IEEE / PES Transformers Committee Meeting

October 18, 2007
Minneapolis, Minnesota USA

Unapproved Minutes

Minutes and information available on the Committee Website:

www.transformerscommittee.org
IEEE/PES TRANSFORMERS COMMITTEE MEETING  
Minneapolis, Minnesota  
October 18, 2007  

ATTENDANCE SUMMARY  
Main Committee Meeting Attendees at the Fall 2007 Meeting

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Stiegemeier, Craig: CM
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Thierry, Juan Luis: AP
Thompson, Jim: CM
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Tillman, Robert: AP
Tolbert, George: AP
Traut, Alan: CM
Tuli, Subhash: CM
Vailoor, Vasanth: II
Valdemar, Julio: II
Verner, Jane Ann: CM
Vogel, Herman: AP
Wagenaar, Loren: CM
Wallach, David: CM
Wang, Patrick: II
Wicks, Roger: AP
Yu, Jennifer: II
Yule, Kipp: CM
Zhao, Peter: CM

CODE KEY
II Interested Individual
II - LM Interested Individual - IEEE Life Member
AP Active Participant
AP - LM Active Participant - IEEE Life Member
CM Committee Member
CM - LM Committee Member - IEEE Life Member
CM - EM Committee Member - Emeritus Member
IEEE/PES TRANSFORMERS COMMITTEE MEETING
Minneapolis, Minnesota
October 18, 2007

MEMBERSHIP SUMMARY

Transformers Committee Members as of the Fall 2007 Meeting

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IEEE/PES TRANSFORMERS COMMITTEE MEETING
Minneapolis, Minnesota
October 18, 2007

MEMBERSHIP SUMMARY
Transformers Committee AM System Roster as of the Fall 2007 Meeting

Abdulsalam, Sami - II
Abi-Samra, Nick - II
Adusei, Frank - II
Aguirre, Samuel - AP
Aho, David - CM
Ahrens, Paul - II
Ahuja, Raj - AP
Aikens, Thomas - II
Alfonso, Nelson - AP
Allan, Dennis - CM
Allaway, Dave - II
Allen Jr, William - II
Allen, Jerry - II
Allen, Jerry - AP
Allustiarti, Raymond - CM - EM
Alves, Marcos - II
Alymann, Melidia - II
Amaya, Edison - II
Amos, Richard - AP
An, Joy - I
Anderegg, Don - AP
Anderson, Gregory - CM
Anderson, Thomas - II
Andersson, Sten - II
Angell, Don - AP
Antoran, Javier - II
Antosz, Stephen - CM
Antweiler, Jim - AP
Ares, Ignacio - CM
Aresteanu, Viorika - II
Armstrong, James - II
Arnold, James - CM - EM
Arnold, Thomas - II
Aromin, Venzon - AP
Arpino, Carlo - AP
Arteaga, Javier - CM
Asano, Roberto - II
Ashby, Derek - II
Ashford, Mark - II
Astileford, John - AP
Aubin, Jacques - CM - LM
Austin, Peter - II
Avelino, Paulo - II
Averitt, Ralph - II
Ayala, Wilington - II
Ayers, Donald - CM
Azcarraga, Carlos - II
BAE, Yang Ho - II
Baldauf, Joao - II
Baldauf, John - II
Ballard, Donald - AP
Ballard, Jay - AP
Balma, Peter - CM
Bandra, David - II
Baqueiro, Fernando - II
Baranowski, Derek - AP
Barker, Ron - CM
Barnard, David - CM
Barnes, Michael - CM
Barnett, Darren - II
Barrett, Christine - II
Barrientos-Torres, Israel - AP
Barrington, Gary - II
Bartek, Allen - AP
Bartels, Terry - II
Bartley, William - CM
Bartnikas, Ray - AP - LM
Basel, Dana - II
Bassett, Thomas - CM
Bastarache, Daniel - II
Basu, Bikash - AP
Bates, Danny - II
Baumgartner, Christopher - II
Baumschlager, Rainer - II
Baur, Martin - AP
Beaster, Barry - CM
Beauchemin, Claude - II
Beauchemin, E. - II
Beck, Scott - II
Beckman, Stephen - AP
Beckwith, Thomas - II
Bell, Clarence - II
Bello, Oscar - II
Benach, Jeff - AP
Benson, Richard - AP - LM
Berler, Zalya - AP
Bertolini, Edward - II
Berube, Jean-Noel - II
Betancourt, Enrique - AP
Bibles, Mason - II
Binder, Wallace - CM
Bittner, Carlos - AP
Blackburn, Gene - CM
Blackmon, Jr., James - AP
Blake, Dennis - II
Blew, David - CM
Boettger, William - CM
Boje, George - II
Bolliger, Alain - AP
Boman, Paul - AP
Bonecutter, Thayer - II
Bonmann, Dietrich - II
Borm, Al - II
Borowitz, James - II
Borst, John - CM
Bostic, David - II
Bottici, Michael - II
Brady, Catherine - II
Brady, Ryan - II
Brafa, J.D. - II
Branco, Dennis - I
Bray, Frank - AP
Breckenridge, Thomas - II
Bredebeam, Troy - II
Bredder, David - AP
Breytenbach, Richard - AP
Britton, Jeffrey - AP
Bronzeado, Herivelto - II
Brown, Kent - AP
Brown, Steven - II
Brunet, Pierre - II
Brush, Edwin - AP
Buchanan, Paul - CM
Buckmaster, David - II
Burns, Clayton - II
Burns, David - AP
Busch, Michael - II
Bush, Carl - AP
Busot, David - II
Cai, Jim - AP
Califano, Jeremy - II
Callihan, Thomas - CM
Camp, Clyde - II
Campbell, James - II
Cancino, Alvaro - AP
Cannon, Michael - II
Cantrell, Rick - AP
Caples, Greg - II
Cargol, Tim - II
Carhart, Peter - AP
Carlos, Arnaldo - AP
Carpes, Lucio - AP
Carulli, Josep - AP
Caruso, Charles - AP
Carvalho, Carlos - I I
Cash, Donald - LM
Caskey, John - AP
Castellanos, Juan - AP
Caychoa, Carlos - I I
Ceglia, Matthew - I I
Chang, Chiaha - I I
Cheatham, Jonathan - AP
Cheim, Luiz - I I
Chen, Yu - I I
Chen, Yunxiang - AP
Cherry, Donald - AP
Cheung, Joseph - I I
Chigiri, Takeshi - I I
Childs, Scott - I I
Chisholm, Paul - AP
Chiu, Bill - CM
Chmiele, Frank - AP
Cho, Justin - AP
Choi, Kang - I I
Choiniski, Scott - AP
Christini, J. Mark - AP
Chu, Donald - CM
Citalan Perez, Roger - I I
Clairborne, C. Clair - AP
Clark, Colin - I I
Clarke, Peter - I I
Coffeeen, Larry - AP
Colopy, Craig - CM
Comely, Tracy - AP
Connell, Michael - I I
Cooley, Ken - I I
Cooper, Jeffrey - I I
Cooper, Tommy - CM
Corel, Dale - I I
Corkran, Jerry - CM
Corsi, Domenico - AP
Cosse Jr, Roy - I I
Costa, Florian - AP
Costa, Ivan - I I
Cote, Jacques - I I
Cox, Philip - I I
Craig, Douglas - I I
Cranganu-Cretu, Bogdan - I I
Craven, Michael - AP
Cross, James - I I
Crotty III, John - CM
Crouse, John - CM
Cui, Yuan Zhong - I I
Culhane, Michael - I I
Cultrera, Joseph - I I
da Silva, Luiz Otavio - I I
Damico, Frank - CM
Daniels, Timothy - I I
Darby, John - I I
Darovny, William - CM
Darwin, Alan - CM
Daubert, Ronald - CM
Davis, Eric - CM
Davis, Larry - CM
Davydov, Valery - AP
de la Cruz, Dan - AP
Declercq, Jan - I I
Degener, Robert - CM
Del Fiacco, Gene - I I
Del Rio, J. Artoo - AP
Del Vecchio, Robert - I I
dela Houssaye, Kevin - CM
DeRouen, Craig - I I
Desrosiers, Daniel - I I
Dietrich, William - I I
Digby, Scott - I I
Dighe, Ramesh - I I
Dix, Larry - CM
Djurdjevic, Ksenija - I I
Dohnal, Dieter - CM
Doody, Bill - I I
Dorris, Don - AP
Dotson, Randall - I I
Doutreleptont, Alexandre - I I
Drees, Terry - I I
Drexler, Charles - AP
Duart, Jean-Claude - I I
Dubiel, Ray - I I
Duckett, Don - CM - LM
Dudley, Richard - CM
Dugas, Denis - I I
Dukarm, James - AP
Dumas, Beth - I I
Dunkin, Robert - I I
Dunn, James - I I
Duval, Michel - I I
Edds, Michael - I I
Ede, David - I I
Elder, Lonnie - I I
Elliott, Fred - CM
Ellis, David - I I
Ellis, Keith - CM
Epping, Patrick - I I
Erkan, Yavuz - I I
Espindola, Marco - I I
Fairiss, James - AP
Faison, Cleveland - I I
Falcone, Eugenio - I I
Fallon, Donald - CM
Family, Girija - I I
Farooqui, Adnan - I I
Faulkenberry, Michael - AP
Fausch, Reto - AP
Feghali, Pierre - CM
Felber, Michael - I I
Fernandes, Tania - I I
Ferreira, Marcos - CM
Field, Norman - AP
Filer, Douglas - AP
Fishel, Robert - I I
Fitzgerald, Joseph - I I
Flamand, Jacques - I I
Fleeman, Jeffrey - CM
Flekke, Patricia - I I
Foda, Rabiz - I I
Foldi, Joseph - CM - LM
Foley, Jefferson - I I
Forrest, George - AP
Forsyth, Bruce - CM
Fortin, Marcel - CM
Foster, Derek - CM
Foster, Mary - I I
Fradkin, Yurii - I I
Franchek, Michael - CM
Fridman, Harry - I I
Frimpong, George - AP
Galbraith, Shawn - AP
Galloway, Dudley - CM
Gamane, John - I I
Gamboa, Josi - I I
Gamel, Carlos - I I
Ganser Jr., Robert - I I
Ganser, Robert - AP
Gao, Zhi - I I
Garcia, Benjamin - I I
Garcia, Eduardo - AP
Garcia, Patricio - I I
Garcia, Ramon - AP
Garcia-Colon, Vicente - I I
Gardner, James - CM
Garner, Charles - AP
Garmitzchnig, Andreas - AP
Garza, Joseph - AP
Gauthier, John - I I
Gaytan, Carlos - CM
Gerth, Juergen - AP
Gervais, Pierre - I I
Getson, Douglas - AP
Ghafoorain, Ali - CM
Ghosh, Prodip - I I
Ghosh, Saurabh - AP
Gianakouros, Harry - I I
Gibson, Wayne - I I
Gifford, Ian - I I
Gilbert, Ian - I I
Gilbert, Norbert - I I
Gilbertson, John - I I
Gill, Geoffrey - I I
Gill, Jesse - I I
Gilleland, Harley - AP
Yuasa, Sadayuki - I I
Yule, Kipp - CM
Yute, Douglas - AP
Zappetillo, Anthony - I I
Zarmandily, Hassan - I I
Zhang, Jim - AP
Zhang, Shibao - AP
Zhao, Peter - CM
Zhong, Juntao - I I
Zhu, Hanxin - I I
Zingl, Reinhold - I I
Ziomek, Waldemar - CM
Zito, Anthony - I I
Zouaghi, Abderrahmane - I I

Membership Code
CM
Committee Member

CM - EM
Committee Member - Emeritus
Member

CM - CM
Committee Member - Corresponding
Member

CM - LM
Committee Member - IEEE Life Member

AP
Active Participant

I I
Interested Individual
IEEE/PES TRANSFORMERS COMMITTEE MEETING
Minneapolis, Minnesota
October 18, 2007

ATTENDANCE SUMMARY
Committee Members and Guests Present at the Fall 2007 Meeting

Ahuja, Raj: AP
Alfonso, Nelson: AP
Allaway, Dave: I I
Allen, Jerry: I I
Amos, Richard: AP
Anderegg, Don: AP
Anderson, Gregory: CM
Antosz, Stephen: CM
Antweller, Jim: AP
Aromin, Venzon: AP
Arpino, Carlo: AP
Arteaga, Javier: CM
Ayers, Donald: CM
BAE, Yang Ho: I I
Ballard, Jay: AP
Balma, Peter: CM
Baranowski, Derek: AP
Bartek, Allan: AP
Bartley, William: CM
Bartnikas, Ray: AP - LM
Basu, Bikash: AP
Beaster, Barry: CM
Beauchemin, Claude: I I
Beck, Scott: I I
Beckwith, Thomas: I I
Benach, Jeff: AP
Benson, Richard: CM - LM
Berler, Zalya: AP
Bertolini, Edward: I I
Berube, Jean-Noel: I I
Betancourt, Enrique: AP
Bibbles, Mason: I I
Binder, Wallace: CM
Blackburn, Gene: CM
Blackmon, Jr., James: AP
Boman, Paul: AP
Botti, Michael: I I
Brady, Ryan: I I
Branca, Dennis: I I
Brown, Kent: I I
Brush, Edwin: AP
Bush, Carl: AP
Cai, Jim: I I
Callsen, Thomas: CM
Campbell, James: I I
Cancino, Alvaro: AP
Cantrell, Rick: AP
Carhart, Peter: I I
Carlos, Arnaldo: AP
Caskey, John: AP
Castellanos, Juan: AP
Ceglia, Matthew: I I
Cheatham, Jonathan: AP
Chérim, Luiz: I I
Chen, Yunxiang: AP
Chen, Yu: I I
Cherry, Donald: AP
Chisholm, Paul: AP
Chiu, Bill: CM
Chmiel, Frank: AP
Choinski, Scott: AP
Chu, Donald: CM
Clalburge, C. Clair: AP
Coffeeen, Larry: AP
Colopy, Craig: CM
Connell, Michael: I I
Cooper, Tommy: CM
Cooper, Jeffrey: I I
Corei, Dale: I I
Corkran, Jerry: CM
Costa, Ivan: I I
Craven, Michael: AP
Crouse, John: CM
Cui, Yuan Zhong: I I
Cultrera, Joseph: I I
Damico, Frank: CM
Daniels, Timothy: I I
Darby, John: I I
Darovny, William: CM
Darwin, Alan: CM
Davis, Larry: CM
Davis, Eric: CM
de la Cruz, Dan: AP
Degeneff, Robert: CM
Del Rio, J. Arturo: I I
dela Houssaye, Kevin: CM
Desrosiers, Daniel: I I
Dix, Larry: CM
Dorris, Don: AP
Drees, Terry: I I
Drexler, Charles: AP
Duckett, Don: CM

Dudley, Richard: CM
Dukarm, James: I I
Dumas, Beth: I I
Dunn, James: I I
Duval, Michel: I I
Elliott, Fred: CM
Ellis, Keith: CM
Fairris, James: AP
Fallo, Donald: CM
Farooqui, Adnan: I I
Faulkenberry, Michael: AP
Feghali, Pierre: CM
Felber, Michael: I I
Fernandes, Tania: I I
Field, Norman: AP
Filer, Douglas: AP
Flekkie, Patricia: I I
Foley, Jefferson: I I
Forsyth, Bruce: CM
Fortin, Marcel: CM
Foster, Derek: CM
Franchek, Michael: CM
Galbraith, Shawn: AP
Gao, Zhi: I I
Garcia, Eduardo: AP
Garcia, Patricio: I I
Garcia, Benjamin: I I
Gardner, James: CM
Garner, Charles: AP
Garza, Joseph: AP
Gaytan, Carlos: CM
Ghafourian, Ali: CM
Ghosh, Prodipto: I I
Gillen, Nathaniel: I I
Girgis, Ramsis: CM
Glass, Bryan: I I
Gomez, Rolando: I I
Gomez-Hennig, Eduardo: AP
Gonzalez de la Vega, Jorge: AP
Goodwin, David: AP
Graham, James: AP
Graham, Richard: CM
Graham, John: CM
Griesacker, Bill: CM
Grimand, Aurelien: I I
Gromlovits, Mark: AP
CODE KEY

I I    Interested Individual
I I - LM Interested Individual - IEEE Life Member
AP    Active Participant
AP - LM Active Participant - IEEE Life Member
CM    Committee Member
CM - LM Committee Member - IEEE Life Member
CM - EM Committee Member - Emeritus Member

Sampat, Mahesh: CM
Sandhu, Surinder: AP
Sarkar, Subhas: AP
Sauzay, Mathieu: I I
Scaquetti, David: I I
Scarborough, Mark: I I
Schuette, Christoph: AP
Schweiger, Ewald: AP
Sestito, John: AP
Shekelton, James: CM
Shhteyh, Ibrahim: CM
Shull, Stephen: CM
Sim, H. Jin: CM
Simmons, Charles: I I
Simoes, Joaquim: I I
Simpson, Jr., R.: AP
Smith, Edward: CM
Snyder, Steven: CM
Soltyszewski, Tomasz: I I
Spitzer, Thomas: CM
Stahara, Ronald: CM - LM
Stankowski, Krzysztof: I I
Stein, John: I I
Steineman, Andrew: AP
Stem, Gregory: I I
Stensland, Leonard: CM - EM
Stiegemeier, Craig: CM
Sullivan, John: CM - LM
Sullivan, Christopher: I I
Sundin, David: I I
Sweetser, Charles: AP
Swinderman, Craig: CM
Tellez, Richard: I I
Termini, Giuseppe: CM
Thierry, Juan Luis: AP
Thompson, Jim: CM
Thompson, Robert: CM
Thoren, Stefan: I I
Tillman, Robert: AP
Todd, Brett: AP
Tolbert, George: AP
Tong, Lin: AP
Tostrud, Mark: I I
Traut, Alan: CM
Tridon, Florence: AP
Trummer, Edgar: CM
Tuli, Subhash: CM
Vailoor, Vasantha: I I
Valdemar, Julio: I I
Vedante, Kiran: I I
Verner, Jane Ann: CM
Vir, Dharam: AP
Vogel, Herman: AP
Wagenaar, Loren: CM
Wallach, David: CM
Wang, Patrick: I I
Ward, Barry: CM
Weatherbee, Eric: I I
Websper, Richard: I I
Werelius, Peter: I I
Wicks, Roger: AP
Wilks, Alan: CM
Williams, Randy: AP
Xu, Shuzhen: AP
Xu, Yan: I I
Yu, Jennifer: I I
Yule, Kipp: CM
Zhang, Jim: AP
Zhang, Shibao: I I
Zhao, Peter: CM
Zhong, Juntao: I I
Zhu, Hanxin: I I
Ziomek, Waldemar: CM
Zito, Anthony: I I

IEEE/PES Transformers Committee Main Minutes
Fall 2007
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Forward
The following message was sent by Don Fallon to all meeting registrants and posted on the Transformers Committee website prior to the Fall 2007 Meeting.

Information for all Attendees – IEEE Transformers Committee Meeting, Spring 07
IEEE Patent Requirements for Standards Development Meetings

As discussed during the last several meetings, the Committee continues to be aware of IEEE requirements related to the possibility of inclusion of patents in IEEE Standards. The instances are expected to be rare, and subject to specific review and guidelines. Detailed information on this subject can be found in IEEE website locations listed below. Of present concern to Committee work is the requirement that, at every standards development meeting, a request be made for disclosure of any patents or patent applications any individual believes may be essential to the implementation of the standard. The request, per present IEEE guidelines, is to be made at each WG Meeting, and any responses provided are to be recorded in Meeting Minutes. Positive responses will also prompt a request for documentation on the patent to be supplied to IEEE.

IEEE Instructions for WG Chairs are found on the following 3 slides, available at IEEE web location (http://standards.ieee.org/board/pat/pat-slideset.ppt)

Our WG Meetings are relatively short, and taking the time for the required “call” for patents presents a hardship in our schedule. In order to minimize the impact on WG Meetings, while meeting the intent of the IEEE guidelines, these notes and slides are being provided on the Committee’s website, and all meeting participants are encouraged to review. With this preparation the announcement at WG Meetings, per the following slides, should take no more than a few minutes. For any questions, refer to the following websites, or contact one of the Committee officers.

(http://standards.ieee.org/guides/bylaws/sect6-7.html#6) – Note Clause 6 - Patents
(http://standards.ieee.org/board/pat/guide.html) – Understanding patent issues

Don Fallon, Chair       Tom Prevost, Vice Chair       Ed Smith, Secretary

See Attachment “G” for charts covering the IEEE Patent Requirements for Standards Development Meetings
1.0 Chair’s Report – D. J. Fallon

1.1 PES General Meeting Notes

The PES General Meeting was held in Tampa FL this summer from June 25-28. The Transformers Committee was represented at PES Administrative meetings by Tom Prevost and myself. Ken Hanus and Jin Sim, as our most recent Committee Past Chairs, also attended and participated in the PES General Meeting. Committee representative Robyn Taylor attended the Technical Committee Advisory Board (TCAB), a group assembled to provide direct input on Technical Committee views and concerns to PES President John McDonald. Tom Prevost chaired presentations at two Paper Sessions sponsored by the Committee.

The schedule for upcoming PES General Meetings is as follows:

- 2008: July 20-24 in Pittsburgh, Pennsylvania
- 2009: July 26-30 in Calgary, Alberta, Canada

PES Conference & Exposition (CE) schedules:

- 2008: Int. Conference on Power Technology (POWERCON), Oct. 12-15 in New Delhi, India (Co-sponsored by PES)

PES Joint Technical Committee Meeting (JTCM) schedules:

- January 7-10, 2008 in San Antonio, Texas (http://www.pestechnical.org/)

The JTCM schedule has been set up by PES as a winter venue for 3 days of meetings, allowing Technical Committees to schedule individual meetings as needed. Coordination of schedule with PES as early as possible will help assure that room can be found for requested meetings, and our Committee’s activity leaders (SC and WG Chairs) are encouraged to consider making use of these venues if they might allow projects to proceed more effectively between our meetings. To set up participation in these sessions for our Committee, contact should be made with the PES Technical Council (through our Committee officers) and directly with PES meetings coordinator John Paserba (j.paserba@ieee.org).

Additional information on any of the above meetings can be found on the PES website at (http://www.ieee.org/portal/site/pes/)

Technical Committees are encouraged to make more effective use of the PES monthly newsletter as a means to provide greater exposure for their activities. Submissions will be considered for publication in virtually any area Committees choose (e.g. pictures, meeting summaries, significant projects completed, awards, etc.).

The Plenary Session topic at the General Meeting was “Keeping the U.S. Transmission System Reliable - National, Regional and State Perspectives.” and included discussion the following essential priorities necessary for reliability enhancement:

- Adherence to mandatory reliability standards
- National interest Transmission Corridors
- Transmission Database identifying and recording availability for all circuits
- Uniform synchronized monitoring of system parameters across interconnection borders
- Maintaining engineering talent to keep the Grid operating
1.2 PES Technical Council Activities

The Technical Council met at the PES GM on June 26. Items of note from the meeting follow:

1.2.1 Transformers Committee Technical Council Agenda Items

Prior to the PES Meeting, Technical Committees were requested to provide items of concern for possible discussion at the Technical Council meeting. Excerpting from the Transformers Committee’s 6/12/07 response, the following items were proposed for discussion:

From the Transformers Committee’s perspective there are two items of concern that we’d like to make the PES Technical Council aware of for the upcoming Meeting in Tampa:

(a) Technical Committee Coordination and Liaison Issues - As a first item, we agree there is need for discussion of the concerns related to Coordination and Liaison activities between Technical Committees, as expressed by Mr. Om Malik in his 6/7/07 message. Each situation is different; we have cases where coordination intended by two Technical Committees never quite materialized in a manner that was acceptable to both Technical Committees, resulting in some significant delays to project work. The Committees are working together to keep the projects moving, but the experience does perhaps point out the need for possible process guidelines and Technical Council oversight of liaison and coordination activities needed to allow specific standards projects to stay on track and on schedule.

(b) IEEE Editorial Support Needs - The second item has to do with making sure we do all we can to facilitate and enable our standards development volunteers by keeping administrative and editorial tasks to a minimum and allowing them to concentrate on the technical content of the standards documents they are responsible for. The Transformers Committee acknowledges with great appreciation the support provide by IEEE Staff both to respond to particular items of concern within our Committee and to develop and improve processes that do facilitate our work; at the same time we feel that consideration should be given to additional editorial support needs from IEEE. We are in ongoing discussion with our IEEE liaisons on this issue – and we do owe them more specifics – but we feel it appropriate in the context of the Technical Council Agenda request to bring this item up. A brief statement of this concern, as expressed in our Committee Minutes, follows:

Item from Transformers Committee Spring 2007 Minutes:
IEEE Staff was advised at the Administrative SC Meeting that the next major area of concern for which we need to actively work with IEEE is the tremendous burden that the editorial process sometimes turns out to be for our WG Chairs in preparing new and revised documents. Difficulties include:
• Scanning process used to convert standards documents to Word format for use by WG’s in revision leaves much to be desired – many errors must be corrected.
• IEEE present practice of archiving documents for return to WG’s (for next revision) in Word format is very good – but until all documents have gone through this cycle we still will be faced with scanning difficulties.
• PAR submittal and document editing (per the Style Manual) processes can be difficult, as our WG Chairs do not regularly perform these tasks. Additional assistance from IEEE in these processes would be helpful.

The next step is for the Committee to document these concerns in written format to IEEE to initiate further discussion on possible solutions.

The above items were discussed at the Technical Council Meeting, as outlined in Clauses 1.2.6 and 1.2.7.

1.2.2 Technical Committee Representation at Technical Council Meetings

Starting with next year’s meeting in Pittsburgh, Technical Council will be asking for another representative, in addition to the Committee Chair, to represent and participate for each Technical Committee at Technical Council Meetings. This additional representative, essentially acting as a “Committee Technical Council Delegate”, will have an intended term of greater than 2 years. This is intended to provide greater continuity and effectiveness of dialogue between the Committees and Technical Council.
1.2.3 PES Promotion of “Super Sessions” at General Meetings

PES is interested in promoting “Super Sessions”, sessions that expand across Committee boundaries and involve several Committees. Excerpting from a July message from PES Technical Council Vice Chair Rick Taylor:

The planned Super Sessions for the 2008 PES General Meeting are Emerging Technologies, Wind Power, 2020 Vision, Walking Closer to the Edge, and Nuclear Power. The intention for each session is to involve as many technical committees as possible to represent divergent issues associated with these topics. Each TCPC should be examining the activities of their committee to attempt to identify committee reports or possible panel participants as they relate to each topic. In addition, as the paper review process takes place, high value [top 10%?] papers should be identified for inclusion in these sessions where appropriate or for featuring in your committee “high value” sessions.

The first steps in the organizing of these Super Sessions needs to begin now by identifying volunteer coordinators. It would be entirely appropriate for multiple coordinators to work on each session and for individual TCPCs to participate in organizing multiple topics. Coordinators do not have to be TCPCs. Chairs, Vice Chairs or interested individuals are welcomed to provide input and coordination. If you are willing to volunteer, please advise one of the Committee Officers and we will put you in touch with Rick Taylor.

1.2.4 Technical Committee Website “Templates”

IEEE is working on some standardized guidelines for Technical Committee websites. Several existing websites, including our Committee’s website, have been reviewed as part of the effort to determine these guidelines. I commented during this discussion on the advisability of focusing guidelines on suggestions for functional needs, rather than requiring specific sections and formats; this would allow existing working websites (such as ours) to maintain their structure, while providing ideas for potential further improvements.

1.2.5 Re-Structuring of the PES General Meeting

A recommendation has been made to Technical Council to re-structure the PES General Meeting to blend better with Technical Committee meetings. Description of the proposed re-structuring follows:

Re-package the General Meeting to begin on Monday morning, as now, and end Wednesday at noon. In conjunction with the General Meeting would be the semi-annual Joint Technical Committee meeting beginning on Wednesday morning and ending Friday at noon. Registration would be separate, but could include a significantly discounted joint registration fee.

The general meeting would be essentially the same on Monday AM. Administrative meetings would be scheduled into sessions before and after technical sessions, perhaps from 7:30AM-9AM and from 5PM-7PM and into Wednesday AM. General meeting technical sessions would be limited to a certain number of parallel sessions with papers selected based on topic and value. No other official functions would conflict with these sessions. Focus would be on presenting output of the Technical Committees and on the concepts of Super Sessions now being implemented.

For the Technical Committee Meeting starting on Wednesday AM, the Technical committees could choose to have however many paper sessions, poster sessions, etc. as they determine are required/desired. Technical committee participation in these meetings would, of course, be optional, but could include full meetings, targeted meetings, joint meetings with other TCs, or technical presentation sessions only.

We feel this proposal would greatly strengthen the GM program and allow increased focus on relevant and valuable industry issues. If this concept is successful, it may be possible to add a day or day and one-half to the January Joint TC meeting to feature some technical sessions and more joint committee activities.
While the present scheduling of Transformers Committee Meetings does not blend well with scheduling one of our meetings during the mid-summer PES General Meeting, this re-structuring, together with the January Joint Technical Committee Meeting (JTCM), would provide opportunities for specific TF’s or WG’s to meet to continue project progress between our meetings. While I indicated it would be unlikely for the Transformers Committee, as a whole, to meet during this re-structured General Meeting format, I did not object to the plan during the discussion. There was no definitive action to change to this new structure; discussion will continue.

1.2.6 Review of Conference Paper Issues

There is ongoing concern with the need to assure high quality presentation papers during Conference sessions. Suggestions included raising standards for Conference papers to essentially the same level as Transactions Papers; allowing for more Poster Sessions to allow one-on-one dialogue with authors; and allowing authors to decide whether they wanted to present their papers (with the more stringent guidelines required for presentation papers). Jim Harlow suggested emphasizing opportunities to present papers at Technical Committee Meetings, thus providing for a larger, more focused audience for relevant papers. There was no resolution; discussion will continue.

1.2.7 Technical Committee Liaison and Coordination Issues

Om Malik of the Electric Machinery Committee initially raised this as an Agenda item for Technical Council discussion, and we supported need for review and guidance on this issue (see Clause 1.2.1). Several additional Committees, including the Switchgear Committee (jointly sponsoring with us the PC57.142 Switching Transients Guide presently in development) also voiced the need for more guidance from PES. Technical Council and PES officers were receptive to the need, but also stressed the use of the existing Liaison process, and contacting the Standards Coordinating Committee (SCC) as needed to see if they can provide assistance in time of need. We need to continue to pursue this issue with Technical Council, but in the meantime should also consider the SCC as a possible source for help.

1.2.8 IEEE Editorial Support Issues

This issue was raised for discussion by our Committee (see Clause 1.2.1), and supported in writing prior to the meeting as a significant concern by the Switchgear, Station Battery, and Substations Committees. During the discussion several other Committees also indicated concerns and serious difficulties related to the time and effort required by technical committee volunteers to respond to editorial issues, and there appeared to be wide agreement among technical committee representatives that IEEE should focus on providing more support in this area, including consideration of providing more editorial staff to remove some of the editorial burden from our volunteer standards developers. While no promises were made, there was indication that both PES and IEEE SA were receptive to this discussion and were reviewing to develop further understanding and potentially make recommendations for improvement.

1.3 Transformers Committee Activities

Progress since last meeting in several areas of concern for the Committee, together with notes of Committee interest, follow:

1.3.1 Coordination and Liaison Activities – Progress on PC57.142

We continue to report on this project in this report simply because it is a project (the PC57.142 Guide to Describe the Occurrence and Mitigation of Switching Transients Induced by Transformer, Switching Device, and System Interaction) that does require a significant amount of coordination with another Committee (Switchgear) and that requirement for coordination has pointed out that such efforts can face unique challenges. As a result of joint discussion and cooperative effort involving Transformers Committee and Switchgear Committee members in September and October of 2006, the decision was made to move forward with this document under joint
sponsorship of both Committees. Work would continue to be guided by the Transformers Committee, as primary sponsor; and in recognition of the crucial and necessary role our colleagues from the Switchgear Committee play in assuring this document meets the needs of our industry, the PAR for this project lists the Switchgear Committee as our joint sponsor. A joint Task Force, with representatives of both Committees, was to prepare the document for ballot. A new PAR for this project was submitted in January of this year, and subsequently approved.

I had the opportunity to meet and discuss with Switchgear Committee leadership (Chair Ted Burse and Vice Chair Bill Long) at the PES General Meeting in June. Ted and Bill had both supported the joint sponsorship concept, and we continued to agree that this was the best way to proceed. I did advise hope that we could move to ballot soon. As of this point in time we have not been able to proceed to ballot. We will review with the WG and TF leadership to determine how best to proceed to get this industry needed guide into publication.

1.3.2 IEEE/IEC Dual Logo Program / References vs. Bibliography

We reported in the Spring of this year that the IEEE/IEC dual logo process seemed to have hit a snag with concerns from several IEC representatives on the submittal of IEEE C57.123 (Guide for Transformer Loss Measurement) for consideration for Dual Logo status. The subject document has references to several other IEEE documents, and there was reluctance to approve as such approval might imply acceptance of the referenced documents also – and these referenced documents had not been subjected to review by IEC. We recognized the concern as possibly valid, and a concern that may apply to virtually any IEEE document submitted, including C57.135 (Phase Shifting Transformer Guide), previously accepted by IEC for dual logo status. We have not proceeded further with changes to the C57.123 document. One suggestion by IEEE is to remove all references to documents that are not essential to implementation of the document from the References Clause and move them to the Bibliography. Unfortunately, if even one IEEE reference document remains, the IEC concern would still apply. We will continue discussion with IEEE to determine how to proceed.

Included here is a report on this concern presented at the recent IEC TC14 Meeting:

At the request of Phil Hopkinson, IEEE was invited by the Chair of IEC TC14 to give a presentation on the IEC/IEEE Dual Logo Agreement. Jin Sim gave the presentation on behalf of the IEEE and Jodi Haasz from the IEEE-SA attended to provide support.

The results of the meeting follow:

- Support for the IEC/IEEE Dual Logo program was split (about 50/50). As for suggestions as to which documents to submit, IEC TC14 would like to make suggestions for documents and not have IEEE suggest the documents.

    In that regard, there was interest in reviewing IEEE PC57.142 for possible incorporation into the revision of IEC 60076-12. The draft was sent to Jodi Haasz for review prior to distribution to IEC TC14; however, the document had no copyright material associated with it and cannot be distributed until the appropriate copyright material is added to the draft.

    Suggestion for moving forward – IEEE-SA staff recommends that IEEE inform IEC TC14 of their standards in progress to see if there is interest from TC14 in those documents. We also recommend establishing a Category D Liaison with the appropriate IEC TC14 working groups to enable this communication.

- References in IEEE standards were a large concern, especially for the French and German delegations.

    Suggestion for moving forward – Standards listed in the references section of a document should only be those that are called out in the body of the standard itself or those that are needed to understand the standard. All other documents should be moved to the Bibliography section of the document.
Another suggestion would be to reference the international standards. If both the IEEE and international standards referenced conflict, the following information can be included in the References clause:

The following referenced documents are indispensable for the application of this standard (i.e., they must be understood and used; therefore, each referenced document is cited in text and its relationship to this standard is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

Where references to both standards are made, users are responsible for specifying the standard they desire, and manufacturers are responsible for specifying the standard they used for their design and testing.

See the IEEE Style Manual for further guidance, specifically Clause 10.4. Clause 22 might also be useful.

- It was mentioned that if IEEE had an idea for a standard, IEC TC14 would be interested in reviewing it and possibly developing it. Therefore, IEC TC14 might favor the joint development of standards instead of the dual logo program.

Suggestion for moving forward—An agreement with IEC is in progress to allow the joint development of standards. Once approved by both organizations, this will provide the template and rules for joint development between the IEEE and the IEC. A Category D Liaison will also better enable this activity.

We will need to have further discussion with IEEE, as this suggestion and guidance comes directly from Clause 10.4.1 of the IEEE Style Manual (repeated below), and is resulting in requirements to move formerly approved references to the bibliography when documents are revised. The concern is that present enforcement of this requirement by IEEE presents additional editorial burden.

Clause 10.4.1 of the IEEE Style Manual:

Normative references are those documents that contain material that must be understood and used to implement the standard. Thus, referenced documents are indispensable when applying the standard. Each normative reference shall be cited, and the role and relationship of each referenced document shall be explained in the body of the standard. If a reference is not specifically cited in the normative text of the document, then it shall not be listed in the normative references clause. In such cases, it shall be listed in the first or final informative annex, entitled Bibliography.

1.3.3 IEEE SA Financial Reporting Requirements

Since last year, IEEE SA has required all “Standards Developing Groups” to complete annual financial reports submitted in an IEEE SA Template (Form L50-S). Our Meetings Planning SC Chair has maintained financial records for the Committee, and has made the effort to modify the financial record spreadsheet he developed to facilitate reporting the Committee budget per the L50-S form. The 2006 financial report, prepared in this manner, has been filed. Based on the ongoing needs for this detail of financial reporting, the Chair feels consideration of a Treasurer’s position for the Committee is appropriate. This topic will be discussed at the Administrative SC Meeting.

1.3.4 C57 Standards CD

The Committee is continuing to review with IEEE our request to make available for purchase an updated edition of the CD-ROM collection of the latest IEEE sponsored Transformer Standards.
1.3.5 Committee Membership

All are welcome to participate in the work of the Transformers Committee. Membership in the Committee provides recognition of your peers and indication to your co-workers and management of your active role in Committee work. If you are presently not a Main Committee Member, and you have been actively participating in our work for at least one full year – and can secure the acknowledgement of at least 3 Activity Chairs (WG’s, but must include at least one SC Chair) affirming that participation, the Committee will look forward to welcoming you as a member. Membership requirements and application forms can be found in the Organization and Procedures Manual posted on the Committee website.

1.3.6 Meeting Agenda Change – New Business

We will continue – on a trial basis - the Agenda changes made in Dallas for both the Administrative SC and Main Committee Meeting. New Business has been moved forward in the Agenda. With New Business in the typical end of meeting timeslot, and with the time spent on other Agenda items, New Business does not always receive the attention it needs. The time spent on ongoing projects is indeed important, as the Committee deals with many standards documents and substantive issues related to the development and maintenance of those documents – and at times it seems our plates are already so full (recognizing we’re all volunteers) that the ability to take on new issues seems limited. Despite this challenge, we also need to provide sufficient time to raise new technical issues and to address planning and strategy on how the Committee should work. The intent, during this trial, will not necessarily be to debate and discuss each new issue fully within the meeting context, but to at least raise issues, discuss significant points, and suggest course of action.

1.3.7 Association Management (AM) System

All Committee members and active participants, and all individuals interested in Transformers Committee activities, are reminded that virtually all communications on Committee meetings and activities are handled through the Committee website (http://www.transformerscommittee.org/) and through electronic media. Contact information is maintained through our Association Management (AM) system, and administration of membership and meeting attendance records is facilitated by the AM System. All Subcommittee and Working Group Chairs are encouraged to use the AM system for assigning membership within their groups and for communication with their group members. All Committee members, active participants, and interested individuals are reminded also that you are responsible personally for maintaining the accuracy of your contact information, through the AM system, for Committee activities and communication. Updating your contact information in handwriting on a meeting roster does not result in updating your Committee contact information. Keeping your contact information maintained in the AM system assures that the Chair of any Subcommittee or Working Group you are involved with will be able to communicate with you. Details on enrolling and maintaining your contact information in the AM system can be found on the Committee website. The AM system also allows you to check the Committee record of your membership status in individual Working Groups, Subcommittees, and the Main Committee. This can be done by checking your Personal Profile, and then clicking on Subgroup Details. If the Committee record does not match your record, please review with the appropriate WG or SC Chair.

1.3.8 Announcements / Acknowledgments

The Committee notes with sadness the passing since our last meeting of two long time friends, colleagues, and contributors to our standards activities – John Ebert and Ed Norton. Both John and Ed started their illustrious careers with Allis Chalmers; John continued his career with Waukesha and Ed continued with EPRI for many years. Both were very active in Committee work, and will be missed by many friends among our ranks.

I will take the opportunity again to tell you how proud I am of the work done by our Participants and Members, and how proud I am to work with each of you in the Committee. Thanks for your support during my tenure as
Chair, and for the work you do to serve our industry. I know you will provide that same support, together with me, for Tom and Ed as they move to Chair and Vice Chair, respectively, in January.

Keep up the good work!

Respectfully submitted,
Donald J. Fallon
Chair, IEEE/PES Transformers Committee
2.0 Approval of Minutes from Spring 2007 Meeting – Donald Fallon

Chair asked that a motion be made to approve the minutes of the Spring 2007 (Dallas, Texas, USA) meeting. A motion was made by Carl Niemann and seconded by Loren Wagenaar to approve the Spring 2007, Dallas minutes. The Minutes were unanimously approved.
3.0 Administrative Subcommittee – Donald Fallon

3.1 Introductions
Introductions were made by members and guests

3.1.1 Members & Guests
The following members of the Subcommittee were present:
Gregory Anderson  Bill Chiu   Richard Dudley
Fred Elliott      Donald Fallon  Ramsis Girgis
Ken Hanus        Thomas Lundquist  Carl Niemann
Donald Platts    Thomas Prevost   Edward Smith (Ed)
Loren Wagenaar

The following members were absent:
Charles Johnson   Richard Ladroga  Jeewan Puri
James Smith (Jim)

The following guests were present:
Jin Sim           Steve Shull     Dan Mulkey
Peter Balma      William Bartley  Wanda Reder
Christina Sahr   Matthew Ceglia

3.2 Meeting Minutes
Review and approval of the unapproved minutes from the Dallas, Texas meeting:
The Dallas meeting minutes were approved as printed. The motion was made by Ken Hanus,
seconded by Carl Niemann. The motion passed with no descending votes

3.3 Agenda Review
IEEE/PES TRANSFORMERS COMMITTEE
ADMINISTRATIVE SUBCOMMITTEE MEETING – AGENDA

Hilton Minneapolis Hotel, Minneapolis, Minnesota USA – Room: Duluth (3rd Floor)
Sunday October 14, 2007 - Call to Order 2:00 pm

1. Introduction of Members and Guests (:05)

2. Approval of Dallas TX Admin SC Meeting Minutes (:05)

3. Additions to and/or Approval of the Agenda (:05)

4. Meeting Arrangements, Host Report, and Committee Finances
  4.1 - F'07 – Minneapolis – S McNelly (:05)
  4.2 - Meetings/Finances - GW Anderson (:10)

5. IEEE Staff – Matt Ceglia, Christina Sahr (:20)
  5.1 - New PAR Process
  5.2 - Continuing Business items, for general discussion by the Admin. SC:
      5.2.1 IEEE Editorial Support
      5.2.2 IEEE/IEC Dual Logo Process

6. Chair’s Report – DJ Fallon (:05)

7. Vice Chair’s Report – T Prevost (:05)

8. Secretary’s Report – Ed Smith (:05)
  8.1 - Membership Review (:10)
9. Standards Report - B Chiu (:30)

10. Break (:10)

11. New Business, Committee Planning (:40)
   11.1 - Proposed Transformer Paralleling Guide, Power Transformers SC-
         T. Lundquist
   11.2 - TF on Tank Rupture – liaison with CIGRE – T. Lundquist
   11.3 - Sponsorship of Furan Testing TF – ILSC, IFSC, or joint – T. Prevost / D. Fallon
   11.4 - Need for PD measurement guides for Bushings and Instrument Xfmrs-
         L. Wagenaar
   11.5 - Responsiveness to WG/SC surveys; impact on membership – L. Wagenaar
   11.6 - Use of available industry resources for standards development work –
         R. Girgis
   11.7 - Definition of Member Classifications – G. Anderson
   11.8 - Financial Reporting Req’mts – Establishment of Treasurer’s position –
         G. Anderson / D. Fallon
   11.9 - PES request for assistance with “Knowledge Management” project – D. Fallon
   11.10 - Recognition – D Fallon
   11.11 - Other

12. Committee Service Awards – KS Hanus (:05)


14. Old Business (:20)
   14.1 - Coordination and Jurisdictional Issues – D. Fallon
   14.2 - Additional Editorial Support from IEEE – need for follow-up work – D. Fallon
   14.3 - Document Issues: Retention; Figures; Surveys – P Balma
   14.4 - Other

Adjourn

3.4 Meeting Arrangements SC
Meeting attendance (preliminary as of October 14, 2007) for Minneapolis is:
   Attendance 385
   Spouses 50
   No Shows (registered and didn’t attend)
   Dallas “walk-up” registration’s
   Sunday Reception 306
   Monday Standards Luncheon
   Tuesday Speaker Luncheon
   Wednesday Dinner Social 189
   Sunday Event Jordan Transformer

Meeting Minutes
IEEE TC Web access key code is (Contact Greg Anderson for key code)

Meeting Finances:
Balance before the “Fall 2005” Memphis, TN meeting $18,793.02
Balance before the “Spring 2006” Costa Mesa, CA meeting $1,729.81
Balance before the “Fall 2006” Montreal, Canada, meeting $17,014.33
Balance before the “Spring 2007” Dallas, TX meeting $17,751.00
Balance before the “Spring 2007” Minneapolis, MN meeting $44,438.59
Future Meetings:
S08 (March 16-20, 2007) – Charlotte, NC, Westin Hotel, hosted by Shaw Electric

Delivery Services
F08 (October 5-9, 2008) - Porto, Portugal ... Hotel Porto Palacio. Expenses $120 URO (single) $140 (double)

S09 (April 19-23, 2009) – Southern part of the US

F09 (October 18–23, 2009) – Location to be determined

Greg pointed out that we had somewhat of a financial problem, (GOOD PROBLEM) our bank balance was getting too high. . . . . Bill Chiu suggested that we offer the Working Group Chairs a free lunch at Monday’s luncheon meeting. Greg also suggested that we needed to market our Committee to more USERS. Greg also suggested we offer any new USER or a USER that hasn’t attended in some time a free meeting registration.

Greg attempted to reviewed the two new membership groups that was added to our membership types that was approved at the Dallas meeting listed in our data base. That discussion was tabled until later under “New Business”.

Everyone should encourage active participants to become a “Transformers Committee” member. Don strongly suggested that the Subcommittee chairs take an active roll in making sure that active members of their Working Groups are encouraged to become Transformer Committee members

3.5 IEEE Staff
Representing IEEE at the Administrative Subcommittee Meetings were
Matt Ceglia
Christina Sahr

Richard Dudley emphasized the importance of, and suggested that the IEEE needed to come up with a Standard Word document template to help facilitate and simplify the Standard Development process. Don Fallon confirmed the importance of this and requested the IEEE to continue to work on this issue.

Matt Ceglia briefly reviewed the “MyProject process for managing and submitting PAR’s.

The NesCom presentation was designed to provide a visual representation of the new NesCom screens available in myProject, and how to use them. The NesCom review process is solely managed through myProject. The submittal of the PAR and the comments discussion on such PAR shall be mitigated in the system

See Attachment “A” for slides presented

Matt commented that the deadline for getting a PAR in for approval at the next NESCg meeting is the end of tomorrow (October 15, 2007)

NESCOM Administrator
Dave Ringle
Manager, Governance – Policies and Procedures
Phone 732.562.3806
e-mail: d.ringle@ieee.org

REVCOM Administrator
Moria Patterson
Phone: 732.562.3809
e-mail: m.patterson@ieee.org
Don Fallon discussed the IEEE IEC Dual Logo Process the documents that are cited in a document (are only those that are included in the documents referenced otherwise the document will be rejected by the editorial staff.

During the review of the RevCom process, it was identified that references have been a significant set back. It was identified by Matt Ceglia that other committee’s try to provide equal citation, by providing IEEE and IEC references where appropriate. In addition, emphasis was raised on the review of normative references, as to the nature of the reference, and also to ensure proper citation is made. If a document is listed in the normative reference clause it must be cited in text. If it is not cited in text, the document can be moved to the bibliography if one exists.

Don pointed out that the last document submitted for the Dual Logo process was rejected by the IEC.

Matt reviewed the IEEE position that a working group document can be distributed to the working group members but NOT guests. Matt felt that there would not be an issue with sharing a document with a IEC member but he wants to get at final ruling beforehe takes a firm stance on this issue

3.6 Chair’s Report – D. J. Fallon
Refer to Section 1.0 for a complete “Chair’s Report”

3.7 Vice Chair’s Report
Refer to Section 4.0 for a complete “Vice Chair’s Report”

3.8 Secretary’s Report – J. Ed Smith

3.8.1 Membership Review
Voting Members – One new member was approved and added at the Dallas meeting:

Marcel Fortin Consultant/Hydro Quebec User

A welcome letter was sent to this new member. Again our aim is to encourage active participation in the work of the committee, and encourage all participants to become members of the committee.

We will continue to encourage and work with all Subcommittee Chairs on a new member sign-up campaign.

Please note that we now have eight (8) member types. The Administrative Subcommittee approved adding two member types in Dallas. Remember the AMS does not consider Interested Individuals as “active members”. Notice that Interested Individuals do not show up in the pie-charts. Note also that this report does not indicate the “Interested Individual - IEEE Life Members”. That's because right now, there are none (zero).

Membership, including changes made at the Dallas meeting now stands at:

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<th>Membership Type</th>
<th>Number</th>
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</thead>
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</tr>
<tr>
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<td>Total Interested Individuals</td>
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<tr>
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<tr>
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<td>18</td>
</tr>
<tr>
<td>Committee Member - Corresponding Member</td>
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</table>
Total Committee Members 214
TOTAL IN AMS DATABASE 999

* - indicates this member type receives a discounted registration fee.

See Attachment “C” for Membership Chart

3.8.2 New Member Applications

Three new applications for Committee Membership have been submitted for:

Roger Wicks  Du Pont  Producer
Gary Hoffman  Advanced Power Technologies  Producer
Mark T. Gromlvdvits  Federal Pacific Transformers  Producer

These applications will be reviewed at the Administrative Subcommittee meeting. The Committee welcomes and encourages active participants to become Members of the Committee. Requirements and application forms can be found in the Organization and Procedures (O&P) Manual, accessible on the Committee website. Subcommittee Chairs are encouraged to recommend new members, and to communicate to applicants awareness that Membership is a privilege gained through active participation in Committee work at the WG and SC level. WG and SC Chairs are reminded also that signing an application sponsoring a new member signifies their understanding that the applicant has met the requirement of membership and active participation for at least one year in the WG or SC they Chair. New member applications can be forwarded to the Secretary’s attention at any time for review at the next AdsubCom meeting.

3.8.3 Committee and Subcommittee Directory Rosters

In order to provide indemnification to working group and subcommittee members it is crucial that membership lists be maintained. Fortunately the new AM system should make this simple to administer. It is important that each Subcommittee and working group chair keep the rosters updated so that this information can be provided to the IEEE SA.

3.8.4 Meeting Minutes

The minutes of the Dallas Texas Spring 2007 Transformers Committee meeting were posted to the committee website on Friday, June 8, 2007.

The minutes of the Dallas Texas Spring 2007 meeting were mailed on Friday, June 8, 2007, to those who ordered printed copies during meeting registration. 67 registrants ordered printed copies of the Minutes. A total of 75 copies were printed and bound. The cost of previous minutes were:

- Raleigh (Spring ’03) $3946.82
- Pittsburgh (Fall ’03) $714.27
- San Diego (Spring ’04) $1481.77 (78 @ $13.60 ea. + $357.17 postage)
- Las Vegas (Fall ’04) $1084.56 (60@ $12.76 ea. + $319.17 postage)
- Jackson (Spring ’05) $661.44
- Memphis (Fall ’05) $643.07 (postage $468.07 + printing $175)
- Costa Mesa (Spring ’06) $723.64 (postage $263.64 + printing $460)
- Montreal (Fall ’06) $1020.19 (postage $291.25 + printing $728.94)
- Dallas (Spring ’07) $1379.31 (postage $435.55 + printing $943.76)
Subcommittee Chairs are requested to submit their SC Minutes for the Minneapolis, Minnesota Meeting by December 14, 2007. Minutes should be submitted via e-mail to the Secretary edsmith@ieee.org, with a copy to Susan McNelly sjmcnelly@ieee.org for posting on the Committee website. The submittal should be formatted in Word 2007 (or earlier versions) and should be formatted in the format as shown in the present assembled Minutes, with numbering as indicated in Main Committee Meeting Agenda. Please indicate total attendance count for each Subcommittee, Working Group, and Task Force meeting in your Minutes. Please do not send a copy of the attendance listing for this attendance count. If a SC Vice-Chair, Secretary, or other SC member is preparing the SC Minutes, please let them know these details about Minutes submittals.

A reminder for the December 14th date will be sent to each Subcommittee Chair on Monday, December 03, 2007. I know we are all busy but delaying this task could cause problems in finalizing the publication and posting prior to our next scheduled meeting. In the future all Subcommittee Chairs should plan on completing and submitting your minutes and documents for publication in the posted minutes immediately following the meeting (within several weeks).

3.10 Standards Report:

Refer to Standards Activity since the March 2007 Meeting (Dallas, Texas) dated: October 11, 2007 published in the Main Meeting Minutes.

Bill expressed concern over 4 Standards that required critical action. Those are:  
C57.105-1978 (R1999) - IEEE Guide for Application of Transformer Connections in Three-Phase Distribution Systems  
C57.119-2001 IEEE Recommended Practice For Performing Temperature Rise Tests on Oil Immersed Power Transformers  

All due to expire at the end of this year 2007.

Bill also encouraged attendance at Monday’s Standards Luncheon meeting

Christina pointed out there was new PAR form on-line

Bill indicated that Greg had printed off a balloting pool roster that will be posted on the bulletin board at this meeting. Everyone should review this list to make sure they are included in the balloting pool.

The Standards Subcommittee provides the following Attachments

Attachment “E”  
Transformer Standards Development Status

Attachment “F”  
Transformer Committee Organizational Chart
3.11 NEW Business

3.11.1 Proposed Transformer Paralleling Guide, Power Transformers SC – T. Lundquist - Everyone is in agreement that there is a need for this document. Therefore Don will recommend moving forward with the Working Group.

3.11.2 TF on Tank Rupture – liaison with CIGRE – T. Lundquist - This is a TF under a Subcommittee with the work consisting of a IEEE paper being prepared. Don suggested that we share the information with CIRGE and he will arrange a “side-bar” discussion on this issue. Matt pointed out that the PES governs PAPERS not IEEE, the IEEE is deals with PAR’s. Don will share Matt’s e-mail with the executive committee for further discussion.

3.11.3 Sponsorship of Furan Testing TF – ILSC, IFSC, or joint – T. Prevost / D. Fallon - TF to be headed by Ken Haggard. The issue is consists of determining what Subcommittee this TF should report to,

3.11.4 Need for PD measurement guides for Bushings and Instrument Xfmrs – L. Wagenaar - Don suggested that the interested group should organize and establish a core group willing to work. The group should decide what Subcommittee they should be under. Don Recommends Dielectric Tests Subcommittee

3.11.5 Responsiveness to WG/SC surveys; impact on membership – L.Wagenaar. - Don recommends that the Subcommittee chair review the Subcommittee membership roster and take action to remove non active or non responsive members or other actions based on his discretion.

3.11.6 Use of available industry resources for standards development work – R. Girgis - It was noted that we should use the available resources within our industry at our discretion to accomplish work. It was felt by Tom Prevost that we should not open ourselves up to paying for these services. He felt that this could cause problems in the future. Don felt that we should put our thoughts down and transmit them to Matt for review by IEEE.

3.11.7 Definition of Member Classifications – G. Anderson - We need to define “Active Participation” Greg felt that active participation should be defined as someone who attends regularly and participates at our meetings. Greg actually suggested attending 3 out of the last 5 meetings as a requirement. This should be taken into consideration when we update our O&P Manual.

3.11.8 Financial Reporting Req’mts – Establishment of Treasurer’s position – G. Anderson / D. Fallon - Greg offered a list of possible responsibilities of the “Committee Treasurer”. Don felt that the executive officers should again discuss and review Greg’s proposal and then put it in front of the Administrative Subcommittee

See Attachment “B” for proposed responsibilities

3.11.9 PES request for assistance with “Knowledge Management” project – D. Fallon - Don pointed out that we should be mindful that something should be done in retaining industry knowledge as more of our longer term participants step down and move on. Don asked that if anyone would like to work on this, let him know.

3.11.10 Recognition – D Fallon - Don requested that we skip this issue. However Don encouraged that the Subcommittee Chairs make sure that we somehow recognize the “significant contributors” within their Working Group.

3.11.11 Other; NONE

3.12 Committee Service Awards:

Report from Ken Hanus to be published in the Main Committee Minutes

Don Fallon recognized Richard Dudley for his long dedicated service and advised him that he would be receiving the Transformers Committee’s Distinguished Service Award
3.13 Subcommittee Reports:

3.13.1 Greg Anderson - Meetings and Planning Subcommittee
NO REPORT

3.13.2 Bill Chi - Standards Coordinator
NO REPORT

3.13.3 Richard Dudley - HVDC Converter Transformers & Reactors Subcommittee
NO REPORT

3.13.4 Fred Elliott - Bushings Subcommittee
NO REPORT

3.13.5 Ken Hanus - Distribution Transformer Subcommittee
NO REPORT

3.13.6 Tom Lundquist - Power Transformer Subcommittee
NO REPORT

3.13.7 Carl Niemann - Underground Transformer & Network Protector Subcommittee
NO REPORT

3.13.8 Don Platts - Insulation Life Subcommittee
NO REPORT

3.13.9 Jim Smith - Instrument Transformer Subcommittee
NOT PRESENT (Subcommittee not represented)
NO REPORT

3.13.10 Richard Ladroga - Insulation Fluids Subcommittee
NOT PRESENT (Represented by Bill Bartley)
NO REPORT

3.13.11 Jeewan Puri - Audible Sound and Vibration Subcommittee
NOT PRESENT - (Represented by Ramsis Girgis)
NO REPORT

3.13.12 Charles Johnson - Dry Type Transformer Subcommittee
NOT PRESENT - (Represented by Richard Dudley)
NO REPORT

3.13.13 Loren Wagner - Dielectric Test Subcommittee
Loren indicated that C57.127 has been published and expressed his appreciation to all those individuals that contributed the this effort

3.13.14 Ramsis Girgis - Performance Characteristics Subcommittee
Ramsis Girgis informed the Adm SC that the ASV SC is presently developing a Guide on "Transformer Sound Measurements". This Guide deals with details on measuring methods which are part of the new revision of section 12 (Noise testing) of C57.12.90. However, this
section will need some more work and may not be available for the upcoming ballot of C57.12.90. Ramsis asked for confirmation from the Adm SC that the Guide should only deal with measuring methods included in the reference Standard. Therefore, the revised Guide could not be sent for survey or ballot until the Standard is revised to include the measuring methods explained in the Guide. The SC confirmed his position.

3.14 OLD Business

PC 57-42; There has been struggles in getting input from our Switchgear counterparts. However there has been a

Document Retention - Peter Balmer, As a follow up from our Dallas meeting, there has been discussions with Dave Ringle, IEEE on document retention. Peter said that the basic answer is that there is “no requirement within the IEEE to keep or retain anything after the document has been published”. Peter is to get a copy of the IEEE’s formal reply for publication in the formal

See Attachment "H" for Presentation

3.15 Adjournment

Meeting was adjourned by Don Fallon at 5:18pm
4.0 Vice Chair’s Report – T. A. Prevost

The following items report on activities of PES Committees on which the Vice Chair serves as Committee representative.

4.1 Technical Paper Sessions

4.1.1 2007 PES General Meeting Tampa, Florida. The 2007 IEEE Power Engineering Society 2007 General Meeting was held 24 – 28 June 2007 at the Tampa Convention Center and the Marriott Waterside Hotel in Tampa, Florida, USA.

The Transformers Committee sponsored two paper sessions with a total of thirteen technical papers.

4.1.2 2008 IEEE PES Transmission and Distribution Conference Chicago, Illinois. The meeting will be held on April 20 – 25, 2008 in Chicago. We have received 11 papers for review for this conference.


4.2 Committee Organization and Procedures Manual

The Transformers Committee O&P Manual revision is currently in process.

4.3 Power & Energy Magazine Submission

The Transformers Committee needs to prepare an article for P&E magazine. The Vice-Chair will be looking for topics and volunteers to prepare this article. If you have any thoughts please contact the Vice-Chair.

Respectfully submitted,
T. A. Prevost
Vice Chairman
5.0 Transformer Standards

DATE: October 10, 2007

TO: Members of IEEE Transformers Committee, October, 2007 Meeting @ Minneapolis, Minnesota

FROM: Bill Chiu, Standards Subcommittee Chair
IEEE /PES Transformers Committee

SUBJECT: PE/TR Standards Activities since March, 2007 Meeting (Dallas, Texas)

TRANSFORMERS STANDARDS STATUS
The detail status of the Transformers Committee sponsored standards are shown in the attachment entitled IEEE/PES Transformers Committee Status Report of Standards, dated 10/10/2007.

The report is a list of all the transformer related standards under the sponsorship of IEEE Power Engineering Society Transformers Committee (PE/TR). The standards are grouped by Subcommittees and sorted by document numbers. The report also contains the active PARs under the responsible Subcommittee.

IEEE/IEC DUAL LOGO STANDARDS
Currently there is only one document that has obtained the IEEE/IEC dual logo status:
(Approved by IEC TC 14 as of December, 2004)
The corresponding IEC document number is:
IEC 62032 Ed. 1: Guide for the Application, Specification, and Testing of Phase-Shifting Transformers

Discussions are under way for the consideration of dual log status for:
C57.123 – IEEE Guide for Transformer Loss Measurement

DOCUMENTS PROCESSED BY THE IEEE STANDARDS BOARD
The following sections list all the PE/TR documents processed by the New Standards Committee (NesCom) and the Standards Review Committee (RevCom) of the Standards Board since the March, 2007 meeting in Dallas Texas.

NEW STANDARDS COMMITTEE (NesCom)
EXISTING PARS – EXTENSION, MODIFICATION, and WITHDRAWAL
PC57.32 - Standard Requirements, Terminology and Test Procedures for Neutral Grounding Devices

PC57.139 - Guide for Dissolved Gas Analysis in Transformer Load Tap Changers
Approve [Yes=11, No=0, Abstain=1 (Prevost)]

PC57.13 - Standard Requirements for Instrument Transformers (Previously Approved PAR
Recommendation: Conditionally approve modified PAR until December 2007 contingent upon the change to Item 7.3 to ‘Yes’.

PC57.12.36 - Standard Requirements for Liquid-Immersed Distribution Substation Transformers

NEW PARS FOR REVISIONS OF STANDARDS OR NEW STANDARDS
P638 - Standard for Qualification of Class 1E Transformers for Nuclear Power Generating Stations
Recommendation: Approve PAR for the revision of a standard until December 2011.

PC57.12.00 - Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
Recommendation: Conditionally approve PAR for the revision of a standard until December 2011 with the following changes:
Move last sentence of Item 5.4 to Item 5.5
Remove text from Item 7.4

PC57.12.30 - Standard for Pole-Mounted Equipment - Enclosure Integrity for Coastal Environments
Recommendation: Approve new PAR until December 2011.

PC57.12.31 - Standard for Pole Mounted Equipment - Enclosure Integrity (Previously Approved PAR)
Recommendation: Approve PAR for the revision of a standard until December 2011.

PC57.12.40 - Standard for Network, Three-Phase Transformers, 2500 kVA and Smaller; High Voltage, 34 500 GrdY/19920 and Below; Low Voltage, 600 Volts and Below; Subway and Vault Types (Liquid Immersed) (Previously Approved PAR)
Recommendation: Approve PAR for the revision of a standard until December 2011.

PC57.12.52 - Standard for Sealed Dry-Type Power Transformers, 501 kVA and Larger, Three-Phase, with High-Voltage 601 to 34500 Volts, Low-Voltage 208Y/120 to 4160 Volts- General Requirements
Recommendation: Approve new PAR until December 2011.

PC57.12.70 - Standard Terminal Markings and Connections for Distribution and Power Transformers (Previous PAR Not Available)
Recommendation: Approve PAR for the revision of a standard until December 2011.

PC57.12.90 - Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers (Previously Approved PAR)
Recommendation: Approve PAR for the revision of a standard until December 2011.

PC57.17 - Standard Requirements for Arc Furnace Transformers
Recommendation: Approve new PAR until December 2011.

PC57.113 - Recommended Practice for Partial Discharge Measurement in Liquid-Filled Power Transformers and Shunt Reactors (Previously Approved PAR)
Recommendation: Approve PAR for the revision of a standard until December 2011.

PC57.142 - Guide to Describe the Occurrence and Mitigation of Switching Transients Induced by Transformer, Switching Device, and System Interaction
Recommendation: Approve new PAR until December 2011.

STANDARDS REVIEW COMMITTEE (RevCom)
REAFFIRMATION, EXTENSION, and WITHDRAWAL OF EXISTING STANDARDS

None.

REVISED STANDARDS

C57.12.35/D7 (PE/TR) Standard for Bar Coding for Distribution Transformers and Step-Voltage Regulators
Recommendation: APPROVE [Vote: Yes=10, No=0, Abstain=1 (Thompson)]

PC57.127/D10.0 (PE/TR) Guide for the Detection and Location of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers and Reactors
Recommendation: APPROVE

PC57.129/D10 (PE/TR) Standard for General Requirements and Test Code for Oil-Immersed HVDC Converter Transformers
Recommendation: APPROVE

APPROVAL OF NEW STANDARDS
PC57.12.36/D11 (PE/TR) Standard Requirements for Liquid-Immersed Distribution Substation Transformers

Recommendation: APPROVE [Vote: Yes=10, No=0, Abstain=1 (Thompson)]

STANDARDS DUE TO EXPIRE AT THE END OF 2007
The following projects will be recommended for administrative withdrawn at the December 3, 2007 IEEE-SA Standards Board meeting.

(Note: Active PAR for revision under PC57.32. PAR extension approved to December 31, 2009)

(Note reaffirmation)


C57.12.58-1991 (R2002) IEEE Guide for Conducting a Transient Voltage Analysis of a Dry-Type Transformer Coil


[Also C57.19.03-1996/Cor1-2005]

C57.93-1995 (R2001) IEEE Guide for Installation of Liquid-Immersed Power Transformers

C57.105-1978 (R1999) IEEE Guide for Application of Transformer Connections in Three-Phase Distribution Systems
(Note: Reaffirmation ballot comment resolution)

(Note: Reaffirmation ballot comment resolution)

C57.119-2001 IEEE Recommended Practice for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads beyond Nameplate Ratings
(Note: Reaffirmation ballot invitation started 10/18/2006)

C57.121-1998 IEEE Guide for Acceptance and Maintenance of Less-Flammable Hydrocarbon Fluid in Transformers
(Note: Reaffirmation ballot failed in March, 2006 due to low response rate. Requested termination of existing ballot and to restart reaffirmation process)

C57.124-1991 (R2002) IEEE Recommended Practice for the Detection of Partial Discharge and the Measurement of Apparent Charge in Dry-Type Transformers

C57.131-1995 IEEE Standard Requirements for Load Tap Changers
### BALLOT STATUS – SORTED BY INVITATION NUMBER (As of 03/10/2007 from myBallot)

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IEEE Standards Association Administrative Meetings Schedule

2008 STANDARDS BOARD MEETINGS SCHEDULE AND SUBMITTAL DEADLINES

2008

JANUARY

FEBRUARY

MARCH

APRIL

MAY

JUNE

JULY

AUGUST

FEBRUARY

13-17 BOD, Louisville, KY
16 DEADLINE FOR SUBMISSION - NesCom/RevCom
21-22 CAG, Nantel, Ottawa to host
24-27 BOG, NYC

MARCH

04-05 CAG, Microsoft in Seattle, WA to host
25-27 SASB, Piscataway

APRIL

24-26 SASB - Seoul, Korea

MAY

02 DEADLINE FOR SUBMISSION - NesCom/RevCom
12-16 CAG*, Sony in Tokyo to host

JUNE

04-06 BOG, FL
04-05 BOG, Geneva

JULY

06-06 BOG, FL
07 AWARDS CEREMONY

AUGUST

08-10 SASB, FL

SEPTEMBER

10-12 SASB, Piscataway
18-22 BOD, Denver, CO

NesCom and RevCom both occur on the second day of the SASB meetings

LAST REVISED: 21 SEPTEMBER 2007
### LIST OF ALL OPEN STANDARDS PROJECT (as of 09/30/2007)

http://standards.ieee.org/board/nes/C2-C136.html

(There are currently 57 active PAR)

**PC57.12.00** (PE/TR) Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

**PC57.12.10** (PE/TR) Standard Requirements for Liquid-Immersed Power Transformers

**PC57.12.20** (PE/TR) Standard for Overhead Type Distribution Transformers, 500 kVA and Smaller: High Voltage, 34 500 Volts and Below; Low Voltage, 7970/13 800Y Volts and Below

**PC57.12.23** (PE/TR) Standard for Submersible Single-Phase Transformers; 167kVA and Smaller; High-Voltage 25 000 Volts and Below; Low Voltage 600 Volts and Below

**PC57.12.24** (PE/TR) Standard for Submersible, Three-Phase Transformers, 3750 kVA and Smaller: High Voltage, 34 500 GrdY/19 920 Volts and Below; Low Voltage, 600 Volts and Below

**PC57.12.28** (PE/TR) Standard for Pad Mounted Equipment - Enclosure Integrity

**PC57.12.29** (PE/TR) Standard for Pad Mounted Equipment - Enclosure Integrity for Coastal Environments

**PC57.12.30** (PE/TR) Standard for Pole-Mounted Equipment - Enclosure Integrity for Coastal Environments

**PC57.12.31** (PE/TR) Standard for Pole Mounted Equipment - Enclosure Integrity

**PC57.12.34** (PE/TR) Requirements for Pad-Mounted, Compartmental Type, Self Cooled; Three Phase Distribution Transformers; 5 MVA and Smaller; High Voltage, 34.5kV Nominal System Voltage and Below; Low Voltage, 15kv Nominal System Voltage and Below

**PC57.12.35** (PE/TR) Standard for Bar Coding for Distribution Transformers and Step-Voltage Regulators

**PC57.12.36** (PE/TR) Standard Requirements for Liquid-Immersed Distribution Substation Transformers

**PC57.12.38** (PE/TR) Standard for Padmounted Type, Self-Cooled, Single Phase Distribution Transformers; High Voltage, 34500 GrdY/19920 Volts and below, Low voltage, 480 Volts and below; 167 KVA and smaller

**PC57.12.40** (PE/TR) Standard for Network, Three-Phase Transformers, 2500 kVA and Smaller; High Voltage, 34 500 GrdY/19 920 and Below; Low Voltage, 600 Volts and Below; Subway and Vault Types (Liquid Immersed)

**PC57.12.51** (PE/TR) Ventilated Dry-type Power Transformers, 501 kVA and Larger, Three-Phase, with High-Voltage 601 to 34500 Volts; Low-Voltage 208Y/120 to 4160 Volts

**PC57.12.52** (PE/TR) Standard for Sealed Dry-Type Power Transformers, 501 kVA and Larger, Three-Phase, with High-Voltage 601 to 34500 Volts, Low-Voltage 208Y/120 to 4160 Volts-General Requirements

**PC57.12.60** (PE/TR) Standard Test Procedure for Thermal Evaluation of Insulation Systems for Dry Type Power and Distribution Transformers, Including Ventilated, Solid-Cast and Resin Encapsulated Transformers

**PC57.12.70** (PE/TR) Standard Terminal Markings and Connections for Distribution and Power Transformers

**PC57.12.80** (PE/TR) Standard Terminology for Power and Distribution Transformers

**PC57.12.80a** (PE/TR) Standard Terminology for Power and Distribution Transformers - Amendment 1: Definition of Thermally Upgraded Paper


**PC57.12.91** (PE/TR) IEEE Standard Test Code for Dry-Type Distribution and Power Transformers

**PC57.13** (PE/TR) Standard Requirements for Instrument Transformers
PC57.13.1 (PE/PSR) Guide for Field Testing of Relaying Current Transformers

PC57.13.5 (PE/TR) Standard of Performance and Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above


PC57.16 (PE/TR) Standard Requirements, Terminology, and Test Code for Dry-Type Air-Core Series-Connected Reactors

PC57.17 (PE/TR) Standard Requirements for Arc Furnace Transformers

PC57.18.10a (PE/TR) Standard Practices and Requirements for Semiconductor Power Rectifier Transformers - Amendment 1: Technical and Editorial Corrections

PC57.19.100 (PE/TR) Guide for Application of Power Apparatus Bushings

PC57.21 (PE/TR) Standard Requirements, Terminology, and Test Code for Shunt Reactors Rated Over 500 kVA

PC57.32 (PE/TR) Standard Requirements, Terminology and Test Procedures for Neutral Grounding Devices

PC57.91 (PE/TR) Guide for Loading Liquid Immersed Transformers and Voltage Regulators

PC57.93 (PE/TR) Guide for Installation and Maintenance of Liquid-Immersed Power Transformers

PC57.98 (PE/TR) Guide for Transformer Impulse Tests

PC57.100 (PE/TR) Standard Test Procedure for Thermal Evaluation of Insulation Systems for Liquid-Immersed Distribution and Power Transformers

PC57.104 (PE/TR) Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers

PC57.106 (PE/TR) Guide for Acceptance and Maintenance of Insulating Oil in Equipment

PC57.110 (PE/TR) Recommended Practice for Establishing Liquid-Filled and Dry-Type Power and Distribution Transformer Capability When Supplying Nonsinusoidal Load Currents

PC57.113 (PE/TR) Recommended Practice for Partial Discharge Measurement in Liquid-Filled Power Transformers and Shunt Reactors

PC57.119 (PE/TR) Recommended Practice for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Rating

PC57.123 (PE/TR) Guide for Transformer Loss Measurement

PC57.127 (PE/TR) Guide for the Detection and Location of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers and Reactors

PC57.129 (PE/TR) Standard for General Requirements and Test Code for Oil-Immersed HVDC Converter Transformers

PC57.130 (PE/TR) IEEE Trial-Use Guide for the Use of Dissolved Gas Analysis During Factory Temperature Rise Tests for the Evaluation of Oil-Immersed Transformers and Reactors

PC57.131 (PE/TR) Standard Requirements for Tap Changers

PC57.133 (PE/TR) Guide for Short-Circuit Testing of Distribution and Power Transformers

PC57.135 (PE/TR) Guide for the Application, Specification and Testing of Phase Shifting Transformers

PC57.139 (PE/TR) Guide for Dissolved Gas Analysis in Transformer Load Tap Changers
Standards Subcommittee Report
October 14, 2007
Minneapolis, Minnesota

**PC57.140** (PE/TR) Evaluation and Reconditioning of Liquid Immersed Power Transformers

**PC57.142** (PE/TR) Guide to Describe the Occurrence and Mitigation of Switching Transients Induced by Transformer, Switching Device, and System Interaction

**PC57.143** (PE/TR) Guide for Application of Monitoring to Liquid-Immersed Transformers and Components

**PC57.147** (PE/TR) Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers

**PC57.148** (PE/TR) Standard for Control Cabinets for Power Transformers

**PC57.149** (PE/TR) Guide for the Application and Interpretation of Frequency Response Analysis for Oil Immersed Transformers

**PC57.150** (PE/TR) Guide for the Transportation of Transformers and Reactors Rated 10,000 kVA or larger

**PC57.151** (PE/TR) PC57.151 - Sound Level Measurement Guide for Liquid Filled and Dry Type Transformers and Reactors

The Standards Subcommittee provides the following Attachments
Attachment “E” - Transformer Standards Development Status
Attachment “F” - Transformer Committee Organizational Chart
6.0 Recognition and Awards – Chair: Ken S. Hanus

6.1 Certificates of Appreciation

Certificates of Appreciation have been obtained for the following persons:

<table>
<thead>
<tr>
<th>Name</th>
<th>Service Rendered</th>
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<tbody>
<tr>
<td>Susan McNelly</td>
<td>Host, Fall 2007 Meeting, Minneapolis</td>
</tr>
<tr>
<td>Richard Dudley</td>
<td>Distinguished Service Award</td>
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<tr>
<td>Don Fallon</td>
<td>Chair, Transformers Committee</td>
</tr>
<tr>
<td>Bill Chiu</td>
<td>Chair, Transformers Standards Committee</td>
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<tr>
<td>Jack Harley</td>
<td>Chair, Revision of C57.127</td>
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<td>Lee Matthews</td>
<td>Co-Chair, Revision of C57.12.35</td>
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<td>Guiseppe Termini</td>
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<tr>
<td>John Rossetti</td>
<td>Co-Chair, Completion of C57.12.36</td>
</tr>
<tr>
<td>Dave Aho</td>
<td>Co-Chair, Completion of C57.12.36</td>
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6.2 Nominations for IEEE, PES, and Technical Council Awards

None at this time.

Ken Hanus, Chair
Awards Subcommittee
7.1 HVDC CONVERTER TRANSFORMERS Subcommittee
Richard Dudley, Chair


The HVDC Converter Transformers and Smoothing Reactors S.C. met on Oct. 15, 2007 at 1:45 p.m. in the Duluth Meeting Room of the Minneapolis Hilton Hotel with 9 members and 12 guests present. The following are the highlights.

1. Introductions were made.
2. IEEE patent policy was reviewed and no issues were raised.
3. The minutes of the Dallas meeting were approved.
   Note: The minutes of the Minneapolis meeting won't be approved until the meeting of the S.C. in Charlotte, NC.
4. The Chairman briefed S.C. members on the meeting of the Administrative S.C.
5. The Chairman notified members and guests that PC 57.129 had been approved by the IEEE Standards Board. There was an issue related to “references” but the proposal to move “non cited” documents to the “Bibliography” was accepted by S.C. members. PC 57.129 will now proceed to publication.
6. The remainder of the meeting focused on the revision of IEEE 1277. The following are the highlights.
   (i) 800 kV HVDC technology is being developed. Should it be covered in the revision of IEEE 1277 and, if so, how? Should an informative annex be written and when since 800 kV HVDC is a “work-in-process”? Test values for converter transformers and smoothing reactors are an issue; test levels for switching impulse etc.
       A presentation was made by Ulf Radbrandt on tests carried out on various pieces of equipment for 800 kV HVDC application; converter transformers etc.
       Christoph Ploetner made a presentation on tests carried out on converter transformers and 800 kV bushings.
       Richard Dudley, the Chairman described the successful testing of a prototype dry-type air core smoothing reactor for 800 kV HVDC application.
       Pierre Riffon pointed out a number of observations. For 800 kV DC the lightning impulse test level may be lower then the switching impulse test level. Achieving a full tail for the switching impulse may be an issue in most test labs.
       The consensus of the S.C. is that no action should be taken re 800 kV HVDC in the revision of IEEE 1277 until more information is available; monitoring will continue.
   (ii) Pierre Riffon agreed to draft more material on overloads and overload testing. In the case of oil-immersed SMRs the information in the converter transformer standard will be useful; including gas analysis. In the case of dry-type SMRs overload testing can be part of the temperature rise type test. Allowable temperature rise limits during overload should be addressed.
   (iii) Sequence of tests is important for oil-immersed SMRs. A sequence should be recommended. What is the appropriate sequence of tests for dry-type SMRs? The a.c. power test should be
the final test for dry-type SMRs. Should the temperature rise design test be performed before dielectric tests?

(iv) Ventilation clearance requirements should be recommended for dry-type SMRs re the temperature rise design test. RFD will make a recommendation.

(v) Klaus Papp and Christoph Ploetner will upgrade/update the audible sound test section.

(vi) Ulf Radbrandt, Lars-Erik Juhlin and Christoph Ploetner will provide additional material for Annex E re SMRs for VSC HVDC schemes.

(vii) A rule needs to be developed for the “a.c. power test” if the required test voltage cannot be met; lower voltage but longer duration.

(viii) There are concerns that since a full tail cannot be achieved in most cases for the switching impulse test that the insulation system of a SMR will not be as fully stressed as it will be in-service. How can factory dielectric testing properly simulate converter malfunction, converter failure, switching etc.? Should the capacitor discharge test be a type or design test vs. OTHER? This test can be performed at most test labs that have a CB synthetic test facility.

Once the Chairman receives input from S.C./W.G. members on the various issues he will produce Draft #2 well before the next S.C. meeting in Charlotte. The meeting adjourned at 3:00 p.m.

R. Dudley
7.2. **Instrument Transformers Subcommittee**  
Jim Smith, Chair

The Subcommittee did not meet in Minneapolis. However 2 Working Groups did meet and submitted the following reports.

### 7.2.1 Working Group Reports

#### 7.2.1.1 Working Group on Test Requirements for High Voltage Instruments Transformers Rated 115 kV and above

The WG met on October 16, 2007. Three members and six guests attended the meeting. Two guests requested membership. The meeting was chaired by Mr. P. Riffon.

The agenda was approved as written.

Minutes of the Dallas meeting were approved as written.

The IEEE patent disclosure requirement policy was discussed. None of the members and guests present during the meeting were aware of any patents related to the work of the WG.

The first technical subject on the agenda was the new Annex on Endurance Chopped-Wave Test. This Annex has not been produced yet since lack of time. A first draft will probably be ready for review during the next meeting and will be part of D2 of the revision of C57.13.5.

Draft 1 of revision of C57.13.5 has been circulated to the WG membership prior to the meeting. Changes made have been reviewed and the following actions have been agreed upon:

- Regarding the accuracy of the accuracy measuring system (clause 4.3 of C57.13.5), the requirement to be better than 5 times than the required accuracy class to be measured might be changed to 4 times. Vladimir Khalin will check the latest development in this respect with Eddy So and will report at the next meeting.

- Clause 4.4.1 (Sealing tests) will be split in two subclauses one for oil-immersed and one for gas-insulated instrument transformers. In addition, the prescribed sealing tests for oil-immersed instrument transformers (Table 5) will be changed for “typical examples of sealing tests” since other methods might also be fully acceptable. First and second paragraphs will be adapted accordingly.

- Clause 4.4.2 (Mechanical strength of the transformer) has been reviewed and the following changes will be made:
  
  - The standard seismic level will be changed to the low level (0,1g) has defined in IEEE Std. 693 in order to avoid unnecessary tests and/or calculations.
  
  - Addition of terminal load values as defined by IEC will be added.
  
  - Addition of ice-coating performance as defined by IEC will be added.
  
  - The text will be re-arranged in order to split all different mechanical requirements.
Mr. Rolando Gomez’s comments regarding dissolved gas content were slightly discussed but the meeting ran out of time. This subject will be discussed as the first point of order in the next WG meeting. Members and guests were asked to review Mr. Gomez comments prior to next meeting.

The meeting adjourned at 9:15 am on October 16, 2007.

7.2.1.2 PAR P1601 Optical Current and Voltage Sensing Systems - F. Rahmatian (TC/ITSC) and H. Gilleland (PSIM)

Session chaired by: F. Rahmatian

Minutes (Unapproved)

- IEEE disclosure requirements regarding patent issues related to the WG work were presented
  - The participants were asked if anyone is aware of patents relating to the content of PAR 1601 work. There were no responses. It was noted that no patent or IP was disclosed or identified as relevant to P1601 work.
- Meeting agenda was reviewed and accepted.
- Minutes of meeting #16, Mar 12, 2007, Dallas, TX, and meeting #17 of P1601, June 27, 2007, Tampa, FL, were reviewed and approved. The minutes of meeting #17 are appended.
- Update on other standards/industry Activities was given:

Update on activity and status of the draft:

- The comments on the survey conducted from the WG members on Draft 8 were reviewed again (see minutes of meeting #17).
- The decision to start the process of balloting was re-iterated. The members attending were in agreement.
- Mr. Mathew Ceglia, Program Manager, Technical Program Development, IEEE-SA was present at the meeting and provided significant guidance and hands-on help in getting the draft ready for submission:
  - He pointed out that Oct 15 (same day) was the deadline for submission of Draft standards for editorial review to be considered for December meeting of NesCom.
  - He helped review document formatting, title, scope, and purpose to match exactly to the wording approved in the original PAR 1601.
  - Figure 1 was edited by Farnoosh Rahmatian.
  - Some references were moved from Normative Reference section (2) to Annex D (Bibliography). Those were the items not directly referenced in the text of the standard.
  - Two references (paper by E. So et. al.) on accuracy testing were added to Bibliography and referenced in Annex A – Test Code.
  - The document was saved as D09 (Draft 9)
  - The document was submitted online to IEEE for editorial review ahead of the deadline.

Next Scheduled Working Group Meeting

§ IEEE/PES Transformers Committee Meeting, March 2007.
Joint PSIM/Transformers Working Group
PAR P1601 Optical Current and Voltage Sensing Systems
IEEE/PES General Meeting
Convention Center, Tampa, FL

Wednesday, June 27, 2007
2:00 pm – 4:00 pm

Session chaired by: F. Rahmatian (TC/ITSC)

Minutes (Approved, Oct 15, 2007, Minneapolis, MN)

- IEEE disclosure requirements regarding patent issues related to the WG work were presented
  - The participants were asked if anyone is aware of patents relating to the content of PAR 1601 work. There were no responses. It was noted that no patent or IP was disclosed or identified as relevant to P1601 work.
- Meeting agenda was reviewed and accepted.
- Minutes of meeting #16 of P1601, Mar 23, 2006, Dallas, TX, were reviewed.

Update on activity and status of the draft:
- The latest draft, D08 (March 2007), was discussed – it includes updated figures.
- The comments on the survey conducted from the WG members on Draft 8 was reviewed.
  - Thanks to J. Smith for conducting the survey.
  - Only one comment was received, suggesting to change the minimum uncertainty requirement for the test set-up (for accuracy test) from 1/3rd of the accuracy class (as given in IEEE C57.13.5) to 1/5th of the accuracy class. It was decided to use 1/4th as the requirement, as previously agreed in the Montreal meeting, and to remain consistent with international metrology practices.
    - Note: Ideally, the metrology set up uncertainty should be 10 times better than errors to be measured. In cases where such metrology is difficult to achieve, 4 times better is the international practice. 5 times better is not a typical/standard practice (even though the users are naturally encouraged to use the most accurate metrology systems economically available).
- With regards to testing details, it was previously decided not to include details in the first release of this standard. References will be made to C57.13 and other publications in biography – future editions may include specific info. Dr. E. So volunteered to provide some text for this section in a week.
- Dr. So will help with the revision and balloting process in the following months
  - This PAR was taken under PSIM and as such Dr. So’s help and guidance from PSIM will be very much appreciated
  - Next step, preparation for NESCOM review
  - Then, Balloting

Next Scheduled Working Group Meeting
7.3. **Insulating Fluids Subcommittee**  
R.K. Ladroga, Chair, S.J. McNelly, Vice-Chair  

7.3.1. **Introduction/Attendance**  
The Insulating Fluids Subcommittee met in Minneapolis, Minnesota on Wednesday, October 17, 2007 with 26 members and 44 guests present.  
The following 8 guests requested membership: Alfonso Nelson, Ibrahim Shteyh, Kent Brown, Don Platts, Jim Dukarm, Shuzhen Xu, Josh Herz  

**Meeting Agenda**  
1. Introductions  
2. Patents  
3. Minutes Approval  
4. WG Reports  
5. New Business  
6. Old Business  
7. Adjourn  

Introductions were made.  

7.3.2. **Approval of Meeting Minutes and Patent Disclosure**  
As required in IEEE SA Standard Boards by-law, Section 6.3.2, the IEEE patent disclosure requirements were discussed and a request was made for disclosure of any patents that may be related to the work of the WG. No new disclosures were forthcoming.  
The Minutes of the Dallas, Texas meeting were approved as written.  

7.3.3. **Current Subcommittee Business**  
7.3.3.1. **C57.104 – IEEE Guide for the Interpretation of Gases Generated in Oil – Immersed Transformers**  

**Tuesday, October 16, 2007**  

**Minneapolis, Minnesota**  
The meeting was called to order by Rick Ladroga at 1:50 pm on Tuesday, March 13, 2007. Vice Chair William Bartley and Secretary Susan McNelly were also in attendance. There were 30 members, 64 guests, and 10 guests requesting membership.  

Guests requesting membership were: Claude Beauchemin, Dharam Vir, Michel Duval, Herman Vogel, Kent Haggerty, Shuzhen Xu, David Hanson, Tamyres Machado Junior, Prem Patni  

Approval of minutes from the Spring 2007 meeting in Dallas, Texas was requested. The minutes were approved as written.
The IEEE Patent disclosure requirements were discussed and a request was made for disclosure of any patents that may be related to the work of the WG. There were no responses to the request for disclosure.

Introductions of attendees were made.

**Update on status of recent ballot on C57.104:**

The ballot has closed with 115 affirmative votes, 3 negative votes, and 2 abstention votes. There were 120 votes received for 83% returned and 2% abstention.

A recirculation ballot committee will need to be formed to deal with resolution of the ballot comments. Rick Ladroga, Tom Prevost, Susan McNelly, Claude Beauchemin, and Luiz Chiem will be on the comment resolution committee.

**Discussions for New Guide:**

A new PAR request will be filed to start over with an immediate revision to the guide to address the remaining issues that have been raised as soon as the ballot process with the existing document is complete.

**Status reports from Task Forces:**

1. **Framework:**

   Jim Dukarm - Chair
   Tim Raymond
   Dave Hanson
   Jim Graham

   Presentation by Jim Dukarm – “A revised framework for the transformer DGA Guide.

   Design Goals:
   · Clear concise tutorial covering the essentials
   · Technical details included in an appendix or referred to external publications
   · Appropriate new features with discussion of appropriate graphics and case history examples
   · Provide enough practical information for someone to use the guide, but avoid “table of sacred numbers” if possible.

   Document Structure:
   · Introductory text
   · Scope, limitations, definition, etc.
   · Nature, purpose, and application of DGA
     o Nature - brief overview of entire process
     o Purpose – To improve safety and reliability while reducing cost.
     o Application – Risk management, detection and diagnosis of abnormalities, measurement verification and QA, DGA contexts (initial, screening, surveillance, monitoring, verification and QA).
   · DGA Norms
     o Characteristic of DGA data
     o Periodic variation
     o Skewed distributions
     o Measurement uncertainty
     o Derivation, use, and maintenance of norms. It is important to understand the DGA norms are neither purely statistical in nature nor universally applicable.
     o Variables and limit values
       § Minimum limits for gas concentrations
       § Combustible gas increments – baselines and limits
       § Combustible gas rates of increase – window and limits
       § CO2/CO
§ Acetylene/Hydrogen
§ Oxygen/Nitrogen
- DGA Data Interpretation
  - Data quality check before interpretation – List of most common problems
  - Initial assessment – First or isolated sample
  - Screening – Look for signs of suspicious change and classify acc to risk
  - Surveillance – Evaluate rates of change, get diagnosis, watch for danger
  - Monitoring
  - Measurement QA or verification
  - Use of graphics
    - Addenda
      - Case histories – normal operation, faults, stray gassing, etc.
      - Graphical representations – types of charts and suggested uses
      - Diagnostic methods – Duval triangle, Rogers/IEC ratio
      - DGA calculations with measurement uncertainty – increments, average rates, ratios
      - Physical properties of gases – solubility, partial pressure, adsorption

Question – Is there a size transformer (volume of oil) that this guide will apply to. Response – For small pole top type units, the cost to do the analysis is not necessarily appropriate. The information itself is valid for all size units regardless of oil volume. For a small tank, there are less Joules of energy than for a large tank which evens things out. The guide needs to address this with documentation showing that this is true.

2. Data:

Tom Prevost – Chair
Dave Hanson
Paul Boman
Paul Mushill
Bob Ganser Jr
Claude Beauchemin
Jim Dukarm
Dave Wallach
Jim Graham
Joe Kelly

Tom reported that work is in progress and presented the input fields that we will be looking for when collecting the required data.

Manufacturer
S/N
Maximum or Base MVA
HV rating
LV rating
TV rating
Manufactured Year (4 digit year)
Transformer type (core form or shell form)
Preservation System Type (Gas blanketed, conservator, etc.)
Cooling Type (ONAN, ONAF, etc.)
LTC, Degree C Rise (55 or 65C)
Transformer Use (GSU, Transmission, Distribution, other)
Insulating Liquid (Fluid type)
Liquid volume (units)
Sample Date
Reason for sampling (routine, failure, other)
Repaired, Degassed, or Date of last reprocessing
Location (LTC, Bushing, Main Tank)
comment section
Inhibitor Content
Gases: H, O, N, Methane, CO, Ethane, CO2, Ethylene, Acetylene
comment section
Loading level
Items underlined in italics were additions made during discussion. Some of these items may be more appropriate as a list of items that should be tracked on units, but may be difficult to obtain from historical databases.

3. Case Studies:

Brian Sparling – Chair
Kent Haggerty
Dave Wallach
Dave Hanson
Tim Raymond
Norman Field
Jim Graham
Paul Boman
Bob Ganser Jr.
Paul Mushill
Joe Kelly

No report at this time.

4. Diagnostic Methods

Tim Raymond – Chair
Michel Duval
Jerry Corkran
Lance Lewand
Joe Kelly
Norman Field

Michel Duval made a presentation on the proposed changes to the guide.

Other Business:

Bill Bartley will be moving on in his new roll as Standards SC Chair. Rick Ladroga nominated Susan McNelly to replace Bill as Vice Chair. A motion was made and passed.

The meeting was adjourned at 3:10 pm.

Rick Ladroga
WG Chair

Susan McNelly
WG Vice Chair and Secretary

7.3.3.2. C57.106 – IEEE Guide for Acceptance and Maintenance of Insulating Oil in Equipment

Tuesday, October 16, 2007

Minneapolis, Minnesota

The revision for the IEEE “Guide For Acceptance and Maintenance of Insulating Oil in Equipment,” C57.106 –2006, was completed by Jim Thompson, Working Group Chair, and TV Oommen, Co-Chair. It was published on June 6, 2007 and made available in hard copy as of July 3, 2007.

October 17, 2007
James A. Thompson

7.3.3.3. C57.121 –IEEE Guide for Acceptance and Maintenance of Less Flammable HydroCarbon Fluid in Transformers

There was no WG meeting for this Guide at the Minneapolis, Minnesota meeting. This standard will be allowed to expire.
7.3.3.4. C57.130 - IEEE Trial-Use Guide for Dissolved Gas Analysis During Factory Temperature Rise Tests for the Evaluation of Oil-Immersed Transformers and Reactors

There was no WG meeting for this Guide at the Minneapolis, Minnesota meeting. A request for a one year extension for this Guide was filed Monday, October, 15, 2007. Tom Prevost would like to form a ballot resolution committee to resolve the outstanding ballot comments. Kent Haggerty, Dave Wallach, Juan Castellanos, Rick Ladroga, and Tom Prevost have volunteered to serve on the ballot resolution committee.

7.3.3.5. C57.139 - Draft IEEE Guide for Dissolved Gas Analysis Of Load Tap Changers

Tuesday, October 16, 2007

Minneapolis, Minnesota

Fredi Jakob called the WG meeting to order at 11:00 am, Tuesday, October 16, 2007. WG Secretary Susan McNelly was also present. There were 30 members and 28 guests present with 3 guests requesting membership.

Guests requesting membership were:
Michel Duval
Don Anderegg
Luiz Cheim

Agenda:
1. Welcome and Introduction
2. Patent considerations
3. Approval of Spring 2007 minutes
5. Joint Presentation by Dr. James Dukarm and Ms. Shuzhen Xu
6. What next?
7. Adjourn

The IEEE Patent disclosure requirements were discussed and a request was made for disclosure of any patents that may be related to the work of the WG. There were no responses to the request for disclosure.

Approval of minutes from the Fall 2006 meeting in Dallas, Texas was requested. The minutes were approved as written.

A draft of the Guide is expected to be ready for discussion prior to and at the Spring 2008 meeting in Charlotte, NC. We are currently working on a tight time schedule due to the fact that our work has been extended for only a short period. In order to get the draft ready for the next meeting, members who can join our subgroup and contribute to the development of the draft were requested to come forward.

Jim Dukarm and Shuzhen Xu have made significant progress in their statistical studies and jointly presented their results. The presentation is attached.

F07_ltc_stats.pdf
Several people also volunteered to review the draft document prior to the Spring 2008 meeting.

The meeting was adjourned at 12:20 pm.

Fredi Jakob
Chair
Susan McNelly
Secretary

7.3.3.6. C57.147 - IEEE Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers

Tuesday, October 16, 2007

Minneapolis, Minnesota

The WG meeting was called to order at 8:05 am, on Tuesday, October 16, 2007 by the working group Chair, Patrick McShane. Vice Chair, Clair Claiborne, and Secretary, Susan McNelly were also present. There were 13 members present and 44 guests, with 5 guests requesting membership. Since the Guide has been balloted, no additional membership requests will be entertained.

Meeting Agenda

1. Introductions
2. Patents
3. Minutes
4. Update
5. Review last revisions
6. Vote to Submit for Balloting (Recirculation)
7. New Business
8. Adjourn

As required in IEEE SA Standard Boards by-law, Section 6.3.2, the IEEE patent disclosure requirements were discussed and a request was made for disclosure of any patents that may be related to the work of the WG. No new disclosures were forthcoming.

The minutes for the Spring 2007 meeting were approved as submitted and recorded on the website.

Update:

Since the last meeting, the standard went to Ballot and the results are now available. The requirement for >75% balloting was met. The ballot had 98.8% approval, with one negative (34 comments). Matt Ceglia, from IEEE, addressed the reason why a recirculation ballot is required. When a negative ballot with comments is received, a recirculation is required. For the subsequent round(s) of balloting new negatives (comments received on sections previously commented or sections that the working group modified prior to the recirculation) could also cause additional recirculations. Comments from subsequent rounds of balloting that are not tied to sections previously open for comment, do not require mitigation.

The PAR for this standard will expire at the end of the year. An extension has been filed and will be reviewed for approval by REVCOM. A PAR extension has been requested due to the recirculation ballot that will be required.

Formation of two task forces involving natural ester based dielectric coolants were discussed at the last meeting and approved at the Fluid Subcommittee meeting.
1. TF on DGA for Natural Esters – Paul Bowman has agreed to chair this TF

2. TF for Guide for Retrofill of Natural Ester Fluids – Jim Graham has agreed to chair this TF

Key ballot comments were reviewed for the remainder of the meeting.

ASTM References – Eliminated D 3613 as this standard has been recently withdrawn. Several other ASTM standards were also added.

Several minor grammatical or spelling corrections were made

A revised draft with ballot comments incorporated, as appropriate, and a listing of the ballot comments and responses to these comments will be submitted for recirculation ballot as soon as possible.

The Chair thanked all the WG and other participants contributing to this proposed guide.

A comment was made that IEC has recently formed a working group for a Natural Ester Fluid.

The meeting was adjourned at 9:15am.

Respectfully Submitted

Patrick McShane
Working Group Chair

Clair Claiborne
Working Group Vice-Chair

Susan McNelly
Working Group Secretary

7.3.3.7. Furan TF

Monday, October 15, 2007

Minneapolis, Minnesota

The working team or subteam of the Furan Task Force met at 3PM on Wednesday, October 17, 2007. Team members Luiz Cheim, Kent Haggerty, Don Platts, Tom Prevost, and Shuzhen Xu participated.

After discussing the path forward options, the team agreed that the next steps should be as follows:

1. Develop a white paper (approximately 8 pages) incorporating the major issues and current knowledge on Furans. Paper should include the following sections:
   - Scope or Purpose
   - History of Furans
   - How Furans are formed in oil
   - Current ongoing work and studies by various companies and organizations including CIGRE, testing companies, utilities, and users globally.
   - Correlation of DP and Furan data from known databases and studies. Connect insulation age with Furans. Also compare 55 to 65 degree rise transformers. Correlation should include both non-thermally and thermally upgraded paper. Include guidance in paper on where paper samples should be taken from transformer winding when measuring DP.
   - Use of Furans for diagnostics and known limitations such as partitioning of oil, factors that can affect readings and values, types of transformers and applications, loading, oil quality, etc. (How do you move from laboratory values to real life?)
   - Key learnings from previous studies by CIGRE
2. Concurrent with development of a white paper, continue to gather Furan data as part of the data survey for DGA.

3. Set up process to more effectively obtain DP measurement data from failed transformers. Again, provide guidance on where in transformer to gather samples.

4. Expand Task Force membership to include utilities and testing companies.

Tom Prevost agreed to contact Randy Stebbins of SD Myers for information and technical data from his technical paper. Don Platts will contact additional utilities.

Shuzhen Xu and Luiz Cheim agreed to develop a draft of the paper for review by December. Goal would be to have a draft of the white paper ready for review by the task force by the next meeting in Charlotte, NC.

Respectfully Submitted,

Kent Haggerty, TF Chair

7.3.4. Old Business

C57.130 – IEEE Trial-Use Guide for the Use of Dissolved Gas Analysis During Factory Temperature Rise Tests for the Evaluation of Oil-Immersed Transformers and Reactors - The PAR expires at the end of this year. Tom Prevost and Rick Ladroga will work together to try and obtain the ballot resolution information and to determine what is required to move forward with this Guide.

Patrick McShane announced that a new task force concerning DGA for Natural Ester Fluids has been formed. Paul Bowman has volunteered to chair this task force.

Patrick McShane announced that a new task force concerning the application Guide for the use of Natural Ester Fluids (installation, filling, hold times, cold start, etc.) has been formed. Jim Graham has volunteered to chair this task force.

Jim Thompson brought up that the IEEE Std 637 – IEEE Guide for the Reclamation of Insulating Oil and Criteria for its Use has been reaffirmed. Tom Prevost recommended that the next time this guide is revised, that consideration be given to give it a C57 designation so that it falls under the umbrella of the transformer standards numbering.

7.3.5. New Business

Due to Bill Bartley moving on to a new role as Chair of the Standards Committee, Susan McNelly will step up to fill his vacated Fluids SC Chair position.

The reaffirmation for the IEEE “Guide For Reclamation of Insulating Oil and Criteria For Its Use,” Std 637 – 1985, was completed by Jim Thompson, Working Group Chair in August of 2007. The initial ballot and re-circulation ballot resulted in an 86 % response rate and a 95 % approval rate. RevCom approved the document reaffirmation on September 26, 2007.

It was announced that a Study Group would be formed regarding the revision of the IEEE Std 637 – 1985 Guide. Jim Thompson volunteered to chair a future working group and three people volunteered to help. Tom Prevost suggested a revised document name to include a C57 number rather than an IEEE Standard number to provide a more uniform reference for the document.
Ray Bartnikas reported that an IEC TC-10 meeting on insulating fluids will be held next week. They are still quite concerned with corrosive sulfur, which has been more problematic in Europe. Bipin Patel asked if there were any surveys concerning the corrosive sulfur issue. Ray indicated only that there had been a considerable number of failures in Brazil and Italy, but no definitive results were available. Rick Ladroga indicated that Doble had provided a tutorial on the corrosive sulfur issues a couple of years ago. Luiz Cheim indicated that there is a new test available that will be proposed by the IEC task force. This new test can better detect the presence of the corrosive sulfur. This new test method is comparable to the ASTM 1275, method B test.

Ray also indicated that there has been considerable interest in IEC to develop a standard for Natural Ester Fluids.

7.3.6. Adjournment

The Subcommittee adjourned at 12:12 pm.

Next Meeting:


Respectfully Submitted

Richard Ladroga
Fluids SC Chair

Susan McNelly
Fluids SC Vice-Chair
7.4 Insulation Life Subcommittee
Don Platts, Chair

Insulation Life Subcommittee - Un-Approved Meeting Minutes
October 17, 2007 – Minneapolis, Minnesota

7.4 Insulation Life Subcommittee – Don Platts, Chairman

The Insulation Life Subcommittee met in Minneapolis, Minnesota on October 17, 2007 at 8:00 AM. There were 49 members and 90 guests present, with 13 guests requesting membership in the subcommittee.

The minutes of our meeting in Dallas, Texas on March 14, 2007 were approved subject to adding the meeting minutes for the Working Group for the Revision to C57.91 Loading Guide.

7.4.1 Chair’s Report

7.4.1.1 The Spring 2008 IEEE Transformers Committee Meeting will be held in Charlotte, N.C. in March. The Fall 2008 meeting will be held in Portugal in October.

7.4.2 Project Status Reports

7.4.2.1 Reaffirmation Ballot C57.119, IEEE Recommended Practice for Performing Temperature Rise Tests on Oil-Immersed Power Transformers at Loads Beyond Nameplate Ratings

Subash Tuli is working on resolving the negative ballots.

7.4.3 Working Group and Task Force Reports

7.4.3.1 Working Group for the Revision to C57.91 Loading Guide - Tim Raymond

The working group was called to order by Don Platts, standing in for Chair, Tim Raymond, at 9:30 AM on Tuesday, October 16, 2007. Secretary Susan McNelly was also present.

There were 35 members present and 48 guests with 5 guests requesting membership to the WG. Guests requesting membership were:

- Luiz Cheim
- Prodipto Ghosh
- Shaumaun Hakim
- Gael Kennedy
- Chuck Simmons

Agenda:

1. Minutes approval and patent announcement
2. Plan to Complete Standard
3. Changes since 1995 revision

Approval of minutes from the Spring 2007 meeting in Dallas was requested. The minutes were approved as written.

The IEEE Patent disclosure requirements were discussed and a request was made for disclosure of any patents that may be related to the work of the WG. There were no responses to the request for disclosure.

Carlo Arpino had previously volunteered to be the Vice-Chair, and was officially identified at this meeting as the new Vice Chair.
The plan or the standard is to finish cleaning it up by December and send it to the WG and IL SC for a straw ballot before February of 2008 and discuss any comments at the March 2008 meeting in Charlotte. It would then go out for the official ballot next Spring/Summer.

Changes since 1995 revision:

- **Moved Annex G thermal model to main body, recommended for transformers with rated bottom oil rise**
  - Generally accepted that model gives better results than Clause 7 eqs.
  - Bottom oil rise required on test reports since 1999.

  Comment (Barry Beaster) - if someone wants to do more analysis, they would have to tweak the program. The ability to edit values in the program would be valuable. He also indicated that the spreadsheet has both the Clause 7 and the Annex G equations.

- **Kept old Clause 7 equations for cases where bottom oil rise is not available**
  - Units manufactured prior to 1999 most likely will not have bottom oil rise on test report.
  - Added computational complexity of Annex G eqs. May not be justified for distribution transformers where unknowns outweigh any gains in computational accuracy.

  Comment: The WG needs to decide whether for continuity purposes if we need to revert back to the original equations. The modifications that have been made will get you to the same results, but there is a concern that changing the equations may result in negative ballots.

  Comment: The original Clause 7 equations contain an adjustment for the oil time constant that then new revised equations do not.

  Comment (Don Duckett): The time constant for aluminum is different from copper and the question was asked as to whether this has been addressed. Don Duckett will submit a comment on this. Jin Sim commented that for power transformers this was not a concern.

- **Moved 55C rise information into main body, add temperature limits for 55C rise transformers**
  - Many users have 55C rise transformers in service
  - Guide is not just for new units, but those currently in service

  Comment: It was not clear what limits were added and where. Jin Sim indicated that it appears that an effort was made to bring back 55C application into the document, but there are areas that have been missed and need to be addressed. Jin recommended and made a motion to take references to 55C back out of the guide and move them back into the annex. The 65C rating is the present standard. There was overwhelming agreement that the 55C information should be moved back to the annex.

- **Expanded background material on insulation aging, bringing much of the informative annex in.**
  - Insulation aging is an area where numbers have changed over the years. It’s important to retain how those numbers have changed and why.
  - Without background, it’s difficult for users of an equation to gauge the precision and reliability of the answers.
  - Question: Is the Aging section (Clause 6) readable? Does it have too much or too little information?

  Comment (Don Platts): This has unnecessarily complicated the document. It would be more appropriate that this be in the Annex. A question was asked as to whether moving information from the Annex to the main body, if it would leave the standard more open to receiving negative ballots. Don Platts indicated that that the content would be the same regardless of where it is.

A recommendation was made that a survey be prepared to obtain what the general consensus of what should be in the main body and what should be left in the Annex. Jin Sim commented that there is too much tutorial information in the main body.
A proposal was made to keep the information that was in the Annex previously in the Annex. Only clarifications or corrections as needed should be made to the main body. An attempt to reduce the size of the main body should be made.

**Added equation for bubble evolution temperature**


\[
\Theta_{\text{bubble}} = \left[ \frac{6996.7}{22.454 + 1.4495 \ln W_{\text{WP}} - \ln P_{\text{press}}} \right] \\
- \left[ \left( \exp \left( \frac{0.473 W_{\text{WP}}}{830} \right) \right) \left( \frac{V_{g}}{30} \right) \right] - 273 \quad (6)
\]

where
- \( \Theta_{\text{bubble}} \): Temperature for bubble evolution, °C
- \( P_{\text{press}} \): Total pressure, mm of mercury
- \( W_{\text{WP}} \): Percent moisture in paper (dry basis)
- \( V_{g} \): Gas content of oil, % (v/v)

- In 2005, the issue was put to a vote: “Overwhelmingly the consensus was to keep the formulas and add some wording describing the variations that could be seen depending on moisture.”
- In 2006, the issue came up again: “Consensus was that the information should be moved back to an Annex.”
- A final decision is needed.

Comment (Jin Sim): Indicated that if this equation is included in the standard that he would vote negative. His concern is with the application of the equation. Jim Thompson asked the question that if the equation is valid, should it be included with a caution on its use? Don Chu indicated that he would recommend that it be put back in the Annex.

As a result of the discussions, a group vote on each of the following items was requested as to whether they should be kept in the main body of the standard or moved back to the Annex. Results of the votes are provided below.

- 55C – Back to Annex
- Insulation Aging – Back to Annex
- Bubble Evolution – Back to Annex

**Added factors to insulation aging equation to account for accelerated aging with increased moisture content or oxygen exposure.**

- We know moisture and oxygen have a profound effect on aging rate. Current equations do not recognize this.
- However, because of difficulty in estimating moisture content and the variability of moisture both spatially and with load, difficult to account for.

**Added temperature limits for power transformers based on condition (more later)**

**Rough Estimates of Moisture and Oxygen**

Apply multiplying factors to age acceleration factor:
\[ F_{AA} = k_{H_2O}k_{O_2} e^{\frac{\Delta H}{R_{eq}}} \]

<table>
<thead>
<tr>
<th>Moisture Content (roughly)</th>
<th>( K_{H2O} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry (&lt;1.0%)</td>
<td>1</td>
</tr>
<tr>
<td>Moist (1.0-2.5%)</td>
<td>2</td>
</tr>
<tr>
<td>Wet (&gt;2.5%)</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oxygen Content</th>
<th>( K_{H2O} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1</td>
</tr>
<tr>
<td>High</td>
<td>3 - 5</td>
</tr>
</tbody>
</table>

Potential problems with this:
- Moisture is difficult to estimate
- There would be a sharp discontinuity between moisture levels (for example, between 0.9% and 1.0%)
- My opinion – it’s better than nothing

This was discussed and the general consensus is that if there is no supporting documentation for these numbers that there would most likely be negatives on this in ballot.

There are also tables with transformer condition in general provided in the latest draft.

Mark Perkins had the following comment: Moisture in the paper and oxygen in the oil both affect the aging rate of the cellulose, but it is difficult to estimate the affect on the aging at the hot spot of the transformer. The hot spot is typically located as an inner layer of paper where there are many layers, and the paper at the hot spot has moisture content that is considerably less than the bulk insulation. In addition, oxygen in the oil does not have direct contact to the paper at the hot spot paper as it does to the outer wraps of paper. So the affect of moisture and oxygen on aging at the hot spot will be different than the affect on the bulk insulation or on sealed tube samples used in formulating aging factors. In addition, it is very difficult if not impossible for a user to estimate the temperature of the hot spot, the bulk insulation moisture, and the oxygen in the oil due to the lack of specific design information and variability in diagnostic test data. As a result, the effect of moisture and oxygen on the aging rate should be shown only for sealed tube insulation samples to demonstrate the physical processes involved and to show the user the necessity of maintaining low moisture and oxygen conditions in the transformer. The user should be cautioned about applying these factors directly to the aging calculations.

The meeting was adjourned at 10:48 am.

Respectfully Submitted

Don Platts for

Tim Raymond
Working Group Chair

7.4.3.2 Working Group On Thermal Evaluation Of Power And Distribution Transformers (C57.100) – Roger Wicks

7.4.3.2.1 Introduction and Rosters
The working group met on Monday, October 15, 2007 at 11:00 AM with 16 members and 66 guests attending, with 4 guests requesting membership. This brings the number of members to 58.

7.4.3.2.2 Approval of minutes from March 20, 2006 meeting
The minutes of the March 12, 2007 meeting in Dallas were approved as written.
7.4.3.2.3 Patent Disclosure
The chairman asked if anyone knew of any patents that could pertain to this project. There were none.

7.4.3.2.4 Discussion of DuPont-Weidmann test of power transformer model.
The chairman gave a presentation to the working group of the dual temperature aging model. He gave a brief background of the model and then proceeded to present some of the recent test results. A copy of the presentation will be posted on the IEEE PES transformers committee website. Some specific topics were presented with the data that has been collected so far. These include:

- Testing of “wet” vs. “dry cells”
  - Moisture levels of ~0.1%, ~0.5%, and ~1.5% were discussed
  - Chairman Wicks presented the method of increasing the moisture content of the solid insulation in the cells. This was done by adding moisture to the oil followed by a week of thermal cycling. This was effective for the ~0.5% cells but when attempted for ~2.5% cells the moisture was vented to the gas header. Modification of the aging cells is being done to prevent this.
  - Results of “wet” insulation to “dry” insulation was presented which compared the results of sealed tube to the dual temperature aging model.

7.4.3.2.5 Work Groups for Draft 1.0
The chair then presented an overview of work that must be completed to revise the existing C57.100 document. The chair asked for volunteers from the working group to develop a draft for review before the next meeting. A summary of the specific tasks and volunteers follows:

- Distribution Transformer Test Model (Lockie Test)
  - Jin Sim, Jerry Corkran
- Model test (IEC 62332)
  - Roger Wicks, Rick Marek, Bill Simpson
- Sealed Tube Test (Annex)
  - Tom Prevost
- Standard Test Conditions
  - Roger Wicks
- Housekeeping (Style, references etc.)
  - Juan Castellanos, Don Platts

Chairman Wicks will send a word version of the present document to the above listed working group volunteers. All sections should be complete and sent to the chair by the end of January 2008.

7.4.3.2.6 Adjournment
The meeting adjourned at 11:56 AM

7.4.3.3 Working Group for Temperature Rise Test Procedures Section 11 of C57.12.90 - Paulette Payne
The Working Group met at 11:00am October 16, 2007 in Marquette/Lasalle of the Hilton Minneapolis, Minnesota. In attendance were fourteen members and forty-two guests. There were no patent disclosures.

The minutes of the March 11, 2007 meeting were approved as written.
The major topics of discussion were: a presentation by Hasse Nordman regarding average oil temperature rise in distribution transformers, hot resistance measurements time interval, and a review of an old business proposal for correction factors to be applied to constant current temperature rise.

First item was the presentation by Hasse Nordman showing inconsistencies in the results from a heat run of a distribution transformer with cooling ribs. The test was done according to IEEE standards, but the oil temperature readings at the end extremes of the cooling ribs were very different than internal sensors. Mr. Nordman asked for a correction factor that should be developed and applied to the oil temperature results of distribution transformers with cooling ribs. The chair asked for additional information on this subject.

Second item was a review of the proposal of the hot resistance measurement time interval. The initial proposal from Mr. Mark Perkins was to measure resistance every ten seconds for those points taken before four minutes, and every thirty seconds for the points taken from four to ten minutes. There was concern that 10 seconds could be impractical for manual data taking, and a change was done to the proposal to take readings every fifteen seconds for the whole period. A show of hands favored using 15 seconds through the whole period from before four minutes and up to ten minutes. The proposal with the corrections will be send to the WG for comments.

Old Business – The proposal of applying correction factors to the oil temperature for constant current temperature rise test, based on lower than rated winding temperature rises, will be referred to the C57.119 revision group, since C57.12.90 only calls for “constant losses” test.

New Business – A question was raised by Mr. Joe Melanson regarding which would be the applicable correction factors for temperature rise tests done with ambient temperatures outside of the standard 10°C - 40°C range. More information is needed on this subject.

The meeting adjourned at 12:15pm.

Respectfully submitted,

Paulette Payne Powell, Chair
Juan Castellanos, Co-Chair

7.4.3.4 Task Force: on Moisture Estimation in Transformer Insulation – Jin Sim

Task Force chairman, Jin Sim, reported that the latest effort to identify a method to determine moisture content of conductor insulation within a reasonable accuracy did not result in an acceptable conclusion. Jacques Aubin developed and presented a CIGRE paper on the subject (Paper No. 27, BRUGGE 2007) to identify further investigations needed to achieve this goal. While he still believes the path he is taking is the most promising method, we still do not have a number to characterize the accuracy.

During the Fall 2007 Insulation Life Subcommittee meeting, TV Oommen, Tom Prevost, and Don Fallon expressed their agreements in the difficulty of moisture content determination. While organizations such as CIGRE, EPRI, and others proposed alternative approaches to address the issue, we still need to determine the moisture content of the paper to support many IEEE standards and guides dealing with aging and bubbles where it is one of the critically important variables.

After substantial discussions on the subject, the Subcommittee chairman, Don Platts, directed the TF to document what we have so far in a TF report. Jin Sim indicated that he will start with the original TF members to draft a report with a goal of publishing it as an IEEE Conference paper.

7.4.3.5 Task Force on Furan Testing – Kent Haggerty

The Task Force on Furan Testing met Monday Morning, October 15, 2007 with 32 people attending.
Chair, Kent Haggerty commented that while the task force currently is sponsored by the Insulation Life Subcommittee, close communication and interaction with the Insulating Fluids Subcommittee is needed.

The purpose of the meeting was to discuss whether there are sufficient data for development of a technical paper, guide, or standard on Furan Testing.

Tom Prevost shared a presentation that was given by Marie-Claude Lessard on the work that the CIGRE Task Force has done with evaluating diagnostics with Furanic Compounds. Evaluation of Furanic compound contents vs. different parameters such as loading, design, paper insulation type, age, type of oil, type of cooling, etc was performed. CIGRE currently plans to issue a technical paper of Furan Testing by summer 2008. Data collected have been found to be specifically related to thermal degradation of the cellulose insulation. The problem becomes one of determining how the Furan values should be interpreted, the correlation to DP, Normal aging vs. Fault data, remaining life, etc.

Luiz Chiem of Brazil reported that nearly 30,000 data points have been collected from 12 different countries including some data from the US. About a third of the data collected was not complete and had to be discarded. Over half of the data could be correlated to transformer age. CIGRE has a commitment to have their paper published next year.

Don Platts shared a presentation on a users' perspective of Furan Testing, which raised many questions including:

- How to interpret the Furan Test values
- Correlation to DP
- Normal aging vs. Transformer Faults
- Remaining Insulation Life

Since CIGRE has a commitment to produce a technical paper on Furan Testing by the end of 2008, Tom Prevost indicated that there would be copyright issues we should be aware of when the Transformers Committee develops a Furan technical paper. One suggestion was made that the team may want to develop a technical paper or guide on the limitations associated with Furan Testing.

The team concluded that more data from North American utilities, testing companies, and users are needed before a technical paper or guide could be developed.

The task force meeting was closed at 10:45 AM Monday, October 15, 2007.

Additional Information

After our official task force meeting, Luis Chiem, Shuzhen Xu, and Kent Haggerty met to discuss next steps for the team. It was felt that a survey format needs to be developed to provide guidance for obtaining complete Furan and Transformer data. Luiz Chiem also commented that the CIGRE task force will be modifying their survey format and resending to gather more complete data points. Current path forward is to send out a survey to utilities, testing companies, and users requesting more data within North America and share information with the CIGRE task force. When sufficient data has been established, a technical paper or guide will be developed.

Respectfully submitted,

Kent Haggerty
Task Force Chair

7.4.3.6 Task Force on Winding Temperature Indicators - Phil McClure

The Task Force has not reported any progress in producing a paper.
7.4.4  Old Business:
Don Platts updated the Subcommittee on the status of the ballot comments on C57.12.00 and C57.12.90. The Ballot Resolution Group agreed that the comments should be addressed. A draft of the suggested language will be circulated in the Subcommittee.

7.4.5  New Business:
Don Duckett provided a brief introduction of a presentation that will be put on the agenda for the Subcommittee Meeting.

7.4.6  The meeting adjourned at 9:10 AM

Don Platts
Chair, Insulation Life Subcommittee
7.5 Performance Characteristics Subcommittee – Ramsis Girgis, Chairman; Stephen Antosz, Secretary

7.5.1 Introduction / Attendance

The Performance Characteristics Subcommittee (PCS) met on Wednesday, October 17, 2007 with 66 members and 46 guests in attendance. 9 of those guests requested membership in PCS. See last page of these minutes for attendance summary.

7.5.2 Approval of Meeting Minutes

The minutes of the last meeting in Dallas, TX were approved as written.

7.5.3 Chairman’s Remarks

7.5.3.1 Administrative Subcommittee Notes

· Next Transformer Committee meeting dates and locations are as follows:
  2. Fall 2008, October 5-9: Sheraton Hotel, Porto, Portugal
  4. Fall 2009, October 18 – 22, TBD
· IEEE T&D Conference & Exposition: April 20 – 25, 2008, Chicago, IL. There will be 7 transformer papers presented there.
· The issue of dual – logo status of an IEEE and IEC Standard has hit a snag. Since there are many other IEEE documents referenced in an IEEE Standard, these other documents also become a required part of the Standard. There are then possibly additional deeper references in the referenced document. A partial solution is to use only references necessary to implement the Standard in the normative body of the document, and all others go to the Bibliography which is informative only. This problem will be a significant ongoing hurdle to overcome related to dual – logo status of all future documents.
· Those, who are active in the SC & WGs and are still not members of the transformer Standards Committee, are encouraged to apply for membership.

7.5.4 Working Group (WG) and Task Force (TF) Reports

7.5.4.1 PCS WG on Test Code C57.12.90 – Mark Perkins, Chairman; Kirk Robbins, Secretary

This WG met in Minneapolis on October 15, 2007 at 9:30 A.M. There were 85 in attendance, 31 members and 54 guests, of which 5 requested membership

Announcements

The patent slides were shown and the chair asked if anyone had any patent issues relating to this standard. Being none, this discussion was closed.

The minutes from the last meeting were then reviewed and approved as written.

Gerry Rosselli, secretary of the working group, will no longer be able to attend the meetings and will no longer be able to be secretary to the WG. Mark asked for volunteers for a new secretary. Kirk Robbins, from Exelon Energy, is selected to be the new Secretary of the WG.
Task Force Reports

1. Gerry Rosselli reported on the issue of Zero Sequence Test for Interconnected winding Transformers where 2 transformers exhibited negative values. The problem resulted from the voltage measurement, so a new definition of Eav was formulated to correct this problem “Eav = average of three phase measured applied voltages on the HV side divided by the transformer turns - ratio”. With this correction, the negative values no longer exist and the new calculation provides similar values to the original manufacturer’s data. Gerry presented a table of cases that demonstrated the accuracy of the method after this change. It was also discussed that this new method could, in addition, be applied to other transformers without interconnected windings, but that it takes longer to perform the measurement than the current method. A statement to describe this will be added to the text of section 5.5 of C57.12.90. Another statement will be added to qualify the accuracy of the method. The WG agreed to forward the proposed new text for section 5.5 to be included in the upcoming revision of C57.12.90 for the next ballot of this Standard.

2. The TF on short-circuit testing, section 12 of C57.12.90 and PC57.133 Guide to Short-Circuit testing, met at 8:00 a.m. on Monday. Marcel Fortin, TF chair could not attend the WG meeting so Mark and Ramsis reported on behalf of Marcel. The chairman stated that the present Guide mainly included the Low Voltage Impulse method that was historically used for diagnostics in short circuit testing. He also stated that recently the TF agreed to drop the LVI method since it is no longer being used and there are new more effective methods used presently for this purpose, such as FRA and DGA. The question was raised whether a separate S.C. test Guide is necessary. The rest of the information, which was originally part of the S.C. test Guide, could be added to the short circuit testing section of C57.12.90. The chairman requested that WG members review Revision D4 of section 12 of C57.12.90, which was sent to the WG members before this meeting. He requested a response with comments sent to him by November 15, 2007. Also, the Chairman will shortly send members of the WG a document that describes the following:

   i. Content of the present S.C. Guide
   ii. Why it would not be necessary to have a separate Guide
   iii. Proposed sections of the present Guide that he would add to the new revision of section 12 of C57.12.90.

Members of the WG will be requested to send their comments on the need for a separate S.C. test Guide by January 15, 2008. A new draft of section 12 of C57.12.90 will then be ready for review by members of the TF well before the next Standards meeting in March 2008.

After the meeting, Subhash Tuli mentioned that there was an additional diagram needed in Figure 7- Transformer lead markings and phasor diagrams. The Wye-ZigZag diagram is not listed in the table, and needs to be included. The diagram is shown here:

<table>
<thead>
<tr>
<th>Y - ZIG ZAG</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANGULAR DISPLACEMENT 30 DEGREES</td>
</tr>
<tr>
<td>H1</td>
</tr>
<tr>
<td>H3</td>
</tr>
<tr>
<td>X1 X2</td>
</tr>
<tr>
<td>H1 H3, H2-X2, H2-X3</td>
</tr>
<tr>
<td>VOLTAGE RELATIONS</td>
</tr>
<tr>
<td>1) H3-X2 = H3-X3</td>
</tr>
<tr>
<td>2) H3-X2 &lt; H1-H3</td>
</tr>
<tr>
<td>3) H2-X2 &lt; H2-X3</td>
</tr>
<tr>
<td>4) H2-X2 &lt; H1-X3</td>
</tr>
</tbody>
</table>

CONNECT H1 TO X1
MEASURE H3-X2, H3-X3, H1-X3, H2-X2, H2-X3
New Business

The WG chairman presented a new topic; revision to section 6 “Polarity and Phase Relation”. This section is nearly 7 pages in the Standard, and much of the information is outdated and no longer being used and there are some inaccuracies. The WG then went over this section of the standard. There are some inconsistencies in figures 4 and 5 for the polarity marks and the definition of Subtractive and Additive polarity.

The Chairman presented an assortment of different transformer nameplates to show the information used as reference for the polarity test. In general, there is a lot of variability in the way nameplate drawings are shown, and the drawings do not necessarily represent the actual winding configuration. As a result, when the polarity test is performed, what is actually done is measuring the terminal polarity and comparing this with the nameplate information. Examples were shown of transformers from different manufacturers that had various combinations of windings with additive and subtractive polarity. Some nameplates include polarity marks and others do not. The chairman then asked members of the WG if they agreed that it was necessary to update section 6, and the consensus was that it is.

7.5.4.2 PCS WG on General Requirements C57.12.00 - Steve Snyder, Chairman; Enrique Betancourt, Secretary

The WG met on Monday, October 15, at 3:15 PM. There were 28 members and 50 guests present. The following two guests requested membership, leaving the WG membership at 71 members:

Jim Zhang   Arizona Public Service
Ibrahim Shteyh   ABB, Inc. (South Boston)

Following introductions, minutes of the March 12, 2007, Dallas meeting, were approved as submitted. Working group members were then asked about any applicable patents pertaining to our work. No patents were disclosed by anyone.

Old Business:

The chairman presented a new version of Table 21 - Draft 6A - (Routine, design, and other tests for liquid-immersed transformers) that incorporates all the previous changes agreed to by this WG. Hard copies were distributed, including a list of changes included since Draft 3 (balloted April 2003), and two more options, Drafts 6B and 6C, for possible formats of Table 21.

On sight of draft 6A of Table 21, the WG made reference to some items that still required discussion before considering the table formats.

Resistance Measurements

The WG agreed (33 in favor, none opposed) to remove the status of this test as “Other” for Distribution Transformers, and remove the sentence in the note mentioning the range of 500 kVA and below. The new note will read “For distribution transformers rated 2500 kVA and smaller, this is a Design test. Greater than 2500 kVA is a Routine test”.

In response to further questions of how a Distribution Transformer is defined, the chairman remarked that now Std. C57.12.36 defines Distribution Transformers up to 10 MVA, three – phase.

Single Phase Excitation Tests

A discussion ensued about whether this test falls under PCS or Dielectric Tests, and there was no clear determination. In consideration of the considerable expertise assembled at this meeting, the topic was discussed with the understanding that the Dielectric Tests Subcommittee
could override these decisions if it is subsequently determined the topic is better handled in that forum. This will be addressed in the Dielectric Tests Subcommittee meeting on Wednesday.

The comment on this test shown in Draft 6A will be changed to imply that only one winding of each phase should be tested, as it presently is worded in the published standard. After a lively discussion, the group also recommended (37 in favor, 2 opposed), to change the status of this test as “Routine Test” for Class I and Class II Power Transformers. (Further consideration for this test will be taken up in WG C57.12.90. Subhash Tuli volunteered to prepare a paragraph on the subject).

Dong Kim raised the question if Winding Insulation Resistance and Core Insulation Resistance should be “routine tests” for Class I power transformers. Loren Wagenaar will take those subjects within the Dielectric Tests SC.

Dennis Marlow pointed out that Draft 6 of Table 21 was missing Impedance and Load Loss tests. This editorial mistake will be corrected taking the text from previous Draft 5.

As regarding the format of Table 21, the Group agreed that Draft 6A of Table 21 is the most preferred. This version is landscaped with comments in the last column, and will hopefully facilitate application for future users of the document.

Subhash Tuli requested clarification that the sequence of tests listed in Table 21 does not imply the recommended test sequence. The chairman explained that explanatory text will be added to Section 8 of C57.12.00 to address that matter.

Other suggestions included: (Mark Perkins) Categorization of tests in terms of Performance, Dielectric and Mechanical; (Ramsis Girgis) Reduce the comments in Table 21 to the ones necessary to specify what tests and to what types of transformers. The chairman will address those items in the future, after the existing table structure gains acceptance.

The chairman will soon conduct a survey of the PCS membership using the Draft 6A format with all the agreed to changes. It is desired to have this work completed before the next revision ballot of C57.12.00, anticipated next year.

7.5.4.3  WG on Loss Tolerance and Measurement - Ed teNyenhuis, Chairman; Andy Steineman, Secretary

- 4 members and 3 guests attended.

- IEEE Patent Policy - The policy was reviewed by the WG and an opportunity was provided for WG members to identify or disclose patents that the WG member believes may be essential for the use of that standard. No responses were given.

- Minutes from the Dallas Meeting held on Mar 13th, 2007 were read and approved.

- It was reported that the TF for “Guide for Low Power Factor Measurements” has been discontinued, and will only meet within PSIM.

- Frequency Conversion Factors of Transformer Performance Parameters – The status of the proposed wording for inclusion in C57.12.00 and C57.12.90 was reviewed. The status is as follows:
  § Survey is complete in this WG
  § WG reviewed results of the survey & approved all suggested changes to wording
  § Section on Frequency conversion of noise level was reviewed and finalized by Audible Sound & Vibrations SC. Immediately after this meeting, Ramsis Girgis will submit this section to the Audible Noise SC for survey.
§ This wording is planned to be balloted with the upcoming C57.12.00 and C57.12.90 ballots.

- C57.123-2002 – Guide for Transformer Loss Measurement – The status of the Guide was reviewed:
  - The following is presently being done, to be completed by end of Oct:
    - Ballot invitation (forming of ballot pool)
    - Mandatory Editorial Coordination
    - Review of text by IEEE editorial staff
  - Last step is to submit for ballot

- Ramsis Girgis proposed 2 enhancements be made to the Loss Measurement Guide:
  1. Modifications to allow a Dual – Logo IEEE/IEC document. References within the Guide to IEEE Standards will need to be moved to the bibliography. The Guide was quickly reviewed during the meeting, and it was determined that there is a need to examine the feasibility of making this change.
  2. The Department of Energy’s Efficiency Standards for distribution transformers has been recently published. It uses terminology and methods that are not all consistent with C57.12.90. It was proposed that a section could be added to the Guide that would deal with the differences between the two documents.

It was decided that, since the balloting pool for the revised Guide is already being formed, these modifications would be considered for next version of the Guide.

7.5.4.4 WG on Switching Transients Induced by Transformer / Breaker Interaction, PC57.142 - Robert Degeneff, Chairman; Peter Balma, Secretary

This WG was called to order at 8:00 AM on October 16, 2007. There were 72 attendees, 23 members, and 49 guests. The minutes from the March 13, 2007 meeting in Dallas, Texas were approved, and copies of the minutes were distributed.

1. IEEE patent policy was reviewed and if there were no disclosures.
2. The old PAR for this project was withdrawn and a new PAR with joint sponsorship with the Switchgear Committee was submitted, and has been approved.
3. The joint TF that was assembled with members from the Switchgear & Transformer Committees’ has been working on a new draft of the document. The new draft will be shared with both committees and then go out to ballot. Input from the Switchgear committee TF is expected within the next week, and plans are to go out to ballot this fall.
4. The structure of the latest draft of the guide has been revised based on input from the switchgear committee. The new order of the clauses in the guide will aid user’s understanding of the concepts presented.
5. Phil Hopkinson made a brief presentation on his observations of situations where interaction had occurred, and expressed the point of view that both resonances and traveling waves need to be considered. The WG then had an extensive discussion of this concept with contributions from many members of the group. Salient points discussed are highlighted in the following:
   a. It is the combination of the load, cable, switching device, transformer, and the system that produce the potentially damaging interaction.
   b. It is persistence and repetition of the waveform that results in transformer damage.
c. The guide does not discriminate between high and low frequencies. There is a whole family of natural frequencies, but the guide refers primarily to the first three to illustrate the interaction issue.

d. Transformer failures at the line end are usually due to high dv/dt events and not resonant conditions.

6. At the end of the discussion, a decision was made to include information to explain the whole spectrum of frequencies that are in play when considering transformer, switching device and system interactions. It was also reiterated that the guide does not address high frequencies in detail; however, it was decided earlier in this project that was not going to be part of the scope of the initial version of the guide.

7. Bob Degeneff then presented the commonly used Protection / Mitigation methods to protect transformers from switching interactions. The methods include:

   a) Surge arrestors
   b) Surge capacitors
   c) Snubbers
   d) ZORC (Snubber & arrester)
   e) Series Inductance & Shunt Capacitance

A question was raised as to whether something can also be done with circuit breakers to mitigate this problem. Nigel McQuin referred the group to IEEE Standards C37.010, and C37.011 which provide substantial information to aid the user in understanding breaker applications and transient recovery voltages.

There was no other new business brought before the group.

7.5.4.5 WG on Revision of C57.21- Standard Requirements, Terminology, and Test Code for Shunt Reactors over 500 KVA — Richard Dudley, Chairman

The W.G. met in the Duluth Meeting Room of the Hilton Minneapolis Hotel in Minneapolis, Minnesota on Oct. 15, 2007 from 11:00 a.m. to 12:15 p.m. There were 16 members and 17 guests present. The following are the highlights.

1. Introductions were made.
2. The minutes of the Dallas meeting were approved.
3. IEEE patent policy was reviewed and no patent issues were identified re the revision of IEEE C57.21.
4. The remainder of the meeting was devoted to discussing the comments associated with the 5 negative ballots received during the formal IEEE ballot of Draft #12 of the revision of IEEE C57.21. The following are the highlights.

(i) JEFF NELSON
   - Clause 12.8: IEEE C37.109 Guide for the Protection of Shunt Reactors will be “cited” and added to the “Normative References”.
   - Clause 12.2: To be in line with the requirements of the NESC the pedestal height recommendation will be 8 feet 6 inches.
   - Table 5: The proposal to change maximum voltages for 115 kV, 161 kV and 230 kV systems from 121 kV, 169 kV and 242 kV to 123 kV, 170 kV and 245 kV was rejected as current levels are per the current IEEE transformer standards. The proposal is based on the practice in IEEE Switchgear Committee standards.
   - Clause 3.2 and 3.2.3: The title of Clause 3.2.3 will be changed to “Rated Voltage” from “Rated System Voltage”; rated voltage is now defined specifically. The statement in
Clause 3.2.3 “Rated voltage is normally the voltage associated with nominal system voltages” will be deleted.
- Table 1: Table 1 and Table 2 will be modified to show no correction for altitudes £ 1000M.
- Clause 4.1.5: Example (2) will be modified to include seismic to be consistent with the latest revision of IEEE C57.12.00. Note IEEE 693-2005 is “cited” in Clause 10.10.

(ii) LOREN WAGENAAR
- Clause 10.3.4.4: The third paragraph will follow the Notes to ensure there is no confusion as to what the note contents refer to. Notes: “However, only…………………..”
- Clause 10.3.3.1 and 10.3.3.2: Comment that the end user must be notified at the tender stage re testing with a single phase source was accepted.
- During the discussion of LOREN WAGENAAR’s comments it was noted that the clause numbering in Section 10.3.3 was in error e.g. “Turn-to-turn Overvoltage Test for Dry-Type Shunt Reactors” etc. The Chairman will correct this for the “recirculation” draft.

(iii) ALAN DARWIN
- Clause 10.6.6.4: Equation 11 is incorrect. It is correct in IEEE C57.21-1990. This version will be used. The title of Clause 10.6.6.4 will be changed to “Calculation of Sound Level at Each Microphone Position”.

(iv) CARLOS PEIXOTO
- Clause 10.3.3.1.4: The request to change p.d. levels was not accepted by the W.G. Values are in line with those in IEEE transformer standards.
- Section 4.1: Clause 4.1.6 will be added covering “Environmental Conditions” and will be based on the content in Annex A Clause A.3.4. The Chairman will make this change.

(v) JIM WILSON
- Jim Wilson’s comments are accepted.

(vi) The comments associated with “approved with comments” ballots are largely editorial or corrections and are accepted. They will be included in the “recirculation” draft.

The Chairman requested that W.G. members provide any input as soon as possible. The Chairman will produce Draft #13 and send to W.G. members for approval prior to “recirculation ballot”. The meeting adjourned at 12:15 p.m.

7.5.4.6 WG on Revision of C57.110 – IEEE Recommended Practice for Establishing Liquid-Filled & Dry-Type Power & Distribution Transformer Capability When Supplying Non-Sinusoidal Load Currents – Rick Marek, Chair; Kent Haggerty, Co-Chair

There was no meeting this fall since a ballot on the document had just been completed. The ballot results are as follows:

Ballot Open Date: 08/28/2007 Ballot Close Date: 09/27/2007

RESPONSE RATE: This ballot has met the 75% returned ballot requirement. 85 eligible people in this ballot group:

66 affirmative votes
2 negative votes with comments
0 negative votes without comments
2 abstention votes
70 votes received = 82 % returned 3 % abstention

APPROVAL RATE: The 75% affirmation requirement is being met.

68 votes = 97% affirmative, 35 total comments

The next step will be to review the comments, resolve the negative ballots, and then re-circulate an updated version.

7.5.4.7 TF on Semi-Conductor Rectifier Transformers, C57.18.10 – Sheldon Kennedy, Chairman

The WG met on Tuesday, October 16, 2007 at 3:15 PM with 10 members and 5 guests present. Sheldon Kennedy chaired the meeting.

The IEEE disclosure statement was discussed. There were no patents pertaining to this standards work for which any members had awareness.

The minutes of the March 13, 2007 meeting in Dallas were approved.

The Chair announced that the Amendment, C57.18.10a/D2, had been put out for a survey in the Performance Characteristics Subcommittee. Only 17 votes were received out of the 126 members. Eleven approved with no comments. One approved with comments. Five abstentions were received. No negatives were received. Lacking any negative votes, the chair proceeded on with the amendment process.

The Chair sent the draft on for IEEE editorial review. That was completed and the invitation to ballot was sent out on October 7, 2007. The ballot invitation is open until November 9, 2007. The balloting process will begin after that.

The Chair reminded the WG that IEEE had published an Errata in January 2006, correcting some of the problems that occurred when the Word copy was converted to a PDF file. Also, with this Amendment, the standard cannot be reaffirmed in 2008. When it comes due it will have to go to a full revision. The Chair discussed some of the tabled topics from the reaffirmation and previous work and asked members to begin to think about things they would like to work on for the next revision. The Chair also expressed concern for all of the work that will be needed to bring this document into the new IEEE format. This standard contains many tables and formulas which will be a lot of work to convert.

7.5.4.8 WG on IEEE Standard Requirements, Terminology, and Test Procedures for Neutral Grounding Devices, PC57.32 – Steve Schappell, Chairman

In absence of the WG Chair Steven Schappell, the meeting was conducted by Peter Balma and notes were taken by Raj Ahuja.

There were 16 attendees — 6 members and 10 guests with 1 guest Vif Radbrandf requesting membership to the WG.

Approval of minutes from the March 2007 meeting in Dallas was requested. The minutes were approved as written.

The IEEE Patent disclosure requirements were discussed and a request was made for disclosure of any patents that may be related to the work of the WG. There were no responses to the request for disclosure.

Discussion on the present Draft:
There was good discussion from the attendees and following is the summary –
1. The Resistors – Stainless steel type there is need for the justification of temperature limits and the reference documents in the standard.

2. Thermal rating of Resistors – there is need for the tolerance in resistance value at the end of thermal rating duration — to be included in the standard.

3. Section 14.2 There was discussion on the need of reduced Insulation level at the ground end of the resistor as an option available to the users. At present the ground end has same Insulation level as the Neutral end.

4. Zigzag grounding transformers to be covered in the standard

Assignments for sections requiring review:
Members volunteered to review of following sections -

1. Definition of Sections — Peter Balma
2. Ground fault neutralizers – Richard Dudley
3. Grounding Transformers – Donald Ayers
4. Capacitors – Peter Balma
5. Combination Devices – Sergio Panetta

New Business:
600 V class Neutral grounding resistors to be included in the standard for Distribution class transformers. At present standard covers only >= 1200 V class.

### 7.5.4.9 WG on the Guide for the Application and Interpretation of Frequency Response Analysis for Oil Immersed Transformers, PC57.149 — Chairman; Charles Sweetser

WG PC57.149 met for the development of the Frequency Response Analysis (FRA) Guide in Minneapolis, MN on October 15, 2007 at 1:45 PM. There were 76 people in attendance, 21 members and 55 guests which of 11 requested membership.

The first order of business was to show five IEEE slides regarding patents.

The working group chair gave an update of draft D4.

The Working Group Chair presented a brief report on what had been done in the last six months. It was estimated that the document is over 95% complete. The latest contributions were identified and discussed.

Section 1: Scope and Application - Review complete and open to general comments.

Section 2: FRA Test Parameters - Review complete and open to general comments.

Edits to Section 3: Making a FRA Measurement

Larry Coffeen has agreed to supply the alternate connection instructions, including a purpose, description, and terminal connection table. This section will be appended to the primary recommended test connection table

Section 4: Test Records – Paulette Payne Powell and Alexander Kraetge provided recommendations regarding required and optional fields for test records. These fields will be required to save a FRA dataset. Twenty-three items are required; however, several items can be automated if test templates are applied.

Edits to Section 5, analysis and Interpretation: The discussions focused on failure modes and trace comparison strategies.

An analysis strategy regarding failure modes was proposed. 8 failure modes presented:
The working group agreed to limit the failure modes to these 8 categories.

Three common variations (oil, residual magnetization, poor connections and grounding) will also be added to this section, but will clearly be separated, since they are not actual failure modes.

The Working Group recommended including any information describing why the FRA traces change for specific failure modes.

The proposal presented the concept of a one-page format. A one-page analysis template would be created for each failure mode, and would include a view of all applicable tests of a failure mode. The key is to not concentrate on a single test.

This format will include the following tests:

1. HV Open Circuit
2. LV Open Circuit
3. HV – LV Short Circuit

The test will be presented in both before / after and phase / phase comparison formats.

Several members offered to provide case studies; Payne Powell, Alexander Kraetge, Jin Sim, Kurt Robbins, Larry Coffeen, and Peter Werelius.

Alan Darwin volunteered to provide a short description on modeling and agreed to review and edit the appendix on FRA Theory.

The chair provided an update on the CIGRE WG A2.26. The CIGRE WG A2.26 met on October 10, 2007 in Bruges, Belgium. They published their document “MECHANICAL-CONDITION ASSESSMENT OF TRANSFORMER WINDINGS USING FREQUENCY RESPONSE ANALYSIS (FRA).”

The PC57.149 FRA WG plans to have an updated draft D5 at the next meeting.

7.5.5 Old Business

None

7.5.6 New Business

None
Attendance at this Meeting

MEMBERS

1. Raj Ahuja
2. Stephen Antosz
3. Carlo Arpino
4. Javier Arteaga
5. Barry Beaster
6. Enrique Betancourt
7. Wallace Binder
8. Carl Bush
9. Alvaro Cancino
10. Craig Colopy
11. John Crouse
12. Alan Darwin
13. Dan de la Cruz
14. Richard Dudley
15. Fred Elliott
16. Bruce Forsythe
17. Eduardo Garcia
18. Charles Garner
19. Ramsis Girgis
20. E. Gomez-Hennig
21. Bill Griesacker
22. Myron Gruber
23. Stanley Hatch
24. Roger Hayes
25. William Henning
26. Philip Hopkinson
27. Virenda Jhonsa
28. Sheldon Kennedy
29. Vladimir Khalin
30. Alexander Kraetge
31. John Lackey
32. T. Machado Junior
33. Richard Marek
34. Dennis Marlow
35. John Matthews
36. Harold Moore
37. Martin Navarro
38. Van Nhi Nguyen
39. Gylfi Olafsson
40. Klaus Papp
41. Mark Perkins
42. Christoph Ploetner
43. Bertrand Poulin
44. Paulette Powell
45. Ryland Revelle
46. Jean-Cris Riboud
47. Pierre Riffon
48. Girolamo Rosselli
49. Marnie Roussell
50. Mahesh Sampat
51. Ewald Schweiger
52. Jin Sim
53. Steven Snyder
54. Andy Steineman
55. Craig Stiegemeier
56. Charles Sweetser
57. Juan Luis Thierry
58. Robert Thompson
59. Robert Tillman
60. George Tolbert
61. Alan Traut
62. Subhash Tuli
63. Dharam Vir
64. Loren Wagenaar
65. Jim Zhang
66. Peter Zhao

GUESTS

1. Hasse Nordman
2. Ulf Radbrandt
3. Mark Peterson
4. Rudolf Ogajanov
5. Shawn Patterson
6. Waldemar Ziomek
7. Dave Ostrander
8. Paul Mushill
9. Jennifer Yu
10. Jeff Foley
11. Peter Werelius
12. Mark Scarborough
13. Kirk Robbins
14. Robert Perlichke
15. Jim McBride
16. Dong Kim
17. Patrick Wang
18. Prem Patni
19. Shamaun Hakim
20. Dwight Parkinson
21. Steve McGovern
22. Vinay Mehrota
23. Bruce Fairris
24. Donald Ayers
25. Gene Blackburn
26. Lewis Powell
27. Mathieu Sauzay
28. Sanjay Patel
29. Ryan Brady
30. Brett Todd
31. Charlie Drexler
32. David Scaquetti
33. Kipp Yule
34. Steve Jordan
35. Eberhard Lemke
36. Jane Ann Verner
37. Richard Tellez
38. Richard Graham
39. Pat Pries
40. Do Gyoon Kim
41. Mike Craven
42. Randall Kyle
43. Ben Lopez
44. Wayne Johnson
45. Liu Qiuping
46. Fran Huguet

** Guests requesting Membership.
7.6 Power Transformers Subcommittee
Tom Lundquist, Chair

The Power Transformers Subcommittee met on Wednesday, October 17th, 2007 with 51 members and 76 guests; with a total of 127 in attendance.

The minutes from the Dallas, Texas meeting were approved as written.

The chairman asked if anyone was aware of any patent conflicts, none were voiced.

7.6.1 WORKING GROUP AND TASK FORCE REPORTS

7.6.1.1 TASK FORCE FOR REVISION OF C57.17, REQUIREMENTS FOR ARC FURNACE TRANSFORMERS – Dominic Corsi, Chairman
No meeting.

7.6.1.2 WORKING GROUP FOR DEVELOPMENT OF PC57.143, GUIDE FOR APPLICATION OF MONITORING TO LIQUID IMMERSED TRANSFORMERS AND COMPONENTS – Donald Chu and Andre Lux, CoChairmen

The working group met on Monday, October 15 at 8 AM. Approximately 120 members and guests were in attendance.

The guide went through a survey in March 2007. Approximately 19 responses were received; 3 of them negative and 16 positive. Almost all of the comments and suggestions were incorporated during a working session of the WG during the spring Doble Client Conference. These comments were reviewed and discussed for membership concurrence.

Approximately 7 of the comments have not been implemented because they require further action. Volunteers came forward to work on these issues. The goal is to have these contributions back within 2-3 weeks. The new draft (#20) will be surveyed by the WG membership in late November.

The meeting adjourned at 8:45 AM.

7.6.1.3 WORKING GROUP FOR DEVELOPMENT OF PC57.148, STANDARD FOR CONTROL CABINETS FOR TRANSFORMERS – Joe Watson, Chairman

The Working Group for PC57.148 met on Monday, October 15, with 8 members and 16 guests attending (24 total). Four guests requested to be added to the membership. Joe Watson was not able to attend the meeting and Greg Anderson facilitated. The meeting convened at 11:00 am with an introduction and review of the IEEE patent policy and request for any disclosures of conflicts.

Work continues on Draft #4, which was posted on the website in March 2007. Several drawings were also posted in March. Each drawing was briefly reviewed during the meeting. There is continued concern that some of the drawings are too detailed and cannot be bound in the standard document. We are still investigating whether these drawings can be posted somewhere on the Internet for download and review. The consensus of the group is that we should proceed with completing the document without the large detailed drawings and only include several generic figures (non-detailed schematics and wiring diagrams that can be inserted on an 8-1/2" x 11" sheet). Perhaps after the document is initially published, further investigation can continue on how to make the more-detailed drawings available as an "electronic annex" to the standard document.
The opinion of the group is that this document should continue with the “less is better” approach and only include the commonly accepted items that can be agreed by all Users. Several items were identified that seemed to mandate that a User accept something usual. An example was the discussion of “ring-type terminals”. Although the majority of Users in North America specify ring-type terminals, some Users are moving towards allowing European-type, rail-mounted terminal blocks, because of the growing number of transformers being sourced from foreign manufacturers.

One worthwhile suggestion was that we develop a standard one-page “data sheet” that can be bound in the standard. The data sheet can allow a User to quickly check-off the items desired; i.e. either ring-type terminals or European-type terminals, NEMA 4 enclosure, etc. The use of a standard data sheet (acceptable by everyone) will allow a Manufacturer to easily determine the specified items. The consensus of the group was to continue the work on the standard in its present format and perhaps incorporate the data sheet as an annex in a future revision. Perhaps the data sheet can be also placed on the Committee’s website in “active PDF” format which will allow the User to electronically check the desired items and incorporate the data sheet into their company specification.

With the time remaining, the document was quickly reviewed. Several items were suggested for incorporation:

— view glass in door, for viewing an annunciator without opening the door (C. Hurley),
— add description of a NEMA 7 enclosure to Section 5 (K. Yule),
— maximum/minimum mounting height of cabinet; i.e. maximum height to top of 72 inches, or consideration of mounting cabinet high enough to avoid snow or flood water,
— duplex 120 volt, 15 or 20 amp GFI receptacle inside or outside control cabinet,
— “cooling chimney” for cabinets containing devices that produce excessive heat (T. Lundquist),
— reference for “SIS” wire (K. Yule).

The meeting adjourned at 12:15 p.m.

7.6.1.4 WORKING GROUP FOR DEVELOPMENT OF PC57.131, STANDARD REQUIREMENTS FOR TAP CHANGERS - William Henning, Chairman

The Working Group on Tap Changer Performance met on Monday, October 15, 2007 with 16 members and 46 guests present.

The working group chairman asked if anyone had information on patents related to the working group. It was noted that no one present at the meeting expressed knowledge of patents related to our document.

Next, the minutes of the previous meeting in Dallas were approved. The previous meeting in Dallas was primarily devoted to a discussion on temperature rise limits for contacts of load tap changers and de-energized tap changers. The discussion continued at the Dallas meeting. Finally, the following decision was made by a show of hands.

SHOW OF HANDS REGARDING TEMPERATURE RISE

votes to use the same temperature rise limits as in the IEC tap changer standard

0 votes to increase the temperature rise limits for de-energized tap changers to make them the same as for LTCs.

2 votes to decrease the temperature rise limits for LTCs to make them the same as for de-energized tap changers.

So the decision was made to use the IEC temperature rise limits.
A second subject discussed was the wording used to identify the contacts to be tested in the five dielectric tests.

For LTCs,

Test 1: (not changed) live part to ground

Test 2: (not changed) between phases, if applicable

Test 3: (changed to read) between the any two contacts that connect across the first and last taps of the tapped winding

Test 4: (changed to read) between any two contacts that connect across adjacent taps of the tapped winding, or any other contacts relevant to the LTC contact configuration

Test 5: (not changed) between diverter switch contacts in their final open position

For DETCs, the wording was not changed and is reproduced below for reference.

Test 1: live parts to ground

Test 2: between phases, if applicable

Test 3: between the first and last contacts of the DETC

Test 4: between any two adjacent contacts of the DETC

Test 5: any distance, that due to contact configuration will have a higher stress than the ones tested above

With these changes made, the working group now has a complete document ready for balloting. The working group chairman noted that the PAR for revision of C57.131 will expire in December, 2007 and will need an extension granted in order to complete the balloting.

7.6.1.5 WORKING GROUP FOR THE REVISION OF C57.93, INSTALLATION OF LIQUID-FILLED TRANSFORMERS - Michael Lau, Chairman

The document has been submitted to RevCom, waiting for response.

7.6.1.6 WORKING GROUP FOR DEVELOPMENT OF PC57.150, GUIDE FOR THE TRANSPORTATION OF TRANSFORMERS AND Reactors RATED 10,000 KVA OR LARGER - Greg Anderson, Chairman

Greg Anderson, Chair of the Working Group for Transportation Issues Guide, PC57.150, called the meeting to order at 3:25 p.m., Tuesday, October 16, 2007. Also present were the Vice-Chair Ewald Schweiger, and Secretary Susan McNelly. There were 18 members present with 38 guests and 3 guests requesting membership in the WG.

The IEEE Patent disclosure requirements were discussed and a request was made for disclosure of any patents that may be related to the work of the WG. There were no responses to the request for disclosure.
Approval of minutes from the Spring 2007 Dallas meeting was requested. A motion was made and seconded. The motion was approved.

Greg brought up the list of participants and his desire to get this updated so that only those that have actually contributed are on the list that is put in the actual standard.

Participants/Contributors to date:

Gregory W. Anderson, Chair
Ewald Schweiger, Vice Chair
Susan J. McNelly, Secretary/Technical Editor

William Darovny  Marnie Roussell
Doug Filer  Craig Swinderman
James Garner  Robert Thompson
Tom Lundquist  Jane A. Verner
Jerry Murphy  David Wallach
Paul Pillitteri  Kipp Yule
Les Recksiedler  Ricardo Zarate

The WG is presently on draft 4 of the guide. Greg reviewed the various sections in the standard and thanked those that have already provided information that has been input into the guide to date.

Kipp Yule volunteered to help provide additional information for the overseas shipping section. Kipp indicated that placement, quantity, and trigger values of the impact recorders, position of the load on the ship, the size and age of the vessel, whether the unit is oil filled, and design impact requirements are all important factors that need to be considered.

The recent bridge collapse in Minneapolis has had far reaching ramifications on additional limitations and reduced bridge capacities across the US and in other countries. These reduced capacities are affecting shipping durations and permitting.

Bill Darovny and Jane Verner will provide some input for a receipt checklist.

There was a comment from Dave Wallach on the impact recorder section that 5G as an indication of rough handling needs to be thought out. Does it mean that 4G is OK? John Progar had a comment that issues with shipping a unit that has failed and that even though some components may be damaged, care is still needed to protect parts that may still be in good condition. John Progar and Craig Steigemeier will provide information on issues related to transportation of repaired units. There are also issues related to relocation of units. In general, good progress is continuing to be made on the document. A revised draft with the latest input will be sent out in the next several weeks for review.

Meeting was adjourned at 4:22 p.m.
7.6.1.7 TASK FORCE FOR FUNCTIONAL LIFE TESTS OF DE-ENERGIZED TAP CHANGERS – Phil Hopkinson, Chairman

The Task Force on Life Tests, De-energized Tap Changers was called to order at 9:30 AM on October 16, 2007. There were 33 attendees, 13 members, and 20 guests with 2 requesting membership. Reviewed the agenda for the meeting, and the Minutes from the March 13, 2007, meeting in Dallas, Texas, were approved.

1. Mission – Develop Functional Life Test and Supporting Technical Paper for De-energized Tap-changers. Reminder that the goal is to develop the test and have a paper that supports the test. Test will ultimately be included in C57.131.

2. Mr. Hopkinson reviewed slides from the agenda posted on the Transformer Committee Website.
   a. Life considerations
   b. Tap changer Suitability for Synthetic Insulating Liquids
   c. Functional Life Tests Functional Life Tests-Issues
   d. Functional Life Tests-Connections
   e. Functional Life Tests-Issue of Oil Volume
      I. Large liquid volume important for test validity – modified slide Large liquid volume should speed up thermal runaway
      II. 130 C Liquid Temperature a good selection – there is a safety concern with this temperature.

3. Review Test data provided by Larry Dix, Quality Switch

Silver-plated contacts and natural ester oil were used. The data looks stable.

The volume of oil should be large and should not be changed. A thought is that there is a chemical reaction going on with the contacts and too little oil depletes this chemical. Mr. Dix estimates using 10-15 gals in testing. Mr. Kraemer estimated using 500-600 liters in testing conducted at Reinhausen.

Mr. Alan Johnson will look at defining the volume of oil to use in testing.

   Natural ester oil – very stable
   Mineral oil – moderate stability
   Silicone – very unstable

Members are to consider other combinations of where to attach leads and thermal parameters. Additional testing to be conducted by Mr. Dix and Mr. Kraemer.

4. New Business

   There was no new business.

The meeting adjourned at 10:45 AM.

7.6.1.8 WORKING GROUP FOR REVISION OF C57.135, GUIDE FOR THE APPLICATION, SPECIFICATION AND TESTING OF PHASE-SHIFTING TRANSFORMERS – Jin Sim, Chairman

The Working Group for revision of C57.12.135, the “IEEE Guide for the Application, Specification and Testing of Phase Shifting Transformers” met on Tuesday, October 16, 2007 at 11:00 am. There were 8 members and 20 guests attending the meeting. The Vice chair and the secretary could not attend the meeting and notes were taken by Jeff Foley.
After the introduction, patent disclosure was reviewed and previous meeting minutes were reviewed and approved.

The chairman briefly reviewed the activities between meetings. Several members and guests from users and manufacturers of PST contributed with written comments and suggestions to improve the document. All of them will be incorporated into the revision of this guide.

Some parts of the contribution were discussed at the meeting as noted below.

The overloading conditions for very large PST could exceed the switching capability of the LTC and various users handle the situation by utilizing the LTC controls to block the operation under these conditions. After full discussion of the subject, members felt that this should not be included in the guide since it should not be a design guide and virtually all cases of large PST procurement process includes specification and design reviews to address this issue.

Certain PST designs will cause the impedance changes with LTC position changes in non-linear fashion and a concern was raised if this will impact the power flow. Sanjay Patel reported via email that based on his discussions with users that the impedance changes do not impact the power flow as much as the phase angle. Most users utilize analytical tools to study the load flow and can handle the impedance changes.

System planners need information on loading PST and they rely on their technical people to provide guidance. There is not sufficient amount of technical papers or industry guides to address this. Jim McIver will summarize inputs from users and manufacturers on minimum information requirements for specifying a PST for inclusion in the revision of the guide.

A considerable discussion on PST with DETC took place. Several users indicated that they are used to switch connections to either phase shifting or voltage regulation, or to change a fixed angle of regulation. This subject belongs to the user specification, rather than a guide and will be treated as such.

7.6.1.9 WORKING GROUP FOR REVISION OF C57.12.10, STANDARD REQUIREMENTS FOR LIQUID IMMERSED POWER TRANSFORMERS - Javier Arteaga, Chairman

No minutes received.

7.6.1.10 TASK FORCE FOR THE REVISION OF IEEE STD 638-1992, IEEE STANDARD FOR QUALIFICATION OF CLASS 1E TRANSFORMERS FOR NUCLEAR POWER GENERATING STATIONS – Craig Swinderman, Chairman

The task force met on Tuesday, October 16, 2007.

Attendees: 3 members + 3 guests

The meeting began at 1:45 p.m.

The meeting minutes from March 2007 meeting were approved.

The IEEE patent policy slides were shown. An opportunity was provided for the attendees to identify or disclose patents that may be essential for the use of the standard. No responses were given by the attendees of the meeting.

Topics discussed:
In our last meeting in March 2007, it was decided that the group should proceed with applying for a PAR to revise the existing document, keeping the same scope as the original document, but updating the content as necessary. A PAR was recently submitted to IEEE in order to begin a working group for revising this document. The PAR was approved during the June 7, 2007 Standards Board meeting and will be valid until December 2011.
The working group has made good progress and has already prepared a complete draft #1 document of the revision to the standard. This draft #1 of the document will be posted to the transformers committee web-site shortly.

It was noted during our working group meeting that there were no users present in the working group meeting to provide input to the document revisions. During the course of this week, two nuclear plant-related users volunteered to review the draft #1 of the P638 document and provide comments and suggestions. In addition, the working group will contact other users and ask for their input to this draft document. This input will be greatly appreciated by the working group.

The working group is now reviewing the latest versions of IEEE 323-2003 “Qualification of Class 1E Equipment for Nuclear Power Generating Stations” and IEEE 344-2004 Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations” in order to be sure that the latest requirements of these standards are covered in our revision of IEEE 638, or where the document should be modified to follow the updated standards IEEE 323 and 344. Two members have volunteered to review these documents and provide reports by the spring 2008 meeting.

In addition, the working group will review referenced standards C57.12.56, C57.12.60 and C57.100 that describe the thermal aging procedures discussed in Annex A. A member has volunteered to review these standards in order to update Annex A in accordance with the latest version, including updating the example calculations contained in the Annex. This work will also be completed prior to the spring 2008 meeting.

Also, during the meeting it was noted that some of the Normative Reference standards listed in the draft of the document are not actually referenced in the body of the document. The working group will review as to whether these references should be moved to informative references, included in a bibliography, or should be kept as normative references and mentioned in the body of the standard.

Any comments/suggestions received after review by the various users will also be incorporated into the draft of the document prior to the spring 2008 meeting.

The meeting adjourned at 3:00 p.m.

7.6.1.11 TASK FORCE FOR WIND FARM TRANSFORMERS – Joe Watson, Chairman

No meeting held, the work of this task force was concluded.

7.6.1.12 TASK FORCE FOR TRANSFORMER TANK RUPTURE AND MITIGATION – Peter Zhao, Chairman

The chair opened the meeting at 11:00AM, and welcomed the members and guests. There were 29 attendees in total, which included 14 members and 15 guests. One (1) guest requested the membership to the TF.

IEEE patent policy was addressed and no patent conflicts were reported.

Dallas meeting minutes was approved as written.

Two main subjects were covered during the mtg.:

Review and discuss the draft paper – “Transformer Tank Rupture and Mitigation – A Summary of Current State of Practice and Knowledge”, which resulted from 10 presentations during the past mtg.’s. The paper is going to be published on IEEE Transactions.

Prepare for Recommendations. Bill Darovby agreed to take on the job.
New Business

The TF was contacted by Cigre WG A2.33 – Transformer Fire Safety Practices. They were looking for opportunity for cooperation. It would be beneficial if two working groups are able to help each other.

The meeting adjourned at 12:15 PM.

7.6.1.13 TASK FORCE FOR EVALUATION OF PARALLELING TRANSFORMER CONTROLS AS RELATED TO UPDATING C57.12.10 – Tom Jauch, Chairman

After introductions and patent comments, an agenda to encourage discussion was followed. It included:

1) the present standards concerning transformer paralleling in C57.12.10,
2) the proposed additions and changes to those present standards, and finally
3) the proposed outline of the Paralleling Guide.

The first issue addressed was “what is paralleling”. It was agreed a definition (after checking previous definitions) would be included in the document, which needed to be broader than “transformers connected on both the high and low voltage busses”.

Comments included in the discussion:

1. Need to define paralleling methods, typical system configurations, limitations of the guide as well as special applications.
2. A section on “designing transformers for parallel operation” should be added.
3. Trying to incorporate all possible variations could delay the completion of the guide.
4. How do we incorporate system operating considerations? Or do we?
5. Are there any other standards or working groups we need to correspond with for this guide?
6. Guide needs to consider not only the transformer controls but also issues the transformer manufacturers need to consider.
7. When matching xfmr ratings and impedances - which transformer rating should be used?
   o If you only consider the top OFAF rating when paralleling transformers, you could unknowingly overload a transformer at its lower ratings when operating in parallel
8. The engineer specifying transformers at utilities is typically not the same person making the control decisions. We will probably need to solicit responses from “corresponding members” to make this a useful guide.
9. IEC standards discuss ohmic vs % impedance changes. These standards should be considered when preparing our guide.
10. Transformer manufacturers are hoping this guide will help answer many of the questions they run into and have trouble getting answers to. Mainly, when a customer specifies he will be paralleling the transformer with xyz, what does this mean? Often times the OEM’s have trouble getting answers to their questions and they are hoping this guide will help address those issues?

It is obvious that some determined effort will be necessary to properly define and limit the scope and the purpose of this WG. The PAR application descriptions will be circulated among the members soon for comments.

The general assignment of reviewing the proposed outline and e-mailing the chair comments and suggested changes was made.
After the first meeting the membership stands at 19 members. We are soliciting additional members and users to the group, including corresponding members.

The meeting adjourned at 4:30 p.m.

7.6.1.14 TASK FORCE FOR EVALUATING THE NEEDS OF TRANSFORMERS USED WITH SVC – Peter Zhao, Chairman

This is to report the investigation results from the team and no actual TF mtg. was arranged during the mtg.

Team Members:
Loren Wagenaar, Dong Kim, Alan Darwin, Flavio Neuls, Christoph Ploetner, Michael Craven, Peter Zhao.

Summary of the Findings

Performance:
1. Load Condition: 100% inductive, or 100% capacitive, or any combination of both real power and reactive power with the total sum limited to the rated MVA of the transformer.
2. Large Voltage Variations on both LV and HV windings.
3. DC Component: transformer shall operate under normal operating conditions with DC current (amp range varies)
4. Harmonic Requirements
5. Both step up and step down operation
6. Frequent switching

Designs:
1. Low normal flux density design to allow an overflux condition. Core saturation to be achievable when transformer is subject to simultaneous AC and DC excitation currents.
2. Overexcitation and hot spot considerations
3. Harmonics from the electronics had to be taken into account for cooling.
4. Winging arrangements

Constructions:
In general, the same as other power transformers.

Tests:
In general, there is a minimal difference to the normal IEC/IEEE transformer test requirements.

Sometimes, if the nominal flux density is low, the magnetizing characteristics are measured over an extended voltage range. There maybe a requirement for impedance characteristics (LCR) and loss against frequency (high) if the manufacturer of the electronic switching/control equipment attached to the transformer needs such information.

There is sometimes extra calculated/estimated data requested compared with a normal transformer (data that is not easily measured, such as effect of DC in neutral and inrush current).

Actions before next meeting:
Draft the proposal based on the investigation results.

7.6.2 OLD BUSINESS

No old business.
7.6.3 NEW BUSINESS

The Power Transformers Sub Committee would like to offer the topic of “paralleling transformers” as a subject for one of the Monday and Tuesday afternoon technical presentations.
7.7 Underground Transformers & Network Protectors Subcommittee
Carl Niemann, Chair

Meeting Minutes – October 17, 2007

7.7.1 Introduction/Attendance
The Underground Transformers and Network Protectors Subcommittee met on Wednesday, October 17, 2007, in the Ballroom E of the Hilton Minnesota Hotel at 9:30 AM with 11 members and 3 guests present.

7.7.2 Approval of Minutes
The minutes of the March 14, 2007 meeting in Dallas, Texas were approved as submitted.

7.7.3 Membership
Membership stands at 21 members. Michael Hardin and Said Hachichi were accepted as new members.

7.7.4 Chairman’s Remarks
The following Administrative Subcommittee notes were reported to the subcommittee:
· The attendance statistics and future meeting locations
· Admin. Subcommittee is working to add a treasurer spot

7.7.5 Working Group Reports
7.7.5.1 Underground Single Phase Transformers (C57.12.23) – A. Traut, Chairman
1. There were 12 members and 11 guests for a total of 23 in attendance. The total membership of the WG stands at 28.
2. The chair requested disclosure of any patents that might impact this standard. There were no patents disclosed at this meeting.
3. The minutes of the March 2007 meeting in Dallas were approved as submitted.
4. The chair reported that the PAR has an expiration date of 12/31/2009 and that the exiting document published in 2002 is valid to that date.
5. The WG agreed no further changes are needed to Draft 6 of the document.
6. The document will proceed to pre-ballot editorial review and sponsor ballot.

7.7.5.2 Three-Phase Underground-Type Transformers (C57.12.24) – Giuseppe Termini, Chairman
1. The meeting was called to order by the Chairman at 8:00 a.m. on Monday, October 15, 2007 in the Ramsey Room of the Hilton Minneapolis Hotel in Minneapolis, Minnesota.
2. Introductions were made. The meeting was attended by 14 members and 13 guests. Three guests requested membership.
3. The Chairman opened the meeting by asking if anyone in the Working Group knew or had knowledge of any existing or pending patents that may affect the work on this standard. All responses were negative.
4. The Meeting Minutes from the previous meeting in Dallas, Texas in March 12, 2007, were reviewed and approved.
5. The status of the Draft (D1) standard was discussed.
   A. This draft has been issued for mandatory editorial coordination (MEC) by the IEEE editorial staff prior to balloting.
   B. Matt Ceglia of IEEE briefly described the MEC process to the working group. He expects the MEC review to be completed by November 8, 2007.
   C. The Chairman stated that unless there were significant editorial changes, the draft would not be sent out for review by the working group prior to being submitted for balloting.
6. The meeting was adjourned at 8:20 a.m.
7.7.5.3 Liquid Filled Secondary Network Transformers (C57.12.40) – Brian Klaponski, Chairman
1. The WG met on Monday, October 15, 2007 at 09:30 am with 9 members and 6 guests. One guest requested membership.
2. The chairman reviewed the patent legal issue and asked whether there were any patents or patents pending that would affect the WG or standard. None were identified.
3. The minutes of the March 12, 2007 meeting in Dallas, TX were reviewed and approved.
4. B. Klaponski stated that the PAR was approved by IEEE in April 2007.
5. The rest of the meeting consisted of a review of Draft 1 of the standard dated October 4, 2007.
   A. Section 2 - B. Klaponski stated that the referenced standards would include the latest revision and that we will need to review that in detail towards the end of the review of this standard.
   B. Section 3.1 - Deleted reference to C57.12.24.
   C. Section 3.3 - Deleted reference to I.E.C.
   D. Section 3.4 - B. Klaponski will come up with proposed wording to clarify the chopped wave testing requirements listed in C57.12.90.
   E. Section 5.2 - B. Klaponski indicated that Larry Dix will rework this section and present a new draft of this whole section prior to our next meeting.
   F. Section 5.2.5 - Joe Cultrera questioned the 5 min limit for dc testing. He suggested that test duration should be longer, perhaps 15 min.
   G. Section 5.2.6.4 - The comment below Table 6 was reworded and incorporated as a note.
   H. Section 5.2.6.5 - Comment below this section was deleted.
   I. Section 5.3.1 - Section was reworked.
   J. Section 5.3.1.1 - Proposed wording was reworked. Second sentence was removed.
   K. Section 5.3.1.2 - Section was reworked. B. Klaponski will review this section and compare it with the previous revision and make changes as necessary.
   L. Section 5.3.2 - Section was reworked.
   M. Section 5.3.3 – A requirement for minimum operating torque was added and the importance of a maximum operating torque of about 50 ft-lbs was discussed.
6. The meeting was adjourned at 10:50am with the next meeting in Charlotte, NC.

7.7.5.4 Secondary Network Protectors (C57.12.44) – D.H. Mulkey, Chairman
1. The WG was not scheduled to meet.
2. The standard was published in 2005

7.7.5.5 Ventilated Dry-Type Network Transformers (C57.12.57) – A.L. Robinson, Chairman
1. The WG was not scheduled to meet.

7.7.6 Old Business
1. Brian Klaponski lead a discussion on getting the standards development process reviewed and fixed to better utilize the volunteer capabilities of the working group personnel and the professional editorial staff of the IEEE

7.7.7 New Business
1. The Administrative Subcommittee of IEEE Transformers Committee should consider paying the standards association fee for regular attending members instead of a reduction in the next meeting registration fees. Regular attending members would be those attending 4 out of the last 5 meetings. This would encourage more voting members. Brian Klaponski motioned, it was seconded and passed unanimously:
2. Dan Mulkey has received notification of an interpretation request concerning the use of generation on the low-voltage side of network protectors. Dan will forward the information to the C57.12.44 working group and develop a response via email.
7.7.8 Future Meetings

The location and dates for the next meetings are as follows:

- Spring 2008 March 16-20, Charlotte, NC, Westin Hotel
- Fall 2008 Porto, Portugal October 5-9, 2008 (OPO airport code) Porto Palacio Hotel, 120Euro w full breakfast and high-speed internet
- April 19-23, 2009, location TBD
- Oct 18-22, 2009, location TBD

The Subcommittee adjourned at 10:15 AM.
7.8 **Audible Sound & Vibration Subcommittee**  
**J. L. Puri, Chair**

**“AUDIBLE SOUND AND VIBRATIONS” SC**

**Meeting Minutes**  
**Minneapolis, MN**  
**October 16, 2007**  
**Chairman: Jeewan Puri**

The Sub-Committee met at 8:00 AM with 15 members and 7 guests present. Because of other work duties, the SC chairman could not be at the Transformer Committee meetings. The WG and SC meetings were chaired by Ramsis Girgis on Jeewan’s behalf.

**Chairman Remarks:**

- Dates / locations for future Transformers Standards Committee meetings are:
  - Ø Spring 2008: March 16 – 20, 2008, Westin Hotel, Charlotte, NC.
  - Ø Fall 2008: October 5 – 9, 2008, Hotel Porto Palacio, Porto, Portugal
  - Ø Spring 2009, April 19 -23, Southern US location
  - Ø Fall 2009, October 18 – 22, 2009, Location TBD
- Permission was granted by IEC that will enable the IEEE WG to use text from document IEC 60076-10-1 in the IEEE Guide being developed.
- Those who are active in the SCs and WGs and still not members of the Standards committee are encouraged to request membership

**Report on activities of WG on “Noise Measurement Guide”**

The WG met at 3:15 PM with 8 members and 8 guests present.

First item on the Agenda was to bring up to the attention of the WG that new items, such as Load noise, Sound Intensity measuring method, and the wall sound reflection factor, which are dealt with in length in the Guide, are not part of the present section – 13 of C57.12.90. The Chairman reported that he confirmed with the Administrative SC that the Guide, including these items, could not be published until the reference Standard itself includes these same items. Work on development of the Guide can still continue in parallel with the effort of revising section – 13 of C57.12.90. The WG agreed.

The next agenda item discussed was the need to add these three items to section – 13 of C57.12.90. The WG agreed. These are already part of the IEC Standards for many years. The attempt now will be to ensure that proper conditions for accurate measurement of noise and appropriate limits for correction factors are clearly stated in the Standard. This is an opportunity for the IEEE Standards group to improve on the more advanced IEC Standards to include knowledge, in the area of noise measuring techniques, acquired in recent years due to increasingly tougher requirements for low and ultra low noise level transformers by a number of customers in USA and around the world. The SC also agreed upon including these items in the section – 13 of C57.12.90.
Therefore, the plan for the Charlotte meeting is to have Ramsis Girgis present to the WG and ASV SC the background of the development of proposed conditions for accurate noise level measurements using the Sound Intensity method. Chris Ploetner will present the background of the “Environmental Correction factor”. The objective of these presentations is to reach an agreement on the proper conditions for different noise measuring methods as well as appropriate limit on the “Environmental correction”.

It was also reported by Ramsis Girgis that the revised section – 13 of C57.12.90, in its present form, will need a significant amount of improvements both technically and editorially. This is in addition to including agreed upon conditions for accurate measurements, etc., Ramsis Girgis will prepare Draft – 3 of this section before the Charlotte meeting.

Subsequently, a tutorial on transformer and reactor noise measurements will be conducted in the 2008 fall meeting in Porto, Portugal. This will precede the finalization of revision of section 13 of C57.12.90.

50 – 60 Hz Conversion of noise level measurement

1. The document of the 50 – 60 Hz Frequency Conversion of Transformer Performance Parameters, to be added as an Appendix to C57.12.90, has been completed; including agreed upon text in past three SC meetings. will have sections added on The wording is being prepared by the “Audible Noise and Vibrations” SC. Once this is complete, the wording of this conversion will be submitted for inclusion in the new revision of C57.12.00 & C57.12.90.

The part of the document on noise level conversion will be sent for Survey at the ASV SC level. Based on the feedback from this Survey, the document will be finalized and sent for the upcoming balloting of C57.12.90. This is to occur before the end of 2007.

Meeting was adjourned at 9:10 AM.

Submitted by: Ramsis Girgis
7.9  **Bushing Subcommittee**  
Fred Elliott, Chair

7.9.1  **Introduction/Attendance**

Fred Elliott - Chair opened the meeting at 3:00 PM and welcomed the members and guests. There were 44 attendees with 13 members and 31 guests present. Two (2) guests requested for membership.

IEEE patent policy was addressed and no patent conflicts were reported. The Chair informed the participants please review information on Transformers Committee website for details.

7.9.2  **Approval of Minutes of Last Meeting**

The minutes of last meeting in Dallas, TX were approved as written.

7.9.3  **Chairman’s Remarks**

The chair made the following remarks after attending the Administrative Subcommittee.

- Next meeting will be held in Charlotte, North Carolina, March 16-20.
- To join in balloting process, one must be a member of IEEE Std Association.
- References used in the documents shall be properly addressed and referred.

7.9.4  **Working Group (WG) and Task Force (TF) Reports**

7.9.4.1  **WG - Revision of C57.19.00** - Keith Ellis, Chair

No meeting was scheduled.

7.9.4.2  **TF - Revision of C57.19.100** – Tommy Spitzer, Chair

C57.19.100 Bushing Application Guide


The meeting was called to order at 3:15 pm with 15 members and 5 guests. After introductions, no one had any patent disclosers. The minutes from the spring meeting were approved.

Draft 1 of the revision was distributed before the meeting and Trench and PCORE both had comments and changes to the draft. These will be included in Draft 2. The Chair plans to continue to distribute these by e-mail and have a final document in time for the next meeting and proceed to balloting.

The meeting was adjourned at 4:30 pm.

7.9.4.3  **TF – GSU Bushings** – Catherine Hurley, Acting Chair for Les Recksiedler

Catherine reported as follows:
1. Introduction – Everyone
2. Sign in Lists – Attendance 37 – 13 members
3. Titles for the standard
   a. Discussion about limiting MVA or current for this standard, this will not occur
   b. It was determined that this standard would follow a similar title as C57.19.01 since these
      bushings are specifically excluded from this standard
   c. Hurley will prepare this final title and send out to all members for comments
4. Discussions over if this should be a guide or a standard. Concerns about agreement between all parties
   if it becomes a standard. It was determined that it was most beneficial to proceed with a standard.
5. It was determined that this standard would be a companion standard to C57.19.01 with references to
   C57.19.00. This standard will include LV bushings only with high current that are excluded from
   C57.19.01
6. Scope of Work
   a. It was discussed to have a similar detailed scope as C57.19.01 has
   b. C Hurley will draft this an send out a copy to all members for comments
7. IEC bushing standard
   a. Volunteers were requested to compare to the IEC bushing standard
   b. IEC bushing standard also excludes these bushings but will be updated in the next revision
   c. John Graham volunteered to correspond with the IEC on this information
8. List of GSU bushings available
   a. C Hurley volunteered to get the information for AEP
   b. Keith Ellis volunteered to provide a list for manufacturers to compare

7.9.4.4  C57.19.03 – DC Bushing Standard – Fred Elliott, Chair

No meeting was scheduled.

7.9.4.5  IEC Bushing Standards Activity - John Graham of Trench Ltd., UK

IEC BUSHINGS STANDARDISATION

Revision of IEC60137 “Insulated Bushings for Alternating Voltages above 1000V”

A Committee Draft was passed at the IEC TC36: Insulators meeting in Berlin in September 2006. The document
had a majority positive vote but there were strong objections again from TC14: Transformers.

At their meeting in South Africa and subsequently in Mexico TC14 made a decision that testing of transformer
bushings in IEC60137 should cover all the requirements for transformer tests in IEC60076-3: 2000 with an
additional 10% on test voltage. This requirement would mean all bushings >72.5kV rated would be subject to
lightning impulse tests with additional switching impulse and long duration AC withstand required for some
higher voltage bushings. SC36A have continued to object to this requirement on the basis of technical justification
and cost.

In September 2007 a meeting of the officers of SC36A, TC14 and SC17C: Switchgear was held in Geneva. A
compromise was reached on changes to bushing tests as follows:
<table>
<thead>
<tr>
<th>Lightning Impulse</th>
<th>Type Test</th>
<th>Routine Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤72.5kV</td>
<td>FW ± ve 100%</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>&gt;72.5 to &lt;245kV</td>
<td>FW + ve 100%</td>
<td>On 3 bshgs</td>
</tr>
<tr>
<td></td>
<td>FW – ve 110%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CW – ve 121%</td>
<td></td>
</tr>
<tr>
<td>≥245kV</td>
<td>FW + ve 100%</td>
<td>FW – ve 100% (CW – ve 11%)</td>
</tr>
<tr>
<td>AC Withstand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤72.5kV</td>
<td>1min wet 100%</td>
<td>1min dry 110%</td>
</tr>
<tr>
<td>&gt;72.5 to ≤245kV</td>
<td>1min wet 100%</td>
<td>1min dry 110%</td>
</tr>
<tr>
<td>≥170kV</td>
<td>ACLD</td>
<td>1min dry 110%</td>
</tr>
<tr>
<td>Switching Impulse</td>
<td>&lt; 245kV</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Dry ± ve 100%</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Dry – ve 110%</td>
<td></td>
</tr>
<tr>
<td>≥ 300kV</td>
<td>Wet ± ve 100%</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Dry – ve 110%</td>
<td></td>
</tr>
</tbody>
</table>

These changes will be included in a final draft (FDIS) to go to vote by the end of 2007 with probable publication in 2008.

**Review of IEC 61464 “Dissolved Gas Analysis of Oil Impregnated Paper Bushings”**

This document was published as a Guide in 1998. SC36A will join TC10: Insulating Fluids to review this document and incorporate in the wider guide IEC60599: Interpretation of DGA from oil filled equipment. TC14 may also join this work.

John Graham
12 October 2007

7.9. 5.Old Business

**IEEE 693 Bushing Update**

A. Next IEEE 693 Meeting October 23-24, 2007

Main Topic: Discussion of an early draft of a proposal to change the qualification procedure for bushings.

Brief outline of the proposal:

I. The bushing manufacturer would perform a shake table test, using modified IEEE 693 requirements, to determine a failure rating based on a g-level at the “Critical Center of Gravity” and the basic IEEE 693 spectral shape. The g-level reported would be that which causes failure of the bushing (independent of the traditional 0.25g or 0.5g values). The bushing manufacturer would develop a structural, finite element, model for the bushing that is validated by the shake table tests.
II. The transformer manufacturer would develop a "detailed" finite element model of the transformer, including the bushing model information, and perform a time history analysis. The analysis would be required to show that:
   a. The bushing has not exceeded a specified level at the Critical Center of Gravity.
   b. The transformer maximum input ground motion g-level at the specified bushing level.

(Example, the shake table test shows the bushing will fail at 1.2g at the Critical Center of Gravity. The bushing manufacturer reports to the transformer manufacturer a bushing design level of 0.6g, 50% of the failure value, applied at the Critical Center of Gravity. The transformer model shows that a 0.25g ground motion input causes a 0.6g bushing acceleration at the Critical Center of Gravity.)

III. The utility would specify a required transformer input ground motion. The transformer manufacturer would design the transformer to satisfy the Utility’s input ground motion requirement and the bushing manufacturer’s g-level requirement at the Critical Center of Gravity.

The Critical Center of Gravity is the bushing CG only considering the upper portion of the bushing, above the flange connection to the tank.

B. 500 kV Bushing Shake-Table Research

MCEER (University of Buffalo, New York) is still conducting 500 kV bushing shake table test research. This project could receive additional funding from the California Energy Commission.

Reported by Fred Elliott based on input from others.
Oct 17, 2007

7.9.6 New Business

No new business was reported.

7.9.7 Technical Papers

No activity was reported for this mtg.

7.9.8 Adjournment

The meeting adjourned at 4:15 PM.

Minutes submitted respectively by,

Peter D. Zhao

Secretary
Bushing Subcommittee
7.10  Dry Type Transformers Subcommittee  
C. W. Johnson Jr., Chair, Acting Chair Paulette Payne

7.10.1  Introductions and Approval of Minutes  
Meeting was held at 1:30 pm on Wednesday, October 17th, with 12 members and 4 guests, of whom three requested membership. The minutes from the Dallas meeting were approved as written.

In the absence of the SC Chairman Charles Johnson, Paulette Payne chaired the SC meeting and Roger Wicks functioned as acting secretary.

7.10.2  Working Group/Task Force Reports  
The next order of business was the presentation of the reports of the various working groups and task forces. See the following sections for the individual reports:

7.10.2.1  WG Dry Type Test Code C57.12.91  Chairman Derek Foster  
1. The working group met at 3:15 pm with 11 members and 5 guests present.
2. There were no comments regarding the minutes from the March 12, 2007 meeting in Dallas. The minutes were approved as written.
3. The Chairman asked if anyone present had any information regarding patent issues, which may affect the work of the group. No replies were received.
4. Professor Eberhard Lemke gave a presentation to the working group on partial discharge measurement in dry-type transformers, and the relevance of C57.113, Guide for Partial Discharge Measurements in Liquid-Filled Power Transformers and Shunt Reactors, to this working group.
5. There being no new business, the meeting was adjourned at 4:30 pm.

7.10.2.2  WG Dry Type Thermal Evaluation C57.12.56/60  Chairman Roger Wicks  
The working group met in Minneapolis at the Hilton Minneapolis at 1:45 PM on Monday, October 15, 2007 with 5 members and 10 guests present. Attendees introduced themselves and signed a roster.

The Chair reviewed the minutes from the last meeting, which were approved as read. The chair reviewed the patent documents for our meeting, and no patent related issues were noted for the work of this working group.

The bulk of the meeting was spent discussing changes agreed upon at the last meeting, including:

Moving the simulated impulse testing to the annex. Bill Simpson mentioned that this may create some issues in that most, if not all of the approved systems in use today used this method. It was also suggested that we may want to consider retaining this method in the annex as a Normative “alternative” method.

The chair again discussed the need for some simplified drawings covering open-wound technologies and Mark Gromlovits agreed to help with this. Rick Marek also noted that all of the drawings we use will need to be in TIF format. Mark will check with Jeewan to see if he has the original files.

There were further discussion regarding the methods required for thermally evaluating LV windings which are outside the scope of this document, but could be covered by IEEE 259. In the original C57.12.56 document, the LV windings were required to be tested, whereas in the original C57.12.60, testing of the LV windings was not included.
New Business:
We discussed the need to revise the title and scope of the document, changing the word “ventilated” to become “open-wound”. This more accurately describes the equipment tested to this requirement, and also covers testing of dry-type sealed transformers, which are not covered under any other test procedure. The WG chair will submit a PAR revision as well as a PAR extension (already done).

Clause 4.2.1 (b) should including a requirement for bifilar windings in order to facilitate turn-to-turn testing.

It was suggested to review the estimated time per cycle requirements in Table 1 to be reflect more realistic aging cycles which would be required by a testing company (increments of 24 hours). For example, appropriate numbers may be 24/96/336 hours vs. the 30/100/300 hours in our current document.

The chair agreed to compile all of these changes, along with the new graphics and circulate a survey ballot to the dry-type subcommittee and the working group members.

Meeting adjourned at 3:15 PM.

7.10.2.3  WG for Revision of IEEE C57.16: Dry Type Reactors  Chairman Richard Dudley

The W.G. for the Revision of IEEE C57.16 met in the Hennepin / Carver Meeting Room of the Hilton Minneapolis Hotel in Minneapolis, Minnesota on Oct. 15, 2007 from 8:00 a.m. to 9:15 a.m. There were 9 members and 3 guests present. The following are the highlights.

1. Introductions were made.

2. The minutes of the W.G. meeting in Dallas were approved.
   Note: The minutes of the Minneapolis meeting will not be formally approved until the next meeting in Charlotte, NC.

3. IEEE patent policy was reviewed and no patent issues were identified.

4. The remainder of the meeting was devoted to the revision of IEEE C57.16; outstanding issues from the Dallas meeting, issues raised in correspondence and Draft #1 of the revision of IEEE C57.16 prepared and distributed by the Chairman to W.G. members prior to the meeting. The following are the highlights.

   (i) “Annex F” covering CB TRV issues associated with the application of CLRs was discussed. Fred Elliot has asked for input from Ken Edwards who works at BPA and is a member of the IEEE Switchgear Committee. Pierre Riffon again reiterated the need for Annex F as there have been CB failures due to TRV issues associated with the application of CLRs.

   (ii) Sound measurement of FRs was discussed. Klaus Papp and Christoph Ploetner will upgrade the current material. They will also draft a clause “Background Information” to be included after “General”. Information to be covered includes; contractual site measurement of sound vs. factory testing (Per Pierre Riffon site measurement may be more meaningful as harmonics are all present simultaneously; including phase relationships, vs. one at a time in factory testing.), rationale behind factory testing (Factory testing can be meaningful if all major harmonics are considered and resonances are assessed), role of factory testing to verify calculations (and as such can be regarded as a “GO” or “NO GO” test, etc.

   (iii) Clause A.9 on “de-Q’ing” of filter reactors was reviewed. Information will be added on the possible impact of de-Q’ing on the operating temperature of the FR conductor insulation system; depending on the type of de-Q’ing employed. Basically de-Q’ing
should not impact the service life of the FR insulation system. The Chairman will draft the material.

(iv) Annex D on reactors in enclosures was discussed. The Chairman will provide a list of reference papers to be included in a clause to be called “Supporting Documentation” (vs. “Reference” or “Bibliography”) per IEEE editorial staff guidance.

There are 2 types of enclosures for reactors; manufacturer supplied (to which test code applies) and “user” erected. A clause will be added (vs. a note per the Dallas minutes) covering “user” erected enclosures re information that should be supplied to the manufacturer by the user. Jack Aroman will provide a draft.

(v) Clause E.4 of Annex E will be extended to include more information on indoor installation of reactors; critical issues, information the user should supply to the manufacturer, etc.

(vi) Reference material in Annex F and other annexes should be titled “Supporting Documentation” to be in line with IEEE editorial requirements.

(vii) Table 5 was discussed. Test levels for the turn-to-turn test should be first peak crest voltage and not RMS. Obsolete insulation levels should be removed and other test levels updated to be in line with work being carried out in Phil Hopkinson’s T.F. Pierre Riffon will modify Table 5.

(viii) Should the turn-to-turn test be extended to higher voltage levels as an alternative to the lightning impulse test; up to 450 kV BIL? The turn-to-turn test first peak crest voltage should be 85%-90% of BIL. The Chairman will review and report to the W.G.

(ix) The Chairman stated that his objective would be to prepare Draft #2 prior to the Charlotte meeting. The Chairman also requested help in correcting editorial issues resulting from the very poor conversion of the current version of IEEE C57.16 from “pdf” to WORD by IEEE. Although the Chairman’s “Administrative Assistant” had done a great job correcting the WORD version supplied by IEEE there are still errors.

The meeting adjourned at 9:15 a.m.

7.10.2.4 Dry Type General Requirements

Chairman John Sullivan

The working group met in the Ramsey room of The Hilton Minneapolis Hotel.

The meeting was called to order at 11:05 AM by Chairman John Sullivan

The meeting was convened with six (6) members and six (6) guests present.

Introductions were made and the minutes of the last meeting held in Dallas, Texas USA March 12, 2007 were approved.

The IEEE–SA patent slides were shown and a request was made for disclosure of any patents that may be related to the work of the working group. No patents or patent claims pertinent to C57.12.01 were identified by working group members.

Task force reports discussion:
Table 5 – John Sullivan
Table 5, Dielectric insulation levels for dry-type transformers used on systems with BIL’s 200kV BIL and below was revised as directed by the working group at the Dallas meeting. The Table was revised by Charles Johnson to consist of four (4) columns. The first two columns for nominal system voltage and low-frequency voltage insulation levels remain the
The right side of the table was condensed to two (2) columns, BIL rating and chopped wave minimum time to flashover. The consensus of the working group was to extend BIL to 250 kV and to specify allowable alternative test values.

Partial Discharge – Yunxiang Chen

Yunxiang Chen presented an extract of IEC 60076-11, Partial discharge. Chen proposed harmonization with the IEC standard. The IEC standard states the maximum acceptable partial discharge level is 10 pC. He also displayed several partial discharge test reports from European manufacturers. These reports indicate the transformers under test are essentially partial discharge free at the 160% voltage level. Chen will work with the rest of task force members to prepare a tentative revision to table 6 with supporting documentation for the spring meeting in Charlotte.

Next meeting: spring 2008 March 16-20, 2008 in Charlotte, North Caroline.

With no new or old business the meeting was adjourned at 11:40 AM.

7.10.2.5 IEEE PC57.12.52 - Sealed Dry Type Power Transformers

Chairman Sheldon Kennedy

The Working Group met on Monday, October 15, 2007 at 9:30 AM with 6 members and 6 guests present. Sheldon Kennedy chaired the meeting.

The IEEE disclosure statement was read. There were no patents pertaining to this standards work for which any members had awareness.

There were no minutes to approve as this was the initial meeting of the new working group.

The Chair announced that we were beginning work on C57.12.52, which had been approved as a PAR by IEEE. The PAR was granted on May 7, 2007 and will expire on December 31, 2011.

The Chair explained that this document is one of the NEMA documents that came over to IEEE when all of the NEMA standards were moved to IEEE. As such, the document is old, last revised in 1981, and not in the correct format of an IEEE document. Also, there was no electronic copy available from NEMA or IEEE. Roger Wicks’ wife was kind enough to scan the hard copy and make a Word document that we were able to begin to work with. The document still has to be put into the IEEE template and that will change much of its present format.

The Chair also explained changes that occurred during the NesCom review process. The scope and purpose have revisions, consistent with IEEE documents and the NEMA format has been removed.

Next we began to review the document. The designation of these transformers will be updated from GA to GN to be more consistent with IEC and new IEEE designations. As this was an old NEMA products standard, it was very specific with regard to exact kVA ratings and voltages. These will be expanded to allow more ratings. Upper kVA ratings of many sizes are too low for modern dry type transformers.

Tables 2 and 3 are obsolete for the BIL levels and low frequency test values. The Chair will review C57.12.01 and harmonize these tables with the main document.

References to standards will need to be updated.

Table 4 is gives very little information on impedance values and has outdated language. The impedance values will be updated and the language removed or corrected.
Clause 5.1 describes the insulation system. Roger Wicks will review this and see if he can propose a better definition that may incorporate something from C57.12.56 and C57.12.60. In line 5.1.2 the document states that the transformers are filled with a suitable gas. This will be modified to state that they are filled with a suitable gas, including air.

Time expired and the chair asked members to continue to review the document for proposed revisions. The meeting was adjourned at 10:45 AM.

7.10.2.6 IEEE PC57.12.51 Chairman Paulette Payne

Paulette is on a fast track to revise this document. She balloted this document (closing on October 6th successfully). There were 3 negative balloters with 23 comments. Several of the comments were discussed in the subcommittee. More work will be conducted to finish this document in preparing the revision for reballoting.

7.10.3 Old Business Paulette Payne

Ray Barnitkas provided a brief report related to his review of C57.124 (Practice for the Detection of PD in Dry-Type Transformers) which Chuck Johnson had asked him to look at during our Dallas meeting. Ray provided Chuck (electronically) and the WG his recommendation that the document needs work. Since the document date requires work prior to the end of the year, Paulette will talk with Chuck about filing a request to IEEE for an extension so that the appropriate action can be taken on this document (either balloting for reaffirmation to get all the comments or initiation of a PAR for the revision of the document). The WG will make this decision at the meeting in Dallas.

7.10.4 New Business

Phil Hopkinson reminded the Dry-Type SC of the information which will be on the website related to the new energy efficiency requirements for distribution transformers.

The meeting was adjourned at 2:50pm.
7.11 Distribution Transformers Subcommittee
Ken Hanus, Chair

The Distribution Transformer Subcommittee has a total of 9 active working groups/task forces, 7 of those met in Minneapolis.

Subcommittee Meeting Wednesday October 17, 2007 at 3:00 pm
Members 28
Guests 27
TOTAL 55
6 Requests for membership

7.11.2.1 Chair’s Remarks & Announcements:
Review of Administrative Committee meeting highlights
· Future Meetings
· The Unapproved Dallas minutes were approved with no corrections.

7.11.2.2 Working Group Reports

7.11.2.2.1 C57.12.20 Overhead Distribution Transformers
Alan Wilks & Tommy Cooper Co Chairs
awilks@ermco-eci.com & Tommy.cooper@faypwc.com
PAR Status: Approved 9/15/2006
PAR Expiration Date: 12/31/2010, Current Standard Date: 2005
Current Draft Being Worked On: D1
Meeting Time: 9:30 am, Monday, October 15, 2007
Attendance: 43 Total
20 Members
23 Guests

Alan Wilks called the WG C57.12.20 meeting to order at 9:30, introductions were made and rosters were circulated. The unapproved minutes of the spring 07 meeting in Dallas, Tx were reviewed and approved.
Alan then reminded everyone of the IEEE policy on patents and asked if anyone had any patents to declare, none were declared.

Old Business:
1. The PAR status – PAR is effective until 12/31/2010.
2. Alan updated us on the moving of the Dielectric Test of grounded wye transformers to C57.12.90 and C57.12.00. The Low Frequency WG wants us to word the procedures for them. After some discussion, Alan agreed to put together the wording and send it to the WG members for comment.
3. Alan reviewed the ballot on the rewrite of Section 9, there was no conclusions from the ballot. Based on the results from the ballot and after much discussion, Alan put the two balloted items to a vote of the members present:
   a. On the issue of the arc starter wire size, 13 members voted to set the wire size at 18 AWG or smaller, and 6 members voted against using 18 AWG or smaller.
   b. On the issue of changing the duration of the fault, 17 members voted to keep the duration at ½ to 1 cycle, and 1 member voted to not keep the duration the same.

Conclusion, the new draft will show the arc starter wire size as 18 AWG or smaller and the duration will stay the same as ½ - 1 cycle. Ken Hanus volunteered to improve the English of Marcel’s wording of Section 9 that defines a “fault” and a “test”.

IEEE/PES Transformers Committee Main Minutes
Fall 2007
4. Rich Hollingsworth covered his proposed changes to the style of hanger brackets. The members voted unanimously to go with Rich’s #2 proposal which keeps the dimensions from the pole the same and eliminates the “Vee” look.

5. Guiseppe to complete his survey of EEI members on changing the hanger bracket spacings to allow a shorter spacing on small 3-phase units with “A” support lugs.

   Also, Steve Shull wanted to add 15 KVA 3-phase to Table-1, this was put to a vote and everyone agreed.

6. Item on tolerances for arrester nut dimensions was carried forward to the Spring 08 meeting.

The meeting was adjourned at 10:45.

7.11.2.2.2 C57.12.38 Single-Phase Padmounted Distribution Transformers

Combined C57.12.25 & C57.12.21

Ali Ghafourian & Ignacio Ares Co Chairs

aghafourian@ermco-eci.com & Ignacio_ares@fpl.com

PAR Status: Approved 12/08/1998 (For combining Standards C57.12.25 & C57.12.21)

PAR expiration Date: 12-31-2009

Current Standard Date: 1995

Current Draft Being Worked on: D6.1, Dated: March 2006

Meeting Time: 11:00am, Monday, October 15, 2007

Attendance: 40 Total

23 Members

17 Guests

Introductions were made and the roster was circulated.

The IEEE Patent Policy was reviewed and there were no patents cited.

The meeting minutes from the last meeting in Dallas (3/12/07) were approved.

Ali reviewed the IEEE ballot that was conducted during Sept 2007.

   Ballot pool – 75 persons
   Response Rate – 82% (exceeds the required rate of 75%)
   Approval Rate – 95%
   3 - Negative Votes w/comments
   9 - Affirmative Votes w/comments
   62 – Total Comments

Ali started reviewing negative comments.

1. Figure 2b – Should be 17” not 171” for opening depth.
2. Note 4 of Figure 4 – Should be 4A and 4B, not 3A and 3B.
3. Table 2 Dry withstand values – Inconsistent with the old C57.12.21 and the current C57.12.00. Voted to change to 12.00 values (17200 becomes 18000, 34kV becomes 35kV, 40kV becomes 42kV)
4. Section 9.3.1 – Figure references need to be in caps. Ali will check IEEE Style Manual.
5. Section 9.2.5 – Voted to change the first part of sentence from “On phase-to-ground connected transformers,” to “Since the transformers are connected phase-to-ground,”.
6. Section 9.2.4 – Old C57.12.21 specified #8 – 2/0, not #6 – 250kcmil. Voted to go back to previously specified #8 – 2/0.
7. Section 8.5 – Unclear as to which requirements apply only to double door designs. Ali to clean-up wording.
8. Section 7.2 – Voted to change the first sentence back to that of C57.12.25-1990, since the standard only covers transformers with a permanently grounded H2.
9. Section 1.1 and Figure 3 – Voted to add “live front” to Section 1.1 (Figure 3) and to the title of Figure 3.
10. Section 12 – Pressure relief venting pressure is higher than the tank withstand without permanent distortion (Section 11.2). Voted to leave as is.

The meeting adjourned at 12:20pm

Respectively submitted by: Alan Wilks (for Ignacio Ares)

7.11.2.2.3 C57.12.28, C57.12.29, C57.12.31 & C57.12.32 Cabinet integrity Standards

Bob Olen & Dan Mulkey Co Chairs
bolen@cooperpower.com & dhm3@pge.com
Meeting Time: October 16, 2007 Time: 8:00 AM
Attendance: 40 Total
21 Members
19 Guests

1. General:
   a. The minutes from the March 13, 2007 meeting in Hilton Dallas Lincoln Centre located in Dallas Texas were approved as submitted.
   b. A request was made for disclosure of any patents that may be related to the work of the WG, and there were no responses to the request for disclosure.

2. Significant Activities:
   a. C57.12.31 Standard for Pole-Mounted Equipment – Enclosure Integrity, Draft 1.1
      i. 4.3.2 Discussed adding “or every two years” to the requirements for running the coating tests.
      ii. 4.3.4 Discussed changing the delta E Hunter value from four to two.
      iii. 4.5.4 Added ASTM reference to cracking, and changed “crazing” to “checking” and added an ASTM reference to checking.
      iv. 4.5.6 Discussed “exterior and interior” ended up removing the reference and just making it generic as it is mostly just applicable to exterior
      v. Annex A – 4.a.2 Corrected freezer time from 15 minutes to 30 minutes

   b. C57.12.30 Standard for Pole-Mounted Equipment - Enclosure Integrity for Coastal Environments, Draft 1.1
      i. old 3.5 – enclosure security - deleted
      ii. 3.5 – Discussed “gel coat” and left it in for other base materials
      iii. 3.6 – left open adding other materials
      iv. 4.1.2 – Need to add item about galling in this area
      v. 4.2.3 – discussed – no changes
      vi. 4.3.1 – changed to eliminate the “exterior or interior”
      vii. 4.3.2 – added “or every two years”
      viii. 4.3.4 – change the delta E Hunter from four to two
      ix. 4.5.1.1 – The LaQue corrosion site is no longer available – Bob is looking for alternatives
      x. 4.5.1.2 – Dan to make the same as the .31
      xi. 4.5.5 – Dan to make the same as the .31
      xii. 4.5.7 – Gravelometer – Dan to get the impact test from .31 and group to discuss these two alternatives at the next meeting

   c. C57.12.32 – Is out for ballot as a recirculation

3. Standard Status
   a. C57.12.28 Standard for Pad-Mounted Equipment – Enclosure Integrity
   c. C57.12.29 Standard for Pad-Mounted Equipment – Enclosure Integrity for Coastal Environments
e. C57.12.31 Standard for Pole-Mounted Equipment – Enclosure Integrity
g. C57.12.32 Standard for Submersible Equipment – Enclosure Integrity
h. Status: 2002 Standard – reaffirm or issue PAR before 2008

4. Next Meeting:

5. The next meeting is scheduled for October 16, 2007 in Minneapolis, MN.

6. Adjournment:
   The meeting was adjourned at 9:00 AM.

7.11.2.2.4 C57.12.34 Three-Phase Padmounted Distribution Transformers
Ron Stahara & Steve Shull Co Chairs
ristahara@msn.com & sshull@empiredistrict.com
PAR Status: Approved 3/20/2005
PAR expiration Date: 12-31-2009
Current Standard Date: Published March 8, 2005 (2004 date on document)
Current Draft Being Worked On: D2
Meeting Time: October 15, 2007 Time: 1:45 PM
Attendance: 42 Total
11 Members
31 Guests
5 Guests Requesting Memberships

Ron Stahara called the meeting to order, introductions were made, and an attendance roster was circulated. Ron reviewed the IEEE Patent Policy and asked the group if there were any patents that needed to be disclosed. None were announced to the group. The minutes were reviewed. It was discovered Brian Klaponski name was misspelled and Ali Ghafourian pointed out that he had made a comment concerning an issue on section 8.12. These corrections were made to the minutes. A motion by Brian Klaponski was made to accept the minutes as corrected and was seconded by Tommy Cooper. It was approved by acclamation.

Ron Stahara asked that the group review the document and have comments returned to Steve Shull by December so that they could be incorporated into the document. The group did a cursory look through the document and found a number of glaring mistakes that were reported and recorded by Steve Shull. There was some discussion on how the drawings would demonstrate that the bushing panel approach could illustrate both the primary or secondary side of a transformer. It was pointed out that the secondary side is numbered opposite to the primary side and there might be a confused interpretation as they are now shown. It was also pointed out the H0, X0, or H0/X0 bushing would need to be shown in these drawings as well. There was some discussion on this topic and a consensus was reached to place the H0 at two locations; In-line after the H3 bushing and directly below the H3 bushing possibly halfway between the bottom of the pad and the current bushing level or if on the secondary side, right before and in-line with the X1 bushing or directly below the X1 bushing again possibly halfway between the bottom of the pad and the current bushing level. Steve was asked to incorporate these concepts in some fashion in the drawings.

In reviewing Table 2, it was found that the current starting size was 45 kVA where as in other tables it was 75 kVA. A motion was made by Gael Kennedy to make 45 kVA the starting size in all tables where appropriate. This was seconded by Ken Hanus. This motion was carried by acclamation.

The concern that was raised by Ali Ghafourian during the last meeting on section 8.12 was discussed. There was a motion made by Dan Mulkey to change the wording to add the underlined word as shown below:

The minimum current-carrying capabilities of components for looped primary systems shall be 200 amperes load break system (continuous current rating)....

After some discussion it was agreed that the location of this addition was not appropriate and the motion was withdrawn. However, the real concern was the application of this standard for 600 ampere dead front designs. This would cause of the drawings clearance and configurations to change and possibly delay any
balloting of the document to a much later time. It was pointed out by Al Traut that by changing the phrasing of section 8.7.2.3, the document could be limited to a 200 amp dead front design. This is illustrated below.

The 200 ampere high-voltage connectors shall consist of either bushing wells and bushing inserts, or integral bushings, as specified.

A motion was made by Al Traut to change this as shown above. This was seconded by Ali Ghafourian. The motion was carried by acclamation.

A question was asked by Said Hachichi as to why the document was limited to 480 volts. He said that 600 volts was a common voltage used in Canada. It was pointed out by some that commercial wind farms and some ethanol plants had started to use this voltage. Ron Stahara said that early on in this document it was discussed and agreed to that it would be limited to 480 volts because at the time it was the prevailing voltage of the users. It was consensus of the group that this change was beyond this document's scope and that it should be considered in the next revision along with the 600 amp dead front designs.

Steve Shull said that he would make these corrections in the next draft and get this to each of the members to review for the comments due in December. With this, the meeting was adjourned.

7.11.2.2.5 C57.12.35 Bar Coding For Distribution Transformers
Lee Matthews & Giuseppe Termine Co Chairs
lmatthews@howard-ind.com & Giuseppe.termine@peco-energy.com
PAR Status: APPROVED Dated: March 4, 2005
PAR expiration Date: December 31, 2009
Current Standard Date: 1996 (R2004)
Meeting Time: October 16, 2007, 3:15 PM
Attendance: 22 Total
15 Members
7 Guests

The meeting was called to order on October 16, 2007 at 3:15 p.m. in the Marquette/Lasalle Room of the Hilton Minneapolis Hotel in Minneapolis, Minnesota.

The meeting began with introductions of those in attendance.

The chairman asked if anyone was aware of any patents that might affect the development of this standard. No patent claims were made.

The minutes of the previous meeting in Dallas, Texas were reviewed and approved.

The remainder of the meeting consisted of the review of the status of the Draft D7-2007, dated April 9, 2007. This draft was submitted for balloting and it was approved with a 100% positive response. Several comments were received however, they were not required to be addressed as they were determined to be editorial comments by the IEEE. The document has been approved by REVCOM and has been submitted to the IEEE editors for publication.

The meeting was adjourned at 3:30 p.m.

7.11.2.2.6 C57.12.36 Distribution Substation Transformers
John Rossetti & David Aho - Co Chairs
jrossetti@mlgw.org & daho@cooperpower.com
PAR Status: PAR Approved June 2002
PAR expiration Date: December 2008
Current Standard Date: Approved at September 07 REVCOM
Did not meet
7.11.2.2.7 C57.15 Step-Voltage Regulators
Craig Colopy & Gael Kennedy Co Chairs
ccolopy@cooperpower.com & grkennedy@nppd.com
PAR Status: APPROVED Date: June 9, 2005
PAR Expiration Date: December 31, 2009
Current Standard Date: C57.15 – 1999 – Published April 2000
Current Draft Being Worked On: Draft 5.2 Dated: October 2005
Meeting Date: October 16, 2007, 1:45 pm
Attendance: 30 Total
30 Members
12 Guests
2 Guest Requesting Membership

1. Minutes of the Last Meeting 13 March 2007 Un-approved to Approved (moved Ken Hanus, 2nd by Lee Matthews, Passed with no objections)
2. IEEE Patent Policy conflict or infringements given to group – No responses or comments raised.
3. Draft 7 – is most current issue Draft 6 put into IEEE Template Document – short review of document transition to template
4. Normative References: IEEE and IEC documents after Craig gets the update completed he will send section to all the members to provide additional information and references. C57.12, reference used for hanger brackets, C37.90 and C37.92 Surge Withstand. The Chairman of the C37.90 Relay Standard noted that this standard already references the IEC surge testing; The IEC Standards referenced by some of the international utility company’s specifications may need to be included.
5. Short Circuit Discussion relating to Section 5.8 – with special comments concerning the 25 times rated current, 2.26 times for the offset, with a note for example to use larger regulators, adding limiting reactors or other method for limiting the fault current above this. Removed the 40 times rated current section and placed a line on nameplate list (item w) to add symmetrical short circuit withstand ampere rating.

**Action item:** Finish soon – by the end of November send out to members and then have them returned by the end of December.

NEW DISCUSSIONS ON SUBJECTS:

Motion to place the rated shortcircuit withstand ampere rating on the Nameplate. This rating is a withstand which includes thermal and mechanical forces on/in the winding.

Motion was made to adjourn, 2nd ed, and passed with no objection. Meeting over at 2:30PM Tuesday 16 October 2007.

7.11.2.2.8 C57.12.37 Electronic Reporting of Test Data (formerly P1388)
Richard Hollingsworth & Thomas Callsen Co Chairs
rhollin@howard-ind.com & Thomas.Callsen@ExelonCorp.com
PAR Status: Need to submit PAR for next revision
PAR Expiration Date: N/A
Current Standard Date: July 2005
Current Draft Being Worked On: N/A

Did not meet.
7.11.2.3 Subcommittee Old Business:
None reported

7.11.2.4 Subcommittee New Business:

The working group for C57.12.33 will be reactivated with Don Duckett and Al Traut co-chairing the document. The document will be updated with the final DOE ruling and sent out for comment before Charlotte.

Jerry Corkran reported to the subcommittee on several proposed changes in temperature rise test procedures in section 11 of C57.12.90. He also reported the Dielectric Test SC has established a task force to consider if Class I & II substation transformer test requirements should be combined.

Both are areas Distribution Subcommittee members should be aware of.

The meeting adjourned at 3:50 pm.
7.12 Dielectric Test Subcommittee
L. B. Wagenaar, Chair

7.12 Dielectric Test Subcommittee – Loren Wagenaar, Chairman; Thang Hochanh, Vice-Chair; Stephen Antosz, Secretary

The Dielectric Test Subcommittee (DTSC) met on Wednesday, October 17, 2007, in Minneapolis, MN with 59 of 109 members, and 71 guests present. 6 of the guests requested membership and are welcomed into the Subcommittee. See the last page of these minutes for attendance list.

7.12.1 Chairman’s Remarks

1) The Chair reviewed highlights of the Administrative Subcommittee meeting held on Sunday:

   a) The next meetings:
      1) Spring 2008, March 16-20:  Westin Hotel Charlotte, NC
      2) Fall 2008, October 5-9:  Sheraton Hotel Porto, Portugal
      3) Spring 2009, April 19-23, Southern USA location TBD

   b) The issue of dual logo status of an IEEE and IEC Standard has hit a snag. Since there are many other IEEE documents referenced in an IEEE Standard, these other documents also become a required part of the Standard. There are then possibly additional deeper references in the referenced document. IEEE’s immediate solution is to use only references necessary to implement the Standard in the normative body of the document, and all others go to the Bibliography which is informative only. This problem will be a significant ongoing hurdle to overcome related to dual logo status of all future documents.

2) The Chair announced that Thang Hochanh has agreed to become Vice-Chair of the SC.

3) The minutes of the Spring 2007 meeting in Dallas, TX were approved as written, and are available on the IEEE Transformers Committee Web Site.

7.12.2 Working Group Reports

7.12.2.1 Working Group on Acoustic Partial Discharge Tests in Transformers - Jack W. Harley, Chair

C57.127-2007 IEEE Guide for the Detection and Location of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers and Reactors was published August 31, 2007. This is therefore the final report of this Working Group.

The PAR for the writing of the Guide was approved in February of 2003. The first ballot closed at the end of June 2006 and the recirculation ballot closed February 2007. RevCom approval was received in March 2007.

I want to thank the many Working Group members, the WG Secretary Arturo Nunez, Dielectric Test Subcommittee Chair Loren Wagenaar, and others who participated in the writing of this Guide. It was truly a community effort. The general format of our meetings was to have an expert presenter on a particular part of acoustic testing when this was appropriate, and then break-out groups, each with a leader to edit a designated part of the document. Over the course of writing the Guide, those leaders included Alan Darwin, Fred Elliott, Mark Perkins, Ron Daubert, Dirk Russwurm, Hem Shertukde, Thang Hochanh and Barry Ward. There was also substantial input from experts outside our Working Group on specific topics.
A tutorial on acoustic testing was presented by WG members and others in Raleigh NC in March 2003. The presenters represented users of transformers, manufacturers of transformers, manufacturers of acoustic testing equipment and researchers in new uses for acoustic tests.

Tord Bengtsson, a physicist with ABB in Vasteras, Sweden with extensive acoustic PD theoretical, laboratory and field experience came to the WG early in the writing process to lecture the Working Group on PD basics, made the written contributions that demonstrate the fundamentals of PD systems and acted as a technical back-up for me through the writing and balloting processes. I have recommended that an award for outstanding contributions be given to Tord.

A round of applause was given at the SC meeting for Jack Harley and members of his working group in appreciation for their excellent work on this guide.

7.12.2.2 Working Group on Revision of Low Frequency Tests – Bertrand Poulin, Chair; Bill Griesacker, Secretary

The meeting was held on Monday October 15th at 11h00 am. After the usual introduction and display of IEEE’s Patent policy, the minutes of the previous meeting were approved as written.

Next, Dr. Lemke presented his report on the task force meeting for the revision of C57.113 (IEEE Recommended Practice for Electrical Measurements of Partial Discharges in Transformers). The minutes of this meeting are found in Appendix 1. The main topics are:

I. The process of revision of the document is advanced. Comments and suggestions after draft 6 were incorporated in the document.

II. The latest revision is being surveyed within the DTSC.

III. The PAR has been approved by IEEE. The document is ready for the formal balloting process which includes mandatory editing coordination with IEEE staff and the forming of a balloting pool.

Next, the Chairman presented a brief overview of the proposed changes to sections 10.5 to 10.11 of C57.12.90. These proposed changes have been discussed an agreed on in the past several years. They will be part of the next official balloting of the document within IEEE and should be incorporated in the next revision of C57.12.90. There are two items left which have been discussed in the recent past but not yet agreed on.

1. A request for adding the following criteria to section 10.8.6:
   The enhancement of the voltage has not created a significant and steady increase in partial discharge activity. In this context, the partial level recorded during the one hour level must be compared to the level recorded just before the enhancement. The increase if any should not be more than 150 pC.
   The wording of this proposal needs to be better defined. A new proposal must be prepared and circulated before the next meeting.

2. A request for the following addition to section 10.8.2:
   For transformers with ODAF cooling, the first unit of a design shall be tested with all pumps running during the induced test.
   The main objection to this request is that it would require that all transformers be tested with their cooling equipment installed. This is not always practical for those transformers which cannot be moved with their cooling equipment. A new compromise will be proposed and circulated before the next meeting.

On new business, one request has been sent to the WG for a clearer pass/fail criteria for induced test on class II transformers. The present standard is rather vague on this subject. It was explained that PD does not lend itself to this type of criteria on power transformers as easily as RIV measurements did. The present pC measurement of PD is very subjective, relying on engineering judgment in determining if a problem does exist in the transformer. Dr. Bartnikas
added that the problem is that due to the wide variability of the discharge physical nature, origin and intensity, it is not yet possible to closely correlate the intensity and the severity of a PD problem in its relation to the health of a transformer. It was suggested that a tutorial section on pd measurements on transformers be added to the standards, possibly as an annex to C57.12.90.

Meeting adjourned. Minutes submitted by the chairman of the WG

Appendix 1

Working Group: Revision of Low Frequency Tests (Bertrand Poulin)
Task Force: Electrical Partial Discharge Measurement (Eberhard Lemke)

Unapproved Minutes of the TF Meeting
Minneapolis Hilton Hotel
October 15, 2007

1. The Chairman opened the meeting at 8:00 a.m. and welcomed the members and guests. There were 42 attendees present, 14 of them were TF members and 28 guests; 7 attendees requested for membership.

2. The IEEE Patent Policy was discussed based on the submitted transparencies. There were no patent issues to be discussed.

3. The tentative agenda was approved as submitted.

4. The minutes of the previous TF meeting in Dallas were approved as written.

5. Information and discussion on the status of IEEE Guide C57.113
   5.1 on 07 May 2007 the IEEE-SA Standard Board approved the project.
   5.2 A brief survey on the content of the current document was presented
   5.4 The discussion was focused on the specification of PD circuits, in particular on the parameters of PD calibrators. In this context it was pointed out that the calibrator must not simulate real PD pulses due to the strong distortion if PD pulses traveling through transformer windings. Another fact is the comparatively low upper cut-off frequency of PD measuring circuits, which covers only a very low frequency spectrum range of real PD events.

6. Future Work
   6.1 A pre-ballot editorial review of the Study Committee has been initiated.
   6.2 A copy of the draft C57.113 will be sent to the Office of the IEEE Standards Department for review prior to the final vote by the Working Group before the Sponsor Balloting begins.
   6.3 It was also discussed if this document could be used as a basis for PD testing guides applicable for dry-type transformers, instrument transformers and bushings. This matter will be discussed more in detail in the SC Dielectric Tests.

7.12.2.3 Working Group on Revision of Impulse Tests – Pierre Riffon, Chair; Peter Heinzig, Vice-Chair

The WG met on October 1, 2007, from 3:15 pm to 4:30 pm. Eighteen members and thirty-five guests attended the meeting. Three guests requested membership.

The agenda was accepted as written.

The minutes of the Dallas meeting were approved as written.
The IEEE patent disclosure requirement policy was discussed. Reference to the package posted on the IEEE Transformers Committee Web site was made. None of the members and guests present during the meeting were aware of any patents related to the work of this WG.

The first technical item of business was the results of the 2nd survey made on a proposal modifying Clause 10.2.2.1 “Switching impulse waves”. The proposal was surveyed for the second time within the WG and within the Dielectric Tests SC membership. The return rates were 50.5% in the SC and 27.4% in the WG. Out of these returned surveys, 100% were affirmative both within the SC membership and within the WG. No negative surveys were received. Three abstained within the SC. Three comments were received, two were strictly editorial in nature and were accepted. The third comment was from Art Molden who wants to add the DC method as an alternative method for biasing the core. After discussion and because this method is still in use, it has been agreed upon to consider the comment.

A revised proposal taking into account the decisions made during the meeting will be forwarded to Stephen Antosz for implementation in the next revision of C57.12.90.

The second technical subject on the agenda was the results of the 2nd survey made on a proposal modifying Clause 10.3.1.3 “Chopped-wave Test”. The proposal was also surveyed within the WG and within the Dielectric Tests SC membership. The return rates were 39.5% in the SC and 25.3% in the WG. Out of these returned surveys, 88.4% were affirmative within the SC membership and 91.3% affirmative within the WG. Two negative surveys were received. Three abstained within the SC membership. Fifteen (15) comments were received. The first negative ballot was given by Gustav Preininger who requests to keep the maximum time-to-chop limit to 5 µs as recommended in IEEE Std 4. This subject has been discussed in previous WG meetings and it has been agreed upon to harmonize this value with the IEC value of 6 µs. A large majority of members and guests present during this meeting were still in favor to have an harmonized value with IEC by keeping the proposed 6 µs value. Only one member was against. The WG decided to not accept this negative ballot.

The second negative ballot was given by Loren Wagenaar who requests to have a mandatory maximum duration for voltage collapse of 1.0 µs. The text has been reworded by using “shall” instead of “should” and the exception related to transformer windings not exhibiting an oscillatory mode after chopping has been moved from a note to the main text. Loren Wagenaar and the WG did agree with the new proposed wording. In addition, if the requirement of maximum duration of the voltage collapse is conflicting with the amplitude of the overswing in opposite polarity, the priority will be given to the duration of the voltage collapse. The wording will be modified according to the decisions made during the meeting.

Some other comments received were discussed and the decisions have been compiled in the Survey Compilation of Comments. Because the WG meeting was out of time, the remaining technical comments weren’t discussed but the most significant comments are adequately resolved by resolution of Loren Wagenaar’s negative ballot. The remaining comments are mostly editorial in nature and will be considered in the rewording.

The WG agreed upon that the changes needed to be made will not necessitate a 3rd survey and the revised proposal will be forwarded to Stephen Antosz for implementation in the next revision of C57.12.90.

7.12.2.4 Working Group for Revision of the Impulse Test Guides C57.98 and C57.138 – Art Molden, Chair; Joe Melanson, Co-Chair

The meeting started at 3:15PM on Monday October 15, 2007, with 40 attendees present of which 10 were members and 30 were guests. There were 15 requests for membership. Introductions were made of the attendees. The Minutes of the spring 2007 meeting in Dallas were approved.
The IEEE Patent Policy slides were reviewed with the group. The group was asked if there were any known copyright or patent issues associated with any of the material content of our Guide. None were indicated by any of the attendees.

Two items discussed at the last meeting that related to impulse testing of transformers that include non-linear devices and, to optimization of the impulse test circuit so as to obtain the best possible tail duration, have been adopted in the latest revision of C57.12.90. The wording of the clauses in our Guide that discuss those topics will therefore be changed to complement those revisions. Other impulse test items currently being discussed for the next revision of C57.12.90 include chopped wave undershoot and switching impulse test voltage polarity. Wording of the Impulse Guide clauses pertaining to chopped waves and SI polarity will not be changed until those revisions are approved for the next revision.

Two items were submitted for addition to our Guide just prior to this meeting. One item, a Figure of the high voltage and return conductor interconnections between the components of a typical impulse test circuit, provides a clearer indication of the correct method of connecting the voltage divider and chopping gap to the transformer terminal under test. The second item was a long awaited and much appreciated treatise, provided by Bertrand Poulin, on the practical application of Transfer Function software during a transformer impulse test. This document so inspired some amongst us, namely Jim McBride, that he spontaneously and without provocation, offered to add additional content to a section in that document relating to the Coherence Function.

As an item of new business the Chair asked if there was any interest in starting a discussion of some of the items relating to impulse testing, that had recently been surveyed by the Chair of the Dielectric Subcommittee, Loren Wagenaar. Items 1, 5 and 6 of that survey related to transformer impulse testing in general, impulse testing of neutral terminals in particular and to the location of information relating to front of wave test levels. This idea was greeted with a stunned silence, followed by a total lack of coherence, followed by quizzical, pained expressions of sympathy for my obvious state of deteriorating mental health. Those items would be better left to the Dielectric Test Subcommittee was the obvious, general consensus and, as far as the front of wave test tables where concerned, I could put them where the pacoders put the cabbages. Chair’s note: See Section 8.12.4.1 below for the plan to resolve all of these issues.

7.12.2.5 Working Group on Liquid-Filled Transformers Dielectric Test Tables – Phil Hopkinson, Chair; Scott Choinski, Secretary

The WG was called to order at 1:45 PM. There were 49 attendees, 23 members, and 22 guests with 2 requesting membership. Reviewed the agenda for the meeting. The Minutes from the March 13, 2007, meeting in Dallas, Texas, were approved.

WG members reviewed the tables and recommended the following changes:

**Class I Table:**
- Note 3: Delete all after “tested.” The justification is that if fully insulated, it is at BIL so there is no need to state that it is to be tested at the BIL levels at line terminals.
- Note 4: Delete “When specified”
- Note 5: Add “Nominal” in front of voltage, delete “s.” Change “rated” to “nominal”
- Induced test column changed “2U / 1.732” to “2 times rated voltage”
- Nominal System Voltage column: replace “35” with “34.5”

**Class II Table:**
- Max System Voltage column: replace “38” with “36”

Reviewed additions of tables as they would appear in C57.12.00 Clause 5.10. More work is required in the notes. Action: Mr. Patel and Mr. Tuli to review and modify notes, as appropriate.
7.12.3 Liaison Report

7.12.3.1 High Voltage Test Techniques (HVTT), IEEE Standard 4 - Arthur Molden

There has not been a meeting of the High Voltage Testing Techniques working group so far this year. The editorial work has been mainly completed, but for some late revisions to the definition of (impulse voltage) overshoot used in an Annex on k-factor impulse voltage parameter extraction. The IEC have recently revised their definition of this overshoot parameter and it was deemed prudent that we also adopt the same definition. The first draft of this revised standard should be completed soon.

7.12.4 Old Business

7.12.4.1 Results of Latest Survey on Impulse Testing, Class II transformers, Impulse Testing on Neutral Terminals, etc.

The SC Chair re-reviewed results of the Feb 2007 survey on various possible changes to the Standards related to dielectric testing. It was clear that some additional work would need to be done to study and recommend possible changes. Therefore, a Task Force was formed with the following initial members volunteering:

Javier Arteaga
Jerry Corkran
Gytfi Olafsson
Pierre Riffon
Jin Sim
Subhash Tuli
Dharam Vir

A Monday or Tuesday meeting slot will be sought for the next meeting in Charlotte for this TF to decide on a TF name, TF Chair, define the scope, etc., and begin work.

7.12.4.2 External Phase-to-Phase and Phase-to-Ground Clearances

The SC Chair reiterated this lingering issue of adding clearance tables to C57.12.00 is still not moving forward, so a Task Force will be formed to study and make a recommendation to the SC. Following are the initial volunteer TF members:

Loren Wagenaar
Eric Davis
Roger Hayes
Vinay Mehrota
David Wallach

Eric Davis volunteered to be the chair of this task force. Loren Wagenaar will serve as the link to the work that was done some 20 years ago.

7.12.4.3 Electrical Measurement of PD in CT’s and Bushings

At the last meeting Vladimir Khalin asked the question whether it is helpful to develop an IEEE document describing electrical PD in CT’s and bushings. Discussion established that instrumentation for measuring PD in these apparatus is somewhat different than for transformers and shunt reactors. An IEC document already exists; IEC 60270. Is this adequate or should we develop a separate guide. This issue is now referred to Bertrand Poulin’s WG on Low Frequency Testing to consider whether a new guide is needed, and/or if a task force should be formed to work on this.
7.12.5 New Business

7.12.5.1 Dielectric Frequency Response

Mark Perkins suggested that a future tutorial session, sponsored by the DTSC, will be set up to present additional information on this topic. Afterwards it will be decided if this test method should be considered for inclusion into the Standards.

7.12.6 Post Meeting Discussion

After the meeting, there was considerable e-mail correspondence between leaders of the DTSC and the PCS. Discussion started with the question of where to place the section on single-phase excitation tests developed several years ago by Bruce Forsyth’s WG on PCS Revisions to C57.12.00. This subsequently led to the question of whether the Dielectric Test SC should also consider this text. Therefore, a survey was sent to members of both SCs requesting approval and/or comments on the text to be included in the next revision of C57.12.90.

Attendance at this Meeting of the Dielectric Test Subcommittee:

MEMBERS

1. Raj Ahuja
2. Stephen Antosz
3. Javier Arteaga
4. Ray Bartnikas
5. Barry Beaster
6. Enrique Betancourt
7. Craig Colopy
8. Jerry Corkran
9. John Crouse
10. Alan Darwin
11. Eric Davis
12. Fred Elliott
13. Bruce Forsythe
14. Eduardo Garcia
15. Charles Garner
16. E. Gomez-Hennig
17. David Goodwin
18. James Graham
19. Bill Griesacker
20. Myron Gruber
21. John Harley
22. Roger Hayes
23. Bill Henning
24. Thang Hochanh
25. Phillip Hopkinson
26. Sheldon Kennedy
27. Vladimir Khalin
28. Dong Kim
29. Alexander Kraetge
30. John Lackey
31. Eberhard Lemke
32. T. Machado Junior
33. Richard Marek
34. Dennis Marlow
35. John Matthews
36. James McBride
37. Joseph Melanson
38. Kent Miller
39. Arthur Molden
40. Harold Moore
41. Gylfi Olafsson
42. Bipin Patel
43. Mark Perkins
44. Bertrand Poulin
45. Jean-Chris Riboud
46. Pierre Rifon
47. Ewald Schweiger
48. Ibrahim Shteyh
49. H. Jin Sim
50. Steven Snyder
51. Andy Steineman
52. Craig Stiegemeier
53. Juan Luis Thierry
54. George Tolbert
55. Subhash Tuli
56. Dharam Vir
57. Loren Wagenaar
58. Jim Zhang
59. Peter Zhao

**GUESTS**
1. Paul Mushill
2. Jennifer Yu
3. Peter Werehuiss
4. Jeff Foley
5. Alvaro Cancino
6. Van Nhi Nguyen
7. Kent Haggerty
8. Mark Scarborough
9. Mark Hammer
10. Clair Claiborne
11. Gary King
12. Robert Perlitchek
13. Samuel Oriti
14. Peter Carhart
15. John Progar
16. Joe Garza
17. Dwight Parkinson
18. Kirk Robbins
19. Prem Patni
20. John Stein
21. Kipp Yule
22. Vinay Mehrota
23. Juan Castellanos
24. Terry Rennich
25. Don Dorris
26. Bruce Fairris
27. Wolfgang Knorr
28. Axel Kraemer
29. Bill Darovny
30. Martin Navarro
31. Bill Chiu
32. Alan Wilks
33. Ryan Brady
34. Ulf Radbrandt
35. Shawn Patterson
36. Fran Huguet
37. David Wallach
38. William Bartley
39. Stan Linsenbardt
40. Brian Penny
41. Jim McIver **
42. Adnan Farooqui
43. Virenda Jhonsa
44. Nathiev Sauzay
45. Aurelien Grinand
46. Mike Lau
47. Roberto Linan
48. Mark Peterson
49. Jeremy Guardado **
50. Waldemar Ziomek **
51. Shamaun Hakiz
52. David Seaguetti
53. Don Anderegg
54. Steve Jordan
55. Rylind Reville
56. Richard Webper
57. Martin Heathcote
58. Jesse Patton
59. Richard Tellen
60. Dardan Muria
61. Stefan Thoren
62. Kent Brown
63. Pat Pries
64. Do-Gyoon Kim
65. Patrick Wang
66. Jim Cai
67. John Graham
68. Mike Craven
69. Randall Kyle
70. Beu Hopez
71. Rudolf Ogajany

** Guests Requesting Membership
8.0 Editor’s Report – Spring 2007 Dallas, Texas Meeting

Between March 11, 2007 and October 12, 2007 a total of 73 papers in the transformer area were submitted to IEEE Transactions on Power Delivery for possible publication. Many of the papers in this rotation have been revised and resubmitted at least once. For the 56 reviews completed during this period, the recommendations were: Accept without changes: 12, Revise and Resubmit: 31, and Reject: 13. Another 17 papers are undergoing their initial review. A summary of the accepted papers is at the end of this report.

I would like to thank all of the reviewers who volunteered for this effort and donated their time, and would like to encourage everyone associated with IEEE Transformers Committee activities to consider becoming a Reviewer. The comments and suggestions of the reviewers improve the quality of the papers that are published and we need the help of all of you to ensure that we continue to have quality papers that benefit all of us.

I would like to encourage those Reviewers that already have an account on IEEE Manuscript Central to keep their profile information updated and complete the areas for key words and areas of interest. We need more reviewers and I encourage any of you that have not signed up as reviewers to sign up per the instructions below.

Respectfully Submitted,
John Crouse
Editor, IEEE Transactions on Power Delivery
john.crouse@ieee.org

All members and attendees of the IEEE Transformer Committee are invited to review technical papers. Please sign up at: http://tpwrd-ieee.manuscriptcentral.com/

INSTRUCTIONS FOR SIGNING UP TO REVIEW IEEE TRANSACTIONS PAPERS
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3. Please specify any “Specialty / Area of Expertise” according to the 5 numerical codes below:
   13a: Power and Instrument Transformers
   13b: Insulating fluids category
   13c: Dielectric Testing
   13d: Audible Noise and Vibration
   13e: Transformer Modeling Techniques
4. Please specify any “Key Words” such as: distribution transformers, core losses, oil DGA, or thermal, for example.
5. Submit your information.
6. Click on “Request Reviewer Status” to be enabled as a reviewer.
<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Key Words</th>
<th>Lead Author</th>
<th>Decision</th>
<th>Date</th>
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<tbody>
<tr>
<td>1</td>
<td>Novel Technique to Improve the Fault Detection Sensitivity in Transformer Impulse Test</td>
<td>impulse fault, signature analysis, time-frequency representation, transformer</td>
<td>Mr. Essam Al-Ammar</td>
<td>Accept</td>
<td>04/23/07</td>
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<tr>
<td>2</td>
<td>Effect of CCVT Gap Protection Circuit on Voltage Distortion</td>
<td>CCVT, PT, EMTP, Voltage Distortion, Ferroresonance</td>
<td>Prof. Huang Sy-Ruen</td>
<td>Accept</td>
<td>04/23/07</td>
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<tr>
<td>3</td>
<td>Effect of Core Magnetization on Frequency Response Analysis (FRA) of Power Transformers</td>
<td>Frequency response analysis, Magnetization, Magnetic viscosity, Power transformers</td>
<td>Mr. Nilanga Abeywickrama</td>
<td>Accept</td>
<td>07/09/07</td>
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<td>4</td>
<td>A Probabilistic Classifier For Transformer Dissolved Gas Analysis With A Particle Swarm Optimizer</td>
<td>Transformer, dissolved gas analysis, Parzen-Window, particle swarm optimization, Bayes’ theorem</td>
<td>Dr. Wenhu Tang</td>
<td>Accept</td>
<td>07/07/07</td>
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<td>5</td>
<td>Modeling and Protection of Hexagonal Phase Shifting Transformers - Part 1: Short-Circuit Model</td>
<td>phase shifting transformer, hexagonal winding connection, short-circuit studies, transient simulation</td>
<td>Dr. Bogdan Kasztteny</td>
<td>Accept</td>
<td>06/27/07</td>
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<tr>
<td>6</td>
<td>HEAT CONDUCTION PROBLEMS IN SF6 GAS COOLED-INSULATED POWER TRANSFORMERS SOLVED BY THE FINITE ELEMENT METHOD</td>
<td>Transformers, Transient analysis, Thermal factors, Software tools, Simulation</td>
<td>Prof. Magdy Eteiba</td>
<td>Accept</td>
<td>7/23/2007</td>
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<td>7</td>
<td>Identification of terminal connection and system function for sensitive frequency response measurement on transformers</td>
<td>Sweep frequency response, natural frequencies, transformers sensitivity, terminal connections, non-tested windings</td>
<td>Prof. L. Satish</td>
<td>Accept</td>
<td>7/23/2007</td>
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<tr>
<td>8</td>
<td>Multiterminal Three Phase Transformer Model with Balanced or Unbalanced Loading</td>
<td>Transformers, Transformer windings, Circuit modeling</td>
<td>Mr. Robert Del Vecchio</td>
<td>Accept</td>
<td>07/27/07</td>
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<td>9</td>
<td>An Accurate Hysteresis Model for Ferroresonance Analysis of a Transformer</td>
<td>Ferroresonance, Transformer, Hysteresis, Minor Loops, Power Loss, Preisach Theory</td>
<td>Mr. Afshin Rezaei-Zare</td>
<td>Accept</td>
<td>09/12/07</td>
</tr>
<tr>
<td>10</td>
<td>Comparison of Transformer Detailed Models for Fast and Very Fast Transient Studies</td>
<td>Transient analysis, Power transformers, Modeling, Multiconductor transmission lines</td>
<td>Mr. M. Hassan Hosseini</td>
<td>Accept</td>
<td>09/11/07</td>
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<tr>
<td>11</td>
<td>A Novel Converter Transformer and Corresponding Inductive Filtering Method for HVDC Transmission System</td>
<td>novel converter transformer, HVDC, filtering mechanics, inductive filtering, harmonic</td>
<td>Dr. Li Yong</td>
<td>Accept</td>
<td>10/10/2007</td>
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9.0 Meetings Planning Subcommittee – G.W. Anderson

The Meetings Subcommittee (Mtgs SC) holds an open meeting at each Committee meeting to plan future meetings and to assist future hosts by education, mixing of ideas, and lessons-learned. The meeting is attended by the SC Chair, the present meeting host, future hosts, and hosts from past meetings. Others interested in hosting a future meeting, or assisting with meeting planning, are encouraged to attend.

The SC meeting began at 7:00 a.m., Wednesday, October 17, 2007 at Minneapolis Hilton, in Minneapolis, Minnesota, USA. Sixteen (16) people were in attendance. Greg Anderson, SC Chair facilitated. The meeting began with introductions by the attendees.

9.1 Committee Finances

Committee funds are presently $44,438.59 (as of August 1, 2007). Greg thanked the Meeting Hosts for working hard to control expenses and help with stewardship of the Committee’s funds. The hard work by volunteers allows us to maintain low registration fees.

At the moment, we have a surplus of funds. The Administrative Subcommittee is considering ways of productively and strategically using the surplus, such as providing complimentary meeting registrations to first-time user attendees in an attempt to attract new participants from that sector. Also we will sell the C57 Collection CD-ROM at an upcoming meeting and will perhaps provide a discount off the purchase price to Committee Members as a thank you for their work. Greg mentioned that there are also immediate plans to slightly lower the registration fees over the next two meetings to control additional growth of the surplus. Also there are plans to purchase new commercial-grade wireless equipment and a couple more PC projectors.

9.2 Past & Present Meetings

9.2.1 Past Meeting - Dallas, Texas USA (March 11-15, 2007)

Thanks to Ken Hanus and TXU Electric Delivery for hosting the meeting. Ken hosted the meeting back in 1994 and again did an excellent job. Attendance at this meeting was good with 386 attendees (396 minus 10 no-shows) and 38 companions/spouses.

9.2.2 Present Meeting - Minneapolis, Minnesota USA (October 14-18, 2007)

Susan and Paul McNelly and Xcel Energy were the gracious hosts of this meeting. Susan did an excellent job of helping plan the meeting and taking care of local issues. The following is a summary of attendance numbers:

- Attendees (registered for meeting) 391
- No-shows (registered and didn’t attend) 8
- Attendees (actually attended) 383
- Spouse/Companions (actually attended) 50
- Sunday Reception 321
- Monday Standards Luncheon 111
- Tuesday Speaker Luncheon 176
- Wednesday Dinner Social 191
- Spouse/Companion Tours (Mon/Tues) 36/34
Guthrie Theater Presentation (Sat/Tues) 9/31
Jordan Transformer Tour, Sunday Morning ~30
Those Requesting Paper-format Meeting Minutes 68

A further breakdown of those attendees who attended:

- Interested Individual: 142
- Interested Individual, IEEE Life Member: 0
- Active Participant: 114
- Active Participant, IEEE Life Member: 1
- Committee Member: 115
- Committee Member, IEEE Life Member: 10
- Committee Member, Emeritus Member: 1

At this meeting, we were graced with the presence of Ms. Wanda Reder, President-Elect of PES. Wanda attended our Sunday afternoon Administrative Subcommittee Meeting, our Sunday Reception, the Monday Standards Luncheon, and gave an excellent presentation during our Tuesday Luncheon. Wanda was also seen visiting a couple of working group meetings! A big thanks to Wanda for attending AND participating in our meeting.

To recap the social events at the meeting ...
On Sunday evening, we enjoyed a Welcome Reception in the ballroom of the hotel hosted by the McNelly’s and Xcel Energy. On Wednesday evening, we enjoyed an evening at the Science Museum of Minnesota which consisted of a stroll of the exhibits and a dinner which included three selections including a sample of local walleye. The Spouses/Companions boarded buses on Monday and Tuesday for tours of Minneapolis and St. Paul, including a fascinating and funny look at the gangland depression and the prohibition era of St. Paul. Sue also obtained a few advance tickets to theater presentation at the local nostalgic Guthrie Theater on Saturday and Tuesday evenings.

Special thanks to Jordan Transformer for hosting a bus-load of attendees on Sunday morning for a tour of their remanufacturing facility. Technical tours such as this add significant technical content to the meetings. Also, big thanks to AREVA T&D, TBEA Transformers and Baron USA for sponsoring coffee breaks at this meeting and helping us defray the overall cost. Contact Joe Watson (joe_watson@ieee.org) if you are interested in sponsoring a coffee break at a future meeting.

9.3 Future Meetings

9.3.1 Summary

The following dates, locations and respective hosts for future meetings were reviewed.

- March 16-20, 2008 — Charlotte, North Carolina USA; hosted by Robert Thompson and Shaw Energy Delivery Services
- October 5-9 2008 — Porto, Portugal; hosted by EFACEC
- April 19-23, 2009 — Southern USA location (to be determined)

Possible locations for future meetings include: Orlando, Miami, Phoenix, San Antonio, Kansas City, New York or New Jersey (near IEEE HQ), and Winnipeg to name a few. Discussions continue of future meetings in Mexico City and possibly South Korea.
9.3.2 Upcoming Spring 2008 Meeting (March 16-20) — Charlotte, North Carolina

Robert Thompson and Shaw Energy Delivery Services will host of this meeting. The meeting will be held in the beautiful new Westin Charlotte Hotel (601 South College Street). A tour of the Biltmore Estate, America’s most renowned castle will be offered on the Saturday or Sunday before the meeting. Spouses/Companions will likely offered visits of the Duke Mansion, SouthPark Mall and other local attractions. ABB will offer a tour of their Dry Technology Transformer Facility in Bland, Virginia will be offered on Thursday. An “Advance Flyer” was distributed at the Minneapolis Meeting.

9.3.3 Upcoming Fall 2008 Meeting (October 5-9) — Porto, Portugal

EFACEC will host this meeting at the newly-renovated Porto Palácio Hotel (www.hotelportopalacio.com). It is important to note that the hotel room rate will include all taxes, a full breakfast, and free wireless internet in the guest rooms. The meeting will adhere to our typical schedule with the Welcome Reception on Sunday evening, and the Dinner Social on Wednesday Evening. Spouse/Companion tours will likely consist of a visit to the nearby Palácio de Cristal and perhaps a visit to a nearby historically significant town such as Guimarães and/or Braga. There will also be a tour of the EFACEC transformer factory on Sunday morning and/or Thursday afternoon. We will also work with a local tour company to offer day-tours before and/or after the meeting to areas such as the “wine country” and a boat tour of the Rio Douro. An “Advance Flyer” of the meeting was distributed at the Minneapolis Meeting and an updated flyer will be distributed in Charlotte.

9.4 Working Group Reports

9.4.1 WG on Web-Site Development

This working group did not meet.

9.4.2 WG on Educational Development

This working group did not meet.

9.5 New Business

9.5.1 Association Management System

Work will continue to develop new reports, including a report that will allow an activity chair to more easily identify “stale members”; i.e. members who have not attended the previous 2 or 3 previous meetings.

9.5.2 Tutorials/Presentations

The technical tutorials/presentations continue to “exceed all expectations”. Material from each of the presentations is available on the Committee’s web-site. Contact Kent Haggerty (n.kent.haggerty@ieee.org) if you are interested in presenting in the future or have an idea of a future presentation.

Monday and Tuesday afternoon’s presentations consisted of a two-part update of the switching phenomenon that was first presented five years ago at the Pittsburgh Meeting. A big thanks to Bob Degenneff, Phil Hopkinson, Larry Coffeen and Nigel McQuin for their efforts to present us this interesting material.

Presentations scheduled for the Spring 2008 Meeting in Charlotte include the following timely topics: “Short Circuit Strength and Testing” and an update of the “National Energy Policy”. Presentations scheduled for the Fall 2008 Meeting in Portugal include two topics which have particular international appeal: “Sound Intensity Method of Measuring Noise Indoors” and “50/60 Hz Conversion Factors”.

10.1 Approve Minutes

The minutes of the Minneapolis Meeting were approved.

10.2 Adjourn

The meeting was adjourned.

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Additional future candidate presentations include:

- Paralleling of Transformers
- Update on Application of Ester Fluids in Transformers
- Transformer Thermal Modeling - Improving Reliability Data
- Core Heating Due to Main Core Flux
- Non-Sinusoidal Voltage Sources During No-Load Testing
- Geomagnetic & DC Induced Currents Into Transformers
- Frequency Response Analysis
- Wind Farm Transformers
- Loss Tolerance and Measurements
- Furan Testing, Correlation to DP & Insulation Life
- Transformer Core Loss Evaluation
- Revisiting Ferroresonance
- Low Core Loss Transformers
- Zero Sequence Testing of Grounding Transformers

Several meetings ago, we discontinued providing CEUs at the presentations. It was determined that most people do not need accredited CEUs for maintaining professional licenses, but rather unaccredited professional development hours (PDHs) are sufficient. Again at this meeting, we provided a means for attendees to download a “certificate of attendance” from the web-site and bring to the presentation for the instructor to personally sign. This process worked well in previous meetings and will continue for future meetings.

We continue to post each presentation on the website — the slides in PDF format and a recording in AVI movie format.

### 9.5.3 Coffee Break Sponsors

We continue to develop a program to allow companies to sponsor coffee breaks. Joe Watson is administrating the program. We highlight the sponsors in the Meeting Schedule and indicate their patronage on new signs located in the break area. Representatives from the companies are allowed to distribute limited commercial information (flyers) during the break. We will continue to cautiously experiment with this and develop a policy to foster relationships with vendors and help maintain our low registration fees, while keeping a technical focus. We have also started posting the list of upcoming prospective break sponsors on the website. Contact Joe (joe_watson@ieee.org) if you are interested in sponsoring a future break.

### 9.5.4 Committee Historians

We continue to look for volunteers to help document and archive the history of the Committee; i.e. old meeting minutes, old photos, etc. It was proposed that a group of “historians” (or “old timers”) develop a plan to gather old meeting information for permanent archiving. It was suggested that we should create an “anniversary CD” that will contain an assembly of documents and meeting minutes from the past 10-15 years. The CD could perhaps be presented as a gift to all Committee Members and made available to meeting guests and other interested individuals. We continue to look for someone to champion this effort.

### 9.6 Miscellaneous

Additional topics were discussed and reviewed:

Since 2004, we have provided complimentary WiFi in the meeting area in addition to what may be provided by the hotel (usually at a fee). This provides attendees secure access to the Internet with a WEP key provided during meeting check-in. At this meeting, we experienced some problems due to bandwidth limitations of the hotel and also hardware limitations due to our aging equipment. We plan to purchase new commercial-grade 802.11n access points before the next meeting and work to ensure the hotel is prepared for the additional bandwidth.
Again it was noted that the Committee’s “Marketing Flyer” is available on the website (see the “Services” box on the homepage). It is encouraged that everyone download and print this two-page document and distribute it at local conferences, seminars, and IEEE meetings.

The meeting was adjourned at 7:50 am.

Respectfully Submitted,

Greg Anderson, SC Chair

Meetings Planning Subcommittee presentation at the main committee meeting on Thursday March 15, 2007 (See Attachment I )
10.0 Standards Subcommittee – Bill Chiu, Chair

10.1 Meeting Attendance
a. The Standards Subcommittee met on Wednesday, October 17, 2007, at 4:30 PM. The meeting roster was circulated. There were 29 members and 13 guests present. No guests requested membership.

10.2 Approval of previous meeting minutes
Bertrand Poulin motioned for approval of the minutes. Loren Wagenaar seconded the motion. The meeting minutes from the spring 2007 meeting in Dallas, TX were approved as written.

10.3 WORKING GROUP REPORTS.
a. C57.144 - Guide for Metric Conversion of Transformer Standards
   No report

   Tim Raymond, WG Chair was not present, and there was no WG report
   Bill Chiu reported that an amendment to add the definition of thermal upgraded paper was submitted to MEC, but have not heard back from them. When this process is completed, the amended document will be balloted. Bill also requested to the working groups of all subcommittees to send him new definitions identified during the development of their work.

c. C57.12.70 – IEEE Standard Terminal Markings and Connections for Distribution and Power Transformers (by Steve Shull, WG Chair)
   The WG had their second meeting. There were 5 member and 5 guests; no new membership requested. The document was circulated for review. The purpose of the revision is to fix the problems found during the reaffirmation process.
   Steve Shull called the meeting to order, introductions were made, and an attendance roster was circulated. Steve reviewed the IEEE Patent Policy and asked the group if there were any patents that needed to be disclosed. None were announced to the group. Copies of the minutes were circulated and reviewed. A motion was made by Gael Kennedy to approve and seconded by Alan Traut. It was approved by acclamation.
   Steve commented that Section 3 as it currently exists in the standard was correct. No comments were offered from the attendees.
   Charlie Drexler gave comments on his review of Sections 4.3-4.6. A duplication in the title of Figure 13 was eliminated. He also provided edits to the document text which were noted by Steve Shull.
   Alan Traut presented his review of Sections 6.5-6.7. Alan combined the paragraphs concerning station class transformers and unit substations. Alan will provide this section and drawings for the figures to Steve Shull so that he could incorporate it in the next draft.
   Jerry Murphy reviewed Section 7. Jerry commented he didn’t find any problems in the text but he did realign and re-label some of the items in Figure 20. This drawing for the figure was provided to Steve Shull.
   A brief introduction to “clock” notation to which Section 8 refers was made with Jerry Murphy discussing the differences between the IEC and IEEE electrical notations. Steve Shull showed a proposal for a new Section 8 that would provide a clear reference for users of the standard. The members were in agreement with this approach. Ali Ghafourian commented that he had seen an old document that gives the winding relationships. He stated he would look for this item and provide it to Steve Shull if he found it. Steve Shull indicated that he would finish this section for the next meeting.
He also stated that by the next meeting, he would incorporate all of the corrections that were
provided.
A motion was made to adjourn by Gale Kennedy and seconded by Ali Ghafourian and approved by
acclamation.

d. **TF on IEC/IEEE Cross Reference** (by Jim Sim, TF Chair)
   - The TF had its second meeting. A review took place on all the published comparisons of the
two standards. There were good interest & participation.
   - Phil Hopkinson has the assignment to review IEC 76-1 versus our 12.000 and 12.90. IEC 76-1
is going through major changes. Additional considerations will be given to other areas, as
changes are made.

1: Oil Filled Power Transformers, Regulators and Reactors (by Jane Verner, WG Chair)

This was the second meeting for this Working Group. We began with introductions of all in
attendance. There were 41 members and 16 guests present. It was asked if any patents were
related to the work of the group; there were none.

The previous meeting minutes from Dallas were read and approved. A draft of the proposed guide
has been posted to the Transformer Committee website. Notes from the previous task force
meetings and input from various team members are also posted for reference.

Our approach to the document is to start with portions of IEEE 62 that are thought to still be accurate
and not in conflict with other IEEE standards. From here additional sections or clauses can be added
and updated. Comments from the Task Force that reviewed the need to make this a document of the
Transformer Committee are included in the draft with track changes in each section.

   - Clause 6.1.2 Ratio/polarity/phase should be reviewed with respect to C57.12.90.

   - Clause 6.1.2.3 Turns Ratio - Details concerning when there is DETC and/or LTC should be
   included.

   - Clause 6.1.2.4 - Explanation of turns ratio test purpose should be added. The purpose of the
factory testing is to check for turns match to design. Field testing is geared toward picking up
shortened turns or misconnection of leads.

   - Clause 6.1.3.1 Excitation testing does not give an indication that winding has shifted and this
phase should be removed.

   - Clause 6.1.3.2 – Test methods – IEEE 62 presently states that “excitation testing to be performed
at the highest possible test voltage without exceeding the voltage rating of the excited winding.”
The proposed text is, “the test is usually performed at rated voltage or a maximum of 10 kV
without exceeding the voltage rating of the exciting winding.” After much discussion the proposed
text was agreed to by a vote of 36 to 3. [Post meeting note - clause 6.1.6.5 Test voltage
addresses this topic and could be enhanced referenced excitation section]

A general warning of test voltage levels for liquid filled units being tested without the insulating fluid
should be added. Types of liquids also need to be addressed. Dry types and distribution
transformers are subject to a future working group.

Insulated power factor clause should include temperature correction factors for ambient temp, as well
as winding, top oil and bottom oil.
Table 1- Recommended diagnostic characteristics was discussed. The power factor row for new transformers should be removed. The Moisture row should align with C57.106 – Jim Thompson to provide a recommendation.

Dissolved Gas data should align with C57.104 – Jerry Corkran to provide a recommendation.

It was suggested that a summary chart of recommended commissioning, routine and diagnostic tests after a fault be added. (After the meeting Prodipto Ghosh agreed to submit strawman proposal.)

A web meeting was scheduled for the second Thursday in December or Dec 13th. (2:00 PM) Eastern Standard Time (minus 5:00 GMT) Details will be sent out prior to then.

When asking for volunteers to work on the various sections, a very positive response was received from these attending the meeting. A summary follows:

<table>
<thead>
<tr>
<th>Clause</th>
<th>Responsible Person(s)</th>
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<tr>
<td>2 References ASTM</td>
<td>Kip Yule</td>
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<tr>
<td>3 Definitions</td>
<td>Andre Lux</td>
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<tr>
<td>4 Diagnostic Chart</td>
<td>John Matthews</td>
</tr>
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<td>FRA Testing</td>
<td>Chuck Sweetser</td>
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<td>Furans Testing</td>
<td>Prodipto Ghosh</td>
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<td>Tank Vacuum Testing -See clause 4.8.1 of C57.93</td>
<td>Javier Arteaga</td>
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<td>Paper Insulation DP Test 4.13.1.5 of C57.93</td>
<td>Dr. Lemke &amp; Alexander Kraetge</td>
</tr>
<tr>
<td>5 Safety additions</td>
<td>Kip Yule &amp; Prodipto Ghosh</td>
</tr>
<tr>
<td>6.3.6 Environmental Factors</td>
<td>Hakan Sahin</td>
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<td>6.1.7.1 Induced Voltage Test</td>
<td>Christoph Ploetner</td>
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<td>6.3.8 PD Detection</td>
<td>Eberhard Lemke</td>
</tr>
<tr>
<td>6.5.12 Water Content</td>
<td>Jim Thompson</td>
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<td>6.4.11 Power Factor</td>
<td>Jin Sim</td>
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<td>6.4.5 Voltage Regulators</td>
<td>Jin Sim</td>
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<td>6.5 Core</td>
<td>Jin Sim</td>
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<tr>
<td>6.6 tanks and assoc. Devices</td>
<td>Javier Arteaga</td>
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<tr>
<td>Purpose of Tests</td>
<td>Kent Brown</td>
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<tr>
<td>DGA</td>
<td>Jim Thompson &amp; Jerry Corkran</td>
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<tr>
<td>Dielectric Spectroscopy DFR &amp; FDS</td>
<td>Peter Wroclaw &amp; Mark Perkins</td>
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<tr>
<td>Chart of commission, routine &amp; after fault testing</td>
<td>Prodipto Ghosh</td>
</tr>
<tr>
<td>Visual Inspection (post meeting)</td>
<td>Andre Lux</td>
</tr>
<tr>
<td>Factory Testing vs. Field Testing</td>
<td>Mark Perkins</td>
</tr>
<tr>
<td>Annex A.Fl Measurements</td>
<td>G. Matthew Kennedy</td>
</tr>
<tr>
<td>Annex B Bushings</td>
<td>Mike Lau &amp; Peter Zhao</td>
</tr>
<tr>
<td>Annex C Infrared Temp Measurements</td>
<td>Jin Sim</td>
</tr>
<tr>
<td>Dew Point Test</td>
<td>Jin Sim to find a volunteer</td>
</tr>
</tbody>
</table>

Submitted by Jane Ann Verner P.E. 10/17/07

f. Continuous Revision of C57.12.00. (Dong Kim WG Chair) and C57.12.90 Stephen Antosz WG Chair.

Both of these standards were approved by RevCom in September 2006, and were officially published in February 2007. Both documents are now available and ready for use by the different working groups for the development of their work. New PARs for both documents will be requested so that the next revision process could start.

C57.12.90 (by Stephen Antosz): The WG goal is to take this version to Ballot in early 2008, so that the ballot is completed by our March ’08 meeting. Following are the changes already surveyed and ready for inclusion in the next official ballot of C57.12.90

- Mark Perkins’ changes to Clause 5 Resistance Measurements
- Pierre Riffon’s changes to Clause 10.3.1.1 Full Wave test
- Bertrand Poulin’s changes to Clauses 10.5 to 10.11 Low Frequency tests
- Pierre Riffon’s changes to Clause 10.3.2.5 Non-linear devices during test
- Pierre Riffon’s changes to Clause 10.3.1.3 Chopped Wave test.
Pierre Riffon’s changes to Clause 10.2.2.1 Switching Surge test.
Gerry Rosselli’s changes to Clause 9.5 Zero Sequence testing.
Ed teNyenhuis’ new material for Annex B on Frequency Conversion Factors.
Bruce Forsythe’s new clause on Single-Phase Excitation Test (from 2004).

Following are changes that are still in progress.
Jeewan Puri’s changes to Clause 13 Sound test.
Marcel Fortin’s work on Clause 12 Short-Circuit test.
Paulette Payne’s work on Clause 11 Temperature test.
“Retained Comments” from the previous negative ballot of C57.12.90

C57.12.00 (by Dom Kim)

Our WG goal is to complete a ballot in 2008. In order to do that we will have to close off any proposed changes at the end of 2007. Some of the comments from the 2006 ballot were not resolved and will be considered in the latest revision.

One of the major interests is Table 21, Routine Tests, which Steve Snyder has been working on. It is now divided by Class 1 and Class 2 transformers. Phil Hopkinson has been working on the Dielectric Test Table, and another table is being developed for front wave test. If these tables are completed by the end of the year, they may be included in the next ballot.

10.4 Old Business

a. IEEE/IEC Dual Logo

This issue has been on the Standards SC agenda for quite some time because it was originally our objective to start a cue of documents that could have a “dual logo”. But, thus far, IEEE C57.135 Guide for the Application, Specification, and Testing of Phase-Shifting transformers is our only dual logo standard that has been approved.

IEEE C57.123 – IEEE Guide for Transformer Loss Measurement was also a candidate for dual logo consideration. But this standard has received a number of negative ballots. The concerns are primarily in the area of the references (normative vs. bibliography). IEC is concerned in that an approval of the C57.123 would imply an acceptance/approval of all the normative references in the C57.123.

There are many other IEEE documents in the same situation and will also encounter the same resistance by IEC if there is desire for dual logo status. After some discussion, it was agreed that the Dual Logo issue will be referred to the Transformer Administrative Subcommittee for future resolution, and it will be removed from Old Business in Standards Subcommittee.

b. C57 Collection of Standards on CD

Bill Chiu has been working with IEEE-SA to publish a new C57 Collection of Standards in CD version. Unfortunately it takes a long time to publish the CD. Bill waited until after the June 2007 Standards meeting for a cut-off date to produce the CD; and at that point it was too late to make it available at this October meeting in Minneapolis. Our new goal is to have this CD collection available for our membership, by the Spring of 2008. Unfortunately it may not be available the week of our meeting in Charlotte. The collection will include the latest revisions and new standards such as C57.12.00 and C57.12.90, C57.127, C57.140 etc.
10.5  **New Business**

Bill Chiu announced that this was his last meeting as Chair of Standards Subcommittee. (Bill will be assuming other duties in the Transformer Committee.) Don Fallon made a motion that the Subcommittee express their thanks and appreciation to Bill Chiu for his years of service as Standards Coordinator. The motion was seconded, followed by a round of applause.

William H. Bartley, SC secretary has accepted the assignment as Chair and will be seeking a new SC secretary.

10.6  **Adjournment**

   a. The meeting adjourned around 5:30PM.

Respectfully Submitted

William H. Bartley P.E.
Standards SC Secretary
11.0 Reports of Liaison Representatives

11.1 Standard Coordinating Committee SCC 04

IEEE PES Transformers Committee
Liaison Report
For General Session Meeting – October 18, 2007

Standards Coordinating Committee on Electrical Insulation – SCC 04

11.1.1 Scope:
- To formulate guiding principles for the evaluation of insulation materials and systems for electrical and electronic applications.
- To formulate principles for the identification of insulation materials and systems based on functional tests and/or experience.
- To coordinate the preparation of standards for functional test programs and diagnostic methods for the evaluation of insulation materials and systems.

11.1.2 Activities:


11.1.2.3. IEEE 99-1980 (R1992) Recommended Practice for the Preparation of Test Procedures for the Thermal Evaluation of Insulation Systems for Electrical Equipment: IEEE P99 – On September 27, 2007 the revision of the standard was approved and has been submitted to the Standards Publication Department.

11.1.3 Participation:
Anyone interested in joining the Subcommittee should contact:

Paulette Payne Powell
Chairperson SCC 04
ppayne@ieee.org
202-388-2335 (o)
202-497-9057 (c)

Respectfully submitted,
Paulette Payne Powell
11.2 IEC TC-14 Technical Advisory Group Meeting Minutes

U.S. National Committee of the International Electrotechnical Commission,
A Committee of the American National Standards Institute
Technical Advisory Group for IEC TC 14

TAG Administrator:
National Electrical Manufacturers Association
1300 North 17th Street, Suite 1752, Rosslyn, VA 22209
Tel: 703-841-3252, fax: 703-841-3353

MINUTES

PLACE OF MEETING: Hilton Minneapolis Hotel
Minneapolis, Minnesota

DATE AND TIME: Monday, March 12, 2007
8:00 AM

PRESIDING OFFICER: P. Hopkinson, Technical Advisor

Members Present:
S. Choinski NEMA Staff, TAG Administrator
C. Colopy Cooper Power Systems
P. Hopkinson Hvolt, Inc., TA
S. Kennedy Niagara Transformer Corporation
R. Marek Dupont Advanced Fibers Systems
H.J. Sim Waukesha Electric Systems
B. Simpson Innovative Paper Technologies

Members Absent:
D. Aho Cooper Power Systems
J. Corkran Cooper Power Systems
J. Foldi Foldi & Associates
D. Foster Foster Magnetics
R. Girgis ABB
J. Lackey PowerNex Associates Inc
G. Morehart ACME Electric Corporation
P. Powell PEPCO

Others present:
J. Arteaga Kuhlman Electric
P. Balma Consultant
R. Benson Trantech
N. Brush Representing Copper Development Assoc.
A. Cancino IEM-Mexico
J. Caskey NEMA
M. Ceglia IEEE-SA
D. Corel Sola/Hevi-Duty
J. Crouse GE
L. Dix Quality Switch
A. Kraemer MR. Reinhausen
J. Murphy Reedy Creek Energy Services
N. McQuin McQuin Electrical Power Consulting
1. CALL TO ORDER

The meeting was called to order, meeting guidelines reviewed and attendance recorded.

2. APPROVAL OF THE AGENDA

The Agenda was approved as written.

3. APPROVAL OF THE PREVIOUS MINUTES

Minutes of the meeting held March 12, 2007 in Dallas, Texas, were approved as written.

4. REVIEW AND UPDATE OF USNC ROSTERS FOR TC 14

A roster was circulated and corrections were annotated.

5. RESULTS OF THE PLENARY MEETING HELD IN MEXICO CITY JUNE 7-8, 2007

Meetings were organized and hosted by Alvaro Cancino of IEM, who did an outstanding job. There was a tour of the IEM plant that was well received. It was noted that there was an unusually large delegation from China.

6. MT5 REVISION OF IEC 60076-1 – POWER TRANSFORMERS - PART 1: GENERAL. P. HOPKINSON, CONVENOR

This document is the equivalent to IEEE C57.12.00 and C57.12.01. The next Maintenance Team meeting is in Rome, Italy, December 3-5.

A CD was circulated over the summer. 345 comments (45 pages) were received.

7. GAS-FILLED TRANSFORMER STANDARD

This standard was approved as a CDV and is moving to FDIS. The US does not support this activity as the standard deals with SF₆, as the insulating gas only and it is not considered environmentally friendly.

8. ELECTROMAGNETIC FIELDS ARE BACK AS A POTENTIAL ISSUE

CLC TR 50453 - Evaluation of electromagnetic fields around power transformers. The above document has been offered to IEC/TC 14 by CENELEC with the aim of its inclusion into the international standardization process. CLC TR 50453 may be introduced into the work program as a NP, CDV (fast-track) or as maintenance work. IEC national committees are requested to send their feedback through the IEC electronic voting system by 2007-11-23 indicating if CLC TR 50453 should be introduced into the work program of IEC/TC 14.

Environmental issues are big in Europe and the Switchgear Committee has done some work in this area.
The consensus of the TAG is not to participate in this activity.

9. DOCUMENT 10/720/CDV - IEC 62535 ED.1: INSULATING LIQUIDS - TEST METHOD FOR DETECTION OF POTENTIALLY CORROSIVE SULFUR IN USED AND UNUSED INSULATING OIL

Information on a test for corrosive sulphur. There are issues with sulphur in insulating oil. This is being addressed in TC10. There will be more discussion on this topic at the TF Tap Changers for De-Energized Operation

10. IEC 60076-2 ED.3: POWER TRANSFORMERS - PART 2: TEMPERATURE-RISE FOR OIL-IMMERSED TRANSFORMERS

This was not addressed due to time constraints.

11. IEC 60076 POWER TRANSFORMERS – PART 12 - LOADING GUIDE FOR DRY-TYPE POWER TRANSFORMERS

The Dry type loading guide has been drafted and may have some misleading information. Mr. Marek is a member of this WG. There is a concern that open wound transformers are not being considered.

12. IEC 60076-1 TS ED. 2: HIGH TEMPERATURE INSULATION MATERIALS IN LIQUID TRANSFORMERS. R. MAREK, CONVENOR

The MT is working on a CD, though it may go directly to CDV. Loading guide information is being added and this may become a standard (it is currently a technical specification).

13. UHV SYMPOSIUM

The UHV Symposium was held in July in China. Mr. Joe Koepfinger attended the meeting. There is a proposal to establish a new TC to address UHV equipment. Most in the US believe that no new Committees are necessary to address.

14. IEC 60076-6 ED.1: POWER TRANSFORMERS - PART 6: REACTORS

This standard was approved as a CDV and is moving to FDIS.

15. DUAL LOGO ISSUES

This was not addressed due to time constraints.

16. OTHER BUSINESS

There was no other business

17. DATE AND PLACE OF THE NEXT MEETING

The next meeting will be held March 17, 2008, in Charlotte, NC
18. **ADJOURN**

The meeting adjourned at 9:24 AM.

Reported By: S. Choinski  
October 15, 2007
11.3 **CIGRE liaison Report JC Riboud**

11.3 Cigré liaison

11.3.1 **Highlights**
In 2007 activities were related to the problem of oil corrosivity, fire behavior, maintenance and experience with new insulating fluids.

11.3.2 **Main technical directions pursued**
The two strategic directions of SC A2 are:
- To continue on transformer technology issues and to consider new information technologies (data, communication, web services)
- To provide services to CIGRE customers (reliability and availability including impact of accessories, life management, economical issues, tutorials, etc).

11.3.3 **Bruges Meeting 8-10 october 07**
The last colloquium was held conjointly with subcommittee D1 (Materials and emerging technologies) in Bruges (Belgium) and presentation on the three following preferential subjects were given:

PS1: Performance of conventional and new insulating materials for transformers
- Thermal and dielectric performance, corrosivity, fire safety and environmental performances;
- New materials: liquids & solids, material compatibility;
- Experiences accumulated in view of maintenance of existing standards (hybrid system, SF6, etc).

Keynote speakers:
- **Ivanka Atanasova-Hoehlein** – Application based specifications for transformer fluids – needs and challenges
- **Olivier Leaïnt** – Probreakdown and breakdown phenomena in insulating liquids at high voltage

PS2: Reliability/Risk assessment of transformers in service
- Purchasing new transformers vs ‘Refurbishment to new’, technical-economical analysis comparisons, reliability and testing, technical improvements on aged units;
- Diagnostics, risk assessment, post-mortem post scrapping investigations, on-line monitoring, moisture assessment, drying, online degassers and dehumidifiers;
- Oil corrosivity and mitigation technique, reinhibiting , metal passivators.

Keynote speaker:
- **Gilson Machado Bastos** – Reliability and Risk Assessment: A point of view from the Brazilian utilities or how the utilities in Brazil manage to achieve these objectives in a country with a high energy demand

PS3: Reactors (shunt, shunt with regulation, series, neutral) and related items
- Impact of specifications, noise, vibrations;
- Loading, switching operations, experiences in service, system aspects, new applications and designs;
- Reliability, condition assessment, end of life.

Keynote speaker:
- **Roger Cormack** – A snapshot into one utilities experience with the operation of shunt reactors
The following Cigre Tutorials were given.

**Lars Lundgaard**

**Aging of cellulose insulation in transformers**
In most countries the age of transformer population span over an average of 30 years. The detrimental effects of aging on cellulose insulation are reviewed for different types of paper, considering the role of chemical environment, temperature and moisture. The best diagnostic methods to assess the remaining life are presented with discussion on limitations of these methods. Guidance is also provided on condition management and best maintenance practices.

**Mats Dahlund**

**Copper sulphide in power transformer insulation**
In recent years there have occurred several failures, in different classes of equipment, connected to Cu2S formation. These were through various failure modes, normally without warning in DGA. They involved mostly equipment operating at elevated daily average temperature, although within accepted limits. Today there are no universally known and accepted methods to identify units at risk or oils that may cause problems, nor diagnostic techniques to identify already affected equipment. New testing methods are presented. The conditions leading to failures are reviewed and counter-measures are proposed.

**Nicolae Fantana**

**Transformer lifetime data management**
Operation of power transformers implies a number of decisions on loading, maintenance, repair and replacement. These decisions can be made more systematic, precise and repeatable if proper lifetime data is available. This data has to be relevant, sufficient and accurate, for any individual transformer of interest. Methods and strategies are proposed for an optimum selection of significant data to be collected over the life of the transformer.

**Paul Jarman**

**Recommendations for condition monitoring and condition assessment facilities for transformers** Many transformer monitoring techniques and systems have been developed, offering a variety of advantages for the transformer operator and asset manager. In order to facilitate the future installation of such systems, there are certain sensors and facilities that should be provided on new transformers. Review of existing systems is provided with description of basic sensor requirement for condition monitoring. Such facilities include external core grounding, oil sampling points, separate neutrals for each phase, separate compartment for tap-selector, etc.

Cigre can provide a set of tutorials on different subjects related to transformers. Those tutorials are a state of the art reflecting the work done by working groups. They present in an easily accessible way the work done there.

There aim is to:
- Capture the knowledge and know-how developed by CIGRE SC A2 and other related SC and disseminate
- Add value to this knowledge and information by synthesizing state-of-the-art documents
- Improve visibility of recent development in transformer related topics
- Identify the research that appear most promising
- Disseminate at the regional level to reach a larger audience

It exists tutorials on:
- Transformer overload performances
- Transformer short circuit performances
- Economics of transformer management
- Partial discharge in transformers

**11.3.4 Working group and task force reports**
Full progress report, scope and membership of the different groups are on the WEB site of A2

**WG A2-24 - Thermal performances (J. Declercq)** created in 2003.
The WG is considering: fundamentals of thermal ageing of insulation system, thermal modeling of transformers (for monitoring system) and thermal testing of transformers (contribution to measuring uncertainties at heat run tests).

Recent adding were on gas turbine transformer sizing and thermal modeling
We expect a closing of this group in 2008.

WG A2-26 - Mechanical condition assessment of windings (P. Picher) created in 2004.
The CIGRE Working Group A2.26 main objective is to develop a guide on the mechanical condition assessment of transformer windings using the Frequency Response Analysis (FRA) method.
The working group is divided in three task forces: 1-Guidance and introduction to FRA, 2-Techniques and 3-Interpretation.
The WG should deliver a final report soon.

WG A2-27 - Recommendations for condition monitoring facilities (P. Jarman) created as TF in 2003 and as WG in 2005.
A definite pattern and commonality to the requirements of the diverse monitoring systems has emerged. Communication protocols were not be considered, but the WG output may help to guide transformer data requirements for example for IEC 61850 application.
The final report has been circulated within the SC and comments are being taken care of. A final brochure will be issued during the first part of 2008.

WG A2-33 - Fire Safety (A. Petersen/AU)
The aim is to prepare recommendations for transformer fire safety practices that will help transformer designers and users to define and apply best practices in the domain of transformer fire. The scope shall cover different parts, mainly: a) Avoidance of tank rupture, b) Precaution to fire victim and c) Precautions to fire origin.
This Working had its first meeting in Bruges.

WG A2-34 Guide for Transformer Maintenance (C. Rajotte/CA)
The aim is to prepare a guide for transformer maintenance that will help transformer users to define and apply best practices for transformer maintenance. The Scope shall: a) define a best practices list of periodic actions applied on line or off line, b) address condition based maintenance and c) human and material aspects of transformer maintenance, with maintenance planning, maintenance tasks tracking, maintenance resources, cost references, level of competences required for different tasks, training, on-site repair, etc.

WG A2-35 Experiences in service with new liquids (R. Martin/UK)
The aim is to collate and review the in-service experience of using the new fluids in a way which is relevant and beneficial to the electrical industry. Domains to be covered are: a) Basic properties like physical and chemical and electrical differences between the new fluids and mineral oil, fire safety, toxicity, etc. b) Design considerations, c) Maintenance, Retro filling practice, Handling, experiences of these new fluids with cellulose, d) Standards: Review what standards exist for these fluids, highlight deficiencies, propose remedies and e) Further work: identify the knowledge gaps/concerns and propose solutions, or work for other groups.

JWG A2/B4-28 - HVDC Converter Transformers (M. Saravolac) created in 2004.
The design review guide will address specific aspects of HVDC transformers and their application. Concerning test specification, some new recommendations for test requirements and procedures covered will be issued in order to ensure higher reliability in service.
One of the areas under consideration is the duration of the Polarity Reversal test.

11.3.5 Last Publications
All publication are available from the site: http://www.e-cigre.org

N°323 Ageing of cellulose in mineral-oil insulated transformers
The guide describes the normal ageing processes in the cellulose of oil impregnated insulation systems for transformers. The various cellulose materials and their properties are described. New knowledge on oxidation and hydrolysis and the influence of the chemical condition of oil and of
paper together with thermal stresses are described. Also possibilities for diagnostics and for maintenance of the cellulose are discussed.

International Symposium on International standards for Ultra High Voltage
The CD includes the papers presented during the Symposium organized jointly by CIGRE and IEC, in Beijing, 18-21 July 2007. Part of the papers presented at Poster Sessions are also included. The 47 main papers are ordered as they were discussed in the 11 sessions, dedicated respectively to: - Needs and plans for UHV infrastructure (1000kV AC and 800kV DC) - System issues - Lines, Substations, Equipment, Transformers - DC - Testing - Standardization

11.3.6 next meetings
In 2008, the SC meeting will be part of the Paris session. The preferential subjects are the same as those of the colloquium.
11.0 Old Business

There were no items of Old Business brought up
12.0 New Business

No Additional NEW BUSINESS
IEEE / PES Transformers Committee
Meeting Minutes
Attachments

Unapproved
IEEE / PES Transformers Committee Meeting Minutes

Attachment A

General Attachment
IEEE “My Project” Slides Presented

Unapproved
Changes to the NesCom Process

October 2007
A Project Authorization Request (PAR) has been submitted to NesCom by TDM PREVOST for consideration at the 12/04/2007 NesCom meeting.

As the Sponsor/Standards Representative for this project, you are required to either approve or disapprove of this submittal request. Please go to http://ieee.bivio.biz/my-site to review the PAR and either accept or reject the PAR submittal. In order to have the PAR appear on the next NesCom agenda, you must take action by 12/03/2007. The PAR will not be placed on the NesCom agenda until action is taken by you.

If you should have any questions, please contact the NesCom Administrator via e-mail at invalid:moeller@mail.bivio.com or via telephone at 303-543-0013.
The PARs listed on this page require some action by you (the Sponsor or Standards Representative).

**ACTIONS:**

- **Accept**: Acceptance of the PAR by the required cutoff date of the next NesCom meeting. If you choose to accept, the PAR will be added to the next NesCom meeting agenda. Once accepted, the options available to the Sponsor will be changed to "Remove from Agenda".
- **Reject**: If you choose to reject the PAR, it will be returned to the submitter.
- **Remove From Agenda**: Allows you to remove a previously accepted PAR from the NesCom Agenda.

**COMMENTS:**

If comments are available regarding the PAR, you will view and respond to them here.

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IEEE / PES Transformers Committee Meeting Minutes

Attachment B

Proposed Treasurer’s Responsibilities

Unapproved
IEEE is responsible for maintaining accurate and timely financial records for all its units worldwide. Treasurers of organizational units assist IEEE headquarters and the Transformers Committee in this effort by maintaining these records in appropriate formats. The Treasurer’s activity is an important factor in helping the IEEE maintain its nonprofit tax exempt status. It is the recommendation of the Committee Officers that a position of Committee Treasurer be established and further that the position be defined in accordance with the following guidelines.

Committee are related to planning and holding Committee Meetings, a Committee Treasurer’s position will be established within the Meetings Subcommittee (with the SC name updated to Meetings Planning and Finance SC to reflect this added responsibility). The Committee Treasurer is appointed by the Subcommittee Chair, with notification provided to the Committee Chair, and will serve normally for a term of two years. The incumbent Treasurer can maintain the position for additional two year terms, through re-appointment by the SC Chair.
are:

1. Collect and disburse Committee funds, and protect the integrity of those funds.

2. Report the Committee's financial condition, either directly or through the Meetings Planning and Finance SC Chair, to the Administrative Subcommittee (AdSubCom) at each bi-annual meeting.

3. Open a financially sound, federally insured, interest bearing bank account (preferably an IEEE Concentration Bank Account). The account shall be in the name of the Committee and shall include word "IEEE".

4. Maintain a short-accounts registry of the bank account. The registry shall be presented to the AdSubCom for review at each bi-annual meeting.

5. Collect authorized signatures for the bank signature card and submit as necessary. The card shall contain three signatures; those of the Treasurer and at least two Committee Officers.

6. Maintain supporting records of revenue and expenditures (cancelled checks, invoices, receipts, etc.) in "audit-ready" format.
bottom line shall not change significantly over a long period, and an adequate positive balance shall be maintained to fund future expenditures (deposits for hotel contracts, vendors, etc.)

8. Request approval from the Committee Officers for significant non-meeting related expenditures (limit presently set at $500).

9. Be familiar with the "IEEE Finance Operations Manual" and strive to follow procedures and policies applicable to SA organizational units and standards development groups.

corporate financial activities" (i.e., US Sarbanes-Oxley Act), prepare and submit necessary financial reports to IEEE HQ (annual L50-S forms, audit submittals, etc.).

11. Confirm individual "fidelity bond coverage" with IEEE HQ Insurance Department (this is furnished by IEEE but needs to be confirmed for each incoming Treasurer).

12. Assist the Meetings Planning and Finance SC Chair as needed in developing the detailed meeting budget before each bi-annual meeting.

13. Work closely with the SC Chair in submitting proposed registration fees to the Committee Officers for approval before each bi-annual meeting.

AdSubCom, the Committee's O&P Manual should be updated accordingly.
### Membership Summary for 11-OCT-2007

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#### Membership Breakdown

- **Active Participants**: 54.7%
- **Committee Members**: 39.1%
- **Committee Member - IEEE Life Member**: 3.7%
- **Committee Member - Emeritus Member**: 1.5%
- **Interested Individuals**: .8%
- **Active Participant - IEEE Life Member**: .2%
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IEEE / PES Transformers Committee Meeting Minutes

Attachment E

Standards Subcommittee Standards Status
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<td>C57.19.00</td>
<td>Standard General Requirements and Test Procedure for Power Apparatus Bushings</td>
<td>Elliott</td>
<td>K. P.</td>
<td>(615) 847-2157</td>
<td><a href="mailto:keithcota@aol.com">keithcota@aol.com</a></td>
<td>2004</td>
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<td>C57.19.03</td>
<td>IEEE Standard Requirements, Terminology, and Test Code for Bushings for DC Applications</td>
<td>Elliott</td>
<td>F. E.</td>
<td>(360) 418-2269</td>
<td><a href="mailto:felliot@ieee.org">felliot@ieee.org</a></td>
<td>2000</td>
<td>12/31/2007</td>
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<td>C57.12.01</td>
<td>IEEE Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin Encapsulated Windings</td>
<td>Sullivan J. C.</td>
<td>2005</td>
<td>12/31/2010</td>
<td><a href="mailto:jcsullivan@ieee.org">jcsullivan@ieee.org</a></td>
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<td>C57.12.52</td>
<td>Standard Requirements for Sealed Dry-Type Power Transformers, 501 kVA and Larger, Three-Phase, with High-Voltage 601 to 34 500 Volts, Low-Voltage 208Y/120 to 4160 Volts</td>
<td>Kennedy S. P.</td>
<td>1981</td>
<td>5/7/2007</td>
<td><a href="mailto:s.kennedy@niagaratransformer.com">s.kennedy@niagaratransformer.com</a></td>
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<td>PC57.12.60</td>
<td>IEEE Guide for Conducting a Transient Voltage Analysis of a Dry-Type Transformer Coil</td>
<td>Kline A. D.</td>
<td>1991</td>
<td>12/31/2007</td>
<td>(843) 705-2698 <a href="mailto:AKLINE1490@AOL.COM">AKLINE1490@AOL.COM</a></td>
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<td>Need reaffirmation. Need to request extension for reaffirmation or submit PAR for revision before 10/15/2007.</td>
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<td>C57.12.91</td>
<td>IEEE Recommended Practice for the Detection of Partial Discharge and the Measurement of Apparent Charge in Dry-Type Transformers</td>
<td>Kline A. D.</td>
<td>1991</td>
<td>12/31/2007</td>
<td>(843) 705-2698 <a href="mailto:AKLINE1490@AOL.COM">AKLINE1490@AOL.COM</a></td>
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<td>DRY TYPE TRANSFORMERS</td>
<td>Johnson, Jr. C. W.</td>
<td>(276) 688-1512</td>
<td><a href="mailto:charles.w.johnson@us.abb.com">charles.w.johnson@us.abb.com</a></td>
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<td>PC57.16</td>
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<td>Lewis</td>
<td>(910) 738-4251</td>
<td><a href="mailto:tlewis@acmepower.com">tlewis@acmepower.com</a></td>
<td>1982</td>
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<td>C57.94</td>
<td>IEEE Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type General Purpose Distribution and Power Transformers</td>
<td>Lewis</td>
<td>(910) 738-4251</td>
<td><a href="mailto:tlewis@acmepower.com">tlewis@acmepower.com</a></td>
<td>1996</td>
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<td>SubCommittee</td>
<td>HV CONVERTER TR &amp; REACTORS</td>
<td>Dudley R. F.</td>
<td>(416) 298-8108</td>
<td><a href="mailto:richardd@ca.trenchgroup.com">richardd@ca.trenchgroup.com</a></td>
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<td>C57.129</td>
<td>IEEE General Requirements and Test Code for Oil Immersed HVDC Converter Transformers</td>
<td>Dudley</td>
<td>(416) 298-8108</td>
<td><a href="mailto:richardd@ca.trenchgroup.com">richardd@ca.trenchgroup.com</a></td>
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<td>INSTRUMENT TRANSFORMERS</td>
<td>IEEE Standard Requirements for Instrument Transformers</td>
<td>Nelson (301) 975-2936 <a href="mailto:nelson1@ieee.org">nelson1@ieee.org</a></td>
<td>1993</td>
<td>12/31/2007</td>
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<td>Approved - Active PAR to revise std.</td>
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<td>C57.13.2</td>
<td>INSTRUMENT TRANSFORMERS</td>
<td>Conformance Test Procedure for Instrument Transformers</td>
<td>Kliban (714) 389-3797 <a href="mailto:vladimir@kliban.com">vladimir@kliban.com</a></td>
<td>2005</td>
<td>12/31/2010</td>
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<td>INSTRUMENT TRANSFORMERS</td>
<td>Standard of Performance and Test Requirements for Standard Instrument Transformers of a Nominal System Voltage of 115 kV and Above</td>
<td>Rifkin (314) 840-3000 x 3424 <a href="mailto:nmbennett@hydroquebec.ca">nmbennett@hydroquebec.ca</a></td>
<td>2006</td>
<td>12/31/2009</td>
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<td>Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers</td>
<td><a href="mailto:cpmcshane@cooperpower.com">cpmcshane@cooperpower.com</a></td>
<td>(262) 524-4591</td>
<td>12/10/2003</td>
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<td>IEEE Guide for Acceptance of Silicone Insulating Fluid and Its Maintenance in Transformers</td>
<td><a href="mailto:rladroga@doble.com">rladroga@doble.com</a></td>
<td>(617) 393-3133</td>
<td>12/31/2010</td>
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<td>C57.121</td>
<td>IEEE Guide for Acceptance and Maintenance of Less-Flammable Hydrocarbon Fluid in Transformers</td>
<td><a href="mailto:cpmcshane@cooperpower.com">cpmcshane@cooperpower.com</a></td>
<td>(262) 524-4591</td>
<td>12/31/2007</td>
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<td>Guide for Interpretation of Gases Generated in Silicone-Immersed Transformers</td>
<td><a href="mailto:wllam_bartley@joh.com">wllam_bartley@joh.com</a></td>
<td>(860) 722-5483</td>
<td>12/31/2009</td>
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<td>IEEE 637</td>
<td>IEEE Guide for the Reclamation of Insulating Oil and Criteria for Its Use</td>
<td><a href="mailto:javerner@pepco.com">javerner@pepco.com</a></td>
<td>(202) 872-2812</td>
<td>12/31/2012</td>
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| PC57.145     | Guide for the Definition of Thermal Duplicate Liquid-Immersed Distribution, Power, and Regulating Transformers | Beaster B. L.  
(601) 422-1302  bibeaster@ieee.org | 0 | 6/25/1998  12/31/2004 | New Project - Active PAR Std under development |
| C57.100      | IEEE Standard Test Procedure for Thermal Evaluation of Liquid-Immersed Distribution and Power Transformers | Wicks R. C.  
(804) 383-3300  roger.c.wicks@usa.dupont.com | 1999 | 12/31/2008  12/31/2008 | Approved - Active PAR for Revision |
| C57.119      | IEEE Recommended Practice for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Ratings | Tuli S. C.  
(262) 547-0123 x1428  subhash.tuli@waukeshaelectric.spx.com | 2001 | | Approved |
| C57.91       | IEEE Guide for Loading Mineral-Oil-Immersed Transformers | Raymond T.  
(518) 884-0297  tc.raymond@ieee.org | 1995  12/31/2009  12/31/2009 | Approved - Active PAR for revision |
| PC57.91      | IEEE Guide for Loading Mineral-Oil-Immersed Transformers--Corrigendum 1 | Pierce L. W.  
(706) 235-1805  piercelw@aol.com | 2002  12/31/2007 | Approved - Active PAR for Revision |
| C57.91-1995/Cu | IEEE Guide for the Application of High-Temperature Insulation Materials in Liquid-Immersed Power Transformers | Franchek M. A.  
(802) 751-3539  mfranchek@weidmann-systems.com | 1997  12/31/2011 | In conjunction with C57.91 - reaffirmed in 6/2004. Currently under revision |
(610) 774-4686  donplatts@ieee.org | 2000  12/31/2010 | Upgrade from trial use to full use on 3/30/2000  Reaffirmation approved by SA Board in 3/30/2006  Approved |
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<td>Girgis R. C. (518) 276-6367</td>
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<td>Schappell S. M.</td>
<td>(919) 580-3240</td>
<td><a href="mailto:schappell@ieee.org">schappell@ieee.org</a></td>
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<td>Lundquist T.</td>
<td>(602) 236-8617 <a href="mailto:tom.lundquist@ieee.org">tom.lundquist@ieee.org</a></td>
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<td>Standard Requirements for Liquid-Immersed Power Transformers</td>
<td>Arteaga J. (601) 422-1920 <a href="mailto:javier.arteaga@ieee.org">javier.arteaga@ieee.org</a></td>
<td>1997</td>
<td>6/13/2002</td>
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<td>PC57.143</td>
<td>Guide for Application for Monitoring Equipment to Liquid-Immersed Transformers and Components</td>
<td>Chu D. (212) 460-3456 <a href="mailto:chud@iedcon.com">chud@iedcon.com</a></td>
<td>2002</td>
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<td>Standard for Control Cabinets for Power Transformers</td>
<td>Watson J.D. (561) 691-2206 <a href="mailto:joe_watson@ieee.org">joe_watson@ieee.org</a></td>
<td>2004</td>
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<td>Standard Requirements for Arc Furnace Transformers</td>
<td>Corsi D. (330) 875-3333 <a href="mailto:dom.corsi@dmyers.com">dom.corsi@dmyers.com</a></td>
<td>2007</td>
<td>3/22/2007</td>
<td>NEW PAR for revision of</td>
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<td>IEEE Guide for Failure Investigation, Documentation, and Analysis for Power Transformers and Shunt Reactors</td>
<td>Binder, Jr. W. B. (724) 654-3839 <a href="mailto:wbbinder@aol.com">wbbinder@aol.com</a></td>
<td>1991</td>
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<td>Guide for Metric Conversion of Transformer Standards</td>
<td>Olson T.</td>
<td>(204) 474-4080</td>
<td><a href="mailto:tolson@hydro.mb.ca">tolson@hydro.mb.ca</a></td>
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<td>UNDERGROUND TR &amp; NW PROTECT</td>
<td>IEEE Standard for Underground Type, Self-Cooled, Single Phase Distribution Transformers with Separable Insulated High-Voltage Connectors; High Voltage 25kV and Below; Low Voltage 600V and Below</td>
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<td>PC57.12.23</td>
<td>C. G. Niemann</td>
<td>(847) 683-2145 <a href="mailto:carlpuicco@sbcglobal.net">carlpuicco@sbcglobal.net</a></td>
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<td>PC57.12.24</td>
<td>G. Termini</td>
<td>(610) 941-1524 <a href="mailto:giuseppe.termini@peco-energy.com">giuseppe.termini@peco-energy.com</a></td>
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<td>PC57.12.40</td>
<td>B. Klaponski</td>
<td>(204) 633-7220 <a href="mailto:brian.klaponski@carte.ca">brian.klaponski@carte.ca</a></td>
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<td>PC57.12.44</td>
<td>D.H. Mulkey</td>
<td>(415) 973-4699 <a href="mailto:DHM3@PGE.COM">DHM3@PGE.COM</a></td>
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<td>NONE</td>
<td>A.L. Robinson</td>
<td>(361) 289-4001 <a href="mailto:arobinson@aep.com">arobinson@aep.com</a></td>
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<th>Working Group Chair</th>
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<tr>
<td>Trust</td>
<td>(859) 879-2912</td>
<td><a href="mailto:alant@kuhlman.com">alant@kuhlman.com</a></td>
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<td>Termini</td>
<td>(610) 941-1524</td>
<td><a href="mailto:giuseppe.termini@peco-energy.com">giuseppe.termini@peco-energy.com</a></td>
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<td>Klaponski</td>
<td>(204) 633-7220</td>
<td><a href="mailto:brian.klaponski@carte.ca">brian.klaponski@carte.ca</a></td>
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<td>Mulkey</td>
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<td><a href="mailto:DHM3@PGE.COM">DHM3@PGE.COM</a></td>
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<td>Robinson</td>
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| Prepared by B. Chiu, IEEE PE/TR Std. Coordinator | Page 15 of 15 |
IEEE / PES Transformers Committee Meeting Minutes

Attachment F

Standards Subcommittee Transformer Committee Organizational Charts

Unapproved
IEEE / PES Transformers Committee
Meeting Minutes

Attachment G

Patent Presentation

Unapproved
Information for all Attendees – IEEE Transformers Committee Meeting, Fall 07

IEEE Patent Requirements for Standards Development Meetings

As discussed during the last several years, the Committee continues to be aware of IEEE requirements related to the possibility of inclusion of patents in IEEE Standards. The instances are expected to be rare, and subject to specific review and guidelines. Detailed information on this subject can be found in IEEE website locations listed below. Of present concern to Committee work is the requirement that, at every standards development meeting, a request be made for disclosure of any patents or patent applications any individual believes may be essential to the implementation of the standard. The request, per present IEEE guidelines, is to be made at each WG Meeting, and any responses provided are to be recorded in Meeting Minutes. Positive responses will also prompt a request for documentation on the patent to be supplied to IEEE.

IEEE Instructions for WG Chairs are found on the following Instructions and 5 slides, available at IEEE web location (http://standards.ieee.org/board/pat/pat-slideset.ppt)

Our WG Meetings are relatively short, and taking the time show all the slides associated with the required “call” for patents presents a hardship in our schedule. In order to minimize the impact on WG Meetings, while meeting the intent of the IEEE guidelines, these notes and slides are being provided on the Committee’s website, and all meeting participants are encouraged to review prior to the meeting. With this preparation the announcement at WG Meetings, per the following slides, should take no more than a few minutes – and the Committee judges that showing of each slide at each WG Meeting, while appropriate if requested, is not necessary. For any questions, refer to the following websites, or contact one of the Committee officers.

- (http://standards.ieee.org/guides/bylaws/sect6-7.html#6) – Note Clause 6 - Patents

Don Fallon, Chair  Tom Prevost, Vice Chair  Ed Smith, Secretary

Instructions for the WG Chair

The IEEE-SA strongly recommends that at each WG meeting the chair or a designee:

- Show slides #1 through #5 of this presentation
- Advise the WG attendees that:
  - The IEEE’s patent policy is consistent with the ANSI patent policy and is described in Clause 6 of the IEEE-SA Standards Board Bylaws;
  - Early identification of patent claims which may be essential for the use of standards under development is encouraged;
  - There may be Essential Patent Claims of which the IEEE is not aware. Additionally, neither the IEEE, the WG, nor the WG chair can ensure the accuracy or completeness of any assurance or whether any such assurance is, in fact, of a Patent Claim that is essential for the use of the standard under development.
- Instruct the WG Secretary to record in the minutes of the relevant WG meeting:
  - That the foregoing information was provided and the five slides were shown;
  - That the chair or designee provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) that the participant believes may be essential for the use of that standard;
  - Any responses that were given, specifically the patent claim(s)/patent application claim(s) and/or the holder of the patent claim(s)/patent application claim(s) that were identified (if any) and by whom,
  - It is recommended that the WG chair review the guidance in the Standards Companion on inclusion of potential Essential Patent Claims by normative reference.

Note: WG includes Working Groups, Task Groups, and other standards-developing committees.

(Optional to be shown)  1 May 2007
Highlights of the IEEE-SA Standards Board Bylaws on Patents in Standards

- Participants have a duty to tell the IEEE if they know (based on personal awareness) of potentially Essential Patent Claims they or their employer own
- Participants are encouraged to tell the IEEE if they know of potentially Essential Patent Claims owned by others
  - This encouragement is particularly strong as the third party may not be a participant in the standards process
- Working Group required to request assurance
- Early assurance is encouraged
- Terms of assurance shall be either:
  - Reasonable and nondiscriminatory, with or without monetary compensation; or,
  - A statement of non-assertion of patent rights
- Assurances
  - Shall be provided on the IEEE-SA Standards Board approved LOA form
  - May optionally include not-to-exceed rates, terms, and conditions
  - Shall not be circumvented through sale or transfer of patents
  - Shall be brought to the attention of any future assignees or transferees
  - Shall apply to Affiliates unless explicitly excluded
  - Are irrevocable once submitted and accepted
  - Shall be supplemented if Submitter becomes aware of other potential Essential Patent Claims
  - A “Blanket Letter of Assurance” may be provided at the option of the patent holder
  - A patent holder has no duty to perform a patent search
IEEE-SA Standards Board Bylaws on Patents in Standards

Copies of an Accepted LOA may be provided to the working group, but shall not be discussed, at any standards working group meeting.

The Submitter and all Affiliates (other than those Affiliates excluded in a Letter of Assurance) shall not assign or otherwise transfer any rights in any Essential Patent Claims that are the subject of such Letter of Assurance that they hold, control, or have the ability to license with the intent of circumventing or negating any of the representations and commitments made in such Letter of Assurance.

The Submitter of a Letter of Assurance shall agree (a) to provide notice of a Letter of Assurance either through a Statement of Encumbrance or by binding any assignee or transferee to the terms of such Letter of Assurance; and (b) to require its assignee or transferee to (i) agree to similarly provide such notice and (ii) to bind its assignees or transferees to agree to provide such notice as described in (a) and (b).

This assurance shall apply to the Submitter and its Affiliates except those Affiliates the Submitter specifically excludes on the relevant Letter of Assurance.

If, after providing a Letter of Assurance to the IEEE, the Submitter becomes aware of additional Patent Claim(s) not already covered by an existing Letter of Assurance that are owned, controlled, or licensable by the Submitter that may be or become Essential Patent Claim(s) for the same IEEE Standard but are not the subject of an existing Letter of Assurance, then such Submitter shall submit a Letter of Assurance stating its position regarding enforcement or licensing of such Patent Claims. For the purposes of this commitment, the Submitter is deemed to be aware if any of the following individuals who are from, employed by, or otherwise represent the Submitter have personal knowledge of additional potential Essential Patent Claims, owned or controlled by the Submitter, related to a [Proposed] IEEE Standard and not already the subject of a previously submitted Letter of Assurance: (a) past or present participants in the development of the [Proposed] IEEE Standard, or (b) the individual executing the previously submitted Letter of Assurance.

The assurance is irrevocable once submitted and accepted and shall apply, at a minimum, from the date of the standard's approval to the date of the standard's withdrawal.

The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of those Patent Claims, or for determining whether any licensing terms or conditions are reasonable or non-discriminatory.

Nothing in this policy shall be interpreted as giving rise to a duty to conduct a patent search. No license is implied by the submission of a Letter of Assurance.

In order for IEEE's patent policy to function efficiently, individuals participating in the standards development process: (a) shall inform the IEEE (or cause the IEEE to be informed) of the holder of any potential Essential Patent Claims of which they are personally aware and that are not already the subject of an existing Letter of Assurance, owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents; and (b) should inform the IEEE (or cause the IEEE to be informed) of any other holders of such potential Essential Patent Claims that are not already the subject of an existing Letter of Assurance.
Other Guidelines for IEEE WG Meetings

- All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.
- Don't discuss the interpretation, validity, or essentiality of patents/patent claims.
- Don't discuss specific license rates, terms, or conditions.
  - Relative costs, including licensing costs of essential patent claims, of different technical approaches may be discussed in standards development meetings.
    - Technical considerations remain primary focus
- Don't discuss fixing product prices, allocation of customers, or dividing sales markets.
- Don't discuss the status or substance of ongoing or threatened litigation.
- Don't be silent if inappropriate topics are discussed… do formally object.

If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at patcom@ieee.org or visit http://standards.ieee.org/board/pat/index.html

See IEEE-SA Standards Board Operations Manual, clause 5.3.10 and “Promoting Competition and Innovation: What You Need to Know about the IEEE Standards Association's Antitrust and Competition Policy” for more details.

This slide set is available at http://standards.ieee.org/board/pat/pat-slideset.ppt
IEEE / PES Transformers Committee
Meeting Minutes

Attachment H

Document Presentation
Presentation
By
Peter Balma

Unapproved
Document Retention?

- Per David Ringle IEEE still working on this question.
- Current guidance provided by standards association is as follows:

  **File Retention**

- You've spent years developing a standard; your work is done. Now what do you do about all those papers you accumulated in the process?

- Many working group members and officers aren't sure what to do with these materials. You aren't obligated to keep any of it, and it is preferable that you do not. Once the work is complete on a standard, the IEEE maintains the official project file, which contains all the pertinent correspondence. However, many standards developers are loathe to toss out all the paperwork related to a standard they spent years developing. In this case, sponsor-level standards developers may retain the documents in the list to the right for a period of five years after the standard is published. After this time, they should be discarded.
Document Retention? (continued)

- Sponsors may retain the following documents for five years after their standards are published:

1) Log of issues (resolved and unresolved)
2) Meeting minutes and attachments
3) Documents from other organizations
4) Technical input received that resulted in revision to the standard
5) All draft revisions, and correspondence regarding the draft
6) All correspondence produced by the committee
7) A copy of the PAR
8) The response from the IEEE-SA Standards Board to the PAR
9) The sponsor ballot summary, ballot comments, ballot resolution, and other related ballot correspondence
10) Interpretations (requests and responses)
Copyrights and References

- Copyright IEEE from IEEE (transactions, proceedings or papers)?
  - Yes, this is to ensure that IEEE owns the copyright.
- Figures, Tables, Text?
  - Even adapted or modified figures, tables, or substantial text require copyright permission
- Forms to request copyright permissions are available in the Style Manual, manual also leads to letter templates for such requests.
- Discussion???
- Contact:
  - Kim Breitfelder, Manager Standards Editing and Production
    IEEE Standards Activities, 732-465-6601
IEEE / PES Transformers Committee
Meeting Minutes

Attachment I

Meetings and Planning Subcommittee
Presentation

Unapproved
### SC MEETINGS PLANNING

**Fall 2007 Meeting**  
Minneapolis, Minnesota USA  
17 October 2007

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#### MEETING ATTENDANCE

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**-- tentative**
COMMITTEE FINANCES

Existing funds
... before break sponsor contributions
... before cost of printing & mailing minutes from previous meeting

Before Spring 2007 Meeting in Dallas
-- $17,751.87 (as of 12 February 2007)

Before this meeting
...

Before Spring 2007 Meeting in Dallas
-- $17,751.87 (as of 12 February 2007)

Before this meeting
-- $44,438.59 (as of 1 August 2007)
MEETING REPORTS

PAST & PRESENT MEETINGS

- **Spring 2007** – Dallas; Ken Hanus and TXU
- **Fall 2007** – Minneapolis; Sue McNelly and Xcel Energy

FUTURE MEETINGS

- **Spring 2008** (March 16-20) – Charlotte, NC; Hosted by Robert Thompson and Shaw EDS, Westin Charlotte (US$159/159)
- **Fall 2008** (October 5-9) – Oporto, Portugal; hosted by EFACEC, Porto Palacío (120€/140€)
- **Spring 2009** (April 19-23, tentative) - location TBD

My Reservation (Charlotte) ... MAKE YOUR RESERVATION NOW!

Check In 15-MAR-2008 - 3:00 PM *
Check Out 21-MAR-2008 - 12:00 PM *
Number of Rooms 1
Number of Guests 1
* Indicates standard hotel check-in and check-out times and does not reflect special arrangements made with the hotel.

Your Accommodations
1 Room, 1 Adult Per Room, 1 King
Room 1: GREGORY ANDERSON

Room Amenities
Traditional Non-smoking, Heavenly Bed, Heavenly Bath, Laptop Safe

Your Rate

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<th>Avg Est Room Total per Night *</th>
<th>Est Total for Your Stay *</th>
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<td>Room Rate: USD 159.00</td>
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Room rate excludes the following:

Mandatory taxes:
- State Sales Tax: 7.25%
  Per Room / Per Night USD 11.53 USD 69.16
- Lodging Tax: 8.00%
  Per Room / Per Night USD 12.72 USD 76.32

Estimated Total *:
USD 183.25 USD 1,099.49
OTHER POTENTIAL MEETING LOCATIONS

Miami, Orlando, San Antonio, Phoenix, Winnipeg, Kansas City ...

Others ... Mexico City
... South Korea

WORKING GROUPS

• **WG Web-site Development**
  -- did not meet this meeting
  -- password for restricted areas (effective Oct 22)
    Username: xfmrcom (no change)
    Password: Trs34acc (case sensitive)

• **WG Educational Development**
  New WG for Educational Development to promote educational content and coordinate presentations & tutorials. Kent Haggerty is WG chair and focal-point for presentations & tutorials (n.kent.haggerty@ieee.org).
UPCOMING PRESENTATIONS/TUTORIALS

This meeting’s presentations are now on the TC website, in “movie” (AVI) and PDF formats.

UPCOMING PRESENTATIONS/TUTORIALS

Spring 2008 - Charlotte

• Short Circuit Strength and Testing
  – Presenters: Marcel Fortin, Pierre Rifon, IEC Member
  – Sponsoring SC: Performance Characteristics

• National Energy Policy
  – Presenter: Phil Hopkinson
  – Sponsoring SC: Performance Characteristics

Fall 2008 - Portugal

• Sound Intensity Method of Measuring Noise Indoors
  – Presenters: Ramsis Girgis, Chris Ploetner, Donald Chu
  – Sponsoring SC: Audible Sound & Vibration

• 50/60 Hz Conversion Factors
  – Presenter: Ramsis Girgis
  – Sponsoring SC: Performance Characteristics
Future Tutorials

- Paralleling of Transformers
- Update on Application of Ester Fluids in Transformers
- Transformer Thermal Modeling – Improving Reliability Data
- Core Heating Due to Main Core Flux
- Non-Sinusoidal Voltage Sources During No-Load Testing
- Geomagnetic & DC Induced Currents Into Transformers
- Frequency Response Analysis

Future Tutorials (con’t)

- Wind Farm Transformers
- Loss Tolerance and Measurements
- Furan Testing, Correlation to DP & Insulation Life
- Transformer Core Loss Evaluation Through Harmonic Testing with Programmable Sine Waves
- Revisiting Ferroresonance with Actual Field Cases
- Low Core Loss Transformers
- Zero Sequence Testing of Grounding Transformers
MISCELLANEOUS

Coffee-break Sponsors (or “Patrons”)

- Expenses – approx. $4000-5000/day for breaks!
- Goals are three-fold:
  -- Help maintain a low meeting registration fee
  -- Foster relationships between meeting attendees and manufacturers
  -- Provide technical and educational focused material
- Low-key & discreet ... passive & receptive (minimize sales attitude)
  -- suggest wear logo-wear
  -- stand-there, let attendees come to you ... don’t walk-around, shaking hands
  -- don’t pass-out flyers, simply leave info on table
  -- recommend leave copies of educational/technical reports on table too
- Present Cost
  -- Mon, Tues, Wed (4 breaks/day) - $1000/day

See Joe Watson, Break Sponsor Coordinator (joe_watson@ieee.org)

MISCELLANEOUS

- IEEE S50L Forms
- Audit of Finances
- Wireless LAN .. Internet Cafe
- Internet Meetings
- Still looking for a “Committee Historian”
- Defining Treasurer position