C: SYSTEM PROTECTION SUBCOMMITTEE

Chair: R. Hunt
Vice-Chair: S. Ward

The C System Protection Subcommittee met on Wednesday, September 19th, 2007, in Charlotte, NC with 18 members and 33 guests in attendance.

6 Working Groups and 1 Task Force met at this meeting. The members of the Subcommittee approved the minutes of the May 2007 meeting.

A new WG Chair was appointed for C13 – Undervoltage Load Shedding as the previous chair, Art Buanno, will no longer be able to attend PSRC.

The Subcommittee approved the formation of Working Group C16, Relay Scheme Circuit Design Using Microprocessor Relays. The WG Chair will be Ken Birt, Vice Chair Raluca Lascu, and will produce a report to the Main Committee.

PSCE liaison report: nothing to report.

PSSC liaison report: Nothing to report.

Cyber Security: Steve Kunsman reported on a Task Force meeting held as HTF3. As utilities must be "substantially" compliant by 06/2008 and fully compliant by 12/2008, there is much work going on. One of the main issues is how to interpret the standard. There was a discussion whether this group logically belonged to C as the previous Cyber Security work group. While communication security is of great importance, cyber security also encompasses other aspects of relying. It was decided to keep it as HTF3 Task Force for the May meeting and then decide where it belongs. It might be possible that several working groups are created, separately addressing H and C issues.

Reports from the WG Chairs

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

Chair: V. Madani
Vice-Chair: M. Begovic
Output: Survey
Established: September 2004
Expected Completion Date for the Survey: May 2008

Summary Meeting Notes:

WG C-4 met on January 8 in one session with total 10 in attendance (6M, 4 G).

WG members are in the process to transfer the survey responses to the spreadsheet that has been developed for the purpose of tabulating the results was reviewed. Five members have volunteered to assist in extracting responses from the survey to the spreadsheet. In transferring the responses into the spreadsheet (a manual process), there seems to be a uniform interpretation of the questions, and no ambiguity seems to be in the questions or that the respondents have has a n need for further clarification or information.

The attendees also discussed ways to best capture comments that some respondents have provided in their survey. Vahid, Miroslav, and Victor Ortiz are looking at options.

We are still receiving responses to the survey if anyone is interested. Miroslav and Javier are also contacting many of their contacts and CIGRE members internationally to encourage greater participation.

The next topic discussed was the draft outline for the report. Stan Horwitz volunteered to prepare the initial outline and the WG members will be assigned to different sections to start writing the sections. The first draft of the report will be circulated before the May meeting for purpose of discussions at the May 2008 meeting. It was also agreed that if we receive additional responses while in the process of preparing the draft paper, the responses received will be accepted.

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

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 May 2008 and will be presented in a report to the "C" Subcommittee and a Summary Transactions paper.

C9: <u>Appl. of Prot. Relays used for Abnormal Freq. Load Shed. & Restoration</u>
Chair: A. Apostolov
Vice-Chair: K. Behrendt

WG C9 met on January 8 in a single session. The WG discussed the progress of the summary transactions paper.

The group plans to meet for the last time in May 2008. Meeting room requirements for May are: 30 people, powerstrip, projector, single session.

C11: <u>Guide for Protection System Testing</u>
Chair: V. Madani
Vice-Chair: H. DoCarmo
Output: Guide
Established: May 2005
Expected Completion Date: August 2008

WG C-11 met on January 8 in a single session with total 27 in attendance (13 M, 14 G). After review of the patent slides, the WG members reviewed comments from multiple reviewers followed by edited contributions based on reviewer's suggestions. The following writing assignments were discussed:

- Reviewer Comments Received
- Sect. 2.6.4 Updated Dynamic Simulation Testing
- Sec. 5.1.2 (Functional Testing of IEC 61850-based applications), Additional virtual wiring testing
- Power Line Carrier Equipment tests

The WG members were encouraged to submit their comments as the WG members are finalizing the Guide by mid February and start the process for forming the balloting body and official process for review by the IEEE.

The Subcommittee Chair proposed that WG seeks subcommittee approval to proceed. Members of the C subcommittee are part of the balloting body and will have an opportunity to further comment on the draft Guide during the balloting open period. The C Subcommittee members are in favor of proceeding the balloting body. Suggestion was made to send a reminder to the C subcommittee members to encourage the Subcommittee members to join the balloting pool.

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

Scope, Purpose, and Reason:
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.

Reason:
This document will aid academic, manufacturing, application engineers and industry protection professionals with the overall benefits for protection scheme performance testing. The document will discuss benefits and challenges associated with verification of overall protection performance and will include information such as: a) Listing of type / production tests, b) Product performance tests from user view, c) Commissioning test - d) Relay settings are properly selected and calibrated e) Verify connections and calibration of settings, f) Trip/no trip and troubleshooting test.

C12: <u>Performance of Relaying During Wide-Area Stressed System Conditions</u>

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

The Working Group met with 11 members and 10 guests present. The meeting was chaired by Damir Novosel, the WG Chair.
Prior to the meeting, Final Draft 10a of the Working Group Report was distributed to the members and guests on the mailing list. This draft included reviews and updates of few remaining chapters and a final editorial review of the whole document. The complete document has already been reviewed by four WG members prior to the September 2007 meeting.

The document is very close to completion, should be finalized by the May 2008 meeting and sent to C SC for approval. Following steps are planned by May 2008:

- Gene Henneberg and Demetrious Tziouvaras will review Draft 10a of the document to assure that their comments have been properly incorporated. Gene Hanneberg will also add a short contribution on how voting schemes improve security and dependability and, consequently, reduce impact of stressed system conditions.
  By March 15th, 2008.
- The final document will be sent to the members and guests on the mailing list for any final comments.
  George Bartok/Damir Novosel by April 1st, 2008
- The WG members will review the final document and provide final comments.
  By May 1st, 2008.

- If there are no major comments, the document will be sent to C SC for approval. If there are major comments, they will be resolved at the meeting in May 2008.

To decimate information from this report to the wider audience, the WG members and guests proposed to submit and present the report at the following conferences: Western Protective Relaying Conference and MIPSICON in 2008; and Georgia Tech and Texas A&M Protective Relaying conferences in 2009. The report will be submitted as is. It is also proposed to write an IEEE Transactions paper to create a reference paper with wider distribution. To prepare a presentation for the conferences and to write an IEEE paper, a new WG is proposed.

For the next meeting, a single session with a room for 40 people and a computer projector are needed either to finalize the report or to start a new WG to create a presentation for conferences and an IEEE paper.

C13: <u>Undervoltage Load Shedding</u>
Chair: M. Begovic
Vice-Chair: S. Imai
Output: IEEE Report
Established: September 2005
Expected Completion Date: January 2009

The UVLS Working Group met on January 9 with 19 in attendance. This included 10 members and 9 guests.

Discussions on the latest draft:
- Reviewing the definition of SIPS architecture and summary of advantages & disadvantages
- Voltage threshold setting issue considering critical voltage from P-V analysis. Reasonable or not?
- Rate of change of voltage issue

Open sections & volunteers for assignments:
- Coordination between UFLS and UVLS will be written by Burger
- 2.2.5 Voltage reduction and LTC blocking, and 10.1.1 1989 Quebec will be written by Begovic.
- Under 5.2.1, Begovic and Novosel will contribute Adaptive scheme.
- 6.3 Impedance locus detection will be written by Novosel and Begovic
- The paper describing 1987 France incident will be prepared by Begovic and sent to Imai
- 6.1.1 Voltage Slide Scheme and 10.2.3 2001 Peru will be written by Imai based on available papers.
- Rate of change of voltage recovery issue will be added under 6.2 by May and Cunico with GPC.
- GPC UVLS scheme will be added by May and Cunico under chapter 9.
- Conclusion will be prepared by Imai.

Timeline of the activities
- May, 2008 – Complete the final draft
- January, 2009 – Finish the report

We request a projector and a room for 30 people at the next meeting. At this time, we request a time allotment for a single session.

C14: <u>Use of Time Synchronized Measurements in Protective Relaying Applications</u>

Chair: Jim O'Brien
Vice Chair: Alla Deronja
Output: IEEE Report
Established: May 2007
Expected Completion Date: December 2009

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.

C14 met for the first time as a working group on January 8, 2008, in San Antonio, TX, in a single session chaired by Jim O'Brien with 7 members and 24 guests. One guest expressed the desire to join a working group as a member.

Two presentations were given at the meeting. Shinishi Imai of TEPCO, Japan, presented "Experiences of SIPS Using Information of Phase Separation". Dr. Yoshizumi Srizawa of Central Research Institute of Electric Power Industry, Japan, gave a presentation "Modular Device Architecture for Wide Area Measuring, Protection and Emergency Control".

The chair distributed the initial draft of the proposed outline, which was discussed by the group. Since the outline included System State Measurement topic, which did not seem to be consistent with the topic of the relaying applications, it was subsequently dropped. Also, it was proposed to clearly define the term Time Synchronized Measurement before proceeding with defining the outline. The WG title was proposed to be changed to *Use of Synchrophasor Measurements in Protection Applications* based on the discussion of applicability of synchrophasors vs. broader term of time synchronized measurements and the fact that current and potential utilization of the synchrophasors is in wide area system protection vs. in an individual protective relay.

If other members desire to give pertaining to the topic presentations at the next meeting, they are encouraged to do so and should contact the chair or vice-chair to be included on the next meeting's agenda.

Requirements for the next meeting are as follows: single session, meeting room for 35 people with a computer projector.

CTF15: Testing and Design of SIPS
Chair: Y. Hu
Vice-Chair: R. Cummings

Task Force CTF-15 did not meet in January, 2008.

The Task Force CTF-15 is scheduled to meet in May 2008 to define the scope and the product of this future working group. Task force chair will take the lead to prepare a straw man statement and present it at the next meeting.

CTF16: Relay Scheme Design for Modern Relays

Chair: K. Birt
Vice-Chair: R. Lascu
Output: IEEE report
Established:
Expected Completion Date:

Proposed Working Group Title: Relay Scheme Circuit Design Using Microprocessor Relays

CTF16, Relay Scheme Design for Modern Relays, met for the second time on Tuesday, January 8, 2008. There were 49 people in attendance.

There was considerable discussion about topics that should be included in the project scope if a working group is formed. Some comments pertained to the proposed title and if the 1999 PSRC report 'Relay Trip Circuit Design' should be kept intact.

Proposed assignment: Write a supplement to the existing 1999 relay trip circuit design report as an IEEE PSRC 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

Requirements for next meeting: 1 session, room size of 50, computer projector.
CTF16, Relay Scheme Design for Modern Relays, met for the first time on Tuesday, September 18, 2007. There were 58 people in attendance.