

IEEE/PES
Transformers
Committee

Meeting Minutes
October 9, 2003

***IEEE/PES TRANSFORMERS COMMITTEE
MEETING***

October 9, 2003

Pittsburgh, Pennsylvania, USA

***Minutes and Information Available on the
Committee Website:***

www.transformerscommittee.org

IEEE/PES TRANSFORMERS COMMITTEE MEETING

Pittsburgh, Pennsylvania, USA

October 5 - 9, 2003

ATTENDANCE SUMMARY

MEMBERS ATTENDING, AND PRESENT FOR MAIN MEETING (10/9)

Aho, David	Ellis, Keith	Lackey, John	Progar, John
Anderson, Greg	Fallon, Don	Lau, Mike	Puri, Jeewan
Antosz, Stephen	Franchek, Mike	Lewis, Tim	Raymond, Tim
Arnold, Jr., Jim	Fyvie, Jim	Lowdermilk, Larry	Riffon, Pierre
Arteaga, Javier	Gardner, James	Lundquist, Tom	Schweiger, Ewald
Balma, Peter	Ghafourian, Ali	McClure, Phil	Sharma, Devki
Barker, Ron	Girgis, Ramsis	McNelly, Susan	Shertukde, Hemchandra
Barnard, Dave	Gryzkiewicz, Frank	McShane, Patrick	Sim, Jin
Bartley, Bill	Hager, Jr., Red	McTaggart, Ross	Singh, Prit
Binder, Jr., Wally	Haggerty, N. Kent	Miller, Kent	Smith, Ed
Blackburn III, Gene	Hanique, Ernst	Molden, Arthur	Smith, Jim
Boettger, Bill	Hanus, Ken	Moore, Harold	Snyder, Steven
Chiu, Bill	Harlow, Jim	Morehart, Gene	Stahara, Ron
Chu, Don	Hartgrove, Bob	Mulkey, Daniel	Stiegemeier, Craig
Cooper, Tommy	Hayes, Roger	Musil, R.J.	Thompson, James
Corkran, Jerry	Heinrichs, Frank	Niemann, Carl	Thompson, Robert
Crouse, John	Hopkinson, Phil	Olson, Tim	Traub, Tom
Darwin, Alan	James, Rowland	Orehek, Paul	Wagenaar, Loren
Daubert, Ron	Johnson, Jr., Chuck	Paiva, Gerry	Watson, Joe
Davis, Eric	Jonnatti, Tony	Patel, Bipin	Wilks, Alan
Dix, Larry	Juhlin, Lars-Erik	Payne, Paulette	Zhao, Peter
Dohnal, Dieter	Kelly, Joe	Platts, Don	Ziomek, Waldemar
Dudley, Richard	Kennedy, Sheldon	Preininger, Gustav	
Elliott, Fred	Khalin, Vladimir	Prevost, Tom	

MEMBERS ATTENDING, BUT NOT PRESENT FOR MAIN MEETING (10/9)

Beaster, Barry	Harley, Jack	Papp, Klaus	Savio, Leo
Colopy, Craig	Henning, Bill	Patterson, Jr., Wes	Tuli, Subhash
Degeneff, Bob	Kline, Don	Perkins, Mark	Ward, Barry
Fleeman, Jeff	Lindgren, Stan	Reitter, George	
Foldi, Joe	Ma, Joe	Robbins, Chris	
Grunert, Bob	Millward, Paul	Russwurm, Dirk	

MEMBERS ABSENT

Allan, Dennis	Bonucchi, Joe	Feghali, Pierre	Hall, Geoff
Allustiarti, Raymond	Borst, John	Frank, P.E., Jerry	Hansen, Wayne
Altman, Mike	Brown, Charles	Galloway, Dudley	Highton, Keith R.
Atout, Khaled	Cambre, Jr., Max	Gaytan, Carlos	Hoeffler, Pete
Aubin, Jacques	Cash, Don	Gillies, Jim	Huddleston III, Jim
Ayers, Don	Compton, Olin	Graham, Richard	Iman, Mike
Bancroft, Roy	Dahinden, Vincenz	Griesacker, Bill	Jhonsa, VJ
Barnes, Mike	Duckett, Don	Grubb, Bob	Johnson, David
Bertolini, Edward	Ebert, John	Haas, Michael	Kappeler, Cal

Kennedy, Bill	McGill, Jack	Raymond, Charlie	Stensland, Len
Kim, Dong	McQuin, Nigel	Risse, Peter	Stewart, Peter
Koenig, E.	Mehta, Sam	Robinson, Butch	Stoner, Ron
Ladroga, Rick	Mitelman, Mike	Romano, Ken	Sullivan, John
Lazar, John	Mutschler, Jr., Bill	Rossetti, John	Templeton, Jim
Lewis, Frank	Nicholas, Ray	Ruevekamp, Henk	Thomas, Ray
Long, Leonard	Norton, Ed	Sampat, Mahesh	Trummer, Edgar
Lowe, Don	Patton, Jesse	Sankar, V.S.N.	Vaillancourt, Georges
Lowe, Richard	Pearce, Henry	Scheu, Bob	Veitch, Bob
MacMillan, Donald	Pekarek, Tom	Shenoy, Vic	Weffer, Felipe
Maguire, William	Perco, Dan	Shteyh, Ibrahim	Whearty, Bob
Marek, Rick	Pierce, Lin	Shull, Stephen	Wimmer, Bill
Marlow, Dennis	Plaster, Leon	Smith, Jerry	Woodcock, David
Massouda, Tito	Poulin, Bertrand	Smith, Ray	
Matthews, John	Purohit, Dilip	Stein, Werner	

GUESTS ATTENDING, AND PRESENT FOR MAIN MEETING (10/9)

Ahrens, Paul	Corsi, Dom	Kalra, C.J.	Rensi, Randy
Amanatidis, Savoula	D'Amico, Frank	Kennedy, Gael	Riboud, Jean-Christophe
Amos, Richard	Darovny, Bill	Klaponski, Brian	Roh, Hyo Chul
Andersson, Sten	Drexler, Charles	Kostyal, Stanley	Roussell, Marnie
Antweiler, Jim	Fairris, Bruce	Lee, Min-Jea	Schappell, Steven
Ares, Ignacio	Fausch, Reto	Lee, Dennis	Schneider, Jeff
Basel, Dana	Forrest, George	Lemke, Eberhard	Simpson, Jr., Bill
Bassett, Tom	Fortin, Marcel	Leuenberger, Boyd	Sparling, Brian
Beckman, Stephen	Foster, Derek	Lu, Franklin	Sterner, Robert
Bello, Oscar	Gruber, Myron	Mamtora, Jitendra	Teetsel, Mark
Blew, David	Guardado, Jeremy	Mihailovic, Batric	Termini, Giuseppe
Boman, Paul	Heinzig, Peter	Moffat, Jock	Tillman, Robert
Bush, Carl	Hochanh, Thang	Navarro, Martin	Traut, Al
Callsen, Thomas	Holland, John	Nguyen, Van Nhi	Wallach, David
Castellanos, Juan	Holsomback, Steve	Nguyen, Vuong	Wiefling, Ronald
Cheatham, Mark	Huff, Tim	Peterson, Alan	Williams, Michael
Coffeen, Larry	Jauch, Tom	Ploetner, Christoph	
Colquitt, Jr., Roy	Jeong, Benny	Rega, Chris	

GUESTS ATTENDING, BUT NOT PRESENT FOR MAIN MEETING (10/9)

Anderson, Thomas	Brush, Edwin	Cultrera, Joseph	Garza, Joseph
Antoran, Javier	Busse, Frank	Davis, Larry	Gattens, Philip
Aromin, Venzon	Cancino, Alvaro	Davydov, Valery	Gibson, Wayne
Ashby, Derek	Cargol, Tim	Delvecchio, Bob	Gillespie, Eugene
Baranowski, Derek	Caruso, Charles	Dinesh, Pranathy	Gomez Ibarra, Rolando
Barrientos, Israel	Chen, Yunxiang	Dunn, James	Goodwin, Dave
Bartek, Allan	Cherry, Donald	Dymek, Dave	Guerra, Jorge
Basu, Bikash	Chigiri, Takeshi	Ellis, David	Haas, Mark
Benach, Jeffrey	Cho, Juyoun	Epping, Patrick	Haasz, Jodi
Berler, Zalya	Choinski, Scott	Fazlagic, Asim	Hanson, Dave
Betancourt, Enrique	Claiborne, Clair	Field, Norman	Harbaugh, Tom
Bittner, Carlos	Comely, Tracy	Forsyth, Bruce	Hayman, Brent
Blake, Dennis	Costa, Florian	Ganser, Robert	Henry, Dale
Breytenbach, Richard	Craig, Douglas	Garcia, Ramon	Herron, John
Britton, Jeffrey	Culhane, Michael	Garnitschnig, Andreas	Hirt, Robert

Hoffman, Gary
Holifield, Thomas
Hollingsworth, Rich
Hopfner, Caron
Hudson, Stephen
Jagadeesh, Pura
Jakob, Karl
Jakob, Fredi
Jaroszewski, Marion
Jones, Anthony
Jordan, Steve
Jostrand, Patrick
Khan, Aftab
King, Gary
Kirker, Ron
Krump, Reiner
Leighty, Joseph
Loiola, Andre Leite
Luby, Thomas
Marlowe, Dan
Martin, W. Michael

Martin, Mike
Matthews, Lee
McCormack, Matt
Mehl, Donald
Melanson, Joseph
Mitchell, Michael
Monoski, Chris
Morales, Emilio
Morrissette, Guy
Murphy, Jerry
Neal, Jason
Nelson, Tom
Nicholas, Ron
Nikoley, Ingo
Nims, Joe
Nordman, Hasse
Nunez, Arturo
Olen, Robert
Oommen, T. V.
Paik, Henry
Patel, Sanjay

Patel, Jashu
Patwardhan, Jayant
Payerle, George
Payyar, Yogen Shetty
Payyar, Sridhar Shetty
Pereira, Rene
Pointer, Klaus
Provost, Richard
Psyck, Rip
Rahangdale, Ravi
Rahmatian, Farnoosh
Ray, Jeffrey
Recksiedler, Leslie
Reed, Scott
Rivers, Mark
Rogers, James
Roizman, Oleg
Sandhu, Surinder
Shaver, Lenny
Sousa, Joao Paulo
Speegle, Andy

Subramanian, Raman
Sundin, David
Sundkvist, Kjell
Sweetser, Charles
Swider, Joe
Swift, Glenn
Swinderman, Craig
Tanger, Charles
Ten Haagen, Chris
TeNyenhuis, Ed
Thaden, Malcolm
Tobin, Thomas
Verner, Jane Ann
Walters, Shelby
Wicks, Roger
Wiegand, David
Williams, Randy
Wright, Jeffrey
Yute, Douglas
Zito, Anthony

Table of Contents

CLAUSE		PAGE
1.0	Chairs’s Report, Remarks & Announcements – H. J. Sim	1
1.1	Report on the Technical Council Meeting	2
1.2	Transformers Committee Report to Technical Council	4
1.3	IEEE/NEMA MOU issue	7
1.4	IEEE policy on metrification.....	7
2.0	Approval of Minutes of March 20, 2003 – H. Jin Sim.....	7
3.0	Administrative Subcommittee – Jin Sim.....	7
3.1	Introduction of members and guests	8
3.2	Approval of the Raleigh AdCom meeting minutes.....	8
3.3	Additions to and/or approval of the agenda	8
3.4	Meeting Arrangements, Host Reports, and Committee Finances – G.W. Anderson...	8
3.5	ASC C57 ISSUES – H. J. Sim / B.K. Patel.....	9
3.6	IEEE delegation report ANSI C57 Committee – B. K. Patel.....	10
3.7	Committee Service Awards – B. K. Patel	10
3.8	Chair’s report – H. J. Sim.....	11
3.9	Vice Chair’s report – K. S. Hanus.....	11
3.10	Secretary’s report – D. J. Fallon.....	11
3.11	Standards Subcommittee - T. A. Prevost	15
3.12	Round-Table: Subcommittee Activities - Subcommittee Chairs	17
3.13	IEEE Standards Activities – Naeem Ahmad.....	19
3.14	Old Business.....	19
3.15	New Business	20
3.16	Adjournment.....	21
4.0	Vice Chair’s Report – K.S. Hanus	24
4.1	PES Technical Council Committees	24
4.2	Technical Paper Sessions	26
5.0	Transformer Standards – T. A. Prevost.....	26
5.1	Reports of WG’s:	27
5.2	Old Business.....	27
5.3	New Business	28
5.4	Standards Activities Since the October, 2002 Meeting	28
6.0	Recognition and Awards – B.K.Patel.....	48
6.1	Certificates of Appreciation	48
6.2	Nominations for IEEE, PES, and Technical Council Awards	49
6.3	Awards – General.....	50
7.0	Reports of Technical Subcommittees.....	51
7.1	Underground Transformers & Network Protectors SC – C. G. Niemann, Chair.....	51
7.2	Audible Sound and Vibration SC – Jeewan Puri, Chair	55
7.3	Bushings SC – Fred Elliott, Chair.....	56
7.4	Dry Type Transformers SC – C. W. Johnson, Jr., Chair.....	59
7.5	Distribution Transformers Subcommittee – Ed Smith, Chair	63

7.6	Dielectric Tests SC – Loren Wagenaar, Chair	71
7.7	HVDC Converter Transformers & Smoothing Reactors SC – R. F. Dudley, Chair ..	77
7.8	Instrument Transformers SC – Jim Smith, Chair	79
7.9	Insulating Fluids SC – F. J. Gryszkiewicz, Chair, R.K. Ladroga, Vice-Chair.....	89
7.10	Insulation Life SC – D. W. Platts, Chair	94
7.11	Performance Characteristics SC – R. S. Girgis, Chair	107
7.12	Power Transformers – E. G. Hager, Chair, T. Lundquist, Vice-Chair.....	121
8.0	Editor’s Report – M. Christini	129
9.0	Meetings Planning Subcommittee -- G. W. Anderson, Chair	133
9.1	Committee Finances	133
9.2	Past & Present Meetings	133
9.3	Future Meetings.....	135
9.4	Working Group Report.....	135
9.5	New Business	136
9.6	Miscellaneous.....	138
10.0	Reports of Liaison Representatives.....	139
10.1	SCC4 - P. A. Payne	139
10.2	TC 14 TAG - P. J. Hopkinson.....	139
10.3	CIGRE – Jean-Christophe Riboud	143
11.0	Old Business.....	146
11.1	Main Meeting Format.....	146
11.2	Membership Issues.....	146
11.3	CIGRE Contact Information	147
12.0	New Business	147
13.0	Adjournment.....	147
	Attachment 1 – Status Report of IEEE/PES Transformers Committee Standards	148
	Attachment 2 – Meeting Room Attendance Record.....	161

IEEE PES TRANSFORMERS COMMITTEE MEETING

Thursday, October 9, 2003

Chair: H. J. Sim Vice Chair: K. S. Hanus

Secretary: D. J. Fallon

1.0 Chairs's Report, Remarks & Announcements – H. J. Sim

Chairman Jin Sim called the meeting to order at 8:00 A.M. As there were no changes requested, the Agenda as published was generally followed.

Attendance Rosters were distributed. All Meeting participants are encouraged to work towards full membership in the Main Committee. Application forms and membership requirements can be found in the Committee Operations & Procedures (O&P) Manual, accessible on the Committee website (<http://www.transformerscommittee.org/>). Applications can be forwarded to the Secretary at any time, for action at the next Administrative SC Meeting.

Mr. Sim opened the meeting by covering a few announcements, including several items covered in more detail in the Administrative SC Minutes in Section 3. Items reviewed include:

- The Committee thanks Pennsylvania Transformer Technology, Inc. for their support in hosting this meeting. Dennis Blake accepted these thanks, and noted particular appreciation for the efforts of Cal Olsen and Judy Panian in planning for the meeting.
- With the termination of the IEEE/NEMA Memorandum of Understanding (MOU), the Accredited Standards Committee (ASC) process for approval of C37, C57, and C62 Standards as ANSI documents, has ended. Copyright has been transferred to IEEE from NEMA for many of our distribution, dry-type, and underground transformer documents, and complete responsibility for maintenance of these documents will rest with our Committee.
- IEEE Standards Association (SA) dues are scheduled to increase from \$10 to \$35 in 2004.
- Committee Officer transition will take place on January 1, 2004, with Ken Hanus taking over as Chair, Don Fallon moving to Vice Chair, and Tom Prevost, our present Standards Coordinator, starting the officers' progression as our new Secretary. Chairman Sim was also pleased to announce that Bill Chiu of Southern California Edison will step in as our new Standards Coordinator.
- The IEEE/IEC Dual Logo process is proceeding, with a process set up for review and approval of appropriate IEEE documents for IEC use and publication under a dual Logo. Negotiations continue for the reverse process to allow existing IEC documents to be approved for IEEE use.
- Five new Committee Members approved at the Administrative SC Meeting on 10/5/03 were announced to the group and welcomed to full Membership:
 - Barry Beaster, Howard Industries, Inc.

- Eric Davis, Burns and McDonnell
- Tim Olson, Manitoba Hydro
- Tim Raymond, Power Delivery Consultants
- Dirk Russwurm, HV Technologies, Inc.

The full content of Jin Sim's Chair's Report follows:

1.1 Report on the Technical Council Meeting

The first PES General meeting took place during July 13 – 17, 2003, in Toronto, Ontario. Don Fallon, Secretary of our Committee, attended representing the officers of the Transformers Committee.

Attendance for this General Meeting stood at 1340 at the time of the Technical Council Meeting.

1.1.1 Chair's Report

The following is a highlight of the report:

Future PES Meetings

General Meeting 04, Denver, CO June 6 – 12, 2004

Power Systems Conference & Expo, NYC October 2004

Note on the Power Systems Conference & Expo: Plans reviewed by organizer John Paserba. With the T&D Expo going to a 2 year cycle on odd years, intent is to have specialized meetings in Fall of even years – this 2004 meeting in NYC will be the first. John notes that there is room for all Technical Committees to meet in NYC, and all are invited to suggest and/or participate in Panel Sessions.

Power & Energy Magazine

Mel Olken encouraged submissions by all Technical Committees. Content is at the discretion of the submitting Committee – may be on WG or TF reports, Committee activities, or any items of interest. (Transformer Committee input due June 2004, but why not plan now, solicit multiple ideas for submissions, and even submit earlier?)

1.1.2 Technical Council Chair Bruce Dietzman reported the following

- Review of Technical Council O&P Manual revision (See the Vice Chair's report)
- Promotion of goal to expand membership in PES, especially among students and emerging technology industries.
- Notation of “fast-track” standards, including several Transformers Committee projects (C57.143 Monitoring Guide; C57.98 Impulse Test Guide)
- Technical Council Meeting planners comment – several Technical Committees are scheduling a “group” meeting in January 2004 in San Diego. The meeting will be

designed such that other Technical Committee can meet there also and take advantage of the “group planning”.

- There will be a CIGRE Symposium in October 2003 in Montreal, with an IEC Meeting immediately following.
- Panel Session presentations from this meeting (Toronto) will be collected for posting on the PES website, and will be open to all. The intent is to advertise the quality of the content to attract greater participation and attendance at future meetings.
- PES presently working on a negative financial status; intent is to reverse this by the end of 2004.
- Planning for “targeted” small technical focus meetings, the first of which is scheduled to be on “hydrogen”, and to be held in Washington DC.
- Be mindful to keep commercialism out of all technical presentation materials – see the Author's Kit for presentations guidelines.
- Discussion of IEEE/IEC dual logo publications. Significant negotiation has resulted in present circumstance where IEEE documents with no IEC counterpart can be accepted and published by IEEE under the dual logo. Negotiations continue, but at present there is no reciprocal agreement for IEC documents to be accepted by IEEE and be published by IEC under the dual logo, nor is there an agreement on jointly developed documents. ANSI is also involved in the process, as at present purchase of IEC standards in the US must be routed through ANSI.

1.1.3 Other Related Activities

Policy Development Coordinating Committee (PDCC)

Phil Hopkinson's document on proposed procedures for development of PES policy statements was distributed as a starting point. Each member should be prepared to suggest new areas where focused policy statements should be developed by PES, and to lead development of the PES policy statements

Frances Cleveland's Draft Policy statement on “Environmental Issues Related to Energy Policy - Working Toward a Sustainable Energy Future” was distributed for review and comment by the various Technical Committees. If you would like to receive a copy of this draft document, write a request to me at jim.sim@ieee.org.

Emerging Technology Coordinating Committee (ETCC)

- Review/discussion on definition of “emerging technology”
 - Technology where physics is reasonably well understood and definable (note – during afternoon panel session topic of “anti-matter” was deferred until such time as it becomes a more realistic technology).
 - Analysis suggests the possibility/probability of achieving economic viability

- Suitability for practical implementation on a large scale.
- This Committee will:
 - be the entry point for new technology applications
 - perform a design review function for emerging technologies – to understand feasibility and guide towards implementation (If there is a “natural” home for a new technology, it will go there)
- Review of DOE presentation on “Transforming the Grid to /Revolutionize Electric Power in North America”, recommending formation of a new Office of Electric T&D, promoting RD&D (Research, Development, and Demonstration of new technology. Presentation documents can be reviewed at www.energetics.com/electric.html) (Note significance of this item in relation to subsequent 8/14/03 power disruptions.)

1.2 Transformers Committee Report to Technical Council

The following is my report to Technical Council for the Committee:

Committee Meeting Activities

Our Spring 2003 meeting was held April 14-18, 2002 in Raleigh, NC. Mr. Ray Nicholas of ABB was our host. 327 members and guests (and 40 companions) attended the meeting. During this meeting, we had the honor to have Mr. John Estey, PES President, as our Luncheon Speaker. John presented the plans, goals, and challenges of the PES Governing Board. He also discussed ways the IEEE/PES can help the work of the Transformers Committee. He was very well received by all members attending.

Generally, the Committee meets twice a year - in the fall and spring (usually during the last two weeks of March or first two weeks of April; and the last two weeks of October or first two weeks of November). Our meetings are 4-1/2 days in duration that begins generally on Sunday afternoon and runs through noon on Thursday.

During the Spring 2003 meeting, we were able to resolve the IEEE/NEMA issues completely. All of the C57 series of “product standards” previously copyrighted by NEMA are now transferred to IEEE for maintenance under the IEEE-SA process.

The other issue is the great concern that the IEEE metrification policy as applied to product standards may cause certain safety problems. We have many “product standards” that deal with specific weights and dimensions. When these documents are converted to all metric units, there are significant possibilities that these units can be misinterpreted causing safety issues. We are working through the appropriate IEEE-SA organizations to address these issues. The status of this issue will be discussed at the June 2003 Standards Board meeting.

Membership of the Transformers Committee currently stands at 191 members and 19 Emeritus members. The regular members consist of 96 producers, 53 users, and 42 general interest. We also have one life member and one corresponding member. Our invitation list consists of

Newark, NJ 07101-0570

Standards Coordinator

Thomas A. Prevost

EHV Weidmann Industries

One Gordon Mills Way

St. Johnsbury, VT 05819, USA

Phone: + (802) 751-3458

Fax: + (802) 748-8029

E-Mail: tprevost@ieee.org

Subcommittees

Audible Sound and Vibration Subcommittee, J. Puri, Chair

Bushing Subcommittee, F. E. Elliott, Chair

Dielectric Tests Subcommittee, L. B. Wagenaar, Chair

Distribution Transformers Subcommittee, J. E. Smith, Chair

Dry-Type Subcommittee, C.W. Johnson, Chair

HVDC Converter Transformers and Smoothing Reactors Subcommittee, R. F. Dudley

Insulating Fluids Subcommittee, F. J. Gryzkiewicz, Chair

Insulation Life Subcommittee, D.W. Platts, Chair

Instrument Transformers Subcommittee, J. E. Smith, Chair

Meetings Planning Subcommittee, G. W. Anderson, Chair

Performance Characteristics Subcommittee, R. S. Girgis, Chair

Power Transformers Subcommittee, E. G. Hager, Jr., Chair

Standards Subcommittee, T. A. Prevost, Chair

Underground Transformers and Network Protectors Subcommittee, C.G.Niemann, Chair

2003 General Meeting Technical Sessions

The Transformers Committee is sponsoring two presentation sessions on transformers during the General Meeting.

Transformer Standards and Coordination Activities

The Transformers Committee takes responsibility for development and revision of IEEE Standards that fall within its scope. These Subcommittees currently have over fifty Working Groups and Task Forces preparing proposals for standards projects. Information on these standards and projects can be obtained by visiting our WWW homepage:

<http://www.transformerscommittee.org>

Links to information on our future meeting and other information on Transformer Standards can also be found there. Our website will link you to the IEEE Standards Status Report that contains titles, abstracts, and names of contacts for each of the IEEE standards. This report is updated quarterly by the IEEE Standards Department. The status of transformer standards that are not listed in the IEEE quarterly report (either because they have been withdrawn, or they are not IEEE standards) are also included on the Transformers Committee website. The site is constantly improved by adding the committee-related items and technical information. Some of the examples of recent improvements are: posting minutes of various meetings, availability of on-

line meeting reservations for upcoming meetings, an "e-mail reflector service" for efficiently sharing committee related information within the membership, a bibliography of transformer-related books and publications, technical presentations, etc.

Transformers Committee officers and Administrative Subcommittee members are also members of the USNC Technical Advisory Group to TC-14 (Transformers and Reactors). We continue to have productive meetings of the TAG at each Committee meeting.

H. Jin Sim, Chair

1.3 IEEE/NEMA MOU issue

This issue is now completely resolved and will not be reported as a separate item.

1.4 IEEE policy on metrification

Many thanks to all involved, we now have a workable solution. See the Standards Coordinator's report.

Respectively submitted,

H. Jin Sim, Chair

Chrpt03f.doc

2.0 Approval of Minutes of March 20, 2003 – H. Jin Sim

The Chair asked for comment/changes to the Minutes recently distributed for the March 20, 2003, Meeting in Raleigh NC. No changes were suggested, and a motion was made, seconded, and carried to approve the Minutes as written. The Secretary announced that the Raleigh Minutes had been mailed to all Committee members, and to all attendees at the Raleigh Meeting, and asked any attendee or member who had not received the Minutes to check to assure that the Committee had their proper mailing address. Starting with the Pittsburgh Meeting, the primary means for distribution of Minutes will be the Committee website. Printed Minutes, at least for the near future, can be ordered at costs at time of meeting registration, and will be mailed prior to the subsequent meeting. (Note: 67 registrants at the Pittsburgh Meeting ordered printed Minutes.)

3.0 Administrative Subcommittee – Jin Sim

Chairman Jin Sim covered the key points of the Administrative Subcommittee Meeting held on October 5, 2003. Full details of the Minutes of the Administrative Subcommittee Meeting Minutes follow.

3.1 Introduction of members and guests

Chairman Sim called the meeting to order at 2:00 p.m., Sunday, October 5, 2003, in the Grand Station III Meeting Room of the Sheraton Station Square Hotel in Pittsburgh, Pennsylvania, USA. The meeting started with introductions of members and guests.

The following members of the Subcommittee were present:

G. Anderson	R. F. Dudley
F.E. Elliott	D.J.Fallon
R.S.Girgis	F.J. Gryszkiewicz
E. G. Hager, Jr.	K.S. Hanus
C.W. Johnson, Jr.	C. G. Niemann
B. K. Patel	D. W. Platts
T. A. Prevost	J. Puri
H. J. Sim	J. E. (Jim) Smith
J. E. (Ed) Smith	L. B. Wagenaar

The following guests were present:

Savoula Amanatidis	Peter Balma
Dennis Blake	Jodi Haasz

3.2 Approval of the Raleigh AdCom meeting minutes

The minutes of the previous Administrative Subcommittee meeting in Raleigh were approved as written.

3.3 Additions to and/or approval of the agenda

As there were no changes proposed, the Agenda provided by the Chair prior to the meeting was generally followed.

3.4 Meeting Arrangements, Host Reports, and Committee Finances – G.W. Anderson

The Meetings Planning SC report is included in the Committee meeting minutes. Items discussed during the Admin. SC Meeting include:

- Financial – Committee budget, prior to the Pittsburgh meeting, was approximately \$10,385. This is after a deposit of \$3,500 had been provided for the San Diego meeting. This puts us roughly in the same good position we had been in prior to the Raleigh Spring '03 meeting, where the budget stood at \$13,787. For most of our recent meetings we have been able to keep the budget at a reasonable level to provide for appropriate financing of meeting preparations. Funds taken in and expended for each meeting are roughly \$70,000 - \$75,000.
- Pittsburgh Registration status – Dennis Blake of Pennsylvania Transformer Technology provided an update on the status of meeting plans and registration totals. At the start of the Meeting, there were 306 registered attendees and 47 registered companions. Full attendance details are included in the Meetings Planning SC Minutes.

- Meeting planning modifications include:
 - Audio-visual recording (slides plus presentation audio) of the technical presentations will be attempted at this meeting. The intent is to make the presentations available in this format on the website. Because of the large anticipated size of the files, we may produce CD's to sell at cost if there is interest.
 - We're looking for candidate projects to use on-line technology (internet, phone, etc.) to hold working meetings between our regular meetings – allowing individuals to participate jointly, each from their own work location. Details have not been worked out; input from members whose employers have utilized such technology to facilitate project progress is requested. IEEE's "virtual community" may provide some of this capability, and Tom Fields (Southern Company volunteer to IEEE) may be available to present ideas to our Committee.
- Future Meetings (full details in the Meetings Planning SC Minutes):
 - March 7-11, 2004 – San Diego, CA; hosted by Ron Kirker for San Diego Gas & Electric, to be held at the Catamaran Resort Hotel on Mission Bay in San Diego. (Note - subsequent to this meeting Ron moved to other responsibilities, and another host from SDG&E will be named.)
 - Fall'04 – Edinburgh, Scotland; tentative dates September 19-23, 2004; hosted by Jim Fyvie for VATECH Peebles Transformers. As of our meeting time the hotel arrangements have not yet been finalized.
 - Jackson, MS, is being considered for the Spring '05 meeting, and also as a tentative back up for Fall '04 in the event Edinburgh plans can not be completed. (Note – subsequent to this meeting plans were finalized for Edinburgh in the Fall.)
- Break Sponsorship – HICO America Inc., On-Line Monitoring Inc., Weidmann-ACTI Inc., and VA Tech are sponsoring breaks during this meeting. This program is intended to help contain costs for attendees. Present schedule includes 13 breaks, and even with limited refreshments budget for these breaks is almost \$12,000. Sponsorship costs run roughly \$750 for a beverage/snack break. The Committee recognizes and appreciates the support provided by these sponsors. If you wish to investigate future sponsorship opportunities, please contact Joe Watson (joe_watson@fpl.com). Joe is coordinating this activity.

3.5 ASC C57 ISSUES – H. J. Sim / B.K. Patel

With the previously reported resolution of the IEEE NEMA MOU (Memorandum of Understanding) issue, Chairman Sim indicated that the ASC C57 Committee process has been terminated. No more meetings of the ASC C57 Committee will be required. IEEE developed standards will be accepted as ANSI National standards without the ASC C57 process.

Considerable time was spent at this time on discussion of concerns related to IEEE formatting and handling of reaffirmation documents, specifically as related to problems experienced with C57.21. This issue is covered in more detail in the Standards SC Report area.

3.6 IEEE delegation report ANSI C57 Committee – B. K. Patel

Due to the termination of the ASC C57 balloting process, there was no report from the IEEE delegation. There will be no future reports.

An excerpt from the Minutes of the Accredited Standards Committee (ASC) C57 meeting on March 20, 2003, in Raleigh NC, referencing termination of ASC C57, follows:

***** Start of excerpt

FUTURE OF ASC C57

Members engaged in extended discussion of the future of the committee. Members like the forum provided by C57 to discuss relevant issues. It was a convenient channel to review transformer standards, however, this will no longer be the case with IEEE will no longer submitting standards. IEEE membership rules were raised as a concern.

No one could recall the last time another organization submitted a standard, with the exception of NEMA TP-1. At their meeting March 16, NEMA elected to ballot their members with a recommendation to discontinue C57. Without NEMA support, a new Secretary would need to be appointed for C57. Members discussed the possibility of reducing meeting frequency, and the challenge of maintaining membership if the committee became dormant. It was suggested that an alternative NEMA-IEEE liaison could be established at the IEEE PES Transformer Committee meetings.

General consensus was that the Committee served a purpose but its time has passed.

Motion: Recommend ballot ASC C57 members to dissolve committee.

Motion approved 12-0

Action: Secretary to circulate ballot.

***** End of excerpt

3.7 Committee Service Awards – B. K. Patel

Bipin Patel presented his report, which is included in the Committee meeting minutes. Bipin appealed to Administrative SC members for input and suggestions for awards. Note was again made of the new award, for “Long-standing and Notable Contributions to the Transformers Committee”. This award is to recognize our retiring members after their years of active participation and contributions. The award, in the form of a plaque, has been presented on a selected basis in the recent past and now it is intended to become a regular practice of recognizing our worthy members.

Tom Prevost also mentioned the “Standards Medallion” Award. Committees are encouraged to recommend individuals for this award. The IEEE-SA Standards Medallion is awarded for

outstanding achievement in the development and implementation of standards within the technologies of the IEEE Standards Association.

Bipin noted the significant effort on the part of many of our members, particularly those in the Distribution Transformers SC and the Underground Transformers and Network Protectors SC, in working with IEEE to reach a resolution on metrification issues. He commented that this effort was worthy of recognition within the Committee. Through this work, IEEE came to recognize and accept our concerns for worker safety if strict application of only metric units would be applied to all of our product standards. It was agreed that verbal recognition and thanks would be provided at Thursday's Main Committee meeting to all involved in this extended negotiation and interaction with IEEE. With apology for possible omission of other active participants in this work, the Committee will recognize all who participated, and will include in that list Ed Smith, Carl Niemann, Brian Klaponki, Dudley Galloway, Steve Shull, Ron Stahara, Glen Anderson, Don Duckett, Dan Mulkey, Malcolm Thaden, Jin Sim, Jim Harlow, and Tom Prevost.

3.8 Chair's report – H. J. Sim

Jin presented his report, which is included in the Committee meeting minutes. Particular note was made of a Draft Policy Statement assembled with the Policy Development Coordinating Committee of the PES Technical Council, on "Environmental Issues Related to Energy Policy - Working Toward a Sustainable Energy Future". As our work is so integral a part of the energy industry, we should maintain awareness and influence on such policy statements. Contact the Chair for a copy of this Draft Policy. We will also consider an appropriate method to post or link to PES policy statements on our website.

3.9 Vice Chair's report – K. S. Hanus

Ken presented his report, which is included in the Committee meeting minutes. Note was made of several items: (1) Our Committee is scheduled to provide an article to the PES Power & Energy magazine for the June edition. The article format and content is at the discretion of the Committee. This represents an opportunity for the Committee to highlight and promote activities in a manner that encourages greater participation. (2) Revision of our O&P Manual is scheduled by the end of 2003, with possible updates to include reference to revisions in Technical Council's O&P Manual for standards development procedures, and addition of definition and responsibilities of Corresponding Members within our Committee. (3) Eight papers were sponsored by our Committee for presentations at the PES General Meeting this past July in Toronto; and June 6-12, 2004 in Denver.

3.10 Secretary's report – D. J. Fallon

The Secretary's Report was submitted prior to the meeting, and is included here. The Addendum (Clause 3.10.5) reviews action taken at this meeting.

3.10.1 Membership Review

Voting Members – Four new members were added at the last meeting in Raleigh:

- Tommy P. Cooper, Public Works Commission, Fayetteville
- George J. Reitter, Delta Star, Inc. (retired)
- Waldemar Ziomek, Pauwels Canada, Inc.
- Alan Darwin, Alstom T&D Transformers

Welcoming letters have been sent to these new members. One additional submitted application remained incomplete at the time of the meeting. Sponsoring signatures had been included, but notation by those signers of participation in those groups for at least one full year was not yet available. Communication with several members indicated the applicant's active participation, leading to the conclusion that it was appropriate to consider him for membership, but in the absence of three signatures attesting to the minimum one year's apprenticeship by each sponsoring group, the application was deferred for future action. The Secretary pointed out a discrepancy in the O&P Manual, with participation in WG's/SC's indicated on the reverse of the application form, and participation and membership listed in the body of text. The inconsistency will be addressed in the upcoming revision, with intent to more clearly indicate both active participation and membership in the respective WG's and SC's as a pre-requisite for Committee membership. Contact will be made with the applicant, thanking him for his participation, and encouraging continuing participation as part of the process of attaining membership. Our aim is to encourage active participation in the work of the Committee, and encourage all participants to become members of the Committee.

Linden Pierce's status was changed to Emeritus membership, with the unanimous approval of the Administrative SC members present. A notification letter will be forwarded to Linden, expressing the Committee's appreciation for his outstanding service.

Member Chuck Murray also recently forwarded a letter of resignation from the Committee, and expressed his appreciation to all he had worked with for their professionalism and friendship over the years. A letter of recognition and thanks will be forwarded to Chuck for his years of contribution to the Committee.

Committee Membership review is finally proceeding. Individually addressed letters were sent with the Raleigh Minutes Mailing to all Members, thanking them for their participation. Members who had not been in attendance at any Meeting within the past two years (or longer) were notified of the possibility that their membership might be reviewed at Pittsburgh. Corresponding, Life, and Emeritus Members are not required to attend, but Members with those classifications were asked to affirm their interest and confirm their contact information as part of this Membership review. Membership status recommendations will be made, for review by the Chair, based on responses received and contacts made prior to the Meeting; this review may continue for a few weeks after the Meeting. One response made it apparent that the non-attendance letters did not sufficiently recognize the possibility that non-attendees may be very active participants through correspondence. As reviewed at our last meeting, the classification Corresponding Member needs to be defined in the next update of the Committee O&P Manual,

scheduled by year's end. This classification should hold the same status as that of regular Member.

Following changes made, but prior to any actions to be reviewed in Pittsburgh, membership stands at:

Members -		190
Classifications:	Producers -	96
	Users -	53
	General -	41
Life Members		1
Corresponding Members -		1
Emeritus Members -		19

The invitation list has 615 names on it at this time. Several Guests who are no longer attending have been removed, and that review continues also.

3.10.2 New Member Applications

New applications for Committee Membership have been submitted for:

- Eric Davis, Burns & McDonnell
- Tim Olson, Manitoba Hydro
- Tim Raymond, Power Delivery Consultants, Inc.
- Dirk Russwurm, HV Technologies, Inc.

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.

3.10.3 Committee and Subcommittee Directory Rosters

Subcommittee Chairs are requested to keep the rosters updated as they change constantly. Discussions will continue on movement towards eventual use of a single database of Committee roster information, so that when a member or guest registers, any corrections to contact information can be used to automatically update Subcommittee and Working Group rosters.

3.10.4 Meeting Minutes

The Minutes of the Raleigh NC Spring '03 meeting were mailed on September 11, 2003, with expected delivery to domestic US destinations by September 16, and to international destinations by September 22. The Minutes were reproduced at a cost of \$2,050.12 for 430 copies and postage costs were \$1,896.70 for 414 mailings (342 within the US and another 72 worldwide), which averages \$9.53 per mailing. The net cost of Minutes printing and mailing varies for each meeting.

Up to this time, printed Minutes have routinely been supplied to all Guests registered at a particular Meeting, and to all Members, regardless of attendance. Starting with the Pittsburgh Meeting printed Minutes will no longer routinely be supplied. Electronic posting on the Committee website (<http://www.transformerscommittee.org/>) will be the primary means of distribution. For the near future, at least, any Committee Member and any Meeting registrant will be able to pre-purchase a printed copy, if desired, through the on-line meeting registration process. These copies of the Minutes will be mailed prior to the subsequent meeting. Present purchase price has been set at \$15, as reduced printing volume is expected to increase per unit cost.

Moving to electronic posting as the primary means for communication of Minutes places greater emphasis on the need for timely submittal, assuring that all interested parties have access to Meeting information as soon as possible. Subcommittee Chairs are requested to submit their SC Minutes for the Pittsburgh Meeting by November 21, 2003. Minutes should be submitted via e-mail to the Secretary (donald.fallon@ieee.org), with a copy to Susan McNelly (sjmcnelly@ieee.org) for posting on the Committee website. The submittal should be formatted in Word 2000 (or earlier versions) and it would be appreciated if the Minutes were put in the format as shown in the present assembled Minutes, with numbering as indicated in the Pittsburgh Main Committee Meeting (10/9/03) 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.

3.10.5 Addendum to Secretary's Report – Action Taken During Admin. SC Meeting

In return correspondence to the membership review letters sent out, past members Tom Clark and Gene Kallaur, and past Emeritus Member Sam Foster indicated that they were no longer able to participate, and agree to the proposed removal of their membership status. The Committee thanks these individuals for their contributions to our work; the Secretary will remove their names from our active roster. Roster review will continue.

The Secretary noted that Clause 4.2 of our O&P Manual states, "The Chair, with the concurrence of the Administrative Subcommittee, may designate members as Emeritus Members. The Emeritus Member classification is intended to apply to individuals who have made longstanding and notable contributions to the Committee, but because of a change of personal situations are unable to participate as Voting Members." In correspondence within the Administrative SC prior to the meeting, there had been some discussion on whether members should nominate

themselves for the honor of Emeritus Membership, or whether others could nominate. That discussion continued at the meeting, with the conclusion that it was consistent with the intent of the Manual and the Committee's desire to recognize achievement that nominations could be made by any member of the Committee. The Secretary then made the following nominations for Emeritus Membership consideration, in each case for their longstanding contributions to the Committee's work and the standards development process:

- Jim Templeton, former Subcommittee Chair, and still active in the industry, but unable to regularly attend,
- George Vaillancourt, in addition for his work in initiating the Committee's website,
- Ray Allustiarti, still active as a Consultant, but unable to regularly attend.

The Chair accepted these nominations, and the Administrative SC concurred with the change. These members will be notified of this elevation in their membership status. The Secretary had also intended to nominate Frank Heinrichs, for his contributions to the work of the Insulating Fluids SC, but upon learning of Frank's continuing active WG leadership through correspondence, despite his inability to attend regularly, the decision was made to defer this nomination at this time. We hope to have Frank continue his active work on C57.104, and upon completion of that work this nomination may be considered again.

Previously submitted membership applications were reviewed and approved for the new member applicants identified in Section 3.10.2 (Eric Davis, Tim Olson, Tim Raymond, Dirk Russwurm). In addition, Barry Beaster of Howard Industries submitted an application when he and the Secretary were surprised to learn in review of records that he was not yet a Member. Barry's application was approved also.

3.11 Standards Subcommittee - T. A. Prevost

3.11.1 Standards and coordination activities

Tom Prevost reviewed his report, which is included in the Committee meeting minutes. In addition, items of note during this section of the meeting include:

- Each SC was requested to note those standards for which action would be required to avoid expiration of PAR's or administrative withdrawal of standards. PAR's were due to expire for C57.130, C57.12.01, and C57.141, and action must be taken to extend.
- Particular attention must be paid to resolution of issues resulting in C57.133 (Guide for Short Circuit Testing) possibly being withdrawn. Withdrawal of this Guide will be an unacceptable loss to the industry; The Performance Characteristics SC, the Standards SC, and the Committee officers will work with IEEE to resolve any outstanding issues.
- In the past 1-2 years, almost all Reaffirmation ballots have had to be recirculated due to negative ballots with comments suggesting minor changes to the document. As the reaffirmation process does not allow for any changes to be made to the document, holding up

the process for “minor” issues is considered inappropriate, or a nuisance. Significant issues should result in a negative ballot on reaffirmation, but less significant issues should not. Due to this concern for nuisance negatives to Reaffirmation ballots creating unnecessary work and delaying the reaffirmation process, Jim Smith made a motion that we petition IEEE to change the process so that Reaffirmation ballots will not be subject to recirculation. The motion reads as follows:

For all Reaffirmation ballots, to hold one ballot only. To reaffirm, there must be 75% approval in the returned ballots. The balloting options to consist of:

- **Approval without comments**, meaning the standard continues to reflect the state of the art and contains no significant obsolete or erroneous information
- **Approval with comments**, meaning the standard continues to reflect the state of the art and contains some obsolete or erroneous information that requires updating at the next revision.
- **Negative with comments**, meaning the standard does not reflect the state of the art and contains significant obsolete or erroneous information.

Richard Dudley seconded the motion. After significant discussion, the motion carried with 11 in favor and 5 opposed. Although reservations were expressed that IEEE intent in providing for recirculation would not allow for this modification, Tom Prevost will take this motion to IEEE.

- Frank Gryskiewicz mentioned that the PSIM developed IEEE 62 Field Diagnostic and Test Guide, particularly the Transformers sections, is proceeding towards reaffirmation, and that PSIM then wishes the Transformers Committee to take over the maintenance of this document. The Standards SC plans to suggest the Power Transformers SC as the appropriate home for revision and future maintenance.
- IEEE SA has notified members of increase of annual dues from \$10 to \$35. Discussion at the meeting reflected some dismay at the explanations forwarded for this increase, but the Officers continue to recognize the efforts of IEEE SA in supporting our activities, and continue to recommend SA membership to our participants.
- Note is made here also of an item brought up by Richard Dudley earlier in the course of the meeting, but felt by the Secretary to be relevant to the Standards section of this report. Richard repeated his warning to all SC Chairs, based on the serious problems in reaffirmation of C57.21 due to errors introduced in the balloted document through character recognition during scanning by IEEE. Document sponsors are urged to check the documents carefully. IEEE has indicated they will provide additional editorial overview. We have also changed the process to have a Draft forwarded back to the WG Chair, or other appropriate person guiding the reaffirmations, after any scanning – for final review prior to balloting. These changes should help address these problems, but the C57.21 reaffirmation process has been a continuing struggle. Questions were also raised on the Adobe Framemaker format IEEE is using, when most WG Chairs are comfortable working in Word format – and the difficulties presented by this mis-match. Richard and Peter Balma discussed the ongoing

difficulties related to the translation errors in the C57.21 reaffirmation document. The continuing process of the C57.21 Reaffirmation will be followed, and the Committee will intervene with IEEE in an attempt to assist if problems persist.

3.11.2 Documents submitted to the Standards Board

See the standards status report in Attachment 1, presently posted on the website and planned for inclusion at the end of the assembled Committee Minutes.

3.12 Round-Table: Subcommittee Activities - Subcommittee Chairs

3.12.1 Distribution Transformers – Ron Stahara, for Ed Smith

The DTSC thanks all those who have worked towards resolution of two items that have weighed heavily on the SC's ability to work effectively – the IEEE/NEMA MOU, and the Metrification issue. With resolution of these issues, work on completion of several standards is back on track.

3.12.2 Bushings - F. E. Elliott

Fred reports a need for a new PAR for Corrigenda to C57.19.03, Standard Requirements, Terminology, and Test Code for Bushings for DC Applications.

3.12.3 HVDC Converter Transformers & Smoothing Reactors - Richard Dudley

Richard reported that the current focus of the S.C. is the evaluation of and development of possible future revisions to IEEE C57.129 (converter transformers) and IEEE 1277, (smoothing reactors). The basis for the preliminary revision work is feedback from projects and input re developing HVDC technologies such as voltage source converters. To-date feedback and input has been significant and of high quality; currently there is a high level of activity in the area of converter transformers.

3.12.4 Dry-Type Transformers – Chuck Johnson

Chuck reported that review of leadership of the WG on Dry Type Thermal Evaluation due to the difficulty in Chair Richard Provost's regular attendance while residing in Korea. Work will proceed within the WG on reaffirmation of C57.12.56 and C57.12.60 before administrative withdrawal, and then consideration is being given to combining these documents as part of future revision.

3.12.5 Instrument Transformers - J. E. Smith

Jim reports that C57.13 has completed the reaffirmation process and has been forwarded to RevCom for approval; C.57.13.2 and C57.13.6 will be ready for balloting shortly.

3.12.6 Performance Characteristics – R. S. Girgis

Ramsis reminded the AdMin SC that PCS will be sponsoring a Panel Session on Transformer Excitation during this meeting.

3.12.7 Meetings & Planning - Greg Anderson

As indicated, Greg's report is included in the Committee meeting minutes. He also noted that three books, with authorship including members of our Committee, would be available for sale during this meeting. A percentage of proceeds of these sales returns to the Committee. In order to encourage attendance through the end of Thursday's meeting, copies of the books will be presented as door prizes here and will be planned for San Diego also. Winners must be present when the drawing is made during the latter part of the Main Committee meeting.

3.12.8 Dielectric Tests - L. B. Wagenaar

Loren reports that C57.38 is now out for reaffirmation. He also asked the Chair for approval of formation of a new TF on PD measurement systems within the WG on Low Frequency Tests, to pick up on the work Georges Vaillancourt pioneered 10-15 years back with C57.113. Mark Perkins recommends Dr. Eberhard Lemke of the Technical University at Dresden, and Lemke Diagnostics, to head this TF. The Chair concurred.

3.12.9 Audible Sound and Vibration - Jeewan Puri

Jeewan reported that the SC is making progress with the sound level measurement guide, but that there are continuing difficulties in gaining adequate participation to keep this progress moving. The concept of changing from SC to WG status was discussed, but regardless it appears that more participation from interested parties is necessary. Committee officers will appeal to the membership at the Main meeting, during Jeewan's report, for additional volunteers to work within the AS&V SC.

3.12.10 Underground Transformers and Network Protectors – C. Niemann

Carl reported that the SC feels that C57.12.57, the standard for Ventilated Dry-Type Network Transformers, successfully balloted earlier by NEMA and scheduled for review here, should be allowed to die a natural death and be administratively withdrawn. The Chair's questions confirmed that this standard was not in use and that very few, if any, such transformers had been in production in recent years. With no objections expressed within the group, the Chair advised Carl to poll the membership at the Main meeting for acceptance of withdrawal of this standard.

3.12.11 Insulating Fluids – F. J. Gryszkiewicz

Frank advised that the SC was sponsoring a presentation on Natural Based Ester Insulating Fluids at this meeting. Patrick McShane participate in this presentation, and has agreed to Chair a new WG related to use of these fluids.

3.12.12 Insulation Life – D. W. Platts

Don advised that the SC will be sponsoring a presentation on Temperature Indicating Devices at this meeting, and that the SC has lost its Secretary due to his inability to attend meetings and will be appealing for a replacement.

3.12.13 Power Transformers - E.G. Hager

No items to report to the Administrative SC.

3.13 IEEE Standards Activities – Naeem Ahmad

Naeem did not attend; there was no report to the Administrative SC. Jodi Haasz and Savoula Amanatidis of IEEE were present for a planned discussion of the IEEE/IEC Dual Logo publication process during the New Business section of the meeting.

3.14 Old Business

3.14.1 Thursday Morning Main Meeting Format, Function, and Value

As this subject had been brought up at the previous two meeting, the Chair had asked Administrative SC members, to provide specific recommendations on improvement of the Thursday meeting structure and content – to be forwarded for review at this Meeting. All Committee members had been invited to supply input as well. Unfortunately there still was very little input provided prior to this meeting. Bipin Patel and Don Fallon provided suggestions. Discussion continued at the meeting, and Don was asked to review his suggestion.

Don presented his view that time spent during the Main Committee meeting in review of SC and WG activities has lost a good bit of its value with the increasing use of the Committee website to promptly post all SC Minutes upon submittal. As a result, and as many have suggested, discussion of those activities at the Main meeting can be eliminated. There still is value in gathering all attendees to update them on items discussed during the Administrative SC meeting – items of interest, and items requiring action or response within WG's and SC's or by the membership as a whole. The idea for consideration involves moving the Main meeting from Thursday to either Monday or Tuesday morning (Tuesday preferred as some attendees travel Monday morning), limiting it to no more than two hours, scheduling no other meetings at this time, and encouraging attendance by all. The meeting will primarily consist of presentation to members and attendees of information they need to know related to Committee activities. A brief segment on awards and recognition will still be included, as that can help motivate participants if done properly, but WG and SC activity reports would be left to the posted Minutes. The timeslots taken from WG activities would have to be replaced either by moving all WG and SC activities back, or perhaps extension of the working days to see if all activities could be completed by Wednesday. With the present amount of work being done, Don was not certain that shortening the meeting to end on Wednesday was the correct approach, but some members

have expressed difficulty with the time away from work required to attend the full meeting, and might be interested in concluding on Wednesday. This revised scheduling concept was presented merely as one suggestion, open for discussion, and meant to solicit additional ideas and suggestions.

Don will discuss with the Meetings Planning SC Chair, as there are many impacts that SC will have to review in making any change to our schedule. Administrative SC Members are requested by the Chair to review this idea, comment, suggest other ideas, and be prepared to discuss and act on suggestions for improvement at the next Administrative SC meeting.

There were no other items of old business.

3.15 New Business

3.15.1 Committee Officer Succession

Chairman Sim announced that, effective January 1, 2004, Ken Hanus will assume responsibility as Committee Chair, Don Fallon will move to Vice-Chair. Bipin Patel and Jin Sim, as past and present Chairs, have also concurred in appointing Tom Prevost to be the new Committee Secretary. Members of the Administrative SC applauded Jin for his leadership, and welcomed the officers to their new scheduled positions.

3.15.2 IEEE/IEC Dual Logo Publication.

Jodi Haasz and Savoula Amanatidis of IEEE presented information on cooperative efforts between IEEE and IEC in this area. An agreement has been reached allowing for IEEE documents, specifically those with no counterpart in IEC, to be nominated for dual IEEE/IEC logo publication. Upon nomination, IEC will perform a technical review of the document for consideration as an acceptable IEC document. No changes whatsoever in the content of the document will be allowed, it can either be accepted as is, or not accepted. Upon completion and approval of the IEC technical review, the document is then published with the dual IEEE/IEC logo. Two IEEE standards from the Instrumentation and Measurement Society have been nominated to date for this consideration. Future candidates being discussed include documents from the Computer Society and the Power Engineering Society (Switchgear Committee, and hopefully the Transformers Committee). Suggestions for candidate documents are welcome.

It is our understanding that, while negotiations are proceeding, at present there is no agreement on a reverse path for IEC documents to be reviewed and accepted by IEEE for dual logo publication. IEEE will continue to work for such harmonization.

Jodi's presentation materials will be made available on the Committee website.

3.15.3 Coordination of Oil Characteristic Requirements in Several IEEE Documents

Peter Balma pointed out that there are tables with suggested transformer oil characteristic requirements in tables in several IEEE documents, and that these tables are not in agreement

with each other. Different values can be found in tables and text in C57.106, IEEE637, and IEEE62. There is a need to for coordination to avoid confusion to users. In discussion there was general concurrence that this was an issue that should be addressed. Possible methods to address could include having characteristic requirement tables and information in one document, possibly C57.106, with the other documents referring to C57.106. Additional similar issues were brought up by Don Platts, who asked where we can find authority for technical content when balloting on different standards with overlapping content, such at the C62 field testing and diagnostics guide, when compared in certain sections with the installation guides and application guides. Without resolving specifics of these questions, the Chair indicated that this group, our Administrative SC, had the responsibility to respond to specific questions in this area and delegate specific tasks for review and response. The Insulating Fluids SC is asked to review the questions related to coordination of oil tables.

3.15.4 Transformer Modeling for Use with EMTP/ATP Studies

Wally Binder pointed out that the Switchgear Committee and the Surge Protective Devices Committee are both working on system modeling and requirements for EMTP and ATP transient analysis programs. He questions whether we should have some involvement, at least in liaison capacity, as these groups are including discussion of model requirements and characteristics for transformer equipment. There are several of our members who are qualified to participate or at least comment based on their experience. The Chair suggested that several of our members discuss and possibly present actions for liaison or other activity, starting first perhaps with a presentation on transformer modeling and relation to system study methods. Bipin Patel was asked to coordinate this discussion, with possible input from Fred Elliott, Tom Lundquist, Bob Degeneff, Ramsis Girgis, Richard Dudley, and any other interested parties.

3.15.5 Distribution Transformer Thermal Performance and Loading Issues

Carl Niemann advised that several utilities had done some work with NEETRAC on thermal performance, loading, and overloading of distribution transformers. This work included thermal test procedures to demonstrate dynamic overload performance per specification requirements, and determination of optimal size of transformer equipment based on load requirements. A lot of data and information was developed, and Carl asked if any of this material might be useful in relation to existing or planned Committee documents. The Chair asked Carl to be in touch with Insulation Life SC Chair Don Platts and Distribution Transformers SC Chair Ed Smith to assess interest in incorporating consideration of this work within our scope of activities.

There were no other items of New Business for the Administrative SC.

3.16 Adjournment

Chairman Sim adjourned the meeting at 5:40 p.m.

Respectfully submitted,

3.0 Administrative Subcommittee (cont'd)

D. J. Fallon, Secretary

IEEE/PES Transformers Committee Meeting Locations

<u>Year</u>	<u>Spring</u>	<u>Fall</u>	<u>Committee Chair</u>
2004	San Diego, CA	Edinburgh, Scotland, UK	Hanus
2003	Raleigh, NC	Pittsburgh, PA	Sim
2002	Vancouver, BC, Canada	Oklahoma City, OK	Sim
2001	Amsterdam, The Netherlands	Orlando, FL	Patel
2000	Nashville, TN	Niagara Falls, ON, Canada	Patel
1999	New Orleans, LA	Monterey, Mexico	Matthews
1998	Little Rock, AR	Guanajuato, Mexico	Matthews
1997	Graz, Austria (summer)	St. Louis, MO	Binder
1996	San Francisco, CA	Burlington, VT	Binder
1995	Kansas City, MO	Boston, MA	Harlow
1994	Dallas, TX	Milwaukee, WI	Harlow
1993	Portland, OR	St. Petersburg, FL	Borst
1992	Birmingham, AL	Cleveland, OH	Borst
1991	Phoenix, AZ	Baltimore, MD	Veitch
1990	Denver, CO	Montreal, PQ, Canada	Veitch
1989	Chicago, IL	Charlotte, NC	Veitch
1988	Washington, DC	Long Beach, CA	Compton
1987	Ft. Lauderdale, FL	New Orleans, LA	Compton
1986	Little Rock, AR	Pittsburgh, PA	Yannucci
1985	St. Louis, MO	Toronto, ON, Canada	Yannucci
1984	Vancouver, BC, Canada	Boston, MA	Savio
1983	Atlanta, GA	Detroit, MI	Savio
1982	Los Angeles, CA	Philadelphia, PA	McNutt
1981	Portland, OR	Phoenix, AZ	McNutt
1980	Williamsburg, VA	Milwaukee, WI	Bonucchi
1979	San Diego, CA	Houston, TX	Bonucchi
1978	Miami, FL	Chattanooga, TN	Bennon
1977	Charlotte, NC	Montreal, PQ, Canada	Bennon
1976	New Orleans, LA	San Francisco, CA	Honey

4.0 Vice Chair's Report – K.S. Hanus

4.1 PES Technical Council Committees

The following are reports on activities of PES Committees on which the Vice Chair serves as Committee representative. All of the meetings reported were held at the 2003 General Meeting in Toronto, Ontario, July 13-17, 2003. Don Fallon, Secretary of our Committee, attended representing the officers of the Transformers Committee.

4.1.1 Technical Sessions Committee

Susan Sacks of the PES Executive Office discussed the following points:

- TCPC's - note new deadlines for Technical Sessions requests for the 2004 General Meeting
- Office of Foreign Affairs Correspondence (OFAC) of the US government has issued an embargo against 5 countries (Iran, Iraq, Libya, Cuba, Sudan)
- For 2004, TCPC's will be able to go on-line to (1) Request meetings; (2) Schedule papers; (3) Re-use/modify Committee meeting requests from year to year

Maria Proetto discussed the need to allow appropriate time for reviews in the paper cycle.

Paula Traynor talked about the Technical Committee meeting notices update and the need to respond quickly to updating schedules for meetings.

Brian Gott discussed the new "Less Formal" panel presentation format which allows for later submission and later inclusion of panel material, although this will mean that later submitted material will not be available for pre-printing.

Lou Wozniak, Technical Program Chair for the 2004 General meeting, provided details on the technical sessions for the 2004 General meeting in Denver.

The meeting will be held at the Adam's Mark Hotel from 6-10 June 2004. This power engineering conference will bring together practicing power engineering engineers and academics from around the world. The aim of the conference is to provide, share and discuss various issues and developments in the field of electrical power engineering.

The theme of the meeting is "**Is It Easy Being Green?**"

The tracks for the technical sessions are as follows:

TRACK 1: Active Load Participation and Its Impact on Markets

- *Conservation and Efficiency Measures*—Including load reduction/control to avert less environmentally friendly generation
- *Energy Efficient T&D Systems* — T&D companies have a vested interest in lowering their own usage of electricity; manufacturers are offering energy efficient equipment, IT
- *Substation Technologies to Improve System Efficiency* — includes FACTS, automation, IT,

advanced monitoring and control, voltage control, etc.

TRACK 2: Environmental Dimensions

- *Improved Environmental Impact of Existing Assets*-can include technologies used for aesthetic improvements, noise mitigation, spill control/prevention, land remediation, waste management, EMF, community acceptance, etc.
- *Innovative generation and transmission controls and analysis techniques for improved power system dynamic performance and efficiency*
- *The Role of Distributed Generation on Reducing the Environmental Impact*
- *End of Life Issues for Electrical Equipment* – death after life topic
- *Role of the Power System Engineer* –
 - Substation Design for Environmental Acceptance
 - EMC and Its Applications in Communications
 - Environment Friendly Cable
 - EPD, Environmental Product Declarations
- *ISO 14000* – It's Impact on Design and Construction of Power Facilities
- *Regulatory Initiatives and International Issues*
- *Role of Renewable Energy Sources*

TRACK 3: Integration of Dispersed Generation

- *Hydropower* – the original renewable and green power source
- *Penetration of Dispersed Technologies in the Power System* – Internal/external security, reliability, power
- *Dispersed Generation and Interconnection*

TRACK 4: Sustainability and Global Climate Change

- Developing a Sustainable Energy and Power System
- Policy Formulation and Incentives
- Sustainable Energy Development and Supply - Continuing Education and Curricular Changes
- Impact of Megagrids

Complete manuscripts are to be submitted electronically via the 2004 PES General Meeting Web site, which will be linked to the [PES home page](#). The site will be available for submissions on or about 13 October 2003 through 8 December 2003. Authors will be notified of the decision regarding their paper by the late January, 2004. Authors should check the PES Author's Kit for manuscript formatting and preparation instructions. The Author's Kit is posted on the PES Web site noted above. See the PES Web site for additional information about the 2004 meeting which will be posted as it becomes available.

The Transformers Committee is scheduled to contribute an article about the TC to the PE Review / Power & Energy magazine with input due June 2004. The format is at the discretion of the TC and is a chance to sell the committee.

4.1.2 Organization and Procedures Committee

Changes to Technical Council O&P Manual – Bruce Dietzman reported an ANSI audit several years back resulted in the loss of IEEE accreditation due to procedural concerns. Recently, there was a hold on PES PAR's while the IEEE SA Standards Board audit committee reviewed similar concerns related to differences in individual Technical Committee O&P Manual procedures. The solution was an agreement to make appropriate wording changes in the Technical Council O&P Manual, and have all O&P Manuals refer to the Technical Council Manual. The audit committee provided the proper wording, which has been approved by Technical Council, and the temporary hold on PAR's has been removed. Technical Council is expected to provide guidance on wording needed in Technical Committee O&P Manuals to indicate deference to the Technical Council Manual. The Transformers Committee O&P Manual will have to be reviewed, particularly in reference to standards development. The Transformers Committee plan is to submit an updated O&P Manual to the Technical Council O&P Committee by the end of the year.

4.2 Technical Paper Sessions

4.2.1 Technical Paper Session at the 2003 General Meeting

Two technical sessions were planned with 4 proceedings papers and 6 transactions papers to be presented during the IEEE/PES 2003 General Meeting in Toronto, Ontario, July 13 – 17, 2003. Five of the transactions papers and three of the session papers were actually presented.

4.2.2 Technical Paper Session(s) at the 2004 General Meeting

The submission of papers for the 2004 General Meeting in Denver will open mid-October and close December 8, 2003. The final program for technical program will be finalized in late February 2004.

Respectfully submitted,

K.S. Hanus, Vice Chair

5.0 Transformer Standards – T. A. Prevost

The Standards Sub committee met Wednesday, October 8 at 4:30 PM with 8 members and 30 guests.

- Minutes of Raleigh Meeting were approved.

5.1 Reports of WG's:

5.1.1 C57.12.00, C57.12.90 - Subhash Tuli, WG Chair

Reviewed status of C57.12.00 and 12.90

- Went for ballot end of last year
- Received many comments and negatives on metrification
- Will reballet this fall with revised draft
- Steve Beckman brought up a concern that it is difficult to know who is responsible for a particular table OR clause in 12.00 and 12.90.
- We will review this and see if there is some way to designate this.

5.1.2 PC57.144 WG on Guide for Metrification of Transformer Standards – Dudley Galloway, WG Chair

- WG did not meet.
- Guide is in balloting stage.

5.1.3 Reaffirmation of IEEE 62: IEEE Guide for Diagnostic Field Testing of Electric Power Apparatus - Part 1: Oil Filled Power Transformers, Regulators, and Reactors - Wally Binder, WG Chair

- Recirculation will close this fall. Starting a TF for revision. This will be done in Power Transformer Sub committee.

5.2 Old Business

5.2.1 Metrification Policy

Reviewed Metrification policy:

- A ruling by the Standards Board will allow working groups to use dual dimensioning in a standard if they feel there are safety issues with a metric only standard.

5.2.2 IEEE/IEC Dual Logo

- Reviewed intent of program

- We recommended C57.135 Guide for Application, Testing Installation and Operation of Phase Angle Shifting Transformers as our first standard to be proposed for a dual logo.

5.2.3 C57.12.80 Terminology for Power and Distribution Transformers

- Will start WG for revision – Tim Raymond has volunteered to lead

5.2.4 Reaffirmation Process

Discussed reaffirmation process

- Need to be willing to withdraw negatives
- Proposal reviewed in Ad Com to be presented to standards board.
- There was discussion at the meeting on a proposal that for reaffirmation ballots Ad Com would be the ballot group after the SC chair conducted a survey ballot that the standard still represented the state of the art and there were no significant technical errors. This proposal did not get support.

5.2.5 NEMA Standards

- Sheldon Kennedy and Giuseppe Termini indicated that they have a task to bring NEMA standards into IEEE. What process should they follow?
Reaffirmation? or new? or revision?
 - T Prevost will check and advise.
- Also what is the status of original word processor file of document?

5.3 New Business

We will try a Web Meeting for ballot resolution of C57.104, Frank Heinrichs (chair).

We would like to thank Savoula Amanatidis, Managing Editor Standards Activities and Jodi Haasz, Nescom secretary, for attending our meeting.

Bill Chiu has accepted position of Standards Coordinator as of January 1, 2004. Thank you Bill!

5.4 Standards Activities Since the October, 2002 Meeting

The Standards Subcommittee Chair's October 5, 2003, Report to the Committee, presented at the Administrative SC Meeting, follows. The Attachment referenced is included at the end of the Minutes.

DATE: October 5, 2003
TO: Members of IEEE Transformers Committee
FROM: Tom Prevost, Standards Subcommittee Chair
SUBJECT: Standards Activities since the April, 2003 Meeting

TRANSFORMERS STANDARDS AND COORDINATION ACTIVITIES

The transformers standards status is given with one attachment:

Attachment 1 is a list of all the C57 standards, including ANSI C57 standards, sorted by Subcommittee names. It contains a listing of the projects for which a Subcommittee is responsible. The standards that are not assigned yet, or do not belong to the Transformers committee, are listed under the Standards Subcommittee.

DOCUMENTS SUBMITTED TO THE STANDARDS BOARD

(PARs)

IEEE-SA Standards Board

New Standards Committee (NesCom)
Recommendations
19 March 2003

TARGET EXTENSION REQUESTS

PC57.12.25 (PE/TR) Standard for Pad-Mounted, Compartmental-Type, Self-Cooled, Single-Phase Distribution Transformers with Separable Insulated High-Voltage Connectors; High Voltage, 34500 GrdY/19920 Volts and Below, Low Voltage, 240/120 Volts; 167 kVA and Smaller - Requirements (Deferred from the December 2002 meeting)

Recommendation: Approve target extension request until December 2004.

PC57.19.00 (PE/TR) Standard General Requirements and Test Procedure for Power Apparatus Bushings (Deferred from the December 2002 meeting)

Recommendation: Approve target extension request until December 2004.

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

Recommendation: Approve target extension request until December 2005.

PARS TO BE ADMINISTRATIVELY WITHDRAWN

PC57.133 (PE/TR) Guide for Short Circuit Testing of Distribution and Power Transformers
(Deferred from the December 2002 meeting)

Recommendation: Approve administrative withdrawal.

IEEE-SA Standards Board

New Standards Committee (NesCom)

Recommendations

7 May 2003

PARS FOR THE REVISIONS OF STANDARDS

PC57.13.2 (PE/TR) Conformance Test Procedure for Instrument Transformers

Recommendation: Approve PAR for the revision of a standard until December 2007.

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

Recommendation: Approve PAR for the revision of a standard until December 2007.

IEEE-SA Standards Board

New Standards Committee (NesCom)

Recommendations

10 September 2003

PARS FOR REVISIONS OF STANDARDS

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

Recommendation: Approve PAR for the revision of a standard until December 2007.

IEEE-SA STANDARDS BOARD REVIEW COMMITTEE (RevCom)
RECOMMENDATIONS
19 March 2003
NEW

C57.127-2000 (PE/TR) IEEE Trial-Use Guide for the Detection of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers

[No negative comments received during trial-use period, which is now complete; Sponsor requests elevation of status to full-use.]

Recommendation: Elevate status of standard from trial-use to full-use. Editorial staff will be notified to implement the necessary changes. IEEE Standards Dept. database will be updated to reflect that the standard will be due for reaffirmation in 2005.

5-YEAR REVIEW OF STANDARDS

PE/TR

C57.13-1993 IEEE Standard Requirements for Instrument Transformers

Sponsor states that a reaffirmation ballot will be initiated.

Recommendation: Extend until December 2003.

C57.19.00-1991 (R1997) IEEE Standard General Requirements and Test Procedure for Outdoor Power Apparatus Bushings

Sponsor has submitted a PAR extension request to NesCom for revision project PC57.19.00.

Recommendation: Extend until the expiration of the PAR for PC57.19.00 [December 2004].

PARs Due to Expire

This letter is to advise you that the projects listed below will expire at the end of 2003 and action will be required.

- PC57.12.01 Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin Encapsulated Windings

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

- PC57.141 Guide for the Application of Load Tap Changers

If the projects will not be submitted to RevCom in time for the December 2003 meeting, you have the following options:

1. Request an extension for the projects. The Target Extension Request Form can be found at <http://standards.ieee.org/guides/par/extension.rtf>. Please note that this extension request can now be from one to four years.
2. Request withdrawal of the projects.

Please advise me in writing of the action that should be taken. This information will be placed on the agenda of the next scheduled NesCom meeting (based upon the date I receive the request), and NesCom will make its recommendation based upon the information provided.

If there is no response to this letter by 21 October 2003, the projects will be recommended for administrative withdrawal at the 10 December 2003 IEEE-SA Standards Board meeting.

If you should have any questions, please contact me at 732-562-6367 or by e-mail at j.haasz@ieee.org.

Best regards,

Jodi Haasz
Senior Administrator
IEEE-SA Governance and Electronic Processes
Standards Activities
Phone +1 732 562 6367
FAX +1 208 460 5300
Email: j.haasz@ieee.org

Standards to be Withdrawn

Please see the attached list of standards that require maintenance actions before the end of 2003.

Many of these standards are slated for administrative withdrawal since no updates have been received from the Sponsors.

Please review the list and take appropriate actions through your Sponsor Liaison .

The submittal deadline for the December 2003 meetings of NesCom and RevCom is 21 October 2003.

If you will be submitting a PAR for a revision project for a standard on the 5-yr list, please do so by that date. PAR forms and instructions can be found at <http://standards.ieee.org/guides/par/index.html>. The NesCom Administrator is Jodi Haasz [j.haasz@ieee.org].

If you will be submitting to RevCom [either a reaffirmation or a revision project for a standard on the 5-yr list], please do so by the submittal deadline. RevCom submittal instructions can be found at <http://standards.ieee.org/guides/revguide.html>. The RevCom Administrator is Dave Ringle [d.ringle@ieee.org].

If the Sponsor desires to keep a standard on the 5-yr list active and cannot complete any of the above actions by the 21 October 2003 deadline, please have the Sponsor Liaison send an email to d.ringle@ieee.org requesting extension of the maintenance deadline and stating the actions that will be taken by the Sponsor.

If no information is received for the standards currently slated for administrative withdrawal, they will be balloted for withdrawal by the Standards Board immediately after the December 2003 Standards Board meeting.

If you have any questions, please contact me.

Regards,

David L. Ringle
Program Manager - Governance, Policy & Procedures
IEEE Standards Activities Department
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
TEL: +1 732 562 3806
FAX: +1 732 875 0524
d.ringle@ieee.org

32-1972 (R1997) IEEE Standard Requirements, Terminology, and Test Procedures for Neutral Grounding Devices

Recommendation: Administrative Withdrawal.

62-1995 IEEE Guide for Diagnostic Field Testing of Electric Power Apparatus - Part 1: Oil Filled Power Transformers, Regulators, and Reactors

Recommendation: Administrative Withdrawal.

1276-1997 IEEE Guide for the Application of High-Temperature Insulation Materials in Liquid-Immersed Power Transformers

Recommendation: Administrative Withdrawal.

C57.12.01-1998 IEEE Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin Encapsulated Windings

Recommendation: Administrative Withdrawal.

C57.12.35-1996 IEEE Standard for Bar Coding for Distribution Transformers

Recommendation: Administrative Withdrawal.

C57.12.56-1986 (R1998) IEEE Standard Test Procedure for Thermal Evaluation of Insulation Systems for Ventilated Dry-Type Power and Distribution Transformers

Recommendation: Administrative Withdrawal.

C57.12.60-1998 IEEE Guide for Test Procedures for Thermal Evaluation of Insulation Systems for Solid Cast and Resin-Encapsulated Power and Distribution Transformers

Recommendation: Administrative Withdrawal.

C57.18.10-1998 IEEE Standard Practices and Requirements for Semiconductor Power Rectifier Transformers

Recommendation: Administrative Withdrawal.

C57.19.100-1995 IEEE Guide for Application of Power Apparatus Bushings

Recommendation: Administrative Withdrawal.

C57.110-1998 IEEE Recommended Practice for Establishing Transformer Capability When Supplying Nonsinusoidal Load Currents

Recommendation: Administrative Withdrawal.

C57.117-1986 (R1998) IEEE Guide for Reporting Failure Data for Power Transformers and Shunt Reactors on Electric Utility Power Systems

Recommendation: Administrative Withdrawal.

C57.121-1998 IEEE Guide for Acceptance and Maintenance of Less-Flammable Hydrocarbon Fluid in Transformers

Recommendation: Administrative Withdrawal.

C57.125-1991 (R1998) IEEE Guide for Failure Investigation, Documentation, and Analysis for Power Transformers and Shunt Reactors

Recommendation: Administrative Withdrawal.

C57.138-1998 IEEE Recommended Practice for Routine Impulse Test for Distribution Transformers

Recommendation: Administrative Withdrawal.

BALLOT STATUS - Invitation to Ballot

Invitation Number	Sponsor (Soc/Com)	Working Group Chair	Invitation Open Date	Invitation Close Date	# of Invitations Sent Out	Type of Invitation
Std.C57.138 REAFF	PE/TR	John R Rossetti	09/04/2003	10/04/2003	653	Electronic Invitation
Std.C57.91 REAFF	PE/TR	Timothy Raymond	07/15/2003	08/14/2003	651	Electronic Invitation
Std.C57.110 REAFF	PE/TR	Richard P Marek	01/23/2003	02/22/2003	844	Electronic Invitation
Std.C57.111 REAFF	PE/TR	N Kent Haggerty	03/31/2003	04/30/2003	642	Electronic Invitation
Std.C57.13 REAFF	PE/TR	James Smith	04/01/2003	05/01/2003	642	Electronic Invitation
Std.C57.18.10 REAFF	PE/TR	Sheldon P Kennedy	06/05/2003	07/05/2003	650	Electronic Invitation
PC57.144	PE/TR	Dudley L Galloway	07/07/2003	08/06/2003	651	Electronic Invitation
PC57.130	PE/TR	Frank J Gryszkiewicz	09/08/2003	10/08/2003	653	Electronic Invitation
Std.C57.125 REAFF	PE/TR	Wallace B Binder	09/12/2003	10/12/2003	653	Electronic Invitation
Std.C57.117 REAFF	PE/TR	Wallace B Binder	09/12/2003	10/12/2003	653	Electronic Invitation
PC57.13.6	PE/TR	Chris Ten-Haagen	09/12/2003	10/12/2003	653	Electronic Invitation

BALLOT STATUS

Ballot Number	Sponsor (Soc/Com)	Type of Ballot	Ballot Opened	Sched. Close Date	# Ballots	Balloting Results			Type of Ballot
						Affirm	Neg	Abstain	
PC57.12.34/D9	PE/TR	Recirc	07-Feb-03	09-Mar-03	90	79%	21%	3%	Electronic
Std. C57.110-1998	PE/TR	Reaff	27-Feb-03	30-Mar-03	132	99%	1%	1%	Electronic
Std. 62-1995	PE/TR	Reaff	17-Mar-03	16-Apr-03	122	95%	5%	3%	Electronic
Std. C57.111-1989 (R1995)	PE/TR	Reaff	09-May-03	08-Jun-03	73	100%	0%	0%	Electronic
Std. C57.13-1993	PE/TR	Reaff	09-May-03	08-Jun-03	92	94%	6%	5%	Electronic
Std. C57.18.10-1998	PE/TR	Reaff	10-Jul-03	09-Aug-03	52	95%	5%	2%	Electronic
Std. C57.13-1993	PE/TR	Reaff Recirc	05-Aug-03	04-Sep-03	92	98%	2%	3%	Electronic
Std. C57.91-1995	PE/TR	Reaff	11-Sep-03	11-Oct-03	155				Electronic
Std. C57.21-1990	PE/TR	Reaff Rblt Recirc	12-Sep-03	27-Oct-03	78				Paper

NEXT STANDARDS BOARD MEETINGS AND SUBMITTAL DEADLINES

Meeting date **Deadline for Submittal of PAR (1) or Draft Standard (2)**

December 8, 2003	October 21, 2003
March 23, 2004	February 13, 2004
June 10, 2004	April 30, 2004
September 21, 2004	August 13, 2004

- (1) A PAR must be sent to the Standards Subcommittee Chair before the stated deadline.
- (2) Standards must be submitted directly to the IEEE Standards Department by the Working Group Chair before the stated deadline to be considered at the next Standards board Meeting.

Note:

The PAR form has been revised. To locate the current PAR form please go to <http://standards.ieee.org/guides/par/index.html>. Also, a new Target Extension Request form is to be used for all extension requests for PARs and is located at <http://standards.ieee.org/guides/par/extension.html>.

Current List of ALL Open Standards Project (from IEEE Web site October 3, 2003)

Designation: PC57.12.00

Sponsor: Power Engineering Society/Transformers

Title: Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

Status: Revision Project

Technical Contact: Subhash C Tuli, Phone:262-547-0121x1428,
Email:subhash.tuli@waukeshaelectric.spx.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 14, 2001

Designation: PC57.12.01

Sponsor: Power Engineering Society/Transformers

Title: Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin Encapsulated Windings

Status: Revision Project

Technical Contact: Anthony J Jonnatti, Phone:727-785-2788, Email:premo2@aol.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Mar 18, 1999

Designation: PC57.12.10

Sponsor: Power Engineering Society/Transformers

Title: Standard Requirements for Liquid-Immersed Power Transformers

Status: New Standard Project

Technical Contact: Javier Arteaga, Phone:414-547-0121 **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 13, 2002

Designation: PC57.12.20

Sponsor: Power Engineering Society/Transformers

Title: Standard for Overhead Type Distribution Transformers, 500 kVA and Smaller: High Voltage, 34500 Volts and Below; Low Voltage, 7970/13800Y Volts and Below

Status: Revision Project

Technical Contact: Glenn W Andersen, Phone:704-382-4323, Email:gwanders@duke-energy.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Dec 6, 2001

Designation: PC57.12.25

Sponsor: Power Engineering Society/Transformers

Title: Standard for Pad-Mounted, Compartmental-Type, Self-Cooled, Single-Phase Distribution Transformers with Separable Insulated High-Voltage Connectors; High Voltage, 34500 GrdY/19920 Volts and Below, Low Voltage, 240/120 Volts; 167 kVA and Smaller - Requirements

Status: Revision Project

Technical Contact: Ali A Ghafourian, Phone:731-285-9121, Email:aghafourian@ermco-eci.com
**For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Dec 8, 1998

Designation: PC57.12.28

Sponsor: Power Engineering Society/Transformers

Title: Standard for Pad Mounted Equipment - Enclosure Integrity

Status: New Standard Project

Technical Contact: Robert C Olen, Phone:262-835-3362, Email:rolen@cooperpower.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: May 9, 2002

Designation: PC57.12.29

Sponsor: Power Engineering Society/Transformers

Title: Standard for Pad Mounted Equipment - Enclosure Integrity for Coastal Environments

Status: New Standard Project

Technical Contact: Robert C Olen, Phone:262-835-3362, Email:rolen@cooperpower.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: May 9, 2002

Designation: PC57.12.33

Sponsor: Power Engineering Society/Transformers

Title: Guide for Distribution Transformer Loss Evaluation

Status: New Standard Project

Technical Contact: Thomas J Pekarek, Phone:330-761-7800, Email:tjpekarek@firstenergycorp.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 25, 1998

Designation: PC57.12.36

Sponsor: Power Engineering Society/Transformers

Title: Standard Requirements for Liquid-Immersed Distribution Substation Transformers

Status: New Standard Project

Technical Contact: John R Rossetti, Phone:901-528-4743, Email:jrossetti@mlgw.org **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 13, 2002

Designation: PC57.12.37

Sponsor: Power Engineering Society/Transformers

Title: Standard for the Electronic Reporting of Distribution Transformer Test Data

Status: Revision Project

Technical Contact: Richard Hollingsworth, Phone:601-422-1105, Email:rhollin@howard-ind.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Nov 1, 2001

Designation: PC57.12.90

Sponsor: Power Engineering Society/Transformers

Title: Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers

Status: Revision Project

Technical Contact: Subhash C Tuli, Phone:262-547-0121x1428,
Email:subhash.tuli@waukeshaelectric.spx.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 14, 2001

Designation: PC57.13.1

Sponsor: Power Engineering Society/Power System Relaying

Title: Guide for Field Testing of Relaying Current Transformers

Status: Revision Project

Technical Contact: M Meisinger, Phone:773-338-1000, Email:mmeisinger@sandc.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 25, 1998

Designation: PC57.13.2

Sponsor: Power Engineering Society/Transformers

Title: Conformance Test Procedure for Instrument Transformers

Status: Revision Project

Technical Contact: Vladimir Khalin, Phone:859-879-2797, Email:vladimir@kuhlman.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: May 15, 2003

Designation: PC57.13.3

Sponsor: Power Engineering Society/Power System Relaying

Title: Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

Status: Revision Project

Technical Contact: Mohindar Sachdev, Phone:306-374-0730, Email:m.s.sachdev@ieee.org
**For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 25, 1998

Designation: PC57.15

Sponsor: Power Engineering Society/Transformers

Title: Standard Requirements, Terminology, and Test Code for Step-Voltage Regulators

Status: Revision Project

Technical Contact: Thomas Diamantis, Phone:315-428-5688, Email:diamantist@nimo.com
**For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Dec 7, 2000

Designation: PC57.19.00

Sponsor: Power Engineering Society/Transformers

Title: Standard General Requirements and Test Procedure for Power Apparatus Bushings

Status: Revision Project

Technical Contact: Keith Ellis, Phone:615-847-2157, Email:keithcota@aol.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 20, 1996

Designation: PC57.21

Sponsor: Power Engineering Society/Transformers

Title: Standard Requirements, Terminology, and Test Code for Shunt Reactors Rated Over 500 kVA

Status: Revision Project

Technical Contact: Richard F Dudley, Phone:416-298-8108,
Email:richardd@ca.trenchgroup.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Sep 11, 2003

Designation: PC57.32

Sponsor: Power Engineering Society/Transformers

Title: Standard Requirements, Terminology and Test Procedures for Neutral Grounding Devices

Status: Revision Project **This is a revision of IEEE Std 32-1972

Technical Contact: Steven Schappell, Phone:919-580-3240,
Email:steven.schappell@waukeshaelectric.spx.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Dec 11, 2002

Designation: PC57.93

Sponsor: Power Engineering Society/Transformers

Title: Guide for Installation of Liquid-Immersed Power Transformers

Status: Revision Project

Technical Contact: Michael Lau, Phone:604-528-3201, Email:mike.lau@bchydro.bc.ca **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 13, 2002

Designation: PC57.98

Sponsor: Power Engineering Society/Transformers

Title: Guide for Transformer Impulse Tests

Status: Revision Project

Technical Contact: Arthur Molden, Phone:845-225-0993, Email:ameesco@worldnet.att.net
**For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Sep 12, 2002

Designation: PC57.104

Sponsor: Power Engineering Society/Transformers

Title: Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers

Status: Revision Project

Technical Contact: Frank W Heinrichs, Phone:724-941-6924, Email:frankus@usaor.net **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Dec 10, 1996

Designation: PC57.106

Sponsor: Power Engineering Society/Transformers

Title: Guide for Acceptance and Maintenance of Insulating Oil in Equipment

Status: Revision Project

Technical Contact: James A Thompson, Phone:605-534-3571, Email:writejt@trservice.com
**For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Dec 11, 2002

Designation: PC57.113

Sponsor: Power Engineering Society/Transformers

Title: Recommended Practice for Partial Discharge Measurement in Liquid-Filled Power Transformers and Shunt Reactors

Status: Revision Project

Technical Contact: Bertrand Poulin, Phone:408-957-8326, Email:bertrand.f.poulin@ca.abb.com
**For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 20, 1996

Designation: PC57.127

Sponsor: Power Engineering Society/Transformers

Title: Guide for the Detection and Location of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers and Reactors

Status: Revision Project

Technical Contact: J.W Harley, Phone:330-657-2471, Email:jack@harleyinc.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Feb 13, 2003

Designation: PC57.130

Sponsor: Power Engineering Society/Transformers

Title: 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

Status: New Standard Project

Technical Contact: Frank J Gryszkiewicz, Phone:617-926-4900x213, Email:frankg@dooble.com
**For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jan 30, 2000

Designation: PC57.131

Sponsor: Power Engineering Society/Transformers

Title: Standard Requirements for Tap Changers

Status: Revision Project

Technical Contact: William R Henning, Phone:262-547-0121, Email:whenning@ieee.org **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: May 15, 2003

Designation: PC57.139

Sponsor: Power Engineering Society/Transformers

Title: Guide for Dissolved Gas Analysis in Transformer Load Tap Changers

Status: New Standard Project

Technical Contact: Richard K Ladroga, Phone:978-630-8865, Email:rladroga@doble.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Dec 11, 2002

Designation: PC57.140

Sponsor: Power Engineering Society/Transformers

Title: Evaluation and reconditioning of Liquid Immersed Power Transformers

Status: New Standard Project

Technical Contact: Rowland I James, Phone:504-576-6246, Email:rjames@entergy.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Sep 16, 1999

Designation: PC57.141

Sponsor: Power Engineering Society/Transformers

Title: Guide for the Application of Load Tap Changers

Status: New Standard Project

Technical Contact: William R Henning, Phone:262-547-0121, Email:whenning@ieee.org **For non-technical questions, including pricing, availability and ordering, please contact IEEE

Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Jun 26, 1999

Designation: PC57.142

Sponsor: Power Engineering Society/Transformers

Title: A Guide To Describe The Occurrence And Mitigation Of Switching Transients Induced By Transformer-Breaker Interaction

Status: New Standard Project

Technical Contact: Robert C Degeneff, Phone:518-276-6367, Email:degenr@rpi.edu **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Dec 7, 2000

Designation: PC57.143

Sponsor: Power Engineering Society/Transformers

Title: Guide for Application for Monitoring Equipment to Liquid-Immersed Transformers and Components

Status: New Standard Project

Technical Contact: Andre Lux, Phone:919-856-3888, Email:andre.e.lux@us.abb.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Mar 21, 2002

Designation: PC57.144

Sponsor: Power Engineering Society/Transformers

Title: Guide to Metric Conversion of Transformer Standards

Status: New Standard Project

Technical Contact: Dudley L Galloway, Phone:573-635-7587, Email:gallowaytt@aol.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE

Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Mar 21, 2002

Designation: PC57.146

Sponsor: Power Engineering Society/Transformers

Title: Guide for interpretation of gasses generated in silicone-immersed transformers

Status: New Standard Project

Technical Contact: William H Bartley, Phone:860-722-5483, Email:william_bartley@hsb.com
**For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: Oct 31, 2002

Designation: PC57.119

Sponsor: Power Engineering Society/Transformers

Title: Recommended Practice for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Rating

Status: New Standard Project

Technical Contact: Subhash C Tuli, Phone:262-547-0121x1428,
Email:subhash.tuli@waukeshaelectric.spx.com **For non-technical questions, including pricing, availability and ordering, please contact IEEE Customer Service at 1-800-678-IEEE (in U.S. and Canada); or 1-732-981-0060 (outside the U.S. and Canada); or send an email customer.service@ieee.org

History: PAR APP: May 16, 2000

6.0 Recognition and Awards – B.K.Patel

6.1 Certificates of Appreciation

Certificates of Appreciation have been obtained for the following persons:

<u>Name</u>	<u>Service Rendered</u>
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Dennis Blake	Host, Fall 2003 Meeting, Pittsburgh, PA
Jin Sim	Distinguished Service Award
Ramsis Girgis	Chair, Working Group C57.123, IEEE Guide for Transformer Loss
George Henry	Chair, C57.12.35, Bar Coding For Distribution Transformers
George Henry	Long-standing and Notable Contributions to the Transformers Committee
Glenn Anderson	Co-Chair, C57.12.20, Single Phase Pole Mounted Distribution Transformers
Glenn Anderson	Long-standing and Notable Contributions to the Transformer Committee
Ernie Nols	Co-Chair, C57.12.25, Single Phase Pad-Mounted Distribution Transformers
John Lazar	Co-Chair, C57.12.25, Single Phase Pad-Mounted Distribution Transformers
John Lazar	Long-standing and Notable Contributions to the Transformers Committee
Dave Barnard	Chair, C57.12.91, Dry Type Transformer Test Code
Joe Kelly	Long-standing and Notable Contributions to the Transformers Committee
Joe Ma	Co-Chair, C57.13.5, Draft Trial-Use Standard of Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above
Pierre Riffon	Co-Chair, C57.13.5, Draft Trial-Use Standard of Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above

6.2 Nominations for IEEE, PES, and Technical Council Awards

None at this time.

6.3 Awards – General

The following is a listing of various awards available:

AWARD	NOMINATION DEADLINE	NOMINATION SENT To
PES Prize Paper Award	***	Mohammad Shahidehpour
PES Working Group Award (Technical Report)	***	Mohammad Shahidehpour
PES Working Group Award (Standard or Guide)	***	Mohammad Shahidehpour
“High Interest” Paper	***	Noel Schulz
Alfred Nobel Intersociety Award	***	Noel Schulz
Technical Committee Prize Paper Award	***	Noel Schulz
Technical Committee Distinguished Service Award	***	Noel Schulz
Tech. Com. Working Group Recognition Award	***	Noel Schulz
IEEE Prize Paper Award (W.R.G. Baker)	April 1	Mohammad Shahidehpour
IEEE Prize Paper Award (Donald G. Fink)	April 1	Mohammad Shahidehpour
IEEE Prize Paper Award (Browder J. Thompson)	April 1	Mohammad Shahidehpour

*** Will be decided later

B.K.Patel, Chair - Awards Subcommittee

AWARDSF03.doc

Secretary’s note: During this section of the meeting, recognition was also provided to those members and participants whose patient and persistent efforts resulted in IEEE’s acceptance of the continuing use of dual units (metric and English/imperial) for our product standards, particularly those where the Committee felt exclusive use of metric units resulted in concern for worker safety. The following individuals were instrumental in preparing our position for communication with IEEE, and were recognized by acclamation at this meeting.

Glenn Andersen

Don Duckett

Dudley Galloway

Jim Harlow
Carl Niemann
Jin Sim

Brian Klaponski
Tom Prevost
Ed Smith

Dan Mulkey
Steve Shull
Ron Stahara

Others assisted also. If any names were inadvertently left out, the Secretary offers his apology. The Committee also appreciates IEEE's action in response to these concerns.

7.0 Reports of Technical Subcommittees

The following reports are those of the technical subcommittees of the Transformers Committee. In most cases they are the complete minutes of meetings held earlier in the week of the Main Committee Meeting.

Secretary's Note: The subcommittee reports have been edited in some cases for consistency in format. No changes have been made to the content of these reports except for typographical errors and removal of material (attendance lists and some general items, typically items from the Administrative Subcommittee Meeting, covered elsewhere) not required in these assembled Minutes. Complete (unedited) Subcommittee meeting minutes are individually posted on the Committee website (<http://www.transformerscommittee.org/>).

7.1 Underground Transformers & Network Protectors SC – C. G. Niemann, Chair

Meeting Minutes – Pittsburgh, Pennsylvania

7.1.1 Introduction/Attendance

The Underground Transformers and Network Protectors Subcommittee met on Wednesday, October 8, 2003, in the Waterfront room of the Sheraton Station Square Hotel at 9:30 AM with seven members and three guests present.

7.1.2 Approval of Minutes

The minutes of the March 19, 2003 meeting in Raleigh, North Carolina were approved as submitted.

7.1.3 Membership

One guest Dave Blew requested membership, he will replace Ernie Nols from PSE&G who retired. Membership stands at 20 members.

7.1.4 Chairman's Remarks

Administrative Subcommittee Notes Reported to SC

- Attendance at meeting is 306 registered and 40 companions.
- The subcommittee was informed that IEEE had agreed to allow dual dimensioning in the Transformer Standards.
- Discussion on the use of the IEEE/IEC Dual Logo.
- The subcommittee was informed that beginning January 2004, Ken Hanus would move to Chairman, Don Fallon would move to Vice Chair, and Tom Prevost would become Secretary

7.1.5 Working Group Reports

7.1.5.1 Three-Phase Underground-Type Transformers (C57.12.24) J. Sullivan / Giuseppe Termini – Co-Chairman

1. Met on Monday, October 6, 2003, at 9:30 AM in the Reflections Room with nine members and five guests present. Giuseppe Termini chaired the meeting
2. Minutes of the March 17, 2003 meeting in Raleigh were approved.
3. The Working Group agreed to pursue a new PAR for revision of the document to address suggested changes brought up at the Raleigh meeting.
4. The task made up of: Giuseppe Termine, Brian Klaponski, Dan Mulkey, and John Sullivan, will work on needed revisions prior to the next meeting.
5. The question of reaffirmation of the standard was brought up. Giuseppe will contact Tom Prevost to determine if the standard requires reaffirmation.
6. David Blew of PSE&G requested membership into the Working Group.
7. Meeting was adjourned at 10:30 AM.

7.1.5.2 Liquid Filled Secondary Network Transformers (C57.12.40) B. Klaponski - Chairman

1. Met on Monday, October 6, 2003 at 3:15 PM with nine members and 11 guests present.
2. Minutes of the March 17, 2003 meeting in Raleigh, North Carolina were approved as submitted.
3. The Chairman summarized the existing PAR and the fact that IEEE Standards Board has

now approved dual dimensioning. The existing PAR had been approved such that the existing C57.12.40 – 2000 document (that was published by NEMA) could be corrected for significant editorial errors. These errors were reviewed by the WG about two years ago;

however, the IEEE metrification policy had not allowed us to simply correct these errors and publish an IEEE C57.12.40 document. The Chairman noted we could now complete the existing PAR. The Chairman had made a request to the IEEE Editorial Staff for an electronic version of the current NEMA published document such that a full draft of the changes could be made.

4. The WG continued the rest of the meeting as if we were working under a new PAR. A new PAR will be applied for after the completion of the existing PAR.
5. The network transformer high voltage switch was discussed. Larry Dix, of Quality Switch, had prepared a handout with revised wording of the switch requirements including the criteria for successful completion of a short circuit test. This was discussed and comments were requested from two other switch manufacturers – GE and ABB. John Crouse had volunteered to contact the appropriate people at GE and the Chairman will contact Steve Schroeder of ABB. It was suggested that the switch pass/fail requirements perhaps be located in a normative annex.
6. The 2000 document eliminated Part II of this standard because of lack of participation from ConEd. Joe Cultrera was present and talked to this issue. ConEd will undertake to state their position on Part II to our WG by the end of 2003. The WG generally agreed during discussion that an inpregnation of Part II into the existing standard would be a preferable way of handling this in the next revision, provided ConEd actively participates.
7. The meeting was adjourned at 4:00 PM.

7.1.5.3 Secondary Network Protectors (C57.12.44) D.H. Mulkey – Chairman

1. Met on Monday, October 6, 2003 at 1:45 PM with five members and twelve guests present.
2. Minutes of the March 17, 2003 meeting in Raleigh, North Carolina were approved as written.
3. Discussion centered on:
 - A. Metrification – figures in Annex H (dual dimensioned) will replace figures in standard which are metric. only
 - B. Section 5.2.5, BIL, was removed – to be held for future revision.
 - C. Section 5.2.4 will need revision in the future to deal with testing when fuses are silver sand.

- D. Old Table 4 was removed – to be held for future revision.
 - E. Section 4.1.4 – removed 2nd paragraph; generation on network will need work in future.
 - F. Removed “min.” from headings in Table 3.
 - G. Standard needs to be ready for balloting at end of San Diego meeting.
4. Next meeting will be held in San Diego, California on March 8, 2004.
- A. One working group session required for the next meeting.
5. The meeting was adjourned at 2:57 PM.

7.1.5.4 Ventilated Dry-Type Network Transformers (C57.12.57) A.L. Robinson – Chairman

No report, Chairman not in attendance. Working Group discussed the need for this standard. It was decided to let this standard die a natural death.

7.1.6 Old Business

- 1) Tom Prevost attended the meeting and clarified the metrification issue to the SC. Tom told the group IEEE had not changed its policy on metrification, only the implementation, this allows us to use dual dimensioning in our product standards

7.1.7 New Business

- 1. A moment of silence was observed for R.B. Robinson who had passed away. RB was chair of the C57.12.44 WG before his retirement
- 2. Dan Mulkey made a request that all WG’s begin using the Web Page to post standards.

7.1.8 Future Meetings

The location and dates for future meetings are as follows:

March 7-11, 2004	San Diego, California
September 19-24, 2004	Edinburgh, Scotland
Spring 2005	Jackson, Mississippi

The Subcommittee adjourned at 10:45 AM.

Submitted by Carl Niemann

7.2 Audible Sound and Vibration SC – Jeewan Puri, Chair

The Audible Sound & Vibration S.C. met on October 8, 2003 at 8:00 a.m. with 16 members and 9 guests present. Four new members were welcomed to our subcommittee.

The minutes of our Raleigh, NC meeting were approved.

7.2.1 Working Group Report - WG for writing “Sound Level Measurement Guide”

Chairman John Holland reported that the WG resolved 31 comments on the first draft of the sound level measurement guide. Fifteen of these comments were editorial and were accepted as submitted. The discussion on the technical comments resulted in the following action items:

Reactors will remain within the scope of this guide. The title of this guide will be modified accordingly.

A new section of the practical aspects of making sound level tests will be included in this guide.

A new section on the narrow band sound level measurements will be added to this guide. Mr. Bill Darovny will write tutorial information on the background and the end use of these test data.

Mr. Lars-Erik Juhlin will provide the text comparing sound intensity and sound pressure measurements made in the near field region of the transformers.

Mr. Richard Dudley had submitted two papers dealing with sound level calculation and mitigation of sound levels in reactors. Richard will propose the text for referencing these papers in the guide.

7.2.2 Standard Sound Level Tables

J. Puri resolved the comments received on the proposed methodology for extending present NEMA Standard Sound Level Tables for liquid filled and dry type transformers. The Sub Committee participants agreed that the proposed analysis and extended tables should be sent to the SC members for comments. This information should be posted on the IEEE Website for inviting comments from the industry.

There being no new business, the meeting adjourned at 9:15 am.

Jeewan Puri

October 8, 2003

7.3 Bushings SC – Fred Elliott, Chair

7.3.1 Introduction/Attendance

Chairman, Fred Elliott opened the meeting at 3:00 PM and welcomed the members and guests. There were 37 attendees with 19 members and 15 guests present. Three guests requested membership to the Bushing Subcommittee.

7.3.2 Approval of Minutes of Last Meeting

The minutes were approved as written.

7.3.3 Chairman's Remarks

The Chair made the following remarks after attending the Administrative Subcommittee meeting.

The next Transformer Committee meeting will be held in San Diego. March 7 - 11, 2004

The IEEE Standards Board has approved the continuing use of dual dimensioning where appropriate in IEEE standards documents, with metric units preferred followed by English units in parenthesis. The reason behind this is safety concerns and confusion.

The Administrative Subcommittee is considering establishing corresponding membership classification for active participants who meet all the committee membership requirements except attendance.

Recently, there have been a number of unresolved negative ballots on reaffirmations. These ballots slow down the process without adding value. The standard being balloted cannot be changed. It can only be accepted or rejected. Comments are held for consideration during the next revision project. Unresolved negatives trigger a recirculation ballot, which takes time and effort that could be put to better use on other active projects.

IEEE and IEC have signed an agreement for dual logo standards. At present, IEEE standards, which do not have equivalent IEC standards, can be proposed for adoption in the IEC. IEC votes to accept or reject the proposal. The document cannot be changed. The balloting and acceptance process is expected to take no more than six months. On the other hand, negotiations are underway to establish a reciprocal agreement that would allow the adoption of the IEC documents by the IEEE.

7.3.4 Working Group and Task Force Reports

7.3.4.1 WG - Revision of C57.19.00 - Keith Ellis, Chair

Keith reported that there would be a recirculation as the negative votes could not be resolved. Draft 6 ballot yielded 96 % approval.

7.3.4.2 TF - Revision of C57.19.100 – Keith Ellis, Acting Chair for Tommy Spitzer

The acting TF Chair opened the meeting at 11:00 AM and welcomed the guests. There were 42 attendees with 6 additional requests for membership on the TF. An active membership list will be established before the next meeting.

The agenda was reviewed and the following items were discussed for the proposed revisions to the document.

Mounting angle greater than 20° as presented by Pritpal Singh was discussed. It was agreed that this item should be included in Draft 1 of the document and that further discussion would be warranted.

Temperature correction of Power Factor as presented by Mark Rivers was discussed. It was agreed that this should be added to section 10.2, Routine and Special Tests.

Temperature rise test for draw lead cable as presented by Pritpal Singh was discussed. After some discussion, the acting Chair asked each bushing manufacturer present to review the proposed text and provide their opinion to the Chair one-month before the next meeting.

Power factor measurement of RG bushings as presented by Lapp was discussed. It was agreed that this information needs to be included in Draft 1 of this document.

Bushing storage recommendations as submitted by a member were discussed. A great deal of discussion took place regarding this issue and it was agreed that Keith Ellis with the help of Florian Costa, would make another attempt to include additional information regarding storage of bushings as well as introduce some recommendations for testing bushings in storage. The revised information would be sent to the Chair one month before the next meeting.

Old Business

At the last meeting it is suggested that applying “Outdoor” bushings indoors could be addressed in the guide. *Volunteer; Devki Sharma* (Please submit before the next meeting)

Harmonize with IEC. *Volunteer; Keith Ellis* (Please submit before the next meeting)

Temperature calculation for short-time loads above bushing rating. *Volunteer; Chris Monoski* (Please submit before the next meeting)

There was continued discussion on DGA of bushing oil. Mike Lau with BC Hydro indicated success in finding bad bushings by taking oil samples and running DGA. The acting Chair indicated that most bushing manufacturers do not recommend oil sampling from “healthy” bushings. If there is continued interest in this subject further discussion could be undertaken within the TF. Nguyen Van Nhi with Hydro Quebec again raised this issue and Nguyen agreed to provide more details on this subject for discussion at the next meeting

New Business

Bushing repair was suggested for this document. It was agreed that Lapp would put together some recommendations one month before the next meeting and send it to the Chair, Acting Chair and the Secretary.

A question was raised about the effects of applying on-line bushing monitors to the test and voltage taps of bushings. The person who raised the questions agreed to prepare some information on this issue one-month before the next meeting and send it to the Chair, Acting Chair and the Secretary.

Epilog: The subject matter for discussion is increasing and it is recommended that this TF be expanded to two sessions for the next meeting.

Adjournment

The meeting was adjourned at 12.15 PM.

7.3.4.3 Report of Technical Advisor to IEC SC36A

No report was available on IEC activities

7.3.5 Old Business

7.3.5.1 Reaffirmation of C57.19.03

The Chair will submit a PAR for preparing a corrigendum. Will require a small group to accomplish this task. No information available on IEC standard on DC bushings.

7.3.5.2 C57.19.01- 2000, Tutorial Presentation

A tutorial to make the members aware of this new dimensional standard was given on October 7 by Fred Elliott, Loren Wagenaar, and Mark Rivers. The chair remarked that it will require a long term effort to adopt the new standard.

7.3.5.3 Bulk Bushing Standard

Pat Jostrand presented the following questions:

- Should there be a separate standard for bulk-type bushings?
- Would it better to make changes to the existing standards? What changes would be required to add these to the existing standards?
- Are there existing resources that could be used to develop the new information?

The above questions were discussed in the meeting and it was agreed to form a group that would discuss the requirements of such a standard. The group would be lead by Pat Jostrand. The following attendees volunteered to work in this group: Larry Davis, Keith Ellis, Bob Hartgrove, Don Platts, Mark Rivers, Pritpal Singh, John Tillman.

Please contact Pat Jostrand at pjostrand@warcoinc.com if you are interested in participating in this group.

7.3.5.4 Switching Impulse Requirements

Devki Sharma raised the question of Switching Impulse again at this meeting. He indicated the need for better coordination between the bushing and the transformer standards. The attendees had discussions similar to the one that took place at the Raleigh subcommittee meeting. No agreement was made for any additional work.

7.3.6 New Business

Phase to ground Clearances

Pritpal Singh referred to the Dielectric Test Subcommittee meeting where there was discussion to include Phase to Ground clearances for transformers in the C57.12.00 standard. It was mentioned that Line to Ground clearances (Arcing Distance) is dependent upon individual designs and vary between manufacturers. Having such a requirement would create a lot of confusion for bushing requirements. Bushing standards do not have such a requirement. Loren Wagenaar (Chair SC Dielectric Tests) agreed to include a Note to exclude bushings from this requirement.

7.3.7 Adjournment

The meeting was adjourned at 4:10 PM

Minutes Submitted By: Pritpal Singh, Secretary - Bushing Subcommittee

7.4 Dry Type Transformers SC – C. W. Johnson, Jr., Chair

7.4.1 Introductions and Approval of Minutes

The Dry Type Transformer Subcommittee met in Pittsburgh at the Sheraton Station Square Hotel at 1:45 PM on October 8, 2003 with 14 members and 5 guests present; 2 guests requested membership. Introductions were made and the attendance roster was circulated. Minutes from the March 19, 2003 meeting were reviewed and approved.

7.4.2 Working Group Reports

The next order of business was the presentation of the reports of the various working groups. See the following sections for the individual reports:

7.4.2.1 WG Dry Type General Requirements C57.12.01 Chairman John Sullivan

The working group met in Pittsburgh at the Sheraton Station Square Hotel at 1:45 PM on Monday October 6, 2003 with nine (9) members and six (6) guests present. Three guests requested membership in the working group.

Chairman John Sullivan was unable to attend the meeting and WG Secretary Tony Jonnatti chaired the meeting.

It was announced that IEEE Std. C57.12.01 had reached the end of its five-year life, but was not ready to be published. The last draft of the document had received a negative ballot due to a vector diagram did not properly pictorially represent the 120 degree angle between the phases. Secretary Jonnatti stated that a PAR extension would be requested and that Jodi Haasz of the IEEE had agreed to assist the Chairman in expediting the extension paperwork.

Under new business, Gene Morehart asked if anyone had observed a difference in the No-Load loss measurement when measuring from the primary side versus the secondary side. Gene stated that he had witnessed a 25% difference in the losses. No one attending the meeting had observed this phenomenon. (At the SC meeting, Jeewan Puri stated that he had seen similar results when measuring No-Load losses for Δ -Y transformers without solid grounded neutrals.)

There being no further business, the meeting was adjourned.

7.4.2.2 Dry Type Reactor TF Chairman Richard Dudley

The Dry Type Reactors T.F. met in the Reflections Room of the Sheraton Station Square Hotel in Pittsburgh, PA on Oct. 6, 2003 at 8:00 a.m. The first portion of the meeting 8:00 a.m. to 9:15 a.m. time slot was devoted to business of the Dry Type Reactors T.F. The remainder of the meeting time slot was devoted to the work of the newly established W.G. for the Revision of C57.21. This portion of meeting will be reported in a separate set of minutes. There were 9 members of the T.F. and 9 guests present. Two guests requested membership in the Dry Type Reactors T.F. The following are the highlights of the meeting.

1. Although this meeting time slot was shared with the W.G. for the Revision of C57.21, consensus was reached that the Dry Type Reactor T.F. should continue to meet at future Transformers Committee meetings in its own time slot. As usual the Dry Type Reactor T.F. will continue to report to the Dry Type Transformers S.C. (Note: The W.G. for the Revision of C57.21 will report to the Performance Characteristics S.C.).
2. The minutes of the Raleigh meeting of the T.F. were accepted.
3. The role and future focus of the T.F. was discussed. The T.F. will continue to support the revision process of C57.21. It will also look at possible future revision work on C57.16, support the revision process of C57.32 (neutral grounding devices) and evaluate suitable high frequency dry type reactor models for EMT studies.

The Dry Type Reactor T.F. portion of the meeting was thus complete and the remainder of the time slot was devoted to the business of the W.G. for the Revision of C57.21.

7.4.2.3 WG Dry Type Thermal Evaluation C57.12.56/60 Chairman Richard Provost

The working group met in Pittsburgh at the Sheraton Station Square Hotel at 9:30 AM on Tuesday, October 7, 2003 with eight (8) members and eight (8) guests present. Three guests requested membership in the working group, and they are welcome.

The chairman reviewed the status of the working group and agreed to keep the working group active after several years without a meeting. The chairman introduced Roger Wicks as Secretary and suggested he become Co-Chairman in order to maintain continuity of the working group due to the Chairman's residence in Korea, making it difficult to attend every meeting. The WG accepted this change.

There are two documents which the WG is charged with maintaining. They are C57.12.56 and C57.12.60. Both these documents are due for withdrawal at the end of 2003 unless re-affirmed. The WG agreed to submit these documents for Re-affirmation with the intent to modify and combine them into one document.

A motion was made and passed to create a new PAR for combining the two documents. The WG discussed and agreed to the Title and Scope of the PAR. The Title of the document will be: "IEEE Standard Test Procedure for Thermal Evaluation of Insulation Systems for Dry Type Power and Distribution Transformers, Including Ventilated, Solid-Cast and Resin Encapsulated Transformers".

The Scope of the PAR will be worded as follows: This Test Procedure is for the thermal evaluation of insulation systems of dry type power and distribution transformers, including both ventilated technology and solid-cast / encapsulated technology, to be used for determining the temperature classification of the insulation systems.

The next discussion involved the numbering of the document. The WG agreed to re-use the C57.12.60 number, since it was the latest document and modify it to include ventilated dry type technology. So the PAR number will be P57.12.60.

After agreement on the wording of the PAR, the WG discussed the changes needed to the documents for combination. The intent is to have a revised document by January 2004 for the WG to review and make comments. Following revisions, the final document will be submitted for vote by the Dry Type Subcommittee at the next Transformers Committee meeting.

The chairman reviewed the two documents in detail. Parts 1 through 3, and Part 5 are essentially the same except for editorial work to include both technologies. Part 4, Test Procedures, will require changes. Part 4.1, Methods of Test are the same. Part 4.2, Test Models will have to be rewritten. The WG agreed to use C57.12.60 as the starting point and include the Full Size Model drawings of the original document. There will be new drawings proposed for the Representative Models for the VDT types. Jeewan Puri and Derek Foster agreed to work on this section.

The next five parts (Part 4.3 to 4.7) will remain unchanged because they are the same for both documents, with the exception the a Cold Shock step will be included, which was not included in the original C57.12.56 standard.

Part 4.8, Dielectric Tests, also needs modification. There are currently three Test Methods outlined (A, B, and C). It was agreed that these would be combined to two test methods, one for Full Size Coils and one for Representative Coils. Derek Foster and Bill Simpson agreed to work on this section.

Finally, the WG Chairman noted that, once completed, he would plan to submit this standard to IEC as a Dual Logo Standard. Bill Simpson, TC-98 Liaison, suggested that we request the TC-14 TAG to submit to TC-98 for consideration and adoption.

There being no other new business, the working group adjourned at 10:30 AM.

7.4.2.4 WG Dry Type Test Code C57.12.91 Chairman Derek Foster

- 1 The working group met at 1:45 pm with 9 members and 11 guests present. Seven guests requested membership.
- 2 After introductions the minutes from the March 18 meeting in Raleigh were approved as written.
- 3 Old Business

Jeewan Puri apologized for not providing a copy of the re-write of Clause 13 in C57.12.90, to include an option for the user to specify sound intensity measurements. Jeewan explained to the working group that he had been unable to obtain a copy of this clause at this time, but hoped to be able to obtain a copy in time to email to the Chairman before the next meeting.

The Chairman sought volunteers to review the various clauses of the standard objected to by Nigel McQuin during the last ballot. Nigel McQuin was not present for the meeting, neither was Max Cambre who provided a very thorough review of Nigel's objections prior to the meeting in Raleigh. Joe Cultrera and Jerry Murphy agreed to review the clauses on resistance measurements, Jerry Murphy and Patrick Epping will review clauses on dielectric tests.

The Chairman raised the question as to whether reference should be made to C57.123, Guide for Transformer Loss Measurement, when loss measurements are considered for the next revision of the standard. Since members of the working group have limited knowledge of the content of C57.123, the Chairman will attempt to obtain an electronic copy of this standard for circulation to all working group members, in time for review before the next meeting.

Patrick Epping informed the working group that Don Kline has written a paper on the subject of loss measurements, which may also be helpful.

- 4 There being no new business, the meeting was adjourned at 2:20 pm.

7.4.3 New Business

- 1 The chair gave a report on the activities of the Administrative Subcommittee meeting.
- 2 Sites for upcoming meetings were announced.
- 3 The chairman announced that the ownership of four (4) ANSI documents had been transferred from NEMA and were now the responsibility of the Dry Type Subcommittee. Four volunteers had agreed to assist the chairman by submitting the documents for ANSI/IEEE Status. There were questions regarding the need to have a PAR to get IEEE status for the documents; the SC chair stated he would discuss this issue with Tom Prevost. There was another question regarding whether the IEEE editors would update these documents to the new single column format. There was also a discussion over the OCR accuracy problems in the translation of these documents since they were probably not in electronic format.
- 4 The subcommittee was once again reminded that the working group members are required to participate and not just attend the meetings. A suggestion was again made for working group chairs to consider removing inactive members from the group.

There being no further business, the subcommittee meeting adjourned at 2:30 PM.

Submitted by C. W. Johnson, Jr.

7.5 Distribution Transformers Subcommittee – Ed Smith, Chair

J. Edward Smith - Chairman
(edsmith@h-jenterprises.com)

Meeting Time:

Attendance: 32 Total

15 Members

17 Guests

2 Guest Requesting Memberships

7.5.1 Chair's Remarks & Announcements:

Review of Administrative Committee meeting highlights

- Future Meetings
- New Members
- Transformer Standards Activity

7.5.2 Working Group Reports

7.5.2.1 C57.12.20 Overhead Distribution Transformers

(Alan Wilks & Tommy Cooper Co Chairs
(awilks@ermco-eci.com & Tommy.cooper@faypwc.com)

PAR Status: Current

PAR Expiration Date: End of 2005

Current Standard Date: 1997

Current Draft Being Worked On: 9 Dated: October, 2003

Meeting Time: 09:30am, Monday, October 06, 2003

Attendance: 29 Total

18 Members

11 Guests

02 Requests for membership

Issues, Remarks & Announcements:

- Introductions were made and the minutes of the last meeting in Raleigh were approved. Glen Andersen's resignation was noted. He will be greatly missed. The metrification issue was briefly discussed with the outcome being dual dimensioning with metric as standard and US customary in parenthesis. Draft 9 was reviewed with most of the changes related to moving the US customary units from the footnotes to behind the metric values but put in parenthesis. The rewording of cover bonding discussed in Raleigh was also added. Several minor corrections were made to improve the dual dimensioning. A line for 125 KV BIL was inadvertently left off Table 6, which will be reinstated. The current draft 9 with the corrections agreed upon in this meeting will be submitted for a T.C. Ballot. A suggestion was made to get the dielectric test paragraph related to single bushings with a high voltage terminal permanently grounded included in 12.00 and 12.90. This would eliminate the need to take exception to 12.00 & 12.90 related to no applied voltage test but higher than normal induced voltage test. The chair will write a letter to the chairman of the dielectric test sub-committee.
- There was no old business other than Draft 9. Angle and Tilt will be discussed in the S.C. meeting.
- For new business, Tim Olsen indicated there were no balloons for some item such as liquid level working, lifting lugs and pressure relief valve in Figures 7 through 14. We will address this in future meetings so as not to delay this draft.
- The meeting adjourned at 10:45AM

7.5.2.2 C57.12.23 Single Phase Submersible Distribution Transformers

Al Traut & Bikash Basu Co Chairs
(alant@kuhlman.com & basub@sce.com)

PAR Status: Approved 3/18/1999 (For Standard Revision)

PAR Expiration Date: N/A

Current Standard Date: 1992, Reaffirmed 1999
Current Draft Being Worked On: #IV
Meeting Time: ***DID NOT MEET***

7.5.2.3 C57.12.25 Single-Phase Padmounted Distribution Transformers

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: End of 2002
Current Standard Date: 1990
Current Draft Being Balloted: #VIII
Current Draft Being Worked on: #3, Dated: March 2003
Meeting Time: ***DID NOT MEET***

NOTE: C57.12.28, C57.12.29, C57.12.31 & C57.12.32 Standards previously under the NEMA Secretariat are reviewed and revised NOW under the IEEE Transformer Committee)

7.5.2.4 C57.12.28 Pad-Mounted Equipment Enclosure Integrity

Bob Olen & Dan Mulkey Co Chairs
(bolen@cooperpower.com & dhm3@pge.com)
PAR Status: Approved
PAR expiration Date: May 09, 2007
Current Standard Date: ANSI/NEMA 1999
Current Draft Being Worked on: D1.6a Dated: 09-09-03
Meeting Time: October 7, 2003 Time: 8:00 AM
Attendance: 40 Total
18 Members
19 Guests
3 Guest Requesting Memberships

Issues, Remarks & Announcements:

- Section 4.1.8 - Mike Cuhlane to work up wording using shackle size for conformance test
- Section 4.1.9 – No test method has been found for “fire resistant”
- Fig. 15 – Mike Culhane to provide drawing of assembled tool to replace the picture
- Mulkey and Culhane to meet on the number of digits in metric conversion spreadsheet
- Mulkey to move US customary units back into text per recent agreement on dual dimensioning
- Goal is to go to ballot following the San Diego meeting

7.5.2.5 C57.12.29 Pad-Mounted Equipment Enclosure Integrity for Coastal Environments

Bob Olen & Dan Mulkey Co Chairs
(bolen@cooperpower.com & dhm3@pge.com)
PAR Status: Approved by NES Com May 23, 2002
PAR expiration Date: May 09, 2007
Current Standard Date: ANSI/NEMA 1999
Current Draft Being Worked on: #1.1 Dated: September 16, 2003
Meeting Time: October 07, 2003 Time: 8:00 AM
Attendance: 40 Total
18 Members
19 Guests
3 Guest Requesting Membership

Issues, Remarks & Announcements:

- changes in 028 standard will be brought into 029 where applicable
- dual dimensioning to be done per recent agreement
- section 5.2.3 – Mulkey to work up wording for metal vs non-metal testing
- section 5.3.1 – accepted change of “1” between “exterior/interior”

7.5.2.6 C57.12.31 Pole Mounted Equipment Enclosure Integrity

Bob Olen & Dan Mulkey Co Chairs
(bolen@cooperpower.com & dhm3@pge.com)
PAR Status: Approved by NESCOM December 06, 2001
PAR expiration Date: December 2006
Current Standard Date: ANSI/NEMA 1996
Current Draft Being Worked on: Dated :
Meeting Times: ***DID NOT MEET***

7.5.2.7 C57.12.32 Submersible Equipment Enclosure Integrity

Bob Olen & Dan Mulkey Co Chairs
(bolen@cooperpower.com & dhm3@pge.com)
PAR Status: Approved by NESCOM December 2001
PAR expiration Date: December 2006
Current Standard Date: ANSI/NEMA 1994
Current Draft Being Worked on: Dated :
Meeting Times: ***DID NOT MEET***

7.5.2.8 C57.12.33 Guide For Distribution Transformer Loss Evaluation

Don Duckett & Tom Pekarek Co Chairs

(don.duckett@fpc.com & tipekarek@firstenergycorp.com)

PAR Status: PAR extension renewed for two years

PAR expiration Date: December 2004

Current Standard Date: October 2001

Current Draft Being Worked On: #9 Dated April 2003

Meeting Date: ***DID NOT MEET***

7.5.2.9 C57.12.34 Three-Phase Padmounted Distribution Transformers

Ron Stahara & Steve Shull Co Chairs

(rjstahara@msn.com & sshull@empiredistrict.com)

PAR Status: Approved 9/21/1995 (For Standard Development)

PAR expiration Date: December 2004

Current Standard Date: New Standard

This NEW Standard is a combination of the following two Standards

C57.12.22 1989 (Three-Phase Padmounted Distribution Transformers with H.V. Bushings)
(Copyright ANSI)

C57.12.26 1992 (Three-Phase Padmounted Distribution Transformers with Separable Connectors)
(Copyright ANSI)

Current Draft Being Worked On: 10 Dated :

Meeting Date: ***DID NOT MEET***

7.5.2.10 C57.12.35 Bar Coding For Distribution Transformers

Lee Matthews & Giuseppe Termine Co Chairs

(lmattews@howard-ind.com & Giueseppe.termine@peco-energy.com)

PAR Status: Active for Reaffirmation

PAR expiration Date: The PAR expires December 2002(*see below)

Current Standard Date: 1996

Current Draft Being Worked On: NONE

Meeting Time: ***DID NOT MEET***

7.5.2.11 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: October 2005

Current Standard Date: NEW Standard Under Development

Current Draft Being Worked On: #1 Dated September 04, 2003

Meeting Date: October 07, 2003 Time: 11:00AM

Attendance: 38 Total

17 Members

17 Guests

04 Guest Requesting Membership

Issues, Remarks & Announcements:

- Minutes from the Raleigh meeting were reviewed and approved as written
- Major changes have been made to this draft since the last meeting. The entire focus of our meeting was to address comments received on the latest draft. Some of the issues addressed are as follows:
 - KVA ratings will be added and ranges expanded in the appropriate tables.
 - After a good debate, it was decided to keep tables as written addressing voltage ration limits. Clarifications will be made to identify phase voltages and to include single-phase voltage applications.
 - The impedance voltage table will be changed to eliminate KVA and BIL mis-interpretations. Also the 480V threshold will be changed to 600V.
 - Due to safety concerns, it was decided to require a “manual” pressure relief on all KVA sizes, not just ratings 2500 KVA and below.
 - Under Oil Fusing Section will be eliminated as it is not addressed in other Distribution Transformer Standards
 - Equipment Grounding Section will be reviewed by Stan Kostyal to try and clarify requirements.
 - The section on “storage” will be replaced with a reference to C57.93. (Installation Guide)
 - It was agreed that bushing terminal requirements and termination supports should be expanded with greater detail. For now this will remain in the appendix.
 - A number of other editorial changes were discussed.
- With no further business, the meeting adjourned at 12:15PM.

7.5.2.12 C57.15-200XStep-Voltage Regulators

(Craig Colopy & Gael Kennedy Co Chairs
(ccolopy@cooperpower.com & grkennedy@nppd.com)

PAR Status: Active

PAR Expiration Date: April 2004

Current Standard Date: C57.15 – 1999 – Published April 2000

Current Draft Being Worked On: Draft 2.1 Dated: March 2003

Meeting Date: Tuesday, October 07, 2003 Time: 15:15

Attendance: 31 Total

Members: 15

Guests: 16

Guest Requesting Membership: 3

Issues, Remarks & Announcements:

- Introduction by all present
 - Minutes of the last meeting approved (moved by Lee Matthews; 2nd by Dave)
 - Began the process of reviewing the comments on the draft 2.0 document

- Jim Chairman T – 14 is here to look at the options of being a dual IEC/IEEE standard
- Ed Smith gave a presentation on the dual dimensioning proposals and their effect on all the Distribution Standards. These will be in Dual Dimensioning. Metric first (US Customary in Parenthesis). A discussion followed.
- Take the issue of all Distribution Standards with dual dimensioning to Committee for clarification. The task was assigned to Ed Smith.
- The group reviewed most of the comments received through 5.7.3 with much insight. (see attached listing)
- Other items included:

_Add definition of Voltage supply Ratio

_3.21 duplicate definition on ONAN

_3.21 last sentence duplicate with 3.17

_3.28 Discussion on the effects of the tap position on the losses, change may be too much detail for a definition

_3.45C57.95-1984 has been withdrawn but it was the only standard that was directly written for loading on regulators

_3.45 look at the -5C versus the -20C of many of the other standards. The -5C comes directly from the C57.12..20-1997. Action: Craig will follow up with Al Wilks on the debate -5 or -20C numbers.

_3.48 first sentence “as shown as”

_3.49 “orof” should “or of”

_5.4 keep 886 amps regulator line in table

_Add notation on Ambient Temperature to the No-load Losses 5.7.3 paragraph?

_Need to provide more explanation on why the temperature measurements and the reactor loss (mainly I²R losses) are in conflict. Specifically in relation to 5.7.3.

- For the next meeting the following will be attempted:
 - Finish these comments, produce a Draft 3, and try to ballot.
- Motion to adjourn made by Ron Starhara and 2nd by Ron Kirker at 16:33.

7.5.2.13 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: Submitted for editorial review and balloting

PAR Expiration Date: December 2005

Current Standard Date: Published under IEEE Std. 1388-2000

Current Draft Being Worked On: D11

Meeting Date: October 06, 2003 Time: 08:00AM

Attendance: 22 Total
Members: 11
Guests: 11
Guest Requesting Membership: 0

Issues, Remarks & Announcements:

- After the introduction of those present, we opened with a review of the par status. There has been a problem uploading the document through the web page. It has been attempted 3 times. The PDF document was sent to IEEE by way of an e-mail. The document was too large. Tom Prevost will now be getting involved.
- It was suggested that we add ANSI C57.12.23-2003 to this document. We also discussed how to get more users to take advantage of this standard format. There are approximately 25-30 utilities using this format. Their feedback is that this data reporting system works well. The suggestion was made to send out a copy of this format with their present format.
- We request one (1) time slot for the San Diego meetings in March.
- Meeting adjourned at 09:15AM.

7.5.2.13 C57.144 Guide to Metric Conversion of Transformer Standards

Dudley Galloway & Tim Olson Co Chairs
(gallowaytt@aol.com & tolson@hydro.mb.ca)
PAR Status: Active
PAR Expiration Date: April 2006
Current Standard Date: New Document
Current Draft Being Worked On: D3 Dated: March 2003
Meeting Date: ***DID NOT MEET***

7.5.3 Subcommittee Old Business:

None reported

7.5.4 Subcommittee New Business:

None reported

Minutes submitted by Ed Smith, Chair

7.6 Dielectric Tests SC – Loren Wagenaar, Chair

The Dielectric Test Subcommittee (DTSC) met on Wednesday, October 8, 2003, at 1:30 p.m., in Pittsburgh, PA with 67 members and 45 guests present. 9 of the guests requested membership on the Subcommittee. See the last page of these minutes for attendance list.

7.6.1 Chairman's Remarks

After introduction of the attendees, the Chair reviewed some of the highlights of the Administrative Subcommittee meeting held on October 5, 2003.

- 1) Minutes due to Don Fallon and Sue McNelly on November 21.
- 2) Next meeting dates and locations are as follows: March 2004 in San Diego, CA. Potential hosts for future meetings should contact Greg Anderson (gwanderson@ieee.org).
- 3) Minutes of the Raleigh meeting are available on the IEEE Committee Web Site.
- 4) A recurring problem needs to be addressed within the Committee regarding Reaffirmation Ballots: people are voting Negative regarding the content rather than reaffirmation. Everyone needs to understand the intent of a Reaffirmation Ballot better – and this will be addressed in the Instructions to Balloting Pool.
- 5) A question was raised on the value and format of the Main Committee meeting on Thursdays. Should these be restructured in some way to make better use of the time? The “valuable parts” are the administrative announcements and awards. The SC reports are not so valuable anymore, especially since these are all easily accessible on the transformerscommittee website.

A motion was made and voted on to cancel the Thursday meeting altogether, and conduct the “valuable parts” during a Wednesday luncheon. In effect this would reduce the conference from 3.5 days to 3.0 days. By hand count of those in attendance, 80 were in favor and 9 opposed. This is a non-binding motion, serving only to give the Administrative SC an idea of the members feelings, which will be considered along with other suggestions.

- 6) In the future the Diel Test SC minutes will not be sent by email due to file problems sending (large) attachments to large numbers of recipients. Many email systems are rejecting them due to virus or spam concerns. It will be considered just to send a brief text email with no attachment, giving a link to the website, and instructions on how to access the minutes and other information once it is all posted. The SC minutes will not require a username and password, but WG/TF documents are on a more secure part of the site and do require use of the username and password.

Sue McNelly will add a link to the website for each WG and TF to keep files. This part of the site will be secure and will require the username and password. Chairmen are encouraged to utilize this more, and send the files to Sue.

There is only one username and password for ALL secure parts of the website. The question was asked, “How secure is this then, if everyone has access?” Much discussion ensued, and it was decided to continue this as is. If a WG or TF truly has some sensitive information to work on, it can still be sent via email to the select individuals who are necessary.

Bipin will provide info to Sue and Greg on a new IEEE service related to this.

- 7) The Administrative SC is working on the idea to create and maintain ONE central roster with people's contact information, rather than all the various TFs, WGs, and SCs having separate rosters. This will greatly simplify much of the attendance and membership issues. It will be each individual person's responsibility to contact the Chairman if email address changes ... not vice versa.
- 8) The minutes of the Spring 2003 meeting in Raleigh, NC were approved as written

Note: Individuals who wish to receive invitations to ballot on IEEE Standards have the responsibility to make sure their correct e-mail address is on file with IEEE. Status can be checked on the following website, or adjacent related websites: <http://standards.ieee.org/db/balloting/ballotform.html>

7.6.2 Working Group Reports

7.6.2.1 Working Group on Partial Discharge Tests in Transformers - J.W. Harley, Chair

Attendance: 32 members and 25 guests attended the meeting. Attendees introduced themselves.

Ron Daubert, Mark Perkins, Hem Shertukde and Barry Ward led WG attendees in reviewing the many changes made at the last meeting to the PC57.127/D2.0 Draft Guide for the Detection and Location of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers and Reactors.

7.6.2.2 Working Group on Revision of Low Frequency Dielectric Tests - Mark Perkins, Chair

The status of C57.12.90 will be balloted again in November 2003 due to changes in the IEEE metrification policy.

The new survey on eliminating temperature correction of power factor to the WG and Diel Test SC is in progress. Of the 18 returns, 17 were affirmative, 9 with comments. One negative was in regard to wording rather than intent. The WG recommended revisions to the proposed text. Next meeting will try to resolve this issue and complete a recommendation to be incorporated in the next revision of C57.12.90.

The next item was on formation of a new Task Force to revise C57.113 Partial Discharge Guide. Dr. Eberhard Lemke will chair this TF which will meet for first time in San Diego. Five people volunteered to be members, and others are encouraged to join as well.

New Business, Subhash Tuli suggested to add a sentence to C57.12.90 stating that for windings with a rated voltage less than 115 kV, no PD measurements are required and guaranteed levels do not apply. This will be discussed at the next meeting.

7.6.2.3 Working Group on Revision of Impulse Tests – Pierre Riffon, Chair; Peter Heinzig, Vice-Chair

The WG met on October 7, 2003, from 3:15 pm to 4:30 pm. 19 members and 19 guests attended the meeting. The minutes of the Raleigh meeting were approved as written. The agenda has been approved as written.

The main subject on the agenda was to review a new proposal regarding the minimum impulse generator energy level to be met during lightning impulse tests for cases where the 50% tail time is shorter than the minimum allowable value of 40 μ s. Decisions taken during the previous Raleigh meeting as well as the inputs received since were considered in the new proposal.

This main changes made are:

- Categories IV has been split in three different categories IVa, IVb and IVc because the former Category IVb was covering a too wide power range. This allows to reduce the recommended energy level for the mid-band of that particular power range.
- The recommended energy level for Category IVc (> 160 MVA, single-phase or > 480 MVA three-phase) has been reduced from 100 kJ to 62,5 kJ in order to cope with most of the test laboratory capabilities.
- Recommended, not mandatory, minimum energy levels are now given for all Class II transformers and for Class I transformers belonging to Categories III and IV.
- A minimum recommended, not mandatory, capacitance of 1,0 μ F is now given for Class I transformers belonging to Categories I and II.
- Use of resistors on non-impulse terminals is now allowed as alternative methods when the tail time can not still be achieved with the recommended energy level or capacitance value. The resistor value shall be minimal for obtaining the minimum required tail time of 40 μ s.

After review, apart some editorial corrections and clarifications, the following technical changes were agreed upon:

- Category II will be extended to 3333 kVA single-phase and 10000 kVA three-phase.
- The resistor value for cable connected transformers will be limited to 30 Ω .
- The recommended efficiency value of the impulse generator to be used in the formula given for the estimation of the tail time will be changed from $\eta = 0,8$ to 1,0.
- Deficiency to meet the minimum recommended energy or capacitance values shall be notified by the manufacturer at the bidding stage. The strategy for achieving the tail time shall also be described by the manufacturer at the bidding stage.
- A shorter waveshape may be accepted by mutual agreement at the bidding stage.

This new proposal, taking into account the decisions taken during the meeting, will be surveyed within the Dielectric Tests SubCommittee prior to the next meeting.

7.6.2.4 Working Group for Revision of the Impulse Test Guide C57.98 – Art Molden, Chair; Joe Melanson, Secretary

This meeting took place on Monday, October 6th at 3:15 PM, there were 18 members and 17 guests present, one of the guests requested membership. Introductions of Members and Guests. The minutes of our spring, 2003 meeting were approved. Items discussed at this meeting were:

1. Pierre Riffon provided a document proposing a test sequence to be used when impulse testing transformers that include non-linear protection devices. Pierre proposed a sequence of shots that included reduced full waves (RFW) from 50% to 90%, then two chopped waves, followed by two 100% full waves, then, a repeat of the RFW shots in reverse order back to the 50% level. The intention being to start a sequence of RFW at a voltage level below that at which the non-linear devices start to operate, to duplicate RFW shots before and after the 100% level shots and to apply two 100 % shots. The duplication of the shots at the various levels provides the means for comparison of the records. There was another suggestion proposing the sequence could also be 50% to 90%, then a 100% full wave, two chopped waves, one 100% full wave and then reversing the reduced wave sequence back to 50%. The group felt that the second sequence, which was already in use at some vendor's plants, was equally suitable and Pierre agreed to this modified sequence being included in his proposal.
2. Steve Beckman pointed out that the present test code includes wording to the effect that the 100% full wave be the final impulse test applied to the terminal under test. The question was how to comply with the Standard if a series of reduced waves were applied "after" the final full wave. Art Molden suggested that the present wording in the test code could be modified to include the special case of tests on transformers that include non-linear devices. This could be an item addressed in the WG for revision of impulse tests and Pierre, the WG chair for that group agreed to include this in his agenda.
3. There was also discussion recommending that the non-linear devices should not operate during switching impulse (SI) tests. The reason given was that the currents during switching surge were higher than the device's normal operating levels and the devices could be damaged by higher temperatures caused by the high currents. Also, during SI testing, the distribution of voltage in the transformer is more linear and so the voltage levels occurring on the non-linear devices would be much lower than occurs during LI testing. Some wording along these lines will be included in the guide.
4. Ernst Hanique inquired about whether or not to continue including information relative to analogue scopes in the guide. The group felt that there was still some necessity to include the information in the standard, given that some manufacturers still use them for impulse tests.
5. Transfer function information provided by Earnst Hanique was discussed, with a request being made for Earnst to provide more examples of transfer functions for the guide. Pierre Riffon asked for clarification of the reasoning behind using the transfer function waves in the guide. His concern was that it was not to be used as an acceptance criterion during impulse tests. The discussion concluded with recognition that it's main purpose would be for diagnostic purposes.
6. Art Molden indicated that we need to make more progress in revision of the guide and that Joe Melanson would try to get more volunteers to begin the actual changes to the guide. The plan is to have a draft version of the guide ready for the fall 2004 meeting in Edinburgh, Scotland. Volunteers were solicited and Subhash Tuli, Tom Harbaugh, Ron Daubert and Thang Hochanh agreed to participate in the process.

7. A discussion was held concerning the location and connection of the voltage divider during impulse tests. The guide recommends that the voltage divider be close to the test object. Some concerns were raised concerning clearances between leads of the generator, chopping gap and voltage divider. A suggestion was made to consider the wording used in the IEC document concerning this topic and to include similar wording in the revised guide.
8. The question of a Glaninger circuit application for short tail impulse applications was raised. Reto Fausch has agreed to provide the group with more information about Glaninger circuit and its effects on wave tail times for the next meeting.
9. Subhash Tuli asked if the guide would consider recommending voltage and time duration tolerances applicable during SI tests on transformers. Subhash pointed out that it can sometimes be difficult to meet the requirement for time duration above 90% and still comply with the requirement for the SI risetime. He also requested that we consider adding information regarding the use of loading resistors on the non impulsed terminals during SI tests. Art Molden pointed out that the WG for revision of impulse tests already has items relating to SI testing on their agenda, we will be working with them on these issues and we will include appropriate wording in our guide. Art also pointed out that the IEC standard already addresses the use of loading resistors during SI tests and we would be reviewing that information for use in our guide.
10. Steve Beckman indicated that the guide should include a statement recommending that the customer be included in the decision as to which of the proposed alternative methods is used for an impulse test when a low impedance winding causes a short tail time. The concern was that some manufacturers do not discuss whether to use any of the four methods for short tail compensation with the customer. Appropriate wording will be included in the revised guide.

7.6.2.5 Task Force on Liquid-Filled Transformers Dielectric Test Table – Phil Hopkinson, Chair; Scott Choinski, Secretary

- a) Mission and Scope – Develop a more easily read group of Dielectric Test Tables with fewer footnotes
- b) Review from Raleigh meeting
 - Used transformer should be referred to as service aged
 - In warranty should be tested at 100%
 - Out of warranty should be tested at 85%
- c) Tables needed and proposed
 - Wye-Connected Test Levels
 - Delta-Connected Tst Levels
 - Chopped Wave and Switching Surge vs BIL
 - Relationship Between Short And Long Time
 - Arrester Protection Levels – Wye
 - Arrester Protection Levels – Delta
 - Commentary on Considerations for Delta and Wye
- d) Marked up C57 10.00

7.6.3 Liaison Reports

7.6.3.1 Surge Protection Devices – Bob Degeneff

Nothing to report.

7.6.3.2 High Voltage Test Techniques (HVTT), IEEE Standard 4 - Arthur Molden

The last meeting was held at the Golden Arrow Hotel in Lake Placid NY on February 10 & 11, 2003, with ten members present. Discussion of proposed revisions to Standard 4 occupied most of the meeting. While it is still the intent of the HVTT committee to perform the “Round Robin” ac and impulse voltage calibration checks, as previously reported, scheduling of the calibration of the Working Group’s measurement standards has been problematic. Those members having expressed an interest in this work will be contacted when the equipment is ready.

7.6.3.3 PCS TF on Frequency Response Testing – Rowland James

Secretary’s Note: This TF operates under Performance Characteristics Subcommittee (PCS) sponsorship, but there is relevance, interest, and participation by Dielectric Tests SC members also. Please refer to Clause 7.11.5.7 of these Minutes for the full text of this TF report.

7.6.3.4 Web Page Development – Eric Davis

- Secure Site Access
 - o The Password is changed twice a year and is provided at the Main meeting.
 - o Username: xfmrcom; Password: Trcom4acc (case sensitive). Effective date is 10/10/03
 - o Sue will address the issue in her email of people who forget the password
- Archives
 - o Minutes for last 3 meetings are available on the website in MS Word and pdf
 - o Minutes for other meetings back to 1998 are accessible on a separate page, and only in pdf format
- Tutorials
 - o Presentation being recorded using “Cantasia”
 - o It captures the audio in real time with the slides
 - o The files are extremely large, and will be available on the website for about 1 month
 - o Greg will investigate burning CD’s
- Subcommittee Pages
 - o Sue has created forms for WG & TF chairmen to fill out to provide basic information and updates about their group’s activities. Send these forms to Sue.
 - o The scope might contain information about the PAR scope, actions, schedule, etc.
 - o Drafts, etc for the secure website should also be sent to Sue

7.6.4 Old Business

7.6.4.1 Phase to Ground Clearances – Loren Wagenaar

Loren sent an email on July 16 summarizing the issues, and showing the NESC which is safety not insulation coordination clearances.

Loren sent a ballot with 4 questions. There was very low (less than 10%) response. A handful of people in the audience don't remember receiving it, so Loren will resend.

Some felt that the NESC Tables should not be repeated, but at least some phase-ground clearances should be included in C57.12.00 ... maybe should use the present IEC ph-grd clearances. Loren will circulate a proposal, for discussion at San Diego meeting.

Loren found his folder with much information on phase-phase clearances, will summarize and send this out in next few months.

Phase-ground distance could have major impact on bushing manufacturers, who have their own set of clearances. Consideration should be given to the idea that this should not set straight-line bushing top to flange dimensions as this is affected by grading of the bushings and creepage of the porcelain. Loren will discuss these issues with Prit Singh.

7.6.5 New Business

7.6.5.1 C57.138, Recommended Practice for Routine Impulse Tests on Distribution Transformers – John Rosetti

Will send reaffirmation ballot. It is in process at IEEE.

Submitted by Stephen Antosz, Secretary

7.7 HVDC Converter Transformers & Smoothing Reactors SC – R. F. Dudley, Chair

The S.C. met in the Grand Station III Meeting Room of the Sheraton Station Square Hotel in Pittsburgh, PA on Oct. 6, 2003 from 1:45 p.m. to 3:00 p.m. There were 11 members and 12 guests present. One guest requested membership. Note that 2 new members were added since the Raleigh meeting; Les Recksiedler of Manitoba Hydro and Sten Andersson of ABB. The following are the highlights.

1. Introductions were made and the minutes of the Raleigh meeting were approved. The S.C. was briefed re the Administrative S.C. meeting.

2. Richard Dudley delivered the sad news that S.C. member Einar Purra had passed away during the summer. His valuable contributions and cheerful good natured approach will be deeply missed by the S.C.
3. The issue of transformers used in conjunction with voltage source converter based HVDC schemes was discussed. As agreed in previous meetings an ANNEX will be included in the next revision of IEEE C57.129 covering such transformers. Pierre Riffon has prepared a draft and comments have been received from Peter Heinzig and Lars-Erik Juhlin. Different schemes are currently utilized and others will be developed. The type of scheme impacts the operational characteristics of the transformer. The ANNEX will make note of these issues but will not provide details. Papers will be referenced. Pierre Riffon will prepare a revised draft reflecting the preceding discussions/inputs.
4. Christoph Plotner made a presentation on the core losses of a transformer used in conjunction with a voltage source converter based HVDC scheme; transformer directly connected to the VSC. Note other schemes are used. Christoph's presentation will be sent to S.C. members with the minutes. Christoph will prepare an IEEE paper based on his presentation and it will be referenced in the ANNEX on transformers used in conjunction with VSCs. It was also noted that operational losses of transformers associated with VSC schemes can be higher than tested losses. This comment will be added to the ANNEX on transformers used with VSC's; including papers in a bibliography.
5. Lars-Erik Juhlin made a presentation on converter transformer failures. A copy of his presentation will be sent to S.C. members with the minutes. One major caution raised by Lars-Erik is that it is very important to fully understand the cause of converter transformer failures before any action is taken re test code. Pierre Riffon also noted that converter transformer failures often result in very large revenue losses; in many cases larger than the cost of the converter transformer.
6. Lars-Erik Juhlin also provided copies of previously published papers on the subject of converter transformer failures; CIGRE (ELECTRA).

“In-Service Performance of HVDC Converter Transformers and Oil-Cooled Smoothing Reactors”, Electra No. 155, August 1994.

“The Relationship Between Test and Service Stresses As a Function of Resistivity Ratio For HVDC Converter Transformers and Smoothing Reactors”, Electra No. 157, December 1994.
7. There is a current effort within CIGRE re converter transformer failures; JTF B4.04/A2-1 which is chaired by Jack Christoferson of the USA. Pierre Riffon obtained permission to distribute the draft version of their report “Analysis of HVDC Thyristor Converter Transformer Performance” and associated written documents to minutes of our S.C. This was done prior to the S.C. meeting. Discussion took place on this CIGRE project. The latest version of the report is Draft 10a. The project is not final. One of the associated documents was prepared by Yanny Fu of KEMA

(Netherlands) and dealt with possible test methodology modification etc. to address possible failure causes. These comments may not be part of the final CIGRE report. Pierre Riffon and Peter Heinzig have commented on Yanny Fu's test proposals. The consensus of the HVDC Converter Transformers and Smoothing Reactor S.C. is that any modification to the test code in IEEE C57.129 will have to be well thought out and fully justified. Testing is expensive. The CIGRE report and associated documents are only an additional information source for consideration by the S.C.

8. Les Recksiedler of Manitoba Hydro made a brief presentation re their experiences with converter transformers. He also included input from the recent HVDC Users Group Conference held in Winnipeg. Some ideas he tabled are:
 - Factors important to converter transformer performance are testing (will not address all failures), design review (should reference CIGRE report "Guidelines For Conducting Design Reviews for Transformers 100 MVA and 125 kV and Above") and quality. Perhaps the preceding can be covered in a brief information annex in C57.129.
 - Converter transformers have passed all required tests and still experience in-service problems. Why?
 - A separate oil conservator should be required for the tap changer to avoid possible erroneous interpretation of dissolved gas analysis for the main tank oil.
 - In specifying the tap changer, derating of the tap changer should be considered due to the high duty level.
 - Does the dc bushing standard adequately address bushings for converter transformers? Input from Fred Elliot will be sought.
9. The Chairman stated that he would attempt to prepare a draft revision of IEEE C57.129 that includes all submissions and discussion consensus prior to the San Diego meeting.

The meeting adjourned at 3:00 p.m.

Submitted by Richard F. Dudley, Chair

7.8 Instrument Transformers SC – Jim Smith, Chair

9 members and 13 guests attended

7.8.1 Chair's Remarks & Announcements:

The dates and locations for future meetings were announced.

The previous meeting minutes were approved as written

7.8.2 Old Business:

Thermal Evaluation

Jim Smith presented a proposal for discussion (see appendix). V Khalin questioned the need and practicality of the proposal as it applies to High-voltage Instrument Transformers. P. Riffon said he would prefer to include continuous PF measurement than PD. He also advised that the 10 °C/hr rate is difficult to achieve and that most Climactic Chambers only go up to 70 °C. He also agreed to investigate IREQ and other labs' capabilities. The other attendees were invited to send him suggestions. J. Ma pointed out that the CVT endurance test does not translate to magnetic IT's.

7.8.3 New Business

P. Riffon presented a comparison of partial discharge requirements as well as information on terminal temperature rise (see appendix)

7.8.4 Working Group Reports:

7.8.4.1 WG C57.13.5 - Working Group on Test Requirements for High Voltage Instrument Transformers 115 kV Nominal System Voltage and above

The WG met on October 7, 2003. Six members and eleven guests attended the meeting.

The meeting was co-chaired by Mr. P. Riffon and Mr. R. McTaggart.

Minutes of the Raleigh meeting were approved as written.

Mr. Joe Ma announced that the Trial-Use Standard 057.13.5 has been approved by IEEE and will be published imminently. A PAR will be requested for modifications to IEEE 57.13.5 as soon as it will be issued in order to be ready in two years time from now.

The impulse test section of the new normative Annex (Annex H) related unbalance current transformers for use as unbalance current protection of capacitor banks have been discussed. This Annex is intended to be added to 057.13.5 when this Trial-Use standard will be due for revision as a full-use standard (in approximately two years from now).

The main topics discussed were:

A review of actual test data and impulse generator parameters for impulse tests across primary terminals of three different unbalance current transformer designs have been presented;

Based on that review, the concept of having a minimum impulse generator energy of 25 kJ for impulse tests across primary terminals has been changed for the concept of a minimum capacitance value. A value of 3,0 pF has been suggested;

Ross McTaggart has presented the results obtained with alternative testing methods such as the use of an inductance in parallel with the front resistor of the impulse generator, impulse tests with the secondary winding in open circuit and impulse tests with a resistive burden applied on the secondary terminal winding.

After discussion, it has been agreed upon that:

The concept of a minimum capacitance value is much more adequate than the minimum energy level concept. The proposed value of 3,0 pF seems to be an acceptable value;

Impulse tests across the primary winding with nominal burden applied to secondary terminals seems to be a valuable alternative method and needs be analyzed further.

A revised proposal will be presented at the next meeting considering the use of the alternative method using the rated burden on secondary terminals. Examples of test circuit configurations and oscillograms will be added if necessary.

The second subject on the agenda was related to the allowable temperature rise of terminals of instrument transformers during temperature rise test. Actual standards (057.13 and 057713.5) do not give any temperature limits to be observed on terminals during temperature rise test. A proposal giving the same values as used for switchgear in IEG 60694 and IEG 60943 has been presented. This proposal limits the temperature rise of terminals to 50CC for bare aluminum or copper terminals, 65~G for tin-coated terminals and 7500 for silver or nickel-coated terminals. The WG did not come to any conclusion yet and this subject needs to be discussed further during the Instrument Transformers SubCommittee meeting and upcoming WG meetings.

7.8.4.2 WG C57.13.6 – Working Group on Instrument Transformers for use with Electronic Meters and Relays – Chris TenHaagen

Chair's remarks & Announcements:

The subcommittee met on October 7,2003 in Pittsburgh, PA with seven members and eight guests present.

Old business

- Par was granted on February 13, 2003, expiring December 31, 2007
- Draft reviewed by Editorial Staff
- With final acceptance of paragraph 6.1.1 re accuracy testing, a survey of the group indicated that there was unanimous agreement that the standard was ready for ballot. The Chair will accomplish this at the earliest possible date

New business

- Agreed changes were made to the draft.
- Draft went for one more review by IEEE editorial staff.
- Draft was uploaded, and request for ballot pool formation initiated. (>71 responded so far).
- Present status: Pool closes October 12, 2003
- Sponsor will review pool for balance.
- Ballot will commence, and chair will respond to any comments or negatives.
- By next meeting, summary of ballots will be presented.

7.8.4.3 Working Group on C57.13 Revision – Tom Nelson

The working group met on October 7, 2003. There were 18 members and guests present.

An application for a PAR to “officially” start working on the draft that we have completed will be submitted to IEEE this month for the December approval meeting. With the PAR approved the draft can go forward to IEEE for balloting after the following items: Attached are the comments that Jim Smith received on the reaffirmation ballot he just completed. The comments that are editorial in nature the working group is asked to review to see if they agree and the draft standard should incorporate these changes before submittal to IEEE for ballot. A few figures need to be modified per IEEE editorial review comments before the draft can be submitted also. It is anticipated that the draft can be submitted for ballot after the March 2004 meeting.

Also attached is the presentation by Chris Tenhaagen discussing the partial discharge testing that is in the draft standard. It is assumed that there will be negative ballots concerning PD testing, and this is one proposal to have in mind when we are addressing the assumed negative ballots.

7.8.4.4 Study Group IEEE Std C57.13.2 – Vladimir Khalin

Working Group met on Tuesday, October 7 at 3:15 PM with 13 members and guests present.

Chair reported: PAR was developed, submitted to IEEE-SA and approved.

Draft of the Standard was sent to the editorial staff for pre-ballot review. The group discussed several editorial and application issues.

Group suggested: Submit the corrected Standard draft for balloting.

Appendix B

Partial discharge tests; comparison between IEC 60044-1, IEC 270-1981, IEC working document 38/298/NP and IEEE C57.13.5 (Trial-Use Guide)

	IEC 60044-1, 1996	IEC 270-1981	IEC 38/298/NP, 2003	IEEE C57.13.5, 2003
<u>Scope:</u>	Current transformers (≥ 1,0 kV)	All electrical equipment without voltage rating	Common clauses to instruments transformers (≥ 1,0 kV; not approved yet)	Instrument transformers for system voltage ≥115 kV
<u>Method of measuring partial discharge:</u>	Apparent charge	Apparent charge	Apparent charge	Apparent charge

Appendix C

Instrument Transformers

Temperature rise of power terminals

Temperature rise of terminals are not or not clearly defined in IEEE C57.13 nor in IEEE C57.13.5 (Trial-Use guide).

IEEE C57.13 states:

"4.6 Temperature rise

The limits of observable temperature rise in instrument transformers when tested in accordance with their ratings shall be as given in table 4, and the transformers shall be designed so that the hottest-spot winding temperature rise above ambient will not exceed the values given in table 4."

**Table 4—
Limits of temperature rise***

Type of instrument transformer	30°C		55°C	
	Average winding temperature rise determined by resistance method (°C)	Hottest-spot winding temperature rise (°C) [†]	Average winding temperature rise determined by resistance method (°C)	Hottest-spot winding temperature rise (°C)
55°C rise [‡]	55	65	30	40
65°C rise [‡]	65	80	40	55
80°C rise dry-type	80	110	55	85

***Temperature rise of current transformers that are a part of high-voltage power circuit breakers or power transformers shall**

be in accord with IEEE Std C37.04-1979 or IEEE Std C57.12.00-1993, respectively.

[†]Temperature rise of other metallic parts shall not exceed these values.

[‡]Temperature rise at the top of the oil in sealed transformers shall not exceed these values."

"6.9 Terminals

Primary terminals of wound-type and bar-type current transformers shall be suitable for use with either aluminum or copper conductors. Secondary terminals and voltage terminals, where provided, shall be suitable for use with copper conductors."

IEEE C57.13.5 (Trial-use Guide) states:

"4.5 Thermal performance requirements

All instrument transformers shall be capable of operating under the most onerous load conditions without exceeding the limits of temperature rise provided in Table 4 of IEEE Std C57.13-1993."

Based on these wordings, possible interpretations could be:

1- Temperature rise of power terminals shall not exceed the hottest-spot temperature rise limits (see note [†] of table 4 of IEEE C57.13).

2- Temperature rise of power terminals are not defined if they are not in direct contact with insulation material.

Current Transformers

- Temperature rise limits of power terminals should be defined according to the material used (copper, aluminum, silver, tin or nickel plating, etc...).
- When exceeding certain temperature limits, contact oxidation starts which can cause further thermal runaway of terminals and produces major damages to the instrument transformers.

Power Terminals

- IEC 60943 "Guide for specification of permissible temperature and temperature rise for parts of electrical equipment, in particular for terminals" and IEC 60694 specify different temperature rises for different type of terminal materials in different type of medium (oil, air, SF₆). These standards specify:

- For bare aluminum or copper bolted contacts (in air):
 - Maximum temperature rise: 50°C;
 - Maximum working temperature: 90°C

- For silver-coated or nickel-coated bolted contacts (in air):
 - Maximum temperature rise: 75°C;
 - Maximum working temperature: 115°C

- For tin-coated bolted contacts (in air):
 - Maximum temperature rise: 65°C;
 - Maximum working temperature: 105°C

Table 3 – Limits of temperature and temperature rise for various parts, materials and dielectrics of high-voltage switchgear and controlgear

Nature of the part, of the material and of the dielectric (See points 1, 2 and 3) (See note)	Maximum value	
	Temperature	Temperature rise at ambient air temperature not exceeding 40 °C
	°C	K
1 Contacts (see point 4)		
Bare-copper or bare-copper alloy		
– in air	75	35
– in SF ₆ (sulphur hexafluoride) (see point 5)	105	65
– in oil	80	40
Silver-coated or nickel-coated (see point 6)		
– in air	105	65
– in SF ₆ (see point 5)	105	65
– in oil	90	50
Tin-coated (see point 6)		
– in air	90	50
– in SF ₆ (see point 5)	90	50
– in oil	90	50
2 Connection, bolted or the equivalent (see point 4)		
Bare-copper, bare-copper alloy or bare-aluminium alloy		
– in air	90	50
– in SF ₆ (see point 5)	115	75
– in oil	100	60
Silver-coated or nickel-coated see point 6)		
– in air	115	75
– in SF ₆ (see point 5)	115	75
– in oil	100	60
Tin-coated		
– in air	105	65
– in SF ₆ (see point 5)	105	65
– in oil	100	60
3 All other contacts or connections made of bare metals or coated with other materials	(see point 7)	(see point 7)
4 Terminals for the connection to external conductors by screws or bolts (see point 8)		
– bare	90	50
– silver, nickel or tin-coated	105	65
– other coatings	(see point 7)	(see point 7)
5 Oil for oil switching devices (see points 9 and 10)	90	50
6 Metal parts acting as springs	(see point 11)	(see point 11)
7 Materials used as insulation and metal parts in contact with insulation of the following classes (see point 12)		
– Y	90	50
– A	105	65
– E	120	80
– B	130	90
– F	155	115
– Enamel: oil base	100	60
synthetic	120	80
– H	180	140
– C other insulating material	(see point 13)	(see point 13)
8 Any part of metal or of insulating material in contact with oil, except contacts	100	60
9 Accessible parts		
– expected to be touched in normal operation	70	30
– which need not to be touched in normal operation	80	40
NOTE The points referred to in this table are those of 4.4.3.		

4.4.3 Particular points of table 3

The following points are referred to in table 3 and complete it.

Point 1 According to its function, the same part may belong to several categories as listed in table 3.

In this case the permissible maximum values of temperature and temperature rise to be considered are the lowest among the relevant categories.

Point 2 For vacuum switching devices, the values of temperature and temperature-rise limits are not applicable for parts in vacuum. The remaining parts shall not exceed the values of temperature and temperature rise given in table 3.

Point 3 Care shall be taken to ensure that no damage is caused to the surrounding insulating materials.

Point 4 When engaging parts have different coatings or one part is of bare material, the permissible temperatures and temperature rises shall be:

a) for contacts, those of the surface material having the lowest value permitted in item 1 of table 3;

b) for connections, those of the surface material having the highest value permitted in item 2 of table 3.

Point 5 SF₆ means pure SF₆ or a mixture of SF₆ and other oxygen-free gases.

NOTE 1 Due to the absence of oxygen, a harmonization of the limits of temperature for different contact and connection parts in the case of SF₆ switchgear appears appropriate. In accordance with IEC 60943, which gives guidance for the specification of permissible temperatures, the permissible temperature limits for bare copper and bare copper alloy parts can be equalized to the values for silver-coated or nickel-coated parts in the case of SF₆ atmospheres.

In the particular case of tin-coated parts, due to fretting corrosion effects (refer to IEC 60943) an increase of the permissible temperatures is not applicable, even under the oxygen-free conditions of SF₆. Therefore the initial values for tin-coated parts are kept.

NOTE 2 Temperature rises for bare copper and silver-coated contacts in SF₆ are under consideration.

Point 6 The quality of the coated contacts shall be such that a continuous layer of coating material remains in the contact area:

a) after making and breaking test (if any);

b) after short-time withstand current test;

c) after the mechanical endurance test:

according to the relevant specifications for each equipment. Otherwise, the contacts shall be regarded as "bare".

Point 7 When materials other than those given in table 3 are used, their properties shall be considered, notably in order to determine the maximum permissible temperature rises.

Point 8 The values of temperature and temperature rise are valid even if the conductor connected to the terminals is bare.

Point 9 At the upper part of the oil.

Point 10 Special consideration should be given when low flash-point oil is used in regard to vaporization and oxidation.

Point 11 The temperature shall not reach a value where the elasticity of the material is impaired.

Point 12 Classes of insulating materials are those given in IEC 60085.

Point 13 Limited only by the requirement not to cause any damage to surrounding parts.

Power Terminals

If IEEE C57.13 and IEEE C57.13.5 permit temperature rises of 55°C, 65°C and up to 80°C for dry type, it is obvious that the 50°C maximum temperature rise for bare aluminum or copper terminals can be easily exceeded. Thus, some rules should be given for a proper choice of contact material and coating and associated temperature rise limits.

It is suggested to modify the clause 4.6 of C57.13 and to add a similar clause in C57.13.5:

"Temperature rise

The limits of observable temperature rise in instrument transformers when tested in accordance with their ratings shall be as given in table 4 of IEEE C57.13, and the transformers shall be designed so that the hottest-spot winding temperature rise above ambient will not exceed the values given in table 4 of IEEE C57.13.

Terminals shall be designed so that their temperature rise and maximum working temperature when tested with their ratings are not exceeding the following values:

- For bare aluminum or copper bolted contacts:
 - Maximum temperature rise: 50°C;
 - Maximum working temperature: 90°C

- For silver-coated or nickel-coated bolted contacts:
 - Maximum temperature rise: 75°C;
 - Maximum working temperature: 115°C

- For tin-coated bolted contacts:
 - Maximum temperature rise: 65°C;
 - Maximum working temperature: 105°C"

Submitted by Ross McTaggart, Secretary

7.9 Insulating Fluids SC – F. J. Gryzkiewicz, Chair, R.K. Ladroga, Vice-Chair

7.9.1 Introduction/Attendance

The Insulating Fluids Subcommittee met in Pittsburgh, Pennsylvania on Wednesday, October 8, 2003 with 21 members and 12 guests present.

7.9.2 Approval of Meeting Minutes

The minutes of the March meeting in Raleigh, North Carolina meeting were approved as printed.

7.9.3 Subcommittee Membership

Paul Boman, Hartford Steam Boiler, was welcomed as a new Subcommittee member.

7.9.4 Current Subcommittee Business

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

This document was approved by the IEEE Standards Board in June of 2002 and was printed in November of 2002. Since that time, a Working Group was formed to review Section 4.5 of the document. This was done as some members felt that this section contained blatant technical errors and was beyond the scope of the guide.

The Working Group met on October 7 with a combination of 50 members and guests in attendance. Jim Thompson and T.V. Oommen are the Co-Chairs of the Working Group. The Working group reviewed the suggested rewrite of Section 4.5. Several additional comments were made. These comments will be incorporated into another revision, which will be discussed at the next meeting in San Diego.

7.9.4.2 C57.104 – IEEE Guide for the Interpretation of Gases Generated in Oil – Immersed Transformers

This Working Group is Co-chaired by Frank Heinrichs and Frank Gryzkiewicz. This document recently completed a Standards Association Ballot. Several negative ballots were received. The negative ballots were resolved and/or rebutted and incorporated into Draft 11C.

A Standards Association Ballot will be conducted on Draft 11C. This will be the first electronic ballot of this document. The Working Group also agreed to participate with IEEE Headquarters in an experimental procedure. Any negative ballots will be resolved or rebutted via a website based and teleconferencing procedure.

7.9.4.3 C57.130 – Trial Use Guide for the Use of Dissolved Gas Analysis During Factory Temperature Rise Tests for the Evaluation of Oil- Immersed Transformers and Reactors

This Working Group is co-chaired by Frank Heinrichs and Frank Gryzkiewicz. This document has been sent to IEEE for a Standards Association Ballot. Frank Gryzkiewicz reported that IEEE sent out the Invitation to Ballot Letter on September 12, 2003.

7.9.4.4 C57.111 – IEEE Guide for Acceptance of Silicone Insulating Fluid and Its Maintenance in Transformers

Kent Haggerty and Jim Goudie are the Working Group Co-Chairs. This document was sent to IEEE for a Standards Association Reaffirmation Ballot. A successful Ballot was completed in September of 2003 and the document has been sent to the Standards Board for approval.

7.9.4.5 C57.139 – IEEE Guide for Dissolved Gas Analysis in Load Tap Changers

Rick Ladroga is the Working Group Chair for this project. Rick was unable to attend the Pittsburgh meetings due to work commitments; therefore, an official Working Group meeting was not conducted. Frank Gryzkiewicz served as Acting Working Group Chair and gave a status report on this project to those in attendance.

In the past, the Working Group had a difficult time agreeing on dissolved gas analysis(DGA) limits for the different design type load tap changers. The Working Group Chair formulated a table containing ranges of the combustible gases of interest for the various design types of load tap changers.

As a result of the discussions, the Working Group was advised that this Guide also contain information on the use of ratios of the various combustible gasses in determining whether the DGA data is indicative of a tap changer problem.

The Working Group will prepare a new draft, which will be discussed at the next meeting in San Diego.

7.9.4.6 C57.146 – IEEE Guide for the Interpretation of Gases Generated in Silicone Immersed Transformers

This document previously carried the IEEE designation P1258. This has been changed to the IEEE designation C57.146 to be consistent with the other standards in the C57 collection.

Jim Goudie and Bill Bartley are the Working Group Co-Chairs of the document. A Standards Association Ballot is in the process of being conducted.

7.9.4.7 IEEE STD 637 – IEEE Guide for the Reclamation of Insulating Oil and Criteria for Its Use

A successful Reaffirmation Ballot was recently conducted on this document. The IEEE Standards Board approved this document at their meeting in December of 2002. There are tables in this document that need to be revised to be consistent with tables in C57.106, which is now being revised (Section 4.5). This will be done when the C57.106 revision is approved.

7.9.4.8 C57.XXX – IEEE Guide for the Acceptance and Maintenance of Natural Ester Based Fluids

Patrick McShane is the Task Force Chair. The Task Force met on Tuesday, October 7, with 14 members and 37 guests in attendance. After discussions, it was agreed that this document would be written in the same format as C57.121.

Patrick has applied for a PAR. When the PAR is approved, the Task Force will become a Working Group. The Working Group will prepare Draft 1 for discussion at the next meeting in San Diego.

The Subcommittee Chair was given a letter from Cooper Industries Associate General Counsel. The letter was addressed to the IEEE Standards Board PatCom Administrator and concerned patent issues associated with the Natural Ester Based Fluids. A copy of this letter can be found as Attachment 1 to these minutes.

IF SC MINUTES - Attachment 1

Cooper Industries
P.O. Box 4446
Houston, Texas 77210-4446
600 Travis, Suite 5800
Houston, Texas 77002-1001
Phone: (713) 209-8534
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H. St. Julian
Associate General Counsel,
Intellectual Property

October 3, 2003



IEEE-SA Standards Board PatCom Administrator
IEEE Standards Department
445 Hoes Lane
Piscataway, NJ 08854

Re: Patent Policy, Clause 6 of the IEEE-SA Standards Board Bylaws

Pursuant to clause 6 of the IEEE-SA Standards Board Bylaws, Cooper Industries, Inc. wants to notify the IEEE of the following U.S. patents and patent application which may relate to liquid dielectric standards activities taken or contemplated by the Insulating Fluids Subcommittee of the PES Transformer Committee. This letter is not, and should not be construed, as a letter of assurance providing a general disclaimer or an agreement to grant licenses under these patents. Moreover, Cooper makes no representation, at this time, that any of the patents or patent application listed below is considered an essential patent.

Mr. Patrick McShane, Chairman of the Insulating Fluids Subcommittee is a Cooper employee.

- U. S. Patent No. 6,037,537, Vegetable Oil Based Dielectric Coolant;
- U. S. Patent No. 6,184,459, Vegetable Oil Based Dielectric Coolant;
- U. S. Patent No. 6,352,655, Vegetable Oil Based Dielectric Fluid;
- U. S. Patent No. 6,389,986, Food Grade Vegetable Oil Based Dielectric Fluid and Methods of Using Same
- U. S. Patent No. 6,613, 250, Vegetable Oil Based Dielectric Fluid and Methods of Using Same; and
- U. S. Patent Application No. 10/619,893, Vegetable Oil Based Dielectric Fluid and Methods of Using Same.

Sincerely,

A handwritten signature in cursive script, appearing to read "H. St. Julian".

H. Saint St. Julian

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

This Guide is approaching the end of its five-year life and must be reaffirmed or revised. The former Working Group Chair, Patrick McShane reported that this document still contains state of the art information. In view of the foregoing, the Subcommittee voted to send this document to IEEE for a Standards Association Reaffirmation Ballot.

7.9.5 Adjournment

There being no new business, the Subcommittee adjourned at 12:20 p.m.

7.9.6 Next Meeting

The Insulating Fluids Subcommittee and its Working Groups will next meet in San Diego, California, during the period of March 7-11, 2004.

Submitted by Frank Gryzkiewicz, Chair

7.10 Insulation Life SC – D. W. Platts, Chair

The Subcommittee met at 8AM on October 8, 2003 in Pittsburgh PA. Attendance was 25 members, 62 guests, and 9 guests accepted as new members.

The minutes of the previous meeting in Raleigh in March were approved.

7.10.1 Chair's Report

Harry Gianakouros, our previous Vice Chair & Secretary, will no longer be able to participate, and has resigned these duties. Eric Davis will be our new Secretary.

Administrative Subcommittee

Emeritus, Corresponding Members discussion of requirements and expectations for these grades of membership

Reaffirmation – The IEEE process allows for no changes at all to the document.

When conducting a ballot we are likely to get negative comments, but no changes can be made to resolve those issues.

Committee has agreed to wording which explains this. It should be used with future ballots and we hope it will simplify the process.

C57.12.76 Re-affirmation – Balloting was complete 2 years ago and it is still not resolved. We need to commit to get this work completed.

7.10.2 Working Group Reports

7.10.2.1 TF Winding Temperature Indicators P. McClure

The meeting convened at 8:00 AM. Six members and 58 guests were present. Ten guests requested membership and three guests who requested membership at the last meeting, were accepted as members.

It must be reiterated that the objective of the Task Force is to write a technical paper and present a panel session on the subject of winding temperature indicators. An obvious requirement for membership in the group must therefore be a substantial contribution towards the completion of that objective. To require less would diminish the efforts of those who have contributed to the effort.

The minutes of the previous meeting in Raleigh were presented and approved.

Old Business:

Progress on the technical paper was described. A substantial contribution was made by Andreas Garnitschnig in the areas of Virtual WTI's and transformer manufacturer's perspective. Draft five of the paper was not released, however; because it was desired to add new data from a recent heat run that was run with the specific intention of determining the time constant of a heated thermowell.

New Business:

At the previous meeting in Raleigh, transformer manufacturers and owners were asked if there were any transformers in production that could be used as subjects of a specially sequenced heat run designed to determine the time constant of a heated thermowell. The transformer's equipment requirement was imbedded fiber optic temperature sensors and a heated thermowell. Duke Energy had one such transformer and offered to run our test sequence in conjunction with a special sequence that they were running.

The test was run in mid-September and unfortunately equipment failure rendered the data for the heated thermowell unusable. Despite this setback, valuable data was collected from the other devices which were monitoring the transformer, and the level of cooperation and coordination made this an overall positive experience.

Hopefully this will be the first of many such tests. The task force would like to thank all parties involved for their efforts in this prototype test.

The group was asked if any other such transformers existed and if so, whether their owners would be willing to allow a survey to be conducted. Two owner's representatives said that they knew of transformers which were equipped with the necessary equipment and offered to review

the test sequence and ask the transformer manufacturer if it would be willing to run the sequence.

The meeting was adjourned at 9:00 AM.

Respectfully Submitted, Phillip G. McClure, Chairman

7.10.2.2 WG Thermal Evaluation of Power and Distribution Transformers C57.100 R. Wicks

The Working Group met at 9:30 AM on October 6, 2003, with 10 members and 44 guests attending, with 16 guests requesting membership. This brings the number of members for the working group up to 38 members.

After introductions, the Chairman presented the agenda for the meeting, and circulated the attendance rosters, and asked for and received approval of the minutes from the March 17th meeting in Raleigh.

Following this, the Chairman provided background on the status of this document which needs to be either revised or reaffirmed prior to the end of 2004. He also discussed the results of a working group ballot regarding the Title of the document and the Scope which was conducted in order to submit a PAR for this work. The Chairman was disappointed with a 50% response to the ballot. All respondents were in favor of the title as balloted:

Title: IEEE Standard Test Procedure for Thermal Evaluation of Insulation Systems for Liquid-Immersed Distribution and Power Transformers

The vote on the scope was less favorable with ½ of the balloters offering suggested wording. This led to a delay in the PAR submittal to make sure that all in the working group were in consensus. The following is the scope which was balloted:

1.1 Scope - This standard provides test procedures to evaluate the thermal aging characteristics of the insulation system used in liquid-immersed distribution or power transformers. The dielectric liquid is part of the insulation system. The test procedure shall simulate practical service conditions of the insulation system as close as technically reasonable.

The Chairman then turned the floor over to Don Platts, Insulation Life Subcommittee Chair to discuss his comments related to our document. Don spent a considerable amount of time looking at our document in both the 1986 version and the 1999 version and felt there were some issues that needed to be resolved prior to beginning work on the document. This includes:

This document, which appears to require an insulation system test for each type of transformer design varies from the original intent of C57.100 which called out a test for each insulation system. It is this requirement of a test per design which creates a major issue for power transformer manufacturers which makes the requirements in this standard unrealistic.

Also, Don felt that we need to place an insulation thermal life expectancy requirement in C57.12.00, and that this document should specify tests, not specifications and tests.

This led to some spirited discussions related to how this document should be utilized. Don asked if anyone was present who was involved in the completion of the 1999 version of the document to

better understand why the change in emphasis from the 1986 version had happened. No one in the room could recall the rationale for these changes made between versions, though several of the working group members were in attendance.

It was pointed out that the distribution transformer testing per the standard worked well for certain ranges of equipment, but that a large quantity of test units would have to be built to be statistically significant. Additionally, if a full life curve were to be developed, then multiple points (3 or 4) would be required adding to cost and complexity.

Power transformer manufacturers confirmed that such testing for their designs would be impractical, but that they were comfortable with model testing of insulating materials (such as the sealed tube tests described in the Annex). They have done this type of testing over the years to evaluate new materials. It was noted that they need to be in compliance with IEEE standards (as are often requested by customers), and that this standard is impossible to meet as currently written (separate test for each design).

It was voted and agreed that the Task Force on Thermally Upgraded Insulation would have the lead on the inclusion of the performance requirement (to meet or exceed the curve from C57.91) into C57.12.00. This will then leave our working group to update and/or add to the test methods to evaluate insulation systems for liquid-immersed power and distribution standards. This may end up being either two or three methods, which include the distribution model, the sealed tube test and likely one other transformer model.

A brief review on the IEC working group to develop such a new model was discussion by the Chair of that Working Group (Dick Provost), with promises to provide copies of the document to members of the Working Group when allowed to (at the correct stage of the IEC voting process).

With all of this discussed, the Chairman then asked for final discussion on the Title and Scope in order to facilitate a PAR submittal by the October 21st submission deadline.

It was a consensus in the room that the title was OK, but that some tweaking of the scope was needed. The Chairman will try and circulate a proposal to the working group members by the 15th in order to submit the PAR in time.

Work Assignments: The Working Group Chair will send copies of the document to those new members and guests who were not copied after the first meeting in March.

After work begins on the document, the Chair agreed to solicit information from equipment manufacturers who would be willing to share evaluations they have made in the recent past which may apply to this document. A few people in the room noted to the Chair that they had such information.

The meeting concluded at 10:45 AM.

Respectfully submitted, Roger Wicks, Chairman; Robert Whearty, Secretary

7.10.2.3 WG Temperature Rise Test Procedure in Section 11 of C57.12.90 - P. Payne

The first meeting of the Working Group was held October 6, 2003 at 11:00 am in Grand Salon III at Sheraton Station Square in Pittsburgh, Pennsylvania. There were forty-nine (49) attendees; twenty-seven (27) of which requested membership. *Subsequent to the meeting, one additional person requested membership.*

The Chair outlined three work items:

1. Standardized methodology for determining the cooling curve.
2. Whether or not the time for resistance measurement after shutdown should be reduced from 4 minutes to 2 minutes.
3. Proposal for revision of 11.5.2.1.

Item 1: The Chair briefly summarized the Cooling Curve Survey. The level of response being low did not provide sufficient data for analysis. The Chair will review the survey documentation to identify methodologies detailed and provide this information to the Working Group.

Item 2: The attendees agreed that the time for measurement of resistance after shutdown should not be decreased from 4 minutes to 2 minutes based upon various factors that affect the time for winding stabilization including:

1. Transformer size and winding type.
2. Transformer parameters (R, L and C)
3. Manufacturer's measurement equipment.
4. Time required to safely disconnect connections (~ 1.5 to 2 minutes).

It was noted that the settling time for delta connected windings could be 10 to 15 minutes. This time can be lowered if the delta is broken. The delta winding has a long time constant due to high inductance and low resistance. The time constant can be decreased by reducing inductance either by polarization of saturation of the core.

Joe Foldi and Thang Hochanh will prepare an explanatory clause of the factors that affect time to stabilization.

Item 3: The chair will poll the Working Group members on the proposed change to clause 11.5.2.1.

There being no other business, the meeting adjourned at 11:50am.

Respectfully submitted, Paulette A. Payne, WG Chairperson

7.10.2.4 TF Defining Thermal Upgraded Insulation - D. Platts

Several members of the subcommittee and many guests met on Tuesday October 8, 2003, to review efforts to find a definition of thermally upgraded insulation. Attendance was 46.

Minutes of the March meeting in Raleigh were approved.

Harold Moore reported on Westinghouse research test results for hundreds of tests at 120C for the upgraded paper, vs. the 105C for standard kraft paper. The aging of the upgraded paper was not greater than the aging of the old paper.

Later testing programs demonstrated the improvement in aging at elevated temperatures as found during overloads. These were sealed tube accelerated aging tests. The end of testing was a 50 % retention of degree of polymerization. At 150C, the base paper had a life of 80 hours, while the upgraded paper lasted 675 hours.

He also provided curves from English studies that showed an improvement in the aging rate of upgraded paper when controlled moisture was introduced. Another curve demonstrated the improvement of aging with elevated oxygen content.

Tim Raymond reported that he found a GE paper that compared the aging of Permalex insulation vs. kraft paper. It also includes information on the nitrogen testing to confirm the upgrading process. The curves in that paper were similar to those Harold presented.

Tom Prevost presented review of the temperature requirements. He also showed a curve provided by P McShane of Cooper test results comparing loss of tensile strength vs. aging at 150C

He explained that Weidman is performing aging tests on insulation samples in sealed aging tests where the chemical content of the upgrading additive was varied, and the measured nitrogen content varied. He expects to have the results to report at the next meeting.

Tom provided a draft definition for consideration.

Thermally Upgraded Paper

Cellulose based paper which has been chemically modified to reduce the rate at which the paper decomposes. Ageing effects are reduced either by Partial elimination of water forming agents (as in cyanoethylation) or by inhibiting the formation of water through the use of stabilizing agents (as in amine addition, dicyandiamide). A paper is considered as thermally upgraded if it meets the life criteria as defined in ANSI/IEEE C57.100; 50% retention in tensile strength after 65,000 hours in a sealed tube at 110C or any other time/temperature combination given by the equation:

$$\text{Time (hrs)} = e^{(15,000 / (T+273) - 28.082)}$$

Because the thermal upgrading chemicals used today contain nitrogen, which is not present in Kraft pulp, the degree of chemical modification is determined by testing for the amount of nitrogen present in the treated paper. Typical values for nitrogen content of thermally upgraded papers are between 1 and 4 percent, when tested per ASTM D-982.

The group discussed a variety of topics.

- Other chemicals are used for upgrading paper, should we test for them? --No support for that.
- Since the process used to apply the chemical to the paper can affect the test results, should we also require an aging test to confirm the thermal upgrading? --No we already have C57.100, do not need to develop another testing procedure.

- We confirmed again that the existing C57 documents do not contain sufficient information to eliminate the need for the definition.
- Review of the differences in the temperature and performance requirements in IEC and IEEE.
- Since European papers are also described as upgraded, how do we know that the performance of North American papers are better, (lower aging rates) --Papers collected for the TF all demonstrate the improved aging performance.
- Is the Task Force to define thermally upgraded paper or thermally upgraded insulation? -
-Chair selected title arbitrarily, pressboard products are not usually upgraded, and are not usually exposed to the elevated temperatures. Definition will be for thermally upgraded Paper.
- Discussion of the fact that the loading guide has moved from discussion of loss of tensile strength to DP when discussing aging, while Thermal Evaluation guide 57.100 still refers to tensile strength, and only mentions DP as another way to evaluate aging of cellulose. -
This will need to be addressed by appropriate working groups.
- Discussion about the fact that it is very confusing to try to compare IEC to IEEE requirements because of the use of temperature rises, and varying standard ambient. Suggestions that we should move from rises to absolute temperature values. -This may be addressed by appropriate working groups.

Frank Heinrichs made a motion to accept the proposed definition after removing reference to C57.100. Discussion centered on having that reference to tie the definition into the testing procedures to evaluate aging. The motion was not seconded.

Tom Provost made a motion to accept proposed definition as stated. It was seconded, and received unanimous support.

Don Platts proposed inserting the definition into C57.12.00 as a new clause 5.11.3. He also suggested removing the requirement that the insulation system meets the aging criteria in the definition from c57.100 which is a guide for performing thermal evaluation testing, and placing it into the new clause.

Discussion again followed on the expected minimum insulation life value of 65000 hours based on tensile strength vs. 85,000 hours based on DP measurements.

Work will be done before the next meeting to try to resolve those questions, and to develop a viable proposal for these changes to C57.12.00

The meeting adjourned at 9:18 AM.

Respectfully submitted by: Donald W. Platts, Chair

7.10.2.4.1 Discussion during subcommittee meeting

Jin Sim asked if the reference to C57.100 (another IEEE document) within the definition would be acceptable to IEC? Hasse Nordman commented that he thought it would be fine, but he will check and provide a response.

Questions were raised about utilization of the word “paper” in the definition.

Comments: Thermal stability is design independent. Will it exclude those who use pressboard - Should we change ‘paper’ to ‘cellulose’? Is tensile strength a relevant test criteria to use for a pressboard insulation material, since is not usually used in tension?

Tom Prevost reiterated statements from the TF meeting that no manufacturers are making thermally upgraded pressboard. So, right now there is no use of thermally upgraded pressboard.

Subcommittee Vote = 41 to 0 against change to cellulose.

7.10.2.5 WG Thermal Duplicate Guide PC57.145 B. Beaster

The working group met on Tuesday, October 7, 2003 with eight members and 22 guests attending. An agenda, a copy of the Spring 2003 meeting minutes, a proposal to address ballot comments on draft 6.0, and a rough draft 7.0 of the guide were electronically distributed to the working group prior to the meeting. Additional paper copies were available for guests. After introductions, the Spring 2003 meeting minutes were approved as issued.

To resolve several draft 6.0 negative ballots related to the need for detailed thermal evaluation on distribution class transformers, the aforementioned proposal was offered. A general recommendation was proposed to eliminate the evaluation of thermal duplicates and provide the thermal results without adjustment from the previously tested transformer or not to provide any thermal data unless specifically requested by the customer’s specification. There was consensus among several distribution manufacturers that this has been a generally accepted industry practice, at least for certain transformer sizes. In order to accommodate both the need for detailed thermal evaluation when requested and when a simpler approach is acceptable, Subhash Tuli suggested a footnote be added to Table 2 (where tolerances for transformer size are outlined). This footnote would clarify what would be provided to the user if no specific thermal evaluation were specified. This keeps the guide format roughly the same. The next guide will incorporate this suggestion.

Another general recommendation was proposed for the larger transformers, 5 to 100 MVA. Ballot comments on draft 6.0 were received regarding the comparison of design values of the new transformer to the tested values of the thermal duplicate transformer as a necessary selection requirement. These comments came from designers who preferred to compare design-to-design characteristics. Malcolm Thaden and Don Fallon stating the preference to use actual test data contested this proposal. In the discussion, it was felt that test data eliminated one degree of variability between the original design calculation and test results. This may be especially true for those who haven’t refined their thermal models to predict thermal results with higher accuracy. Hasse Nordman commented that many designers of larger transformers adjust new calculations based on test results of the proposed thermal duplicate so some of this variability is removed. It was agreed to keep the comparison as design-to-test for the added confidence it provides.

Jeff Ray expanded on this ballot 6.0 comment regarding the lack of consideration of hottest spot rise in the guide. Discussion followed about the desire to use the latest FEA techniques to the ‘pool’ of tested transformers to pre-quality some selections [it was suggested that some of these

original transformers may not meet the latest hottest spot requirements]. The next draft will incorporate the hottest spot rise with the other thermal performance calculations.

An issue of how to address using 55/65°C rise transformers for thermal duplicates of 65°C designs was raised by Raman Subramanian. Based upon the current limits in Table 2 of the guide, this comparison is not clearly defined. Further study will be needed prior accepting or rejecting this comparison.

Don Platts raised the final issue addressed at the meeting. Don commented that the latest standards define the requirement to have detailed thermal models and calculations supported by test for hottest spot temperature calculation. If this has been developed, then the manufacturer already has the capability to provide all the thermal performance information required by the guide [in order to calculate hottest spot, winding gradients and oil rises are needed as intermediate steps]. Don suggested that the Insulation Life Subcommittee be polled to assess the need for continuing to develop a thermal duplicate document with this methodology [As chairman of the Insulation Life Subcommittee, Don Platts will conduct this poll of the subcommittee]. This poll will be done in parallel with continued revision of the document and feedback will be reviewed at a future working group meeting.

Time had expired and the meeting adjourned.

Respectively submitted, Barry L. Beaster, Chairman

7.10.2.6 TF Revision to Temperature Ratings in C57.12.00 - D. Marlow, D. Platts

The task force met on Tuesday, October 7, 2003 at 11:00. Attendance was 9 members and 25 guests. Dennis Marlowe, the chair, could not attend the meeting. Don Platts led this meeting.

Minutes of the March meeting in Raleigh were approved.

Prior to the meeting a survey of the Insulation Life Subcommittee was conducted to determine if the proposed topics were still recommended for addition to the standard, and where acceptable as proposed.

During this meeting, we reviewed the comments that were submitted with the negative votes.

The first proposal -- to allow an exception to the allowable average temperature rise for transformers built with pumped directed oil flow to harmonize with IEC. Our review found several of the comments to be unrelated to the question of inserting this wording, or were not valid. We did find that the reference to limiting the top oil temperature to 65C would not agree with IEC and should be reviewed.

The second proposal deals with transformers built with concentric winding arrangements where windings may be situated one above the other. It will state that the separate temperature test results for the windings shall be averaged and then compared to the allowable temperature limits for average winding rise. The hot spot limit is not to be altered.

Again the comments submitted discussed the potential problems with this type of winding construction, but did not address temperature rise issues. The consensus was that there is concern

about the temperatures that could be found under unequal loading conditions, or with only one of the windings loaded. Therefore, we recommend that the proposal be changed to state the hottest spot limit of 80C will still apply to each winding, and should be evaluated for all loading conditions.

Those attending the meeting were polled again to determine if we should proceed with the plans to insert these items into C57.12.00.

For the first proposal only ½ expressed an opinion with the vote being split between the yes and no votes.

For the second proposal, after we added the requirement to evaluate the hottest spot limit for all loading conditions, about ¾ voted to approve, with none voting to eliminate it.

This information will be relayed to Dennis for his discussions with those submitting the comments, and for future task force activities.

The meeting adjourned at 11:51 AM.

Respectfully submitted by: Donald W. Platts, for Dennis Marlow, Chair

7.10.2.7 WG Revision to Loading Guide C57.91 - T. Raymond

The Working Group met at 2:00pm on Tuesday, 7 October 2003 with 74 total attendees, 21 were members and 53 guests.

C57.91-1995 Reaffirmation (w/ Corrigenda)

- Reaffirmation ballot opened 11SEP03
- As of 07OCT03, 97.1% Approve with 68.2% return
- Ballot closes on 11OCT03

Several comments have been received, and will be reviewed for the revision. A significant portion of these comments were concerns over the base document/errata/corrigenda relationship. One negative ballot was cast due to some typos in the base document that were corrected by the errata sheet issued several years ago. This errata was not, for some reason, provided with the ballot. The Chair has been informed by IEEE representatives that the errata will be combined with the new version of the published document.

C57.91 Revision

Organization

Volunteers were solicited to sign up for the following three task forces:

- Risks – Identify and evaluate risks of elevated temperatures
- Temperature calculation – Develop practical thermal model of in-service transformers and associated ancillary equipment
- Ratings – Develop loading criteria and methodology for mitigating loading risks in everyday use

The purpose of these “task forces” is to provide a pool of expertise, to which a particular section or issue will be assigned. Several volunteers have come forward, and emails will be sent in the coming weeks to charge each group with some initial tasks.

Changes from 1995 revision to Draft 2

The following is a list of changes made between the original document and the last draft (Draft 2) produced by Linden Pierce. The working group re-examined each item to ensure that the group was still in agreement with these initial changes.

1. The scope was expanded to include voltage regulators

- Discussed at previous meeting. Keep addition of voltage regulators.

2. The scope was expanded to include silicone and high fire point fluids.

- Discussed at previous meeting.

Comment from Lin Pierce: I wish that the WG would reconsider including silicone fluid and HTHC in the scope of the documents. In looking at the minutes I feel the WG got sidetracked by the discussion of vegetable oils, etc.

Both silicone fluid and HTHC have IEEE standard numbers and ASTM numbers. But more importantly they are included in C57.12.00. Vegetable oils are not.

I believe the changes to include them are EASY. In referring to C57.91-1995, they are already included in the Annex G equations. In regard to Clause 7 all you have to do is adjust the thermal capacity equations in Clause 7.2.5. All you have to do is multiply the factors in front of the gallons of fluid by the specific heats of the new fluids divided by the specific heat of mineral oil. These specific heats are given in the ASTM specs. No other factors are affected.

I suspect that there will be little or no change for HTHC.

There is a large group of industrial users that do not attend our meetings but use our standards. If we exclude their transformers they are going to write their own standards.

There was some discussion at the meeting that this was not a simple task. For now, maintain original scope of mineral oil only.

3. Insulation life was clarified to be 180,000 hours as given in C57.100-1999.

- The sections on loss-of-life will be reviewed and revised. In particular, the justification for the selection of a specific life time or endpoint criteria must be given.

4. The material on gas evolution in the prior guide was deleted and new material added.

- Old material on gas evolution was unusable in the form given. The new material shows promise as a practical evaluation method, however some aspects need to be discussed further. In particular, the gas evolution temperature is highly dependant upon moisture content of the cellulose. The determination of insulation moisture content is difficult and a subject of great debate within the committee.

5. The temperature prediction methods were changed as described previously.

- This will be changed, as described later.

6. Suggested loss of life limits were added for power transformers.

7. Temperature limits for bushings for power transformers were added

8. Limits were added for loading of 55 °C transformers.

9. Many normative annexes were moved into the main document.

- There is a great deal of excellent content in the Annexes of the 1995 standard. At minimum, the Annex discussing the effect of overload on bushing, LTCs, CTs, etc. should be brought to the main body of the guide. Some of the more esoteric content will be left as Annexes.

10. The effect of over or under excitation, non-sinusoidal load currents were incorporated into the temperature equations.

- Most of this content will be moved to an Annex, to make the body of the guide easier to understand and more readable. The consensus was that these effects are rarely included in rating calculations. However, the subject of over-excitation has been brought to the forefront by the tutorial on overvoltage requirements given at this meeting on Monday. The working group should review this subject.

11. Information on frequent short term overloads greater than 2 times normal was added.

- This section will be removed in the next draft.

12. Numerous editorial changes were made to improve the guide.

Where to go from here?

Little work was done on the actual document since the last meeting. Some decisions need to be made on how much revision is needed. One option would be to simply start with the 1995 revision and address comments and issues raised regarding that document. The Chair believes the 1995 revision has some shortcomings, so more than this will be necessary. As a start, the chair recommended the following:

1. A refined and expanded section detailing the risks of overload. Essential to any discussion of transformer loading is the evaluation of risk. The maximum load a transformer can carry is the highest load that maintains an acceptable risk level. Traditionally, an acceptable risk level is maintained by setting limits on temperatures and loss of life. Currently, section 5.1 includes a list of possible risks of elevated load levels. This list should be “fleshed out” to add more details of each reasonable risk, giving the user of the guide a feel for the potential consequences. These risks could be divided into 2 categories of risk: short-term and long-term.

2. The temperature calculations, as outlined in draft 2 section 10, are unwieldy and complex. In my opinion, it is not very usable. I am well acquainted with the thermal models, and I still get confused when reading through it. The temperature calculations should be reduced to two models: 1) a model similar to Annex G of the old guide, with some minor simplifications to make it more practical. 2) a top oil only modification to the first model. These models need to be practical and efficient for all users of the guide. A spreadsheet implementing these models is available on the WG web site.
3. A note should be added in the discussion of loss of life that the loss-of-life equations represent a moisture content of 0.2%-0.3% by weight and that transformers with higher insulation moisture contents may exhibit significantly higher rates of aging.
4. Sections 11 and 12 should be re-thought. These sections should be updated to include current utility practice.

Following this, the membership made the following comments:

- Jin Sim expressed concerns over expanding the scope of the document to cover liquids other than mineral oil. For the time being, the scope will be restricted to mineral oil only. If it is decided at a later date that other liquids can be incorporated, the issue can be raised again then.
- T. V. Oommen gave some background on the his bubble formation research.
- Following the discussions during the WG meeting for the definition of thermally upgraded insulation, it was recognized that the areas of the loading guide specific to thermally upgraded paper are not properly identified.
- Hasse Nordman mentioned evidence that distribution transformers rated < 2500kVA do not exhibit the same rapid duct oil rise that is seen in power transformers. These transformers most closely followed the standard Clause 7 equations. As a result, two models may be recommended; one distribution transformers <2500kVA and one for transformers >2500kVA.
- Following Dr. Preininger's excellent tutorial presentation on Monday regarding overexcitation, the impact of system voltage and overexcitation on loading capability should be reviewed, and at least merits a mention in the guide.

Schedule

Have Draft 3 with first cut at the above, along with any other suggestions and comments incorporated, by the next meeting. With any luck, I'll send this out early so the WG members have sufficient time to review.

I hope to make better use of the time between meetings by communicating more via email and using the various electronic tools available. I will find out what's available and try to get it set up in the near future.

The meeting was adjourned at 3:00pm.

Respectfully Submitted, Tim Raymond, Working Group Chairman

7.10.3 Old Business

None

7.10.4 New Business

Jin Sim – Noted that moisture content in operating transformers has become an active issue in the industry. There are several papers around that discuss the issue and various testing methods, such as the Recovery Voltage Method.

He suggested that the transformers committee look at initiating a project, and that the Insulation Life, Insulating Fluids and probably Dielectric Tests Subcommittees would all need to participate.

D. Platts-Reported that at this meeting, he had been given two papers regarding Distribution Transformer Loading, and Test procedures to test under overload conditions. They were described as being similar to existing procedures in our documents. He will review them to determine if we need to work with this information and if an existing WG or TF could include this.

The Chair mentioned that the Minutes had been posted on website, and the Agenda was also posted on website but not mailed to members.

It was suggested that the members should get an email reminder to check website. There was overwhelming support, and we will follow that practice from this point on.

Another question was raised, is Access to the Web a problem for members? Everyone appears to have access to the web.

The meeting Adjourned at 9:16

Submitted by Eric Davis, Secretary

7.11 Performance Characteristics SC – R. S. Girgis, Chair

7.11.1 Introduction/Attendance

The Performance Characteristics Subcommittee (PCS) met at 11:00 A.M. on Wednesday, October 8, 2003 with 68 members and 24 guests in attendance. 6 of those guests requested membership in PCS.

7.11.2 Approval of Meeting Minutes

The minutes of the March 19, 2003, PCS Meeting in Raleigh were approved as written.

7.11.3 Chairman's Remarks

7.11.3.1 Administrative Subcommittee Notes

1) Next Standards meeting dates and locations are as follows:

Spring 2004: March 7 – 11, San Diego, CA
Fall 2004 is Sept 19 – 23 in Edinburgh, Scotland

2) Next year's IEEE PES meeting will be held in Denver, Colorado, from June 6–12, 2004.

3) It was emphasized that when balloting for reconfirmation, a negative vote should not be cast unless the proposed changes are significant. When the proposed changes are either minor, or editorial in nature, that the vote should be "approved with proposed changes"

4) We need to get the S.C. Guide through ASAP. The chairman will contact Nigel MQuin and IEEE to finalize the issues involved. Tom Prevost will provide help.

5) The Administration committee is looking into the possibility of a different format for the Thursday Transformer Standards Committee meeting.

6) At the end of this year, Jin Sim who is the present chairman of the transformer committee will complete his two-year tenure. As of January 1st., Kenneth Hanus, the present vice president, will assume the chairmanship, Don Fallon, the present secretary will be the vice chair, and Tom Prevost will be the secretary.

7) Minutes of this meeting should be sent to Don Fallon before November 21, 2003.

8) Note: Individuals who wish to receive invitations to ballots on IEEE Standards have the responsibility to make sure their correct e-mail address is on file with IEEE. Status can be checked on the following website, or adjacent related websites:
<http://standards.ieee.org/db/balloting/ballotform.html>

7.11.3.2 Membership

6 new members asked for membership and were added to the PCS Roster:

Frank Damico, Tamini	Gene Blackburn, Consultant
Ron Daubert, Finley Engineering Co	Bob Tillman, Alabama Power Co
Christoph Ploetner, Siemens	Greg Anderson, Consultant

The Membership roster will be reviewed, and members who have not attended any of the last 4 meetings will be contacted regarding their removal from the PCS roster; thanking them for past

participation, and indicating that with renewal of participation they will be welcome to rejoin the group.

7.11.4 Agenda Changes

The report on activities of the Semi-conductor Rectifier Transformer – C57.18.10 WG – Sheldon Kennedy, Chairman, was added to the Agenda and report on the activities of the DETC Specifications and Test TF – Phil Hopkinson, Chairman, was removed from the Agenda as this TF now is part of the LTC Performance C57.131 WG reporting to the “Power” SC.

7.11.5 Working Group and Task Force Reports

7.11.5.1 PCS WG for Continuous Revision to C57.12.90 – Bruce Forsyth, Chairman; Rowland James, Secretary

The PCS working group for Revisions to test code C57.12.90 met in Pittsburgh, Pennsylvania on October 6, 2003 at 9:30 A.M. There were 40 members and 20 guests in attendance. The following 3 guests requested membership, and are welcomed into the Working Group, bringing total membership to 92:

Gary King	Howard Industries
Dana Basel	ABB
Hem Shertukde	University of Hartford

After introductions, the minutes from the March 17, 2003 meeting were reviewed. A motion to accept as written was made by Bob Hartgrove and seconded by Subhash Tuli. The motion passed unanimously. The Agenda was then reviewed and no changes were requested.

The Chairman announced that as a result of a recent ruling by the IEEE regarding the use of metric and imperial units in standards, IEEE Std C57.12.90 will be re-balloted in mid-November. Any new items to be included in the ballot must be submitted no later than October 31, 2003.

The Chairman announced that there are currently 7 open items (5 old and 2 new) for the WG to consider.

Old Business

Before addressing the first item under Old Business, the chairman asked the WG to consider a new item, WG Item 18, “Proposed Wording for 50-60 Hz Frequency Conversion Factors” which was presented to this WG by the WG Loss Tolerance and Measurement. The proposal provided wording for clauses affecting no-load loss and excitation current, load loss, and audible sound level. The WG offered a number of technical and editorial changes in the text. Also, it was suggested to examine the effect of a series reactor on the conversion factors for no load loss. Ed teNyenhuis will take the comments raised during the discussion to the WG Loss Tolerance and Measurement for their consideration. A revised text will be submitted in the San Diego meeting, including text on the thermal and S.C. tests.

The next item, Draft 2 of WG Item 11, "Single-Phase Excitation Tests," was discussed at length. A few minor errors were identified for immediate correction. Several changes to a table under clause 1.4 "Test Procedure" were recommended. The main substantive changes were as follows:

1. The word "should" will be changed to "shall."
2. The word "Recommended" will be changed to "Required."
3. The list of optional tests will be eliminated since the WG felt the document should only include requirements.
4. The requirement to test every DETC tap position will be changed to required only the rated DETC tap position be tested.
5. A note will be added to describe the additional tests required when the regulating voltage winding design does not have equal voltage between each tap.

Since time was running out, the Chairman ended the discussion and informed the WG that a copy of the revised wording for WG Item 11 would be emailed to WG members shortly along with wording for WG Item 9, "Operational Tests of Load Tap Changers" for review, and hopefully resolution, prior to the next meeting.

Finally, the chairman announced that during the PCS meeting in Raleigh, there was a consensus that the WG for Continuous Revisions to C57.12.90 would be the WG to develop the test procedure for the DGA test with input from the WG for C57.12.00 and the Insulating Fluids Subcommittee. Based on this, the Chairman will re-open WG Item-14 and make the necessary contacts with the chairmen of these WG and SC.

7.11.5.2 PCS WG for Continuous Revision to C57.12.00 - Steve Snyder, Chairman; Dennis Marlow, Secretary

The Working Group met on Monday, October 6 at 1:45 PM. There were 29 members and 51 guests in attendance. The following guest requested membership, and is welcomed into the Working Group, bringing the total membership to 64 members :

Allen Mitchell: ABB, St. Louis, Mo.

Following introductions, the minutes from the March 17, 2003 Raleigh meeting were approved as submitted.

Subhash Tuli reported that as a result of the recent IEEE decision to allow dual dimensioning on Transformers Committee documents, C57.12.00 will be re-balloted, probably as soon as mid November 2003. This ballot will also capture all the pending changes accumulated since the previous ballot.

The Working Group then began discussing the topics of old business, as follows :

WG Item 49, Section 7.1.5.2 Asymmetrical current used for short circuit calculations. Comments received from the draft 3 ballot of C57.12.00 – 2000 stated that the x/r ratio for the user's system is greatly different than the recommendations in the standard, and

that they differ from those values used in IEEE C37.04 and IEC 56. This comment is directed at the statement in the standard : “When the system impedance is included in the fault-current calculation, the x/r ratio of the external impedance shall be assumed equal to that of the transformer, when not specified.”

Following the spring meeting, Ramsis Girgis researched this topic and provided data on over 100 transformers, revealing a range of x/r ratios as follows :

	<u>Range of x/r Ratio</u>
Small Power Transformers	15 to 40
Medium Power Transformers	35 to 70
Large Power Transformers	40 to 125

He also received input from the ABB power systems engineering group, and found that x/r ratios for power systems varied approximately as follows :

765 kV Lines	21
500 kV Lines	15
345 kV Lines	12
230 kV Lines	10
161 kV Lines	9.7

This data was widely discussed among the WG members and guests, with the final conclusion that since the system x/r is much smaller than the transformer x/r, it will have little impact upon the asymmetrical peak current calculation. The effect it will have is to make the design slightly more conservative. By a vote of 38 –2, the WG voted to not change the standard, except to add a note explaining this rationale.

WG Item 50, Section 7.1.5.3 System characteristics for short-circuit calculations. A comment received from the draft 3 ballot of C57.12.00 – 2000 stated that the default value of $X0/X1 = 2.0$ as given in the standard is too high. The user suggested a value between 0.60 and 0.40 .

After a great deal of discussion, the WG determined that more data needs to be collected from other users to make a more informed decision. The chairman will survey the PCS committee and WG to collect additional **system values** of $x0/x1$, and the discussion will resume at the next meeting based on the collected data.

WG Item 52, Section 9.2 Tolerances for Impedance. A comment received from the draft 3 ballot of C57.12.00 – 2000 stated that the user felt the impedance tolerances given in the standard were not clear, and that the tolerances were too great. The suggestion was to cut in half the present tolerances, and to add a tolerance on tap position.

The chairman reported that a survey of the PCS committee and this WG conducted during July/August 2003, **to determine opinion on this request**, produced the following results :

168 surveys sent	Question 1) 39 No	12 Yes
52 responses	Question 2) 37 No	14 Yes
28 manufacturers	Question 3) 41 No	7 Yes

13 utilities
11 consultant / other

This discussion began with some users explaining how a reduced variation in impedance could provide benefits to them, particularly with respect to paralleling transformers with mismatched impedances. An opinion also was expressed that users believe manufacturers can easily reduce this tolerance without much difficulty because of the availability today of accurate impedance calculations based on advanced magnetic field calculations. It was pointed out that this section applies to all transformers manufactured according to C57.12.00, including distribution transformers which normally incorporate rectangular construction, and that construction variables are especially onerous with rectangular coils. Some manufacturers reported that after reviewing historical data, the proposed reduced tolerances would be hard to meet. A more reasonable reduction may be feasible..

At this point the meeting time had expired, so this discussion will be continued at the next meeting. For the sake of a proper decision on this item, more data is encouraged from transformer manufacturers.

7.11.5.3 Loss Tolerance and Measurement - Ed teNyenhuis, Chairman; Andy Steineman, Secretary

- 16 members and 8 guests attended, with 1 guest requesting membership.
- Minutes from the Raleigh meeting, Mar 18, 2003, were read and approved.
- Because of the absence of Eddie So, the TF meeting for “Guide of Low Power Factor Power Measurements” was canceled and thus there was no report. A status report on the guide will be requested from Eddy So.
- Frequency Conversion Factors of Transformer Performance Parameters
 - Wording from the Raleigh meeting had been sent to the C57.12.90 WG and was presented in the WG meeting on Oct 6. The WG for C57.12.90 suggested some editorial changes and requested that the sections on the frequency conversion factor should be presented again at a later meeting once the revisions are completed, including the sections on the temperature-rise and short circuit tests.
 - The WG discussed the suggested change by WG for C57.12.90 to add the phrase “upon agreement with the customer at the time of quotation”. The WG agreed that this wording was not consistent with the rest of the C57.12.00 or the C57.12.90. It was decided that the wording should be revised to “upon mutual agreement with the customer”.
 - Revised wording in C57.12.90 Section 8.6 (No load loss and exciting current) – The WG agreed to revise the wording as follows:
 - Change the “ $B < 1.4T$ ” to “ $B \leq 1.4T$ ”
 - Remove “rated” from “rated flux density”
 - Move the sentence “Since the value of these conversion factors is an average value ...” to the end of the section

- Revised wording in C57.12.90 Section 9.4.3 (Load Loss) – The WG agreed and discussed the following:
 - Move the sentence “Since the value of these conversion factors is an average value ...” to the end of the section
 - Add wording on converting the measured impedance voltage to the rated frequency for the next meeting.
 - It was shown that the impedance voltage is nearly proportional to frequency. The error of using a frequency ratio can be 0.5% for small transformers (< 50MVA) but the error is negligible for large transformers.
 - Verification data from 6 units measured at both 50 Hz and 60Hz was shown. Except for 1 unit, the error was less than 1% on the total loss. This 1 unit had a very high stray loss relative to the total loss and perhaps there was some temperature effect on the measurement.

- Revised Wording in C57.12.90 Section 13.3.7 (Sound Level) – The WG agreed to revise the wording as follows:
 - Remove “rated” from “rated flux density”
 - Move the sentence “Since the value of these conversion factors is an average value ...” to the end of the section

- Short Circuit Test – The WG discussed how the test could be done at a different frequency than the rated frequency:
 - The voltage applied would be nearly the ratio of the frequency (as per the discussion on impedance voltage)
 - The WG agreed to investigate the necessity of converting the K factor for a different frequency. A statement should be given in the standard.
 - The WG agreed on the need to examine the effect of performing a 50 vs 60 Hz s.c. test on a transformer relative to the number of cycles and energy applied to the transformer

- Temperature Rise Test – The WG agreed to the following:
 - The current must be adjusted to provide the correct rated frequency total heat run loss
 - The manufacturer must have a supply to operate the cooling at the rated frequency
 - Conversion factors must be developed to convert the measured winding rise and tank/structural parts rise to the temperature rise for rated frequency. This will be developed for the next meeting.
 - The tank / structural parts would have a few degrees greater temperature rise than at rated frequency. The manufacturer must ensure there is sufficient margin in the temperature rise of these parts to avoid gas generation during the temperature rise test.

- Distribution Transformers – The WG agreed to the following:
 - Oil-filled distribution transformers are covered by C57.12.90. Once the work is completed for frequency conversion factors, a review should be made to ensure that it is

applicable for distribution transformers.

- There should be a need for frequency conversion factors for dry type transformers. The chairman of the C57.12.91 WG will be notified of this so that appropriate wording is added to that standard.

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

The Working Group on Switching Transients Induced by Transformer/Breaker Interaction was called to order at 8:02 AM on October 7, 2003. There were 75 attendees, 37 members, 5 requesting membership, and 33 guests. The agenda for the meeting was reviewed, and the Minutes from the March 18, 2003, meeting in Raleigh, North Carolina were approved. The minutes, and a new draft of the guide were also distributed.

1. Status of the guide was reviewed. Draft 1.5 includes comments from several reviewers, and was sent to IEEE Editorial staff for comments. The comments from IEEE and some additional input as described below, will be included, so that an informal survey of the subcommittee can be held in the next two to three months.
2. Additional items to be added to the guide include the following:
 - Frequency Response Analysis (FRA) Larry Coffen
 - Additional definitions
 - Discussion of damping Phil Hopkinson
 - Breaker Section Switchgear Committee
 - Additional example Robert Degeneff
3. A question was raised as to what frequencies are of concern, is it just the first two resonant frequencies to be considered, or all frequencies. Discussion of this topic pointed out that the anecdotal evidence reviewed by the group has seems to indicate lower frequencies are of greatest concern. Higher frequencies however can occur, but typically are attributed to the proximity of gas insulated systems. In addition, it was indicated that higher frequencies tend to be quickly damped.
4. Contributors (Phil Hopkinson, Bob Degeneff, and Tom Tobin) were thanked for their effort to prepare and present the tutorial session held on this subject at the Raleigh meeting.
5. Thomas Tobin made a presentation to the group titled "Switching Resonance Load Circuit Investigation on Creation of Re-ignitions." The following items briefly summarize the key topics of the presentation, which will be made available electronically to the working group.
 - 5.1. Assumptions
 - Transformer terminal model
 - 5.2. Circuits
 - Magnetizing current is not a problem
 - 5.3. Load circuit

- Resistive, higher power factor, and electronic loads to be considered
 - 5.4. Vacuum circuit breaker
 - Ability to interrupt and chop high frequencies
 - 5.5. Base cases
 - Distribution of re-ignitions versus frequency considered
 - 5.6. Cable length impacts
 - 5.7. Loads
 - Motor loads not difficult duty
 - Electronic / rectifier loads need investigation
 - 5.8. Three phase models
 - Greater complication and inter-phase capacitance is a driver and seems to be important.
 - 5.9. Three phase cases
 - Virtual current interruptions occur in phases where contacts have not yet parted
 - 5.10. Future work
 - Transformer model to be used
 - Rectifier / electronic load models
 - Risk or probability of re-ignition
6. Discussion after the presentation considered the impact of load current / chopping current and the likelihood of repeated re-ignitions. Further, the types of transformer and or rectifier load models that could be used were also discussed, along with the impact of higher loads.
7. It was requested if the Switchgear Committee (Tom Tobin) could provide additional characteristics for vacuum breakers. In addition, the working group was asked to review the guide in general, and to provide any guidance to enhance the content of the guide.
8. There was no new or old business.

7.11.5.5 Semi-Conductor Rectifier Transformers, C57.18.10 – Sheldon Kennedy, Chairman

The Working Group met on Monday, October 6, 2003 at 3:15 PM with 16 members and 4 guests present. Sheldon Kennedy chaired the meeting.

C57.18.10 is due for reaffirmation. The standard was balloted for reaffirmation. There were 44 votes with one abstention for an 84 % return, meeting the 75 % requirement. There were 41 affirmative votes with two negatives with comments.

The negative votes agreed to remove their negatives and vote affirmative if the working group would agree to begin a revision to discuss the comments.

The working members present voted unanimously to accept the motion that this standard is worthy of reaffirmation, but that the comments received would improve the standard. A new work should be started to incorporate the comments through a corrigenda to the standard.

Besides the editorial comments, there was interest in commenting about the possibility of ferroresonance with some of the ungrounded wye circuits from a utility. A user was interested in including comments about the use of electrostatic ground shields in windings and their potential test problems. Some other comments received were somewhat vague and need further discussion and explanation from the commenters.

It was agreed that a task force would be formed at the next meeting in San Diego to resolve the comments into a corrigenda to this standard. This will be produced after the reaffirmation.

7.11.5.6 Neutral Grounding Devices, PC57.32 – Steve Schappell, Chairman

The working group met at 3:15 pm on Monday, October 6, with 16 in attendance. There were 6 members and 10 guests. One of the guests requested membership, and will be accepted.

Edgar Taylor, past chair of PC62.91 (IEEE 32), was introduced. Edgar spoke briefly about the need for the neutral grounding devices standard, as well as its history. He provided copies of several documents, including letters with suggestions for the standard, a conference paper on thermal ratings and temperature limits for neutral grounding devices, and a marked-up rough draft of PC62.91.

The group discussed the Definitions and Terminology section. It was suggested by Edgar that many of the definitions could be removed, as they are provided elsewhere.

The group discussed the different types of grounding devices, and agreed that the ones in common use today are resistors, reactors, and transformers. Capacitors and ground-fault neutralizers were deemed rare, and will be moved to an annex.

Richard Dudley said that he would talk to Christoph Plotner, Chairman of IEC60076 Reactors, to determine if our working group would benefit from their work on grounding transformers and suppressive reactors.

Tom Prevost said that he would check on the status of IEEE 32 to determine if it should be renewed, so that the standard would not die before the new standard comes out.

Steve Schappell volunteered to produce a new draft of PC57.32 and email it to the members and guests by the end of October.

7.11.5.7 TF on Frequency Response Test Standard/Guide – Rowland James, Chairman; Charles Sweetser, Secretary

The PCS task force met for the development of a guide for Frequency Response Analysis (FRA) in Pittsburgh, Pennsylvania on October 7, 2003 at 3:15 P.M. There were 40 persons in attendance, 10 members and 30 guests of which 13 guests requested membership.

Rowland James made a brief report on the development of the draft. Charles Sweetser presented a newly condensed outline consisting of six sections. The sections are as follows:

Section 1 - SCOPE AND APPLICATION

Section 2 - FRA TEST PARAMETERS

- Section 3 - MAKING AN FRA MEASUREMENT
- Section 4 - TEST RECORDS
- Section 5 - ANALYSIS AND INTERPRETATION
- Section 6 - APPENDIX: FRA THEORY

Members were assigned for contribution according to their expertise for each section.

The following members were assigned:

Responsibility	Section 1	Section 2	Section 3
Primary	Mark Perkins	Ernst Hanique	Charles Sweetser
Secondary	Joe Watson	Richard Breytenbach	Paulette Payne
Secondary	Jin Sim	May Wang	Jeff Britton
Secondary	Rowland James	Larry Coffeen	

	Section 4	Section 5	Section 6
Primary	Barry Ward	Charles Sweetser	Bob Degeneff
Secondary	Bertrand Poulin	Larry Coffeen	
Secondary		Richard Breytenbach	

Fred Elliott of BPA presented a short report on experience of FRA testing. The report focused primarily on the transportation of transformers and reactors. Fred's examples included apparatus with and without oil. All of the results indicated that no shipping damage had occurred.

It is planned that the assigned primaries will be approached by Chuck Sweetser to have them review and add to the sections of the present document. Once this is completed, the different sections will be sent to the Secondaries for their input and comments. This is planned to be completed, and a more complete draft, submitted before the FRA TF meeting in San Diego.

After some general comments the meeting was adjourned at 4:10 P.M.

7.11.6 Project Reports

7.11.6.1 Status of C57.133 - Guide for Short Circuit Testing - Nigel McQuin, Chairman

Chairman not present. Nothing to report

7.11.6.2 Status of Revision of C57.110-1998 - IEEE Recommended Practice for Establishing Transformer Capability When Supplying Nonsinusoidal Load Currents – Rick Marek, Chairman

Nothing to report

7.11.6.3 Status of Revision of C57.21, 1990 (R1995) - Standard Requirements, Terminology, and Test Code for Shunt Reactors Rated Over 500kVA – Richard Dudley, Chairman

A meeting was held in the Reflections Room of the Sheraton Station Square Hotel in Pittsburgh, PA in the 8:00 a.m. to 9:15 a.m. time slot to establish W.G. membership and commence work on the revision of C57.21. Note that the time slot was shared with the Dry Type Reactor T.F. At future IEEE Transformer Committee meetings the W.G. for the Revision of C57.21 will meet in a separate time slot. The Chairman of the W.G. for the Revision of C57.21, Richard Dudley, asked for volunteers to join the W.G. Fourteen of those present requested membership. The following are the highlights of the ensuing discussions.

1. The Chairman informed those present that a PAR for the revision of C57.21 had been approved at the Sept. meeting of the IEEE Standards Board. The scope of the revision work will be to address issues raised in ballot comments during the recent reaffirmation process for the current version of C57.21 and to add two annexes; one on thyristor controlled reactors used in SVCs and the other on dielectric stresses imposed on shunt reactors during switching. The W.G. will report to the Performance Characteristics S.C.
2. The reaffirmation of the current version of C57.21 is at recirculation ballot stage and the process should be completed by the end of 2003; including IEEE Standards Board approval.
3. The Chairman informed attendees of his difficulties in obtaining from IEEE a usable copy of the current version of C57.21 in WORD format. This subject was raised at the Administrative S.C. meeting and IEEE staff attendees promised to address this issue. An IEEE staff member in attendance promised to provide a suitable WORD formatted copy of C57.21 by the end of November 2003. The Chairman will continue to follow up with Noelle Humenick of IEEE.
4. The subject of iron losses in oil-immersed shunt reactors was reviewed. Although the equation submitted by Peter Heinzig, to replace the current equation in NOTE 15, is technically correct, Pierre Riffon has demonstrated by example calculation that it is not practical due to inherent tolerances in the measured data (temperature and measured total losses) used in the calculation process. In Pierre's example the error was 50% using the proposed equation vs the values for iron losses calculated by the manufacturer. Consensus was that calculated iron losses provided by the manufacturer should be used. NOTE 15 of Clause 10.4.4.1 will be rewritten. "Iron losses will be provided by the shunt reactor manufacturer; calculated iron losses."

5. Pierre Riffon's draft modification to Clause 10.3.3 was discussed; partial discharge measurements during the one hour low frequency over voltage test for oil immersed shunt reactors will be based on apparent charge and units of pico Coulombs vs RIV and micro volts. Pierre used the current test methodology for power transformers as his guide; magnitude of partial discharge does not exceed 500 pC (old method 200 μ volts), increase in partial discharge does not exceed 150 pC and no steadily rising trend in partial discharge actively. It is also recommended to use ultrasonic transducers to help discriminate between internal and external partial discharge sources. Partial discharge measurements are not applicable to oil immersed shunt reactors rated 69 kV and below. Pierre's proposal was accepted.
6. The only issue arising out of discussions of Pierre's proposal for Clause 10.5.3. was whether the current Tables 5A (oil immersed) and 5B (dry type) should be combined into one table covering both oil immersed and dry type SRs. Consensus was reached that this should be done and Pierre Riffon agreed to produce a first draft. Issues of note re this exercise are.
 - Insulation test levels for oil immersed only or dry type only should be specifically noted.
 - Since oil immersed and dry type shunt reactors are used interchangeable in the power system, test values should be common for the same dielectric test methodology.
 - The current Table 5A contains multiple test levels for the various voltage classes. This reflects the practice for power transformers. Is it applicable for shunt reactors? Acceptable BILs for SRs for a specific system voltage class will differ from those for power transformers due to the high number of switching operations that SRs are exposed to. A note will be added to the combined table re this issue and the reader will be referred to ANNEX B which discusses dielectric stresses to which SRs are exposed during switching.
 - Ramon Garcia raised the issue of how to handle system voltage classes not specifically listed in the table. The current NOTE (2) provides some guidance re the low frequency overvoltage test. BIL's are normally specified by the purchaser.
 - The number of system voltage classes will be reduced but will cover a range as is done in bushing standards.
7. Greg Polovick's comment re Pierre's draft of Clause 10.3.3 was discussed. If a single phase test is performed in lieu of a 3 phase test (based on agreement between purchaser and manufacturer) due to equipment limitations, Greg proposes that a second single phase supply be used to ensure stressing of the interphase insulation. This may not always be possible. Per Pierre a single phase test has been the practice especially on

EHV SRs. The phase to phase insulation is stressed but not at operating voltage levels. To take into consideration Greg's comment a NOTE will be added "A single phase test does not fully stress the interphase insulation. However, if a second single phase supply is available it is possible to fully stress the interphase insulation".

8. The Chairman agreed to prepare Draft #4 of ANNEX B taking into consideration the comments from IEC MT 32 and Pierre Riffon's rebuttal. Inputs from other W.G. members was requested as soon as possible. Hopefully input from the IEEE Switchgear Committee will be available for consideration. It was agreed to keep the discussion in the second paragraph of B.3.3. as is. The dv/dt description will be replaced by "high rate of change voltage excursion" as it is more appropriate and meaningful.
9. The Chairman agreed that he would prepare a first draft of the revision of C57.21 based on the above discussion, the draft annexes prepared by the Dry Type Reactor T.F. and previous discussions (Raleigh) of comments received during the reaffirmation balloting process. This should be available in early 2004.
10. Peter Balma has submitted to IEEE a marked up copy of the version of C57.21 that was balloted during the reaffirmation process correcting all the OCR errors. Many thanks to Peter.

7.11.6.4 Panel Discussion "Power System Over-voltage Requirements and their Impact on Transformer Design" – Ramsis Girgis Chairman

The tutorial contained the following items:

- Influence of system conditions on excitation of transformer cores, presented by Dr. Gustav Preininger
- Influence of core excitation on core design, presented by Dr. Ramsis Girgis
- Over-voltage requirements and system operating parameters for GSUs and Autos, presented by Mr. Bipin Patel and Mr. Donald Chu
- Experience with Utilities specifications, system operations, and impact on core over-excitation, presented by Mr. Harold Moore
- Recommendations, by Mr. Harold Moore

Subsequent to this tutorial, the participants on the tutorial were selected to form the nucleus of the TF of representatives from users, manufacturers, and consultants to decide on what changes to what specific Standards are necessary. The TF will also develop the text for the changes agreed upon by the TF. The first meeting of this TF will be held in the San Diego meeting. Mr. Craig Stiegemeier was selected to be the chairman of this TF.

7.11.7 Old Business

A discussion was held whether or not to expand the scope of C57.12.00 to cover 25 Hertz transformers. It was decided that these are “specialty” transformers and therefore do not need to be covered at this time when there are a number of more pressing items which need to be attended to.

7.11.8 New Business

A Tutorial session will be arranged for the San Diego meeting to discuss accurate measurement of zero-sequence impedance for interconnected transformers. Subsequent to the meeting a Task Force will be formed to develop the standard test.

7.11.9 Next Meeting

The next meeting is scheduled for March 10, 2004, in San Diego, CA.

Submitted by: Stephen Antosz, Secretary

7.12 Power Transformers – E. G. Hager, Chair, T. Lundquist, Vice-Chair

The Power Transformers Subcommittee met Wednesday afternoon at 1:30 pm with 43 members, 22 new members and 55 guests in attendance.

The minutes from the Raleigh meeting were approved before the various working groups and task forces reported.

7.12.1 WORKING GROUP AND TASK FORCE REPORTS

7.12.1.1 TASK FORCE FOR REVISION OF C57.17, ARC FURNACE TRANSFORMERS – Dominic Corsi, Chairman

Dominic Corsi reported that the Task Force was called to order at 8:00 am on Monday, October 6th with 15 attendees. This was the group’s 4th meeting since the start of the Task Force project.

The first order of business was to review and approve the minutes from the April meeting held in Raleigh, NC. The minutes were provided in electronic format prior to the meeting and were approved by the members present.

Dominic Corsi reviewed the status of the Task Force and progress to-date. It was noted that some of the members had not received correspondence from the Chair and it was re-emphasized that all members make sure that their e-mail addresses are accurate. It is the intention of the Chair that the majority of correspondence takes place via e-mail. Those members missing the latest mailings will be readdressed.

The Chair presented an open letter to the Task Force written by Giovanni Testin of ABB and Ugo Piovan of Weidmann. In the correspondence, Mr. Testin listed topics that he felt were both significant and generic to Arc Furnace Transformers. These topics were reviewed in detail by the Task Force to make sure that they were included in the contents of the current revision. It was agreed that the topics were covered but would serve also as a valuable basis for detailed writing under the particular subject content for each.

Under New Business, the Task Force was polled for participation and writing of the Contents.

The following individuals volunteered.

- Appendix A: Dissolved Gas Analysis
 - Joe Kelley
 - Frank DiAmico
- Ratings:
 - Dominic Corsi
 - Bob Ganser
- Appendix B: DC Arc Furnace Transformers
 - Sheldon Kennedy (Contributor)
 - Ugo Piovan (tentative)
- Appendix C: Guide for Protection
 - Tom Slovik (tentative)

Volunteers are needed for the following:

- Impedance Voltage
- Insulation Levels
- Connections
- Testing
- Construction
- Short Circuit Characteristics

A discussion on commissioning and field testing of arc furnace transformers followed. While arc furnace transformers do have sometimes special and unique requirements, it was decided that these were not sufficiently different to warrant a new Appendix on Commissioning and Field Testing in the revision.

The meeting adjourned at 9:00.

Rowland James commented that the IEEE Virtual Community could be utilized for data transmittal issues.

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

Michael Lau presented the minutes of the Working Group meeting.

The Working Group for the Installation of Liquid-filled Transformers was called to order at 9:35 am on Monday, October 6th. There were 45 attendees including 22 members, 4 new members

and 19 guests. The agenda for the meeting was reviewed, followed by approval of the minutes from the March 17, 2003 meeting in Raleigh, NC. The agenda, minutes and a new draft of the Guide were distributed.

Draft 4 of the Guide has been placed on the Transformer Committee website for use by the Working Group.

Since the IEEE Standards Board has allowed dual dimensioning, the Working Group was asked whether we should utilize dual dimensioning in this Guide. The consensus of the group was to provide both dimensions, which will be included in the next revision.

It was proposed to the Working Group that all acceptance criteria from throughout the document be placed in a common informative annex. Further, as part of this discussion it was proposed that some of this information may be available in EPRI's life extension project and could possibly be utilized as an information source. Paulette Payne and David Wallach, Barry Ward and Michael Lau will review this information and provide feedback to the Working Group.

Currently there is some duplication of material between Clause 3 ("small transformers") and Clause 4 ("large transformers") in the Guide, and several suggestions were raised as to how to best include this material. First, to continue it as-is in both sections; second, to separate it out into a general clause; and third, to complete the document and determine then if separation is really necessary. The Group did not reach consensus as to the best approach, and further review of this area will be needed.

The subject of Clause 4.6, Preliminary Liquid Filling, was revisited. The Group previously agreed to remove this clause, but the issue was raised again. Due to the change in the state-of-the-art, the clause will not be returned to the document.

A question was raised relative to the extent of the time required by new Clause 4.8.3.2, Assembled Unit Vacuum Tests. Discussion indicated that it needed to be clearer as to when this procedure might be needed, and what other alternative methods might be applicable.

Clause 4.9.3, Hot Air Circulation for drying was discussed. Concerns for the effectiveness, potential hazards, costs and quantity of air needed for this process were all discussed. Consideration for the removal of this Clause from the document was presented, however a majority vote of the Group was to retain it in the Guide.

Paulette Payne provided an update of Doble's activities in this area and indicated there were no additional updates at this point in time. However, it was indicated that Doble's document is considering information relative to vacuum hold times relative to pressure and hold time after filling. After discussion, it was the Group's consensus that this Guide should provide guidance for vacuum times, which might be applied at various steps in the process.

Volunteers were requested to assist in further review of several aspects of the Guide and the following areas were assigned:

- General Format: Peter Balma
- Units and Conversion Factors: Susan McNelly
- Hot Oil Circulation: Donald Chu

- Annex of Acceptance Criteria: Mike Lau
- Insulation Dry-Out: Harold Moore
- Storage: Malcolm Thaden
- General Review: Greg Anderson, David Wallach

There was no other old or new business, and the meeting adjourned at 10:45 am.

7.12.1.3 WEST COAST WORKING GROUP - Michael Lau, Chairman

Michael Lau reported that the West Coast Working Group met on Tuesday, October 7th at 8:00 am with 10 members and 3 guests.

The Chair reported that this Working Group currently has no active projects. A few previously identified projects, such as documents on Wind Generation transformers and transformer shipping were discussed.

It was decided by the Group that work should proceed on a Guide for transformer shipping considerations. The Chair requested a collection of information and efforts to be made for the definition of a Scope of the project prior to the next meeting

The meeting adjourned at 9:20 am.

Joe Watson asked Michael Lau if the Wind Generation document was also moving forward. A brief discussion was held by the Subcommittee on the common practice of off-the-shelf padmount transformers being utilized for step-up applications at wind generation sites and the lack of understanding in this application's performance requirements. Following this discussion, it was agreed to also proceed with a document for wind generation and similar distributed generation step-up applications. Bippen Patel also suggested that we should search to see if IEC Standards exist for windfarm applications.

7.12.1.4 Task Force on a Guide for Standard Control Cabinet Designs – Joe Watson, Chairman

Joe Watson reported that the task force met at 11:00 am on Monday, October 6, with 31 in attendance. There were 18 members and 13 guests. None of the guests requested membership.

The minutes from the Raleigh meeting were approved as submitted.

Copies of the Draft Guide for the Layout, Design and Construction of Control Cabinets for Power Transformers were handed out to those who did not have copies. The scope, purpose, references and definitions were briefly discussed.

Cabinet construction was discussed in great detail, beginning with the types of cabinets available, from NEMA 3R to NEMA 4X. The thickness of the cabinet and doors is listed as 3mm in the Draft. The group questioned this, and Steve Schappell volunteered to help with the material section. It was mentioned that there needs to be more information on exterior coatings, and C57.12.28 was mentioned as a reference that should be added. Also, a question was raised about the recommended type of stainless steel for control cabinet construction, and it was

pointed out that the definition of NEMA 4X should be consulted. Tim Huff volunteered to find out what is available from European manufacturers.

The group discussed swing panels, specifically latches for the panels and covers for any “live” parts on the rear of the swing panel. The question was raised as to what voltage level should require protective covers. It was mentioned that the Draft may need a separate section detailing protection. Hurricane-proof doors were mentioned as a needed option, and that the Draft needs to define “sturdy” in Section 4.6.

Different environments were discussed, including coastal, normal, and explosion-proof. Joe Watson will address this in the next Draft. It was suggested that Section 4.7 specifically state that conduit shall not enter the top of the cabinet. Section 4.8 needs to list types of removable plates, including aluminum, mild steel, and stainless steel. Greg Anderson volunteered to work on Sections 4.7 and 4.8.

The need for Section 4.9 was questioned – is it a duplication of NEMA? Steve Schappell volunteered to help with Section 4.10 on mounting. The group discussed Section 4.12 concerning lights, specifically whether a manual switch should be required in addition to the door switch. It was decided that this should be an option. Steve Schappell volunteered to help with Section 5 on components, and Joe Watson volunteered to work on Section 6 concerning modular cabinet designs.

The meeting adjourned at 12:15 pm.

The Chair also reported that the PAR would be requested for this project and that since a key goal of this document is to produce a code for specifying the various options under standard control cabinet designs, a Guide may not be the appropriate type of document. In conversations with Committee officers following the Task Force meeting, it was determined that a Trial Use Standard would be more appropriate, and the PAR will be requested as such.

7.12.1.5 WORKING GROUP ON LOAD TAP CHANGER PERFORMANCE - William Henning, Chairman

William Henning reported that the Working Group on Load Tap Changer Performance met on Monday, October 6th with 15 members and 26 guests attending.

It was announced at the meeting that IEC 60214-1 is published and is now available from IEC. It covers resistive and reactive load tap changers and de-energized tap changers. Since an IEEE Standard and an IEC Standard covering tap changers exist today, merging these two documents and obtaining a dual logo on one Standard will be difficult. Craig Colopy proposed to have IEEE focus on review of the IEC document with the intent to adopt the bulk of it. This agrees with the discussion held at the Spring 2003 meeting in Raleigh, NC.

Testing is covered in IEC 60214-1, while application is covered in IEC 60214-2, which is close to completion. Mr. Colopy recommended waiting for completion of 60214-2 before bringing it into IEEE with the purpose of creating its own document. It has been suggested that testing would be covered in IEEE C57.131.1 and the application covered in IEEE C57.131.2. The PAR would have to be revised to change from C57.131 to C57.131.1.

A PAR was taken out for C57.141, which would have covered application. That PAR expires soon with action to be taken by November.

It was approved unanimously by the Working Group to have Draft 1 created by using a copy of the published IEC 60214-1 document. The Draft would be circulated among members along with a comment form to be used for suggested changes. There were no known issues with using the IEC document as a starting point. Dieter Dohnal will check IEC on this. Mike Culhane provided a summary of the direction that the de-energized tap-changer Task Force is taking, relative to combining the requirements if IEC 60214-1 with Phil Hopkinson's proposal for a functional life test.

Jim Harlow has asked the Group to revisit the power factor requirement for the breaking capacity test when work commences on the new Draft.

Red Hager nominated Craig Colopy as Vice-Chair and Mr, Colopy accepted. The meeting adjourned at 2:10 pm.

A lengthy discussion was held by the Subcommittee on the direction for the Working Group to take for this Standard. Jin Sim pointed out that IEEE would not support -1 and -2 suffixed documents, as is the practice of IEC. He also pointed out that the IEC can vote on and accept IEEE documents, but the IEEE does not normally vote on and accept IEC documents.

Jin Sim suggested that the Subcommittee should provide a clear direction to the Working Group on this issue. After discussion, Mr. Sim offered the following motion that was subsequently passed by the Subcommittee:

“motion to guide the working group to proceed with developing the guide, C57.141, with the following information as the basis.

- IEC 60214-2 draft
- Functional life test information available from Phil Hopkinson
I also move to guide the working group to proceed with revising the standard, C57.131, with the increased scope to include the DETC and a new title "IEEE Standard Requirements for Tap Changers"
- The reason for this is that members of the IEC working group clearly indicated that they do not want to include the functional life test information in the standard or the guide. One other reason I stated is that the IEC document will not be finalized for another year or more and we do not want to hold up our process.”

7.12.1.6 Working Group on C57.140 “Guide for the Evaluation and Reconditioning of Liquid Immersed Power Transformers” - Rowland James, Chairman.

Rowland James reported that the Working Group met at 3:15 PM on Tuesday, October 7, 2003 in Pittsburgh, PA with 71 in attendance. There were 38 members and 33 guests.

After introductions a brief discussion of the latest draft's status was held. The Chair reported that only two sections remain outstanding, Bushing CT's and Shell form transformers. Eric Davis of Burns & McDonnell volunteered to help with bushing CT's. Input on Shell form transformers should be submitted by Juan Therie shortly.

The current draft will be submitted to the Standards Editorial staff once clauses have been re-ordered in a more logical sequence.

Discussion from the floor:

- Don Platts noted that there are conflicts between what was written and quoted references. Contributors will be asked to reconcile these.
- Tom Lundquist suggested that chairman be sure the Working Group is part of Ballot Pool. This will be done.

The meeting was adjourned at 4:30 PM.

7.12.1.7 TASK FORCE FOR FUNCTIONAL LIFE TESTS OF DE-ENERGIZED TAP CHANGERS – Phil Hopkinson, Chairman

Phil Hopkinson discussed his Task Forces work during the Subcommittee's discussions following William Henning's report. The following written report was submitted:

The Task Force on Life Tests, De-energized Tap Changers was called to order at 9:30 am on October 7th. There were 52 attendees composed of 24 members, 8 new members and 20 guests. The agenda for the meeting was reviewed and the minutes from the March 18, 2003 meeting in Raleigh, NC were approved. This Task Force is now under the Power Transformers Subcommittee.

The Mission of the Task Force is to develop a functional life test and report for de-energized tap changers. The Chair presented a scope (as follows) for the functional life test and reviewed his testing results that were presented in a previous meeting.

Functional Life Tests:

A functional life test shall be performed as a Type Test to demonstrate the adequacy of the contact design to achieve long stable thermal life. The test consists of thermal cycling at accelerated current and temperature, with daily cool-down cycles. A successful test is completed if contact resistance remains within 25% of the original value and stability is achieved.

The test is conducted by passing twice rated current through the contacts for 8 hours per cycle at ambient temperatures of 130°C.

A total of 30 of the 8-hour on and 16-hour off cycles (days) are required to complete the functional life tests.

A report on testing by Cooper was presented by M. Culhane and Dieter Dohnal provided similar data from testing by Reinhausen. Results indicate that only silver-silver contact surfaces currently pass this test.

A report on Reinhausen's testing will be presented by Dieter Dohnal at the next meeting.

The meeting adjourned by the 10:45 scheduled time.

7.12.1.8 WORKING GROUP FOR REVISION OF C57.12.10 - Javier Arteaga, Chairman

Javier Arteaga presented the report for the Working Group for revision of C57.12.10.

The meeting was called to order shortly after 2:00 pm on October 7th with 8 members, 5 new members and 10 guests present.

The minutes from the Raleigh meeting were approved.

The focus of this meeting was to review the accessory requirements in the construction section.

- The Tap Changer will be identified as a De-energized Tap Changer. A clarification will be made for the operating handle location requirements.
- It was noted that accessory requirements for conservator style tanks needs to be added to the Standard since there is no upper kVA limit identified in the Scope.
- The sizes of the various indicators will be identified as minimums. Scale ranges and contact settings need to be reviewed to reflect current technology.
- The winding temperature indicator section will be updated as progress is made in the separate Working Group focusing on winding temperature indicators.

Action Assignments

- Tom Lundquist will review the accessory sections with respect to conservator tank designs. Jin Sim will provide input to Mr. Lundquist.
- David Aho will provide a review of the remaining accessory items for sealed tank designs.
- Jane Verner will review current technologies of gauges and provide suggestions on rewriting specific sections.
- Javier Arteaga will e-mail the revised Draft to everyone in attendance for review.

The meeting adjourned at 3:00 pm.

7.12.1.9 WORKING GROUP ON THE APPLICATION OF ON-LINE MONITORING TO LIQUID IMMERSSED TRANSFORMERS AND COMPONENTS- Donald Chu and Andre Lux, Co-Chairpersons

Donald Chu reported that the Working Group for the Application of Monitoring to Liquid-Immersed Transformers and Components met on Tuesday, October 7th with 47 attendees.

A brief discussion was held on the status of the Guide. All revisions have been made and the Guide is ready to be sent out to the Working Group membership to solicit comments, within one month. Comments will be discussed at the next meeting in San Diego.

Some discussions were held on what information the Users would like to see in the Guide. The following information was requested to be included:

- Status and discussion of present sensor and monitoring technology
- Measurement parameters and how they can be used in diagnostic algorithms
- Diagnostic algorithms and how they can be used to give a status to the health of the equipment
- Parameters which must be measured to implement algorithms
- Lessons learned from utilities who have implemented monitoring systems
- Minimum hardware specifications

The meeting adjourned at 3:45 pm.

7.12.2 OLD BUSINESS

Red Hager reported that the Working Group for IEEE 693 will be meeting in San Diego in the near future and he will attend the meetings.

Tom Lundquist reported that a Task Force will be recruited for revision of C57.135, the Phase Shifting Transformer Guide. Members of the previous Working Group and others submitting comments during balloting, as well as any users of the Guide since its' publication will be sought out to review the document to see if revisions are needed.

Wally Binder presented results on the reaffirmation of C57.117 and C57.125. Both were still open to ballot and in-progress at the time of this meeting. As of October 4th, both ballots are 25% complete.

7.12.3 NEW BUSINESS

Ernst Hanique gave a presentation on testing the natural frequency of power transformers.

The meeting adjourned at 2:45 pm.

Submitted by Joe Watson, Secretary

8.0 Editor's Report – M. Christini

As Mark was unable to attend, Chairman Sim read his report:

Between April 2003 and October 2003, a total of (41) papers and in the transformer area (25 new and 16 revised) were submitted to IEEE Transactions on Power Delivery. During this time (29) reviews were completed and (12) reviews are in-progress. For completed reviews, the recommendations were: Accept without changes (12), Revise and Resubmit (11), and Reject (6). A complete summary of these papers is listed below.

I would like to thank all of the reviewers who volunteered for this effort and donated many hours of their time over that past three years. I sincerely appreciate your time and effort.

Mark Christini

Editor, IEEE Transactions on Power Delivery

Accept without changes:

TPWRD-00390-2002.R2	IMPROVED INSERT GEOMETRY FOR REDUCING TANK WALL LOSSES IN PAD-MOUNTED TRANSFORMERS	Olivares
TPWRD-00012-2003.R1	An Evidential Reasoning Approach to Transformer Condition Assessments	Tang
TPWRD-00015-2003.R1	Deriving an Equivalent Circuit of Transformers Insulation for Understanding the Dielectric Response Measurements	Saha
TPWRD-00039-2003.R2	Estimation of the Hottest Spot Temperature (HST) in Power Transformers Considering Thermal Inhomogeneity of the Windi	Pradhan
TPWRD-00056-2003.R1	Sensitive online PD-Measurements of on site Oil/Paper-insulated Devices by means of optimized Acoustic Emission Techniques (AET)	Grossmann
TPWRD-00072-2003.R1	Development of a DC Current-Blocking Device for Transformer Neutrals	Bolduc
TPWRD-00104-2003.R2	Fault Diagnosis of a Power Transformer Using an Improved Frequency Response Analysis	Kim
TPWRD-00127-2003.R1	Power Transformer Temperature Evaluation for Overloading Conditions	Jardini
TPWRD-00130-2003.R3	Efficient Operation Regions of Power Distribution Transformers	Yang
TPWRD-00278-2003	Analysis of a Ferro-Resonant Circuit Using Bifurcation Theory and Continuation Techn	Zhou
TPWRD-00301-2003.R1	Dynamic Thermal Modelling of Power Transformers	Susa
TPWRD-00367-2003	A Controllable Reactor of Transformer Type	Tian

Revise and Resubmit:

TPWRD-00039-2003.R1	Estimation of the Hottest Spot Temperature (HST) in Power	Pradhan
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	Transformers Considering Thermal Inhomogeneity of the Windings	
TPWRD-00104-2003.R1	Fault Diagnosis of a Power Transformer Using an Improved Frequency Response Analysis	Kim
TPWRD-00130-2003.R1	Efficient Operation Regions of Power Distribution Transformers	Yang
TPWRD-00130-2003.R2	Efficient Operation Regions of Power Distribution Transformers	Yang
TPWRD-00177-2003	Specifying Transformer Winter and Summer Peak-load Limits	Li
TPWRD-00240-2003	A Neutral Resistor Based Technique For Transformer Inrush Current Reduction, Part I: Simulation and Experimental Results	Xu
TPWRD-00241-2003	A Neutral Resistor Based Technique For Transformer Inrush Current Reduction, Part II: Theoretical Analysis and Design Guide	Xu
TPWRD-00289-2003	Improvement of the Cooling Process of Oil Immersed Electrical Transformers Using Heat Pipes	Rosas
TPWRD-00301-2003	Dynamic Thermal Modelling of Power Transformers	Susa
TPWRD-00339-2003	A Complete Transient Model for Three Phase Power Transformers Using a Wavelet Filter Bank	Saleh
TPWRD-00375-2003	A Transformer Transfer Voltage Simulation Method Based on Approximate Frequency Characteristic Curves	Funabashi

Reject:

TPWRD-00066-2003.R1	Experimental Investigation of Internal Short Circuit Faults Leading to Advanced Incipient Behavior and Failure of a Distribution Transformer	Butler-Purry
TPWRD-00185-2003	Transformer Design Considering Restrained Inrush Current Based on Four-Layer Structure	Cheng
TPWRD-00227-2003	IR Thermographic Condition Monitoring of Power Transformers using Statistical and Neural Network techniques	Willis
TPWRD-00261-2003	Dissolved Gas Analysis Using Evidential Reasoning with Fuzzy Sets	Spurgeon
TPWRD-00264-2003	Application of Self-Organizing Map(SOM) to Prediction of	Ohkita

	Oil Temperature of a Substation Transformer	
TPWRD-00381-2003	Intershielded Disc Windings in Power Transformers	Ryder

Still In Progress:

TPWRD-00339-2003.R1	A Complete Transient Model for Three Phase Power Transformers Using a Wavelet Filter Bank	Saleh
TPWRD-00346-2003	DERATING OF TRANSFORMERS FOR OPERATION UNDER EXTREME WEATHER CONDITIONS IN NETWORKS HAVING OTHER VOLTAGE AND/OR FREQUENCY RATINGS	Saied
TPWRD-00404-2003	Electromagnetic and acoustic emissions to diagnose complex electrical and mechanical structures	Muzi
TPWRD-00412-2003	A moisture-in-oil model for power transformer monitoring. Part II: Experimental verification	García
TPWRD-00413-2003	A moisture-in-oil model for power transformer monitoring. Part I: Theoretical Foundation	García
TPWRD-00414-2003	Measured Transformer Derating and the Comparison with IEEE C57.110	Najdenkoski
TPWRD-00433-2003	An Effort to Understand What Factors Affect the Transfer Function of a Two-Winding Transformer	Satish
TPWRD-00455-2003	Transformer Modeling for Low- and Mid-Frequency Transients – The State of the Art	Martinez
TPWRD-00464-2003	Fuzzy-Neural Power Transformer Diagnostic System with Auto-Generation of Fuzzy Rules	Chang
TPWRD-00465-2003	Analysis of Ultrasonic Signal by Partial Discharge and Noise from the Transformer	Kweon
TPWRD-00492-2003	Voltage sag effects on three-phase transformers. Part I: Simulation results	Sainz
TPWRD-00493-2003	Voltage sag effects on three-phase transformers. Part II: Theoretical study	Sainz

All members of the IEEE Transformer Committee are invited to review technical papers. To review IEEE Transaction Papers on transformers, please sign up at: <http://tpwr-ieee.manuscriptcentral.com/>

INSTRUCTIONS FOR SIGNING UP TO REVIEW IEEE TRANSACTIONS PAPERS

1. Before you create a new account, please check for an existing account by clicking on: "Check for Existing Account"
2. Assuming that you do not get an existing account notification email, click on "Create New Account" and enter in your information.
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.

Submitted by Mark Christini, Editor

9.0 Meetings Planning Subcommittee -- G. W. Anderson, Chair

The Meetings Planning Subcommittee (Mtgs SC) holds an open meeting at each 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 meeting began at 3:00 p.m., Wednesday, October 8, 2003 in the Sheraton Station Square Hotel in Pittsburgh, Pennsylvania, USA. Seventeen (17) 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 \$10,385.18 (as of September 6, 2003). Greg thanked the recent Meeting Hosts for working hard to control expenses and help with stewardship of the Committee's funds.

9.2 Past & Present Meetings

9.2.1 Past Meeting - Raleigh, North Carolina, USA (March 16-20, 2003)

Ray Nicholas and the Host Team at ABB did an excellent job of planning and implementing the previous meeting in Raleigh. It was noted that Ms. Beverly Jenkins, Special Events Manager in

ABB's Raleigh Office contributed greatly to the planning of the event. Attendance was good at the meeting (332 attendees and 41 companions/spouses).

The speaker for our Tuesday Luncheon (207 attendees) was Mr. John W. Estey, President and CEO of S&C Electric Co. and current President of the IEEE PES. Mr. Estey gave a sobering presentation that challenged us all to continue concentrating on the technical aspects of our business and encouraged employees to continue supporting standards development. On Monday, 99 people participated in a "working luncheon" where Tom Prevost reviewed the procedures in developing standards. This event was very well accepted and we hope to hold it often.

On Wednesday evening, 166 people attended dinner at the North Carolina Museum of Art. On Monday, 33 companions/sponsors enjoyed shopping at the Triangle Town Center and lunch. On Tuesday, 33 companions/sponsors enjoyed a trip to Duke Chapel and Sara Duke Gardens located at Duke University in Durham, and then returned to Raleigh for a lunch at the Cardinal Club and a tour of the State Capital Building.

On Sunday morning, a group toured Waukesha Electric System's transformer plant in Goldsboro, North Carolina. On Thursday afternoon, a group toured ABB's Small Power Transformer Facility in South Boston, Virginia. Attendance at both tours was restricted (by invitation only).

9.2.2 Present Meeting - Pittsburgh, Pennsylvania, USA (October 5-9, 2003)

Meeting Host Dennis Blake of Pennsylvania Transformers (PTTI) gave a brief report of the on-going meeting. Attendance was good (335 attendees and 46 companions). The Pittsburgh Host Team did a great job of planning and implementing the meeting. A special thanks to Judy Panian and Cal Olsen of PTTI for their hard work.

The speaker for our Tuesday Luncheon (211 attendees) was Mr. Ed Reis, Executive Director of the George Westinghouse Museum. Mr. Reis, dressed in period clothing, provided a captivating first-person impersonation of George Westinghouse. On Monday, 81 people participated in a "working luncheon" while Tom Prevost reviewed the procedures in developing standards. This event was very well accepted and we hope to hold it often.

On Wednesday evening, 161 people attended the dinner social at the National Aviary. On Monday, 31 companions/spouses enjoyed a tour of Amish Country. On Tuesday, 30 companions/spouses enjoyed a trip to Fallingwater, a familiar example of Frank Lloyd Wright's work.

On Sunday morning, a full busload toured Pennsylvania Transformer's transformer plant in Canonsburg. On Monday evening, 53 people (including 6 companions) toured Mitsubishi Electric Power Products high voltage circuit breaker factory in Warrendale. Attendance at both tours was restricted (by invitation only).

Special thanks to HICO America, On-line Monitoring, Weidmann-ACTI, and VA-Tech Transformers for sponsor coffee breaks at this meeting and helping us defray the cost of the meeting.

9.3 Future Meetings

9.3.1 Summary

The following dates, locations and respective hosts for future meetings were reviewed.

- March 7-11, 2004 -- San Diego, California, USA at the Catamaran Resort Hotel. Hosted by San Diego Gas & Electric (Sempra Energy Utilities).
- September 19-23, 2004 -- Edinburgh, Scotland. Hosted by Jim Fyvie and VA TECH Peebles Transformers.

Possible locations for future meetings include: Jackson, Mississippi; Phoenix; Memphis; New York or New Jersey (near IEEE HQ); Minneapolis; Denver; Branson, Missouri; Las Vegas; Portugal and Montreal to name a few.

9.3.2 Upcoming Spring 2004 Meeting (March 7-11) -- San Diego, California, USA

San Diego Gas & Electric Company (SDG&E) will host the Spring 2004 Meeting in Pittsburgh, San Diego, California. The meeting will be held at the Catamaran Resort Hotel (www.catamaranresort.com) located on Mission Bay. Room rates are \$145/night (without taxes), single or double occupancy.

Technical tours are planned of SCE/ESI Edison Repair Facility and SDG&E's Distribution Operations Center. The Wednesday Evening Social will include a cruise on Mission Bay. Companion/spouse events under consideration are a full-day trolley tour through the Old Town & Coronado area. Other events under consideration include visits to the San Diego Zoo, and Point Loma and Cabrillo National Monument).

9.3.3 Upcoming Fall 2004 Meeting (September 19-23) -- San Diego, California, USA

Jim Fyvie gave a brief summary of the planning for the Fall 2004 Meeting. Jim distributed a preliminary flyer at the Pittsburgh Meeting.

9.4 Working Group Report

9.4.1 WG on Web-Site Development - Submitted by Susan McNelly

The working group meeting was held at 7:00 am on Wednesday, October 8, 2003. In spite of its early hour, the meeting was well-attended with 15 people present (5 were new attendees).

9.4.1.1 Meeting Agenda

The agenda for the meeting was as follows:

1. Introductions
2. Latest Changes
3. Archives
4. Tutorial Videos

5. Other Issues?
6. Adjournment

9.4.1.2 Latest Changes

There was a brief discussion and demonstration for new attendees of the use of the SC and WG web pages. Also, the use of the private directory for posting of draft standards and other documents that needed to be kept in a protected area were again discussed.

Ownership of the SC web pages and WG pages by their chairs was again stressed. Templates for creating new pages have been developed for the WG Chairs to use. The template is available in both MS Word and Adobe Acrobat format. The template is available on the Main Subcommittee page.

9.4.1.3 Archives

The group discussed how much information should be kept available on-line and in what format. Minutes will be left on the site, but after they are bumped from the page with the last three meetings worth of minutes, they will be kept in Adobe .pdf format only rather than in both Word and .pdf. At the last meeting there it was decided to only keep the .pdf files of the main minutes not the breakouts of each SC etc. At this time, the full and breakdown minutes are still available. Until we receive indication that we need to reduce our use of the server, they will be kept.

9.4.1.4 Tutorial Videos

At the Fall 2003 meeting, McNelly initiated a trial of video capture software to record the tutorial and presentation discussions. This software allows you to capture all actions and sound on a computer and turn it into a video that can then be used by the members to take the information back home and share with others in their companies. A demonstration of one of the new videos recorded was shown to the Web Site WG.

9.4.1.5 Other Issues

Greg Anderson brought up the suggestion of adding a search function to the web site. McNelly will look into this possibility. Anderson also brought up the idea of creating a member directory with photos. This will be raised at the Main Committee meeting on Thursday to see if members in general have an issue with having their photo on the web site and whether if done it should reside in a protected area of the site or not.

No other issues were raised and the meeting was adjourned.

9.5 New Business

9.5.1 Mailing of Meeting Minutes

As in the past, the cost for printing and mailing that document was included in the registration fee. The primary source of meeting minutes for the Pittsburgh Meeting will be the Committee's website.

This will be the last time that we will send printed meeting minutes via mail. In the future, the web-site will be the primary source for that document. For the Fall 2003 Meeting and subsequent meetings, we will charge a slight fee (probably US\$15) for printing and mailing printed meeting minutes (in paper format).

Another issue is that the present format of our minutes is not "web-friendly". It is worthwhile that we consider reorganizing and reformatting the document as a web-based document. This issue will be addressed in a future meeting and assistance is needed.

9.5.2 Tutorials/Presentations

Four technical tutorials/presentations were presented at the Pittsburgh Meeting and they continue to "exceed all expectations". Material from each of the presentations is available on the Committee's web-site.

The following panel discussions were presented at the meeting:

- "Winding Temperature Measurement: Techniques, Devices and Operation", by Garnitschnig, McClure, Shaver, Teetsel, Thompson
- "Power Systems Over-voltage Requirements and Their Impact on Transformer Design", by Chu, Girgis, Moore, Patel, Preininger
- "Simplifications of Bushing Ratings and Dimensions Included in New Standard IEEE C57.19.01-2000", by Elliott, Rivers, Wagenaar
- "Ester-based Fluids", by McShane, Oommen, Tanger

Future candidate presentations include: Net Meetings (On-line Meetings and Remote Conferencing), Web-based Review of PES Technical Papers, IEEE Virtual Communities, Loss Tolerance & Measurement (by Ramsis Girgis), Moisture in Transformers, Noise and Sound Measurements, Paralleling Transformers, and National Energy Policy (by Phil Hopkinson). In San Diego, two local engineers will present their findings on two subjects: Seismic Design Considerations and a Proposed Test to Determine Zo.

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) is 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.

At the Pittsburgh Meeting, we experimented with recording the presentations with a program called "Camedia". This application runs in the background of a MS-Powerpoint presentation, creating a .MOV file, while recording in real-time the voice of the presentation over the slide presentation. We recorded two presentations in Pittsburgh but had some problems with the audio. We will continue to experiment with this program and hopefully will record all presentations in San Diego and perhaps distribute the files on CD-ROM at that meeting.

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. Representative 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 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:

We are considering taking a photo of each attendee and creating a webpage containing those photos. This would help everyone "place a face with a name". The page would be protected from access from the general public and will be accessible only behind the secure portion of the website. We are planning on taking the photos during meeting registration in San Diego.

We are still investigating a way of coordinating and consolidating our membership databases and Greg is looking at several outside companies that provide such services, including integrated on-line meeting registration systems. We presently maintain and use several non-relational databases: the Committee "mailing list" maintained by SC Secretary, the attendee list for each meeting, the standards ballot lists, and individual membership lists maintained by SC & WG chairs. It would be helpful if databases used by the Committee were relational, centrally-located, and the contact information was self-maintained by the members.

Greg again encouraged everyone to create their own "IEEE e-mail alias address" - an excellent service provided free of charge by IEEE. An alias is a permanent e-mail address that remains the same, even if the user moves to a different company or ISP. For instance, Greg uses "gwanderson@ieee.org" and has used that same address for years, even though he has changed employers three times. A message sent to an individual's alias is immediately re-directed to an e-mail address chosen by the individual. For instance, an e-mail sent to Greg's alias is immediately forwarded to his work address. The alias service also provides excellent virus filtering, and often, a person can create a much simpler (shorter) e-mail address than the one provided by their employer. An alias also identifies a person as an IEEE member. A link to the IEEE e-mail alias service is provided within the Committee's website.

The 9/11 Event and the depressed economy have affected our meeting attendance and participation. We need to develop a contingency plan and look for opportunities to continue work during such situations. We need to learn to work more efficiently between normal scheduled Committee meetings. Greg suggested that one WG or TF plan and hold a "between meeting" Internet or telephone conference and report the results (how it went, etc) to the Committee at a future meeting. We will continue to consider a WG or TF project that would be a candidate to hold a mid-meeting on-line conference.

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.

Respectfully Submitted, Greg Anderson, SC Chair

10.0 Reports of Liaison Representatives

Status Reports on transformer related projects had previously been provided by EPRI during this section of the Meeting. In the interest of conserving time during the Main Meeting for topics that all attendees can access and/or participate in, the EPRI Status Reports have not been requested for the Raleigh Meeting. Attendees can access EPRI information through the EPRI website at www.epri.com.

10.1 SCC4 - P. A. Payne

No Standards coordinating Committee No. 4 (SCC4) activities to report at this meeting.

10.2 TC 14 TAG - P. J. Hopkinson

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 1847, Rosslyn, VA 22209

Tel: 703-841-3253, fax: 703-841-3253

MINUTES

PLACE OF MEETING: SHERATON STATION SQUARE HOTEL
7 Station Square Dr.

Pittsburgh, PA15219

DATE AND TIME: Wednesday, October 8, 2003
3:00 PM

PRESIDING OFFICER: P. Hopkinson, Technical Advisor

Members Present:

J. Corkran	Cooper Power Systems
D. Foster	Olsun Electronics Corporation
P. Hopkinson	Hvolt, Inc.
S. Kennedy	Niagara Transformer Corporation
J. Lackey	Lackey Transformer Services
P. Payne	PEPCO
H.J. Sim	Waukesha Electric Systems

Members Absent:

C. Colopy	Cooper Power Systems
J. Foldi	Consultant
R. Girgis	ABB
C. Ko	Lapp Insulator Company
R. Marek	Dupont Advanced Fibers Systems
G. Morehart	ACME Electric Corporation
W. Patterson	ABB

Others present:

J. Arteaga	Howard Industries
S. Choinski	NEMA Staff, TAG Administrator
R. DelVecchio	Consultant
D. Fallon	PSE&G
J. Kelly	S.D. Myers, Inc., TC10 TAG
T.V. Oommen	ABB
J. Puri	Hvolt, Inc.
P. Riffon	Hydro-Quebec
B. Simpson	Quin-T Corp.
R. Thompson	Duke Energy – Energy Delivery Services
R. Wicks	DuPont

1. CALL TO ORDER

The meeting was called to order, 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 19, 2003, were approved as written.

4. REVIEW AND UPDATE OF USNC ROSTERS FOR TC 14

Members reviewed the TAG roster and made necessary corrections. It is in the industry's best interest to have as much support in developing the US position within the IEC. Official members are required to pay the TAG participation fee, and are eligible to participate on IEC working groups. TAG meetings are open to all interested parties.

5. REPORT FROM TAG ADMINISTRATOR

Two documents circulated since last meeting:

14/469/DC: IEC 60599: Mineral oil-impregnated electrical equipment in service - Guide to the interpretation of dissolved and free gases analysis - IEC/TC 10

Comments due to IEC January 16, 2004

14/468/DTS: IEC TS 60076-14: Guide for the design and application of liquid-immersed power transformers using high-temperature insulation materials

Comments due to IEC November 7, 2003

USNC will be identifying those not paying the annual fee for TAG Administrator follow-up.

6. REPORT FROM TECHNICAL ADVISOR

TC 14 leadership changed with Jim Fyvie replacing Dennis Allen as Chairman. Nick Bradfield is the Secretary; both are from the UK.

Obtaining financial support for IEC activities was discussed. NEMA and EEI had provided funding for IEC delegates in the past up to \$2000 per trip. This spread the costs as not to burden one company. Expect any Working Group to have two meetings per year and the Plenary meeting is held every two years.

Current Circulated Documents:

14/469/DC: Gas in Oil Analysis and maximum allowable concentrations

Gas ppm levels too high, recommend C57.104 values used. US position will be to reject and add an "in some countries" clause.

14/468/DTS – A letter from Rick Marek was presented reminding members to provide comments and determine the US position.

Review of Working Groups and Maintenance Teams

It was noted that some WG's were changed to MT's per IEC guidelines. WG's are for new projects, MT's conduct work on existing documents.

Current Working Groups

WG 21 Convertor Transformers	Sheldon Kennedy	Work Completed
WG 2 Short Circuit	Jerry Corkran	WG Abandoned – now MT
WG 24 Dielectric Tests	Loren Wagenaar	No recent activity
WG 25 Audible Sound	Jeewan Puri	Measurement Techniques
WG 26 Tapchangers	Craig Colopy	Application Guide
WG 27 Dry Type Transformers	Wes Patterson	Document Dormant – now MT
WG 28 Internal Protection		CSP Transformers
WG 29 High Temperature	Rick Marek, Convenor	

Liquid Filled Transformer (14/468/DTS): US comment sent in on 2/28/03 to indicate concern for electrical contact heating and thermal runaway at elevated temperatures. Contact oxidation conforms to 10 C half-life rule.

WG 30 Gas Insulated Transformers	No US Interest	Japanese Initiative
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(14/461/NP): Technology not currently used in the US. What benefit is there for US suppliers? Program passed within IEC despite US opposition.

Maintenance Teams

MT 1 Revision of IEC 60354 Loading Guide for Oil Immersed Power Transformers

MT 2 Ability to Withstand Short Circuit Committee draft document (14/464A/MCR) produced with special attention to radial and axial stresses for core type and shell type constructions, respectively. Follows Cigre initiative: CD 2003, CDV 2004, FDIS 2005.

MT 3 Revision of IEC 60289 Reactors

MT 27 Dry Type Transformers (14/460/RDV): Controversial Fire Test

where transformer coil is burned on a large bunsen burner. This test is not used in the US but is favored by at least one European Country. The test has questionable practicality.

6. TC 14 MEETING PLANS

The next TC-14 Plenary meeting is planned for March 2004 in Frankfurt, Germany.

7. OTHER BUSINESS

There was no new business.

8. TIME AND PLACE OF NEXT MEETING

The next meeting will be held in conjunction with the Spring IEEE PES Transformer Committee meetings March 2004 in San Diego, CA.

9. ADJOURNMENT

The meeting adjourned at 4:20 PM EST.

Reported By:

S. Choinski

October 8, 2003

10.3 CIGRE – Jean-Christophe Riboud

10.3.1 Cigré miscellaneous

CIGRE transformer committee A2 met for its colloquium in Merida Mexico last June. This colloquium was attended by a large number of participants revealing the high interest given to electrical technical matters.

10.3.2 Work planned

An article giving the state of the art in gas insulated transformer will be prepared by specialist for publication in the CIGRE review ELECTRA.

A very interesting report on the moisture behaviour in transformer insulation will be soon published and available from CIGRE. This report covers subject of source of moisture and moisture distribution in transformer insulation as well as moisture equilibrium, solubility of water in oil, moisture migration, and also propose a panel of hazardous effects of moisture

10.3.3 A2 achievement

Two new brochures are or will be published this year as result of working group studies:

N°227 is for sale since June and deals with life management techniques of power transformers, its the result of the work made by the working group A2 18

The brochure resulting in the work of group 12 16 on instrument transformers will be published at the end of 2003.

Those documents can be purchased from CIGRE all information may be found on www.cigre.org

10.3.4 A2 Final report expected before end of 2003

Economic of Transformer Management final report will be release by the working group A2 20 before the end of 2003.

Electrical Environment of transformers final report will be release by the working group A2/A3/B3 21 before the end of 2003. This reports deals with transformer and breaker interaction for high voltage transformers. It's work had been based on a careful analyses of actual failures mostly linked with SF6 Failures. It proposes some clues to evaluate the risk and mitigate it.

10.3.5 A2 Work in process

There are currently four working groups ongoing:

- A2 23 on lifetime data management with task forces on
 - Specification for data's and reason why
 - Management of data's
 - Data collection

- A2 24 on thermal performances of power transformers . The scope of which will cover the fundamental of ageing.; the rating of new transformers and special attention will be paid to gas turbine transformers, and also practical applications for in service transformers.

- D1/A2 01 11 On new advance in DGA interpretation

- A4 04/ A2 1 On Analysis of HVDC system performances correlated to converter transformer performances.

10.3.6 A2 Future activities

A reliability advisory group is created. It 's intended that this group produce failure guide and failure definition.

Reliability will be the main topic for CIGRE 2005 colloquium.

10.3.7 A2 New working group proposal

Bushing reliability may look after the trend of bushing performances and their long term reliability impact.

Mechanical condition of windings with assessment of frequency response analysis. The idea is to promote good practices and some standards for FRA measurement and to prepare the next step which could be FRA interpretation.

10.3.8 CIGRE next meeting

Paris session will be held in 2004, the two preferential subjects for transformers are:

- 1 Thermal performances
- 2 On site operation and maintenance.

You can find more on www.cigre-sc12.org

Submitted by: Jean-Christophe Riboud

11.0 Old Business

11.1 Main Meeting Format

We have been discussing for several meetings the issue of how much value the Thursday Main Committee Meeting provides to members and attendees, and whether changes in format, content, or schedule might be effective in enhancing that value. The Chair reminded all that, despite several requests, very few specific suggestions have been forthcoming. Some suggestions are outlined in the Administrative SC Minutes. The Chair asked again for SC Chairs, or any others with thoughts or ideas in this regard, to forward their suggestions in writing to any of the Committee officers, and asked that this subject be reviewed as an Agenda item at the next Meeting. The Secretary suggested that input be posted on the website to allow review prior to the next meeting.

11.2 Membership Issues

The Secretary noted that the mailing of the Raleigh Minutes had included cover letters indicating that printed Minutes would no longer be mailed as a matter of course to Members and meeting attendees. The letters to members were specifically addressed, with the intent to verify contact information, and those letters also notified members who had not attended meetings within the past two years that their membership status would be subject to review based on attendance requirements in our O&P Manual. Review of attendance and maintenance of an accurate roster record is necessary in setting a quorum that will realistically allow voice votes to proceed when required at meetings.

The Secretary has suggested Corresponding Membership to several Members who have difficulty regularly attending. A few responses to the above letters again pointed out the importance and significance of participation by correspondence. There are several members who are not able to attend regularly, but whose level of participation meets and exceeds that of some of our attending members. Any of us may face budgetary or other business constraints at any time that could preclude attendance. Participation by correspondence then becomes the only means to maintain active membership. While much work is accomplished at meetings, we note also that even more work is required between meetings to allow our projects to proceed in a timely manner. Correspondence is key to this progress. As discussed previously, the definition of Corresponding Membership, intended for inclusion in the next O&P Manual update, is planned to indicate that status, responsibilities, and stature are identical to those for regular Membership – with the only difference being that regular attendance is not required. As such, movement back and forth between regular Membership and Corresponding Membership will be possible, depending on attendance. Corresponding Members will not be included in the quorum count, which should facilitate achieving quorums at meetings. These changes are proposed, and have been approved in principle in Administrative SC review.

11.3 CIGRE Contact Information

In order to promote awareness and interaction between our IEEE documents and IEC documents, Ramsis Girgis suggested that an addendum be prepared to the CIGRE Liaison report providing names and contact information for the various areas of responsibility related to transformers. The Secretary will review with our CIGRE Liaison the appropriate means to provide this information.

There were no other items of old business raised for discussion.

12.0 New Business

There were no items of new business raised.

13.0 Adjournment

The meeting was adjourned at 11:17 AM.

Respectfully submitted,

Donald J. Fallon, Secretary

Attachment 1 – Status Report of IEEE/PES Transformers Committee Standards

ATTACHMENT 1 STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE					
STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUBDATE PARDATE REV DUE	STATUS AND COMMENTS
<i>03-Oct-03</i>					
SUBCOMMITTEE: AUDIBLE SOUND & VIBRATION					
CHAIR:	J. PURI				
PHONE:	(704)282-7413				
C57.136	GUIDE FOR SOUND LEVEL ABATEMENT AND DETERMINATION IN OIL-FILLED TRANSFORMER	DARWIN, A.		9/20/00	Approved Standard 9/2000
None					2005
SUBCOMMITTEE: BUSHING					
CHAIR:	F. E. ELLIOTT				
PHONE:	(360)619-6099				
C57.19.00	GENERAL REQUIREMENTS AND TEST PROCEDURES FOR OUTDOOR APPARATUS BUSHINGS (IEEE 21)	ELLIS, K. (615)847-2157	PSIM IEC SC36 IA/PSE ICC	7/23/91 6/20/96 2002	Standard extended until Dec 2004 PAR extended until Dec 2004
C57.19.01	STANDARD PERFORMANCE CHARACTERISTICS AND DIMENSIONS FOR OUTDOOR APPARATUS BUSHINGS (IEEE 24)	SINGH PRITPAL (901)696-5228	ICC IA/PSE IEC SC36A	12/29/00 2005	Revised Standard Approved 12/29/2000
C57.19.03	STANDARD REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR BUSHINGS FOR DC APPLICATIONS	F. E. ELLIOTT (360) 619-6099		6/20/96	reaffirmed Dec 10, 2002
None					2007
C57.19.100	GUIDE FOR APPLICATION OF APPARATUS BUSHINGS	ELLIOTT F. E. (360) 619-6099	SWGR SUB PSR	3/16/95	Balloting Reaffirmation
None					2001
NEW	TASK FORCE TO STUDY APPLICATION AND PROBLEMS OF DRAW-LEADS FOR BUSHINGS	NORDMAN RUSS (414)547-0121			Standard Extended until 12/2003
NEW					NEW TASK FORCE

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUB DATE PAR DATE REV DUE	STATUS AND COMMENTS
SUBCOMMITTEE: DIELECTRIC TESTS					
CHAIR: L. B. WAGENAAR					
PHONE: (614)552-1759					
C57.113	GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN LIQUID-FILLED POWER TRANSFORMERS AND SHUNT REACTOR	PERKINS, M. [314]382-2100	PSIM IAS/PSE IEC TC14 L	12/5/91 2007	Reaffirmed 12-20-02 PAR withdrawn 12/10/02
C57.127	GUIDE FOR THE DETECTION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS	J. W. HARLEY (216)425-1838		9/20/00 2/13/03 2005	Has been granted Full-Use status
C57.138	RECOMMENDED PRACTICE FOR ROUTINE IMPULSE TEST FOR DISTRIBUTION TRANSFORMERS	ROSSETTI J. (901)528-4743	T&D IA/PSE PSIM	3/19/98 9/19/96 2003	
C57.98	IEEE GUIDE FOR TRANSFORMER IMPULSE TEST	Moulden, A., (845) 225-0993	NONE	12/2/93 9/11/02 2004	New PAR approved 9/02

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUB DATE PAR DATE REV DUE	STATUS AND COMMENTS
SUBCOMMITTEE: DISTRIBUTION TRANSFORMERS					
CHAIR:	Ed SMITH				
PHONE:	(314)677-3421				
C57.12.20 PC57.12.20	OVERHEAD-TYPE DISTRIBUTION TRANSFORMERS, 500 KVA AND SMALLER- H V 34500 VOLTS AND BELOW, L V 7970/13800Y &	ANDERSEN GLEN WILKS, A.		6/20/96 2/1/02 2001	PAR for revision approved Feb 2002
C57.12.23 PC57.12.23	UNDERGROUND-TYPE, SELF-COOLED, 1-PHASE DISTRIBUTION TR WITH SEPERABLE INSULATE HV CONNECT HV 24940GrdY..L.V.,240...:167kVA.	Traut, A., Lee R.	T&D IC IAS/REPC	6/12/02 3/18/95 2007	Revised Standard approved June 2002
C57.12.25 PC57.12.25	REQUIREMENTS FOR PAD-MOUNTED COMP-TYPE, SELF-COOLED, 1-PHASE DISTRIBUTION TR W/SEP INS HV CONN, HV 34500GrdY...:167kVA...	LAZAR, GHAFORI	T&D IC IAS/REPC	5/11/96 12/8/98 1995	Recirculating Ballot PAR extended until Dec 2004
C57.12.28 PC57.12.28	Standard for Pad Mounted Equipment - Enclosure Integrity	OLEN / MULKEY 262-835-3362		5/1/02	
C57.12.29 PC57.12.29	Standard for Pad Mounted Equipment - Enclosure Integrity for Coastal Environments	OLEN / MULKEY 262-835-3362			
C57.12.31 PC57.12.31	Standard for Pole Mounted Equipment - Enclosure Integrity	OLEN / MULKEY 262-835-3362		9/11/02 2007	
C57.12.32 PC57.12.32	Standard for Submersible Equipment - Enclosure Integrity	OLEN / MULKEY 262-835-3362		9/11/02 2007	
C57.12.33 PC57.12.33	GUIDE FOR EVALUATION OF LOSSES IN DISTRIBUTION TRANSFORMERS	PEKAREK T. DUCKETT, D.	PSIM	6/1/98	PAR extended until 12/2004 Ballot closed 4/1999
C57.12.34 PC57.12.34	REQUIREMENTS FOR THREE PHASE PAD-MOUNTED DISTRIBUTION TRANSFORMERS	Shull, Stahara (417)625-5100	ICC	12/6/00	Par extended until 12/2004 Being Balloted
C57.12.35 NONE	STANDARD FOR BAR CODING FOR DISTRIBUTION TRANSFORMERS (POLE-MOUNTED, PAD-MOUNTED AND UNDERGROUND)	Henry, G.		6/20/96 2001	Need to revise/reafirm by 12/02

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUBDATE PARDATE REV DUE	STATUS AND COMMENTS
C57.15 PC57.15	REQUIREMENTS, TERMINOLOGY, & TEST CODES FOR STEP-VOLTAGE REGULATORS	KENNEDY, G. COLOPY, C.	SUBS IAS/PSE	9/16/95 12/6/00 2004	
IEEE1388 Pc57.12.37	STANDARD FOR THE ELECTRONIC REPORTING OF TRANSFORMER TEST DATA	SMITH J. ROLLINS (601)892-4661		12/6/00 10/1/01 2005	Revising, will publish as c57.12.37

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PURDATE PAR DATE REV DUE	STATUS AND COMMENTS
SUBCOMMITTEE: DRY-TYPE TRANSFORMERS					
CHAIR: C. JOHNSON					
PHONE:					
C57.12.01	GENERAL REQUIREMENTS FOR DRY-TYPE DISTRIBUTION TRANSFORMERS AND POWER TR INCL THOSE WITH SOLID CAST & or RESIN-ENCAPSULATED WINDINGS	SULLIVAN J. 813-228-4111	NEMA 1A/1&CPS U.L. ANSI	9/1/98 Balloting 3/1/99 2003	
C57.12.50	REQ. FOR VENTILATED DRY-TYPE DISTRIBUTION TRANSFORMERS, 1 PHASE, AND 15-500kVA, 3-PHASE HV 601-34500VOLTSLV 120-600V	SULLIVAN J. (813) 228-4111		6/12/85 Need PAR for revision to get ANSI/IEEE status 1994	
C57.12.51	REQ. FOR VENTILATED DRY-TYPE POWER TR, 50kVA & LARGER, 3 PHASE, WITH HV 601-34500V, LV 208Y/120 TO 4160 VOLTS	SULLIVAN J. (813) 228-4111		6/12/85 Need PAR for revision to get ANSI/IEEE status 1994	
C57.12.52	REQ. FOR SEALED DRY-TYPE POWER TRANSFORMERS, 50kVA & LARGER, 3 PHASE, WITH HV 601-34500V, LV 208Y/120 TO 4160 VOLTS	SULLIVAN J. (813) 228-4111		6/12/85 Need PAR for revision to get ANSI/IEEE status 1994	
C57.12.55	CONFORMANCE STANDARD FOR TR-DRY-TYPE TRANSFORMERS USED IN UNIT INSTALLATIONS INCL. UNIT SUBSTATIONS	SULLIVAN J. (813) 228-4111		4/7/86 Need PAR for revision to get ANSI/IEEE status 1992	
C57.12.56	TEST PROCEDURE FOR THERMAL EVALUATION OF INSULATION SYST FOR VENTILATED DRY-TYPE POWER & DISTRIBUTION TRANSFORMER;	PROVOST R. L. (302)999-2225		3/1/98 REAFFIRMED IN SEPT 1998 2003	WOULD LIKE TO COMBINE WITH C57.12.60
C57.12.58	GUIDE FOR CONDUCTING TRANSIENT VOLTAGE ANALYSIS OF A DRY-TYPE TRANSFORMER COIL	PAYNE P. (202) 388-2138	IEC IAS	9/19/96 Reaffirmed 6/2002 6/28/78 2007	
C57.12.59	GUIDE FOR DRY-TYPE TRANSFORMER THROUGH FAULT CURRENT DURATION	PAYNE P. (202)388-2335		12/5/01 Revision approved Dec. 2001 9/21/00 2006	
C57.12.60	TEST PROCEDURE FOR THERMAL EVALUATION OF INSULATION SYSTEMS FOR SOLID-CAST & RESIN ENCAP POWER & DIST TRANSFORMER	PROVOST R. L. (302)999-2225	IEC SC15E NEMA	3/19/98 REVISION APPROVED 3/98 6/26/97 2003	WOULD LIKE TO COMBINE WITH C57.12.56
C57.12.91	TEST CODE FOR DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS	FOSTER D. (815) 678-2421	SPD EM T&D	12/6/00 Approved Dec 6, 2000 2005	

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUBDATE PAR DATE REV DUE	STATUS AND COMMENTS
C57.124 NONE	RECOMMENDED PRACTICE FOR THE DETECTION OF PD AND THE MEASUREMENT OF APPARENT CHARGE IN DRY-TYPE TRANSFORMERS	PAYNE P. (202)388-2138	NONE	6/29/91 6/27/91 2007	REAFFIRMED 6/12/02
C57.134	GUIDE FOR THE DETERMINATION OF HOTTEST SPOT TEMPERATURE IN DRY TYPE TRANSFORMERS	PAYNE P. (202)388-2138		12/29/00 9/21/95 2005	Approved by standards board 12/00
C57.16 NONE	STANDARD REQUIREMENTS, TERMINOLOGY, AND TEST CODE FOR DRY-TYPE AIR-CORE SERIES CONNECTED REACTORS	DUDLEY R. (416)298-8108	NEMA IAS T&D	12/10/90 2006	Reaffirmed on 6/13/01
C57.94 NONE	RECOMMENDED PRACTICE FOR INSTALLATION, APPLICATION, OPERATION & MAINTENANCE OF DRY-TYPE GEN PURPOSE DIST & POWER TR	PATTERSON W. (919)848-1860		12/9/87 2005	Reaffirmed 6/2000
C57.96 None	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS	PIERCE L. (706)291-3166	T&D SCC14 SCC10	6/26/95 2004	
IEEE 259 None	TEST PROCEDURE FOR EVALUATION OF SYSTEMS OF INSULATION FOR SPECIALTY TRANSFORMERS	SIMPSON R. W. JR. (603)284-4362		6/26/95 3/21/90 2004	
SUBCOMMITTEE: HVDC CONVERTER TR & REACTOR					
CHAIR:	R.DUDLEY				
PHONE:	(416)298-8108				
C57.129 None	GENERAL REQUIREMENTS & TEST CODE FOR IMMERSED HVDC CONVERTER TRANSFORMERS AND SMOOTHING REACTORS FOR DC POWER	OR.DUDLEY (317)286-9387	EM T&D PSIM	6/1/00 2005	
IEEE1277	GENERAL REQUIREMENTS & TEST CODE FOR IMMERSED AND DRY-TYPE HVDC SMOOTHING REACTORS	OR.DUDLEY (317)286-9387	SUB	3/29/00 2005	Upgraded to full use 3/20/02

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PURDATE PAR DATE REV DUE	STATUS AND COMMENTS
SUBCOMMITTEE: INSTRUMENT TRANSFORMERS					
CHAIR: J. E. SMITH					
PHONE: (919)827-3220					
C57.13	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS	NELSON T. (301)975-2956	PSIM PSR SPD	6/7/93 6/14/94 2002	Standard Extended until 12/2003 Par withdrawn. Need new PAR
C57.13.2	CONFORMANCE TEST PROCEDURE FOR INSTRUMENT TRANSFORMERS	KHALIN V. (859) 879-2797		6/3/03	
C57.13.5	TEST REQUIREMENTS FOR INSTRUMENT TRANSFORMERS OF A NOMINAL VOLTAGE OF 115KV AND ABOVE	Ma J.	SWGR EM TC 38 US T	3/20/03 9/19/96 2008	Trial Use Guide approved 20 Mar 2003
C57.13.6	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS FOR USE WITH ELECTRONIC REVENUE METERS AND RELAYS	TEN-HAAGEN C. (603)749-8433	PSIM PSR TD	2/13/03	Par approved Feb 13, 2003

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUBDATE PAR DATE REV DUE	STATUS AND COMMENTS
SUBCOMMITTEE: INSULATING FLUIDS					
CHAIR: F. GRYSZKIEWICZ					
PHONE: (617)926-4900					
C57.104	GUIDE FOR THE DETECTION AND DETERMINATION OF GENERATED GAS IN OIL-IMMERSED TRANSFORMERS & THEIR RELATION	HEINRICHS F. W. (412)941-6924	PE/IC PE/SUB PE/T&D	6/27/91 12/10/96 2002	Balloting PAR Extended until 12/04
PC57.104					
C57.106	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF INSULATING OIL IN EQUIPMENT	Thompson, J. 919-580-3247	NONE	6/12/02 12/10/02 2007	
PC57.106					
C57.111	GUIDE FOR ACCEPTANCE OF SILICONE INSULATING FLUID AND ITS MAINTENANCE IN TRANSFORMERS	J. Goudie (517)496-6826	IAS T&D ED&PG	2/2/89 12/10/87 2001	NEED Reaffirmation or Revision Standard Extended until 12/04
NONE					
C57.121	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS	McSHANE C. P. (617)926-4900	PSRC T&D IAS	9/16/98 2003	
NONE					
C57.130	T-U GUIDE FOR USE OF DISS. GAS ANALYSIS DURING FACTORY THERMAL TESTS FOR THE EVALUATION OF OIL-IMMERSED TRANS. AND	HEINRICHS F. W. (412)941-6924	NONE	1/30/01 0	Balloting Standard Requesting PAR xtension
PC57.130					
C57.139	GUIDE FOR DISSOLVED GAS ANALYSIS IN TRANSFORMER LOAD TAP CHANGERS	Ladroga, R.	IEC US TA	12/10/02	New PAR approved
PC57.139					
IEEE 637	GUIDE FOR THE RECLAMATION OF INSULATING OIL AND CRITERIA FOR ITS USE	J. Thompson (605) 534-3571		6/4/84 2007	reaffirmed 12-10-02
NONE					
IEEE1258	TRIAL-USE GUIDE FOR INTERPRETATION OF GASES GENERATED IN SILICONE-IMMERSED TRANSFORMERS	Goudie/Bartley (517) 496-6826	T&D ICC	6/15/95 0	
PC57.146					

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUBDATE PAR DATE REV DUE	STATUS AND COMMENTS
SUBCOMMITTEE: INSULATION LIFE					
CHAIR: D. PLATTS					
PHONE:					
GUIDE FOR DEFINITION OF THERMAL DUPLICATION BEASTER B.					
1538	GUIDE FOR DETERMINATION OF MAXIMUM WINDING TEMPERATURE RISE IN LIQUID FILLED TRANSFORMERS	PLATTS, D.		6/1/00	Approved as new standard 2005
C57.100	TEST PROCEDURE FOR THERMAL EVALUATION OF OIL-IMMERSED DISTRIBUTION TRANSFORMERS	Wicks, R. (804) 383-3300	PE/PSR IA/PSE PE/T&D	6/26/95	Applying for new Par 2004
C57.119	RECOMMENDED PRACTICE FOR PERFORMING TEMP. RISE TESTS ON OIL-IMMERSED POWER TRANSFORMER AT LOADS BEYOND NP RATING	S. Tuli 262-547-0121	SWGR SUBS SCC4	10/10/01	Approved New Recommended Practice 5/16/00 2006
C57.91	GUIDE FOR LOADING MINERAL OIL-IMMERSED TRANSFORMERS	RAYMOND T. (518) 884-0297	SUB T&D PSE	6/14/95	Corriagenda Approved Dec 10, 2002 3/24/06 Reaffirm disapproved. 2-year extension granted 2000
IEEE1276	IEEE GUIDE FOR THE APPLICATION OF HIGH TEMPERATURE INSULATION MATERIALS IN LIQUID-IMMERSED POWER TRANSFORMERS	FRANCHEK M. A. (802)748-3936	T&D	6/1/97	Balloting Reaffirmation 3/21/96 Extended until 12/2003 2002

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUBDATE PAR DATE REV DUE	STATUS AND COMMENTS
SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS					
CHAIR:	R. GIRGIS				
PHONE:	(314)679-4803				
C57.105	GUIDE FOR APPLICATION OF TRANSFORMER CONNECTIONS IN THREE-PHASE DISTRIBUTION SYSTEMS	REITTER G. (415)591-4463		6/17/92	Reaffirmed 3/99
NONE				2004	
C57.109	GUIDE FOR THROUGH-FAULT CURRENT DURATION	PATEL B. (205)877-7740	PSR	3/18/93	Reaffirmed 6/2000
NONE				2005	
C57.110	RECOMMENDED PRACTICE FOR ESTABLISHING TRANSFORMER CAPABILITY WHEN SUPPLYING NONSINUSOIDAL LOAD CURRENTS	MAREK R. P. (804)838-8080	T&D PSR NEMA	7/2/98	
NONE				2003	
C57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT	GIRGIS, R. (765)286-9532		6/12/02	Approved as new standard 6/12/02
PC57.123				9/16/95	
				2007	
C57.133	GUIDE FOR SHORT-CIRCUIT TESTING OF DISTRIBUTION AND POWER TRANSFORMERS	McQUIN N. (412) 829-1205	T&D, SWG PSR IECTC14	SUBS IAS/PSE IAS/REP	PAR withdrawn Mar 2003 Need new PAR Balloting complete, awaiting publishing
C57.142	A guide to describe the Occurance and Mitigation of Switching Transients Induced by Transformer/Breaker interaction	DEGENEFF, R. 518-276-6367		12/7/00	
PC57.142					
C57.18.10	REQUIREMENTS FOR SEMICONDUCTOR RECTIFIER TRANSFORMERS	KENNEDY S. P. (716)896-6500	NONE	3/1/98	STANDARD APPROVED MARCH 1998
NONE				2003	
C57.21	REQUIREMENTS, TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA	Dudley R.		4/2/91	Balloting Reaffirmation
PC57.21				6/1/03	
				2001	
IEEE 638	QUALIFICATION OF CLASS 1E TR FOR NUCLEAR POWER GENERATING STATIONS	PIERCE L. W. (706)291-3166	NPE SUB SC2	3/19/92	REAFFIRMED 1999
P638				10/29/90	
				2004	

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUB DATE PAR DATE REV DUE	STATUS AND COMMENTS
SUBCOMMITTEE: Power Transformers					
CHAIR: HAGER/LUNDQUIST					
PHONE:					
PC57.143	Guide for Application of Monitoring Equipment to Liquid-Immersed Transformers and Components	A. Lux/D. Chu 919-856-3888		3/21/02	
C57.116 NONE	GUIDE FOR TRANSFORMERS DIRECTLY CONNECTED TO GENERATORS	REITTER G. (415)508-2850		1/3/89 2005	Reaffirmed 6/2000
C57.117 NONE	GUIDE FOR REPORTING FAILURE DATA FOR POWER TRANSFORMERS AND SHUNT REACTOR	CASH D. (702) 227-2316		6/17/92	REAFFIRMED 1998
C57.12.10 None	TRANSFORMERS 230KV AND BELOW - 8333/10417kVA 1 PH, -100000 KVA 3 PH w/o LTC, 100000kVA w/LTC - SAFETY REQUIREMENTS	Javiar Arteaga (312)394-2704		6/4/87 6/13/02 1993	Coordinate with C57.12.36
C57.120 NONE	LOSS EVALUATION GUIDE FOR POWER TRANSFORMERS AND REACTORS	JACOBSEN R.	SUB EM ED&PG	12/29/00 5/1/80 2005	Reaffirmed 12/29/00
C57.125 NONE	GUIDE FOR FAILURE INVESTIGATION, DOCUMENTATION AND ANALYSIS FOR POWER TRANSFORMERS AND SHUNT REACTORS	CASH D. (702) 227-2316	T&D ED&PG PSE	6/27/91 6/28/87 2003	REAFFIRMED 1998
C57.131 PC57.131	REQUIREMENTS FOR LOAD TAP CHANGERS	Henning, W.		3/16/95 6/3/03 2001	Reaffirmation ballot underway Extended until 12/2003
C57.135 C57.135	GUIDE FOR APPLICATION, TESTING, INSTALLATION AND OPERATION OF PHASE ANGLE SHIFTING TRANSFORMERS	TRUMMER Lundqu 43-3172-606-404	PSRC EMC IAS/PSP	12/5/01	Standard approved 12/5/01
C57.140 PC57.140	Evaluation and Reconditioning of Liquid Immersed Power Transformers	JAMES, R. (504)576-6246		2006	PAR extended until Dec 2005
C57.141 PC57.141	GUIDE FOR APPLICATION OF LOAD TAP CHANGERS	HENNING, W. (414)547-0121		9/16/95 6/26/95	

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUBDATE PAR DATE REV DUE	STATUS AND COMMENTS
C57.17 ANSI	REQUIREMENTS FOR ARC FURNACE TRANSFORMERS	CORSI D. 330-875-3333		12/12/95 6/13/02 2006	STANDARD HAS BEEN WITHDRAWN TF has been established, No PAR submitted
C57.93 PC57.93	GUIDE FOR INSTALLATION OF LIQUID-IMMERSED POWER TRANSFORMERS.	LAU M. (604)528-3201	NONE		
SUBCOMMITTEE: Standards					
CHAIR: T.A. PREVOST					
PHONE:					
PC57.144	Guide to Metric conversion of Transformer Standards	Galloway, D. (573)635-7587		12/5/02	
C57.12.00 VARIOUS	GENERAL REQUIREMENTS FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	TULLI S. (414)547-0121		6/21/00 6/13/01 2005	Reviewing ballot comments
C57.12.13 ANSI	CONFORMANCE REQUIREMENTS FOR LIQUID-FILLED TRANSFORMERS USED IN UNIT INSTALLATIONS INCL. UNIT SUBSTATIONS			9/2/81 1987	ASSIGN TO SUBCOMMITTEE NEMA STANDARD
C57.12.53 ANSI	REQUIREMENTS FOR DRY-TYPE, UNDERGROUND, SINGLE-PHASE WITH SEPARABLE INSULATED H-V 24940 grdY/14400 V			0	ONLY TITLE EXIST (NO PAR) IS IT REQUIRED?
C57.12.54 ANSI	REQUIREMENTS FOR DRY-TYPE, UNDERGROUND 3 PHASE DISTRIBUTION TRANSFORMERS, 2500 kVA OR <, HV 24940 grdY/14400 OR <LV 480V			0	ONLY TITLE EXISTS IS IT REQUIRED?
C57.12.70	TERMINAL MARKINGS AND CONNECTIONS FOR DIST. & POWER TRANSFORMERS	Prevost, T.A. (802)751-3458	T&D SUBS ICC	12/6/00	
C57.12.80	TERMINOLOGY FOR POWER & DISTRIBUTION TRANSFORMERS	TRAUB T. P. (312)394-2704	T&D SUBS	2005 5/1/92 6/14/95 2002	
C57.12.90 None	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS & GUIDE FOR SC TESTING OF ...			6/26/95 6/15/95 2004	Resolving comments and negatives from latest ballot

STANDARD PROJECT	TITLE	WORKING GROUP CHAIR AND PHONE	COMMITTEES REQUESTING COORDINATION	PUB DATE PAR DATE REV DUE	STATUS AND COMMENTS
SUBCOMMITTEE: UG TR & NETWORK PROTECTORS					
CHAIR: C.G. Niemann					
PHONE: (708)410-5307					
C57.12.24	UNDERGROUND-TYPE 3-PHASE DISTRIBUTION TRANSFORMERS, 2500kVA AND SMALLER; HV, 34500Grdy...& BELOW, LV, 480 V AND BELOW	SULLIVAN, J. (813) 228-4111	T&D IAS/PSEC IC IEC TC 14 IAS/REPC	3/17/94 1999	Need new PAR
C57.12.40	REQUIREMENTS FOR SECONDARY NETWORK TRANSFORMERS, SUBWAY & VAULT TYPES (LIQUID IMMersed)	Klaponski, B. (204) 633-7220	T&D IAS/PSEC ICC IEC TC14 IAS/REPC NEMA	2/1/02 1998	PAR Approved feb. 2002
C57.12.44	STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS	MULKEY D. H. (415)973-4699	T&D IAS/PSEC SWGR EEI IAS/REPC NEMA	8/1/00 2005	Revised Standard approved 8/2000
C57.12.57	REQUIREMENTS FOR VENTILATED DRY-TYPE NETWORK TRANSFORMERS 2500kVA AND BELOW, W/HV 34500V AND BELOW, LV 216Y...AN	ROBINSON, A.	T&D EEI/T&D SCC14	3/18/92 12/5/91 2000	Need new PAR to establish standard

Attachment 2 – Meeting Room Attendance Record

NOTE: Van., OKC, Ral., and PBGH info. not yet factored into MAX or AVG figures. Check Committee website for future update.

GROUPS	Nash. TN Apr. 00	Niagara Oct 00	Amster. Apr01	Orlando Oct 01	Van. B.C. Apr02	OKC.OK Oct 02	Ral. NC Mar 03	PBGH.PA Oct 03	MAX	AVG
Committee Registration: Members and Guests	302	361	265	289	280	280	332	335	361	285
Spouses	94	94	67	69	81	81	41	46	94	63
Luncheon	175	217	131	149	161	176	207	211	262	196
SC ADMINISTRATIVE	23	22	18	24	23	20	19	22	24	21
NEWCOMERS ORIENTATION						~30	~20	~25		
SC Meeting and planning			15	17	22	18	14	17	15	15
SC AUDIBLE NOISE AND VIBRATION	21	21	17	27	25	17	21	25	32	25
WG Sound measurements					23	19	18	-		
WG Transformer siting guide C57.136								-		
SC BUSHINGS	28	28	28	29	42	44	46	37	32	26
WG Revision C57.19.00	25	38	25	27	36	29	-	-	38	28
TF Draw Lead Bushings	24	27	18	13				42	27	21
WG Revision C57.19.01	19							-	38	27
SC DIELECTRIC TESTS	91	96	62	87	93	117	124	112	96	77
WG Revision to Low Frequency Tests	48		34	48	40		50	-	54	41
WG Revision of Transient Dielectric Tests	43	37			38	40	34	35	43	34
TF Rev. to Impulse Tests				19	41	27	46-WG	38	19	19
TF L.F. Transformers Dielectric Test Table		46	60	45	46		54	-	46	43
WG Partial Discharge Tests	47	66	65	44	41	86	74	57	66	55
SC DISTRIBUTION TRANSFORMERS	53	41		50	45	40	47	32	53	42
WG Dist. Substation Transformers C57.12.36	40	37		32	22	28	30	38	40	29
WG Overhead Type Distr. Transfs. C57.12.20	49	39		40	36	32	32	29	49	36
WG Single-Phase Submersible C57.12.23	20	18					-	-	41	21
WG Single-Phase Deadfront Padmount C57.12.25	47			33	35	27	40	-	47	38
WG Bar Coding							-	-	40	40
WG Loss Evaluation C57.12.33	45			49	41	48	35	-	49	47
WG Electronic Data Transmittal	22			17	16	26	21	22	22	17
WG Three-Phase Padmount C57.12.34	42			33	40	36	38	-	42	33
WG Step-Voltage and Induction Regs C57.15				26	26	18		31	26	17
SC DRY-TYPE TRANSFORMERS	25	31	20	20	21	20	27	19	33	25
WG Test Code C57.91	11	24	12	10	13	12	24	20	23	18
WG Dry-Type Reactors	10	11	13	7	10	10	9-TF	18	13	10
WG Dry-Type Thermal Eval. And Flammability								16		
WG Dry-Type General Requirements C57.12.01	23	23	14	25	20		18	15	28	23
WG Dry-Type Thru Fault Current C57.12.59	15	16						-	16	16

Notes: Data maintained for four years only. Updating required to include all WG's presently meeting, and remove WG's no longer meeting.

NOTE: Van., OKC, Ral., and PBGH info. not yet factored into MAX or AVG figures. Check Committee website for future update.

GROUPS	Nash. TN Apr. 00	Niagara Oct. 01	Amster. Apr01	Orlando Oct. 01	Van. B.C. Apr02	OKC.OK Oct 02	Ral. NC Mar 03	PBGH.PA Oct 03	MAX	AVG
SC HVDC CONVERTER TRANF. & REACTORS	7	19	15	7	13	14	13	23	19	10
IEC TC 14 TAG		37	30	14	27	12	20	25	37	27
SC INSTRUMENT TRANSFORMERS	10	17			15	16	18	22	13	11
WG C57.13.5 Test Req Instr Transf >115 kVA	10	13	13	16	12		23	17	20	14
WG C57.13.6 Instr Transf for Electronic Meters & Relays	11				11	13	14	15	20	16
WG Revision of C57.13		10	10		9	12	18	18	17	11
SC INSULATING FLUIDS	75	66		70	33	39	40	33	84	70
SC INSULATION LIFE	51	66	30	109	90	84	107	96	109	64
WG Loading Liq. Transformer		58		76	86			74	108	81
WG Revision of Temperature Test Code							-	49	29	26
WG Thermal Duplicate	27		30	26			41	30	40	31
TF Winding Temperature Indicators	27	28		23	22	23	23	64	32	25
TF On Temperature Rise Clause 5, C57.12.00				27	34	25	-	-	27	27
SC PERFORMANCE CHARACTERISTICS	69	82	81	102	110	115	129	92	102	71
WG Loss Tolerance and Measurement	33	37	29	31	29	24	36	24	37	30
WG PCS Rev. C57.12.00	49	70	37	63	51	53	69	80	75	57
WG PCS Rev. C57.12.90	42	65	34	44	76	91	65	60	65	41
TF Joint/PSIM low pf measurement					22	50	34	-		
WG Switching Transients	52	49	39	50	45	60	94	75	52	42
WG DETC specifications and tests	49	40		3	62		44-PT	52-PT	50	43
SC POWER TRANSFORMERS	66	109	80	116	112	110	113	120	116	65
WG LTC Performance	24	21	29	24	40	44	50	41	31	27
WG C57.140 Transformer Life Extension	62	48	35	66	66	72	100	71	66	48
WG Monitoring of Liquid Immersed Transformers		55	70			82	56	47	70	54
TF Control Cabinet Guidelines				49	29	42	36	31	49	49
WG Revision of C57.12.10	37	30	27	34	28	40	33	23	37	32
WG West Coast					20	11	10	13	13	13
WG Installation of Liquid Filled Transformers, C57.93			39		57	59	35	45	39	39
WG Phase Shifting Transformers C57.137	26	45	25					-	45	33
SC STANDARDS	38		32	47	30			38	47	23
Standards Development Practice Review							~50	~50	8	
SC UNDERGRND. TRANF. & NETWK. PROTCS.	26	18	3	13	14	13	15	10	26	16
WG Three-Phase Underground Transfs. C57.12.24	27	15	4	9			15	14	27	14
WG Liquid-Filled Sec. Network Transfs. C57.12.40	16	15		14	14	15	18	20	17	16
WG Secondary Network Protectors C57.12.44	10	14		10	8	8	11	17	14	11
WG Dry-Type Network Transfs. C57.12.57	10	15		9		7	-	-	15	9

Notes: Data maintained for four years only. Updating required to include all WG's presently meeting, and remove WG's no longer meeting.