

**POWER SYSTEM RELAYING  
COMMITTEE**

**OF THE**

**IEEE POWER ENGINEERING  
SOCIETY**

**MINUTES OF THE MEETING**

**September 22-25, 1997**

**Quebec, Canada**

**MAIN COMMITTEE MEETING OF THE POWER SYSTEM RELAYING COMMITTEE**  
**Lowes Le Concorde, Quebec, Canada**  
**THURSDAY, September 25, 1997**  
**8:00 A.M. - 12:00 NOON**

**I. CALL TO ORDER** ***R. W. Dempsey***

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Chairman Bob Dempsey called the meeting to order on Thursday, September 25, 1997.

**II. APPROVAL OF MINUTES** ***G.R. Nail***

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The minutes of the Williamsburg, VA meeting were approved.

**III. FINANCIAL REPORT** ***G.R. Nail***

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Available on request.

**IV. REPORTS OF INTEREST**

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**A. PSRC Technical Paper Coordinator's Report** ***A. G. Phadke***

The Power System Relaying Committee will organize two panels at the Tampa Winter Power Meeting. The first panel is entitled "SYSTEM PROTECTION AND PLANNING – for prevention of wide area disturbances" and will be chaired by Stan Horowitz. The panel members are Stan Horowitz, Kevin Kozminski, Ken Martin, Tony Giuliant, and Alex Apostolev. The second panel is entitled "SYSTEM DISTURBANCE RECORDS: Are you analyzing them or inviting catastrophe?" and will be chaired by John Boyle. The panel members are John Boyle, Ken Behrendt, Larry Smith, Jim Bright, and Bob Burnett.

In addition, we will sponsor a paper session (very likely a poster session). The papers will be drawn from the 23 papers which are currently under review in the PSRC.

It was decided at the PES Publications Committee meeting in Berlin that henceforth papers and the Technical Meetings sponsored by the PES (such as the summer and winter power meetings) will be disconnected from each other. Practically, what this means is that the paper review deadlines will no longer be tied to the meeting dates. The authors of papers will be asked their preference as to where they wish to present their papers AFTER the papers have been accepted. PSRC intends to set up a review cycle which will coincide with our meetings in January, May, and September.

We encourage the Subcommittee Chairmen to be thinking of possible panel session topics for future Winter and Summer Power meetings. These topics should have relaying issues as their central theme, but should also appeal to a wider segment of the PES membership. Please send your ideas to the Vice-Chairman, PSRC as soon as possible. In particular, if you have a hot topic now, we need to get started on the plans for the 1998 Summer Power Meeting.

**B. Power Engineering Society Report**

**Gary Michel**

No report for this meeting.

**C. Cigre**

**C. Mozina**

Report not currently available

**D. EPRI**

**L. L. Mankoff**

No report for this meeting.

**E. IEC Report**

**E.A. Udren**

The IEC is actively updating its environmental withstand test standards suite to align with generic EC requirements in familiar and new areas. TC 95 begins with generic IEC Standards of the 1000 series and creates specific procedures and limits relating to the type testing of measuring relays. Of five voting documents presently requiring USNC response, four relate to new or updated environmental tests:

**95/57/CD – Draft IEC 60255-22-3 Radiated EMI Immunity Tests**

- To replace prior non-standard Report 255-22-3.
- Test 80 MHz to 1 GHz. Range of 27 to 80 MHz, which was included in test of prior Report, is now covered in proposed conducted immunity 60255-22-6 discussed below.
- Based on IEC 1000-4-3 generic standard.
- Test level 10 V/m rms, versus 35 V/m for most recent revision of IEEE/ANSI C37.90.2. EMI carrier has 1 kHz AM at 80 %.
- Most tests at reference non-operate condition, with frequency sweep or 1% steps. This was the only testing done in prior standards.
- Spot checks are to be done at five frequencies to verify that relays can pick up and drop out, i.e. function per specifications, in presence of EMI fields. This is a new testing requirement.

**95/54/NP (New work proposal): Conducted EMI Tests**

- to create IEC 60255-22-6
- The old IEC radiated EMI test went from 27 MHz to 1 GHz; the newest CD has 80 MHz to 1 GHz, because of testing difficulties with 27-80 MHz radiation (see 1. above).
- The proposed test applies 10Vrms directly to groups of relay I/O leads, swept or stepped in 1% increments from 27 MHz to 80 MHz. Test signal amplitude modulated 1kHz, 80%.
- Groups are ct, vt, CI, CO, comms., etc. Signals coupled through isolating networks.
- No operation with relay energized in reference condition; verify ability to pick up and drop out protection function only at two spot frequencies.
- Based on IEC generic standard 1000-4-6.

**95/55/NP (New work proposal) Power Frequency Interference Tests**

- A new type of environmental withstand test – power frequency voltages on low-energy circuits.
- Simulation of induced voltages in control circuits from multiconductor cables with shields which conduct large currents during ground faults.
- Focus on copper-cable connections for status inputs and data communications.
- Recognize and differentiate balanced inputs (e.g. RS-485 signal conductor pair) from unbalanced inputs.
- Only for connections to cables entirely within the substation – excludes circuits intended for pilot

wires or telephone circuits going outside the station.

–Test levels not given; reference to existing Swedish and UK standards, and “0.1 $\mu$ F/250V” test.  
–Also excluded – high energy circuits >10VA, e.g. pt, ct, power supply inputs; optical fiber connections.

95/58/CD – Draft IEC 60255-24 COMTRADE – Common Format for Transient Data Exchange  
–Developed in parallel with IEEE revision of COMTRADE Standard by WG of Dr. A.G. Phadke.

95/59/CD – Draft IEC 60255-25 Electromagnetic Emission Tests for Electrical Relays

–Radiated emissions from relay, plus conducted emissions from power supply leads.

–Revision of 95/48/CD recently discussed.

–Test levels were previously 10 dB more lax than CISPR 22-16-1 which covers information technology equipment (e.g. computers).

–The present draft has the same levels as CISPR 22-16-1, i.e. 10 dB worse than before, due to complaints of many national committees.

–Conducted limits, dB over 1  $\mu$ V: 150 kHz to 500 kHz, 66 average, 79 quasi-peak. 500 kHz to 30 MHz, 60 average, 73 quasi-peak.

–Radiated limits, dB over 1  $\mu$ V: 30 to 230 MHz, 40 quasi-peak. 230 MHz to 1 GHz, 47 quasi-peak.

–Radiated test is carried out in a large rf-quiet open site with over 10 m between DUT and antenna, plus underlying conductive ground plane. Also OK to use qualified anechoic chamber.

IEC TC 95 Meeting, New Delhi, India, October 21-22.

Program of work for TC 95

## ***F. Substations Committee Working Groups***

***J. McDonald***

### **C0: Data Acquisition, Processing and Control Systems Subcommittee**

### **C2: Application of New Technologies in Substation Monitoring and Control**

**Chair: John Dean**

**Vice Chair: Mason Clark**

**Sec: Tony Watson)**

After introductions by each of the 13 Members and 30 Guests, we were given Summaries of each of the three Task Force Meetings held or being held.. The remainder of the meeting was used to discuss future work and direction of the Working Group. Wayne Block, past Chairman of this working group is organizing a successor to the “Fundamental of Supervisory Systems”. The goal is to have the document complete by the April 1999 IEEE T&D Conference. A tutorial would be presented based on one of the chapters, Substation Automation. Wayne’s E-mail address is wblock@ladwp.com and telephone number is (213) 367-2389. He would appreciate hearing from anyone willing to help with his efforts. Other activities discussed were ideas for two future panel sessions to be given at the 1999 Winter Power Meeting, entitled “Artificial Intelligence at the Substation Level” and at the 1999 Summer Power Meeting, “The Home Page as an Entry to Automated Substations”.

On a personal note, I find these fall joint meeting with the Power System Relaying Committee an invaluable opportunity for exchange of ideas as new technologies and industry trends cause an overlap of these committees.

### **C2TF: “The Use of Computer Technology in Substation Data Acquisition and Control”**

**Chair: Mason Clark**

Vice Chair: Ron Farquharson  
Sec: John Dean

First, each of the 10 members and 25 guests introduced themselves and gave a brief description of their organizations involvement or recent projects they were involved in that used computer technology in a substation. Next there were three very informative presentations given by:

- Herb Faulk (Sisco) - "Data Security"
- Alex Apostolov (GEC Alsthom) - "Integrated Protection and Control" and
- Charlie Pencinger (Doble) - "On-Line Diagnostics: A Progress Report"

**Task Force 2 Scope:** "To provide a forum by which suppliers of computer equipment and software can interchange information with users and potential users of this technology in substations. To evaluate the requirements for successful application of this technology in the substation environment. To identify, or survey, the need for guidelines, recommended practices, etc., for successful applications of computer technology in substations. To identify the need for substation information outside the substation, and how it could be communicated throughout the organization."

**C2: Task Force 3, Programmable Logic in Substations:** The task force met on Tuesday, 23 September 1997 and had 42 attendees. Dan Gregory reported that the programmable logic book should be in the hands of IEEE Press by the end of 1997. Mike Putt of Tasnet made an excellent presentation on uses of programmable logic in several real-world applications, which generated a lot of good questions and discussion. We concluded the meeting with a lively discussion of the mechanics of applying programmable logic to substations. Issues included: field interfaces, sensors, transducers, environment. The possibility of conducting a Panel Session on the topic during the 1998 Summer Power Meeting or 1999 Winter Power Meeting was explored and agreed upon. The date of the Panel Session is "TBD".

**G. Standards Coordinator's Report**

**M. Sanders**

No report this meeting.

**V. COMMITTEE REPORTS**

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Go to specific Subcommittee reports on Minutes Web Page.

**VI. Old Business**

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None.

**VII. New Business**

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**FUTURE MEETING DATES:**

|                       |                    |                        |
|-----------------------|--------------------|------------------------|
| January 12-15, 1998   | Savannah, Georgia  | Riverfront Marriott    |
| May 11-14, 1998       | Salt Lake City, UT | Salt Lake Hilton       |
| September 14-17, 1998 | Asheville, NC      | Great Smokies Sunspree |
| January               | Las Vegas, NV      | Under Negotiation      |

**Lowes Le Concorde, Quebec, Canada**

September 1997 Meeting  
Attendance List

If your company name is missing, you are not on the mailing list.

| Attendee            | Company                    |
|---------------------|----------------------------|
| Mark Adamiak        | G.E. Protection & Control  |
| Alex Apostolov      | GEC Alsthom                |
| John Appleyard      | S&C Electric               |
| Michael Baldwin     | NPPD                       |
| Barbara Beckwith    | BecTech West               |
| Ken Behrendt        | Schweitzer Eng. Labs, Inc. |
| Gabriel Benmouyal   | IREQ                       |
| David Blackburn, Jr | Retired                    |
| John Bonazoli       | Boston Edison              |
| John Borkhuis       |                            |
| Stuart Borlase      | KEMA Consulting            |
| John R. Boyle       | Power System Analysts      |
| Dennis Branca       | Northern States Power      |
| Jim Bright          | Basler Electric            |
| John Brown          |                            |
| Mark Browning       |                            |
| Larry Budler        | NPPD                       |
| John Burger         | AEP                        |
| Jeff Burnworth      | Basler Electric Company    |
| Mark Carpenter      | TU Electric                |
| Daniel Carreau      | Snemo Distributions, Inc.  |
| Carlos H. Castro    | PSE&G Company              |
| Jack Chadwick, Jr.  | Consultant                 |
| Simon Chano         | Hydro Quebec               |
| George Chirco       | Powertec Industries        |
| Mason Clark         | Duke Engr. & Services      |
| Steve Conrad        | Public Service Co. of N.M. |
| Carey Cook          | S&C Electric Company       |
| Ken Cooley          | Tampa Electric Co.         |
| Al Darlington       | Consultant                 |
| Douglas Dawson      | Consultant                 |
| John Dean           | Public Electric & Gas      |
| Robert Dempsey      | Potomac Electric Pwr. Co.  |
| Thomas J. Domin     | Pennsylvania Pwr & Light   |
| Mike Dood           | Wisconsin Electric         |
| Paul R. Drum        | Duke Power Company         |
| Richard Dube        | General Electric           |
| Clare Duffy         | GEC Alstrom                |
| Vern Dvorak         | WAPA.                      |
| Kevin Easley        | NovaTech                   |
| Walter A. Elmore    | ABB Power T&D Co.          |
| Philip Engel        | Cinergy                    |
| Attendee            | Company                    |
| Jules Esztergalyos  | B.P.A.                     |
| James Evans         | Detroit Edison             |

|                    |                            |
|--------------------|----------------------------|
| Herb Falk          | SISCO                      |
| Bill Feero         | ERM                        |
| Jeff Fenn          | Bangor Hydro Electric Co.  |
| Charles Fink       | Entergy                    |
| Charles Froman     | Houston Lighting & Power   |
| Jeffery Gilbert    | Pennsylvania Pwr & Light   |
| Harley Gilleland   | The HagGil Group           |
| Benoit Gingras     |                            |
| Adly Girgis        | Clemson University         |
| A. T. Giuliante    | ATG Exodus                 |
| Jay Gosalia        | Doble Engineering          |
| Dan Gregory        | DCG Technologies           |
| Steve Grier        | Dayton Power & Light       |
| Ed Guro            | Pennsylvania Pwr & Light   |
| Jim Hackett        | Onterio Hydro              |
| John E. Harder     | Application Consultant     |
| Glen Harmon        | Basler Electric            |
| Wayne Hartmann     | Intelligent Controls       |
| Roger A. Hedding   | ABB Power T&D              |
| Charles Henville   | B C Hydro                  |
| Jerry Hohn         | Indianapolis Power & Light |
| Dan Hollands       | Qualitrol                  |
| Dennis K. Holstein | SRS Technologies           |
| S. H. Horowitz     | Consultant                 |
| John Horwath       | Commonwealth Edison        |
| Chris Huntley      | NORTEL Lentrionics         |
| Mohamed Ibrahim    | New York Power Authority   |
| Jim Ingleson       | New York Power Pool        |
| Nick Ioannou       | Baltimore Gas & Electric   |
| Barry Jackson      | Duke Power Company         |
| Dave Jamison       | Detroit Edison             |
| M. C. Janssen      | KEMA T&D Power             |
| Jerry Jodice       | Doble Engineering          |
| Bob Jones          | Rochester Gas & Electric   |
| Edward Kalkstein   | Kaltech Associates, Inc.   |
| Patrick Kerrigan   | General Electric           |
| Mladen Kezunovic   | Texas A&M University       |
| Kumul Khunkhun     | Stone & Webster            |
| Charles Kinne      | Northern States Power      |
| Ljubomir Kojovic   | Cooper Power Systems       |
| Attendee           | Company                    |
| M. Kondragunta     | Southern California Edison |
| Bill Kotheimer     | Kotheimer Associates       |
| Peter A. Kotos     | General Electric           |
| Kevin C. Kozminski | Pacific Gas & Electric     |
| Edward Krizauskas  | NY State Elec. & Gas Corp. |

|                          |                           |
|--------------------------|---------------------------|
| <b>Prem Kumar</b>        | Bechtel                   |
| <b>Joeseoph Kwan</b>     |                           |
| <b>Larry Lawhead</b>     | Basler Electric           |
| <b>Paul Lerley</b>       | Basler Electric           |
| <b>Dennis Loudermilk</b> | Universal Power Products  |
| <b>Bill Lowe</b>         | Northern States Power     |
| <b>Matt Lukens</b>       | Zeus Electric             |
| <b>Ajay Madhwesh</b>     | ABB                       |
| <b>Ken Martin</b>        | Bonneville Power Admin.   |
| <b>Fidel Marquez</b>     | Commonwealth Edison       |
| <b>Will Marsh</b>        | Mississippi Power         |
| <b>Rai Martilla</b>      | Ontario Hydro             |
| <b>Ken Martin</b>        | BPA                       |
| <b>John McConnell</b>    | GEC ALSTHOM               |
| <b>Brian McDermott</b>   |                           |
| <b>John McDonald</b>     | KEMA Consulting           |
| <b>Mike McDonald</b>     | Union Electric            |
| <b>Jeff McElray</b>      | OMICRON Electronics       |
| <b>Peter McLaren</b>     | Univ. of Manitoba         |
| <b>Roger Meachem</b>     | Crown International, Inc. |
| <b>Harish Mehta</b>      | Mehta Tech                |
| <b>Mike Meisinger</b>    | S&C Electric Co.          |
| <b>Jerry Melcher</b>     |                           |
| <b>Dean Miller</b>       | Pacificorp                |
| <b>George P. Moskos</b>  | Boston Edison Company     |
| <b>Chuck Mozina</b>      | Beckwith Electric         |
| <b>Bruce Muschlitz</b>   | Bitronics                 |
| <b>Kalyan Mustaphi</b>   | Northern States Power     |
| <b>George Nail</b>       | SGS Witter Inc.           |
| <b>Brad Nelson</b>       | Wisconsin Power & Light   |
| <b>John Newbury</b>      | OPEN University           |
| <b>Dan Nordell</b>       | Northern States Power     |
| <b>Damir Novosel</b>     | ABB-TTI                   |
| <b>Ron Onate</b>         | Arizona Public Service    |
| <b>Henry Painchaud</b>   | Cooper Power Systems      |
| <b>George Parr</b>       | Consultant                |
| <b>Subhash Patel</b>     | General Electric Company  |
| <b>Charlie Pencinger</b> | Doble Engineering         |
| <b>Arun Phadke</b>       | Virginia Tech             |
| <b>Tim Phillippe</b>     | LICOM Inc.                |
| <b>Mysore Pratap</b>     | Northern States Power Co. |
| <b>Mike Putt</b>         | Tasnet                    |
| <b>Le Quang-Minh</b>     |                           |
| <b>Mario Ranieri</b>     | Electroswitch             |
| <b>Dan Reckerd</b>       | CINERGY                   |
| <b>Jaime De La Ree</b>   | Virginia Tech             |
| Attendee                 | Company                   |
| <b>Greg Robinson</b>     | KEMA Consulting           |
| <b>Bob Ryan</b>          | Schweitzer Engineering    |
| <b>M. S. Sachdev</b>     | Univ. of Saskatchewan     |
| <b>Richard Schultz</b>   | American Electric Pwr     |
| <b>Ralph Seitz</b>       | Dupont                    |
| <b>Richard Sevigny</b>   |                           |
| <b>Dilip Shroff</b>      | Black & Veatch            |

|                          |                           |
|--------------------------|---------------------------|
| <b>Hong Ming Shuh</b>    | Tennessee Valey Authority |
| <b>T.S. Sidhu</b>        | Univ. of Saskatchewan     |
| <b>Mark Simon</b>        | Commonwealth Edison       |
| <b>Alex Singharaj</b>    | BPA                       |
| <b>Veselin Skendzic</b>  | Cooper Power Systems      |
| <b>Allen Skopp</b>       | Bailey Network Mgmt.      |
| <b>Larry Smith</b>       | Alabama Power             |
| <b>Peter Solanics</b>    | Centerior Energy          |
| <b>James E. Stephens</b> | Retired                   |
| <b>Charles Sufana</b>    | Commonwealth Edison Co.   |
| <b>C. Swaminathan</b>    | ABB                       |
| <b>Glenn Swift</b>       | Alpha Power Technologies  |
| <b>Rick Taylor</b>       | GEC Alsthom               |
| <b>Jim Teague</b>        | General Electric          |
| <b>John T. Tengdin</b>   | Consultant                |
| <b>Mike Thompson</b>     | Basler                    |
| <b>S. I. Thompson</b>    | AVO Multi-Amp Inc.        |
| <b>James S. Thorp</b>    | Cornell University        |
| <b>D. Tziouvaras</b>     | PG&E                      |
| <b>Joe Uchiyama</b>      | USBR                      |
| <b>Eric A. Udren</b>     | Cutler-Hammer             |
| <b>Sahib M. Usman</b>    | Bechtel Power Corp.       |
| <b>Charles L. Wagner</b> | Consultant                |
| <b>Jim Waldron</b>       | PECO Energy               |
| <b>Thomas Walters</b>    | Rochester Instruments     |
| <b>John Wardlow</b>      | Pacific Electric & Gas    |
| <b>Donald Ware</b>       | Florida Power Corp.       |
| <b>Hirashi Watanabe</b>  | Toshiba                   |
| <b>Wm P. Waudby</b>      | Consumers Energy          |
| <b>Ron Westfall</b>      | Beckwith Electric         |
| <b>Jerome Williams</b>   | General Electric          |
| <b>Philip B. Winston</b> | Georgia Power Company     |
| <b>David Wood</b>        | SEL                       |
| <b>Murty Yalla</b>       | Beckwith Electric Co.     |
| <b>Karl Zimmerman</b>    | SEL                       |
| <b>John Zipp</b>         | Consumers Power Co.       |
| <b>Stan Zocholl</b>      | SEL                       |

## **Advisory Committee**

As part of our educational efforts, we are increasing our presentations at our meetings. These will include tutorials, working group reports, and other topics of interest. At our next meeting, we will try to have a Working Group Report as well as our pilot session of "Ask The Expert" where everyone will have an opportunity to ask one of our experts questions on any protection issues that they are working on. We think this will be very interesting and informative.

George Nail is also looking into offering CEU credits for continuing registration requirements. If you have any information on procedures for issuing CEU's, please talk to George.

Due to the change in procedures of PES on balloting procedures, John Appleyard has agreed to review the PSRC practices and recommend changes as appropriate. This may include creating a "Balloting Body" from our membership in order to satisfy PES and the Standards Board requirements.



**B: ADVISORY COMMITTEE**

**R.W. Dempsey, Chairman**

**A. Phadke, Vice Chairman**

**September 25, 1997 Meeting**

**Expected Completion Date: Continuous**

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**B1: AWARDS AND TECHNICAL PAPER RECOGNITION**

**C. F. Henville, Chairman**

**M. S. Simon, Vice Chairman**

**Expected Completion Date: Continuous**

During their meeting, the WG compiled a short list of IEEE papers for more detailed review in a selection process for PSRC nominations for PES awards, and for PSRC awards. The detailed reviews will be completed by the end of October. The WG also considered possible candidates for various PSRC awards. Results will be publicized at future meetings. Charlie Henville and Jeff McElray will be leaving the WG at the end of this year. Starting January 1, 1998, Mark Simon will become the WG Chair.

At the Main Committee meeting, Ed Guro, Chair of the PES Awards Committee presented mounted certificates to the members of the System Protection and Voltage Stability WG which had won the 1997 PES award for outstanding working group report. Certificates of appreciation were also presented to the following individuals who had completed their assignments:

Everett Fennell, Chair of the Sequential Tripping of Generators WG,  
Mike McDonald Chair of the Device Function Number Recommendations WG,  
Charlie Henville, Chair Voltage Collapse Mitigation, and Awards and Recognition WGs,  
John Zipp, Chair Protection of High Voltage Cables WG,  
Jerry Jodice, Chair Relay Performance Testing WG,  
Eric Udren, Chair Line Protection with Digital Computers WG,  
Phil Waudby, Chair AC Generator Protection Guide WG,  
Stanley Horowitz, Chair University/Industry Interaction WG,  
Stig Nilsson, Chair Digital Protection System Designs WG,  
Jim Ingleson, and Larry Budler, Chairs Protection Systems Operating Experience WG,

John Tengdin, Chair High Impedance Fault Detection Technology WG

**B2: FELLOWS AWARDS**

**J.S. Thorp, Chairman**

**Expected Completion Date: Continuous**

The Working Group did not meet. A report was sent to the PES Fellows Committee after the May PSRC meeting.

**B3: MEMBERSHIP COMMITTEE**

**J. E. McConnell, Chairman**

**Output: Improve PSRC Participation**

**Expected Completion Date: Continuous**

Noticeably, the ratio of attendance by user companies to other than user companies is on the decline. This may be offset by attendance of consultants who by in large are retained by user companies. User company participation can possibly be increased by management awareness of the importance of work conducted by PSRC. The committee will undertake a report to PRSC Officers suggesting measures to help improve user company attendance.

**B4: O/P MANUAL & W.G. TRAINING**

**Tom Wiedman, Chairman**

**Output: Update O/P Manual**

**Expected Completion Date: Continuous**

Due to a logistics problem with box lunches, the working group did not meet in Quebec City. Flow charts for two processes are ready for review by the working group. These are: 1.) producing a Special Publication, and 2.) producing an IEEE Standard. These two topics are to be discussed at the January 1998 meeting.

**B7: TECHNICAL PAPER REVIEW**

**J.S. Thorp, Chairman**

The Working Group met on September 23, 1997 and considered papers submitted for the 1998 Winter Meeting.

**B8: BIBLIOGRAPHY AND PUBLICITY**

**T.S. Sidhu, Chairman**

Working group met on Sept. 23, 1997 with six members and one guest present. Minutes of the May 1997 meeting were approved as circulated. The Chairman reported that the 1996 bibliography paper was approved by the PSRC officers and will be published in the

Transactions. Revised assignments were made for preparation of the 1997 bibliography paper. WG members provided comments on the Relay Engineers' mailing list sent by Jeff Burnworth and agreed on ways to revise this list. The Chairman distributed the corrected copies of the compendium of papers. The Chairman will prepare the title page, table of contents etc. and send it to the WG members along with ballot. PSRC activities report was distributed to WG members for comments within two weeks. Then, the report will be sent to the PES Review editor for publication. M. Kezunovic, D. Finley and A. Folkman resigned from the working group. Peter Crossley joined the WG as a corresponding member.

**C: System Protection**  
**P. B. Winston, Chair**  
**J. S. Thorp, Vice-Chair**

The System Protection Subcommittee (Phil Winston, Chair) met on September 14, 1997; with 28 in attendance..

#### **C1 ( I17): SOFTWARE MODELS FOR RELAYS**

**P. G. McLaren, Chair**  
**K. K. Mustaphi, Vice Chair**  
**Established: 1995**  
**Output: IEEE Transactions Paper**  
**Expected Completion Date: 1998**

The Working Group met on September 24, 1997 with 9 members, and 12 guests present. The chairman circulated a new draft for discussion. (Had been e-mailed to members prior to meeting). The meeting agreed that the circulated draft only required minor amendments. All such amendments should be sent to the chairman by the end of October. The chairman would then send out a final draft for ballot in the WG (and elsewhere) in time for the January meeting. There was further discussion about two further WG's or task forces. One would deal with compiling examples and test cases (M. Meisinger) and the second would deal with more complex issues of interactive, off-line evaluation of protection systems (Peter). It was felt that the second should be delayed until the WG had finished its assignment. The assignment for the first was:

The taskforce would investigate the level of interest in expanding the introductory efforts of C1 (I17) Software Models for Relays, in the area of phasor models for protective relays. This effort would develop a foundation for what the advantages are and demonstrate these advantages with examples, the outcome is intended to educate less experienced engineers on the advantages of phasor models.

#### **C2(I14): DATA & DATABASE STRUCTURES FOR PROTECTION ENGINEERING**

**D. Fulton, Chair**  
**T. Seegers, Vice Chair**  
**Established: 1990**  
**Output: Special Publication**  
**Expected Completion Date: 1997**

The working group did not meet. WG has finished its work. The special publication and the IEEE summary paper are under publication. A paper prepared by the WG is also on the program of the CIGRE meeting to be held in the first week of October in S. Africa. The WG was disbanded at this meeting.

**C3(I16): NEW TECHNOLOGY RELATED TO TRANSMISSION AND DISTRIBUTION PROTECTION**

**A. P. Apostolov, Chair**  
**P. A. Solanics, Vice Chair**  
**Established: 1994**  
**Output: IEEE Transactions Paper**  
**Expected Completion Date: 1997**

The Working Group met on September 23, 1997; 42 members and guests were present. Minutes of the Williamsburg, VA meeting held on May 13, 1997 were approved as posted on the working group Web page before the meeting. Two presentations were made at the meeting:

1. "Protection of Untransposed Transmission Lines" by Alexander Apostolov, GEC ALSTHOM
2. "Object Models of Protective Relays" by Alexander Apostolov, GEC ALSTHOM

There were very interesting discussions and comments on different aspects of the presentation. Selection of topics for presentations at the Savannah, GA January 1998 meeting will be made by the end of November 1997.

**C4 (D10): APPLICATION OF INTELLIGENT SYSTEMS TO POWER SYSTEM PROTECTION**

**M. Kezunovic, Chairman**  
**D. J. Novosel, Vice Chairman**  
**Established: 1993 Output: Subcommittee Report**  
**Expected Completion Date: 1998**  
**Status: Draft #6**

The meeting was held with 6 members and 4 members present. The following agenda was approved:

Membership update  
Review of Draft #8  
Assignments for Draft #9 and #10  
Liaison Reports

As a result of the membership update, 4 members were removed from the membership due to the lack of further interest (A. Howard, P LeBlanc, F. Soudi, R. Strem), one member requested to be changed to a corresponding member (S.S. Venkata), and a new corresponding member was added (B. Kasztenny). The draft #8 was reviewed together with a written contribution from Dr. Kasztenny. The following assignments were defined:

Due Oct. 1, 1997, A Apostolov, J. Bright, S. Borlase (comments on Draft #8); J. G. Gilbert, A.A. Girgis (comments on contributions by Dr. Kasztenny)

Due Nov. 1, 1997, M. Kezunovic, D. Novosel (Draft #9)

Due Dec. 1, 1997, All members (comments on Draft #9)

Due Jan. 1, 1998, M. Kezunovic, D. Novosel (Draft #10)

It is expected that the WG will complete its assignment in 1998. M. Kezunovic will check with P. Winston regarding the type of the final report that the WG will deliver.

**C5 (F10): MATHEMATICAL MODELS FOR CURRENT TRANSFORMERS AND VOLTAGE TRANSFORMERS**

**Demetrios Tziouvaras, Chairman**  
**Peter McLaren, Vice-Chairman**  
**Established: 1993**  
**Output: IEEE Transactions Paper**  
**Expected Completion Date: 1996**  
**Current draft: #3**

The Working Group did not meet in Quebec. All negative ballots have been resolved. The Working Group plans to submit the paper for PSRC officer approval and subsequently submitted to the PSRC main committee for comments of substance.

**C6 (K14): WIDE AREA RELAYING.**

**Miroslav Begovic, Chair**  
**Damir Novosel, Vice Chair**  
**Established, 1996**  
**Expected Completion Date: 1999**  
**Output: Special Publication and a Transactions paper.**

The Working Group met in a single session with 12 members and 14 guests in attendance. The Minutes of the May 14, 1997, meeting have been approved.

Dick Schultz, the chairman of the IEEE PES WG on "Power System Dynamics Measurement" (PSDM) gave a presentation on goals, scope, and activities of his working group. It has been concluded that two working groups cover different but complementary topics. The PSDM WG focuses on measurements to be used for post-mortem disturbance analysis and planning purposes. The PSRC WG focuses on the issues related to causes of disturbances, existing strategies, and needs for improvement related to protection and real-time emergency control. The activities of the two WGs will be coordinated. Draft reports will be presented at each other's WG sessions by the liaison or a joint member present at the meeting for comments and contributions. Charles Henville will provide a brief document that will identify areas in which the results of PSDM WG activities can contribute to the K14 WG activities. Liaisons with relevant entities are:

IEEE/PES PSDM WG - Gary Michel  
EPRI - Peter Solanics  
CIGRE WG on Angle Control - Damir Novosel

The PSRC will hold a panel session at the IEEE Winter Meeting in Tampa in February on issues related to the K14 WG activities. The working title is:

System Protection and Planning to Prevent Wide-Area Disturbances

Panelists are:

Horowitz - moderator  
Kozminski - protection practices and planning criteria  
Giuliante - relay response under abnormal system conditions  
Martin - Phase angle measurement applications  
Apostolov - new system protection technologies

Horowitz - anatomy of a blackout

It is proposed to organize short presentations by panelists at the next WG meeting in January 1998. A double session is requested for the next WG meeting in January 1998 with the second session the third slot on Wednesday morning.

Partial responses were received on the assignments to compile NERC reports. A deadline to submit all responses is November 15. The responses will be compiled into a draft report by the January meeting. New assignments for the WG members are on practical implementation of wide area protection and emergency control systems with a goal to analyze existing utility strategies and solutions. Volunteers for the initial assignments are:

Nicholas Ioannou  
Kalyan Mustaphi  
Mohamed Ibrahim  
Demetrios Tziouvaras  
Ken Martin  
Jaime De La Ree

### ***Task Force Reports***

#### **CTF1 (HTF1): SWITCHYARD DATA ACQUISITION**

**Chairman: E. Udren**  
**Established: 1996**  
**Expected Completion Date: 1998**

It was reported that the task force report was given in the Communications Subcommittee meeting.

#### **EMTP TASK FORCE**

**Chairman: Demetrios Tziouvaras,**  
**Established: 199**  
**Expected Completion Date: 1999**

The taskforce met in Quebec City on September 23, 1997. The taskforce agreed that we have sufficient material at hand to prepare a report to the subcommittee on the fundamentals of electromagnetic transients program applications to system protection. The taskforce agreed to request approval for the formation of a WG with the following title and proposed assignment:

“Prepare a report to the systems protection subcommittee on the fundamentals of electromagnetic transients program applications to system protection, and a one day tutorial to be presented to the PSRC members.” The formation of the WG C7 “EMTP applications to power system protection” with an expected completion date of Sept. 1998 was approved.

***Liaison Reports:***

1. **T&D Committee** M. Kezunovic No report
2. **IEEE Working Group on Power System Measurements** G. Michel

This Working Group last met February 6, 1997 in New York City at the IEEE PES Winter Power Meeting. The Working Group Chairman is Dick Schulz of AEP. The chairman informed the group that the Task Force on Power System Monitoring with Phasor Measurements reporting to the System Dynamic Performance Subcommittee of the Power System Engineering Committee is being replaced by the Working Group on Power System Dynamics Measurements reporting to the Power System Stability Controls Subcommittee of the Power System Dynamic Performance Committee.

Along with an elevation of this group to a Working Group, a new scope was proposed as follows:

Development of procedures, methods and techniques for detecting, recording, and analyzing power system dynamic performance, for use in system controls, for event reconstruction, for validation of correct operation of equipment, controls and protection, and for developing and improving simulation models. The Working Group (WG) will consider transducers, computation equipment and algorithms, communications, and other portions of systems for these measurements. The WG will disseminate its results appropriately, including use of panel sessions, technical paper sessions, and preparation of WG papers. The WG will coordinate its activities with other IEEE and CIGRE bodies, including the Power System Relaying Committee and the Power Systems Instrumentation and Measurements Committee.

Discussion on the proposed scope followed. One member felt that the working group should keep its focus narrow by addressing only phasor monitoring, as the preceding task force did. However many others felt that the working group should address all forms of recording devices used to gather system dynamics phenomenon. There were other editorial revisions suggested. Most members felt comfortable with the content of the scope, and the chairman requested that comments on the draft of the scope be sent to him. Technical presentations were given by Alex Golder of Scotland, UK, John Hauer of Pacific NW National Laboratory, John Paserba of General Electric, Graham Rogers of Cherry Tree Scientific Software, and Bharat Bhargava of Southern California Edison.

On July 24, 1997, at the Summer Power Meeting in Berlin, the PSDM WG sponsored a panel session entitled "Latest Trends in Measurement Based Power System Monitoring Systems" chaired by Eddie Dehdashti of Pacific Gas and Electric. Panelists included: Ram Adapa of EPRI, USA; Colin Ray of National Grid Company (NGC) of UK; Jean-Pierre Clerfeuille of EdF, France; Professor H.W. Weber of University of Rostock, Germany; Hiromichi Sato of Tohoku Electric Power Company, Japan; Naoyoki Uchida, of Komae Research Center, Japan. (Due to birth of a newborn, Dr. Grebe of RWE Energy was unable to attend and was replaced by Professor Weber.)

The panelists: a) emphasized the importance of measurements for dynamic performance in traditional and restructured utilities; b) described EPRI's efforts in developing and demonstrating phasor measurement based systems; c) described the need of NGC as a restructured electric utility for measuring dynamic performance, including the NGC approach to measuring governor response for acceptable dynamic performance and to ensure that market players comply with their contracted obligations; d) described European interarea oscillations and presented a phasor measurement based approach in monitoring these oscillations; e) described three separate monitoring systems in EdF: the phasor measurement based 'Defense Plan', 'Coordinated Secondary Voltage Control', and 'Monitoring for Load and Frequency Control'; f) described Tohoku's GPS synchronized monitoring system to observe system disturbances and phase angle separation among remote stations; g) described six monitoring systems in Japanese utilities in addition to the earlier presentation: 1) Tokyo Electric Power Company's On-line Monitoring Voltage Security System, 2) Tokyo Electric Power Company's Out-of-Step Protection System, 3) Chubu Electric Power Company's Monitoring and Prevention of Large Failures, 4) Chugoku Electric Power Company' System Stabilizing Control, 5) Kansai Electric Company's Block System Stabilizer, 6) CRIEPI's SDH-Based Time Synchronization System for Communication

Overall, based on the feedback that was received, this panel session provided value to the PES members by introducing a number of measurement based monitoring systems that were not previously reported in US literature. The Working Group is working to develop a special publication from this panel session, if sufficient support can be provided by the authors who did not prepare written reports. Because the panel session ran very long, the planned work to develop specific WG directions did not occur. That work will be conducted before and during the Winter 98 meeting.

### 3. **NERC Engineering Committee** Phillip B. Winston

It was reported that the "NERC Planning Standards and Guides" have gone to the Board of Trustees for approval.



## **D: LINE PROTECTION SUBCOMMITTEE**

**J. A. Zipp, Chairman**  
**R.M. Westfall, Vice Chairman**

The Line Protection Subcommittee met in Quebec City, Canada on September 24, 1997 with 19 members and 33 guests present and chairman John Zipp presiding. The minutes of the Williamsburg, Virginia meeting were approved.

### **D1: EFFECTIVENESS OF DISTRIBUTION PROTECTION**

**R. P. Taylor, Chairman**  
**C. Fink, Vice Chairman**  
**Established: 1994, Output: IEEE Paper**  
**Expected Completion Date: 1999**  
**Status: Draft #5**

The working group met with 12 members and 8 guests attending. The results of the Line Protection Subcommittee and working group electronic survey ballot were discussed. Comments were received concerning the survey content and survey software mechanics. It was noted that the software skip logic was not implemented in the ballot version in order to facilitate a review of all survey questions. There was a general discussion on the features and limitations of the software. Survey cover letter content and resolution of comments were also discussed. John Tengdin, Paul Lerley and Charlie Fink were assigned to individually review the entire survey and incorporate ballot comments. This assignment is due to the chairman by the end of November. Larry Lawhead volunteered to take the software program and further investigate its capabilities. The mailing list, logistics of a mailout and final resolution of ballot comments were identified as future action items.

### **D2: FAULT LOCATING**

**Karl Zimmerman, Chairman**  
**Demir Novosel, Vice Chairman**  
**Established: 1996, Output: IEEE Guide**  
**Expected Completion Date: 1999**  
**Status: Draft #1**

The working group met on Wednesday, September 24, 1997 with 13 members and 8 guests. Draft #1 of the guide has been circulated to the working group, either by hard copy or e-mail. We expect to receive comments and three outstanding writing assignments by November 1. The working group is also working with the Standards Coordinator to create an "Invitation to Participate" to any interested non-PSRC participants. The Chair also circulated a MathCad worksheet showing three common fault location algorithms for single-phase to ground faults. We plan on creating a second draft before the January meeting in Savannah, and to meet in a double session to discuss the guide.

### **D3: INSTANTANEOUS OVERCURRENT SETTINGS**

**J. R. Boyle, Chairman**  
**K. Behrendt, Vice Chairman**  
**Established: 1995, Output: IEEE Paper**  
**Expected Completion Date: 1998**  
**Status: Current Draft #6**

The working group met on September 23, 1997 with 11 members and 23 guests attending. The chairman reviewed all comments to Draft #5. The paper has been approved by the working group and subcommittee members with comments. It has

been reviewed by Barbara Beckwith and all of the officers. The paper will be presented at the main meeting on September 25 and a copy will be sent (or provided at the meeting) to all members for comments of substance. If approved by 75% of the members it will be submitted for publication.

**D4: AUTOMATIC RECLOSING**

**W.M. Strang, Chairman**  
**P.B. Winston, Vice Chairman**  
**Established: 1996, Output: IEEE Guide**  
**Expected Completion Date: 2001**  
**Status: Current Draft #3**

The working group met with 11 members and 9 guests attending. The latest draft was distributed . Discussions included a proposed reclosing time line, remaining writing assignments were made and deadlines for future work established. The following items are due by October 15 to the chairman: all outstanding writing assignments, comments related to of the paper and the reclosing survey.

**D6: TRANSMISSION LINE PROTECTIVE SYSTEMS LOADABILITY**

**Tony Seegers, Chairman**  
**J.B. Williams, Vice Chairman**  
**Established: 1997, Output: IEEE transactions paper**  
**Expected Completion Date: 2001**  
**Status: New Working Group**

Working group D6 met for the first time at the Quebec City meeting with 22 people in attendance. Fourteen indicated an interest in becoming members. The objective of this working group is to produce an IEEE Transactions paper on transmission line protective systems loadability. The assignment of this paper is to investigate and report on those issues that affect protective systems loadability including calculations, evaluations and mitigation. Target completion date is 2001.

**D14: TRANSMISSION LINE PROTECTION GUIDE**

**W.M. Carpenter, Chairman**  
**A.N. Darlington, Vice Chairman**  
**Established: 1992, Output: IEEE Guide**  
**Expected Completion Date: 1998**  
**Status: Draft #13**

The working group met in double session with 19 members and 24 guests attending. The recent ballot on Draft #13 was discussed .All negative ballot issues except one were resolved. That one issue involves the wording concerning "weak feed logic and echo logic" in sections 44.2.4.7 and 4.3.5, and it should be resolved within two weeks.The working group members should finish their comments within 2 weeks for inclusion in Draft #14. This includes input as to what references are required. Plans are to incorporate these comments and ballot the subcommittee. Between now and the next meeting, the balloting body for the document should be identified. At the next PSRC meeting , the working group will be prepared to present an overview of the guide to the main body.

**D15: HIGH IMPEDANCE FAULT DETECTION**

**A.P. Napikoski, Chairman**  
**J.T. Tengdin, Vice Chairman**  
**Established: 1997, Output: IEEE transactions paper**  
**Expected Completion Date: 2001**

### **Status: New working group**

The working group met with 9 members and 18 guests in attendance. The minutes of the January 97 meeting were approved. The approved assignment was presented and is as follows:

**Investigate and report on the occurrence of high impedance events in electrical distribution systems. Solicit input from the industry on the occurrence of these events. Establish a tracking system to tabulate and record events. Prepare a transaction paper that will present the results of these findings.**

The event reporting template was discussed, with a change suggested in Item #5 to include high impedance events other than downed conductors. John Tengdin agreed to explore with Rick Taylor the use of the survey software being used by D1 for the Distribution Protection Practice survey. It was also suggested that the reporting template be put on the PSRC web site. Several utilities reported on high impedance events. The Electrical World article on the use of portable DFM to detect arcing faults in service entrance secondary cables was discussed.

### **LIAISON REPORTS**

#### **1. Distribution Automation Working Group, Distribution Subcommittee, & D Committee, J. T. Tengdin, Liaison**

Nothing to report.

#### **2. P1124 - Guide for Analysis and Definition of DC Side Harmonic Performance of HVDC M. S. Sachdev, Liaison**

No report.

#### **3. Applications of Intelligent Methods to Transmission and Distribution Problems, General Systems Subcommittee, Transmission and Distribution Committee - M. Kezunovic, Liaison**

Nothing to report.

#### **4. Artificial Intelligence Applications Working Group, Computer and Analytical Methods Subcommittee Power Systems Engineering Committee - M. Kezunovic, Liaison**

Nothing to report.

#### **5. Intelligent Methods in Station Control Working Group of the Station Control Subcommittee, of the Energy Development and Power Generation Committee. - Dr. A. Girgus, Liaison**

Nothing to report.

### **COORDINATION REPORTS:**

#### **1. Design Guide For Improving Lightning Performance of Overhead Distribution Lines, Transmission and Distribution Committee - Roger Hedding, Coordinator.**

There was no meeting held at the Summer Power meeting. All negative ballots have been resolved. The paperwork has been completed and sent to the IEEE for review by the standards board.

**Old Business:**

None

**New Business:**

Phil Winston submitted a letter from Mr. Hans Püttgen, Chairman, Public Affairs Council, proposing that the PES move forward with the distribution of the pamphlet entitled "How to Be Safe Around Power Lines". The Public Affairs Council will handle distribution and funding for this effort.

**General Discussion:**

Brad Nelson, Wisconsin Power and Light, presented a significant event to the Wisconsin transmission system which resulted in relay operations on load. There was a large power transfer his company had no knowledge of causing unexpected relay operations and low voltages in several neighboring power companies.

## **H: RELAY COMMUNICATIONS SUBCOMMITTEE**

**M. G. Adamiak, Chairman**  
**M. S. Simon, Vice Chairman**

### **H1: REVISION OF IEEE GUIDE FOR POWER LINE CARRIER APPLICATIONS** **JOINT WORKING GROUP**

**Chairman: B. Nelson**  
**Vice Chairman: M. Simon**  
**Established: 1995**  
**Output: Revision of IEEE 643**  
**Expected Completion Date: 1998**

H1 Working Group met on September 24 with 10 members and 4 guests. The working group assignment is to provide clauses 9 and 10 for the PLC application guide C643. Clauses 9 and 10 concentrate on the protective relay application of PLC. C643 is being revised by the PSCC. Roger Ray is the working group chairman. The PSCC should have draft 5 completed by the next PSRC meeting (January in Savannah). The group discussed the inclusion of a general safety warning. The IEEE was not able to provide any guidance on this issue. The chair will consult the PSRC officers to obtain their perspective on this issue. The group then reviewed comments received on clause 9. These comments will be incorporated into the next draft. Chapter 10 comments will be sent to the chair by November 1. All - Please forward any typographical comments to Brad. Please any comments to the Chair: (please note revised Email address) BradNelson@madison.wpl.com or by US mail to Brad Nelson, Wisconsin Power & Light, PO Box 192, Madison, WI, 53701-0192.

### **H2: COMTRADE STANDARD REVISION**

**Chairman: R. Ryan**  
**Vice Chairman: C. Shank**  
**Established: 1995**  
**Output: Revised Standard C37.111-199x**  
**Expected Completion Date: 1997**

12 members and 9 guests attended. Jay Gosalia replaces Jerry Jodice, Dennis Holstien joins for coordination with communications initiative tasks. The WG ballot was successful with 30 returned ballots out of 36 members with no negatives. Some editorial corrections resulted from the comments returned with the ballot, and all have corrections have been incorporated. The Chairman reported that drafts had been distributed to all persons (3) requesting liaison under the first part of the PAR but that drafts had not been supplied to Terminology Review WG or Standards Coordinating committee. A copy of the draft used for ballot has since been given to Barbara Beckwith, Chair of Terminology Review WG G2. The Chairman will follow up with Standards with regard to Draft Coordination. The Chairman will contact Standards Coordinator Miriam Sanders about formation of a voting body. A copy of the latest draft was supplied to Eric Udren and Arun Phadke for IEC coordination, as well as a list of modifications made since the draft given to IEC in January. At the request of Tony Giuliante, a Task Force was formed for preparation of a draft summary paper, and a presentation for the May PSRC on the revised standard. Members to be Mark Adamiak, Bob Ryan, Jay Gosalia

### **H3: COMTRADE USERS GROUP**

**Chairman: C. Shank**

**Vice Chairman: J. Sperr**  
**Established: 1995**  
**Output: COMTRADE Interpretations Paper**  
**Expected Completion Date : Ongoing**

No report.

**H4: Evaluation of Message Communications**

**Chairman: D. Holstein**  
**Vice Chairman:**  
**Established: 1997**  
**Output: Standard**  
**Expected Completion Date: 1999**

H4 met in double session. The first session was a joint meeting with H5 and C2TF4 of the Substation Committee. 43 members and guests attended the meeting. Dennis Holstein presented a C2TF4 report and an H4 report. C2TF4 intends to submit a PAR to develop an IEEE standard, "Standard for Communications for Substation Integrated Protection, Control and Data Acquisition. Their work plan requires close coordination with PSRC to include the protection specifications. 22 members and guests attended the second session. Comments were received on the work plan to develop PC 37.115, "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". The members also reviewed the list of substation applications received from Working Group H5. Dennis Holstein presented a liaison report describing the participation of Cigre Study Committee 34 Task Force 01 in developing PC 37.115. Klaus-Peter Brand will be invited to present a special report on their activity at the next H4 meeting. Herb Falk presented a special report on the results of the UCA benchmark testing and lessons learned.

**H5: Application of Substation Peer to Peer Communications**

**Chairman: M. Adamiak**  
**Vice Chairman: J. Beatty**  
**Output: Paper**  
**Expected Completion Date: 1999**

The WG met jointly with the Substations C2TF4 on Monday afternoon with a total of 43 attendees. The scope of the WG was reviewed along with the list of identified applications. Three additional applications were identified and added to the list. The list will be frozen at this point so that the H4 WG can focus on a defined set of applications to map as part of their standards work. Final writing assignments were made and review teams established to move the effort along. In addition to H5 discussions, the Substations SC described their plans to standardize the EPRI work being performed regarding Peer to Peer communications using MMS over Ethernet. The PSRC H subcommittee will be a liaison on this work and have open access to all work in progress. A PAR will be submitted in the very near future.

**H7: HTF2: INTER RELAY COMMUNICATION PROTOCOL TASK FORCE**

**Chairman: G. Michel**  
**Established: 1997**  
**Expected Completion Date:**

H7 WG Progress Report: Bill Higinbotham developed a matrix that compares characteristics of each of the manufacturers approaches to the relay to multiplexer DS0 interface. Comments regarding the matrix have been solicited from the other H7 WG presenters.

**H8: IEEE STANDARD FOR SYNCHROPHASORS FOR POWER SYSTEMS**

**Chairman: K. Martin**  
**Vice Chair: G. Benmouyal**  
**Established: 1992**  
**Output: Standard (P1344) -**  
**Expected Completion Date: 1997**

H8, Synchrophasor Standard, IEEE 1344-1995. The standard was completed and approved by IEEE in December, 1995. It was published in May 1996. The working group prepared a transactions paper on the standard which was presented at the 1997 Summer Power meeting. Comments were due by the end of August. None have been received, so there is no further work for the working group. The working group has voted to disband.

**H9: INTER SUBSTATION PROTECTION USING DIGITAL COMMUNICATIONS**

**Chairman: G. L. Michel**  
**Vice Chairman: G. Pleinka**  
**Established: 1993**  
**Output: Transaction Paper**  
**Expected Completion Date: 1997**

H9 Progress Report: The H9 working group did not meet in Quebec. Receipt of the remaining writing assignments made at the last meeting are expected within the next few weeks. The chairman will then add these to the final document and ballot the H9 working group membership.

**H10: Revision of the Audio Tone Application Guide**

**Chairman: Ken Fodero**  
**Vice Chairman:**  
**Established: 1997**  
**Output: Revised application guide**  
**Expected Completion Date: 1997**

The working group will hold its first meeting in Savannah GA in January 1998.

***Task Force Reports***

**HTF1: SWITCHYARD DATA ACQUISITION**

**Chairman: E. Udren**  
**Established: 1996**  
**Expected Completion Date: 1998**

Task force HTF1 did not meet in Quebec. There has been little progress of IEC TC57 WG12, and no issues to discuss at the moment. WG12 met last in July, in Banff, Alberta. The WG reviewed its liaison group activities and the status of its documents to date. It

then subdivided and joined ad hoc issue working groups with members of WG's 10 and 11, aimed at defining common architectural issues for the building of the protocol layers for all of the substations data communication channels. The next meeting of WG's 10, 11, and 12 will take place in Edinburgh in late October.

### ***Liaison Reports***

#### **1. Power System Communications Committee - E. A. Udren**

Nothing to report

#### **2. Substation Committee - J. Tengdin**

"Trial Use Recommended Practice for Data Communications Between Intelligent Electronic Devices and Remote Terminal Units in a Substation" - The negative ballots on draft 5 have been resolved. The document is now before the IEEE Standards Board for final approval. The next joint meeting of PSRC and the C0 working groups and task forces of the Substations Committee will be at the September 14-17, 1998 PSRC meeting in Asheville, NC. Substations Committee C2 TF4 is submitting a PAR to move the RP3599 Requirements Specification and "Build To" Specification to an IEEE Standard.

#### **3. IEC TC57 Working Group 10, 11 and 12 Report - D. Holstein**

This IEC group is developing IEC STD 61850, "Substation Automation System". The group is restricted by scope as to which communication interfaces they can address. Excluded are control center to substation and protection-to-protection interfaces. These interfaces are the responsibility of other TCs and WGs. Convenors for the three working groups are trying to lift the protection-to-protection restriction. The next meeting will take place in Edinburgh, Scotland in October.

### **Coordination Reports**

**P1260 "Guide on the Protection, Measurement and Analysis of AM Broadcast Reradiation by Power Lines" - J. Zipp - No activity to report**

**P1379 - John Tengdin - No activity to report**

**C93 - R. Ray - Liaison Report on ANSI C93 Committee - No report.  
Cigre SC34 TF01 Liaison Report**

Cigre Study Committee 34 Task Force 01 is developing integrated substation test scenarios from a European point-of-view. The primary analysis tool used to develop these scenarios is PICOM (Pieces of Information for Communication). SC34TF01 met in Berlin after the PES Summer Power Meeting to review the preliminary PICOM results. Dennis Holstein and John Tengdin, members of SC34TF01, attended the Berlin meeting and reviewed the results. The next meeting will be in Edinburgh, Scotland following the IEC TC57 WG 10, 11 and 12 meeting. Dennis Holstein and John Tengdin will attend the meeting.

**UTC UPDATE - J. Ingleson**



Nothing new to report. This item will no longer appear on the general agenda. Any items of interest will appear under new business.

***Old Business***

None.

***New Business***

Bob Ryan will making a presentation during the May PSRC meeting on Comtrade. A member was welcomed to the Communication Subcommittee. John Burger

## **I: RELAYING PRACTICES & CONSUMER INTERFACE PROTECTION SUBCOMMITTEE**

**M.S. Sachdev, Chair**

**J.L. McElray, Vice-Chair**

The Relaying Practices and Consumer Interface Protection Subcommittee (Moh Sachdev, Chair) met on September 24, 1997; 35 members and 49 guests were present. Minutes of the Williamsburg, VA meeting were approved as posted on the PSRC and Relaying Practices and Consumer Interface Subcommittee Web sites and copies provided at the meeting. The following Working Groups assigned to the Subcommittee in the reorganized PSRC reported as follows.

### **1. Working Group Reports**

#### **I1: DIFFERENTIAL AND POLARIZING RELAY CIRCUIT TESTING**

**W.J. Marsh, Jr., Chair**

**L. Smith, Vice-Chair**

**Established 1996**

**Output: Revision to IEEE Guide C37.103-1990**

**Expected Completion Date: 1998**

The working group met with 4 members and 5 guests present, copies of the May 1997 Draft 2 were handed out, contributions by Bob Ryan were discussed and Draft 3 will be assembled, corrected and revised by November 15, 1997. Ken Birt has resigned due to change of his assignment at his place of work.

#### **I2 (G2): TERMINOLOGY USAGE REVIEW**

**B.L. Beckwith, Chairman**

**J.D. Huddleston, III, Vice Chairman**

**Established: 1986**

**Output: IEEE Dictionary Updates**

**Expected Completion Date: Continuing**

The working group met with 7 members present. The members discussed the abbreviations for (Ct, CT, ct) and (VT, vt) all of which are correct according to the IEEE. However, the chairman will verify the IEEE dictionary and its definition of the correct abbreviation. The members reviewed a negative ballot from Mike McDonald and revised the document accordingly. The term 'adaptive relaying' was also reviewed.

#### **I3: RELAY PERFORMANCE MEASURING CRITERIA**

**W.M. Carpenter, Chair**

**L. Budler, Vice Chair**

**Established: 1996**

**Output: Special Publication**

**Expected Completion Date: 1999**

The working group met and discussed the mis-operation table. This table represents one of the two major elements in the measuring criteria being prepared. The meeting focused on the definition of an event that is the other major element in the measuring criteria. Agreement was reached on the definition of an event. The agreed upon definition is "The operation of all necessary breakers to isolate an electrical fault including all subsequent automatic or manual reclose operations (and trips if appropriate) or any set of conditions resulting in an unintentional operation of the protective system." Between now and next meeting, the members will begin identifying many of the application/interpretation problems with the prepared measuring criteria. This work will be the basis of our meeting in January 1998.

**I4 (G3): IEC STANDARDS ADVISORY**

**Eric Udren, Chairman**

**M.M. Ranieri, Vice Chairman**

**Established: 1989**

**Output: IEC Standards**

**Expected Completion Date: Continuing**

The working group met to discuss the USA voting position for five new IEC documents, (three committee draft standards and two proposals for new standards). Refer to the IEC Report in the Minutes of the Main Committee.

**I5 (F9): TRIAL-USE STANDARD FOR LOW ENERGY INPUTS FOR PROTECTIVE RELAYS**

**Peter McLaren, Chairman**

**Eric Udren, Vice Chairman**

**Established: 1992**

**Output: Trial-Use Standard**

**Expected Completion Date: 1996**

The working group met in a double session with 7 members and 2 guests in attendance. A variety of works was discussed and several members agreed to specific writing assignments. The working group members will review C37.90.1 on surge withstand capabilities to determine if our work complies with this standard.

**I6 (G1): REVISION OF C37.90 - RELAY ELECTRICAL POWER APPARATUS**

**Mario Ranieri, Chairman**

**James Teague, Vice Chairman**

**Established: 1993**

**Output: Revision of Standard ANSI/IEEE C37.90**

**Expected Completion Date: 1998**

The working group did not meet.

**I7 (E9): ELECTROSTATIC DISCHARGE TESTING FOR PROTECTIVE RELAYS**

**J. Teague, Chairman**

**M. S. Simon, Vice Chairman**

**Established: 1992**

**Output: IEEE Standard C37.90.3**

**Expected Completion: 1998**

The working group met with 5 members and 5 guests present. Comments on Draft 6 were received prior to the meeting. The comments were considered and will be incorporated into Draft 7 along with an appendix on the comparison between the PSRC work on electrostatic discharge testing and the relevant IEC standards. The working group intends to develop a final draft consensus and begin balloting before the January meeting.

**I8 (E10): SURGE WITHSTAND CAPABILITY (SWC) TESTS FOR PROTECTIVE RELAYS**

**J. G. Gilbert, Chairman**

**J. Teague, Vice Chairman**

**Established: 1994**

**Output: IEEE Standard C37.90.1 (revision)**

**Expected Completion: 1998**

The working group met in double session with 7 members and 6 guests in attendance. Both

sessions were devoted to the revision of draft 3b of C37.90.1. The chairman distributed written comments, received from Downs, Burnworth, and Simon; the comments were discussed and draft 3b was revised accordingly. Considerable discussion took place on the use of a capacitor-coupling clamp. During the meeting changes were made to sections 2 through 7. The following assignments were made: Veselin Skendzic - rework Fig. 8 and the associated text, Jeff Gilbert - expand 4.3.4 to clarify differences in test leads for the oscillatory and fast transient tests, Mark Simon - move part of Section 5.4 to a new annex and use figures to clarify identified issues. All assignments are due in October.

#### **I9 (G4): TERMS USED BY POWER SYSTEM PROTECTION ENGINEERS**

**M.S. Sachdev, Chairman**

**B.D. Nelson, Vice Chairman**

**Established: 1990**

**Output: Special Publication**

**Expected Completion Date: 1998**

The final draft was approved by the PSRC officers and was submitted to Dr. Phadke, Vice Chair of PSRC for submission to the IEEE Headquarters. Dr. Phadke submitted the document to the Chairman of PES Technical Council for approval. The document will be submitted to the IEEE Headquarters as soon as an approval is received from the Chairman of the PES Technical Council. A summary paper is being written and should be ready in November for balloting.

Brad requested that he Subcommittee approve simultaneous balloting in the working group and the Subcommittee. This was approved.

#### **I10 (F7): APPLICATION OF CURRENT TRANSFORMERS FOR RELAYING**

**Mark Conroy, Chairman**

**Brad Nelson, Vice-Chairman**

**Established: 1988**

**Output: Guide IEEE/ANSI C37.110-1996**

**Expected Completion Date: 1998**

The working group met with 9 members and 14 guests. The PSRC officers returned the draft of the summary paper submitted for their approval. Stan Zocholl volunteered to rewrite the summary paper. The working group will also make a 30 to 40 minute educational presentation at the January 1998 PSRC Main Committee Meeting.

#### **I19: THE ANALYSIS OF SUBSTATION DATA**

**L. Smith, Chair**

**C. Shank, Vice Chair**

**Established: 1995**

**Output: Special Publication**

**Expected Completion Date: 1999**

The working group met with 5 members and 16 guests in attendance. The outline of the paper and writing assignments were agreed upon for further discussions at the January meeting.

## **2. Task Force Reports:**

### **(a) Relay Service Letter Database, J. Ingleson**

The latest version of the relay-service letter database file has been placed on the Web site of Relaying Practices Subcommittee. This file is available in the dBase (.dbf) and the Excel

(.xls) formats. Both these files can be downloaded from the Web site, that can be reached at the following address.

<http://www.engr.usask.ca/~sachdev/rpncl/>

### **3. Liaison Reports:**

#### **(a) Power Systems Engineering Committee:**

No report.

#### **(b) IAS & I&CPS: A.C. Pierce**

No report was presented.

#### **(c) Instrument Transformer Subcommittee**

- i. C57.13.1 IEEE Guide for Field Testing of Relaying Current Transformers and C57.13.3 IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases: Both guides received unanimous votes for re-affirmation.
- ii. C57.13 Requirements for Instrument Transformers: A proposed draft of a definition for K-class CTs has been received. Changes to Tables 2, 3 and 10 through 14 have been proposed.
- iii. C57.13.6 Requirements for Instrument Transformers for Use with Electronic Revenue Meters and Relays: The PAR was disapproved by NESCOM at its September 1996 meeting. The Working Group will make adjustments and resubmit the PAR.

#### **(d) P420 Control Panels: Cliff Downs.**

No activity to report.

#### **(e) C37.100 Dictionary of Terms, M.S. Sachdev**

The new IEEE dictionary has been published. The IEEE has invited its members, who participate in Standards activities, to become members of the newly formed IEEE Standards Association at a cost of \$10.00 per year. The introductory offer is available up to the end of 1997. The members joining the Association before the end of the year will get free of charge a copy of the dictionary on a CD-ROM that is priced at \$ 175. Those wishing to become a member should contact

**IEEE Operations Center  
Standards Association  
445 Hoes Lane, PO Box 1331  
Piscataway, NJ 0885-1331**

**Tel: 1-800-678-4333 or 1-732-562-3800**

**Email: [ieee-sa@ieee.org](mailto:ieee-sa@ieee.org)**

### **4. Coordinator's Reports:**

#### **(a) P384-NPEC, Standard Criteria for Independence of Class 1E Equipment and Circuits, Munnu Bajpai**

No activity to report.

#### **(b) P827R1-NPEC Ad-Hoc Criteria Safety Systems in Nuclear Plants, C. W. Fromen**

There has been some activity and the coordinator is trying to gain a copy of the report for the January meeting.

**(c) IEEE-765.D5 STD for Preferred Power Supply for Nuclear Power Generator Plants, Munnu Bajpai**

No activity to report.

**(d) T &D Committee**

No report was received.

**5. Old Business:**

No issues were taken up.

**6. New Business:**

4. Two working groups, F8: Digital Simulator Performance Requirements for Relay Testing and I11: Transient Recording Data, have completed their assignments. The Chairman, Moh Sachdev, congratulated Mladen Kozunovic and Jim Bright, Chairs of the Working Groups, and the members of those working groups for a job well done. A motion was made and seconded to disband both working groups.
5. Jim Ingleson presented a proposal to start a new working group to re-visit "A Survey of Relay Test Practices". There have been significant technological advances since the results from the 1991 survey were compiled. Jim Ingleson agreed to chair of this working group.
6. A new Task Force has been formed to investigate whether these two standards need revision due to technological advances in relaying; C57.13.1 IEEE Guide for Field Testing of Relaying Current Transformers and C57.13.3 IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases. Mike Meisinger will be the Chairman of this Task Force.
7. The Chairman reported to the Subcommittee that its name does not reflect properly the activities of its Working Groups. The following Scope prepared by the Vice Chair was presented for discussion.

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

The subcommittee members agreed on the proposed Scope and agreed that this Scope be submitted to the Main Committee for approval.

The Subcommittee invites anyone interested in the two assignments (items 2 and 3) to join either the working group or the task force at the January meeting.

Respectfully submitted,

Moh Sachdev

## **J: ROTATING MACHINERY PROTECTION SUBCOMMITTEE**

P. W. Powell, Chairman

W.P Waudby, Vice-Chairman

The subcommittee met on September 24, 1997 with 8 members and 10 guests present. Minutes of the May 14, 1997 meeting in Williamsburg, Va were approved. The Vice-Chairman discussed briefly the items of interest from the Advisory Committee.

### **J1: REVISION OF C37.106-1987 GUIDE FOR ABNORMAL FREQUENCY PROTECTION FOR POWER GENERATING PLANTS**

3. Benmouyal, Chairman

K. C. Kozminski, Vice-Chairman

Established: 1996

Output: Standard Revision IEEE/ANSI C37.106-1987

Expected Publication Date: Dec 1999

Status: Guide Extended, Draft 2 was reviewed.

The working group met with 8 members and 5 guests. Draft 2 of the revised Guide was reviewed. One major issue, which was raised and needs to be addressed in the Guide, is how turbine blade fatigue damage accumulates for operation at various frequency levels. WG members were asked to review and comment on the revised Guide.

### **J3: REVISION OF C37.96, GUIDE FOR AC MOTOR PROTECTION**

J. Gardell, Chairman

M. Bajpai, Vice-Chairman

Established: 1993

Output: Standard Revision IEEE/ANSI C37.96

Expected Completion Date: 1998

Status: Waiting to ballot.

The working group met briefly with 4 members and 2 guests present. The balloting process has not gone smoothly. John Appleyard volunteered to work with the PSRC Standards Coordinator to move the document through the balloting process.

### **J4: SEQUENTIAL TRIPPING OF GENERATORS**

E. C. Fennell, Chairman

K C. Kozminski, Vice-Chairman

Established: 1993

Output: Transaction Paper

Expected Completion Date: 1996

Status: Paper was presented at the CIGRE meeting in South Africa.

### **J5: IMPACT OF LARGE STEEL MILL LOADS ON GENERATING UNITS**

P. A. Solanics, Chairman

K. C. Kozminski, Vice-Chairman

Established: 1995

Output: Transactions Paper

Expected Completion Date: 1998

Status: Reviewing second draft.

The working group met in single session with 7 members and 12 guests attending. Draft 2 of the transaction paper was discussed, concentrating on the assignments submitted since the last



meeting. Several new assignments were made and are due to the Vice-Chairman by October 31st. The Vice-Chairman will distribute Draft 3 to the Working Group members prior to the January meeting.

### **J11: APPLICATION OF MULTIFUNCTION GENERATOR PROTECTION SYSTEMS**

M. Yalla, Chairman

E. C. Fennell, Vice-Chairman

Established: 1994

Output: Transaction Paper

Expected Completion Date: Sept 1998

Status: Draft #6

The working group met in a double session with 11 members and 11 guests. The meeting concentrated on reviewing the draft, as revised, to resolve three negative ballots. The negative ballots were resolved. Due to the extent of the changes, the WG decided to ballot the Subcommittee and Working Group again.

#### **Liaison Reports:**

##### **8. Energy Development and Power Generation Committee**

No report.

##### **9. Electric Machinery Committee, C. J. Mozina.**

They expressed interested in the Motor Protection Guide and the Impact of Large Steel Mill Loads on Generating Units paper.

#### **Coordination Reports:**

1. **P958-EDPG, Guide for Adjustable Speed Drives**, J. D. Gardell - No report given.
2. **1249-EDPG, Guide for Computer-Based Control Systems for Hydroelectric Plant Automation**, M. S. Sachdev. No report given.
3. **C62.92.3-SPDC, Application Guide for Neutral Grounding of Generator Auxiliary System**, R. W. Haas. Nothing to report.
4. **P408-NPEC, Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations**, K. J. Khunkhun Nothing to report.

#### **Old Business:**

Motor protection tutorial: Chuck Mozina and Al Pierce met with IAS. IAS is interested in helping us develop a tutorial on motor protection. Chuck will get more details on this at the next IAS meeting.

#### **New Business:**

Chuck Mozina will find out if IAS has any issues of concern between the Buff Book and our Generator Protection Tutorial. IPP and small generator protection are two areas of possible concern.

**K SUBSTATION PROTECTION SUBCOMMITTEE**

**S. P. Conrad, Chair  
C. F. Henville, Vice Chair**

The Subcommittee met on 24 September, 1997, with 13 members and 25 guests present. The minutes of the previous meeting in Williamsburg were approved, as recorded

**K1: PROTECTION OF PHASE ANGLE REGULATING TRANSFORMERS.**

**Mohamed Ibrahim, Chair  
Frank Plumptre, Vice Chair  
Established, 1995  
Expected Completion Date: 1998  
Output: Transactions Paper  
Draft 1**

The WG met in two sessions. John Burger made a presentation on Flexible AC Transmission System (FACTS) as applied for phase angle regulating purposes. Two presentations were also made by Mohamed Ibrahim, one on the Interphase Power Controller (IPC) interface to phase angle regulators (PAR), and another on the parallel operation of PAR. Draft 1 of the paper, including all figures was issued. Some sections of the paper were reviewed in the second session. Future assignments were reviewed, with the plan that these be submitted to the Chair by 15 November, 1997. There were 8 members and 16 guests at the meeting.

**K2: TRANSFORMER PROTECTION GUIDE**

**M. P. Sanders, Chair  
R.W. Haas, Vice Chair  
Established: 1991  
Output: Revision of Standard ANSI C37.91  
Expected Completion Date: 1997  
Draft 6**

The working group did not meet in Quebec City.

**K3: TRANSFORMER THERMAL OVERLOAD PROTECTION**

**Carlos Castro, Chair  
S. Zocholl, Vice Chair  
Established 1995  
Expected Completion Date: 1998  
Output: Committee report/Transactions paper  
Draft 2**

The WG met in a double session. During this meeting 4 additional sections of the proposed paper were covered for a total of 8 out of 9 sections.

The existing assignment of the WG calls for describing an adaptive thermal transformer overload protection based on the equations from C57.91-1995, (IEEE Guide for Loading Mineral-oil Immersed Transformers). As the WG investigates these equations more deeply, they find unacceptable accuracies for their use in estimating temperatures. There is an alternate set of equations in

C57.91-1995, but data to use these equations are not readily available. Finally, there are other developing approaches to thermal overload protection that do not use these IEEE C57.91 equations. Many members are of the opinion that these should be included in the paper.

The direction of the WG is to avoid limiting itself to the IEEE equations (as the assignment states) but to include and briefly describe all practical approaches to adaptive thermal protection including their advantages and disadvantages. The possible need for WG assignment revision will be discussed next meeting.

The following four new members were welcomed to the WG:- Linden Pierce (IEEE Transformer Committee, coordinator to K3), Josi Lums Pinto de Sa, (Instituto Superior Tecnico), Portugal, Clare Duffy (GEC Alstom), and, Michael Thompson (Basler Electric). 19 members and 19 guests attended the meeting.

- K4: BUS PROTECTION GUIDE**  
**S.P. Conrad, Chair**  
**R.W. Haas, Vice Chair**  
**Established, 1983**  
**Output: Revision of Standard ANSI C37.97**  
**Expected Completion Date: 1997**  
**Standard complete, awaiting publication**

The WG did not meet in Quebec City.

- K5: NETWORK TRANSFORMER PROTECTION GUIDE**  
**C. R. Sufana, Chair**  
**J. J. Horwath, Vice Chair**  
**Established, 1994**  
**Output: Revision of Standard ANSI C37.108**  
**Expected Completion Date: 1999**  
**Draft 3**

The majority of time spent during this session was devoted to the discussion of the connection of co-generation to either side of the network protector on the feeder connected to the transformer high side. Correspondence from Jock Moffat of Cutler Hammer was discussed. Also discussed was "IEEE Standard Requirements for Secondary Network Protectors" (C57.12.44), and Steve Grier's draft regarding co-generation. 10 members and 3 guests attended the meeting.

A working group Web page has been established at the URL <http://www.ucm.com/mark/psrc>. To access the latest draft of the WG revised standard, choose the C37.108 area from the Web page. This page is presently being tested by WG members. A link to the PSRC Home page will be established when the WG members have proven the robustness of the page.

- K6: SHUNT CAPACITOR PROTECTION GUIDE**  
**C. J. Cook, Chair**  
**S. R. Chano, Vice Chair**  
**Established, 1994**  
**Output: Revision of Standard ANSI C37.99**

**Expected Completion Date: 1999**  
**Draft 5**

The WG met in a double session to discuss various revisions to the guide. Draft 4A of section 6, and draft 5 of Section 7 were handed to members of the WG for review. During the meeting, Pratap Mysore gave a presentation related to unbalance protection on fuseless banks, negative sequence and phase instantaneous overcurrent relays. A complete version of the draft should be sent to all WG members by Chairman Cook no later than November 1, 1997.

Due to a change in job duties, Carey Cook will no longer be able to continue to chair this WG. Starting January 1998, Simon Chano will become the Chair and Gerry Fenner will be vice chair. The Substation Protection Subcommittee greatly appreciates the efforts of Carey to develop the revisions to this standard over the last several years.

- K9: RELAY TRIP CIRCUIT DESIGN**  
**D.C. Dawson, Chair**  
**J. Gosalia, Vice Chair**  
**Established, 1988**  
**Output: IEEE Special Publication**  
**Expected Completion Date: 1998**  
**Balloting complete**

This WG did not meet in Quebec City. The proposed special publication is complete except for some revisions required to the figures. The document will then be sent to the PSRC secretary for transmittal to the Chairs of the PES Technical Council and the PES Publications Department for publication.

- K13: SERIES CAPACITOR BANK PROTECTION**  
**A.F. Elneweih, Chair**  
**F.P. Plumptre, Vice Chair**  
**Established, 1993**  
**Output: IEEE Special publication**  
**Expected Completion Date: 1998**  
**Balloting complete**

The WG did not meet in Quebec City. The PSRC officers approved sending the draft to PSRC main committee members for comments of substance. The draft was sent to all Main Committee members at the end of August, 1997. Only a few editorial comments were received. The Chair will wait a few more weeks to see if any late comments come in. If there are no comments requiring further working group discussion, the final draft will be sent to the Secretary of the PSRC (by 15th October, 1997) for transmittal to the PES Publications Department. A draft summary paper will be discussed at the next meeting.

- G7: STANDARD FOR INVERSE TIME OVERCURRENT CHARACTERISTICS.**  
**Gabriel Benmouyal, Chair**  
**Mike Meisinger, Vice Chair**  
**Expected Completion Date: 1997**  
**Output: New IEEE Standard C37.112-1996**

**"IEEE Standard Inverse Time Characteristic Equations for Overcurrent Relays"  
Complete**

The WG did not meet in Quebec City. The summary paper has been balloted by the WG members and the Subcommittee and one negative ballot will be resolved by the end of October, 1997. The summary paper will then be sent to the PSRC Vice Chair for publication in the IEEE Transactions on Power Delivery. Having completed the summary paper, the WG has completed its work and is now disbanded.

- 118: GUIDE FOR PROTECTIVE RELAYING OF UTILITY CONSUMER INTERFACE.  
Irwin Hasenwinkle, Chair  
Fred Griffin, Vice Chair  
Expected Completion Date: 1998  
Output: Revision of ANSI Standard C37.95  
Draft 2**

The WG did not meet in Quebec City.

**Liaison Reports**

**1. Transformer Committee, J.D. Huddleston III**

No report.

**2. Performance and Testing of HVDC Transmission Systems, P-1030.1, P-1030.2, and P-1030.3, R.E. Hart**

Nothing to report. WG 15.05.06 did not meet at the 1997 PES Summer meeting in Berlin, Germany.

**Coordination Reports**

**1. ANSI/IEEE Switchgear Standards C. F. Henville**

As of January 1998, Charlie Henville will no longer provide PSRC coordination for these three standards. In future, coordination for these three standards will be provided by Frank Plumptre.

**4. ANSI/IEEE Standard C37.20.2 Standard for Metal-Clad Switchgear.**

A ballot was received for Draft 7 of this revised standard. Since the document was the same draft that the PSRC coordinator had previously provided comment, the coordinator provided a negative ballot with the same comments as previously provided.

**5. ANSI/IEEE Standard C37.20.3 Standard for Metal-Enclosed Interrupter Switchgear.**

This standard is awaiting approval of a new PAR from IEEE Standards Board. It is hoped that coordination will be achieved for any revision work done on this standard.

**6. C37.100.1, Common Requirements for IEEE Power Switchgear Standards**

Altitude correction factors are still an area of intense controversy. The first common clause document is expected to be out for ballot by February, 1998.

**2. Transformer Committee, Project C57.119, Recommended Practice for Performing Temperature Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Rating. J.E. Stephens**

A ballot of the final draft has been approved. The standard has been sent to the Standards Board for their consideration at their December 1997 meeting.

**3. PC62.91-SPD, Revision of IEEE 32 Requirements, Terminology, and Test Procedures for Neutral Grounding Devices, D.C. Dawson.**

A reaffirmation ballot on the existing standard was conducted this spring, but the results have not yet been announced. Preparation of the first draft of the revision is in progress.

**4. C37.66 Requirements for Capacitor Switches for Ac Systems, C. Cook.**

No report. Carey Cook is no longer able to provide coordination for this standard. Simon Chano agreed to provide PSRC coordination instead.

**5. P1375 Guide for the Protection of Large Stationary Battery Systems, T. E. Weidman**

No report.

***Old Business***

None.

***New Business***

The scope of the Subcommittee was reviewed in the light of recent reorganization of the PSRC. The new agreed upon scope which was submitted to the PSRC for approval reads as follows:

“Evaluate and report on methods used in protective relaying of substations and the consumer or independent power producer, associated equipment and performance of these protection systems. Develop and maintain relaying standards which relate to this equipment and the utility consumer interface.”

Dave Blackburn has resigned from the Subcommittee. Steve Conrad expressed the Subcommittee's thanks for all the years of help that Dave has provided to the work of the Subcommittee.

This was the last meeting to be chaired by Steve Conrad. Starting in January 1998, the new chair will be Charlie Henville, and the new vice chair will be Simon Chano.

Bill Feero presented the reason for review of the underwriters Laboratory document UL 1741 "The First Edition of the Standard for Static Inverters and Charge Controllers for use in Photovoltaic Power Systems". It was agreed to form a task force to review this document and to provide comments to the Subcommittee and the Main Committee by, or at the January meeting of the PSRC