundancy. WG 18 has issued their first version on hydro plant control. WG 17 has models for Distributed Generation and is now working on feeder equipment based on logical node models.

Bruce Muschlitz is hosting a meeting on Thursday (after the EPRI meeting) and Friday on testing issues. GOOSE performance is also being discussed.

John Tengdin asked about environmental requirements in section 9. He feels that there may be a need to revisit the section about transient tests if the measuring units are out on the bus. He has a copy of an EPRI study on the E and H fields. He will introduce in the C37.90.1 meeting a recommendation on forming a C37.90.4 working group to address the issue.

Bruce Muschlitz asked Christoph about the task force that is working to have models on a web based database. It is essentially an online standard. There is much discussion by the task force on what is public and what is free.

Alex Apostolov next gave Damien Tholomier's presentation entitled CIGRE WG B5.36 Applications for Protection Schemes based on IEC61850. The scope is to define possible applications based on 61850 and to integrate user specs and development of the international standard. The WG did many surveys covering topics such as: review of existing protection schemes, possible migration, possible new protection schemes based on 61850, defining required engineering and commissioning tools. IEC61850 does not define the tool but does say that tools are needed.

There were 16 utilities that responded to the survey. The survey covered such topics as CB failure, Automatic Reclosing, intertripping, blocking, load shed, and auto restoration.

Survey results indicated that some did not understand the standard. Some said GOOSE messages were not compatible with existing test and maintenance procedures.

The survey was quite detailed in presenting the results. Comments included:

- Some KEMA certified IEDS had ICD files that were not compatible.
- Installation costs should be reduced due to reduced wiring and bay standardization.
- Protection availability should be improved.
- IEC61850 does not define architecture so there is pressure to have guidelines developed. There needs to be a high degree of expertise of engineers.
- Commissioning should be more convenient and faster.
- There is a concern about interchangeability; especially of the merging units.
- IT security required more skilled personnel.
- There is a great need for training especially for the communications.
- Performance: faster than hardware.
- There is a concern on clarity of AC/DC schematics when GOOSE is used.

John Burger next gave a presentation on AEP's Station Data Repository (SDR) to help meet NERC and gridSMART data requirements. They estimate a cost savings in the millions.

AEP is obtaining PRC-002 Disturbance Monitoring and reporting information from relays, over the station LAN, using IEC61850. They collect sequence of events reports, fault records, transients, and dynamic disturbances. Data is also retrieved from other equipment for line loading, transformer loading, etc. Data is also displayed locally on the station computer. John also explained how they are using Synchrophasors from relays to supply dynamic data, 30 samples per second. Approximately 95% of the SDR data is supplied via 61850 communications protocol. John noted the current challenges of moving data thru corporate and station firewalls. AEP is retrieving gridSMART data via wireless media and has a trial going on of about 100k devices. The station LAN may play a part in retrieving this information. At the moment they have over 100 substations on line using the SDR technique.

H7 IEEE 1588 Profile for Power System Applications

(Joint Working Group SUB C7 & PSRC H7)

H7 Chair: Bill Dickerson

Substations C7 Chair: Tim Tibbals

Vice-Chair: Galina Antonova

Output: Standard

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

Joint WG H7/Sub C7 met on May 12 in Pittsburgh, PA in a triple session with 49 attendees (21 members and 28 guests). We had to move to a larger meeting room due to large turnout.

After introductions, Galina called for changes to January 2009 meeting minutes. There being none, minutes were approved by acclamation.

IEEE patent policy slides were presented. Attendees were advised to inform the chairs about any patent issues. None were identified.

Galina presented an update for project status:

- Revised PAR including Substation Committee is approved
- Profile Draft 1.1 is available
- Plug-fest is announced
- TC57 WG10 needs profile in early 2010.

Discussion ensued about WG10 coordination/Dual Logo. John Tengdin suggested getting the standard done under IEEE then presenting it to WG10. There are 10-15 WG10 members in this WG already.

Discussion of combined Profile Draft 1.1 followed:

- On one-step vs. two-step operation

There was a general agreement to allow both: for receivers both are mandatory, for transmitters two-step is mandatory and one-step is optional. It was also suggested to run these by practical network architectures to identify any issues.

- On Destination MAC Addresses

It was decided to use special MAC address for Pdelay messages and another MAC Address for all other messages.

- On tagged vs. untagged frames

It was decided to send PDelay messages untagged and all other messages tagged with configurable priority (default = 4) and configurable VID (default = 0).

- On UDP/IP mappings and unicast communication

It was decided to remove these from the profile.

- On mapping into Synchronphasors time quality nibble

It was decided to use 1588 ClockAccuracy when in synch and add a new field (possibly as TLV) for degrading accuracy in holdover.

Other issues were listed: Alternate master option, Security extension, Source MAC Address modification, and step vs. slew. It was decided to discuss these electronically.

Clemens Hoga and Karl Weber gave a presentation on High Availability Seamless Redundant Ring (HSR) and its dependencies with 1588 power profile. It was concluded that HSR applications need one-step operation and Source MAC Address modification is an issue.

Discussion on profile plug-fest followed. It was decided to continue with the current approach and solicit more participants. If 5 vendors could participate (currently 2 vendors and one testing lab expressed interest) it would be possible to hold it in September.

H8 Application of COMTRADE for Exchange of Synchronphasor Data

Chair: K.E. Martin

Vice Chair: E. Allen

Output: WG Paper

Assignment: Develop a paper on issues related to the use of COMTRADE for exchange of Synchronphasor Data. Develop a profile (scheme) to use COMTRADE for this purpose. Report on other formats that have been used such as “.dst”. Address issues that would arise in converting .dst and other formats to COMTRADE.

Note: H8 was listed as HTF1 prior to this meeting.

The meeting commenced at 8 AM on May 12 with 14 members and 17 guests present. Ken Martin presented the proposed profile for placing phasor data into COMTRADE format. This profile requires no changes to the COMTRADE standard; it proposes a convention for representing phasor data in the existing COMTRADE standard. If this approach is followed, then the end product of the group would be an application guide for users to place phasor data into COMTRADE. The profile was initially presented at the previous meeting of the task force on September 10, 2008 in Burnaby, BC. The profile was then sent to the HTF1 e-mail list on October 20 with a request for comments by November 7. All comments received were incorporated, and the most recent version of the document was sent to the H Subcommittee on December 12 with a request for comments by January 1, 2009 in anticipation of approval at the January PSRC meeting.

A number of comments about the profile were provided at this meeting. Mark Adamiak mentioned that time quality information is not covered by the schema. He proposed to use digital channels to convey this information and will provide a written description to be added to the profile.

It was noted that the designations "R", "S", and "T" for phase quantities in Europe have largely been replaced by "1", "2", and "3". The use of "1", "2", and "3" as phase identifiers was added to the profile.

Comments were made about providing more guidance in the schema on calculating the value of `timemult`. However, no specific changes to the schema were deemed necessary.

Several comments were made about adding prefixes to channel names in order to specifically identify those channels as being part of a complex pair. Such designations could aid the automatic processing of COMTRADE files by COMTRADE readers. However, the chair, vice-chair, and other members believe that the schema already makes a provision for this identification by the use of "r", "i", "m", and "a" in the second character of the phase identification field (ph) and by the ordering of the two portions of each complex quantity as consecutive channels. Furthermore, the current COMTRADE standard (1999) does not define any means of automatic channel identification.

Some of the comments and discussions were about deficiencies in the 1999 version of the COMTRADE standard, not issues with the proposed schema. It was requested that the meeting discussion instead focus on the completion of the template for putting synchrophasor data into the current COMTRADE standard, which is still the 1999 version. Accordingly, a recommendation was made to remove references to the new COMTRADE standard currently under development (such as `tmq_code`) from the schema. The task force agreed with this recommendation.

The task force took a vote on whether to submit the schema, with Mark Adamiak's additions and with references to the new COMTRADE standard deleted, to the H Subcommittee for approval. The vote was 10-1 in favor of this action with the remaining members not voting.

H9 Understanding Communications Technology for Protection

Chair: M. Sachdev

Vice Chair: R. Midence

Output: Paper

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

The Working Group met on May 12, 2009. Nine members and six guests were present.

Status of the Report: The list of contributions received by the Chair was reviewed. Chair stated that he had received three new contributions until the day prior to the meeting.

With regards to the future of the working group, the participants confirmed that there is definitely an interest on the document, therefore the working group will continue with the production of the document. The future of the activity appears promising again. The first draft of the document was presented and discussed. The Chair indicated that there are still some contributions that were assigned in the past, which have not been received yet. The Chair requested to those who attended the meeting, to identify possible individuals or sources of information to complete the missing sections. The Chair also requested volunteers to review the document for consistency. No volunteers were nominated for this task during the meeting.

Writing Tasks: The Chair will make a request again to those present and also to the members of the group who attended previous meetings.

First draft of the Report: The draft of the report was reviewed and the following additions / modifications were suggested:

From the meeting of April 14, 2009:

Section 2.0 describing the manner in which communications is used in substations is added. Marc Benou provided his contribution during the meeting

Tom Dahlin for providing contribution to Section 8.9 prior to the meeting. Tom indicated that he found inconsistency and numerous repetitions in the current draft. He will indicate to the Chair the sections that need to be modified and he will follow up.

The scope of Section 7.5, Electrical Interfaces, is expanded. Oscar will try to provide additional input. If necessary, he will seek assistance from other members of the WG. Oscar was not present during the meeting. The Chair will follow up with Oscar.

Section 11.1 addressing the issue of proprietary protocols is added. Jim Niemera provided his contribution prior to the meeting, but it was not included in the draft that was presented during the meeting

A discussion on the differences between protocols, interfaces and connectors ensued. Roger Moore agreed to write the Introduction of the report that would include the OSI model explaining the communication's layers – not received yet. This task was assigned to René Midence.

Roger also agreed to review the outline and provide recommendations so that the WG report follows the OSI model that will make it easier for the readers for follow. – Not received yet. This task was assigned to René Midence.

Introduced during the meeting of January 2009:

To boil down the protocols covered in IEEE 1615 – It was agreed that IEEE 1615 may not have been the correct reference which probably was IEEE 1613. It was also agreed that the document should include some reference information to said standard.

The document should incorporate basic descriptions with reference to other IEEE document – The Chair advised that he was not able to include this information in the current DRAFT and asked for volunteers to help producing the list. Re-assigned to René for next meeting.

Include in the introductions a couple of paragraphs referring to cyber security, more to bring awareness to the reader. The Chair will request contributors for this.

Introduce a short sentence to call the attention of the reader that communications are an important component of the smart grid. The Chair will request contributors for this.

Introduced during the meeting of May 13, 2009:

The Chair questioned why a section on Transmission Line Protection Schemes was included in the document. The group recommended to be included to capture communications requirements and issues for P&C Pilot Schemes.

The DRAFT needs to be revised to eliminate conflicts, repetitions, etc. The Chair advised that the document was a very preliminary version with several missing sections, but nevertheless, it needs to be revised accordingly. Tom Dahlin will revise some of the sections as indicated above.

Add a section on IEC61850 Substation to Substation Communications. The Chair will ask for volunteers to write this section.

The Chair will distribute the list of sections that either don't have a person assigned to or that the contribution was not yet received. The list is included in the Appendix of this document.

Target date: Drafts are due on or before August 31, 2009. This was not agreed during the meeting. The new chair will communicate the new deadline to the contributors.

A revised draft of the report will be put together and distributed before the next meeting of the Working Group.

H10 Naming Installed Intelligent Electronic Devices (IEDs)

Chair: R. Cornelison

Vice Chair: J. Hackett

Secretary: A. Makki

Output: Paper

Assignment: Create a PSRC Report that describes a convention to uniquely identify (name) installed Intelligent Electronic Devices (IEDs) including measured and calculated quantities for the purpose of sharing data collected by these devices.

WG H10 met Tuesday May 12, with 6 members and 8 guests.

After introductions and approval of the minutes, Dr. J C Tan presented "IEC 61850 Naming Convention and its Applications in Hydro One and Manitoba Hydro".

JC Tan joined the group and volunteered to write a section on how IEC 61850 and 61346 handles naming devices and channels.

H11 C37.118 Standard for Synchrophasors for Power Systems

Chair: K. Martin

Vice Chair: B. Kasztenny

Output: Standard

Assignment: Revise the IEEE Synchrophasor standard, C37.118-2005, by adding measurement extensions, communication harmonization, and other improvements according to the PAR issued 27 March 2008.

The working Group met on Wednesday May 13, 2009 with 15 members and 15 guests. A reminder has been made regarding IEEE-SA patents and intellectual property bylaws.

An update has been provided by Ken Martin and Matt Ceglia regarding the dual-logo IEEE/IEC process. An attempt is being made to establish a joined working group to develop a common standard and have it balloted by both bodies. Discussion followed regarding logistics of this future activity. Veselin Skendzic brought up a concern that IEC may not approve of the existing serial communication protocol, potentially creating a major issue for the joined group. The WG took a position that an effort should be made to prevent this situation and work out toward a good mutually agreed version. Matt Ceglia pointed to ways to resolve such conflicts, for example, by having some parts under dual logo and some under IEEE only (C37.118.1, .2, etc.)

Ken Martin reviewed a combined proposal for specifying dynamic synchrophasors test requirement. The document combines proposals from Ken Martin, Arun Phadke and Jerry Stenbakken.

A discussion followed. Gabriel Benmouyal voiced a concern that the step change requirements conflict the steady state filtering requirement. A consensus was reached to look into this issue and develop an opinion after NIST makes their tests available for a large number of existing PMU brands.

Bogdan Kasztenny pointed to a danger of having too narrow tests and designing PMUs to pass the tests by leveraging a prior knowledge of the test as specified in the standard, giving the magnitude of a step change as an example. This sparked a discussion on the effective measuring range of PMUs: metering range vs. fault recording range. Veselin Skendzic and Bogdan Kasztenny are to look at a possibility to specify standard ranges to aid users with selecting PMUs for various applications (system oscillations vs. backup protection or line parameter estimation, for example).

Discussion followed on a proposal to keep magnitude and phase/frequency oscillations tests separate or combined. The WG did not reach a consensus on this.

Gabriel Benmouyal suggested simulating power swings and specifying tests signals that mimic the actual power swing. Gabriel will work on examples with Arun.

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

Chair: E.A. Udren

Vice Chair: J. Gould

Output: Report

Assignment: Develop a report to assist protection engineers in configuring Ethernet LANs and networking equipment when the network traffic includes critical protection messaging such as IEC 61850 GOOSE

messaging. Topics include switch and router configuration, VLANs, security, priority queuing, traffic monitoring and control, and topology choices and redundancy.

The Working Group met on May 13 with 9 members and 11 guests.

We received a new draft of IEC 61850-90-1 technical report on interstation communications with which the draft should coordinate. The example presentation methodology is proposed for use in the summary of substation Ethernet applications in the H12 report.

The WG reviewed the status of Draft 1 questions of scope, coordination among sections, and definition of exactly what is needed for the few missing sections. Volunteers took these assignments, notably including synchrophasor traffic requirements, and the appropriate level of application guidance for protection traffic networking between substations on large LANs or on WANs.

A few editors will exchange and patch the draft before recirculating to the WG with new additions or slots for new additions.

H13 Understanding Requirements and Applications of the Substation Cyber Security Standards (Joint Working Group SUB/C1 & PSRC/H13)

Chair H13: Steven Kunsman

Chair C1: Sam Sciacca

Vice Chair H13: Tuan Tran (newly appointed)

Output: Standard

Assignment (draft): 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 H13 met on May 13, 2009 with 42 in attendance - 17 members, 25 guests with 5 of these guests requesting to be new members. Substations WG C1 will meet in next week.

Agenda

- Introductions
- IEEE Patent Slides
- Approval of the Jan 2009 minutes
- Finalization of WG Assignment and Substation/PSRC PAR authorization
- Review of the draft document outline
- Next Step -> Draft Report Outline assignments

A quorum established 17 of the 26 joint WG members present. The first order of business was review of January minutes followed by review the draft PAR. January 2009 minutes and proposed PAR were approved by the working group members present. Any changes resulting from next week’s Substation C1 WG meeting will need to be email balloted for approval.

WG H13 approved PAR Scope (to be confirmed at SUB/C1):

Title: Cyber Security Requirements for Substation Automation, Protection and Control Systems

Scope: 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.

Purpose: Modern substation automation, protection and control systems, while using technology advancements to achieve greater power system reliability, can be vulnerable to a multitude of security threats. These vulnerabilities and threats can lead to overall power system integrity issues. With the increasing dependency on communication technology and the growing pressure of a secure utility infrastructure, various standardization bodies are in the process of developing cyber security standards where very little effort has gone into the harmonization or rationalization of these standards to the substation applications. Examples of important standards to the utility community are:

- NERC CIP
- IEEE 1686, IEEE P1711
- IEC 62351

This standard builds on the other work to date to produce a specification for a technically feasible cyber security implementation.

WG reviewed the draft outline of the document. Comments to the draft:

1. Stan Klein/Markus Braendle - suggested to review the ESP to Boundary Protection and include ESP, firewall, VPN as a subsection focused on defense in depth.
2. Craig McClure – need to include requirements for IEDs located in the substation in the switchyard. The cost of having 2 ESP (camera and card readers) is too expensive.
3. Steve – System Architectures needs the following sub-categories being single boundary protection, multi-boundary protection, substation to substation, wireless inside substation, feeder automation wireless connections.
4. Alex Apostolov/Craig McClure/Stan Klein – discussed the need for 6 walls enclosure for ESP per NERC/CIP. Remote device in switchyard needs to also be protected with secure enclosure.
5. Markus Braendle – The focus of the document needs to be on “sound engineering practices” in the definition of security requirements.
6. Juergen Holbach – raised the question of teleprotection which today is outside the area NERC/CIP but will be considered in this document.
7. George Gresko– recommended moving section 6.1 to a substation 6.4.x. Changed heading 6.4 to SCADA and Remote Access.

Section Assignments

1. Sam – section 6.4.1
2. George Gresko – section 6.4.2 (old section 6.1) Corporate LAN
3. Steve/Craig McClure/J-C Tournier – section 6.2
4. Craig McClure – remote capabilities (for breaker IED or merging unit)
5. Stan Klein – review NERC Control System Document
6. Markus Braendle – review NIST document structure versus draft
7. Alex Apostolov– section 6.6
8. Stan Klein/Markus Braendle – section 6.5
9. Aaron Moore/Solveig Ward – review C1 cyber security report for considerations in various sections.

H15 Coupling Redundancy for Protection Systems Using Power Line Carrier

Chair: R. Ray

Vice Chair: J. Zipp

Output: Paper

Assignment: To develop a working group report that discusses the various coupling schemes for power-line-carrier systems and the coupling schemes ability to provide for redundancy.

H15 met on Tuesday, May 12, 2009 with 12 people in attendance.

At the past meeting there were four assignments given out and one was received. This assignment was incorporated into the document and, prior to this meeting a revised document was sent out to all. Just before this meeting there were several comments and some written material received from Bruce Pickett. In the meeting we spent time discussing Bruce’s comments since the group had not had time to review this material prior to the meeting. Most of the meeting time consisted of an excellent discussion on two points: What can and cannot be considered redundancy in a coupling scheme and the effects of transients across

the protective gaps of the drain coil in the CCVT and the line tuner. That is, does the operation of these gaps frustrate the requirements of redundancy in the coupling scheme since they could all fire at the same time? This also led to a discussion on the magnitude setting of these protector units. This discussion reached no conclusion at this time but should stimulate further comments on the subject.

Old assignments still required:

- Short discussion on Modal Analysis – John Zipp
- If redundancy exists in a coupling system how should the carrier sets be adjusted to alarm a failure of part of the coupling system – Jon Kellner
- Short discussion on the pros & cons of Coaxial vs. Triaxial cable – John Miller

New assignment:

- Bruce Pickett will add to and incorporate his material and thoughts into the document and return it to me.
- Chair will then send the document out to the group for review and comments prior to the next meeting.

H16 Common Format for Event Data Exchange (ComFEDE)

Chair: M. Adamiak

Vice Chair: P. Martin

Output: Standard

Assignment: Develop an XML-based Common Format for Event Data Exchange (COMFEDE) - including associated descriptive data values.

The WG met on May 13, 2009 on PAR PC37.239 with 8 members and 4 guests. Randy Hamilton provided a mapping from Basler of one of their SOE reports into ComFEDE that was reviewed during the meeting. As a result of this mapping, several additional items were identified as being “desirable” to add to the Schema, namely:

- Explicit indication that that a particular event was the result of a fault operation
- The need to qualify the voltage level identifier as being primary voltage
- The need to be able to incorporate the Name of the setting file of the tripping relay
- A clarification of semantics between Fault Clearing Time and Breaker Operate Time.
- Additional of an option field to identify the SSC or SCD file associated with a device

As a result of discussion on the concept of fault clearing time and breaker operate time, it was decided to add definitions of these terms as well as a diagram that defines these times on a fault waveform. The chairman took on the responsibility of defining these terms and providing a basic diagram to illustrate the definitions. Additionally, Mladen Kezunovic also volunteered to create a more detailed diagram to define additional parameters of a fault/breaker operation.

Another item discussed was that of creating a Style sheet that would be able to map the XML file into a web page. I was decided that the Scheme will still undergo several changes so this activity was postponed until the end of the year – at which time, a student may be solicited to create the style sheet.

The Chairman is to follow-up with IEEE SA to determine the best way to publish the standard – given that a major portion of the standard is the Schema.

The presentation on providing integrity, authentication, chain of trust, and confidentiality aspects to the document was postponed and Stan Klein present options at the next meeting.

HTF1 Application of COMTRADE for Exchange of Synchrophasor Data

Now WG H8 – see minutes above.

Liaison Reports

PES Substations Committee

J. Tengdin

No report to SC. See Main Committee report.

PES Communications Committee

S. Klein
No report.

IEC TC57, WG10, 17, 18 and 19

C. Brunner

IEC TC57 / WG10 is currently working on the following topics:

(1) Preparation of Edition 2 of IEC 61850:

Part 6, 7-1, 7-2, 7-3 and 7-4 have been approved as CDV.

The preparation of the FDIS is planned for the second quarter of 2009.

Part 8-1 and 9-2 have recently been issued as CDV. Voting closes in September. They include solutions for redundancy based on IEC 62439. The other parts will follow in a second step.

(2) A draft technical report IEC 61850-90-1 describing how to use IEC 61850 for communication between substations has been published. As a consequence, some of the models in IEC 61850-7-4 have been updated and new functionality is added to the Substation Configuration Language.

(3) A new task force will deal with condition monitoring and IEC 61850. The plan is to produce a report IEC 61850-90-3.

(4) Another task force will prepare a technical report with network engineering guidelines.

(5) For the next working group meeting, a task force will discuss about different aspects of IEC 61850 and testing. This includes all flavours like e.g. conformance testing, system testing or routine testing. The purpose is, to figure out, where additional standardisation work may be required and which areas may be covered by the UCA international users group.

(6) A new work item has been submitted to IEC to create a double logo standard for synchrophasor transmission using IEC 61850 based on C37.118. The voting on that new work item closes July 24.

IEC TC57 / WG17 has issued the FDIS of IEC 61850-7-420: object models for distributed energy resources. They will next work on models for distribution feeder and network equipment.

IEC TC57 / WG18 is preparing EC 61850-7-510: use of the logical nodes defined in IEC 61850-7-410 to model applications for the control of hydro power plants and starts the process to prepare amendments to Edition 1.

IEC TC57 / WG19 is responsible for the overall harmonization within TC57. One core focus is the harmonization between the world of field devices (IEC 61850) and the control centre and system level applications (CIM standards; IEC 61968 / 61970).

IEC TC57 / WG15 is responsible for security. A draft technical specification IEC 62351-7 about objects for network and system management has been published. These abstract objects need to be mapped into IEC 61850 models. A CD IEC 62351-8 for role based access control has recently been circulated.

I: RELAYING PRACTICES SUBCOMMITTEE

Chair: T. Sidhu

Vice Chair: R. Beresh

The Subcommittee met on May 13, 2009 with 21 members and 18 guests – a quorum was not achieved.

- Tarlochan was not able to attend. Vice-chair Bob Beresh filled-in
- Approval of previous I minutes from Atlanta, 2009 – unable to approve due to lack of quorum
- Adcom is requesting presentations for the main committee meetings
- The Arlington TX, Sept 2009 meeting will be extended by ½ day (Thus PM) with SC meeting on the Thursday am and main committee meeting Thursday pm

Reports from the WG Chairs

I2: Terminology Review

Chair: Mal Swanson

Vice Chair: Barb Anderson

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

May 12, 2009 Meeting

The I2 working group met at 11:00 am on Tuesday, May 12, 2009 with eight members and three guests. Mal Swanson chaired the meeting. Matt Ceglia from IEEE Standards attended the meeting.

Minutes from the last meeting were approved.

C37.234: Oscar reported that all the original terms have been placed in the Definitions clause of the standard.

Mal and Matt reviewed the procedure for access to the IEEE Terms Database:

1. All working group chairmen can gain free access to the Database by emailing a request for a password to Matt Ceglia at m.j.ceglia@ieee.org.
2. All working group chairmen need to have new definitions in a separate "Definitions" clause 3.0 if they are developing a Standard, Guide or Recommended Practice. Terms already in the IEEE Std. 100 Dictionary or the Terms Database that may be needed to understand the document are put in the Glossary.
3. Most members of the I2 Terminology working group have received passwords to the database. Matt will get passwords for the remainder.

The working group then discussed the procedure that will be used for the list of definitions from Groups # 1 through 5 of this working group since C37.100 has been disbanded.

Barb Anderson will have the newest revision of Groups #1 though 6 emailed to working group members and Russ Patterson as "NRD1-6_059".

I3: Relay Functional Type Testing

Chair: Jerry Jodice

Vice Chair: Bryan Gwyn

Output: Report

Meeting: #5 – May 12, 2009

Working Group Assignment

The Working Group Report framework has been completed with some contributions included. It was agreed that cases would be listed in an Appendix in the report with a list and brief description in the main report. This will make updating the document easier.

Members agreed that any disturbance presentations given at the main meeting would be captured as a case. Drew Welton agreed to review the GA Tech Fault Conference papers for possible candidates for this document. Members agreed that eventually papers should be written for various conferences to raise the profile of this work. Jerry Jodice will ask Russ Patterson – PSRC web master to put the IEEE I 13 report on the PSRC web site.

The following people agreed to submit test reports by July 31 2009:

Jeff Pond: A misoperation of a Directional Comparison Blocking Scheme on a current reversal during a fault. Parallel line set up.

Steve Turner: Model of a two winding transformer and differential protection. This assignment is almost complete. The report needs to be converted to Word and a Comtrade file attached.

Drew Welton: Simple event on a feeder protection. 52A contact did not transition due to a problem in the breaker. Breaker failure initiated. Insufficient current to drop targets on all phases faulted. This assignment is almost complete. The report needs to be converted to Word and a Comtrade file attached.

Simon Chano: Degraded performance of a distance relay due to low or high frequency.

Juergen Holbach: Using data from the 2003 Blackout to test Out of Step protection schemes

Bob Beresh: Overreaching due CCVT Transients for three phase bolted fault

Drew Wielton: Bus Differential Protection miss operation

Tony Giuliante: CT Saturation and breaker failure

Rick Turner: Incorrect CT tap on bus differential protection

The following assignments are complete:

Tony Giuliante: Benefits of measuring input values while testing Electro Mechanical relays

Reference Material

CIGRE SC 34.10 report

IEEE I13 report

I4: IEC Standards Advisory

Chair: Eric Udren

Vice Chair: Mario Ranieri

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

The WG met on May 13, 2009 with 7 members and 1 guest.

Typically, the WG discusses TC 95 documents, some requiring a vote to be sent through USNC. In this meeting cycle, however, IEC circulated no new standards documents.

Eric Udren described the successful fundraising campaign he conducted with Murty Yalla to obtain \$18,000 from our industry to support the meeting of TC 95 at the IEC General Meeting in Seattle in October of 2010.

Eric reported on recent TC 95 documents:

- 95/249/RM – Sao Paulo meeting minutes from November 2008.
- 95/250/RVC – Voting result for 95/231/CDV - Measuring relays and protection equipment - Part 1: Common requirements
 - US request for C37.2 reference table restoration rejected.
- 95/251/RVC – Voting result for IEC 60255-151, Overcurrent Relays
 - No US comments, but extensive markup by others.
- Presentation on IEC strategy by C. Jacquemart of IEC CO in Geneva at TC 95 meeting.

Murty Yalla reported on Maintenance Team (MT) 4 of TC 95, developing new IEC relay functional standards projects:

- 60255-151 – Functional standard for over/under current protection – ready for final draft international standard (FDIS).
- 60255-127 - Functional standard for over/under voltage protection - a single curve implementation similar to -151, ready for CDV.
- 60255-121 - Functional standard for distance protection – Extensive discussion on the draft for an elaborate scheme of testing – almost 1000 standard tests over the full range of operating conditions – to demonstrate proper performance of a distance relay or function.
- 60255-149 – Functional standard for thermal relays – not yet begun – to update 60255-8.
- 60255-187-1,2, etc. family of standards - Functional standard for differential protection – bus, transformer, line, etc. – not yet begun, and needs more definition. We might expect tests under various conditions as is now being developed for -121.

I5 Schematic Representation of Power System Relaying

Chair: Kevin Donahoe
Vice Chair: Dave Zinn
Output: Report
Meeting # 6 - 5/13/2009

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

Output: Report, writing assignments to be established

I5 Schematic Representation of Power System Relaying met in a single session with 8 members and 16 guests. The meeting was chaired by Charles Sufana as the Chair and Vice Chair were not present.

Rafael Garcia presented what ONCOR is doing for their prints. ONCOR has essentially standardized on the settings format and panel designs and thus have prints that represent one relay per print. Rafael also showed typical relay setting sheets and how they are color coded for the relay techs. Some of the prints are extensive and show the complete logic.

There was some discussion on how IEC-61850 relays should be represented on prints. Further discussion followed; it would appear that there will be the need to have multiple prints for the relays, i.e. one line, AC, DC, logic, settings, etc.

There was some discussion on who will need what prints and with what level of detail should be on the prints. It is hoped that the working group will be able to provide some direction in the final report. Kevin Donahoe will be sending an email to the working group to ask for volunteers for writing assignments. He will also be looking for additional presentations. Adi Mulawarman indicated that he will try to have a presentation on what Xcel Energy did for IEC-61850 relays.

I6: Practical Aspects of Rogowski Coil Applications to Relaying

Chair: Ljubomir Kojovic
Vice Chair: Bob Beresh
Output: Guide
Meeting: #3

The WG met and reviewed the outline and the first draft of the document. Assignments will be handed out at the next meeting. The guide will provide a useful resource for those wishing to apply Rogowski coils in practical applications.

I9: Revision of C37.105 Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

Chair: Sahib Usman
Vice Chair: Roy Ball
Output: Revision of Standard C37.105
Meeting Minutes May 12, 2009

1. The latest draft D11 of the Std. C37.105 was discussed to ensure that all resolved negative comments/changes are addressed.

2. All members of the WG agreed that the Draft 11 is finalized and ready for issue for re-balloting.
3. The WG discussed the document (Excel spread sheet) covering all negative comments and their resolution/ disposition by the WG. The WG concluded that the document is completed and ready for issue along with the finalized draft 11 to IEEE SA.
4. Matt Ceglia of IEEE explained the need for the modified PAR, since the Scope of the Std. has significantly changed. Matt has informed that the Modified Par has already been submitted and is in the process of approval by IEEE.
5. Also, Matt advised that, according to the new procedure, it is necessary to comply with the requirements of RevCom for re-balloting.
6. The WG is planning to issue all documents including a cover letter in about two weeks so that IEEE will process the documents for circulation of the draft among the balloters in June.

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

Chair: Marie Nemier
Vice Chair: Munnu Bajpai
Suresh Channarasappa – Co –Chair SC-2
Output: Revision of Standard C37.98
 Meeting Minutes May 13, 2009

The WG is on track to complete this work prior to the PAR expiring.

I11: Application of Optical Current Transformers for Protective Relaying

Chair: Harland Gilleland
Vice Chair: Bruce Pickett
Output: Guide
Meeting: May 12, 2009

The meeting was called to order with 8 members & 10 guests
 We opened with a Welcome and Introduction of Attendees

There were opening discussions and review of the Agenda by Harley

Also a review of the details in the PAR being developed for the Guide, with focus on open questions in sections 1.2, 2.1, 4.2, 4.3, 3.2, and corrections or additions to be done, and discussion on 5.2 Focus, 5.3 Purpose, and 5.4 Need.

Next there was a focus on five key Sections of the Guide, including review of the written material that will be posted on the Web site. The WG members and guest had a spirited and productive discussions on the following topics:

Presentation by Farnoosh Rahmatian on Performance
 Presentation by Michael Mendik on Testing and Applications
 Presentation by Don Parker on Training
 Short talk by Brian Mugalian about Words and IEEE dictionary

Harley discussed the Teams and the possible need to rotate some personnel to help with other sections.

I15: Revision of C37.110 – Guide for the Application of Current Transformers Used for Protective Relaying Purposes

Chair: George Moskos
Vice Chair: Barry Jackson

Output: Revision of Standard C37.110-1996
Meeting: 12 May, 2009

The WG did not meet.

I17: Trends in Protective Relaying Performance

Chair: Mark Carpenter

Vice Chair:

Output: Periodic Reports to Subcommittee

WG I-17 met on Tuesday with 2 members and 1 guest, several members indicated they were not able to meet for various reasons. I presented the results of the 2008 trending data including data from a new contributor and it was added to the results. The latest WG Trending report that includes data from 2000 to 2008 has been submitted for posting in the WG web site. I also provided a short presentation on how Oncor's relay performance had changed as a result of changing out about 900 relay panels in the last four years. Greg Sessler of ATC made a presentation on how ATC performs trending and how trending is used to focus on system improvements by making to part of incentive pay for the whole organization. There was very good open discussions on all aspects of system performance. At the next meeting we hope to have Phil Winston with Georgia Power and Bruce Mackie with NES Power present trending activities at their respective companies. I encourage member of the I subcommittee to attend since it should be good practical information for all utility members. For the next meeting I request a meeting room for 20 people and an projector. I will also be contacting individuals that were part of the original I-17 working group to see if we can get an update on how their companies system has changed.

I18 Anomaly Checks for Relay Settings

Chair: Peter McLaren

Vice Chair: Mukesh Nagpal

Output: Report to main committee

Meeting: #6 – May 12, 2009

The WG met for a single session with 5 members and 8 guests

The Chair indicated that he had received a reasonable response rate to the questionnaires sent out to Manufacturers and Utilities. Steve Turner and Rafael Garcia undertook to analyze the responses and report back to the WG in time for the next meeting.

A discussion took place on some possible security features, both hardware and software, and how they might be implemented.

Before proceeding further with an outline the WG felt it should wait for the analyses of the survey questionnaires. There were also some events coming up in the near future which could have significant bearing on the work of WG. (EPRI "The protection systems of the future" and NERC/CIP)

The WG will meet for a single session at the next meeting, 20 people and we need a CP.

"The WG will produce a report on relay software features and setting practices which minimize the possibility of wrong settings being downloaded to a relay. The WG will commence its task by conducting a survey of relay manufacturers and utilities to get information on present practice."

I19: Protective Relaying and Redundancy

Chair: S. Ward

Vice Chair: B. Gwyn

Output: Report to the main committee

Estimated Completion Date: Sept 2009

Meeting #5 – May 12, 2008

Assignment: Produce a special report addressing redundancy considerations for relaying.

The Working Group met for a single session with 17 members and 25 guests in attendance on May 12, 2009.

Draft 9 was reviewed and final assignments handed out. It is expected to have a report complete by September to circulate to the subcommittee members.

Assignments:

Gene to look at NPCC section 6.1.1 on readability

Phil Beaumont to expand and look at NERC paper

Link to NERC white paper for reference

The use of the terms system A & B is not consistent through out the document - Solveig

Section 4.3 needs to be completed - John Zipp

The document needs to be reviewed for any contradictions - Solveig, Bryan, Jon Sykes

The WG needs to consider some conferences and papers for publicizing the report

Eric Udren runs a WG on IEC 61850 the WG discuss redundancy in their report and so should be referenced

The working group will meet in September for a single session, 30 people, with computer projector, to finalize review of the report.

I20: Revision of C37.90.1 SWC Tests

Chair: Tom Beckwith

Vice Chair: Jeff Burnworth

Output: Revision of C37.90.1 SWC Tests Standard

Meeting: May 12, 2009, Atlanta, GA

The sixth meeting of the Working Group (WG) I20 met on May 12, 2009, in Pittsburgh, PA, in a single session with 11 Members, and 5 Guests.

The Minutes of Meeting #5 in Atlanta, GA, in January, 2009 were approved as submitted.

Conversion to the Standard IEEE Template Format

Tom Beckwith discussed the revisions from Draft 3 to Draft 4. Draft 3 was reformatted into IEEE standard template to become Draft 4. Jeff Burnworth will continue to maintain the Master Draft.

History of SWC Test Annex

The working group discussed John Tengdin's proposal to include a history of the development of the SWC Test Standard.

Harmonization with IEC standards

The working group continued discussions on harmonizing with IEC and focused on issues associated with differences in waveforms between IEC and IEEE C37.90.1. It was concluded to change IEEE C37.90.1 oscillatory test to specify that both polarities will be tested as stated in the IEC requirements. We discussed the differences in the oscillatory wave shape decay rate specification between the IEC and IEEE standards. The working group will investigate developing waveform characteristics that will result in a single test waveform specification that will accommodate both the IEC and IEEE requirements.

Working Group Assignments

The following assignments were established.

Bui Dac-Phuoc – Review Excel comparison table listings developed by Mario Ranieri and Jeff Burnworth for accuracy. Compare IEEE Std C37.90.1™-2002 to IEC 60255-22-1 (2007-10) (Class A) Oscillatory and IEC 60255-22-4 (2008-04) (Class A) Fast Transient

Ryan Bares – Contact Haefely engineering to confirm the SWC Test waveforms that are produced by Haefely tester(s). Specifically the working group is interested in the following standards:

IEEE Std C37.90.1™-2002

IEC 60255-22-1 (2007-10) (Class A) Oscillatory

IEC 60255-22-4 (2008-04) (Class A) Fast Transient

Jeff Burnworth – Prepare a draft revision of section 4. Test wave shapes of IEEE C37.90.1 to propose waveform characteristics that will result in a single test waveform specification that will accommodate both the IEC and IEEE requirements.

Tom Beckwith/Murty Yalla – Revise sections 8. Test procedures and 9. Criteria for acceptance to encompass the IEC Standards.

Note: Section 7. Application of test wave revision not yet assigned. Sections 5. Test generator characteristics and 6. Equipment to be tested should not require changes.

ITF1 Manufacturer's Service Letter Database

Chair: Jerry Jodice

Vice Chair:

Output: Service Letter Database

Meeting: 12 May, 2009

I TF#1 met Wednesday 12th with five participants in attendance.

These included Jerry Jodice, Aaron Martin, Dennis Loudermilk, Bob Beresh and Mario Ranieri.

No new Advisories were submitted for the DB.

Assignments:

Past Due:

Jeff Pond, GRID has confirmed he will supply scanned copies of the Advisories files from GRID.

New Assignments:

1. Jerry Jodice will request the I SC, and subsequently the Main Committee to issue a formal request to those manufacturers which supply relays in North America, to provide PSRC, I TF#3 with Advisories as they are made available to their user communities.
2. Aaron Martin will investigate sources of Advisories within BPA, with the objective of inclusion in the DB.
3. Dennis Loudermilk agreed to issue an email request to his clients, advising of I TF#3 activities, and requesting their participation.
4. Jerry Jodice will send the email addressing access procedure to the Doble site for Advisories, to all attendees.

PS: JAJ will request PSRC to include the Advisories DB on the PSRC web site, making two sites available for interested users.

ITF2: Promotion of Dual Logo of C37.2

Chair: John Tengdin

Vice Chair: TBD

Output: TBD

Meeting: Did not meet

Status Report of PSRC I TF2 for PSRC Pittsburgh 2009 Meeting

No meeting of TF2 was scheduled due to the uncertainty of any progress on a dual logo for C37.2.

The Chairman of the PES Substations Committee has made a formal request to IEC TC57 asking its Chairman to poll the member countries of TC57 to see if there is an interest in creating a dual logo (IEEE & IEC) for IEEE C37.2 without change, or to form a joint WG to explore any proposed changes for a dual logo standard. Responses are due in September 2009.

Given the uncertainty of the IEC response, no meeting of I TF2 should be scheduled for the PSRC September meeting. A status report will be provided at the I Subcommittee meeting.

ITF8 Revision to C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

Chair: B. Mugalian

Vice Chair: Bruce Magruder

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

Five members were present.

The Task Force received copies of the relevant IEC standards related to the grounding of instrument transformer secondary circuits and cases and began their review. Other IEEE and IEC documents were suggested for review and will be obtained. One member (J. Pond) completed his review of the 2008 NEC book. One member (Z. Bukhala) is reviewing grounding practices used in China and will provide a report. The members will also be contacting new people who may have reference information on grounding in their countries of origin. Based on the amount of documents to review and to possibly reference, the Task Force recommends that a Working Group be formed to begin work on the next revision to the Guide.

The Working Group will plan to hold its first meeting in Arlington TX in September 2009 to begin draft of a PAR. We will use the Wednesday 8:00 a.m. time slot, room for 15 people, and will need a computer projector.

Liaison Reports

The Instrument Transformer Sub Committee met in Miami in April. The minutes are not yet posted.

A new task force has been created to review further proposed changes to C57.13. Several suggested changes were circulated prior to the meeting.

The chairman, Jim Smith, is seeking any changes that the PSRC members would like to see reviewed. A number of proposed changes were discussed.

Coordination Reports

None

Old Business

None

New Business

- Jeff Pond and Bryan Gwyn were welcomed into membership of the I SC
- WG chairs are to add the SC chair to their "cc" list
- The Jan 2010 meeting is scheduled for Orlando FL
- Someone is needed who will lead the affirmation of C37.103 "Guide for Differential and Polarizing Relay Circuit Testing"

- TF ITF8 was made the new WG I8 (Brian Mugalian: chair)

J: ROTATING MACHINERY PROTECTION SUBCOMMITTEE

Chair: K.A. Stephan

Vice Chair: M. Yalla

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

The Subcommittee met on May 13, 2009 with 16 members (achieving quorum) and 11 guests. There was a call for the approval of the minutes of the Jan 2009 meeting in Atlanta. The minutes were unanimously approved by the subcommittee members.

Reports from the WG Chairs

J1: Adjustable Speed Drive Motor Protection Application and Issues.

Chair: J. Gardell

Vice Chair: P. Kumar

Established: 2003

Output: Report to the Subcommittee

Expected Completion: Dec 2008

Status: Draft 8 (Final)

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

The Working group did not meet at this meeting.

The report is published on the PSRC website. J sub committee chair will send email to the subcommittee members providing the website link. This work will be the topic of a presentation during the PSRC Main Committee session during this meeting.

J2: Protection Considerations for Combustion Gas Turbine Static Starting

Chair: Mike Reichard

Vice Chair: Zeeky Bukhala

Established: 2005

Output: Report to the Subcommittee

Expected Completion: 2009

Status: Draft 2b

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

1. Introductions – 7 members & 1 guest
2. The WG reviewed and approved the January 2009 meeting minutes without revision.
3. The final draft of the paper was sent by email to J subcommittee members for ballot on 4/20/09 by the J Chairman, Kevin Stephan. Instructions were to cast vote approved or disapproved to the J2 WG Chair and J Chair by May 4, 2009. Out of the votes cast, five subcommittee members replied “Approved with Comments”. The report passed the working group and subcommittee ballots with no negative ballots received. The WG reviewed these comments during this session.

The majority of the comments were approved and will be incorporated into the document. A revised draft will be forwarded to subcommittee Chair for review by Main Committee Officers following all implemented revisions before being placed on the PSRC website.

J7: Revision of C37.101, Generator Ground Protection Guide

Chair: J.T. Uchiyama

Vice Chair: R. Das

Co-Vice Chair: Mike Reichard

Established: 2000

Output: Revised Guide

Status: Completed

Assignment: Review and revise as needed C37.101.

The Working Group did not meet at this meeting. A Summary Paper is in progress.

J8: Generator Tutorial Revision

Chair: Michael Thompson

Vice Chair: Chris Ruckman

Output: Tutorial (published by PSRC)

Expected Completion Date: 2010

Status: Draft 0.50

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

The Working Group met for a single session with 17 members and 3 guests. We would like to thank Kevin Stephan for serving as vice-chair for Chris Ruckman who was not able to attend and recording these minutes.

Output will be a special publication of the PSRC and published on the PSRC website. Phase two output will be an eight-hour tutorial presentation. An expected date of completion for phase 1 is January 2010. We are presently on draft 0.50.

The minutes of the January, 2009 meeting were approved during the J8 working group meeting.

The Technical Document Specialist (TDS) resource, Kim Sarf, was discussed. The working group has had a very good experience with working with Kim so far. It was discussed that she will be available to the group during the month of June, 2009. She will not be available to the group again until November, 2009. The working group was encouraged to complete assignments in the next few weeks to keep her queue full through the end of June. Kim is redrawing all figures to improve clarity and consistency. The chair emphasized to all authors that it is extremely important that all authors review the figures in detail for accuracy.

A suggestion was made regarding treatment of reference material. There are many good citations for further reading at the ends of each chapter. Many of these are not directly cited in the chapters. It was suggested that the correct form would be to include a bibliography to contain all of these citations and only include references at the end of chapters that are directly cited in the chapter. C. Mozina suggested that the bibliography be listed by subject matter. The chair took the assignment to attempt to organize the bibliography. This suggestion was agreed upon by the working group.

The method for credit to the original authors of the tutorial was revisited by the working group. It was suggested that the tutorial include a foreword that discusses the history and purpose of the tutorial. This foreword would also give credit to the original authors and the material that they contributed to. The chair agreed to take on this assignment and have a draft for the working group to consider by next meeting.

The outline of the document has been color coded to make it easier to keep track of the status of each chapter.

- Green means that the chapter is in final editorial review between the TDS and the authors.
- Yellow indicates that the chapter is in peer review between the peer reviewer and the authors.
- Red indicates that the chapter is not yet ready for peer review.

The working group went through each chapter and discussed status and due dates for completion of assignments. Detailed information is available in the outline of the document. Several chapters did not have representation from their authors. The chair will contact them for an update. The outline will be updated and placed on the web ftp site.

Chapter 2.5 on Breaker Failure has had no progress. Mike Reichard agreed to take on this assignment.

During review of the chapter on OOS protection, Mike Reichard commented on European practice of looking for multiple pole slips before tripping. It was decided that the tutorial should not deviate from the current recommendations contained in C37.102.

J9: Motor Bus Transfer Application and Issues Investigation

Chair: Jon Gardell

Vice Chair: Dale Fredrickson

Established: 2006

Output: Working group report

Expected Completion: 2011

Status: Draft 1.0

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

1. The Working Group met in a double session with 19 Members and 7 Guests on Wednesday, May 13, 2009. This was the tenth meeting.
2. Jon Gardell gave a status report of the work performed to date.
3. In the first session the WG discussed prior plans for field testing and data acquisition at the TVA Paradise Plant. This has been delayed due to plant issues. However, another possible field test site has been identified, and several members will pursue this opportunity. The WG also discussed the need to provide input to WG J10 AC Motor Protection Guide revision by mid-2010. The organization of the report into two parts, with an Annex was discussed. The output may change to a Transactions paper or even a Guide as work progresses. Began a review of partial Draft 1. Discussed the possibility for communication with motor manufacturers on criteria for safe bus transfer, as well as providing comments to NEMA on our concerns with C50.41.
4. The second session continued the review of Draft 1. Several sections were identified for revision, with assignments taken by attendees. In particular, sections on history of motor bus transfers and topologies of same were assigned for revision, as well as the section on industry guidance.
5. Assignments are due to the Chairman by August 15, 2009.

J10: Revision of C37.96 Guide for AC Motor Protection

Chair: Prem Kumar

Vice Chair: Dale Finney

Established: 2007

Output: Guide Revision C37.96

Expected Completion:

Status: Draft 1.0

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

The meeting was attended with 10 members and 5 guests. After the introductions, the Patent Slides were shown. Matt Ceglia also gave a brief description on the significant issues of the patent slides

The circulated Atlanta meeting minutes which were approved with quorum.

Various assignments were reviewed. Following are the follow-up action items/assignments based on this meeting. All remaining assignments/peer reviews are due by August 15th. WG members need to copy relevant section from D1 draft and make modifications as required and send to Prem for incorporation into next draft of document.

- 1) Wayne Hartmann will add column in fault table so as to cross reference various types of faults with applicable protective functions that would detect them. He would also do the figures in Visio for motor speed torque curves-carry over from meeting.
- 2) Pat Kerrigan will peer review Dale Finney's summary of J1 ASD protection report-carry over from last meeting.
- 3) Suhag Patel and Sudhir Thakhur will peer review clauses on coordination with fused contactors and ground fault protection delays when using toroidal CTs due to capacitance, motor inrush, and phase current differences.
- 4) Sahib Usman will peer review clause on considerations of placement of power factor correction capacitors relative to relay sensing CTs.
- 5) Summary of J9 Motor bus transfer that will need to be included was discussed with J9 (Jon Gardell). J9 could be broken into two parts one the text, and the other results of field test. Jon Gardell will send an email to J10 leadership summarizing the discussions.
- 6) Tom Farr will submit a clause on settings derivations for reduced voltage starting (carry over from last meeting).

The settings examples to be used were discussed. Prem will provide data for a large induction motor (high inertia drive) to different motor suppliers (Ge –Dale Finney, Subash Patel for SEL and Suhag Patel for ABB). The results will be discussed at later meetings.

JTF3: Power plant and transmission system protection coordination

Chair: Joe Uchiyama

Vice Chair:

Established: 2007

Output: Comments to NERC

Expected Completion: TBD

Status: Outline

JTF3 (Power Plant & Transmission System Protection Coordination) met on Tuesday afternoon (4:30) with 30 attendees.

Chairman opened the meeting with introductions. After the introductions, the chairman presented a power point of the white paper that has been worked on three (3) years. The presentation showed the brief history behind the document, and contents of the white paper including some examples of devices. After the

presentation, the chairman asked for volunteers to perform quick reviews of the last draft document before it is presented to the NERC PC meeting which will be held in June 2009. Eleven people volunteered at this meeting.

Gary Kobet reported that there is a CIGRE document "Harmonization of Power Plant and Transmission Protection." This document will be a good reference for this white paper.

Liaison Reports

Electric Machinery Committee

C.J. Mozina

The committee will meet at PES General Meeting in Calgary, Canada – July 26-30.

Nothing new to report.

IAS I&CPS Committee

C.J. Mozina

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

Nuclear 1E WG

P. Kumar

No report

NERC

J. Uchiyama

PRC-002 and PRC -003 are in process.

Coordination Reports

None

Old Business

C37.106 Reaffirmation status: The standard was reaffirmed and it is good for the next 5 years.

New Business

WG J1: Adjustable Speed Drive Motor Protection Application and Issues will write an IEEE Transactions paper based the published report. Tom Farr, Dale Finney and Jon Gardell will write the paper.

WG J2: Protection Considerations for Combustion Gas Turbine Static Starting will wite an IEEE Transactions paper based on the subcommittee report. Mike Reichard and Steve Conrad will write the paper.

Chuck Mozina proposed that J subcommittee look into issues related to generator Power Load Unbalance Protection. The Subcommittee decided to table this item until a future meeting.

"C37.102 IEEE guide for AC generator protection" an abstract of a summary paper was submitted to Western Protective Relay Conference. M. Yalla will also be submitting a summary of the C37.102 guide to PAC WORLD magazine.

A new task force will meet next time to look into the protection issues related to Pumped Storage Generation. Joe Uchiyama will chair this task force.

K: SUBSTATION PROTECTION SUBCOMMITTEE

Chair: F. P. Plumptre

Vice Chair: P.G. Mysore

The K-Subcommittee met on Wednesday May 13, 2009 in Pittsburgh, PA, with 19 out of 41 members and 18 guests in attendance. Since the quorum to approve the minutes of the January 2009 subcommittee meeting, members will be requested to send in their approval via e-mail.

ITEMS OF INTEREST FROM THE ADVISORY COMMITTEE MEETING:

The chair requested information from the working groups who are completing or have just completed their work for presentation at future PSRC meetings. Any information regarding presentation should be sent to Roger Hedding with copies to Frank Plumptre and Pratap Mysore.

Chairs of the working groups are requested to include the working group assignment with their meeting minutes to meet the new formatting requirements.

The September 2009 meeting in Arlington, TX will have a new format. The subcommittee meeting will be on Thursday September 17th morning and the main committee meeting will be in the afternoon. Please make appropriate travel plans.

Reports from the WG Chairs

K1: Protection of Transformers against faults and abnormal conditions

Chair: Mohindar Sachdev

Vice-Chair: Pratap Mysore

Established: 2003

Output: Revision of IEEE C37.91-2000

Expected Completion Date: 2007

Guide: Balloted and Approved, Summary Paper expected to be completed by 2009

Assignment: To revise the IEEE guide C37.91, 2000 and expand it to include the protection of phase shifting transformers and thermal overload of transformers

The Working Group K01, Protection of Transformers Against Faults and Abnormal Conditions, did not meet.

C37.91 guide was published in May 2008. The Chair will prepare the paper and will circulate it among the WG members for approval. The draft will also be circulated among the Subcommittee members concurrently for approval.

K3: Reducing Outages Through Improved Protection And Auto restoration In Distribution Substations

Chair: Bruce Pickett

Vice Chair: Tarlochan Sidhu

Established, 2002

Output: Paper

Expected Completion date: September 2008

Draft 13

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

Meeting was called to order with 4 members and 4 guests.

Preliminary Summary paper that had been previously handed out was not discussed, as it was too preliminary.

Discussed Draft 13

The last change Appendix A editorial changes was discussed making the paper Draft 13. No other changes were recommended.

Item 2 – Finalize in parallel, Tarlochan is finalizing the Transactions Summary Paper. As soon as that is finished, then that will be sent out to WG for comments or possible approval if no comments are returned.

The full paper (Final Draft 13) will be posted on the website. Once WG vote is finalized on the Summary Transactions paper, then both will be submitted to the Subcommittee.

Comments were made about utility companies experiencing restrictions on travel and how some were unsure of being able to travel in September.

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

Chair: Mukesh Nagpal

Vice Chair: Chuck Mozina

Established, 2009

Output: Consider revision to guide

Expected Completion Date: 2012

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

The Working Group (WG) met on Tuesday May 12 in a single session with 9 members a 1 guest in attendance.

Note that a quorum was not achieved as we have 19 members in the WG.

In the absence of the chair, Chuck Mozina, the vice chair ran the meeting, with Frank Plumtre noting the minutes of the meeting.

The status of the PAR application was reviewed with Frank Plumtre indicating that the PAR request was submitted in time for the June IEEE standards board meeting.

Volunteers were asked to undertake writing assignments, broken down as follows:

| | | |
|-----|---|----|
| 1.0 | Overview | MN |
| 1.1 | Scope | MN |
| 1.2 | Purpose | MN |
| 2.0 | References | MN |
| 3.0 | Establishing Consumer Service Requirements and Supply Methods | DG |
| 3.1 | Interconnection | DG |
| 3.2 | General Design Approach | DG |
| 3.3 | Information Exchange | DG |
| 3.4 | Specific Supply Considerations | DG |
| 4.0 | Typical Utility-Consumer Interconnection Configurations | JB |
| 4.1 | Single Supply-Single Transformer | JB |
| 4.2 | Dual Supply-Single Transformer | JB |

| | | |
|-----|---|--------|
| 4.3 | Dual Supply-Dual Transformer | JB |
| 5.0 | Brief Review of Protection Theory | FPP/JB |
| 5.1 | Protection System Design Considerations | FPP/JB |
| 5.2 | Protection Systems Overview | FPP/JB |
| 6.0 | System Studies | MN |
| 6.1 | Types of Studies | MN |
| 6.2 | Required Data | MN |
| 6.3 | Performance of Studies | MN |
| 7.0 | Consumers With Generators, Large Motor Loads | MN/FPP |
| 8.0 | Interconnection Examples | CM |
| 8.1 | Single Supply from remote utility station | CM /ST |
| 8.2 | Dual Supply from remoter utility station, single transformer configuration | CM /ST |
| 8.3 | Dual Supply from remoter utility station, dual transformer configuration | CM /ST |
| 8.4 | Dual Supply from a remote utility substation, dual circuit switcher and transformer configuration | CM /ST |
| 8.5 | Supply to a remote non-utility substation with generation | CM /ST |

Steve Conrad made available a word version of the document, which the chair will send out to all WG members.

Dead-line for the first draft for assignments end of July.

KTF4: Joint Task Force T & D Capacitor Sub-Committee, K13 Series Capacitors

Chair: Simon Chano

Output: jointly prepare a PAR to issue a corrigendum to the guide.

Expected Completion Date: TBA

Assignment: Coordinate PSRC standards activity with Capacitor Subcommittee

The Working Group (WG) met on Tuesday May 12 in a single session with 2 members in attendance, F P Plumtre and Miriam Sanders.

In the absence of participants, it was decided to defer any future meeting until the January 2010 Joint PES, PSRC meeting.

No meeting scheduled for September 2009

K5: APPLICATION OF COMMON PROTECTIVE FUNCTIONS IN MULTI-FUNCTION RELAYS

Chair: Simon Chano

Vice Chair: Dean Miller

Established, 2005

Output: Report to the PSRC

Expected completion date: Early 2009

Draft 8

Assignment: Develop a document that addresses the considerations in applying the ancillary protection and control functions that are common in multiple relays and the integration of these functions into the overall protection system. This document addresses subjects related to specific topics such as: breaker failure, automatic reclosing, synchronism check, voltage status monitoring, breaker controls, and event and fault recording. The applications of duplicate protective schemes are discussed with consideration for security, dependability, testing, and maintenance.

Working Group K5 met in a single session on Tuesday, May 12, 2009 in Pittsburgh with 8 members and 13 guests.

Simon was not able to attend the meeting so it was led by Dean.

Draft 8 of the report was distributed to the working group members and the members of the K subcommittee in April with the request to cast a vote as to the adequacy of the report for general distribution. Only five people responded. In spite of the poor response we did receive a number of valuable comments. Prior to the meeting all of the non-issue comments had been incorporated in the next draft of the report.

The other comments were discussed and the following decisions made:

1. The abbreviations of BF for breaker failure and AR for automatic reclosing would continue to be used after first writing out the phases in full, followed by the abbreviation.
2. The report does not suggest that redundant BF is needed and it will remain that way.
3. No strong stand is taken in the report on the need for redundant AR. A statement will be added that reclosing is a control not a protection function.
4. The figures 7.0, 7.2, 7.3, & 7.4 will be modified to remove the SEL unique notations.
5. The reference that microprocessor relays are self-calibrating will be removed.
6. Work will be done with the author of Annex 5 to reconcile a difference between the annex and the main body of the report.

The resolution of these comments will be included in Draft 9 of the report will be sent out to the Working Group and K Subcommittee members for review. The intent is to submit the report to the PSRC offices for approval before the September meeting.

The summary paper for the report was distributed to the members three weeks prior to the meeting. Comments on the summary paper are expected within the next three weeks.

The Working Group will meet in September in a single session. We will need a room for 25 people with a computer projector.

K6: Sudden Pressure Protection for Transformers

Chair: Randy Crellin

Vice Chair: Don Lukach

Established: May 2005

Output: Report

Expected Completion Date: May 2010

Draft 2.0

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

The working group did not meet during the Pittsburgh meetings. We have finalized the survey document with Marc Beebe (Manager of Strategic Research at the IEEE) and have received approval from the PSRC officers to proceed. Our current plans are to send the survey request notices June 1st, with the survey period closing the end of August, organize the survey responses early September, and then meet to discuss during the September 16th meeting in Arlington Texas.

As previously identified, we have obtained the attendance and/or membership lists of the following individuals which we intend to email the survey request notices (utilities only):

- 2007 and 2008 WPRC
- 2007 and 2008 MIPSYCON
- 2008 and 2009 Texas A&M
- 2008 and 2009 Georgia Tech
- WECC Members
- PSRC Main Committee
- Place notice in Power System Protection Yahoo Users Group
- Place notice in PAC Magazine Website.

Don Lukach has replaced Bill Gordon as Vice Chairman of the working group.

K7: GUIDE FOR THE PROTECTION OF SHUNT REACTORS.

Chair: Kevin Stephan

Vice Chair: Pratap Mysore

1. Established, 1999

Output: Revision of ANSI/IEEE C37.109

Expected Completion date: 2006

Status: Published

Assignment: Revise and update C37.109. " Guide for the Protection of Shunt Reactors."

Working Group K7 did not meet this session. Charlie Henville presented the summary report at the IEEE PSCE meeting March 15-18th in Seattle, WA. The report document carrying proper copyright notice will be sent to the PSRC subcommittee chair to be placed on the subcommittee website. With the IEEE guide published in 2006 and the summary report completed, it was moved to disband the K7 working group. It was suggested that the WG chair e-mail the WG members to look for interest in presenting the report at the regional or other relay conferences.

The Chair, vice chair and the members of the subcommittee and guests in attendance thanked Kevin for his contributions and efforts in completing the assignment.

K8: GUIDE FOR THE PROTECTION OF SHUNT CAPACITORS

Chair: Pratap Mysore

Vice Chair: Arvind Chaudhary

2. Established, 2006

Output: Revision of IEEE C37.99

Expected Completion date: 2011

Status: Draft 2.01

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

The Working group, K8, met on May 12, 2009 in one session with ten members out of twenty six and eight guests in attendance. After the introductions and the review of IEEE Patent slides, meeting minutes of the January meeting was reviewed. Due to less than fifty percent of the members present, the meeting minutes will be sent out for approval via e-mail.

Draft 2.01 of the guide was reviewed with discussions focused on the following topics:

- Bibliography reviewed by Sukumar Brahma will be rearranged in Alphabetical order as per the styles manual.
- Pratap to contact Bogdan to include write up on protection methods not covered in the guide.
- Clause 8.3 – unbalance calculations of externally fused banks – Ilia Voloh presented the new table that combines the references from four tables in the existing guide. This was well received. He will work on the remaining types to be included in the next draft. Rick Taylor and John Appleyard will be reviewing Ilia's write up to verify the equations.
- Russ Patterson submitted a write up on bridge capacitors. This will be added in Clause 5 (Bank connections) as a new sub-clause-“5.5 –Special configurations”
- Robert Frye from TVA will submit a write up on TVA special banks that would also be included under clause-5.5.
- Pratap mentioned about an annex that was added to the shunt reactor guide C57.16 draft. Pratap will add this to the secure member documents folder on PSRC.
- Oscar Bolado and Sam Sambasivan will review clauses 1-7 including the equations.
- Sukumar Brahma to review all annexes including equations.
- Pratap will work with Greg Sessler on the new annex that will show examples of settings on several bank configurations.
- Russ Patterson and Simon Chano will revise the Filter bank clause with discussion on more common filter bank configuration.

All assignments are due by June 26, 2009 except for Ilia's revision on unbalance methods. Prompt review would help in completing the work on time.

The chair thanks Russ for taking notes during the meeting.

Sam Sambasivan and Robert Frye are the new members of the working group.

KTF9: Arc-Flash Coordination With Other Industry Groups

Chair: Karl Zimmerman

Vice Chair:

Output:

Established: May 2009

Expected completion date:

Assignment: Coordination with other industry groups involved in arc flash activity.

The task force met on May 12, 2009 at 9:30 PM with 14 attendees. The purpose of this meeting was to discuss what activities the PSRC should participate in with respect to arc-flash.

The chair reports that there is no new activity with IEEE 1584, but there is a website www.ArcFlashForum.com where many are posting industry activity.

The working group recommends that no working group be formed, but that a liaison be established to communicate with other industry groups or standards organizations, including:

- Petroleum and Chemical Industry Committee of Industrial Applications Society Switchgear Committee (Sponsor of IEEE 1584)

- National Electrical Code (NFPA 70E)
- Canadian Safety Authority
- National Electric Safety Code (NESC)

The working group also recommends that any activity be reported at the K Subcommittee meeting, either under Old or New Business, or as a separate agenda item. For example, an agenda item could be added, called perhaps “Arc Flash Activity” or “Arc Flash Forum”.

No meeting for September.

K10: SCC21 DISTRIBUTED RESOURCES STANDARD COORDINATION

Chair: Gerald Johnson

Vice Chair: TBA

Established, 1999

Output: Standard through the SCC 21

Expected Completion Date: 200x

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.

K10--SCC21 Distributed Resources Standard Coordination working group met May 12, 2009 with 3-members and 2-guests. P1547.2 which is the application guide for the 1547 standard was approved earlier this year by the standards board and will be available for purchase as soon as the board gets it into print.

Working group P1547.7 “Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection” met for the first time at the January meeting and meeting minutes were distributed to the K10 membership. P1547.4, intentional islands and 1547.6 DG connected to secondary networks met at the January meeting and are progressing. The latest draft of each document can be found on the SCC21 web site.

P2030 Draft Guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), and End-Use Applications and Loads” is being sponsored by SCC21. Scope and Purpose can be found on the SCC21 web site. The first meeting is being hosted by Intel Corporation at its headquarters in Santa Clara, CA, June 3-5, 2009; however, Intel can only accommodate 150 people and unfortunately is already full. There is a webinar/remote option coordinated by IEEE, but I am not sure if there is a limit for this option.

Anyone who has special interest in the progress of a particular SCC21 working group or would like to provide input, let the chair know and he will make sure the information gets to the right place.

K13: (PC 37.116): GUIDE FOR PROTECTIVE RELAY APPLICATION OF TRANSMISSION-LINE SERIES CAPACITOR BANKS.

Chair: Frank Plumptre

Vice Chair: Dan Hamai

Established, 1999

Output: With the completion of the Guide the current project is a transaction paper

Expected Completion Date: Summary Paper by mid 2008

Assignment: To prepare a guide for the application of protective relays on transmission-line series capacitors.

The WG did not meet. A continued effort is needed on the summary paper. Per direction from PSRC officers it is acceptable to produce a conference paper i.e.: a document that can be presented at one of the three major relay conferences. Simon Chano and Frank Plumptre will head up this effort, with a plan for completion prior to the September PSRC meeting

K14: (PC 37.234): GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER SYSTEM BUSES

Chair: Bogdan Kasztenny

Vice Chair: Stephen Conrad

Established: May 2005

Output: Guide (PC37.234)

Expected Completion Date: 2009

Draft 9.08

Assignment: Write a “Guide for Protective Relay Applications to Power System Buses” to present practical bus protection schemes; discuss their adequacy, complexity, strengths and limitations with respect to variety of bus arrangements, while providing specific application guidelines.

The K14 Working Group met May 13, 2009 in Pittsburgh, with 17 members and 13 guests in a single session. Chairman Bogdan Kasztenny presided. The minutes of the January 2009 meeting were approved as printed.

Bogdan Kasztenny discussed the IEEE patent requirements and reviewed the status of the guide to date.

The current draft D9.07 has recently been balloted. The ballot closed on April 19, 2009 with a 95% approval and 94% response to the ballot. There were a total of 155 comments from 136 balloters, with only 1 negative comment yet to be resolved. The chairman and WG discussed draft 9.08 which contains resolutions to comments received from the balloters. Few more changes have been identified during the meeting.

The WG agreed to have the new draft (D9.09) stand for recirculation after having a chance to review the remainder of the comments not covered in the WG meeting. Upon a favorable response from the WG regarding draft 9.08 and the comment response spreadsheet, the D9.09 will be submitted for recirculation. The WG is to review the changes and vote on releasing draft 9.09 for re-circulation before May 31, 2009.

The WG members are asked to submit their opinions and changes regarding comments and proposed resolution details as soon as possible, ahead of the end of May cut-of date.

Liaison Reports:

Nothing to report

Old Business:

Nothing to report

New Business:

If companies have travel restrictions to allow members to attend working group meetings, PSRC will be happy to write letters to the responsible persons in the company to emphasize on members contributions and the importance of attending working group meetings. Any one in need of such justification, please contact Mal Swanson.

VII PRESENTATIONS:

Our main committee meeting is greatly enhanced by presentation by our members of the outputs of the different working groups. We always appreciate their efforts. This time we had four interesting presentations.

Performance of Relaying during stressed system conditions
Adjustable speed drive motor protection applications and Issues

Damir Novosel
John Gardell

Future Meetings:

Sept. 2009 – Arlington, TX (Dallas, TX area) Sheraton for Sept. 14-17, 2009

This will be the first meeting that will try the new format. The meeting will start as usual with the Monday evening reception and working groups on Tuesday morning. However, Wednesday will be all day of working groups, Thursday morning will be subcommittee meetings and Thursday afternoon will be the main

committee meeting. Since this is near the Dallas-Fort Worth airport, many should be able to get flights out early evening.

May 2010 - Madison, WI (Madison Concourse Hotel) May 10-13, 2010. Same format as above.

September 2010 – Berkeley, CA (near San Francisco, CA) - Doubletree - Sept 13 -16, 2010.

The format will be that working group meetings start on Monday afternoon and we will finish with the Main Committee meeting on Thursday morning.

VIII. The meeting was adjourned by Chairperson Miriam Sanders