IEEE/PES Transformers Committee

Meeting Minutes
April 5, 2000

IEEE/PES TRANSFORMERS COMMITTEE MEETING

April 5, 2000

Nashville, Tennessee

IEEE/PES TRANSFORMERS COMMITTEE MEETING

NASHVILLE, TENNESSEE

APRIL 5, 2000

ATTENDANCE SUMMARY

MEMBERS PRESENT

Aho, David	Allan, Dennis	Anderson, Glenn	Anderson, Greg
Antosz, Steve	Arnold, Jr. Jim	Atout, Khaled	Ayers, Don
Balma, Peter	Barnes, Mike	Barker, Ron	Boettger, Bill
Borst, John	Cash, Don	Chiu, Bill	Chu, Don
Corkran, Jerry	Degeneff, Bob	Diamantis, Tom	Dix, Larry
Dohnal, Dieter	Duckett, Don	Dudley, Richard	Elliot, Fred
Ellis, Keith	Fallon, Don	Foldi, Joe	Franchek, Mike
Galloway, Dudley	Ghafourian, Ali	Grunert, Bob	Gryszkiewicz, Frank
Haas, Michael	Hager, Jr., Red	Haggerty, Kent, P.E.	Hanique, Ernst
Hanus, Ken	Harley, Jack	Harlow, Jim	Hartgrove, Bob
Hayes, Roger	Hopkinson, Phil	James, Rowland	Johnson, Jr., Chuck
Jonnatti, Tony	Kelly, Joe	Kennedy, Sheldon	Khalin, Vladimir
Kim, Dong	Kline, Don	Lackey, John	Lau, Mike
Lewis, Tim	Lindgren, Stan	Lowe, Richard	Lundquist, Tom
Marek, Rick	Matthews, John	McNelly, Susan	McQuin, Nigel
McTaggart, Ross	Mehta, Sam	Miller, Kent	Mitelman, Mike
Moore, Harold	Morehart, Gene	Mulkey, Daniel	Murray, Chuck
Niemann, Carl	Paiva, Gerry	Orehek, Paul	Patel, Bipin
Payne, Paulette	Pekarek, Tom	Perkins, Mark	Pierce, Lin
Plaster, Leon	Platts, Don	Poulin, Bertrand	Preininger, Gustav
Prevost, Tom	Puri, Jeewan	Riffon, Pierre	Robinson, Butch
Rossetti, John	Sankar, V.S.N	Shertukde, Hemchandra	Shteyh, Ibrahim
Sim, Jin	Singh, Prit	Smith, Ed	Smith, Jerry
Smith, Jim	Snyder, Steven	Stahara, Ron	Sullivan, John
Thompson, James	Tuli, Subhash	Vaillancourt, Georges	Veitch, Bob
Wagenaar, Loren	Watson, Joe	Weffer, Felipe	Whearty, Bob
Wilks, Alan	Wimmer, Bill	Zhao, Peter	

MEMBERS ABSENT

Allustiarti, Raymond	Altman, Mike	Artega, Javier	Aubin, Jacques
Bancroft, Roy	Barnard, Dave	Bertolini, Edward	Binder, Jr., Wally
Cambre, Jr., Max	Clark, Tom	Crouse, John	Dahinden, Vincez
Ebert, John	Feghali, Pierre	Fleeman, Jeff	Frank, Jerry P.E.
Gayton, Carlos	Gillies, Jim	Girgis, Ramsis	Graham, Richard
Grubb, Bob	Hall, Geoff	Hansen, Wayne	Heinrichs, Frank
Henning, Bill	Highton, Keith	Hoefler, Pete	Holdway, Tim
Iman, Mike	Jhonsa, VJ	Juhlin, Lars-Erik	Kallaur, Gene
Kennedy, Bill	Lazar, John	Lewis, Frank	Light, Hal
Loveless, Mark	Lowdermilk, Larry	Lowe, Don	MacMillan, Donald
Ma, Joe	Maguire, Willliam	Massouda, Tito	McShane, Patrick
Molden, Arthur	Musil, R.J.	Papp, Klaus	Patterson, Jr., Wes
Patton, Jesse	Perco, Dan	Purohit, Dilip	Raymond, Charlie
Risse, Peter	Robbins, Chris	Sampat, Mahesh	Ruevekamp, Henk
Savio, Leo	Saxon, Bill	Scheu, Bob	Sharma, Devki

Shull, Stephen	Smith, Steve	Stein, Werner	Stiegemeier, Craig
Stoner, Ron	Templeton, Jim	Thenappan, Vis	Traub, Tom
Trummer, Edgar	Ward, Berry	Woodcock, David	Young, Rick

GUESTS PRESENT

Antweiler, Jim	Arpino, Carlo	Ballard, Don	Bartley, Bill
Bello, Oscar	Blackburn, Gene	Bush, Carl	Cancino,
Alvero Castellanos, Juan	Colopy, Craig	Cooper, Ron	Cooper, Tommy
Corsi, Dom	Culhane, Michael	Darovny, Bill	Darwin, Alan
Daubert, Ron	De La Houssaye, Kevin	Drexler, Charles	Eckholz, Klaus
Fairris, Bruce	Fausch, Reto	Forsyth, Bruce	Foster, Derek
Fyvie, Jim	Ganser, Robert	Garcia, Ramon	Garza, Joseph
Ghosh, Saurabh	Gianakouros, Harry	Greely, Thomas	Griesacker, Bill
Gruber, Myron	Henry III, George	Holland, J.	Hughes, Bert
Jordan, Stephen	Kalra, C.J.	Keithly, Dave	Kennedy, Gael
Kirchner, Lawrence	Kirker, Ron	Klaponski, Brian	Kranich, Neil
Lortie, Raymond	Machado, Jr., Tamyre	Marlow, Dennis	Martin, Mike
Martinez, George	Matthews, Don	McClure, Phil	Milward, Paul
Moffat, Jock	Morales Cruz, Emilio	Nguyen, Van Nhi	Nicholas, Ray
Nielsen, Jim	Nordman, Russ	Oommen, TV	Oriti, Samuel
Palazzo, Sebastian	Progar, John	Purra, Elnar	Reitter, George
Riboud, Jean-Christophe	Romano, Ken	Russwury, Dick	Schwartz, Wes
Schweiger, Ewald	Shenoy, Vic	Smith, Henry	Sparling, Brian
Spitzer, Tommy	Steineman, Andy	Stensland, Len	Steuestam, Bengl-Olof
Subramanian, Raman	Tachibana, Yoshiaki	Tenyenhuis, Ed	Termine, Guiseppe
Traut, Al	Trivitt, Donnie	Tuohy, John	Von Gemmingen, Rich
Wolfe, Frank	Zhao, Tony	Ziomek, Waldemar	

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CLAUSE PAGE

IEEE PES TRANSFORMERS COMMITTEE MEETING
WEDNESDAY, APRIL 5, 2000
Chair: B. K. Patel Vice Chair: H. J. Sim
Secretary: K. S. Hanus

1.0 Chairs's Report, Remarks & Announcements – B. K. Patel

The chair B. K. Patel called the meeting to order at 8:00 A.M. Mr. Patel opened the meeting by covering a few minor announcements. He then covered the main points of his chair's report shown in full length below.

The current host , Alan Wilks then gave a report on the attendance and other statistics on the meeting. The statistics were:

Registration – 302
Companions – 94
Tuesday Luncheon – 175
Tuesday Evening Outing – 282
Saturday Evening Grand Old Opre – 172

The Committee thanked the Host Committee with a round of applause.

Roger Hayes provided details about the next meeting in Niagara Falls, Ontario Canada on October 14 - 18, 2000. See Clause 4.0 for the details.

1.1 Report on the Technical Council Meeting, January 23-27, 2000 in Singapore

Attendance for the Winter Meeting stood at approximately 900 at the time of the Technical Council Meeting. The meeting was reasonably attended with a greater participation from the Asian and far-eastern countries as expected. The US participation was noticeably low.

1.1.1 Technical Council Reorganization

Chair Jones introduced the subject of Technical Council reorganization. He reported that two groups were formed to examine the PES structure and the Technical Council structure. The first is the Industry Advisory Committee, which was to bring to the PES what they thought the power industry wanted from the PES. The second was a group formed by Don Volzka and chaired by Stig Nilsson. The charge given to this group was to recommend whether or not the TC structure should be changed to meet the restructuring of the industry as a whole. The structure that is recommended by the Nilsson committee will be combined with input from the Industry Advisory Committee and presented for Technical Council review and comment.

Stig Nilsson gave the report of his committee. His main conclusion was the Technical Council should restructure along the lines that the power industry is restructuring. This report is also attached to these minutes.

Don Volzka then reviewed the reason for, creation, staffing, and purpose of the Industry Advisory Committee. The committee recommended changes that are being considered by the

Nilsson committee. Extensive discussion followed. Chair Jones will present this information as soon as possible on a web site that will allow comments on the proposal. Until that time he will provide additional information via e-mail. Each technical committee should address how their committees would have to be modified to make this transition.

1.1.2 Special Publication

The PES will be publishing a Special Publication on 20th Century Papers that Defined Our Industry. The nominated papers have been received, reviewed, and balloted by the Editorial Board for the document. Concern was expressed that not all-technical areas of our Technical Committees are represented in the submitted papers. The Editorial Board is in discussion now as to publish what we have or to delay the publication and seek papers from the missing areas.

1.1.3 Future Meetings

Summer 2000 - Seattle

Anjan Bose reported that 350+ proceedings papers have been received already for review to be included in the Summer 2000 meeting program. The advanced registration fee will be required of each author before their papers are accepted.

Winter 2001 – Columbus

Stan Horowitz has been named as the Technical Meeting Chair for the meeting. No input from the PES Advisory Council has been received regarding preferred technical tracks. This will be determined at future meetings of the technical meeting program chairs.

1.1.4 Electronic Paper Submission

Mel Olken made a slide presentation regarding the status of electronic publishing. IEEE Publication Department has come up with the publishing requirements with the use of FlightDeck software. This custom software automates almost all paper processes and many meeting and session planning functions. Transaction papers are already processed using this software. Here is a slide from his presentation that compares two processes:

Manual Paper Process	**FlightDeck Paper Process**
Paper submitted as camera-ready hard copy	Paper submitted unformatted on diskette and in hard copy
Data entered: stand-alone	Data entered: referential integrity
Papers accumulated, mailed to Paper Coordinators	Files merged, captured, e-mailed to EIC with RF1, review - forms
Manual letters typed, mailed	Automated notification of authors, EIC via e-mail
Paper Coordinators mail papers to reviewers	EIC notifies AE, reviewers, sends paper via e-mail
Paper Coordinators mail decisions to Exe. Office	EIC emails decisions to FlightDeck
Decisions mailed manually to authors	Decision, comments sent to author automatically
Hard-coded programmer-generated reports	Automatic and user-generated flexible reports

Based on the discussions at the meeting, this process presents some formatting problems on the authors' part. However, for Proceedings papers, it appears, we will not face the formatting obstacles encountered for Transactions papers because the IEEE publishing criteria will not apply. There seems to be no reason to not use electronic submission as an author will simply

submit his paper in the electronic format, which he has, in all likelihood, used to prepare the paper anyway. This would be formatted the same as was submitted in printed format previously.

It is planned that this will be effective for the Columbus meeting.

1.1.5 PES Directory

No report on the related topics was presented.

1.1.6 NERC/IEEE Standards Development Status

Chair Jones reported that he had a meeting in Edmonton with Mike Gent, President, National Electric Reliability Council regarding a partnership between NERC and PES to produce NERC Planning Standards that are currently being developed and to produce these standards as IEEE standards. Ron Nebo, Mike Gent's assistant, has been assigned the project. PES has been released to form a working group under the Power Systems Operating Committee on Policy 8B, Operator Training. The working group was scheduled to meet on January 26,00 in Florida. The work seems to be progressing more slowly than anticipated. The delay appears to be within NERC.

Don Volzka reported that NERC has two groups – operating and planning. Ninety percent of the NERC work in the operating area is not suitable to become standards. The planning area does offer areas that are appropriate for standards development. Not all areas within NERC, however, are supportive of the project; and that might be the reason for a perceived "pull-back" from working with PES. Don suggests that "if NERC won't do it, then we should".

Questions were asked regarding the possibility of international participation on the project, particularly the IEC. Since this is strictly a North American requirement, the international effort would not be appropriate. However, PES involvement in the project would bring recognition to the PES.

Chair Jones reported how he showed NERC that the PES procedures in standards development closely followed the procedures NERC uses. Judy Gorman reported that a PAR needs to be submitted. Chair Jones responded that although a PAR had not been submitted, action on this only awaits NERC approval for the project. He also said any standards would be IEEE standards with IEEE numbers. The method of approval for the standards with both IEEE and NERC has yet to be settled. Chair Jones will report back to the Technical Council on the progress made at the Florida meeting.

1.2 Topics from Committee Chairs

There were no topics for discussion from the Technical Committee Chairs

1.3 Standing Committee Reports

1.3.1 Future Technical Development Committee - Brian Gott

Brian reported that the Future Technical Development Committee determined that their charge was to encourage discussions that identify the needs for standards that cross boundaries between more than one technical committee. The committee will sponsor sessions on areas like this at future meetings.

1.3.2 Standards Coordinating Committee – Gary Engmann

Chair Jones reported that the Standards Coordinating Committee, chaired by Gary Engmann was not meeting in Singapore; but Gary was meeting with NERC personnel in Florida this week as discussed above.

1.4 Transformers Committee Report to Technical Council

I reported the following to Technical Council for the Committee:

1.4.1 Committee Meeting Activities

Our Fall 1999 meeting was held November 7-10, 1999 in Monterrey, NL, Mexico. Mr. Alfonso Delgado Cruz, GE-Prolec, was our host. A total of 275 members and guests attended the meeting.

Membership of the Transformers Committee currently stands at 178 members and 20 Emeritus members. The regular members consist of 85 producers, 52 users, and 41 general interest. Our invitation list consists of over 500 engineers and managers in the transformer and utility industry. Attendance at our semi-annual meetings is typically near 300. Anyone with an interest in furthering the technology is welcome at our meetings. With active participation, an invitation is extended to become a member.

The Committee goals are to encourage open participation in transnationalization of transformer standards; to promote technical and educational endeavors such as panel sessions, peer review of technical literature on cognizant subjects; and to support the efforts of the Power Engineering Society.

Future Meetings

Spring 2000:

April 2-5, 2000, Opryland Hotel, Nashville, TN, USA. Contact Alan Wilks, host @ ERMCO Transformers + (901) 285-9121, fax + (901) 287-4101 or one of the Committee Officers.

Fall 2000:

October 15-18, 2000, Niagara Falls, Ontario, Canada. Contact Roger Hayes, host @ Ferranti-Packard Ltd. + (905) 685-6551, fax + (905) 685-9783 or one of the Committee Officers.

Spring 2001:

Amsterdam, The Netherlands. Contact Ernst Hanique, host @ Smit Transformers + (31) 024-3568744, fax + (31) 024-3568748 or one of the Committee Officers.

Fall 2001:

Orlando, FL, USA. Contact John Progar, co-host with Joe Watson, Florida Power & Light, @ Ohio Transformer (800) 591-2256, fax + (941) 722-2549 or one of the Committee Officers.

Spring 2002:

Vancouver, BC, Canada. Contact Mike Lau, host @ BC Hydro + (604) 528-3201, fax + (604) 528-3347 or one of the Committee Officers.

1.4.2 2000 Winter Power Meeting Technical Sessions

The Transformers Committee is sponsoring three presentation sessions and a tutorial on sound measurements in transformers during the Winter Power Meeting.

1.4.3 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 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.dsuper.net/~georgev/Transformers.html

Links to information on our future meeting sites and other information on Transformer Standards can also be found there.

Our WWW site 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 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 Web site.

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.

Bipin K. Patel, Chair

2.0 Approval of Minutes of November 11, 1999 - B.K. Patel

The minutes of the Monterrey meeting were approved as written. It was noted several pages were missing out of the minutes that were mailed out due to printing errors. Anyone needing these pages can contact the secretary and the minutes in full will be posted on the committee web page.

3.0 Vice Chair's Report – H. J. Sim

The vice chair covered the main points of his report shown in full length below.

3.1 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 2000 Winter Power Meeting in Singapore on January 23 - 27, 2000.

3.1.1 Technical Sessions

Previous Publications Committee and Technical Sessions Improvement Committee have been combined into this one new committee.

Here are the high points of the discussions held and the report presented at the meeting:

a. The question of sacrificing quality by accepting conference papers by abstracts was discussed. One committee felt the quality was good, another thought the quality suffered. Several reasons for rejection were discussed. This will be restated as to the reasons for acceptance rather than reasons for rejection.

b. Discussions were held covering the responsibilities of the Technical Committee Program Chairs (TCPCs) for the Seattle and Columbus meetings. A Technical Program Chair needs to be designated for the Vancouver meeting. TC chair will take this as an action item.

c. The TCPCs were previously prohibited from serving for two consecutive meetings based on a recent agreement. This was changed back to where it was based on the discussion at the meeting. The preliminary revision of the TC O&P Manual handed out at the meeting will be revised accordingly.

d. TCPCs for the four meetings S2000 thru T&D2001 should now be designated. All TCPCs are requested to report the designee, with contact information, for their technical committee after consulting as necessary with their committee leadership. A message that the TCPC should change for each meeting met with significant misgivings and will not be imposed. The Vice-Chair is designated as TCPC for our committee.

e. Quality of Proceedings papers on recent meetings was discussed. There was extreme disparity noted regarding the processing and resulting quality of Proceedings Papers for the meeting:

   - PSP&I rejected about half of their paper submittals based only on the Abstracts, before seeing the paper.

- PSRC felt that they could not reject any papers at the Abstract stage and did not reject any after receipt of the full paper. With later consideration, they believe about half should have been rejected.

- EM estimates, after seeing the complete papers, that about half would have been accepted as Transactions Papers, if so submitted.

  Other committees reported mixed opinions regarding quality of the papers.

One committee chair argued for changing our Proceedings Papers acceptance criteria to require the complete paper. Subsequent discussion noted that the present schedule does allocate the committees six weeks to reject a complete paper. In the past this prerogative has been stated to be invoked if the submitted paper is found to be "blatantly commercial". In order to be sure that only quality papers pass the screening process, the criteria is expanded, and stated in an affirmative manner. A Proceedings paper which has been prepared and submitted in response to prior acceptance of the Abstract, will be accepted for the meeting if it:

- Is submitted per the published schedules and in the required presentation format.

- Is of subject matter appropriate for presentation at the subject meeting.

- Is of a technical nature (as opposed to commercial)

- Is more than simply a restatement of well-known technology.

- Is judged to exceed qualitative criteria of being elementary or trivial in its presentation.

TCPCs are reminded that the acceptance criteria for Proceedings papers is intended to be distinctly less stringent than that imposed for Transactions papers.

f. Mel Olken made a presentation regarding the status of electronic publishing. For Proceedings papers, we will not face the formatting obstacles encountered for Transactions papers because the IEEE publishing criteria will not apply. There seems to be no reason to not use electronic submission as an author will simply submit his paper in the electronic format, which he has, in all likelihood, used to prepare the paper anyway. This would be formatted the same as was submitted in printed format previously.

   It is planned that this will be effective for the Columbus meeting.

g. Technical Committees have been submitting a story on their activities for publishing in the PE Review. The emphasis of this publishing is on present and future activities. It may include items such as technical information, announcement of new working groups, task forces and membership information, etc. Our committee's turn for this publication is this June's issue.

3.1.2 Organization and Procedures Committee

3.1.2.1 Technical Committee Activity Reports

No major discussion during the individual TC report.

3.1.2.2 Revision of the Technical Council Organization and Procedures Manual

Our committee O&P Manual has been revised based on the current revision of the TC O&P Manual and submitted to the committee for approval. There is a major organizational change in PES TC structure being contemplated presently. As a result an agreement was reached at the meeting that if a technical committee has O&P Manual revisions in progress they should go ahead and complete those if necessary to continue the work of the committee. If it is not necessary, the work should be suspended until the direction of the Technical Council reorganization is clearer.

3.2 Technical Paper Reviews

3.2.1 Technical Paper Review Summary

We received 22 transaction papers and review for 11 of them are complete.

Six 2000 Summer Meeting Proceedings paper abstract was received and approved. There will be one transactions grade paper presented at this meeting as well.

3.2.2 Technical Paper Session at 2000 Summer Meeting

A transformer session is planned for the Seattle meeting.

Respectfully submitted,

H.J.Sim, Vice Chair

4.0 Administrative Subcommittee – Bipin K. Patel

Chairman Patel covered the key points of the Administrative Subcommittee Meeting held on April 2, 2000. See the Administrative Subcommittee Meeting Minutes in full length below for details.

4.1 Introduction of Members and Guests

Chair Patel called the meeting to order at 2:00 p.m., Sunday, April 2, 2000, in Davidson E Room of the Opryland Hotel, Nashville, TN..

The following members of the Subcommittee were present:

K. S. Hanus	B. K. Patel
R. F. Dudley	P. E. Orehek
F. E. Elliott	L. W. Pierce
D. J. Fallon	T. A. Prevost
F. J. Gryszkiewicz	J. Puri
E. G. Hager	H. J. Sim
Ed Smith	J. E. Smith
J. W. Matthews	L. B. Wagenaar

The following guests were present:

Naeem Ahmad
Greg Anderson
Alan Wilks
Roger Hayes
Ernst Hanique
Carl Niemann
Chuck Johnson

4.2 Approval of the Monterrey Meeting Minutes

The minutes of the previous Administrative Subcommittee meeting in Monterrey were approved as written. It was noted that several pages from the committee minutes mailing were missing due to printing errors. These missing pages will be posted on the committee web page.

4.3 Additions to and/or Approval of the Agenda

The previously communicated agenda was generally followed.

4.4 Meeting Arrangements, Host Reports, and Committee Finances

Greg Anderson gave a brief report on the Committee's finances. Before the previous meeting in Monterrey, Mexico, the Committee's funds were $12,620. The Monterrey meeting had loss of $6,415 due to unbudgeted fees from on-line registration services and last minute audio/visual requests. Therefore, the Committee's funds before the Nashville meeting was $6,205.

The following dates, locations and respective hosts for future meetings were reviewed:

- October 15-18, 2000 -- Niagara Falls … Roger Hayes (VA-Tech/Ferranti-Packard)
- April 8-12, 2001 -- Amsterdam … Ernst Hanique (SMIT)
- October 14-18, 2001 -- Orlando, Florida ... Joe Watson (FPC) and John Progar (Ohio Transformer)
- April 14-18, 2002 -- Vancouver, B.C. … Mike Lau (BC Hydro)
- Fall 2002 -- open for US meeting; contact Greg Anderson for information
- Spring 2003 -- open for US meeting; contact Greg Anderson for information

Alfonso Delgado Cruz and the other members of the GE-Prolec Host Team did a great job hosting the meeting in Monterrey. GE-Prolec approached the meeting with a "team approach" that proved successful.

Alan Wilks gave a brief report of the on-going meeting. Alan reported on the on-line registration count (see the Attachment at the end of the minutes for final numbers).

Roger Hayes gave a report on the progress of the Fall 2000 meeting in Niagara Falls. Roger has rooms reserved at three hotels on the Canadian side of The Falls -- The Sheraton Fallsview, Comfort Inn & Suites, and Renaissance Fallsview. All meetings will be held at the Sheraton Fallsview. The Tuesday Evening Dinner Social will a "Canadian Favorite" variety show, "Oh Canada, Eh?!.

Ernst Hanique has reserved rooms at the Hilton Hotel in Amsterdam for the Spring 2001 meeting. The room rate will be approximately US$225 with alternate, less-expensive rooms nearby. The meetings will start with a reception on Sunday night. On Monday, SMIT will host a tour of their plant in Nijmegen followed by a dinner. The trip to Nijmegen will be via steam train provided by SMIT. The activity meetings will be on Tuesday & Wednesday with the "general meeting" on Thursday morning. The regular Speaker Luncheon will be on Wednesday with the Evening Social (canal tour and visit to a 17th century ship) on Wednesday evening.

Greg Anderson gave a brief report on the on-line registration system. The Monterrey meeting was the first time we used the registration system provided by IEEE-TCMS. It was very successful with approximately 220 pre-registering. Approximately 251 pre-registered for the Nashville meeting. Two individuals from IEEE Travel & Conference Management Services (ITCMS) were at the Nashville meeting to assist with on-site registration. ITCMS will continue to provide "cradle-to-grave" registration services at this and future meetings. The Committee will provide them with travel to and from the meeting and hotel accommodations. ITCMS will

provide (for a set fee) labor, computers, printers, namebadges, etc. at each meeting. This service will be a tremendous help to local hosts and will allow them to concentrate on local issues.

Greg stated that the "extended meeting schedule" will begin at the Orlando meeting (Fall 2001). The meeting will begin Sunday night with the usual Hospitality Reception. Activity meetings will begin on Monday morning and will continue through Wednesday afternoon with the "main wrap-up" meeting on Thursday morning. Greg will submit a proposed detailed schedule to the Administrative Subcommittee for comment and approval. The following criteria will be followed at the Orlando meeting and afterwards.

- Only one timeslot for each SC meeting.
- No more than two timeslots for each WG or TC activity.
- A target maximum of five (6 absolute maximum) meetings per timeslot.

4.5 Old Business

The committee discussed how to address the issue of converting documents from English to metric units in a uniform manner. After much discussion it was decided to form a working group under the standards subcommittee to address this within the transformers committee. Richard Dudley was asked to chair the working group. Richard would coordinate with the various subcommittee chairs and also with IEEE thru Naeem Ahmad. Frank Gryszkiewicz also suggested looking at similar efforts within ASTM.

4.6. IEEE DELEGATION REPORT ANSI C57 COMMITTEE – SPRING 2000

4.6.1 The IEEE delegation has responded to five ballots since the meeting in Monterrey, Mexico. IEEE returned affirmative ballots for the following:

- P1277/D11 “Trial-Use General Requirements and Test Code for Dry Type and Oil-Immersed Smoothing Reactors for DC Power Transmission” - Recirculation
- ANSI/IEEE C57.94 “IEEE Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type General Purpose Distribution and Power Transformers” - Reaffirmation
- PC57.136/D11 “Guide for Sound Level Abatement & Determination for Liquid-Immersed Power Transformers & Shunt Reactors Over 500 kVA”
- IEEE C57.109-1993 “IEEE Guide for Liquid-Immersed Transformer Through-Fault-Current Duration” - Reaffirmation
- PC57.116 “IEEE Guide for Transformers Directly Connected to Generators” – Reaffirmation

4.6.2 The following roster of the IEEE Delegation to ANSI ASC C57 was approved by the IEEE-SA Standards Board on January 30, 2000:

- Matthews, J.W., Baltimore, MD - Chair, IEEE Delegation
- Borst, J. D., Jefferson City, MO

- Hanus, K. S. (alternate), Fort Worth, TX
- Patel, B.K., Birmingham, AL
- Prevost, T. A., St. Johnsbury, VT
- Sim, H.J., Goldsboro, NC
- Smith, H. D., Bluefield, VA

4.6.3 Processes for Development of IEEE/ANSI/NEMA Copyrighted Documents

We have been working with IEEE, ANSI, and NEMA since the meeting in Monterrey to clarify the Committee procedures for this work.

We obtained the following clarifications for IEEE from Judy Gorman:

For IEEE Copyrighted documents:

- we obtain IEEE project authorization (requires copyright clearance)
- we develop/maintain the document according to IEEE procedures
- IEEE conducts balloting (simultaneously for C57 approval)
- we obtain IEEE Standards Board approval
- we are indemnified by IEEE

For ANSI/NEMA Copyrighted Documents:

- we can maintain (IEEE will not authorize)
- we develop/maintain the document according to IEEE procedures (not required by IEEE)
- IEEE ballot is not required (IEEE will not conduct C57 ballot)
- IEEE Standards Board approval is not required
- we are not indemnified by IEEE

This information was conveyed to ANSI and NEMA along with the following list of Non-IEEE C57 Documents involved in this development process:

Standard	Project	WG Chair	IEEE Standard Collection (Date)	On IEEE Database (Date)	Copyright
C57.12.10			1988		-
C57.12.13			-		-
C57.12.20			1997	Yes (1996)	NEMA
C57.12.21			-		-
C57.12.22			1989	Yes (1995)	ANSI
C57.12.24	PC57.12.24	Niemann	1994	Yes (1994)	ANSI
C57.12.25	PC57.12.25	Lazar	1990	Only Project	-
C57.12.26			1992		ANSI
C57.12.28			-		-
C57.12.29			1991		ANSI
C57.12.31			1996		NEMA
C57.12.32			1994		NEMA
C57.12.40	PC57.12.40	Plaster	1994	Yes (1993)	NEMA
C57.12.50			1981		ANSI

C57.12.51			1981		ANSI
C57.12.52			1981		ANSI
C57.12.55			1987		ANSI
C57.12.57			1987	Yes (R1992)*Note	ANSI
C57.12.70	PC57.12.70	Prevost	1978	Yes (R1992)*Note	ANSI

*Note- C57.12.57 and C57.12.70 do not show that they were reaffirmed in the "phonebook".

In order to obtain indemnification for our work in the development process, we asked both ANSI and NEMA if they would be willing to transfer the copyrights to IEEE or indemnify our working groups while working on these documents. ANSI has responded that they cannot provide indemnification to our working groups, but they would be "…very happy to assign whatever rights we may have in any of those documents either to IEEE, to NEMA or jointly to IEEE and NEMA…" NEMA has not responded.

John W. Matthews, Chair

IEEE Delegation to ANSI ASC C57 Committee

4.7 Committee Service Awards – J. W. Matthews

John's full report will be shown in the Committee meeting minutes.

4.8 Chair's Report – B. K. Patel

Bipin presented his report which will be included in the Committee meeting minutes.

4.9 Standards Subcommittee - T. A. Prevost

4.9.1 Standards and Coordination Activities

Tom Prevost reviewed his report which will be included in the Committee meeting minutes.

4.9.2 Documents Submitted to the Standards Board

See the status reports starting on page 80.

4.10 IEEE Standards Activities – Naeem Ahmad

- All training modules on web for IEEE Standards have been updated
- A web page Standards-Process-at-a -Glance is available to help WG>>Chairs/Sponsor Chairs with checklists on each step of the standard process and a simple page of links to help them along the process. Go http://standards.ieee.org/ and select Standards-Process-at-a -Glance under Standards Development.
- Standards Home Page http://standards.ieee.org/db/balloting/ can provide you;

Balloting Status Reports and Sign-up to join Balloting Pool.

- It is best to do editorial review in early stage of standard development. Please Contact Gregory Kohn at 732-562-3831/ g.kohn@ieee.org for editorial review of the drafts.

- Electronic Balloting Program is now available as a choice. Let me know, if your group is interested. All members of the balloting group must have access to web and e-mail address.

- NesCom Minutes are available at http://standards.ieee.org/board/nes/699nesmin.html. In minutes, each PAR # is linked to the actual PAR. By clicking on the PAR #, you will go to approved PAR, the signature pages and the approval letter in pdf format.

- NesCom Recommendations at http://standards.ieee.org/board/nes/699nesrec.html.

- In globalization efforts first IEEE Standards National Committee has been established in Canada. Efforts are under way to establish similar committees in other countries.

- Standards Development Solutions (SDS) is a dedicated fee-for service program provided by IEEE-SA to support accelerated standards development and meet the special needs of IEEE working groups. This service will not affect other no-fee services provided by IEEE-SA. Currently DOE, EPRI, NERC are using this service.

4.11 Subcommittee Activities - Subcommittee Chairs

4.11.1 Audible Sound and Vibration - Jeewan Puri

Jeewan brought to the committee's attention the need for a single guide or standard to address sound level measurement methods and sound levels. Currently each document addresses the particular needs relating to sound measurement methods and levels. It would make it easier if a single document existed. After discussion it was decided to form a working group to come up with a proposed document for the committee to review before making any further decisions.

Jeewan also addressed the need for a single document to address control wiring. He is to come up with an outline for the committee to review as to content before any further work is done or decisions made.

4.11.2 Bushings - F. E. Elliott

No Report.

4.11.3 Dielectric Tests - L. B. Wagenaar

Loren brought up the issue of altitude correction and how there appears to be an error in the fact the error correction acumulation for 0-1000 feet is not taken into account. After much discussion it was decided the error needs correction. This correction will also need to be made in altitude correction for heat run tests.

4.11.4 Distribution Transformers – E. Smith

No Report.

4.11.5 Dry-Type Transformers - W. Patterson

No report.

4.11.6 HVDC Converter Transformers & Reactors - W. N. Kennedy/Richard Dudley

- C57.129 Converter Transformers is with the IEEE editor.
- P1277 Smoothing reactors has been approved by the Standards Board and is with an IEEE editor.
- C57.129 & P1277 are 2 year trial documents and therefore review by the SC will start immediately.
- Altitude correction for dielectric strength was an issue during balloting of P1277. Current methodology in IEEE standards is incorrect. The correction should be cumulative from zero meters, but should start to be applied 1000 meters.

4.11.7 Instrument Transformers - J. E. Smith

No report.

4.11.8 Insulating Fluids - F. J. Gryszkiewicz

No report.

4.11.9 Insulation Life - L. W. Pierce

Lin Pierce reported that Bob Grubb has resigned as WG chair for the working group on C57.119 and the document has been balloted. Subash Tuli has volunteered to pick up the chair of the working group. No objections were given to Subash chairing the working group.

4.11.10 Performance Characteristics - D. J. Fallon

No Report

4.11.11 Power Transformers - E.G. Hager

No Report

4.11.12 Underground Transformers and Network Protectors - P. E. Orehek

Carl Neimann will be replacing Paul as SC chair.

4.12 Vice Chair's Report -

Jin submitted a written report which will be included in the Committee meeting minutes.

4.13 Secretary's Report – K.S. Hanus

4.13.1 Membership Review

Voting Members - Six new members were added at the last meeting in Monterrey, Mexico as noted in the meeting minutes. Also there were few changes in voting classification for some members.

Following these changes and prior to the addition of new members at this meeting, membership stands at:

Members -		179
Classifications:	Producers -	86
	Users -	53
	General	40
Emeritus Members -		19

Poor Attendance Records - The invitation list has been revised by removing guests with poor attendance record and adding new guests by request. Members who have not attended a committee meeting since Spring of 1998 will be contacted to determine their interest in maintaining membership.

4.13.2 New Member Applications

Seven new members were approved and welcomed. Two were held over from the Monterrey meeting and they are Dong Kim (Southern California Edison) and Steven Snyder (Kuhlman Electric). Other applications approved were Jack Harley (JW Harley Inc), Kent Haggerty (DuPont), Donald McMillan (Tech-Tran Corp.), Susan McNelly (Northern States Power Company) and Stephen Antosz (Weidmann Technical Services).

4.13.3 PES Directory Rosters

Subcommittee chairs are requested to keep the rosters updated as they change constantly. The accuracy of the directory has been known to be unacceptable for some subcommittees and their working groups.

4.13.4 Meeting Minutes

Minutes of the Monterrey, Mexico meeting were reproduced at no cost, again compliments of Ken Hanus and TXU Electric. Postage costs were $ 2,441.05 for 567 mailings, which averages $4.31 per mailing. Note that the net cost of the minutes varies for each meeting and the $10 portion of the registration fee is a valid nominal fee.

I request Subcommittee Chairs to submit their minutes by June 2, 2000 for this meeting. The submittal should be an electronic file on a 3 ½" diskette (Email preferred), formatted in Word 97 (or earlier versions). Please indicate total attendance count for each subcommittee, working group, and task force meeting in your minutes. Please do not send me a copy of attendance listing for this attendance count. If someone is preparing minutes for you please let them know these details about submitting the minutes for publication.

4.14 New Business

It was brought to the committees attention that the meeting hosts put out a lot work hosting a meeting and it would be nice to present them with an award for doing so. After much discussion it was decided an award would be given.

The meetings planning working group is now doing a lot of work to support these meetings and it has been asked by the working group chairman to raise the status of the working group to subcommittee level within the administrative subcommittee. After much discussion a motion was made to do so and it passed unanimously.

A question was asked if the "Phone Book" would be published on a CD rom format in the future. At this time it is not available but Naeem Ahmad will pass along to IEEE staff the request.

4.15 Adjournment

Bipin adjourned the meeting at 6:00 p.m.

Respectfully submitted,

K. S. Hanus, Secretary

AdSub Attachment 4.4.2-1

IEEE/PES Transformers Committee Meeting Locations

Year	Spring	Fall	Committee Chair
2002	Vancouver, BC, Canada	Open	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
1975	Lakeland, FL	Denver, CO	Honey
1974	Pittsburgh, PA	Scottsdale, AZ	Alexander

5.0 Transformer Standards - T. A. Prevost

The standards subcommittee met on Tuesday, April 4th 2000 at 3:30PM with seven members and thirty one guests in attendance.

The minutes from the November, 1999 meeting in Monterrey were approved as written.

Most of the meeting was spent discussing an issue with C57.12.00 concerning Table 19. After much interesting discussion we decided to keep the present draft as-is overriding a negative to replace the old Table 19.

Because C57.12.00 is on a continuous revision program there will be opportunity to readdress this issue in the revision of the next draft.

Status of Standards:

- C57.12.00 - Will be going out for a recirculation ballot which will include all negatives with associated documentation. Ballot should go out this Spring.
- C57.12.90-1999 - Was published last year. Now working on next revision cycle.
- C57.12.70 - Balloted draft was sent to REVCOM. However they had a procedural problem which require another recirculation ballot. The ballot should be sent out next month.
- C57.12.80 - In the balloting process. A recirculation ballot should go out in the next few months.
- C57.98 - Have applied for a new PAR for revision.

Two Year continuous revision cycle for C57.12.00 and C57.12.90 .

Because of some procedural problems with the balloting of C57.12.00 we have not got the revisions of C57.12.00 and C57.12.90 on the same time cycle. In the meeting in New Orleans we established a deadline of September 15. 2000 for all proposed revisions for the next revision of these standards. This will now be set for September 15, 2001.

We plan to begin work on a new guide for metric conversion.

The meeting Adjourned at 4:30 PM.

6.0 Recognition and Awards – J. W. Matthews

6.1 IEEE Fellows Certificate

Linden Pierce has been elected to the IEEE grade of Fellow for contributions to the understanding of heat transfer and loading of liquid-immersed and dry type power and distribution transformers. At his request, presentation of this certificate will be made at this meeting.

6.2 Certificates of Appreciation

Transformers Committee Certificates of Appreciation will be presented to the following persons for service as Chairs or Co-Chairs:

Name	Service Rendered
Wallace B. Binder, Jr.	Chair, Awards Subcommittee
Wallace B. Binder, Jr.	Chair, IEEE Delegation to ANSI ASC C57 Committee
Robert L. Grubb	Chair, Working Group on Thermal Tests
Paulette A. Payne	Chair, Working Group on Dry-Type Hot Spot Differentials
R.W. Simpson, Jr.	Chair, Working Group on Dry-Type Specialty Transformers
F. N. Young	Chair, Working Group on Diagnostic Field Testing and Monitoring of Liquid-Immersed Transformers

6.3 Transformers Committee Prize Paper Award

The paper 96 SM 539, "The Effects of Long Term Operation and System Conditions on the Dielectric Capability and Insulation Coordination of Large Power Transformers" authored by P. Balma, R. Degeneff, H. Moore, and L. Wagenaar was selected to receive this award for the year 2000. This paper is also the Transformers Committee nomination for the PES Prize Paper Award for 2000.

7.0 Meetings Planning Subcommittee

The "Meetings Planning SC" (previously the Meetings Planning WG) holds an open meeting at each TC meeting (generally on Tuesday afternoon) to plan future meetings and assist future hosts by education and mixing of ideas & lessons-learned. The meeting is attended by (at least) the SC Chair, the present meeting host, future hosts, and hosts from past meetings. Others interested in hosting a future meeting are encouraged to attend.

At the Administrative Subcommittee Meeting on Sunday, it was decided that the Meetings Planning WG would become a subcommittee.

The Meeting Planning Subcommittee meeting began at 2:00 p.m., Tuesday, April 4, 2000 in the "Robertson A" Room of the Opryland Hotel in Nashville, Tennessee. Twenty-one (21) individuals attended. Greg Anderson, SC Chair facilitated.

The meeting began with introductions by the attendees.

7.1 Meeting Finances

Before the previous meeting in Monterrey, Mexico, the Committee's funds were $12,620. The Monterrey meeting had loss of $6,415 due to unbudgeted fees from on-line registration services and last minute audio/visual requests. Therefore, the Committee's funds before the Nashville meeting was $6,205.

7.2 Past & Present Meetings

7.2.1 Past Meeting - Monterrey, N.L., Mexico

Alfonso Delgado Cruz and the other members of the GE-Prolec Host Team did a great job hosting the meeting in Monterrey. GE-Prolec approached the meeting with a "team approach" that proved successful. The Monterrey meeting was the first time we used the on-line registration system provided by IEEE-TCMS. Although there were some problems associated with transferring some data to the host team in Monterrey, the process was helpful in administrating meeting registration and approximately 220 pre-registered.

7.2.2 Present Meeting - Monterrey, Mexico

Alan Wilks welcomed everyone to Nashville and to the Opryland Hotel and gave a brief report of the on-going meeting. Alan reported on the attendance at the meeting (see the Attachment at the end of the minutes).

7.3 Future Meetings

7.3.1 Summary

The following dates, locations and respective hosts for future meetings were reviewed:

- October 15-18, 2000 -- Niagara Falls … Roger Hayes (VA-Tech/Ferranti-Packard)
- April 8-12, 2001 -- Amsterdam … Ernst Hanique (SMIT)
- October 14-18, 2001 -- Orlando, Florida ... Joe Watson (FPC) and John Progar (Ohio Transformer)

- April 14-18, 2002 -- Vancouver, B.C. … Mike Lau (BC Hydro)
- Fall 2002 -- open for US meeting; contact Greg Anderson for information
- Spring 2003 -- open for US meeting; contact Greg Anderson for information

7.3.2 Upcoming Meeting -- Niagara Falls

Roger Hayes from VA-Tech/Ferranti-Packard gave a report on the progress of the Fall 2000 meeting in Niagara Falls. Roger also introduced Sherry Baker from "Events Extraordinare" who is assisting with the meeting planning. Roger has rooms reserved at three hotels on the Canadian side of The Falls -- The Sheraton Fallsview, Comfort Inn & Suites, and Renaissance Fallsview. All meetings will be held at the Sheraton Fallsview. The Tuesday Evening Dinner Social will a "Canadian Favorite" variety show, "Oh Canada, Eh?!. Roger & Sherry provided a very informative booth at this meeting with brochures about the meeting. The "room block" for the Niagara Falls meeting is now open and rooms are available at the three hotels. Roger Hayes can be reached at (905) 685-6551 x-263 or hayes.roger@vatech.fpt.ca.

7.3.3 Upcoming Meeting -- Amsterdam, The Netherlands

Ernst Hanique from SMIT has reserved rooms at the Hilton Hotel in Amsterdam for the Spring 2001 meeting. All meetings will be held at the Hilton. The room rate will be approximately US$225 with alternate, less-expensive rooms nearby. The meetings will start with a reception on Sunday night. On Monday, SMIT will host a tour of their plant in Nijmegen followed by a dinner. The trip to Nijmegen will be via steam train provided by SMIT and will be by invitation only. The meetings will be on Tuesday & Wednesday with the "general meeting" on Thursday morning. The regular Speaker Luncheon will be on Wednesday with the Evening Social (canal tour and visit to a 17th century ship) on Wednesday evening. Ernst Hanique can be reached at (905) 685-6551 x-263 or ehanique@inter.nl.net.

7.4 New & Old Business

7.4.1 On-line Registration

Greg Anderson gave a brief report on the on-line registration system. The Monterrey meeting was the first time we used the registration system provided by IEEE-TCMS. It was very successful with approximately 220 pre-registering. Approximately 251 pre-registered for the Nashville meeting.

Two individuals from IEEE Travel & Conference Management Services (ITCMS) were at the Nashville meeting to assist with on-site registration. These two individuals, Ms. Vita Feuerstein and Ms. Jennifer Lambert, are familiar faces to those who attend other PES meetings and will hopefully continue to be familiar faces at our meetings. ITCMS will continue to provide "cradle-to-grave" registration services at this and future meetings. The Committee will provide them with travel to and from the meeting and hotel accommodations. ITCMS will provide (for a set fee) labor, computers, printers, namebadges, etc. at each meeting. This service will be a tremendous help to local hosts and will allow them to concentrate on local issues. This service along with the Concentration Account (see Fall 1999 minutes) greatly reduces the burden of the local host.

7.4.2 TC Web-Page

The Committee's web-page has been enhanced to feature more information about upcoming meetings. In the future, when the invitation packages are mailed out, essentially all the information found in the invitation packages will also be available on the web-page. A big thanks to Georges Vaillancourt for maintaining the site. Georges is investigating further enhancements to the site such as registering it with a more-familiar URL such as "www.transformerscommittee.org" (note: this URL was registered in June 2000). George will provide a proposal to the SC to purchase necessary software such as Adobe Acrobat and MS-Frontpage.

7.4.3 Meeting Schedule

Greg Anderson will continue to perform the duty of creating and managing the meeting schedule. Benefits will include: reducing each Host's "learning curve"; improving the similar appearance of each meeting (one of Greg's personal goals); and designating one "point man" for schedule input from each SC Chair.

Reminder -- Due to the increasing problem to fit all activities into the present meeting schedule, the Administrative Subcommittee decided to extend the meeting another day (24 hours). The extended schedule will begin at the Orlando meeting (Fall 2001). The meeting will begin Sunday night with the usual Hospitality Reception. Activity meetings will begin on Monday morning and will continue through Wednesday afternoon. The "main wrap-up" meeting will be Thursday morning from 8:00 am until noon. Greg will submit a proposed detailed schedule to the Administrative Subcommittee for comment and approval.

The following criteria will be followed at the Orlando meeting and afterwards.

- Only one timeslot for each SC meeting.
- No more than two timeslots for each WG or TC activity.
- A target maximum of five (6 absolute maximum) meetings per timeslot.

7.5 Miscellaneous

Greg Anderson is now employed with Omaha Pubic Power District and can be reached at (402) 636-2561 or gwanderson@oppd.com.

The meeting was adjourned.

8.0 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 and they are identified as minutes.

Secretary's Note: The subcommittee reports have been edited to the format of the IEEE Style Manual. No changes have been made to the content of these reports except for typographical errors and obvious improvements (removal of attendance lists and general items covered elsewhere).

8.1 Audible Sound and Vibration - J. Puri, Chair

The Subcommittee met on April 3 at 2:50 p.m. with 12-members and 9-guests present. Minutes of the last meeting in Monterrey, Mexico meeting were approved with one editorial comment.

8.1.1 WG Chairman Report:

Alan Darvin, the Chairman of Working Group (WG) for writing Transformer Siting Guide C57.136 has gone through a successful ballot with 97% affirmative votes. There were only two negative votes and some editorial comments. All the comments and editorial corrections will be resolved and this document will be recirculated and should be ready for printing by our next meeting.

8.1.2 SC Chairman's Report on IEC Activities:

Jeewan Puri, the Subcommittee Chairman gave a brief overview of the tutorial on "Sound Level Measurements in Transformers". This tutorial was jointly presented by Jan Declercq and Jeewan in the PES Winter Meeting in Singapore.

8.1.3 New Business:

The following new items were discussed:

- The issue of adding sound intensity measurements to IEEE C57.12.90 and C57.12.91, test codes for Liquid-Filled and Dry-Type transformers, was discussed. Jeewan Puri and Jan DeClercq will, jointly, chair the Working Group for changing the test codes for Liquid-Filled and Dry-Type transformers. This addition will make Sound Intensity as an equally valid method for demonstrating compliance with sound level specifications.

  The members then discussed if the sound level test code should be made into a standalone standard like IEC60076-10 or should it still remain a part of the present IEEE C57.12.90 and C57.12.91 documents.

  It was decided that a group of nine volunteers should evaluate if the sound level test code should be made into a standalone standard like IEC60076-10 or should it still remain a part of

the present IEEE C57.12.90 and C57.12.91 documents.

- Jeewan Puri presented a methodology for evaluating the standard sound level tables published in NEMA TR1 and ST 20 documents. This approach simply provides a test of reasonability for the progression of sound levels based on the kVA ratings of transformers as follows:

$$\Delta dB = 10 * Log\left[\left(\frac{kVA_1}{kVA_2}\right)^Z\right]$$ **Validity Check Equation**

Where:
ΔdB = Change in Sound Level

By observing the change in sound levels as a function of kVA ratings in NEMA Standards TR 1 and ST 20, it is derived that the value of exponent Z should be 1.03.

Jeewan Puri will update NEMA sound level tables using this methodology and send them to the subcommittee members for their review. Their comments will be discussed in our next meeting.

Jan Declercq and Jeewan Puri will present a tutorial titled "Sound Levels and their Measurement in Transformers". This is the same tutorial that they presented in the IEEE PES Meeting in Singapore in January this year.

Jeewan Puri
SC Chairman

8.2 Bushings - F. E. Elliott, Chair

8.2.1 Introduction and Membership

Chairman, Fred Elliott opened the meeting at 9:30 AM and welcomed the members and guests. The meeting was attended by 16 members and 12 guests. Two requests for membership were received. See attachment for membership list.

8.2.2 Chairman's Remarks

Next meeting - Niagara Falls, Ontario Canada, October 15 - 18, 2000
Starting with Fall of 2000 meeting, the duration will be extended by a day. This is being to done to reduce the number of concurrent sessions.
Email is an essential tool for keeping subcommittee work moving. Members are encouraged to obtain it.
All members are urged to inform the Chair of their interest in continuing their membership to the subcommittee. Only 85 % have responded to a letter from the Chair. The Chair will contact those who do not respond.

8.2.3 Approval of Minutes of November 9, 1999 Meeting Held in Monterrey, Mexico

The minutes were approved as written.

8.2.4 Working Group / Task Force Reports

8.2.4.1 D1. WG on General Requirements and Test Procedure For Power Apparatus Bushings (C57.19.00)

Keith Ellis reported that his WG met on April 3, 1999 at 2:00 PM with 12 members and 13 guests present. Five requests for membership were received. He reported the following:

1. Approval of Last Meeting Minutes

The minutes were approved as corrected.

2. Discussion on Comments Received on PC57.19.00 Draft 3

Issues /comments on Draft 3 were discussed. It was agreed that all resolved comments would be incorporated in Draft 4 and then circulated within the WG before the next meeting.

3. Discussion on C2 Power Factor and Capacitance Measurements on Bushings up to 69 kV

There was a lot of discussion regarding the need to test C2 power factor/capacitance on these bushings. Because of variability and concerns expressed by the bushing manufacturers and the time it may take to resolve this issue, it was agreed to refer this topic to Bushing Subcommittee with the recommendations to form a TF.

4. New Business

No new business was discussed.

5. Adjournment

The meeting was adjourned at 5:15 PM after two sessions.

8.2.4.2 D2. WG on Performance Characteristics and Dimensions for Outdoor Apparatus Bushings (PC57.19.01)

P. Singh reported that his WG met on April 3, 2000 at 10:55 AM with 15 members and 4 guests present. He reported the following:

1. Approval of November 8, 1999 Minutes of Meeting Held in Monterrey, Mexico

The minutes were approved as written.

2. Status of PC57.19.01 Draft 7

It was reported that IEEE/SA Standards Board has approved D7 of PC57.19.01 as a revision of C57.19.01-1991 and that the revised standard should be available in a month or so.

3. New Business

No new business was discussed.

4. Adjournment

The meeting was adjourned at 11.20 AM

8.2.4.3 D3. Task Force on Draw-Lead Bushings

Russ Nordman reported that his Task Force meeting was held at 1:20 PM on April 3, 2000 with 13 members and 11 guests present. One requests for membership was received. He reported the following:

1. Approval of Last Meeting Minutes

The minutes were approved as written.

2. Draw Lead Basis of Rating

An initial proposal for temperature rise limits was sent to representatives of the bushing manufacturers for review in the TF.

The WG discussed March 23 proposal to assign responsibility of thermal limits, testing and calculations on draw lead loading to bushing manufacturers. Suggestions were made for limits on hottest spot temperature rise, oil level, and draw lead insulation used during a temperature rise test. Based on this information, L. Pierce has agreed to write a proposal.

A flow chart with critical tasks, decisions, and dates was presented. It is open for review and revision as required by manufacturers. It was proposed that this TF be concluded by the end of next year.

3. Adjournment

The meeting was adjourned at 2:35 PM.

8.2.5 Report from Technical Advisor to IEC 36 A

Russ Nordman reported the following:

Russ is trying to form a US Technical Advisory Group for the IEC 36A. This will need the participation of four people.

A new WG is being formed for a DC bushing standard and they are looking for a representative from the US. Doug Getson's name has been given to the Secretary of the USNC/IEC as a representative.

He reported that at this time the only active project is on Seismic Standard.

8.2.6 Old Business

8.2.6.1 Reaffirmation/Revision of C57.19.100

Fred. reported that the invitations to ballot have been issued. Due date is April 28, 2000.

8.2.7 New Business

8.2.7.1 C2 Power factor on Bushings up to 69 kV

Based on the recommendations of the WG on PC57.19.00, Mark River presented his case for including C2 measurements for bushings up to 69 kV that have a test tap as per the IEEE Standard C57.19.01. He pointed out the sensitiveness of C2 measurement when there is moisture ingress. The bushing manufacturers on the other hand expressed concerns on the variability observed during this measurement. The reason for this is that C2 insulation in these bushings is not finely controlled by design. In addition, this measurement can be affected by other factors. In order to resolve this issue, it was agreed to form a TF. Mark Rivers agreed to assume the responsibility of TF Chair.

8.2.7.2 Other Comments

Fred reported that the distribution transformers subcommittee is looking for expertise on distribution type bushings. Those interested should either contact Ken Hanus or Fred Elliott.

Florian Costa made a comment that we commonly refer to oil filled bushings in subcommittee discussions and that there are other types of bushings. Other members pointed out that bushing standards do not exclude other types of bushings and information is included in the IEEE Standards C57.19.00-1991 and C57.19.01-1991

Russ Nordman pointed out that TF/WG/SC chairs should have access to electronic membership list to the transformer committee.

8.2.8 Adjournment

The meeting was adjourned at 10:43 AM

Minutes Submitted By,

Pritpal Singh, Secretary Bushing Subcommittee

8.3 Dielectric Test Subcommittee - L.B. Wagenaar, Chair

The Dielectric Test Subcommittee (DTSC) met on April 4, 2000, at 2:00 p.m., in Nashville, TN, with 53 members and 38 guests present. Three of the guests requested membership on the Subcommittee, they included: Carlo Arpino, James Gardner and Peter LaRocca.

8.3.1 Chair's Remarks

After introduction of the attendees, the Chair reviewed some of the highlights of the Administrative Subcommittee meeting held on April 2, 2000. (See Section 4.0 of Transformer Committee meeting minutes from the Nashville, TN meeting for details).

- The next meeting of the IEEE Transformers Committee will be held in Niagara Falls, Ontario, Canada on October 15-18, 2000. The meeting after that will be in Amsterdam, Netherlands on April 8-12, 2001.

- The chair noted that all dielectric tests are specified in C57.12.90, if additional information or explanation is required it is placed in a guide.

- C57.12.00 has not yet been approved, the chair did not know the exact reason.

- The subcommittee minutes from the November 9, 1999 meeting in Monterrey, MX were approved with a correction to the location of the next meeting, which will be held October 17, 2000, in Niagara Falls, Ont., Canada.

8.3.2 Working Group Reports

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

17 members and 30 guests attended the meeting. Attendees introduced themselves. Minutes of the previous meeting November 8, 1999 in Monterrey, Mexico were approved.

Georges Vaillancourt presented material from laboratory testing that he has done to verify commonly accepted acoustic characteristics and field experiences using the results. Portions will be included in the Guide for the Location of Acoustic Emissions from Partial Discharges in Oil Immersed Power Transformers and Reactors.

The letter ballot PAR C57.127 Trial Use Guide For the Detection of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers has passed with one negative ballot. The guide had been circulated to the previous voters for the second time for their approval of changes to the Safety Warning. After discussion of the negative ballot, alternative wording was agreed on and the Guide will be circulated again.

The organization, contents and writing of the next document, Guide for the Location of Acoustic Emissions from Partial Discharges in Oil Immersed Power Transformers and Reactors, will be

the subject of a meeting in Twinsburg, Ohio July 12 and 13. Persons wanting to influence this guide are welcome to attend or send information to Jack Harley at jack@harleyinc.com.

8.3.2.2 Working Group on Low Frequency Tests - Mark Perkins, Chair

The working group met on Monday, April 3, 2000 at 10:55 am with 19 members and 29 guests. Two guests requested membership in the working group. Minutes of the previous meeting in Monterrey were approved as written and there was an introduction of members and guests.

The first order of business consisted of presentations on digital partial discharge equipment by Reto Fausch and Dirk Russwurm. The presentations were excellent and useful in helping us plan for additions to C57.113.

The chairman then reviewed the progress on revisions to C57.12.90 and C57.113. Subhash Tuli reported on the latest ballot of C57.12.90.

The group then discussed additional data on power factor vs. temperature received since the last meeting. This data confirms our conclusions reached at the last meeting.

For the next meeting, it was agreed to have some presentations on advanced low voltage dielectric tests. Reto Fausch will present information on the recovery voltage method and the chairman will present information on the ac and dc dielectric response tests.

The meeting was adjourned at 12:05 PM

8.3.2.3 Working Group on Revision of Transient Dielectric Tests - Bertrand Poulin, Chair

The Working Group met on Monday April 4th at 2:50 with 43 people present.

C57.98 is presently under revision. This work is lead by Subhash Tuli. Any comment or proposed revision must be sent to Subhash Tuli or myself. Since we do not expect to have a draft ready for circulation anytime soon, the PAR will not be submitted immediately to IEEE in order in order not to fall short of time at the end of the process. The PAR will be submitted as soon as necessary to start the survey process. So far, neither the chairman nor Subhash has received anything.

Next, the Chairman reported that several people are still not happy with the present Impulse test code in C57.12.90. These people would like to see in the standard a strong incentive for manufacturers to achieve proper wave shapes, both for the front and tail. In the past, attempts to make any changes to the standard were abandoned due to lack of consensus on how to achieve these goals.

For the front time, the chairman proposed to add an extra chopped wave for cases where the front time cannot be achieved. The reasoning behind is that although the test is not equivalent, the impulsed terminal would get the fast transition missing to the full wave. After long discussions, it became clear that there would not be any consensus reached on this matter anytime soon. Some

variation were proposed, namely to add an extra wave chopped at the crest so that a full amplitude transition occurs. The issue was left open for later discussions or proposals.

For the time to half value, there is no new proposal. The chairman noted that the only effective way used so far was the AEP approach using correction factors for amplitude if short waves are used. Pierre Riffon proposed again to specify that impulse generators must have a minimum energy available for the test. Again, no consensus appears to be in sight on the subject. Discussions will resume at the next meeting.

Last, Bob Degeneef reported briefly on the work being done in his group dealing with switching transients produced by the interaction of transformers and breakers.

The meeting adjourned at 4:05.

8.3.2.4 Discussion of Working Group Report at DTSC Meeting

The Working Group chairman commented that at the working group meeting it was recommended that a 1.1 factor be applied to the chopped wave in order to obtain the fast transition when the correct wave front time can not be achieved.

Another proposal was to apply a full amplitude chopped wave that would be chopped at the crest of the wave to obtain the fast transition and appropriate stress across the winding. The chopped wave voltage transitions is typically much faster than the 1.2 usecond full wave front. The multiplication factor of 1.1 on the additional chopped wave may not be needed.

The Working Group chairman felt that this was a valid point and may be the best compromise, if we are able to reach a compromise on this issue.

8.3.2.5 Task Force on Liquid-Filled Transformers Dielectric Test Tables - Phil Hopkinson, Chair

The Task Force met on April 3, 2000 at 4:15 PM. The Task Force is working on the Revision of the Dielectric Test Tables in C57.12.00, Tables 3,4,5,6 and 7. They are attempting to simplify the tables and harmonize them with the IEC Standard. They would also like to explain the background of the values in the tables.

The Task Force has been working on a proposal for the revision of the tables over the past couple of meetings. They reviewed two different types of tables one for WYE-Connected and the other for Delta-Connected transformers. The Task Force also discussed the relationship between the various test levels currently in the tables. The value in the tables were developed at different times with different philosophies being applied.

For the lower voltage class transformers, the test levels are more severe with 2 times rated voltage for the applied test potential. At higher and higher rated voltages the table are further away from the 2 time level.

The Task Force also looked at the impulse levels for the rated voltage. In some cases there are as many as four impulse levels listed for a given rated voltage (example 230kV). The Task Force has looked at these impulse levels in terms of the arrester levels and will try to recommend a preferred impulse level.

The Task Force has received several suggestions and comments. The tables will be reviewed and modified with these suggestions and reviewed by the Task Force at the Fall meeting in Niagara Falls, Ontario, Canada.

8.3.3 Status Reports of Specific Standards C57.12.00 and C57.12.90 - S. Tuli by L.B. Wagenaar

The chair previously reported on C57.12.00 that has not been approved.

C.57.12.90 was approved in December 1999 and has been published.

8.3.4 Liaison Reports

8.3.4.1 Insulation Coordination – John Crouse

(no report)

8.3.4.2 Surge Protection Devices – Bob Degeneff

(no report)

8.3.4.3 IEC TC14/WG24 – Loren Wagenaar

There have been no meetings of this group since the last DTSC meeting. There will be a meeting of TC14 in June in Ludvika, Sweden. There are two items on the agenda concerning dielectric tests.

The first is IEC76-3, Dielectric Insulation Test Levels and Clearances. This document is in the FDIS Stage (Final Draft International Standard) and is in Geneva, Switzerland to be published.

The second item is the IEC document corresponding to IEEE C57.98 (Impulse Guide). The IEC has drafted a new document, which will be discussed at this meeting. One problem they are having is that the impulse oscillograms of the original document have not yet been obtained. The group is trying to locate the original oscillograms or new examples.

8.3.5 Old Business

8.3.5.1 IEEE - 4 Art Molden/Bertrand Poulin

B. Poulin was not present at the last meeting, but did get a copy of the meeting minutes. If anyone would like copies of the minutes please contact B. Poulin by email: Bertrand.f.poulin@ca.abb.com

8.3.5.2 Phase to Ground Clearances – B. Chiu

(no report)

8.3.6 New Business

8.3.6.1 Altitude Correction Factors

The DTSC chair addressed an issue that was raised during a ballot for Smoothing Reactors (1277). One of the Circuit Breaker Liaison members pointed out that the Altitude Correction Factors in the Smoothing Reactor Document were incorrect. It appears that the Altitude Correction Factors in all the current IEEE Standards are incorrect. The correction factor should accumulate from sea level up to 1000 meters. It is acceptable not to use any corrections up to 1000 meters, but once you get to 1000 meters you must apply the cumulative correction factor from sea level.

The current Correction Factor Curve will be sent to the DTSC membership along with the minutes for their review. This issue will be discussed at the next meeting. If additional work is required, a Task Force will be assigned to do the work.

With no additional New Business, the meeting was adjourned.

8.4 Distribution Transformers - E. Smith

Meeting Time: 2:00pm, Tuesday, April 4, 2000

Attendance: 53 Total
28 Members
25 Guests
6 Guests Requesting Membership

8.4.1 Chair's Remarks & Announcements:

Future Meetings
Niagara Falls . . . Roger Hayes (VA Tech/Ferranti-Packard)
Amsterdam, The Netherlands . . . Ernst Hanique (Smit Transformer)
Vancouver, British Colombia . . . Mike Lau (B.C. Hydro)

Working Groups and Co Chair's Requirements
C57.12.34 (Three-Phase Padmounted Distribution Transformers) - User Co Chair needed
C57.12.35 (Bar Coding Distribution Transformers) -User & Producer Chairs needed
C57.12.33 (Loss Evaluation Guide) - Producer Chair needed

Standards Copyright Issues
IEEE
ANSI

NEMA

Metric Requirements for Standards

1. Appointment of a new W/G Metric Guide - Dudley Galloway - Chair
2. Dudley to review Distribution Transformer. Standards for Metric Issues to avoid delays. Dudley will Start with C57.12.34 (Three-Phase Padmounted Distribution Transformers).

Fast Track Standardization Process

Develop a Working Group Guide/Manual Consisting of:

- W/G Meeting Attendance & Participation Requirements
- W/G Voting Requirements
- W/G Work Assignments At Meetings
- W/G Work Assignments Between Meeting
- W/G Co Chairs Meeting Following Subcommittee Meetings

8.4.2 Working Group Reports

8.4.2.1 C57.12.20 Single Phase Pole Mounted Distribution Transformers

(Copyright: **NEMA**)

Alan Wilks & Glenn Andersen Co Chairs
(awilks@ermco-eci.com & gwanders@duke-energy.com)

Current Standard Date: 1996

Current Draft Being Worked On: #5 Dated April 2000

Meeting Time:9:30am, Monday, April 3, 2000

Attendance: 49 Total
24 Members
25 Guests

Issues, Remarks & Announcements:

1. Reinserted references to Military Standards
2. Modified dimensions for the "J" L. V. Spade requirements
3. Modified dimensions for the "H" L. V. Spade requirements
4. Investigate the requirement for weight/mass of the Transformer to be included on the type "A" nameplate
5. Metric Conversion/Requirement Concerns

8.4.2.2 C57.12.23 Single Phase Submersible Distribution Transformers

(Copyright: **IEEE**)

Al Traut & Roger Lee Co Chairs
(alant@keco.com & leerj@sce.com)

Current Standard Date: 1992, Reaffirmed 1999

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

Current Draft Being Worked On: #2 Dated March 17, 2000

Meeting Time: 8:00am, Monday, April 3, 2000

Attendance: 20 Total
7 Members out of 11
13 Guests

Issues, Remarks & Announcements:

1. Eliminated 150 KV BIL Rating in Standard, application is limited.
2. Figures will show L.V. Terminals in the Subtractive Polarity position
3. Clause 5.2 will refer to the dielectric test table in C57.12.00.
4. Added optional 125 KV BIL for four voltages in table #1
5. Metric Conversion/Requirement Concerns

This standard should be ready to ballot following the October 2000 meeting.

8.4.2.3 C57.12.25 Single Phase Padmounted Distribution Transformers

(Copyright: **NOT SURE**)

Ali Ghafourian & John Lazar Co Chairs
(ali.ghafourian@us.abb.com & john.p.lazar@nspco.com)

Current Standard Date: 1990

PAR Approved 12/08/1998 (For Standard Revision)

Current Draft Being Worked On: #7 Dated March 2000

Meeting Time: 1:20pm, Monday, April 3, 2000

Attendance: 47 Total Members and guests

Issues, Remarks & Announcements:

1. All issues and comments were basically editorial in nature

This Draft will be revised and re-balloted through the IEEE.

8.4.2.4 C57.12.33 Guide For Distribution Transformer Loss Evaluation

(Copyright: **IEEE**)

Don Duckett & Tom Pekarek Co Chairs
(don.duckett@fpc.com & tjpekarek@firstenergycorp.com)

Current Standard Date: NEW Standard Under Development

PAR Approved 6/25/1998 (For Standard Development)

Current Draft Being Worked On: #7 Dated February 1999

Meeting Time:2:50pm, Monday, April 3, 2000

Attendance: 45 Total
26 Members out of 42
19 Guests

Results of the Balloting of Draft #7
106 Ballots Issued
68 Affirmative Votes
6 Negative Votes
6 Abstention Votes
80 Total Votes Returned = 75% Returned

68 Affirmative Votes
6 Negative Votes
74 Total Votes = 91% Affirmative

The minimum requirements for a successful ballot were met.

Reviewed the Results of the Balloting of Draft #7

Issues, Remarks & Announcements:

1. Four of the six negative votes were related to the topic of transformer efficiency taken from NEMA TP 1.
2. All negative ballots were reviewed by the W/G, some items are being included
3. Many negatives and suggestions were editorial in nature.

Work required between this and the next meeting:

1. Communicate in writing to the negative balloters with the W/G's position.
2. Make the corrections covered at this meeting and the appropriate editorial suggestions.

3. Re-circulate the document.
4. Update the W/G membership roster for inclusion into the final document.

8.4.2.5 C57.12.34 Three-Phase Padmounted Distribution Transformers

(Copyright: **IEEE**)

Ron Stahara & Vacant Co Chairs
(rjstahara@msn.com & Vacant)

Current Standard Date: NEW Standard Under Development

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) PAR Approved 9/21/1995 (For Standard Development) The PAR extension expires 2000.

Current Draft Being Worked On: #5 Dated April 1999

Meeting Time:10:55am, Tuesday, April 4, 2000

Attendance: 42 Total
19 Members
23 Guests

Issues, Remarks & Announcements:

1. Sam Michael has resigned as Co Chair due to his new position at DTE Energy.
2. Section 6.2 Dielectric Tests was changed to read the same as Section 5.2 in C57.12.25.
3. Changes were made to the tables in figures #3 and #8.
4. The decimal equivalents and footnote style would be checked in the IEEE style manual.
5. Dudley Galloway volunteered to review the document for Metric Conversion/Requirement Concerns.

This standard should be ready to ballot following the October 2000 meeting.

8.4.2.6 C57.12.35 Bar Coding For Distribution Transformers

(Copyright: **IEEE**)

Vacant & Vacant Co Chairs

Current Standard Date: 1996

Current Draft Being Worked On: NONE

Meeting Time: DID NOT MEET THIS SESSION

8.4.2.7 C57.12.36 Distribution Substation Transformers

(Copyright: **IEEE**)

John Rossetti & Leon Plaster Co Chairs
(jrossetti@mlgw.org & leon.plaster@us.abb.com)

Current Standard Date: NEW Standard Under Development

Current Draft Being Worked On: #1 Dated March 31, 2000

Meeting Time: 10:55am, Monday, April 3, 2000

Attendance: 40 Total
18 Members
22 Guests
9 Guests Requesting Membership

Issues, Remarks & Announcements:

1. The PAR for the development of this standard will be resubmitted at the same time as C57.12.10 for a clear distinction between the two documents "Power vs. Distribution" characteristics.
2. C57.12.36 will be formatted to resemble C57.12.10.
3. Specific sections were assigned to individuals for formatting.
4 Section 6 is new, NEMA standards TR-11, 201 & 210 will be used as a starting point
5. Several comments will be incorporated into draft #1, add 208Y/120, Modify table #2 for FA ratings below 10MVA, modify various rating tables to match document scope, and Y-Y construction.

8.4.2.8 P1338 Electronic Reporting of Test Data

(Copyright: **IEEE**)

Dave Rolling & Jerry Smith Co Chairs
(drolling@cooperpower.com & jwsmith@southernco.com)

Current Standard Date: NEW Standard Under Development

Current Draft Being Worked On: #5 Dated February 1999

Meeting Time: 9:30am, Tuesday, April 4, 2000

Attendance: 22 Total
9 Members

13 Guests

Results of the Balloting of Draft #7
95 Ballots Issued
60 Affirmative Votes
6 Negative Votes
6 Abstention Votes
72 Total Votes Returned = 75% Returned

66 Affirmative Votes
6 Negative Votes
66 Total Votes = 90% Affirmative

The minimum requirements for a successful ballot were met.

Reviewed the Results of the Balloting of Draft #5

Issues, Remarks & Announcements:

1. Most concerns dealt with .the name of the document and inclusion of the word "Distribution" to not include power transformers.
2. Many other issues were addressed. Interested parties should contact one of the working group co chairs for a detail list of issues and concerns.

Work required between this and the nest meeting:

1. The changes approved by the working group will be incorporated into draft #6 for re-circulation.
2. The negative ballots will be responded to in accordance with the recommendations and decisions of the working group.

8.4.2.9 C57.15 Step-Voltage Regulators
(Copyright: **IEEE**)

Tom Diamantis & Craig Colopy Co Chairs
(diamantist@nimo.com & ccolopy@cooperpower.com)

Current Standard Date: 1986

Current Draft Being Worked On: #5 Dated April 2000

Meeting Time:DID NOT MEET THIS SESSION

Issues, Remarks & Announcements:

1. The C57.15 standard was balloted and approved for publication in April 1999.
2. All negatives and comments were resolved or addressed.

3. In January the standards publication department sent the W/G Co Chairs a final copy for approval and comments. This was sent back in March. The document will be available in the near future for publication.
4. In the process of requesting a new PAR to update the 1999 issue of C57.15 to incorporate the latest changes made to C57.12.00 and C57.12.90. Any other issue will also be addressed in the next revision.

8.4.2.10 C57.12.28, .29, .31 & .32 Standards are reviewed and revised under the NEMA secretariat

(Meetings are normally held in conjunction with IEEE Transformer Committee meetings)

8.4.2.10.1 C57.12.28 Pad-Mounted Equipment Enclosure Integrity

(Copyright: **NEMA**)

Joe Martin Chair

Current Standard Date: 1999

Current Draft Being Worked On: NO CURRENT ACTIVITY

Meeting Time: DID NOT MEET THIS SESSION

Issues, Remarks & Announcements:
NONE

8.4.2.10.2 C57.12.29 Pad-Mounted Equipment Enclosure Integrity For Coastal Applications

(Copyright: **NEMA**)

Joe Martin Chair

Current Standard Date: 1999

Current Draft Being Worked On: NO CURRENT ACTIVITY

Meeting Time: DID NOT MEET THIS SESSION

Issues, Remarks & Announcements:
Note: Most, if not all, of the figures in this 1999 published document are in error.

8.4.2.10.3 C57.12.31 Pole Mounted Equipment Enclosure Integrity For Coastal Applications

(Copyright: **NEMA**)

Joe Martin Chair

Current Standard Date: 1996

Current Draft Being Worked On: NO CURRENT ACTIVITY

Meeting Time:DID NOT MEET THIS SESSION

Issues, Remarks & Announcements:
NONE

8.4.2.10.4 C57.12.32 Submersible Equipment Enclosure Integrity For Coastal Applications

(Copyright: **NEMA**)

Joe Martin Chair

Current Standard Date: 1994

Current Draft Being Worked On: Draft of Original Dated 1994

Meeting Time:1:00pm, Wednesday, April 5, 2000

Issues, Remarks & Announcements:
NONE

8.4.3 Subcommittee Old Business:

NONE

8.4.4 Subcommittee New Business:

1. A request has been submitted and is under current evaluation for a working group to be formed to address specific requirements for "Pole Mounted Distribution Transformer Low Voltage Bushings".

8.5 Dry-Type Transformers - W. F. Patterson, Chair

8.5.1 Chair Remarks and Announcements

The Dry Type Transformer Subcommittee met at 10:55 AM on April 4, 2000 with 16 members and 9 guests present. Charles W. Johnson chaired the meeting. Introductions were made and the attendance roster was circulated. Minutes from the November 9, 1999 meeting were reviewed and approved. Announcements were held until after the working group reports were given.

8.5.2 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:

8.5.4.1 WG Dry Type Smoothing Reactors IEEE 1277 **R. Dudley**
8.5.4.2 WG Dry Type General Requirements C57.12.01 **J. Sullivan**
8.5.4.3 WG Dry Type Thru-fault Current C57.12.59 **P. Payne**
8.5.4.4 WG Dry Type Test Code C57.12.91 **T. Lewis**

8.5.3 Announcements and New Business

The chair discussed issues from the Administrative Subcommittee meeting. The details of that meeting can be found in the main committee minutes. Subcommittee members were reminded to return ballots in a timely manner. The location and dates for upcoming meetings were discussed. Being no further new business, the meeting was adjourned at 11:20 AM.

8.5.4 Working Group Reports

8.5.4.1 Working Group on Dry Type Reactors - Chair: Mr. Richard Dudley

On April 3, 2000 the Dry Type Reactor W.G. met from 9:30 a.m. - 10:45 a.m. in the Cumberland A Meeting Room of the Opryland Hotel in Nashville, Tennessee. There were 7 members and 3 guests present. The following are the highlight of the meeting.

1. The attendance list was circulated.

2. The minutes of the Monterey meeting were approved.

3. The issue of the correction of dielectric strength for altitude was discussed. Current correction methodology in IEEE and IEC standards is not correct. This issue surfaced during the balloting process on P1277. It will be dealt with by the Dielectric Tests S.C. Should the Transformers Committee adopt the philosophy of maintaining a standard of common clauses as is done by IEC? The Switchgear Committee have a document covering common clauses; C37.100.1. C37.100 covers definitions pertaining to switchgear.

4. C57.21 is nearing the end of its current 5 year life. The consensus of the Dry Type Reactor W.G. is that it is satisfactory and should be submitted to "reaffirmation" ballot. The W.G. also felt that refinements could be made to the document and that consideration be given to raising a PAR to cover the following suggested items. This work could be carried out during the next 5 years of life of the reaffirmed document.

   (i) An ANNEX should be added to cover switching issues as they relate to the performance and service life of dry type and oil immersed shunt reactors. For the next meeting of the W.G. Pierre Riffon agreed to prepare a presentation on HQ's switching and protection practice for shunt reactors. Other aspects to be addressed in an ANNEX and to be discussed at the next W.G. meeting are breaker restrike effects

and acceptable dielectric stress levels that shunt reactors can be subjected to on a daily basis. The content of such an ANNEX would have to take into consideration work being carried out by Bob Degeneff's W.G. on Switching Transients Induced by Transformers/Breakers.

(ii) An ANNEX should be added to cover the Thyristor controlled shunt reactors of static VAR systems. This ANNEX would be similar to those added to C57.16 for filter reactors, capacitor switching reactors and capacitor discharge reactors. The ANNEX would explain how C57.21 can be applied to TCRs.

(iii) Some refinements could be made to the main text re impulse generator rating (kilojoules), criteria for temperature rise stabilization during heat run etc.

It should be emphasized that the current version of C57.21 is satisfactory for 5 more years of use and should be reaffirmed. The above recommended work will refine the document and can be carried out during the next 5 year life cycle. The Performance Characteristics S.C. will formally review the oil immersed SR portion of the document and make a recommendation. An overall position will be formulated by the W.G. and S.C.

5. C57.16 was discussed as it will be due for action in 2 years. The consensus is that it should be reaffirmed at that time but refinements could be made to the document. These would be carried out once the refinements to C57.21 are complete. One area for consideration is the addition of an ANNEX covering switching issues for current limiting reactors; the focus being on the control of breaker TRV. A capacitor connected in parallel with the reactor can be used to control breaker TRV. How should these capacitors be tested?

6. IEEE 32 Neutral Grounding Devices was discussed by several W.G. members at the end of the Converter Transformer and Smoothing Reactor S.C. meeting. The Dry Type Reactor W.G. provided input to the revision of IEEE 32; neutral grounding reactors and arc suppression coils. This document is currently under the jurisdiction of the Protective Devices Committee. Where does it belong? This issue was raised at the Administrative S.C. meeting. Input from IEEE and the Standards Board will be sought. The important issue is that this document is needed and the revision process must be completed.

7. Pierre Riffon asked if line trap main coils should be covered in an ANNEX of C57.16. LT's are covered by ANSI C93.3 which very recently went through revision. There is no need to cover LT main coils in C57.16.

The meeting adjourned at 10:45 a.m.

8.5.4.2 Working Group on Dry-Type General Requirements – C57.12.01 - Chair: Mr. Mr. John Sullivan

Secretary: Anthony Jonnatti

The spring meeting of this working group was held in the Opryland Hotel in Nashville, Tennessee on April 3, 2000 in room Cumberland C.

Chairman John Sullivan opened the meeting at 2:50 PM. Introduction of the members present were made.

Members Present – 11
Guests Present -- 12

Seven (7) guests requested membership

The minutes of the fall meeting in Monterrey, Mexico were approved as written by Mike Haas and seconded by Chuck Johnson

The first order of business was a discussion on the improvement of communication through the use of E-Mail and Web capability. It is believed that this would improve the exchange of information between meetings and expedite the entire process as well as keeping the members informed. All members and guests present indicated that they had E-Mail addresses. The introduction of the E-Mail and Web capability will be used as soon as possible.

The working group was informed that the latest copy of C57.12.01 is being submitted to IEEE headquarters for balloting

A discussion was held on the addition of forced air ratings in the next revision of this standard. After discussion of this subject in the group it was decided that this subject would not be addressed in the next revision of this standard.

A short discussion on testing for Radio Interference in dry-type transformers was held. It was decided that this test was not necessary.

Protection against electric shock in dry-type transformers, such as power cast units was discussed. Although the group indicated that it was an important item it should not be written into this standard. OSHA requirements should be followed by the manufactures to indicate on the manufactured products the dangers of high voltage in dry-type transformers

The addition of a temperature relay requirement in the standard was discussed. It was indicated that the product standards does list the addition of a temperature relay as an optional item. The working group decided that no change on this item is required in this standard.

A short discussion on cooling guidelines for vault and cubical installation was held. It was indicated that recommendations on cooling guidelines already exist. Consequently no addition information is necessary in this standard.

There was no old business and no new items that required action by this working group.

The working group was adjourned at 4.00 PM

8.5.4.3 Working Group on Dry Type Thru-fault Current C57.12.59 - Chair: Ms. Paulette Payne

The Working Group met Davidson A at the Opryland Hotel in Nashville, Tennessee on April 3, 2000 at 1:20pm. There were nine members and six guests present.

The Chairperson gave the statement of purpose. As the Guide was rescinded more than two years ago, we cannot ballot for reinstatement, but must instead establish a PAR and form a Working Group to revise the Guide. PC57.12.59 Draft 1.0 was prepared and sent to the Dry Type Transformer Subcommittee membership for possible interest in participating in the Working Group.

The PAR has been submitted for approval. The workscope is to make any necessary technical/editorial corrections and format the document in accordance with IEEE Style. Discussion focused on Draft 1; comments are as follows.

1. Introduction, paragraph 2, item 1: Verify temperature ratings and insulation temperature rise with IEEE C57.12.01 as reference, and make necessary corrections for agreement with C57.12.01.

2. Introduction, paragraph 3, last sentence: Correct publication year for IEEE C57.12.96 to "1998."

3. References: IEEE 100, the Standard Dictionary, is to be referenced instead in the Bibliography.

4. Figure 1: Correct kVA headings for Category 1 Transformers to agree with Table 1.

5. Figure 1 Note: Correct publication year for IEEE C57.12.01 to "1998."

6. Clause 4.3 Note: Correct publication year for IEEE C57.96 to "1998."

Participants were requested to submit any other comments on Draft 1.0 by May 5, 2000 for incorporation into Draft 2.0. The second Draft will be balloted to the Working Group and Subcommittee, simultaneously. Upon resolution of comments and preparation of the final draft, the document will be balloted to IEEE.

Being no further business, the meeting adjourned at 1:55pm.

8.5.4.4 Working Group on Dry-Type Test Code - C57.12.91 - Chair: Mr. Dave Barnard

Secretary: Mr. Tim Lewis
Acting Secretary: Mr. Gene Morehart

The working group met at 8 AM April 4, 2000 at the Opryland Hotel Convention Center in Nashville, Tennessee. There were 7 members and 4 guests. Tim Lewis chaired the meeting. Introductions were made and the minutes of the Monterrey, Mexico meeting were approved as written.

OLD BUSINESS:

1. Draft PC57.12.91 2/4 January 2000 is out for ballot by the Main Transformers Committee. Results of the ballot are not final.
2. There was no other old business.

NEW BUSINESS:

1. The group discussed comments on a negative ballot of PC57.12.91 Draft 2/4 January 2000 received from Linden W. Pierce:

   Comment No. 1: Minimum information to be included in the certified test data. Mr. Pierce recommended that hottest spot temperature rise (calculated or by test) be included as part of the minimum information included on the certified test data. Chuck Johnson noted that standard C57.134 (Guide for Determination of Hottest Spot Temperature in Dry Type Transformers) was only recently approved and had not yet been proven through test. It was the consensus opinion of those present that hottest spot temperature rise information (calculated or by test) should not be added to the certified test report at this time. This issue would be revisited after C57.134 had been proven through test.

   Comment No. 2: The word "average" should be added before "temperature rise" in Clause 16.3. The group agreed to this change.

   Comment No. 3: C57.134 has been approved and should be added to the list of references. The group agreed to this change.
   Comment No. 4: Reference to C57.12.01-1989 should be replaced throughout the document with C57.12.01-1998. The group agreed to this change.

   Comment No. 5: Update the paragraph in the Introduction referring to PC57.134. Drop the "P' from PC576.134 and change "Once published, this guide will describe …" to "This guide describes …". The group agreed to this change.

There being no further new business the meeting adjourned at 8:30 AM.

8.6 HVDC Converter Transformers & Smoothing Reactors S. C. - Richard Dudley, Chair

The HVDC Converter Transformers & Smoothing Reactors S.C. met in the Cumberland A Meeting Room of the Opryland Hotel in Nashville, Tennessee from 10:55 a.m. - 12:00 p.m. There were 7 members and no guests present. The following are the highlights.

8.6.1 The minutes of the Monterey meeting were approved.

8.6.2 The attendance list was circulated.

8.6.3 The status of C57.129 and P1277 were reviewed. C57.129 is with IEEE editorial staff and "galley" proofs are expected imminently. P1277 was approved by the Standards Board and an IEEE editor has been assigned. One major issue associated with the ballot of P1277 was a NEGATIVE ballot re the dielectric strength correction factor for altitude. This ballot was resolved on the basis that this issue would be formally reviewed. The current correction in IEEE transformer standards (and also other IEEE standards) is incorrect. Altitude correction is cumulative and should begin at 0 meters but should be applied starting at 1000 meters. Current methodology is to apply no cumulative correction at 1000 meters; corrections applied at 1000 meters and above are essentially always off by 1000 meters. This subject will be addressed by the Dielectric Tests S.C.

8.6.4 Since C57.129 and P1277 are both "trial use" documents with a 2 year life it was decided that any revision initiatives should start immediately. For the next meeting of the S.C. the focus will be on loss measurement and calculation methodology for converter transformers. Actual data for recently delivered converter transformers will be presented and discussed. Input is expected from Alan Forest, Pierre Riffon, and Einar Purra.

8.6.5 Since a 2 year trial may not be sufficient time to get adequate feedback (due to the inconsistent nature of HVDC project timing) it is anticipated that a further 2 year trial year period may be required. It is anticipated that any required PARs will be raised prior to the second 2 year trial. In the interim initial assessment and evaluation of the documents will be carried out such as that outlined above re loss measurement and calculation for converter transformers.

8.6.6 Feedback on C57.128 and P1277 is requested from manufacturers, users and consultants. Note that HQ will use both documents on a new "back to back" HVDC project.

The meeting adjourned at 12:00 p.m.

Regards,

Richard Dudley

8.7 Instrument Transformers - J. E. Smith, Chair

8.7.1 Chair's remarks & Announcements:

The subcommittee met on April 4, 2000 with 6 members and 4 guests present.

- The dates and locations for future meetings were announced
- The minutes of the Nov. 9, 1999 meeting were approved as written.
- The WG C57.13.5 survey received 1 negative ballot, so it must be re-circulated in the WG before progressing to the SC level

- It was agreed that documents and comments would be circulated between meetings to accelerate the process

8.7.2 Working Group Reports:

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

The Working Group had two meeting sessions. Both were co-chaired by Pierre Riffon of Hydro Quebec.

(1) Session 1 9:30 am – 10.45 am, April 4, 2000.
` Six members and one guest attended the meeting.
(2) Session 2 10.55 am – 12.10 pm April 4, 2000.
Eight members and 2 guests attended the session.

The Minutes of last meeting at Monterrey, Mexico were approved without correction.

The result of the survey on draft 11 is one negative vote, 5 affirmative votes with comments.

To improve the draft, the following were presented and discussed:

- The IEEE editor has provided helpful recommendation on editorial improvements on table of contents; definitions location of figures within the document
- Reference to 2% damping and 10 Hz for clause 10.2.1.1 is to be removed.
- Test condition III for the sealing test in Table 5 applies to transformer with oil expansion system.
- Because of good experience and popular demand, reduced insulation levels will be included in Table 1 for 245, 362 and 550 kV maximum system equipment. For 362 maximum system voltage and above, wet applied voltage will be deleted, as SIL with only positive polarity will suffice.
- To alleviate test bottleneck, routine LIL will be done on sample test basis for transformers used for 245 kV maximum system voltage and below.
- Dissipation factor for gas-filled transformer should be reviewed, as the present value is too stringent.
- The tolerance of capacitance determined from the test data for the ground shield check is 10%
- The clause on routine partial discharge test should clearly indicate that it is optional to extend the test up to 30 minutes.
- The minimum test time for short circuit test on CT stays unchanged.
- For Clause 10.8.2, the resistance of primary conductor is done by calculation based on geometry and material. In Annex A1.2, 5 times the thermal time constant requirements stays unchanged, as the related error for short time is too high.
- For Clause 10.9.3 will be revised to show that the secondary short circuit test performed on the secondary winding with the lowest impedance should suffice provided that he has previous supporting test data.

- For Clause 8.5, routine chopped voltage wave test is to be added for gas-filled transformers
- For CT, the induced voltage and open circuit test is to be substituted with an inter-turn over-voltage test as given in the IEC60044-1.
- Extinction voltage for partial discharge shall be 1.5 times the maximum line to ground voltage for transformers rated for maximum system 362 kV and below. Values stay as they are for transformers rated 550 and 800 kV maximum system voltage.
- The draft 12 should be made available May 15, 2000 (or latest May 30, 2000) for the purpose of clearing the negative vote and final review before submitting to the main body for balloting.

8.7.2.2 WG C57.13.6 – Working Group on Instrument Transformers for use with Electronic Meters and Relays – Chris Ten Haagen

The Working Group met on April 2, 2000, with six members and five guests present.

- The minutes of the November 8, 1999 meeting held in Monterrey Mexico, LA. meeting were distributed and approved as written.

- A draft of C57.13.6 updated since Monterrey meeting was circulated for review. Editorial corrections noted at that meeting reviewed and accepted. At that meeting, by a show of hands, addition of a second CT accuracy using a 'step' to 0.3% accuracy at 5% of rated current, was adopted. This was incorporated in the draft, and sent out for survey by the members of this working group in December 1999. Results of this survey and updates to the draft were reviewed and discussed. It was apparent from the survey and group discussion that there is a precedent for the second CT accuracy definition.

Action Items:

- Lively debate was generated regarding the need for four test points on the 'stepped' CT accuracy rating, with the approval by show of hands. It was agreed that only two test points are necessary to certify the original 'no-step' 0.15S accuracy rating.
- Table 2 was discussed, with the agreement that the 'Secondary terminal voltage column be removed. A footnote will direct the reader to the parent document.
- Rated Voltage in Table 1 will be corrected from 100% to 110%.
- Note on figure Figure 1 will be changed to acknowledge second stepped accuracy.

The above will be incorporated in the draft and re-circulated to the members in time for the next meeting.

8.7.2.3 Working Group on C57.13 Revision – Tom Nelson

- The meeting was chaired by Jim Smith in the absence of Tom Nelson. He will continue to do so for the period of time that Tom is unable to attend
- Copies of the C57.13 standard were reviewed and discussion was held on the different areas that were to be revised.
- It was agreed that copies of the changes would be distributed before the next meeting.

8.7.3 Old Business

NONE

8.7.4 New Business

- C57.13.2 has been re-affirmed but it is in need of revision. It was agreed that a Study Group would be set up prior to requesting a PAR. Vladimir Khalin volunteered to be Chair.

8.8 Insulating Fluids Subcommittee - F. J. Gryszkiewicz, Chair

The Insulating Fluids Subcommittee and its Working Groups met concurrently in Nashville, Tennessee on Monday and Tuesday, April 3 and 4, 2000. In attendance were 29 members and 46 guests. One guest requested membership on the Subcommittee. This brings the Subcommittee Membership to a total of 73 members.

The Subcommittee minutes of the November 8 and 9, 1999 meeting in Monterrey, Mexico were approved as submitted.

8.8.1 Current Subcommittee Projects

8.8.1.1 C57.130 - Trial Use Guide for the Use of Dissolved Gas Analysis During Factory Thermal Tests for the Evaluation of Oil Immersed Transformers and Reactors - Frank Heinrichs, Chair

This Trial Use Guide was sent to the Standards Board for approval. At their meeting in January, RevCom voted to Disapprove this Guide due to a problem in the balloting procedure. This document must now go through a Recirculation Ballot before it can be sent to RevCom for approval.

8.8.1.2 P1258 - Trial Use Guide for the Interpretation of Gases Generated in Silicone-Immersed Transformers - Jim Goudie, Chair

This Trial Use Guide has successfully completed a Recirculation Ballot. It will be sent to the Standards Board for approval at their next meeting in June.

8.8.1.3 C57.104-1991 - IEEE Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers - Frank Heinrichs, Chair

The Working Group met on Monday, April 3 and discussed the results of the recent Subcommittee Survey on Draft 7. The comments received will be incorporated into Draft 8, which will be sent out for a Subcommittee Survey prior to the next meeting in Niagara Falls, Canada.

7.8.1.4 C57.106-1991 - IEEE Guide for Acceptance and Maintenance of Insulating Oil in Equipment - Joe Kelly, Chair

The Working Group met on Monday and Tuesday, April 3 and 4. Draft 4 of this document had been sent out for a Working Group Survey prior to the meeting in Nashville.

The results of the Working Group Survey on Draft 4 were discussed at the meeting in Nashville. The comments received will be incorporated in Draft 5 which will be sent out for another Working Group Survey prior to the next meeting in Niagara Falls, Canada.

8.8.1.5 C57.139 - Dissolved Gas Analysis in Load Tap Changers - Rick Youngblood, Chair

The Working Group met on Tuesday, April 4. Draft 3 of this document was sent out for a Working Group Survey after the meeting in Monterrey, Mexico. The comments received were incorporated into Draft 4, which was sent for a Working Group Survey prior to the meeting in Nashville. The results of the Draft 4 Survey were discussed at the meeting in Nashville. The comments received will be incorporated into Draft 5 which will be sent out for a Working Group Survey prior to the next meeting in Niagara Falls, Canada.

8.8.1.6 IEEE Standard 637 - IEEE Guide for the Reclamation of Insulating Oil and Criteria for its Use

This document went through a Reaffirmation Ballot after the last meeting in New Orleans. Three negative ballots were cast. These negative ballots concerned various test values which indicate when reclamation is warranted. These same test values are included in a table in C57.106, which is currently under revision. Until C57.106 is revised, the test values in Std. 637 cannot be revised.

The Subcommittee Chair will contact the three negative balloters and explain this to them. The negative ballots must be withdrawn in order for the Reaffirmation Ballot to pass.

8.8.2 Next Meeting

The Subcommittee and its Working Groups will meet at the next meetings in Niagara Falls, Canada, October 15-18, 2000.

Respectfully submitted,

Frank J. Gryszkiewicz, Chair
Insulating Fluids Subcommittee

8.9 Insulation Life - L. W. Pierce, Chair

The Insulation Life Subcommittee met at 8:00 AM Tuesday, at the Opryland Hotel, Nashville, Tenn. Attendance was 19 members and 32 guests. The minutes of the Nov. 9, 1999 meeting in Monterrey, Mexico were approved.

8.9.1 Status Reports

Status reports were given for the following projects:

Don Platts on PC1538, "Guide for Determination of Maximum Winding Temperature Rise in Liquid Filled Transformers". A recirculation ballot was completed and the document submitted to IEEE REVCOM. It had to be pulled from the agenda because the revised C57.12.00 has not been approved by IEEE. PC1538 quotes language from the revised C57.12.00 which is not in the 1993 version. PC1538 will be added to the REVCOM agenda when C57.12:00 is approved.

George Henry, Chair, Working Group on Revision of Temperature Test Code reported that the Working Group has completed its work. A draft of Clause 11, Temperature rise tests has been forwarded to Subhash Tuli for the next revision cycle for C57.12.90.

Subhash Tuli reported on PC57.119, "Recommended Practice for Performing Temperature Rise Tests on Oil-Immersed Transformers at Loads beyond Nameplate Rating". Bob Grubb, Chair of the Working Group on Thermal Tests has retired. Subhash Tuli will complete the work on this document. The document has been balloted by IEEE, however the PAR has expired. Plans are to issue a new PAR, conduct a recirculation ballot, and complete the work by October 2000.

Leon Plaster reported on his investigation of other standards relative to the subject of temperature rise of metallic parts. Leon located references in two standards, paragraphs of which are quoted below:

From IEC76-2 issued in 1993, page 13: "No numerical limits are specified for the temperature rise of the core, of electrical connections outside the windings or of structural parts in the tank. It is a self-evident requirement, however, that such parts shall not reach temperatures which will cause damage to the adjacent parts or undue ageing of the oil. For large transformers this may be investigated by special testing, see annex B."

Then from page 41, Annex B: "Monitoring of local temperatures of the tank and of electrical terminations by means of infrared camera technique may be carried out in order to reduce the risk of damage during the test. Monitoring of temperature of structural metal parts inside by means of temporarily installed sensors may serve the same purpose. Gas-in-oil analysis before and after the test is a diagnostic method for hidden overheating (See clause C.4)".
From CAN/CSA-C88-M90, August 1990, Page 37: "(c) Metallic parts in contact with or adjacent to conductor insulation or other electrically stressed insulation shall not attain a temperature in excess of that allowed for the hottest spot of the winding adjacent to that insulation. (d) Internal metallic parts other than those covered in Item (c) that are immersed in transformer oil shall not attain a temperature rise in excess of 100 °C."

These standards will be considered in formulating a Subcommittee survey for changes to C57.12.00.
Working Group and Task Force reports were as follows:

8.9.2 Working Group on Loading of Liquid Immersed Transformer - Linden Pierce, Chair.

The Working Group met at 8:00 AM on Monday, April 3, 2000 with 15 members and 30 guests in attendance. The minutes of the Nov. 8, 1999 meeting in Monterrey, Mexico were approved.

Membership of the Working Group consists of 16 users, 16 manufacturers, and 3 general interests. The purpose of the Working Group is as follows:

1. Serve as a study group of the Power Engineering Society to review liquid filled transformer loading issues, particularly new developments.

2. Issue a Corrigenda for C57.91-1995.

3. Conduct a reaffirmation ballot on C57.91-1995, and

4. To revise C57.91-1995

Draft 1 of the Corrigenda to IEEE C57.91-1995 was briefly reviewed. Comments received from a survey indicated the following additional items:

1. Page 11: In Table 3 the 190 °C hot spot row columns .3 and .4 should be 0.62 and 0.82 hours.

2. Page 92. In Table H1, the label for the second column should be changed from "Permissible Total Losses", to "Permissible Load in % of Nameplate Rating".

The revision of C57.91-1995 was reviewed. The plans are to produce the best guide for loading in the world. A draft for review by the Working Group is planned for the Summer of 2000. If satisfactory, an IEEE ballot will be conducted. Plans are to publish the revision in the year 2001.

Proposed changes to C57.91-1995 are as follows:

1. Correct errors.
2. Conform to IEEE metric practice.
3. Change scope to include voltage regulators.
4. Change scope to include liquids other than oil.
5. Include insulation life curve from C57.100-1999.
6. Revise Annex A on gas evolution.
7. Review Annex B for updated information.
8. Revise Annex D for 55 °C transformers to add temperature limitations like tables 6,7,8.
9. Move normative annexes into main body. Currently there are 31 pages in the main body and 73 pages in annexes. Eight of ten annexes are normative.

8.9.3 Working Group on Thermal Duplicate - Barry Beaster, Chair

The Working Group met on Monday, April 3, 2000 with ten members and seventeen guests attending. Linden Pierce presided for Barry Beaster who could not attend. The minutes of the November 8, 1999 meeting in Monterrey, Mexico were approved.

Draft 3.0 of P1524, "IEEE Guide for the Definition of Thermal Duplicate Liquid-Immersed Distribution, Power, and Regulating Transformers" was reviewed at the meeting. The following topics were discussed.

1. The definitions section contains two terms which are similar. "3.4 External dissipation cooling dissipation capacity" which has units of watts per unit area, and "3.5 External cooling dissipation rate" which has units of watts at a specified oil rise. It appears that the term in 3.5 is more of a capacity than the term in 3.4. The term in 3.4 should be "External cooling heat flux density". and 3.5 should be "External cooling dissipation capacity". In table 1 giving the tolerances, "3.4 external cooling dissipation capacity is used", but not "3.5 external cooling heat dissipation rate". 3.4 is more applicable to radiator units and 3.5 is more applicable to units with forced air/forced oil heat exchangers.

2. The use of "shall" instead of "should". Normally "should" is used in a guide. However, in this case since the document is a definition, the use of "shall" may be appropriate. Linden Pierce will review and propose language for the forward and make recommendations where "shall" and "should" are to be used.

3. Language about complying with hot spot temperature limitations should be added.

4. The exponents should be defined with numerical values from the loading guide given. A sentence will be added that, "Other values may be used if the manufacturer has test data to justify".

5. The purpose of the document needs clarification. Although the Purpose is given in clause 1.2, an additional paragraph in the Forward might help. The document is intended to address situations where a user has a specification statement, "Perform a thermal test in accordance with C57.12.90 unless the manufacture has thermal test data from a thermal duplicate transformer". In these situations IEEE 1524 would serve to determine if the prior tested unit met the definition of a thermal duplicate. If the definition is met then no test would be required. The calculated adjusted thermal parameters are to be shown on the test report per Clause 7. One individual stated that a test would still be required to confirm the adjusted numbers. However, this is not true.

The document is nearing its final form. One more draft addressing the above topics should make the document ready for IEEE ballot.

8.9.5 Task Force on Winding Temperature Indicators - M. F. Barnes, Chair

The Task Force on Winding Temperature Indicators met on Monday, April 3, 2000. There were 8 members and 19 guests in attendance. The minutes of the November, 1999 meeting in Monterrey, Mexico were approved as written.

The purpose of this task force is to write a technical paper regarding winding temperature indicators, operation in different situations, different cooling modes, and different size transformers, with particular attention to problems of the present technology in certain circumstances.

Carlo Arpino volunteered to coordinate the paper, with Robert Thompson assisting. Several Other task force members volunteered to submit material according to an outline that had previously been approved. The task force will endeavor to have a rough draft of a paper for the next meeting.

8.9.6 Old and New Business

There was no old or new business so the meeting adjourned.

Respectfully Submitted by:

Linden W. Pierce

Insulation Life Subcommittee Chair

8.10 Performance Characteristics - D. J. Fallon, Chair

8.10.1 Introduction/Attendance

The Performance Characteristics Subcommittee (PCS) met at 9:30 a.m. on Tuesday, April 4, with 42 members and 27 guests in attendance. 10 of those guests requested membership in PCS. All members and guests were requested to provide e-mail addresses, as PCS will be moving towards electronic transmittal of minutes and other Subcommittee documentation.

8.10.2 Approval of Meeting Minutes

The minutes of the November 9, 1999, PCS Meeting in Monterrey, Mexico, were approved as written.

8.10.3 Chairman's Remarks

8.10.3.1 Administrative Subcommittee Notes

The chair discussed issues from the Administrative Subcommittee meeting. The details of that meeting can be found in the main committee minutes.

Chairman Rick Marek's C57.110 WG (Recommended Practice for Establishing Transformer Capability when Supplying Non-Sinusoidal Load Currents) won the Prize WG Award. Any active WG members who have not received a certificate should contact Rick, or advise me via e-mail (donald.fallon@pseg.com)

PCS extends its congratulations to Lin Pierce on his election as IEEE Fellow.

PCS extends best wishes to Paul Orehek, retiring from work, and from Chairmanship of the Underground Transformers and Network Protectors Subcommittee, as well as to Carl Neimann, replacing Paul as Subcommittee Chair.

Lin Pierce reminded all SC Chairmen that the Transformer Committee is a "technical" committee, with the capability to work on technical seminars, training, and technical paper presentation in addition to the necessary work on standards development and maintenance. All members should consider opportunities for such activities.

Standards Report – There have been some problems of late in the balloting process. It is important for all those supervising a balloting process to realize that all negative ballots must be

responded to, either through acceptance, or through rejection with reasons. Whether accepted or rejected, the negative ballots and resolutions must be fully communicated in the recirculation ballot, detailing the negative ballots and the response provided.

IEEE Standards Association (SA) Report:

- Instructional presentations on the standards development process are available on the SA web pages. Look under "Standards Process at a Glance" at (http://standards.ieee.org)
- SA is promoting the electronic ballot process. Transformer Committee Chair Bipin Patel suggests it be tried on several ballots. SA notes that the process cannot be mixed between mail and electronic ballots, but must be handled for reach ballot in only one format.

PCS Chair suggested that IEEE, and IEEE SA, consider making the C57 "phone book" compilation of transformer standards available on CD ROM. Naeem Ahmad indicated he would discuss within IEEE.

Two PCS members were accepted as new members of the main IEEE Transformers Committee during the Administrative Subcommittee meeting – congratulations to Steve Snyder, Kuhlman Electric, and Steve Antosz, Weidmann Technical Services.

8.10.3.2 Membership

10 new members were added to the PCS Roster:

Klaus Eckholz, Siemens AG
Saurabh Ghosh, Pauwels TRF, Inc.
Tamyres Machado, Siemens Brazil
Michael Mitelman, Wicor America
Ray Nicholas, ABB
Subhas Sarkar, Virginia Transformer
Ewald Schweiger, VA TECH ELIN Transformatoren
Hemchandra Shertukde, Diagnostic Devices, Inc.
Ed Tenyenhuis, ABB Transformers
Waldemar Ziomek, Pauwels Canada, Inc.

The Membership roster will be reviewed after the Niagara Falls meeting. 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 they will be welcome to renew their participation and rejoin the group.

8.10.4 Agenda Changes

1. Review of C57.21-1990 (R1995), IEEE Standard Requirements, Terminology, and Test Code for Shunt Reactors over 500kVA, added to the New Business section
2. Correction in Project Reports section – Reaffirmation of C57.109, Through Fault Duration Guide, will be discussed.

8.10.5 Working Group Reports

8.10.5.1 PCS Revisions to C57.12.90

The WG met on Monday, April 3, with 7 members and 36 guests in attendance. Pierre Feghali has resigned as chair of this WG due to changes in his responsibilities at work. PCS Chair Don Fallon presided at the meeting, which mainly consisted of solicitation for a new WG Chair, in order to re-start the process of PCS review of appropriate items within the context of the continuous review process for C57.12.90. Bruce Forsyth of Southwest Electric agreed at this meeting to take over as WG Chair. Subhash Tuli agreed to provide some start-up support for Bruce, by assisting in summarizing the status and listing C57.12.90 comments for review by this WG. Jerry Corkran also agreed to provide for Bruce as he takes on this task. The Chair thanked Bruce, and encouraged PCS members to help get this effort back on track.

8.10.5.2 Loss Tolerance and Measurement - Ramsis Girgis

16 members and 17 guests attended, 2 requested membership

First report was on meeting of TF on "Guide of Low P.F. power measurements." The Guide is close to completion, and will be ready for review by the TF at the next meeting.

Next item discussed - the returns from the survey by the Performance Characteristics Subcommittee of the Loss Measurement Guide. The majority of the comments were editorial. There were a number of technical comments which were resolved in the meeting. The Guide will be ready for balloting once the recommended changes are implemented. It is planned that the formal balloting process of the Guide be complete before the next meeting of the WG. At that time, the returns of the ballot will be discussed.

Next item discussed were results of measurements performed by three manufacturers on losses and noise at both 50 and 60 Hz in order to arrive at recommended conversion factors of transformer performance parameters between the two frequencies.

Next item discussed was a plan to add a proposed text for a section on "Measuring auxiliary losses" to be a subsection of section #9 (load loss) in C57.12.90.

The meeting was adjourned at 5:20 p.m.

8.10.5.3 PCS Revisions to C57.12.00 - Donald W. Platts

The Working Group met on Monday, April 3, at 1:20PM. We had 16 members and 33 guests in attendance. The minutes of the Nov. 1999 meeting in Monterey Mexico were approved.

The chair reported on the status of draft 5 of C57.12.00. RevCom again rejected the document. There were procedural issues concerning the recirculation of negative comments with the ballot. Subash Tuli has indicated that it will be recirculated again, very soon.

Work status: The comments to be addressed have been divided up between 7 Task Force leaders. A list of the issues that they have addressed was prepared and circulated.

The chair reported that all of the items that have been resolved will be gathered to prepare a survey of the working group and the subcommittee.

There were no other items of old business. There was no new business. We divided up into Task Force groups and continued the process of reviewing the comments.

The meeting adjourned at 2:35..

8.10.5.4 Switching Transient Induced by Transformer/Breaker Interaction - Bob Degeneff, Chair; Peter Balma, Secretary

The Working Group on Switching Transients Induced by Transformer/Breaker Interaction was called to order at 8:00 AM on Tuesday April 4, 2000. There were 20 members and 32 Guests present. Introductions were made, and the minutes of the April 24, 1999, meeting in New Orleans were accepted without comment. The working group did not meet in the fall of 1999. The PAR for this project has been submitted, and its current status will be reviewed by the Performance Characteristics Subcommittee.

After introductions, Draft 1 of the proposed guide was distributed and a general overview was provided. The intent of this guide is to:

- Define and clarify the Transformer/Breaker interaction problem.
- Identify important relationships.
- Provide Guidance/Education for users to recognize occurrences.
- Suggest & quantify mitigation.
- Provide concrete examples.

A review of the Table of Contents brought to surface the need for a testing clause, which will be added.

The discussion continued with an in depth conversation of the topic. This included specific situations where it has occurred; transformer characteristics and design; and system conditions and configurations. In addition, a historical perspective was provided by several members of the group to assist in providing a context for this project.

Volunteers to assist writing various clauses of the guide were requested, and many members of the working group agreed to move the guide forward. All contributors were asked to provide preliminary input within six weeks for incorporation into the document.

A request for any New Business for the working group was made, and the issue of reviewing this phenomenon relative to multiple transformer installations was raised. It was agreed that further investigation of this area was needed, and that it could be included in the guide.

The meeting adjourned at 9:20 AM.

8.10.5.5 DETC Specification and Test – Phil Hopkinson

The WG met on 4 April 2000@10: 55 AM. There were 41 members and 8 guests present. The chairman opened the meeting with a round of introductions of the members and guests present. Following that, he noted that the mission of the WG is to develop a performance requirements document for De-energized Tap Changers (DETC) that recognizes transformer applications. The reference documents for the project include C57.12.00, C57.12.01, C57.91 and C57.96.

The chairman reviewed the project with the goal to outline the direction and starting point for off-circuit tap changers. He noted that there is no standard for De-energized Tap Changers today. The development of such a standard will aid in closing the gap between the user and the manufacturer and increase the understanding of both requirements and capabilities. Part of the effort to close the gap is ensuring clarity in the definitions.

The chairman reviewed the general requirements of tap changers, noting that their use with transformers requires that both be closely coordinated. (Chart 2) The tap changer must be capable of operating in the environment in which they are located – liquid or dry.

It was proposed that a sentence be included that addresses the loading guide for dry-type transformers in the thermal environment section.

Discussion was raised over the location of the tapchanger in Liquid filled transformers. The chairman indicated that it should be assumed to be located in the transformer top oil, presumably secured to the core clamp. Environmental temperature for the tapchanger is very important as a determinant to tapchanger contact life. This life is mostly determined by contact stability against oxidation. The chairman indicated that experiments have shown oxidation aging to follow the same 10 degree rule as electrical insulation. Under the 10 degree rule, for every 10 degrees C in higher temperature, the contact oxidation time is cut in half..

In life testing, 130 C was used, since that is the level that would be a limit with overcurrent protective devices.

A question was raised as to whether or not this material is being presented as a document or background information. The chairman noted that the material should be used for both purposes.

In dry-type transformers, three cases were presented:

A. one mounted above the core clamp,
B. In the transformer cabinet but not above the core clamp
C. In a separate enclosure.

Liquid filled transformer tap changers are not likely to be in a separate tank from the transformer. The tap changer should be viewed as a device that is placed into a position during installation and not moved for the next thirty years.

Members engaged in a brief discussion of connections and contact conditions. The chairman proposed to add a statement that indicates that the leads and buswork systems must be electrically stable to provide adequate tapchanger life.

It was proposed that the leads be addressed. To the question of including leads in the document, members indicated that they should be considered but not addressed in detail. The chairman proposed: since electrical leads to and from the tap changer, stable lead connections need to be made to achieve satisfactory performance. It was noted that other IEEE documents on tap changers do not address leads, hence a simple statement about stability of connections should be sufficient.

Life considerations. The chairman noted that some say that the life expectancy of a transformer, addressed in terms of thermal temperature, is 20 or 30 years. The average load on the average transformer is pretty low, he noted. But being consistent with the loading guide, a life of 180,000 hours is a reasonable one. One member questioned the 10 degree rule noting that the life of a transformer is influenced by very complex phenomena and is affected by a number of critical factors that do not rely on oxidation alone.

The chairman added that if the contacts don't increase in resistance, there is a limited likelihood of thermal runaway.

Nameplate/Specified Ratings. The tapchanger manufacturer will be asked to specify the following current and voltage values:

A. Rated current
B. 2X rated current for ½ hr. daily.
C. Max. Symmetric fault current
D. Max crest fault current.
E. System voltage
F. BIL
G. Tap-Tap withstand
H. Tap-Ground Withstand
I. Phase to Phase Withstand

Synthetic insulating liquids (Chart) Would a tap changer designed for use in mineral oil be used in silicone. As contacts age, a film build up seems to insulate the contact and helps in their oxidation faster. Different fluid operates differently with different contacts.

Types of Tests (Chart):

Resistance
Contact spring pressure
Dielectric integrity
Gland Seals
Functional life
Short circuit
Mechanical endurance
Operating torque

The chairman inquired if the above list identified the routine tests correctly. During discussion it was agreed that the dielectric integrity test should be a type not a routine test. It was also proposed that the contact spring test should also be a type test; others indicated the test was a routine test. The chairman noted that this is an issue that needs further discussion. On high

volume devices, tests are based on a statistical sampling; lower volume devices it is a routine test. It was noted that in the IEC some individuals do not accept the routine test but operate on a statistical sampling method. The chairman requested that a volunteer provide proposed language on addressing the test. Mr. Doug Getson and George Henry and Larry Dix agreed to provide proposals.

A test, twice rated load, eight hours on, followed by 16 hours off for a total of 30 replications. The test is considered passed if resistance change is less than 25% and stability is achieved.

Super temperature of contacts not something that can be measured but can be calculated. The chairman engaged in a discussion of tests he conducted on contacts using various kinds of metals, using twice rated current.

The chairman advised members that they would receive a copy of the entire presentation to enable them to mull over the information and prepare for discussions at the next session.
The meeting was adjourned at 12:15 PM

8.10.5.6 C57.133 Guide for Short Circuit Testing - Nigel McQuin

The WG did not meet in Nashville. The ballot pool has been formed – but the ballot has not yet been sent out. Formatting changes are necessary, and will be completed to enable the ballot to proceed.

The Chairman requests the cooperation of the committee in approving this document, unless there are definite errors in the document. Previous circulation of this document as a draft within the WG only elicited one set of comments, which hopefully has caught any obvious corrections. The intent is to complete the establishment of this material as a separate document from C57.12.90, and then for all received comments at this ballot to be collated for the revision of the stand-alone document in the next revision cycle.

PCS Chair Don Fallon requests members to consider in the ballot process that the Short Circuit Test Guide will go out of publication shortly if this Ballot is not approved, as the Annex has been removed from the revision of C57.12.90. If concerns for the Ballot on C57.133 can be expressed as comments to an approved ballot, then this needed document will stay in print and any comments will be reviewed by the WG for future revision..

8.10.6 Project Reports

8.10.6.1 Reaffirmation of C57.109 - Guide for Transformer Through Fault Current Duration - Ron Barker

The Guide has been balloted for reaffirmation. Results were not yet available at the time of the meeting.

8.10.6.2 C37.91/D13 Guide for Relay Application – Ron Barker (Liaison)

The Guide has been approved by RevCom and is now in final editing in preparation for publishing.

8.10.6.3 Inrush Current Presentation

Monday morning's presentations on inrush current were very well received. In Chairing the session, Phil Hopkinson (Square D) provided the results of work done in response to questions on coordination of overcurrent protection for medium voltage transformers. Ramsis Girgis presented discussion and data on ABB work in the same area. Spirited discussion ensued, with questions related to:

- Impact of inrush current on transformer protection
- Inrush current effects (similarities/differences) as related to short circuit conditions
- Utility monitoring and mitigation by controlled breaker pole closing

There was considerable interest in continued discussion of the topic. Any manufacturer or user who would like to be involved in a possible future presentation should contact Phil Hopkinson (hopkinsp@squared.com) with thoughts on what you would propose to discuss. We will discuss a possible seminar at a future meeting with the Meetings Planning WG.

The attendance roster for Monday's presentation was only signed by 18 attendees. If you wish to register your attendance, and receive a copy of Phil's paper, please contact Phil at the e-mail address above.

8.10.7 Old Business – There were no other items of Old Business

8.10.8 New Business

8.10.8.1 Status of C57.21, 1990 (R1995) Standard Requirements, Terminology, and Test Code for Shunt Reactors Rated Over 500kVA

This document requires maintenance, as it is now almost 5 years old. PCS will address this document, with some assistance from the Dry Type Reactor WG in the HVDC Converter Transformers and Reactors SC. The Chair requested a small group to review C57.21 within the next few months and advise whether it continues to represent the current state of the art with no significant errors. If so, PCS will forward it to the Standards SC for reaffirmation. If not, a PAR and WG will be developed to deal with necessary changes. Fred Elliott, Sheldon Kennedy, Richard Dudley, and Pierre Riffon all volunteered for this review. Richard Dudley reported that the Dry Type Reactor WG had already reviewed and advised that the document was suitable for reaffirmation. They are considering forming a WG to prepare an instructional annex to discuss reactor application issues, such as: switching transients, SVR thyristor controlled reactors, direct connected and tertiary connected reactors.

There were no other items of new business.

8.10.9 Next Meeting

The next meeting will be held on October 17, 2000, in Niagara Falls, Canada.

The meeting adjourned at 10:35 a.m.

Respectfully submitted,
Donald J. Fallon
PCS Chair

8.11 Power Transformers Subcommittee: Everett Hager - Chairman

The Power Transformers Subcommittee of the IEEE Transformers Committee met at 10:55 a.m. on Tuesday, April 4th with 29 members, and 37 guests present. Ten of these guests requested, and were granted membership.
The Minutes from the previous meeting in Monterrey, Mexico, were approved.
The following Working Group and Task Force reports were presented:

8.11.1 REVISION OF C57.12.10 WORKING GROUP

Chairman Javier Arteaga presented the report on the Working Group for revision of C57.12.10 as follows:

The initial Working Group meeting for C57.12.10, Power Substation Transformers, met on Monday, April 3rd at 8:00 a.m. There were 24 people in attendance with 13 people requesting membership.

The latest revision of C57.12.10 was completed in 1997 and published in 1999 by NEMA. When last published, NEMA retained the copyrights. At the NEMA meeting held on Sunday, April 2, 2000, it was agreed to transfer the copyrights to IEEE for C57.12.20, C57.12.40 and C57.12.50. C57.12.10 was not mentioned, presumably because it was assumed that it had been previously transferred. Transfer of C57.12.10 to IEEE will be brought up in the Wednesday ASC C57 Main Committee meeting.

A scope will be assembled as the first order of business. It was recommended that references made to specific ratings be removed such that this document can also cover power transformers beyond 230 kV and 100 MVA. Coordination will be necessary with the Working Group for Distribution Substation Transformers (C57.12.36) which has limited their scope to 10 MVA and 69 kV without LTC's. The revised scope for C57.12.10 will need to be approved by the Subcommittee prior to submitting the PAR. (*NOTE: A motion to approve this revision was moved, seconded and approved at this point during Mr. Arteaga's presentation*.)

The general feeling is that there needs to be a clear distinction between Power Transformers (C57.12.10) and Distribution Substation Transformers (C57.12.36) in order to obtain approval of a PAR. The features of the transformers typically define whether Distribution or Power requirements apply.

One difference noted has to do with Distribution and Class I Power impulse test levels. Another deals with sidewall bushings. C57.12.10 mainly deals with cover bushing applications but there are few applications (i.e. GSU, low profile, switchgear coordination) that require sidewall

bushings. Additional items to address include utilization voltages, inter-tie transmission, harmonics, switching and impact loading.

Currently Section 6 only covers reactance-type LTC's. Resistance-type and vacuum-type should also be considered for inclusion. Specific LTC requirements are covered in C57.131. C57.12.10 is meant to deal with LTC applications and controls. The existing controls section was rewritten during the 1997 revisions. It was suggested to make sure the Working Group doesn't attempt to duplicate information already in C57.131. C57.12.10 currently covers LV side applications. HV side applications are typically customer specific but will be considered for inclusion.

Action items identified are as follows:

1. Review the scope of the WG on Distribution Substation Transformers (C57.12.36)
2. Prepare a scope for the revision of C57.12.10 and issue for comments
3. Review the proposed table of contents for C57.12.36
4. Create a list of Distribution and Power substation characteristics.

This will be used in support of getting both PAR's approved.

The meeting adjourned at 9:15.

8.11.2 DIAGNOSTIC FIELD TESTING AND MONITORING OF LIQUID FILLED TRANSFORMERS (ON-LINE MONITORING) WORKING GROUP AND TASK FORCE

Andre Lux reported for the Diagnostic Field Testing and Monitoring of Liquid Filled-Transformers Working Group and Task Force. Fifty-four Members and Guests were in attendance.

The Task Force and Working Group met jointly at this meeting and are proposing to move the Task Force to the Working Group level with Donald Chu and Andre Lux serving as Co-Chairmen.

The Task Force has made considerable progress on the Guide, which is currently at Draft #8. Draft #8 will be surveyed by the Working Group in August to determine how close the Guide is to Balloting.

The Par for this Guide has not yet been applied for so the Working Group could have enough time to develop the document.

The Par Application will be submitted by June 11 in order for it to be on the Agenda for Nescom's September meeting.

8.11.3 LTC PERFORMANCE WORKING GROUP

Chairman William Henning reported for the Load Tap Changer Performance Working Group as follows:

The Working Group met on Monday, April 3rd with 17 members and 7 guests in attendance. At the meeting, the Working Group reviewed a comparison of IEC 214-1989, "On-Load Tap Changers," C57.131, "Standard Requirements for Load Tap Changers," and the latest Committee Draft of IEC 60214-1, "On-Load Tap Changers." This resulted in three action items:

1. With copyright permission now secured, copies of IEC 214 and IEC 541 will be sent to Working Group members.
2. A Working Group Survey will be conducted, asking to identify what information should be included for reactance-type tap changers. This information will be sent to Craig Colopy, Bengt-Olaf Stenestam and Tom Traub for consideration by IEC WG 26.
3. We will attempt to harmonize the list of definitions:
   a. The names we give to devices.
   b. The text used to define each device.

The meeting adjourned about 12:00 p.m.

8.11.4 PHASE SHIFTING TRANSFORMERS WORKING GROUP

The report of the Working Group for the Guide for Phase-Shifting Transformers, PC57.135 was presented by Tom Lundquist, the Co-Chair.

The Working Group met on April 3rd at 2:50 p.m. with 22 members and 4 guests present. The following items were covered:

1. Approved minutes from Monterrey, Mexico meeting
2. Minutes correction: Listed as Draft 11, was actually Draft 10
3. Copies of Draft 11 issued for comment
4. Discussion on the following items:
   a. Jim Harlow – Control Circuits page 54, Surge Withstand capability test pass test but manufacturer still responsible for unit. Second sentence line 34 delete after "properly" and add "after the test."
   b. A selection will be added for Measurement of the phase angle, as a new paragraph 10.2.2
   c. Figure 7.2 is not correct. Dr. Preininger will add proper drawing as in Draft 10
   d. Dr. Preininger will also fix Figure 7.1
   e. Enlarge vector diagram of Figure 10, assigned to Dr. Preininger
   f. Dr. Preininger will change Figure 1 labels
   g. Figure 3 vector diagram will be enlarged and broken into two parts
   h. Make change in reference to exciting unit to main unit throughout the document
   i. Clause 6.3 Nameplate change double negative portion to "do result in acceptable service conditions." And drop "s" for "sources."
   j. In design criteria Phase Angle correct sentence to reflect phase angle under load and voltage regulation in the unit.

The meeting was adjourned at 4:00 p.m.

8.11.5 GUIDE FOR THE EVALUATION AND RECONDITIONING OF LIQUID IMMERSED POWER TRANSFORMERS (C57.140) WORKING GROUP

The report on the Working Group for PC57.140, the Guide for the Evaluation and Reconditioning of Liquid Immersed Power Transformers was presented by Chairman Rowland James as follows:

The working group met on Tuesday, April 4 at 9:30 A.M. There were 25 members and 37 guests in attendance. Six persons requested membership in the working group.

PC57.140, draft 3, e-mailed earlier to working group members was reviewed. The chair requested volunteers for the preparation of the individual sections of this draft and also requested comments and recommendations for additions or deletions to the present document. Discussions were concentrated on Condition Assessment and Risk Assessment. These two sections will be combined into one section with condition assessment preceding risk assessment.

Task forces will be developed for each section of this guide in order to expedite its development.

A survey was taken of those that plan or will attend the IEEE/PES Summer Meeting in Seattle. One person indicated that he planned to attend this meeting. Therefore, we will not be meeting at the summer meeting.

The meeting was adjourned at 10:40 A.M.

8.11.6 WEST COAST WORKING GROUP

Red Hager reported on the work done by the West Coast Working Group. The group will meet jointly with the IEEE Substations Committee's West Coast Subcommittee in Vancouver later this month. Note: At the meeting in Vancouver Mike Lau of BC Hydro agreed to Chair the West Coast Working Group.

8.11.7 OLD BUSINESS:

1. C57.116, the IEEE Guide for Transformers Directly Connected to Generators has been reaffirmed.
2. C57.93, the Guide for Installation of Liquid-Immersed Power Transformers will be due for reaffirmation by the end of this year and the application for reaffirmation will be submitted in the near future.

8.11.8 NEW BUSINESS:

Joe Watson presented a proposal for a new Guide for Power Transformer Control Cabinets. The consensus was that this Guide would be beneficial, especially to smaller utilities, IPP's and industrial users. One volunteer for this new Guide was obtained during the presentation and two manufacturers later offered to support such efforts. The Group will meet as a Task Force for the next few meetings before a decision is made to apply for a PAR.

The meeting adjourned at 12:10 p.m.

8.12 Underground Transformers and Network Protectors - P. E. Orehek

8.12.1 Introduction/Attendance

The Underground Transformers and Network Protectors Subcommittee met on April 4, 2000, with 11 members and nine guests present.

8.12.2 Approval of Minutes

The minutes of the November, 1999 meeting in Monterrey, Mexico were approved as submitted.

8.12.3 Membership

Two new members were welcomed into the Subcommittee. They were Edwin Owen of General Electric and Ken Romano of Georgia Power. Membership is now 16.

8.12.4 Chairman's Remarks

Administrative Subcommittee Notes

A. The next meeting will be held in Niagara Falls, Canada from October 15 to 18, 2000.

B. Electronic balloting is now available.

C. There is a new PAR form and extension request.

8.12.5 Working Group Reports

8.12.5.1 Three-Phase Underground-Type Transformers (C57.12.24) C.G. Niemann - Chairman

The Working Group met on Monday, April 3, 2000 at 9:30 a.m. with eight members and nine guests in attendance.

The minutes of the meeting on November 8, 1999 in Monterrey, Mexico were approved as submitted.

Gisueppe Termaine of PECO energy became a member of the Working Group.

The revised Standard has been approved by ASC C57 and should be published by June 2000. NEMA will publish the standard.

A number of new items were presented for consideration in the next revision.

There being no additional new or old business, the meeting was adjourned at 10:00 a.m.

8.12.5.2 Liquid Filled Secondary Network Transformers (C57.12.40) R. L. Plaster - Chairman

The Working Group met on Monday, April 3, 2000 with nine members and seven guests in attendance.
The minutes of the November 1999 meeting in Monterrey, Mexico were approved as written.

The revised Standard has been approved by ASC C57 and should be published by June 2000. NEMA will publish the standard.

The Working Group agreed in Monterrey to discuss the reinstatement of Part II that was removed from the revised standard. After much discussion, it was agreed to try and incorporate this part into the current approved document for the next revision.

The Working Group also agreed not to reinstate the old Part II as currently written to bridge the gap between the present time and the completion of the new revision. It was felt that it would delay the revision to incorporate the two parts into one concise document. Also, this incorporation depends on the active participation of personnel from the Consolidated Edison Company

Memphis Light, Gas and Water Company to the Chairman submitted a number of comments and each item will be considered in the next revision.

Three new members were added to the Working Group. They were Edwin Owens of General Electric, Ken Romano of Georgia Power Company and Don Matthews of Quality Switch Company.

There being no additional business the meeting was adjourned at 11:30 a.m.

8.12.5.3 Secondary Network Protectors (C57.12.44) D.H. Mulkey - Chairman

The Working Group met on Monday, April 3, 2000 with eight members and two guests in attendance.

The minutes of the November 1999 meeting held in Monterrey, Mexico were approved as written.

Presently, an IEEE recirculation ballot is out to approve the revised standard and has a due date of April 7, 2000.

Some editorial changes were made to the revised standard proposal.

The Working Group members were requested to review their method used for getting remote monitoring facilities out of their protectors. This item will be considered for the next revision.

Two new members were added to the Working Group. They were Ken Romano of Georgia Power Company and Joe Cultrera of Consolidated Edison Company.

There being no additional business the meeting was adjourned at 1:50 p.m.

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

The Working Group met on Monday, April 3, 2000 with six members and four guests in attendance.

The minutes of the November 1999 meeting held in Monterrey, Mexico were approved as written.

The Working Group reviewed Draft #10 of the document and corrected two dimensions and included that a gasket be provided on the throat to eliminate a possible clearance problem between the flexible connector and the throat housing.

The working Group recommended that draft #10 be sent to the NEMA secretariat for balloting in the ASC C57 Transformers Committee.

There being no additional business the meeting was adjourned at 11:30 a.m.

8.12.6 New Business

Since I plan to retire from PSE&G Company in May 2000, Carl Niemann of Commonwealth Edison Company was appointed Chairman of the Subcommittee. The Transformer Committee Chair approved this appointment.

Also, John Sullivan of Tampa Electric Company was appointed as Chairman of the C57.12.24 Working Group for Underground-Type Three-Phase Distribution Transformers as a replacement for Carl Niemann.

Since the activities of this Subcommittee were transferred from the ANSI Transformers Committee to the IEEE Transformers Committee in 1990, I believe we all benefited from the move. We were now able to attend and participate in other technical group sessions, participate in the administrative functions of the Committee and to become members and attend the IEEE and ASC C57 Main Transformer Committee meetings. It has been fun and my pleasure in working with this group professionally and personally and wish you continued success in developing transformer standards.

8.12.7 Future Meetings

The location and dates for future meetings are as follows:

October 15-18, 2000	Niagara Falls, Ontario, Canada
April 8-12, 2001	Amsterdam, The Netherlands
Fall, 2001	Orlando, Florida
Spring, 2002	Vancouver, British Columbia, Canada

The Subcommittee meeting adjourned at 10:45 a.m.

9.0 Reports of Liaison Representatives

9.1 EPRI – S. R. Lindgren

Memorandum

April 7, 2000

TO: Mr. Ken Hanus
Secretary, IEEE Transformers Committee
TXU Electric & Gas
PO Box 970
Fort Worth, TX 76101

FROM: Stan Lindgren, Manager, Power Transformers

SUBJECT: **EPRI LIAISON REPORT**

The following report is for inclusion in your minutes for the April 5, 2000, meeting in Nashville, TN:

1. Moisture Dynamics:

   - Very rapid load changes can cause bubble formation under some conditions and reduce low frequency and impulse dielectric strength by 40%. This has been demonstrated in models with rapid/high overload.

   - Additional work has been completed to experimentally study moisture dynamics associated with rapid overloads and cool-down cycles plus detect inception of partial discharges caused by bubble evolution. Moisture moves away from the hot conductor fast and returns very slowly after cool-down. Distribution of moisture in the solid insulation was found to be very uneven and time to dissolve free water is very long. TR-113390, *Power Transformer Behavior During Overload - Phase I: Dynamic Behavior of Moisture.* is now published. Phase II has been completed to study the correlation between moisture-in-oil with moisture-in-paper for a range of conditions and temperature cycles using winding models with moisture contents ranging from 0.5% to 7.0% in paper and pressboard. Phase III started 1/99 to broaden the experimental work and include prototype field applications of a dynamic moisture assessment method on operating conservator-type core-form transformers. TR-114075, *Transformer Moisture-In-Paper Assessment Method – Field trial,* is published. Further experimental work and field trials covering nitrogen-blanketed and shell-form transformers are in process.

2. High Voltage Instrument Transformers & Bushings

EPRI sponsored a workshop 9/90 to provide a forum to compare and categorize failure information, failure modes and potential mitigation measures. This was an outgrowth of the Transformers Committee roundtable in Washington, DC, 4/88. Proceedings, TR 100205, were published. A Project was completed to study fast disconnect switching transient effects on HVCTs. Mathematical modeling was checked experimentally through laboratory tests and switching tests in a 500 kV substation with very high speed instrumentation. Effects of switching resistors during disconnect switching has been studied and found to reduce bus transients and stresses by up to 80%. A final report is published, TR-104961.

A project has been completed to monitor a large number of HVCTs and bushings in laboratories and in service, including on-line tan delta, partial discharge and other available monitoring methods. Units are being tested to failure to evaluate failure modes, sensitivity of monitoring and to develop "end-of-life" criteria for interpretation of field monitoring data.

A Symposium: *HVCTs & Bushings – Failure Prediction & Prevention,* was held September 22-24, 1999 in Portland, Oregon. Proceedings, TR-113649, is published. At this time, three different failure detection methods are being tried at three different utility sites.

3. Dynamic Thermal Circuit Ratings - DCTR

This project involves all transmission components including power transformers regarding software development and a field test involving two substations on a utility system. The field test has been completed. A final report is published, TR-105421. An IEEE paper, 94 SM 473-9 PWRD, was presented at the IEEE/PES 1994 Summer Meeting in San Francisco. A second paper, "Field Application of a Dynamic Thermal Circuit Rating Method", was presented at the IEEE/PES 1996 Winter Meeting in Baltimore. The method has been extended to include transmission lines. DTCR 2.0 is available to EPRI Substations Asset Utilization, Overhead Transmission, and Underground Transmission Target members. DTCR 2.1 is being developed to add the IEC transformer thermal model and other refinements.

4. On-Line Transformer Condition Assessment – Green / Yellow / Red

This project is a continuation of earlier EPRI efforts to develop an on-line low cost gas analyzer that were abandoned because of baseline drift of the sensors. A “key gas” analyzer uses metal-insulated-semiconductor (MIS) sensors to monitor individual ppm for hydrogen, acetylene, ethylene and carbon monoxide. A field demonstration program that involved 40 prototypes, starting October 1993. was completed in 1996. An EPRI/Micromonitors/Sandia National Labs collaborative project was initiated 2/99 to solve technical problems that have delayed commercial production of the MIS sensors. An alternative 8-gas analyzer for nitrogen-blanketed transformers has been developed and is now commercially available. This will be followed by a version suitable for conservator type transformers.

Experimental work is in process to identify the dynamic behavior of gases and other byproducts associated with loading and internal problems. Early results show that gases are developed in the form of tiny bubbles that *are not* quickly absorbed into the oil, including gases with high solubility. Knowledge developed will be used in the development of fuzzy

logic expert system modules that can provide Green-Yellow-Red indication of transformer operating condition.

5. Power Transformer Remaining Life Prediction & Extension

- Furaldehydes in Transformer Oil

  A project has been in place since 1994 to develop a correlation between furaldehydes in oil samples with degree of polymerization (DP) found in paper insulation samples taken from a significant number of transformers in service. Additional laboratory experimental work has identified trace chemicals that are an early indication of insulation degradation and could be sensed through on-line monitoring.

- Vibration & Frequency Response Analysis (FRA)

  A project has been in place since 1994 to develop a correlation between existing winding conditions and vibration & FRA tests before and after internal inspection and reclamping of the same transformers. The objective was to develop noninvasive field test methods and criteria that can be used to predict winding condition in the broad variety of existing power transformers without entering the transformer. Over 40 transformers have had the initial FRA and internal inspection, and over 20 have had the follow-up FRA test. Results have been applied to assess the condition of a number of core-form and shell-form transformers. Recent co-sponsored experiments on a retired 345kV auto-transformer comparing the swept-frequency method and the low-voltage impulse (LVI) method were presented at the EPRI Substation Equipment Diagnostics Conference VIII held in New Orleans, February 21-23, 2000. A variety of problems were introduced individually. In general the study showed that both methods, properly applied, are effective and give similar results.

6. Transformer Expert System - XVISOR

Objective of this project is to capture the knowledge of transformer experts and make it usable in an off-line software tool for evaluation of transformer design questions, condition assessment, problem diagnosis, and identification of maintenance needs. Beta testing has been completed, some modifications made, and EPRI's software acceptance testing is done. XVISOR Version 1.0 is now available to EPRI Substations O&M members. Expansion to add LTC is in process.

7. Guidelines for Life Extension of Substations

These guidelines, now published in Final Report TR-105070 dated April 1995, include a large section on transformer inspection, condition assessment, testing, and maintenance practices. An updated version is in process.

8. Low Maintenance LTC

Work is completed to identify and categorize specific LTC problems, causes and populations involved; evaluate existing mitigation measures; and identify R&D needed to

achieve substantial reduction in LTC maintenance requirements. A workshop was held November, 1996 in Tampa, FL. to provide a forum for discussion of LTC problems / maintenance / and ways to improve reliability and reduce maintenance. Proceedings were published in TR-108398 dated June 1997. Two EPRI projects to improve understanding of contact coking, oil filtration effectiveness and monitoring concepts were recently completed. Further work is in process regarding coking, filtration and novel methods for on-line monitoring.

9. Continuous On-Line Filter

A project is underway to develop a passive on-line filter for mounting on transformers to continuously remove moisture, oxygen and oil degradation products to keep oil in pristine condition.

10. Environmentally Acceptable Transformer Oils

A new project is in process to review the state-of-the-art of dielectric fluids and to perform laboratory tests on available candidate fluids for transformer application. Most of the samples have been collected and tests are underway.

11. Solid-State LTC For Medium Power Transformers

A feasibility review is in process.

cc: Bipin Patel, Chairman, IEEE/PES Transformers Committee

R. Lings, B. Ward

NOTE: Cigre SC 12 information can now be found at their web site: www.cigre.org

9.2 SCC4 - P. A. Payne

No report was given.

9.3 TC 14 TAG - P. J. Hopkinson

The TC 14 TAG met at the Opryland Hotel on Monday, April 3, 2000 at 1:20 PM with 4 members and 14 guests present. The presiding officer was Phil Hopkinson.

9.3.1 PREVIOUS MINUTES

The minutes of the meeting held on 8 November 1999 were approved as submitted.

9.3.2 MEMBERSHIP

Members reviewed the TAG roster and made such changes and corrections as needed.

The Technical Advisor reviewed the new USNC rules regarding eligibility for membership on the TAG. Basically, the USNC position is TAG membership requires payment of annual fees directly to USNC and the rule is to be strictly enforced. This means that in the determination of a US position on an IEC document only those individuals who have paid the annual fees will be entitled to vote. The fees are intended to aid the USNC in the funding of its operations, as required by decisions of the ANSI Board of Directors.

The Technical Advisor briefed members on his efforts to provide supplemental funding for participation at TC14 meetings. He reported that both NEMA and EEI to set up funding for use to reimburse the meeting expenses for qualified persons, up to $2000. The qualified persons are members from the respective organizations.

9.3.3 OLD BUSINESS

Review of the documents on agenda of TC14 Meeting in June 2000

The Technical Advisor noted that he is yet to received the agenda for the meeting to be held in June in Sweden, it is clear that documents likely to be on the agenda include matters relating to withstand short circuit, tap changers, dielectric testing and audible sound levels.

The Technical Advisor proceeded to review the technical issues relating to each of the topics on the agenda.

1. **Short Circuit** – it was reported that the French are not in favor of calculations for short circuit. The present IEC document does not include algorithms for calculations. A brief discussion ensued on a French protest of TC14 not including an “in some countries clause” in IEC 60076-5. It was noted that over the years, the number of transformer failures due to short circuit were miniscule. CICGRE has established a working group to look at the matter; it should be reporting the results its study later this year. Efforts in TC14 are to seek an alternative to testing method that has proved difficult and expensive and provide a reasonable assurance of functionality of the equipment. J. Fyvie noted that UK delegation is expected to present a proposal for consideration at the June meeting. Th French delegation is likely to present an EDF (Electricite de France) paper on short circuit testing at that meeting as well.

2. **Converter transformer** – the IEC document does not completely reflect US goals on addressing the rms/fundamental power matter. There is little interest in TC14 at this time.

3. **High Voltage Converter transformers** – this is an area affected by US customers but for which there is no US representation on the TC14 WG that addresses this matter. It was noted that Richard Dudley, chairman of the IEEE subcommittee, is familiar with the matter and should be included in the discussion. It was pointed out that, like most members of the IEEE committee, Dudley is not a US-citizen and therefore is not eligible to be a member of the US TAG.

4. **On-load tap changers** – Craig Colopy is the US expert working on these matters. The TC14 has a pretty good document that will likely be discussed at the June meeting. IEEE’s working

group has agreed to cooperate on LTC performance by providing information to Craig to bring to the WG. The IEEE WG has agreed to seek harmonization on terms and titles.

5. **No-Load Tap changers (Off circuit tap changer)** – there has been considerable amount of discussion in the IEC WG. There has been considerable cooperation in the US to develop a proposal that has been accepted by the WG chairman.

6. **Audible sound** – The US expert view is that sound intensity is an appropriate preferred method for measuring audible sound. J. Puri has been working diligently to arrive at a methodology to provide a reference table to supplement the methodologies available. The discussion in TC14 will address non-transformer related noise and methods to address that phenomena.

9.3.4 NEW BUSINESS

9.3.4.1 Electromagnetic Fields (EMF)

The technical advisor briefly reviewed the background relating to the establishment of a NEMA group to address EMF issues. He noted that a directive has been issued in Europe setting the limit for human exposure to EMF at 1000 milligause. This is consistent with the European view of prudent avoidance. A brief technical discussion ensued. It was noted that a US Health Service report noted that any correlation between EMF and human health is weak. It was also pointed out that the IEC recently approved the establishment of TC106 to address the human effects of EMF. The technical advisor noted that the subject will not quickly pass and therefore, the matter should be addressed and considered by all interested groups.

9.3.5 TIME AND PLACE OF NEXT MEETING

Members agreed to meet in conjunction with the next meeting of the IEEE Transformer Committee in Niagara Falls, Ontario, Canada October 2000.

9.3.6 ADJOURNMENT

There being no additional business, the meeting was adjourned at 2:45 PM.

REPORTED BY
JOHN A. GAUTHIER
4 April 2000

Attachment 5

10.0 Old Business

None

11.0 New Business

None

12.0 Adjournment

The meeting was adjourned at 11:00 AM.

Respectfully submitted,

Ken S. Hanus, Secretary

Attachment 1

STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE

25-Sep-00

STANDARD/ PROJECT	TITLE OF DOCUMENT	SUBCOMMITTEE SC CHAIR	WG CHAIR AND PHONE NO. TF CHAIR	COMMITTEES REQUESTING COORDINATION	PUB DATE PAR DATE REV DUE	LATEST STATUS/ COMMENTS
1538 P1538	GUIDE FOR DETERMINATION OF MAXIMUM WINDING TEMPERATURE RISE IN LIQUID FILLED TRANSFORMERS	INSULATION LIFE L.W. PIERCE	PLATTS, D.		9/16/98	READY FOR SUBMITTAL TO REVCOM WITHHELD FROM REVCOM PENDING C57.12.00
C57.100 None	TEST PROCEDURE FOR THERMAL EVALUATION OF OIL-IMMERSED DISTRIBUTION TRANSFORMERS	INSULATION LIFE L. W. PIERCE	LOWDERMILK L. A. (704)462-3113	PE/PSR IA/PSE PE/T&D PE/SUB IEC TC 14	6/26/99 12/10/96 2004	
C57.104 PC57.104	GUIDE FOR THE DETECTION AND DETERMINATION OF GENERATED GAS IN OI IMMERSED TRANSFORMERS & THEIR RELATION TO SERVICEABIL.	INSULATING FLUIDS F. GRYSZKIEWICZ	HEINRICHS F. W. (412)941-6924	PE/IC PE/SUB PE/T&D	6/27/91 12/10/96 2000	WG Writing Draft 2 REVIEW DATE EXTENDED TO 12/2000
C57.105 NONE	GUIDE FOR APPLICATION OF TRANSFORMER CONNECTIONS IN THREE-PHASE DISTRIBUTION SYSTEMS	PERFORMANCE CHARACTERISTICS D. Fallon	REITTER G. (415)591-4463		6/17/92 2004	Reaffirmed 3/99
C57.106 PC57.106	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF INSULATING OIL IN EQUIPMENT	INSULATING FLUIDS F. GRYSZKIEWICZ	KELLY, J. 330-630-7000	NONE	6/27/91 12/9/97 2003	WG WRITING D2 Reaffirmed in 1998
C57.109 NONE	GUIDE FOR THROUGH-FAULT CURRENT DURATION	PERFORMANCE CHARACTERISTICS D. Fallon	PATEL B. (205)877-7740	PSR	3/18/93 6/27/91 1998	APPLY FOR PAR TO REVISE NEEDS REVISION/REAFFIRMATION
C57.110 NONE	RECOMMENDED PRACTICE FOR ESTABLISHING TRANSFORMER CAPABILITY WHEN SUPPLYING NONSINUSOIDAL LOAD CURRENTS	PERFORMANCE CHARACTERISTICS D. Fallon	MAREK R. P. (804)838-8080	T&D PSR NEMA IA/PSE	7/2/98 2003	

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C57.111 NONE	GUIDE FOR ACCEPTANCE OF SILICONE INSULATING FLUID AND ITS MAINTENANCE IN TRANSFORMERS	INSULATING FLUIDS F. GRYSZKIEWICZ	(617)926-4900	IAS ED&PG	T&D IEC	2/2/89 12/10/87 2000	NEED Reaffirmation or Revision
C57.113 PC57.113	GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN LIQUID-FILLED POWER TRANSFORMERS AND SHUNT REACTOR	DIELECTRIC TESTS L. B. WAGENAAR	PERKINS M. [314]382-2100	PSIM IEC TC14	IAS/PSE	12/5/91 9/15/99 2000	PAR FOR REVISION APPROVED 9/99 REVISE/REAFFIRM BEFORE June 2000
C57.116 NONE	GUIDE FOR TRANSFORMERS DIRECTLTY CONNECTED TO GENERATORS	POWER TRANSFORMERS E.G. HAGER	REITTER G. (415)508-2850			1/3/89 6/28/79 1999	Balloting Reaffirmation NEED ACTION BY 12/17/99
C57.117 NONE	GUIDE FOR REPORTING FAILURE DATA FOR POWER TRANSFORMERS AND SHUNT REACTORS	POWER TRANSFORMERS E.G. HAGER	CASH D. (702) 227-2316			6/17/92 2003	REAFFIRMED 1998
C57.119	RECOMMENDED PRACTICE FOR PERFORMING TEMP. RISE TESTS ON OIL-IMMERSED POWER TRANSFORMER AT LOADS BEYOND NP RATING (P838)	INSULATION LIFE L. W. PIERCE		SWGR SCC4 IAS	SUBS PSRC EI	9/17/92 0	PAR Withdrawn
C57.12.00 VARIOUS	GENERAL REQUIREMENTS FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	STANDARDS T.A. PREVOST	TULI S. (414)547-0121	T&D SWG IAS	PSRC SUBS IEC-TC14	6/16/93 6/15/95 1998	Draft 5 approved Recirculation Ballot Required
C57.12.00 P1524	DEFINITION OF THERMAL DUPLICATE	INSULATION LIFE L. W. PIERCE	BEASTER,B 765-286-9363	EM I&CPS	IAS PESC	6/1/98	PAR approved June 1998 WORK INCLUDED IN C57.12.00
C57.12.00 PC57.12.00	9.3 TABLE 19 - TOLERANCE FOR LOSSES	PERFORMANCE CHARACTERISTICS D. Fallon	GIRGIS,R.				RESOLVING NEGATIVES

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C57.12.00 PC57.12.00	TABLE 3 AND 5 - HARMONIZE VALUES	DIELECTRIC TESTS L. B. WAGENAAR	POULIN B. (408)957-8326			UNDER DEVELOPMENT
C57.12.00 PC57.12.00	SECTION 5.1 - COOLING CLASS REVISION TO CONFORM TO IEC	PERFORMANCE CHARACTERISTICS D. Fallon	PLATTS D. W. (610) 774-4686 PLATTS D. W.			BALLOTING
C57.12.00 PC57.12.00	SECTION 8 - DIELECTRIC TESTING OF SECONDARY CONTROL WIRING	PERFORMANCE CHARACTERISTICS D. Fallon	TULI S. (414)547-0121			BALLOTING
C57.12.00 PC57.12.00	SECTION 8 - TESTING OF LTC CONNECTIONS	PERFORMANCE CHARACTERISTICS D. Fallon	PLATTS D. (610)774-4686			BALLOTING
C57.12.00 PC57.12.00	SECTION 5.9 - AUXILIARY LOSSES ON CLAS I AND CLASS II POWER TRANSFORMERS	PERFORMANCE CHARACTERISTICS D. Fallon	TULI S. (414)547-0121			BALLOTING
C57.12.00 PC57.12.00	TABLE 17 - MECHANICAL LIFTING REQUIREMENTS CLARIFICATION	PERFORMANCE CHARACTERISTICS D. Fallon	PLATTS D. (610)774-4686			UNDER DEVELOPMENT
C57.12.00 PC57.12.00	AUDIBLE SOUND LEVEL REQUIREMENTS	AUDIBLE SOUND & VIBRATION J. PURI	PURI J. (704)282-7413			UNDER DEVELOPMENT
C57.12.00 PC57.12.00m	GENERAL REQUIREMENTS FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	PERFORMANCE CHARACTERISTICS D. Fallon	PLATTS D. (610)774-4686			INCLUDE IN NEXT REVISION COORDINATE WITH S. TULI

STANDARD/ PROJECT	TITLE OF DOCUMENT	SUBCOMMITTEE SC CHAIR	WG CHAIR AND PHONE NO. TF CHAIR	COMMITTEES REQUESTING COORDINATION		PUB DATE PAR DATE REV DUE	LATEST STATUS/ COMMENTS
C57.12.01 PC57.12.01	GENERAL REQUIREMENTS FOR DRY-TYPE DIST. AND POWER TR INCL THOSE WITH SOLID CAST &/or RESIN-ENCAPSULATED WINDINGS	DRY-TYPE TRANSFORMERS W. PATTERSON	JONATTI A. (813)442-0414	NEMA ANSI	U.L. IA/I&CPS	9/1/98 3/1/99 2003	Revised Standard Approved Sept. 14, 1998
C57.12.10 ANSI	TRANSFORMERS 230kV AND BELOW - 8333/10417kVA 1 PH, -100000 kVA 3 PH w/o LTC, -100000kVA w/ LTC - SAFETY REQUIREMENTS	STANDARDS T.A. PREVOST	(312)394-2704			6/4/87 1993	ANSI STANDARD NEEDS A HOME, DUE FOR REAF.
C57.12.13 ANSI	CONFORMANCE REQUIREMENTS FOR LIQUID FILLED TRANSFORMERS USED IN UNIT INSTALLATIONS INCL. UNIT SUBSTATIONS	STANDARDS T.A. PREVOST				9/2/81 1987	ASSIGN TO SUBCOMMITTEE NEMA STANDARD
C57.12.20 NONE	OVERHEAD-TYPE DISTRIBUTION TRANSFORMERS, 500 kVA AND SMALLER: H V 34500 VOLTS AND BELOW, L V 7970/13800Y & BELOW	DISTRIBUTION TRANSFORMERS Ed SMITH	ANDERSEN GLEN WILKS, A.			6/20/96 2001	NEMA HAS COPYRITE
C57.12.21 NONE	STANDARD REQUIREMENTS FOR PAD-MOUNTED, COMPARTMENTAL-TYPE, SELF-COOLED, SINGLE-PHASE DIST TRANSFORMERS WITH HV BUSHINGS	DISTRIBUTION TRANSFORMERS Ed SMITH	GHAFOURIAN A. (706) 548-3121	T&D	IAS/REPC	10/22/79 6/27/91 1985	NEMA HAS COPYRITE
C57.12.22 NONE	PAD-MOUNTED,COMPARTMENTAL-TYPE SELF-COOLED,3-PHASE DIST. TR WITH HV BUSHINGS,2500kVA AND SMALLER:...REQUIREMENTS.	DISTRIBUTION TRANSFORMERS Ed SMITH	HANUS K. (817)215-6020	T&D IAS/PSEC	IAS/REPC	1/9/95 6/27/91 1999	AWAITING PUB. BY NEMA NEMA HAS COPYRITE
C57.12.23 PC57.12.23	UNDERGROUND-TYPE,SELF-COOLED, 1-PHASE DISTRIBUTION TR WITH SEPERABLE INSULATED HV CONNECT HV 24940GrdY..LV,240..;167kVA.	DISTRIBUTION TRANSFORMERS Ed SMITH	Traut A., Lee R.	T&D IAS/REPC	IC IAS/PSEC	6/1/99 3/18/99 2004	Reaffirmed June 1999 Par approved March 1999
C57.12.24 PC57.12.24	UNDERGROUND-TYPE 3-PHASE DISTRIBUTION TRANSFORMERS,2500kVA AND SMALLER: HV,34500GrdY..& BELOW,LV,480 V AND BELOW	UG TR & NETWORK PROTECTORS P. E. OREHEK	NIEMANN C. (708)410-5307	T&D IAS/REPC IEC TC 14	IC IAS/PSEC	3/17/94 6/20/96 1999	Who owns copyrite? Need action prior to Dec. 17 1999

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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...	DISTRIBUTION TRANSFORMERS ED SMITH	LAZAR/GHAFOURIAN	T&D IAS/REPC	IC IAS/PSEC	5/11/90 12/8/98 1995	Reaffirmation ballot closed. Send to REVCOM NEW PAR APPROVED DEC 9
C57.12.26 NONE	PAD-MOUNTED COMPARTMENTAL-TYPE SELF-COOLED,3-PHASE DIST TR for USE W/ SEPERABLE INSULATED HV CONN.,HV 34500GrdY..2500kVA	DISTRIBUTION TRANSFORMERS Ed SMITH	PAIVA,G.	T&D IAS/REPC SCC14	IC IAS/PSEC	6/17/92 12/5/91 1997	Standard Withdrawn
C57.12.33 PC57.12.33	GUIDE FOR EVALUATION OF LOSSES IN DISTRIBUTION TRANSFORMERS	DISTRIBUTION TRANSFORMERS Ed SMITH	PEKAREK T. DUCKETT, D.	PSIM		6/1/98	PAR APPROVED 6-25-98 Ballot closed 4/1999
C57.12.34 PC57.12.34	REQUIREMENTS FOR THREE PHASE PAD-MOUNTED DISTRIBUTION TRANSFORMERS	DISTRIBUTION TRANSFORMERS Ed SMITH	MICHAELS, S. (313)235-7573	ICC		9/21/95	Target Extension approved to Dec. 2000
C57.12.35 NONE	STANDARD FOR BAR CODING FOR DISTRIBUTION TRANSFORMERS (POLE-MOUNTED, PAD-MOUNTED AND UNDERGROUND)	DISTRIBUTION TRANSFORMERS Ed SMITH	SMITH,E. (314) 677-3421			6/20/96 2001	APPROVED BY STANDARDS BOARD 6/20/96 PREVIOUSLY P1265
C57.12.40 PC57.12.40	REQUIREMENTS FOR SECONDARY NETWORK TRANSFORMERS, SUBWAY & VAULT TYPES (LIQUID IMMERSED)	UG TR & NETWORK PROTECTORS P. E. OREHEK	PLASTER, R.L. (804) 275-2142	T&D IAS/REPC IEC TC14	ICC IAS/PSEC NEMA	3/19/92 6/26/97 1998	PAR APPROVED ON 6/26/97 NEED REVISION/REAFFIRMATION
C57.12.44 PC57.12.44	STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS	UG TR & NETWORK PROTECTORS P. E. OREHEK	MULKEY D. H. (415)973-4699	T&D IAS/REPC EEI	SWGR IAS/PSEC NEMA	12/20/94 9/21/95 1999	Recirculation ballot closed 4/7/2000
C57.12.50 NONE	REQ. FOR VENTILATED DRY-TYPE DISTRIBUTION TR, 1-500kVA, 1 PHASE, AND 15-500kVA, 3-PHASE HV 601-34500VOLTS,LV 120-600V	DRY-TYPE TRANSFORMERS W. PATTERSON	SULLIVAN J. (813) 228-4111			6/12/89 1994	COPYRIGHT NOT RELEASED

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C57.12.51 NONE	REQ. FOR VENTILATED DRY-TYPE POWER T 501kVA & LARGER, 3 PHASE, WITH HV 601-34500V, LV 208Y/120 TO 4160 VOLTS	DRY-TYPE TRANSFORMERS W. PATTERSON	SULLIVAN J. (813) 228-4111			6/12/89 1994	COPYRIGHT NOT RELEASED
C57.12.52 NONE	REQ. FOR SEALED DRY-TYPE POWER TRANSFORMERS, 501kVA & LARGER, 3 PHASE, WITH HV 601-34500V,LV 208Y/120 TO 4160 VOLTS	DRY-TYPE TRANSFORMERS W. PATTERSON	SULLIVAN J. (813) 228-4111			6/12/89 1994	COPYRIGHT NOT RELEASED
C57.12.53 ANSI	REQUIREMENTS FOR DRY-TYPE, UNDERGROUND, SINGLE-PHASE WITH SEPARABLE INSULATED H-V 24940 grdY/1440 V AND <; LV 240/120 V	STANDARDS T.A. PREVOST				 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	STANDARDS T.A. PREVOST				 0	ONLY TITLE EXISTS IS IT REQUIRED?
C57.12.55 NONE	CONFORMANCE STANDARD FOR TR- DRY-TYPE TRANSFORMERS USED IN UNIT INSTALLATIONS, INCL. UNIT SUBSTATIONS	DRY-TYPE TRANSFORMERS W. PATTERSON	SULLIVAN J. (813) 228-4111			4/7/86 1992	COPYRIGHT NOT RELEASED
C57.12.56 PC57.12.56	TEST PROCEDURE FOR THERMAL EVALUATION OF INSULATION SYST FOR VENTILATED DRY-TYPE POWER & DISTRIBUTION TRANSFORMERS	DRY-TYPE TRANSFORMERS W. PATTERSON	PROVOST R. L. (302)999-2225			3/1/98 2003	REAFFIRMED IN SEPT 1998 WOULD LIKE TO COMBINE WITH C57.12.60
C57.12.57 none	REQUIREMENTS FOR VENTILATED DRY-TYP NETWORK TRANSFORMERS 2500kVA AND BELOW, W/HV 34500V AND BELOW,LV 216Y..AND 480Y..	UG TR & NETWORK PROTECTORS P. E. OREHEK	ROBINSON, A.	T&D SCC14	EEI/T&D	3/18/92 12/5/91 2000	REVISE/REAFFIRM BEFORE MARCH 2000 APPLY FOR NEW PAR
C57.12.58 NONE	GUIDE FOR CONDUCTING TRANSIENT VOLTAGE ANALYSIS OF A DRY-TYPE TRANSFORMER COIL	DRY-TYPE TRANSFORMERS W. PATTERSON	KLINE A. D. (404)762-1642	IEC	IAS	9/19/96 6/28/78 2001	REAFFIRMED 9/19/96

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C57.12.59 NONE	GUIDE FOR DRY-TYPE TRANSFORMER THROUGH-FAULT CURRENT DURATION	DRY-TYPE TRANSFORMERS W. PATTERSON	PATTERSON W. (919)848-1860			1/1/89 9/13/84 1996	WITHDRAWN BY STANDARDS BOARD ON 12/10/96
C57.12.60 NONE	TEST PROCEDURES FOR THERMAL EVALUATION OF INSULATION SYSTEMS FOR SOLID-CAST & RESIN ENCAP POWER & DIST TRANSFORMER	DRY-TYPE TRANSFORMERS W. PATTERSON	PROVOST R. L. (302)999-2225	IEC SC15E	NEMA	3/19/98 6/26/97 2003	REVISION APPROVED 3/98 WOULD LIKE TO COMBINE WITH C57.12.56
C57.12.70 PC57.12.70	TERMINAL MARKINGS AND CONNECTIONS FOR DIST. & POWER TRANSFORMERS	STANDARDS T.A. PREVOST	Prevost, T.A. (802)751-3458	T&D ICC	SUBS	6/18/92 6/14/95 1997	Recirculation Ballot required.
C57.12.80 PC57.12.80	TERMINOLOGY FOR POWER & DISTRIBUTIO TRANSFORMERS	STANDARDS T.A. PREVOST	TRAUB T. P. (312)394-2704	T&D	SUBS	5/1/92 6/14/95 1997	Recirculation Ballot pending PAR extended to 12/00
C57.12.90 None	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS & GUIDE FOR SC TESTING OF	STANDARDS T.A. PREVOST	TULI,S.	T&D SWG USTAG	PSRC IECTC14	6/26/99 6/15/95 2004	Apply for new PAR for further revision
C57.12.90 NEW	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	INSULATION LIFE L. W. PIERCE	HENRY G. (501)534-5332			1998	REVISING SECT. 11
C57.12.90 PC57.12.90	REVISE INDUCED TESTS FOR CLASS II POWER TRANSFORMERS	DIELECTRIC TESTS L. B. WAGENAAR	PERKINS M. (317)286-9334				D1 BALOTTED IN TF
C57.12.90 PC57.12.90	CLAUSE 10.4 - IMPULSE TESTS FOR DISTRIBUTION TRANSFORMERS	DIELECTRIC TESTS L. B. WAGENAAR	ROSSETTI J. (901)528-4743				APPROVED BY SUBCOM

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C57.12.90 PC57.12.90	CLAUSE 10 - ADD HI-POT TEST FOR CONTRO WIRING	DIELECTRIC TESTS L. B. WAGENAAR	TULI S. (414)547-0121			D1 BALOTTED IN SUBCOM
C57.12.90 PC57.12.90	CLAUSE 15 - NEW CLAUSE FOR CERTIFICATION TEST DATA	PERFORMANCE CHARACTERISTICS D. Fallon	FEGHALI, P. 408-262-7000			APPROVED BY PCS
C57.12.90 PC57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	PERFORMANCE CHARACTERISTICS D. Fallon	FEGHALI, P. 408-262-7000			NEW PAR NESCOM 03/15/95 COORDINATE WITH S. TULI
C57.12.90 PC57.12.90	CLAUSE 9 - ADD MEASUREMENT OF AUXILARY LOSSES	PERFORMANCE CHARACTERISTICS D. Fallon	TULI S. (414)547-0121			D1 BALLOTED IN PCS
C57.12.90 PC57.12.90	REVISION OF TEMPERATURE RISE TESTS	INSULATION LIFE L. W. PIERCE	HENRY G. (501)543-6546			WORKING ON DRAFT 4
C57.12.90 PC57.12.90d	REVISION OF THE INDUCED TEST	DIELECTRIC TESTS L. B. WAGENAAR	POULIN B. (408)957-8326 M. PERKINS		9/28/90 0	INCLUDE IN C57.12.90 COORDINATE WITH SUBASH TULI
C57.12.90 PC57.12.90x	CLAUSE 13 - ADD TEST PROCEDURE FOR MEASURING SOUND INTENSITY	AUDIBLE SOUND & VIBRATION J. PURI	GIRGIS R. (317)286-9532 TULI S.			D1 BEING PREPARED COORDINATE WITH SUBASH TULI
C57.12.91 PC57.12.91	TEST CODE FOR DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS	DRY-TYPE TRANSFORMERS W. PATTERSON	BARNARD D. (919)738-4251	SPD EM T&D SUBS IEC TC14	6/14/95 6/26/97 2000	Balloting

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C57.120 NONE	LOSS EVALUATION GUIDE FOR POWER TRANSFORMERS AND REACTORS	POWER TRANSFORMERS E. G. HAGER	JACOBSEN R.	SUB ED&PG IEC	EM IAS	12/29/00 5/1/80 2005	Reaffirmed 12/29/00
C57.121 NONE	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS	INSULATING FLUIDS F. GRYSZKIEWICZ	McSHANE C. P. (617)926-4900	PSRC IAS	T&D IEC	9/16/98 2003	REVISION HAS BEEN APPROVED BY IEEE STANDARDS BD
C57.123 PC57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT	PERFORMANCE CHARACTERISTICS D. Fallon	GIRGIS,R. (765)286-9532			9/16/99 0	
C57.124 NONE	RECOMMENDED PRACTICE FOR THE DETECTION OF PD AND THE MEASUREMEN OF APPARENT CHARGE IN DRY-TYPE TRANSFORMERS	DRY-TYPE TRANSFORMERS W. PATTERSON	KLINE A. D. (404)762-1642	NONE		6/29/91 6/27/91 2001	REAFFIRMED 9/18/96
C57.125 NONE	GUIDE FOR FAILURE INVESTIGATION, DOCUMENTATION AND ANALYSIS FOR POWER TRANSFORMERS AND SHUNT REACTORS	POWER TRANSFORMERS E.G. HAGER	CASH D. (702) 227-2316	T&D PSE	ED&PG SWGR	6/27/91 6/28/87 2003	REAFFIRMED 1998
C57.127 PC57.127	GUIDE FOR THE DETECTION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS	DIELECTRIC TESTS L. B. WAGENAAR	J. W. HARLEY (216)425-1838	ICC IEC TC14	PSIM IEC TC42	6/26/97 0	Recirculation of Draft 3 Clsed 3/22/00 BALLOTING
C57.129 None	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED HVDC CONVERTER TRANSFORMERS AND SMOOTHING REACTORS FOR DC POWER TRANSM	HVDC CONVERTER TR & REACTOR R.DUDLEY	R.DUDLEY. (317)286-9387	EM PSIM	T&D SUB	9/16/99 9/26/91 2004	
C57.13 PC57.13	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS	INSTRUMENT TRANSFORMERS J. E. SMITH	NELSON T. (301)975-2956	PSIM SPD	PSR	6/7/93 6/14/94 1998	REQUIRES REVISION/REAFFIRMATION IN 1998 PAR Extended to 12/2000

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C57.13.1 PSRC	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS	INSTRUMENT TRANSFORMERS J. E. SMITH	(919-827-2121		8/25/87 1997	R1992 RELAY COMM. DOCUMENT
C57.13.2 NONE	CONFORMANCE TEST PROCEDURES FOR INSTRUMENT TRANSFORMERS	INSTRUMENT TRANSFORMERS J. E. SMITH	SMITH J. E. (919-827-2121		12/5/91 9/26/91	STANDARD WITHDRAWN Reaffirmation will be on 1/2000 Revcom agenda
C57.13.3 PSRC	GUIDE FOR THE GROUNDING OF INSTRUMENT TR SECONDARY CICUITS AND CASES	INSTRUMENT TRANSFORMERS J. E. SMITH	(919-827-2121		1/23/87 1995	RELAY COMMITTEE DOCUMENT
C57.13.4 NONE	DETECTION OF PARTIAL DISCHARGE AND MEASUREMENT OF APPARENT CHARGE WITHIN INSTRUMENT TRANSFORMERS	INSTRUMENT TRANSFORMERS J. E. SMITH	JONNATTI A. J. (813)785-2788	T&D	5/28/80 0	PAR WITHDRAWN DOCUMENT NEVER SUBMITTED TO SB
C57.13.5 PC57.13.5	TEST REQUIREMENTS FOR INSTRUMENT TRANSFORMERS OF A NOMINAL VOLTAGE OF 115KV AND ABOVE	INSTRUMENT TRANSFORMERS J. E. SMITH	RIFFON, P. 514-840-3000	SWGR EM TC 38 US T	9/19/96 0	REVISED PAR APPROVED 9/19/96
C57.13.6 PC57.13.6	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS FOR USE WITH ELECTRONIC REVENUE METERS AND RELAYS	INSTRUMENT TRANSFORMERS J. E. SMITH	TEN-HAAGEN C. W. (603)749-8433	PSIM PSR TD PSC		REVISED PAR DISSAPROVED 9 /96 NO PAR EXISTS
C57.130 NONE	T-U GUIDE FOR USE OF DISS. GAS ANALYSIS DURING FACTORY THERMAL TESTSFOR THE EVALUATION OF OIL-IMMERSED TRANS. AN REACT.	INSULATING FLUIDS F. GRYSZKIEWICZ	HEINRICHS F. W. (412)941-6924	NONE	3/17/93 0	D13 BEING SENT FOR RECIRC. BALLOT NEED NEW PAR
C57.131 NONE	REQUIREMENTS FOR LOAD TAP CHANGERS	POWER TRANSFORMERS E.G. HAGER	TRAUB T. P. (312)394-2704		3/16/95 2000	Requires Reaffirmation

STANDARD/ PROJECT	TITLE OF DOCUMENT	SUBCOMMITTEE SC CHAIR	WG CHAIR AND PHONE NO. TF CHAIR	COMMITTEES REQUESTING COORDINATION		PUB DATE PAR DATE REV DUE	LATEST STATUS/ COMMENTS
C57.133 PC57.133	GUIDE FOR SHORT-CIRCUIT TESTING OF DISTRIBUTION AND POWER TRANSFORMERS	PERFORMANCE CHARACTERISTICS D. Fallon	McQUIN N. (412) 829-1205	T&D,SWG IECTC14 IAS/PSE	PSR SUBS IAS/REP	9/21/95	PAR APPROVED BALLOT GROUP FORMED
C57.134	GUIDE FOR THE DETERMINATION OF HOTTEST SPOT TEMPERATURE IN DRY TYP TRANSFORMERS	DRY-TYPE TRANSFORMERS W. PATTERSON	PAYNE P. (202)388-2138			12/29/00 9/21/95 2005	Approved by standards board 12/00
C57.135 PC57.135	GUIDE FOR APPLICATION, TESTING, INSTALLATION AND OPERATION OF PHASE ANGLE SHIFTING TRANSFORMERS	POWER TRANSFORMERS E. G. HAGER	TRUMMER E. 43-3172-606-404 t. lUNDQUIST (WG SE	PSRC IAS/PSP	EMC IEC TC14	6/20/96 0	Balloting Group being formed
C57.136 PC57.136	GUIDE FOR SOUND LEVEL ABATEMENT AND DETERMINATION IN OIL-FILLED TRANSFORMERS	AUDIBLE SOUND & VIBRATION J. PURI	DARWIN, A.			3/21/96	Ballot Closed 3/27/2000 PAR APPROVED 03/21/96
C57.138 NONE	RECOMMENDED PRACTICE FOR ROUTINE IMPULSE TEST FOR DISTRIBUTION TRANSFORMERS	DIELECTRIC TESTS L. B. WAGENAAR	ROSSETTI J. (901)528-4743	T&D PSIM	IA/PSE	3/19/98 9/19/96 2003	PC57.138/D7 APPROVED
C57.139 PC57.139	GUIDE FOR DISSOLVED GAS ANALYSIS IN TRANSFORMER LOAD TAP CHANGERS	INSULATING FLUIDS F. GRYSZKIEWICZ	YOUNGBLOOD, C.R. 317-838-2129	IEC US TA		12/9/97	WG PREPARING DRAFT 1
C57.140 PC57.140	Evaluation and Reconditioning of Liquid Immersed Power Transformers	Power Transformers E.G. HAGER	JAMES, R. (504)576-6246			9/16/99	
C57.141 PC57.141	GUIDE FOR APPLICATION OF LOAD TAP CHANGERS	POWER TRANSFORMERS E.G. HAGER	HENNING, W. (414)547-0121			6/26/99	

STANDARD/ PROJECT	TITLE OF DOCUMENT	SUBCOMMITTEE SC CHAIR	WG CHAIR AND PHONE NO. TF CHAIR	COMMITTEES REQUESTING COORDINATION		PUB DATE PAR DATE REV DUE	LATEST STATUS/ COMMENTS
C57.15 None	REQUIREMENTS, TERMINOLOGY, & TEST CODE FOR STEP-VOLTAGE REGULATORS	DISTRIBUTION TRANSFORMERS ED SMITH	DIAMANTIS T. COLOPY, C.	SUBS	IAS/PSE	9/16/99 9/16/97 2004	
C57.16 NONE	STANDARD REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR DRY-TYPE AIR-CORE SERIES CONNECTED REACTORS	DRY-TYPE TRANSFORMERS W. PATTERSON	DUDLEY R. (416)298-8108	NEMA T&D	IAS	12/10/96 2001	APPROVED BY STANDARDS BOARD ON 12/10/96
C57.17 ANSI	REQUIREMENTS FOR ARC FURNACE TRANSFORMERS	STANDARDS T.A. PREVOST				1986	LAST REVISED IN 1986 ANSI DOCUMENT
C57.18.10 NONE	REQUIREMENTS FOR SEMICONDUCTOR RECTIFIER TRANSFORMERS	PERFORMANCE CHARACTERISTICS D. Fallon	KENNEDY S. P. (716)896-6500	NONE		3/1/98 12/28/81 2003	STANDARD APPROVED MARCH 1998
C57.19.00 PC57.19.00	GENERAL REQUIREMENTS AND TEST PROCEDURES FOR OUTDOOR APPARATUS BUSHINGS (IEEE 21)	BUSHING F. E. ELLIOTT	ELLIOTT F. E. (614)223-2259	PSIM ICC	IA/PSE IEC SC36A	7/23/91 6/20/96 2002	APPROVED FOR REAFIRMATION 1997
C57.19.01	STANDARD PERFORMANCE CHARACTERISTICS AND DIMENSIONS FOR OUTDOOR APPARATUS BUSHINGS (IEEE 24)	BUSHING F. E. ELLIOTT	SINGH PRITPAL (901)696-5228	ICC IEC SC36A	IA/PSE	12/29/00 2005	Revised Standard Approved 12/29/2000
C57.19.03 NONE	STANDARD REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR BUSHINGS FOR DC APPLICATIONS	BUSHING F. E. ELLIOTT	HEYMAN OLOF 46-240-83152			6/20/96 2001	APPROVED BY STANDARDS BOARD 6/20/96 APPROVED BY ANSI 6/97
C57.19.100 NONE	GUIDE FOR APPLICATION OF APPARATUS BUSHINGS.	BUSHING F. E. ELLIOTT	ELLIOTT F. E. (503)230-3900	SWGR PSR	SUB	3/16/95 2000	Balloting Reaffirmation REPLACES C57.19.101

STANDARD/ PROJECT	TITLE OF DOCUMENT	SUBCOMMITTEE SC CHAIR	WG CHAIR AND PHONE NO. TF CHAIR	COMMITTEES REQUESTING COORDINATION		PUB DATE PAR DATE REV DUE	LATEST STATUS/ COMMENTS
C57.21 NONE	REQUIREMENTS,TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA	PERFORMANCE CHARACTERISTICS D. Fallon	McGILL J. W. (414)475-3422	EM PSR	T&D	4/2/91 6/9/88 2000	REAFFIRMED 1995
C57.91 PC57.91	GUIDE FOR LOADING MINERAL OIL-IMMERSED TRANSFORMERS	INSULATION LIFE L. W. PIERCE	PIERCE L. (706)291-3166	SUB PSE	T&D	6/14/95 6/13/85 2000	PAR for corriagenda will be on March 2000 Agenda
C57.93 NONE	GUIDE FOR INSTALLATION OF LIQUID-IMMERSED POWER TRANSFORMERS.	POWER TRANSFORMERS E. G. HAGER	GILLIES D. A. (503)622-4847	NONE		12/12/95 2000	Power Trans Sub Comm. will form new WG for rev. INCORPORATED C57.12.11 AND 12.12
C57.94 NONE	RECOMMENDED PRACTICE FOR INSTALLATION, APPLICATION,OPERATION MAINTENANCE OF DRY-TYPE GEN PURPOSE DIST & POWER TR	DRY-TYPE TRANSFORMERS W. PATTERSON	PATTERSON W. (919)848-1860			12/9/87 1992	Balloting Reaffirmation NEEDS REAFFIRMATION
C57.95 NONE	GUIDE FOR LOADING LIQUID-IMMERSED STEP-VOLTAGE AND INDUCTION-VOLTAGE REGULATORS	INSULATION LIFE L. W. PIERCE	(314)554-3097			3/21/91 1996	WITHDRAWN BY STANDARDS BOARD ON 12/10/96
C57.96 None	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS	DRY-TYPE TRANSFORMERS W. PATTERSON	PIERCE L. (706)291-3166	T&D SCC10	SCC14 IA/PSE	6/26/99 12/10/96 2004	
C57.98 NONE	IEEE GUIDE FOR TRANSFORMER IMPULSE TESTS	DIELECTRIC TESTS L. B. WAGENAAR	POULIN B. (408)957-8326 R. E. MINKWITZ, SR.	NONE		12/2/93 2004	REAFFIRMED IN 1999
IEEE 259 None	TEST PROCEDURE FOR EVALUATION OF SYSTEMS OF INSULATION FOR SPECIALTY TRANSFORMERS	DRY-TYPE TRANSFORMERS W. PATTERSON	SIMPSON R. W. JR. (603)284-4362			6/26/99 3/21/96 2004	

STANDARD/ PROJECT	TITLE OF DOCUMENT	SUBCOMMITTEE SC CHAIR	WG CHAIR AND PHONE NO. TF CHAIR	COMMITTEES REQUESTING COORDINATION		PUB DATE PAR DATE REV DUE	LATEST STATUS/ COMMENTS
IEEE 62.1 NONE	GUIDE FOR DIAGNOSTIC FIELD TESTING OF POWER APPARATUS, PART I: OIL-FILLED POWER TRANSFORMERS, REGULATORS AND REACTORS	DIELECTRIC TESTS L. B. WAGENAAR	YOUNG F. N. (216)447-2649			3/17/94	APPROVED BY REVCOM 03/15/95 PUBLISHED
IEEE 637 NONE	GUIDE FOR THE RECLAMATION OF INSULATING OIL AND CRITERIA FOR ITS USE	INSULATING FLUIDS F. GRYSZKIEWICZ	(617)926-4900			6/4/84 1997	NEEDS REVISION/REAFFIRMATION
IEEE 638 P638	QUALIFICATION OF CLASS 1E TR FOR NUCLEAR POWER GENERATING STATIONS	PERFORMANCE CHARACTERISTICS D. Fallon	PIERCE L. W. (706)291-3166	NPE SC2	SUB SCC10	3/19/92 10/29/90 2004	REAFFIRMED 1999
IEEE 799 P799	GUIDE FOR HANDLING AND DISPOSING OF ASKARELS	INSULATING FLUIDS F. GRYSZKIEWICZ	(617)926-4900	EIS T&D	IAC	11/17/86 9/27/79 1998	Standard Withdrawn
IEEE1258 P1258	TRIAL-USE GUIDE FOR INTERPRETATION OF GASES GENERATED IN SILICONE-IMMERSED TRANSFORMERS	INSULATING FLUIDS F. GRYSZKIEWICZ	GRYSZKIEWICZ f. (617)926-4900	T&D	ICC	6/15/95 0	D9 BALLOT IN PROCESS Extension Request tabled to 6/2000 need request
IEEE1276 NONE	TRIAL-USE GENERAL REQUIREMENTS FOR LIQUID-FILLED DISTRIBUTION AND POWER TR UTILIZING HIGH TEMP SOLID INSULATIN MATERIAL	INSULATION LIFE L. W. PIERCE	FRANCHEK M. A. (802)748-3936	T&D		6/1/97 3/21/96 2002	Requested Full Use Status
IEEE1277 P1277	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED AND DRY-TYPE HVDC SMOOTHING REACTORS	HVDC CONVERTER TR & REACTOR R.DUDLEY	R.DUDLEY (317)286-9387	SUB		9/25/91 0	Recirc. Ballot closed 12/24/99 PAR EXTENDED TO APRIL 2000
IEEE1388 P1388	STANDARD FOR THE ELECTRONIC REPORTING OF TRANSFORMER TEST DATA	DISTRIBUTION TRANSFORMERS Ed SMITH	SMITH J. ROLLINS D. (601)892-4661	EEI ASC X12 CS SAB	NEMA PSR	12/7/98 0	NO. CHANGED FROM C57.132

STANDARD/ PROJECT	TITLE OF DOCUMENT	SUBCOMMITTEE SC CHAIR	WG CHAIR AND PHONE NO. TF CHAIR	COMMITTEES REQUESTING COORDINATION	PUB DATE PAR DATE REV DUE	LATEST STATUS/ COMMENTS
NEW NEW	TASK FORCE TO STUDY APPLICATON AND PROBLEMS OF DRAW-LEADS FOR BUSHINGS	BUSHING F. E. ELLIOTT	NORDMAN RUSS (414)547-0121 R. NORDMAN			NEW TASK FORCE

Attachment 2 COORDINATION ACTIVITIES OF THE IEEE/PES TRANSFORMERS COMMITTEE

25-Sep-00

PROJECT / DATE	TITLE / COMMITTEE	CONTACT		COORDINATOR		TR SUBCOMM	STATUS
	GUIDE FOR LIFE MANAGEMENT OF ELECTRICAL EQUIPMENT IN GENERATING STATIONS						
10/14/96	PSIM	DEREK M. SAWYER	416-592-5445	F. N. YOUNG	216-447-2649	DIELECTRIC TESTS	
	HARMONIC LIMITS FOR SINGLE-PHASE EQUIPMENT						
8/15/96	T&D	DANIEL J. WARD	804-775-5328	DON CASH	804-575-2148	PERFORMANCE CHARACTERISTICS	
449	Standard for Ferroresonant Voltage Regulators						Balloting
1/29/98	ETTC	Matthew Wilkowski	972-284-8218				
C62.62	PERFORMANCE CHARACTERISTICS FOR SURGE PROTECTIVE DEVICES CONNECTED TO LOW VOLTAGE AC POWER CIRCUITS						RESOLVING NEGATIVE BALLOTS
3/21/91	SPD	E. GALLO		MAHESH P. SAMPAT	704-462-3226	DIELECTRIC TESTS	
NEW	MEASUREMENT OF POWER AT LOW POWER FACTOR						
2/15/94	PSIM	EDDY SO	613-993-2660	W. R. HENNING	414-547-0121	PERFORMANCE CHARACTERISTICS	
NEW	GUIDE FOR VOLTAGE AND PHASING DETECTORS FOR USE IN HV SYSTEMS IN ELECTRIC POWER UTILITIES						
3/4/94	PSIM	PETER H. REYNOLDS	215-646-9200	G. H. VAILLANCOURT	514-652-8515	STANDARDS	
NEW	GUIDE FOR RECOMMENDED ELECTRICAL CLEARANCES AND INSULATION LEVELS IN AIR INSULATED SUBSTATIONS						APPLYING FOR PAR
2/20/95	SUBS	RICHARD COTTRELL	517-788-0817	G. VAILLANCOURT	514-652-8515	STANDARDS	
P 4	STANDARD TECHNIQUES FOR HIGH-VOLTAGE TESTING						JUST PUBLISHED
2/2/89	PSIM	TERRY McCOMB	613-990-5826	G. VAILLANCOURT	514-652-8515	DIELECTRIC TESTS	
P 62	GUIDE FOR DIAGNOSTIC OF POWER APPARATUS						DRAFT PUBLISHED IN C57 COLL.
3/17/94	PSIM	DAVID TRAIN	617-926-4900	R. A. VEITCH	905-731-9178	STANDARDS	

PROJECT DATE	TITLE COMMITTEE	CONTACT		COORDINATOR		TR SUBCOMM	STATUS
P 454	PARTIAL DISCHARGE MEASUREMENTS						WILL ADOPT IEC-270
3/31/94	PSIM	BARRY WARD	215-646-9200	G. H. VAILLANCOURT	514-652-8515	STANDARDS	
P 656	STANDARD FOR THE MEASUREMENT OF AUDIBLE NOISE FROM OVERHEAD TRANSMISSION LINES						PUBLISHED 12/92
3/8/91	T&D	JAMES R. STEWART	518-395-5025	ALAN M. TEPLITSKY	212-460-4859	AUDIBLE SOUND AND VIBRATION	
P 693	RECOMMENDED PRACTICE FOR SEISMIC DESIGN OF SUBSTATIONS						PUBLISHED IN 1998
9/18/90	SUBS	RULON FRONK	213-367-0005	E.G. HAGER	760-789-3022	POWER TRANSFORMERS	
P 957	GUIDE FOR CLEANING INSULATORS						OLD GUIDE EXTENDED TO 12/94
9/17/92	T&D	WILLIAM L. GIBSON	415-973-3747	L. B. WAGENAAR	614-223-2259	BUSHINGS	
P 979	GUIDE FOR SUBSTATION FIRE PROTECTION						PUBLISHED 1996
6/18/92	SUBS	A. J. BOLGER	604-663-2879	E.G. HAGER	760-789-3022	POWER TRANSFORMERS	
P 980	GUIDE FOR THE CONTAINMENT AND CONTROL OF OIL-SPILLS IN SUBSTATIONS						GUIDE EXTENDED TO 12/94
9/17/92	SUBS	RICHARD G. COTTREI	517-788-0817	F. GRYSZKIEWICZ	617-926-4900	INSULATING FLUIDS	
P1030.3	GUIDE FOR SPECIFICATION OF HVDC PERFORMANCE - PART III, DYNAMIC PERFORMANCE						DISCUSSING DRAFT IN WG
12/5/91	T&D	LEWIS VAUGHAN	514-652-8457	WILLIAM N. KENNEDY	317-286-9387	HVDC CONV. TR & SMOOTHING REA	
P1122	DIGITAL RECORDERS FOR MEASUREMENTS IN HIGH VOLTAGE IMPULSE TESTS						APPROVED BY SB 03/17/94
12/3/92	PSIM	T. R. McCOMB	613-990-5826	BERTRAND POULIN	408-957-8326	DIELECTRIC TESTS	
P1205	GUIDE FOR ASSESSING, MONITORING, AND MITIGATING AGING EFFECTS ON CLASS IE EQUIPMENT USED IN NUCLEAR POWER GEN. STAT						
6/2/96	NPEC	JERALD L. EDSON	208-526-6253	L. W. PIERCE	706-291-3166	INSULATION LIFE	
P1223	POWER SYSTEM DIGITAL TESTING TECHNIQUES						
8/17/89	PSIM	T. R. McCOMB	613-990-5826	R. MINKWITZ, SR.	617-828-3241	DIELECTRIC TESTS	

PROJECT / DATE	TITLE / COMMITTEE	CONTACT		COORDINATOR		TR SUBCOMM	STATUS
P1248	GUIDE FOR THE COMMISSIONING OF ELECTRICAL SYSTEMS IN HYDROELECTRIC POWER PLANTS						
12/6/90	ED&PG	LOUIS A. TAUBER	503-326-2323	E.G. HAGER	760-789-3022	POWER TRANSFORMERS	
P1268	GUIDE FOR INSTALLING TEMPORARY SUBSTATIONS						
3/30/91	SUBS	SHASHI G. PATEL	404-362-5386	E.G. HAGER	760-789-3022	POWER TRANSFORMERS	
P1291	GUIDE FOR PARTIAL DISCHARGE MEASUREMENTS IN POWER SWITCHGEAR						ANSI APPROVED 08/30/93
10/22/91	SWGR	E. F. VEVERKA	414-835-1544	G. H. VAILLANCOURT	514-652-8515	STANDARDS	
P1303	GUIDE FOR STATIC VAR COMPENSATOR FIELD TESTS						APPROVED BY SB 06/94
9/17/92	SUBS	PHILIP R. NANNERY	914-577-2591	R. F. DUDLEY	416-298-8108	DRY TYPE	
P1304	CURRENT MEASURING SYSTEMS WHICH USE OPTICAL TECHNIQUES						
6/18/92	PSIM	T. R. McCOMB	613-990-5826	J. E. SMITH	919-827-3220	INSTRUMENT TRANSFORMERS	
P1325	RECOMMENDED PRACTICE FOR REPORTING FIELD TROUBLE DATA FOR POWER CIRCUIT BREAKERS						INFORMATION COPY REQUESTED
3/17/92	SWGR	D. M. LARSON	203-634-5739	G. H. VAILLANCOURT	514-652-8515	STANDARDS	
P1459	STD DEF. FOR THE MEAS. OF ELECTRIC POWER QUANTITIES UNDER SINUSOIDAL, NON-SIN., BALANCED OR UNBALANCED CONDITIONS						APPLYING FOR PAR
	PSIM	A. E. EMMANUEL	508-831-5239	EDDIE SO	613-993-2660	PERFORMANCE CHARACTERISTICS	
P420	STANDARD FOR THE DESIGN AND QUALIFICATION OF CLASS 1E CONTROL BOARDS, PANELS, AND RACKS USED IN NUCLEAR GENERATIN(						INFORMATION COPY
11/5/94	NPE	M. S. ZAR	312-269-2222	L. W. PIERCE	706-291-3166	INSULATION LIFE	
PC 37.104	GUIDE FOR AUTOMATIC RECLOSING						
7/19/96	PSRC	WILLIAM STRANG	618-288-9211	H. J. SIM	702-227-2316	PERFORMANCE CHARACTERISTICS	
PC37.10	GUIDE FOR DIAGNOSTICS AND FAILURE INVESTIGATION OF POWER CIRCUIT BREAKERS						DRAFT IN REVISION IN WG
5/1/91	SWGR	L. ROLANDO SAAVED	504-363-8765	WALLACE B. BINDER JR.	216-384-5625	PERFORMANCE CHARACTERISTICS	

PROJECT DATE	TITLE COMMITTEE	CONTACT		COORDINATOR		TR SUBCOMM	STATUS
PC37.107	STANDARD FOR DIGITAL PROTECTIVE RELAY INTERFACES						EVALUATING BALLOT RESULTS
12/28/85	PSR	STIG L. NILSSON	408-335-9061	G. H. VAILLANCOURT	514-652-8515	STANDARDS	
PC37.108	GUIDE FOR THE PROTECTION OF NETWORK TRANSFORMERS						REAFFIRMED 1994
9/28/84	PSR	THOMAS E. WIEDMAN	312-394-2593	VACANT		STANDARDS	
PC37.109	GUIDE FOR THE PROTECTION OF SHUNT REACTORS						REAFFIRMED 1993
3/28/85	PSR	LAVERN L. DVORAK	303-231-1636	MIKE ALTMAN	407-694-4975	PERFORMANCE CHARACTERISTICS	
PC37.110	GUIDE FOR THE APPLICATION OF CURRENT TRANSFORMERS USED FOR PROTECTIVE RELAYING PURPOSES						REVISION (D21) BALOTTED IN PSR
5/31/90	PSR	GRAHAM CLOUGH	206-737-6912	J. E. SMITH	919-827-3220	INSTRUMENT TRANSFORMERS	
PC37.122	STANDARD FOR GAS-INSULATED SUBSTATIONS						
3/20/97	SUBS	ARUN ARORA	303-674-7973	J. E. SMITH	919-827-3220	INSTRUMENT TRANSFORMERS	
PC37.91	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER TRANSFORMERS						Balloting
3/19/92	PSR	MIRIAM SANDERS	919-856-2457	RON BARKER	804-257-4671	PERFORMANCE CHARACTERISTICS	
PC37.97	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER SYSTEM BUSES						ANSI APPROVED 05/20/91
12/10/87	PSR	STEVE CONRAD	505-848-2642	J. E. SMITH	919-827-3220	INSTRUMENT TRANSFORMERS	
PC57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS						REAFFIRMED 1992
12/31/80	PSR	ARUN G. PHADKE	703-231-7029	J. E. SMITH	919-827-3220	INSTRUMENT TRANSFORMERS	
PC62.11	STANDARD FOR METAL-OXIDE SURGE ARRESTERS FOR AC POWER CIRCUITS						NEW PAR 6/14/94
6/14/94	SPD	R. M. SIMPSON	919-836-7059	W. A. MAGUIRE	501-377-4273	DIELECTRIC TESTS	
PC62.2.01	APPLICATION GUIDE FOR SURGE PROTECTION OF ELECTRIC GENERATING PLANTS						
6/1/84	SPD	G. L. GAIBROIS	313-237-9332	VACANT		DIELECTRIC TESTS	

PROJECT / DATE	TITLE / COMMITTEE	CONTACT		COORDINATOR		TR SUBCOMM	STATUS
PC62.22	GUIDE FOR APPLICATION OF METAL OXIDE SURGE ARRESTERS FOR AC SYSTEMS						INCLUDE DIST. TRANSFORMER
12/2/93	SPD	J. WOODWORTH	716-375-7270	ROBERT DEGENEFF	518-276-6367	DIELECTRIC TESTS	
PC62.42	GUIDE FOR THE APPLICATION OF LOW-VOLTAGE SURGE PROTECTIVE DEVICES						REVISED PAR 9/22/94
7/18/94	SPD	R. DAVIDSON JR.		MAHESH P. SAMPAT	704-462-3226	DIELECTRIC TESTS	

Attachment 3

25-Sep-00

ABREVIATION	COMMITTEE OR SOCIETY	LIASON REPRESENTATIVE	PHONE NUMBER
AIM/TSC	AUTOMATIC IDENTIFICATION MANUFACTURERS (TSC COMM.)		
CS	COMPUTER SOCIETY	G. S. ROBINSON	(508) 442-0248
ED&PG	ENERGY DEVELOPMENT AND POWER GENERATION COMMITTEE	R.E. Howell	
ED&PG	ENERGY DEVELOPMENT AND POWER GENERATION	VACANT	
EEI	EDISON ELECTRIC INSTITUTE (T&D COMM.)	M. C. MINGOIA	(202) 508-5177
EI	ELECTRICAL INSULATIONS	E. A. BOULTER	(508) 546-3009
EM	ELECTRIC MACHINERY COMMITTEE	B. GUPTA	(416)231-4111
IAS	INDUSTRY APPLICATION SOCIETY	B. C. JOHNSON	(512) 396-5880
IAS/PSE	IAS/POWER SYSTEM ENGINEERING COMMITTEE	R. W. INGHAM	(313) 236-0130
IAS/PSP	IAS/POWER SYSTEM PROTECTION	J. FISCHER	[215] 481-4402
IAS/REP	IAS/RURAL ELECTRIC POWER COMMITTEE	L. E. STETSON	(402) 472-2945
IC	INSULATED CONDUCTORS COMMITTEE	GARY POLHILL	(312) 394-7734
IEC/SC36A	IEC INSULATED BUSHINGS SUBCOMMITTEE 36A	BILL SAXON	(704) 382-6534
IEC/TAG	US TECHNICAL ADVISOR TO IEC TC 14	P. J. HOPKINSON	(704) 282-7469
IEC/TC42	IEC HIGH VOLTAGE TESTING TECHNIQUES COMMITTEE 42	G. H. VAILLANCOURT	(514) 652-8515
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION	J. GAUTHIER	(202) 457-8400
NPE	NUCLEAR POWER ENGINEERING COMMITTEE	M. S. ZAR	(312) 269-2222
PSC	POWER SYSTEM COMMUNICATIONS COMMITTEE	SUKHDEV WALIA	(908) 422-2104
PSE	POWER SYSTEM ENGINEERING COMMITTEE	W. A. JOHNSON	(301) 469-5252
PSIM	POWER SYSTEM INSTRUMENTATION MEASUREMENT COMMITTEE	T. R. MC COMB	(613) 990-5826
PSRC	POWER SYSTEM RELAYING COMMITTEE	R. W. HAAS	(513) 231-2584
SCC14	COORD. COM. ON QUANTITIES UNITS AND LETTER SYMBOLS	B. BARROW	(703) 285-5444
SCC4	COORDINATING COMMITTEE ON THERMAL RATING	P. E. ALEXANDER	(219) 458-4576
SPD	SURGE PROTECTIVE DEVICES COMMITTEE	J. B. POSEY	(216) 887-5129
SUBS	SUBSTATIONS COMMITTEE	GARY ENGMANN	(407) 419-3521

ABREVIATION	COMMITTEE OR SOCIETY	LIASON REPRESENTATIVE	PHONE NUMBER
SWGR	SWITCHGEAR COMMITTEE	D. F. PEELO	(604) 528-3034
T&D	TRANSMISSION AND DISTRIBUTION COMMITTEE	C. KRISHNAYA	(514) 652-8342
TC	TRANSFORMERS COMMITTEE	T.A. PREVOST	(802) 751-3458
TSC	TECHNICAL SYMBOLOGY COMMITTEE (PART OF AIM)		

Attachment 5

GROUPS	Burl Oct.96	Graz Jul.97	St.Louis Nov.97	Little R Apr. 98	Leon. MX Nov. 98	NO, LA Apr. 99	Monterrev Nov. 99	Nash, TN Apr. 00	MAX	AVG
Committee Registration: Members and Guests	287	164	282	267	262	262	275	302	302	263
Spouses	67	91	32	34	49		35	94	94	57
Luncheon	148	108	147	156	262	262	216	175	262	184
SC ADMINISTRATIVE	19	17	19	16	19	22	23	23	23	20
SC AUDIBLE NOISE AND VIBRATION	23	9	22	32	23	28	31	21	32	24
SC BUSHINGS	29	32	23	32	25	11	27	28	32	26
WG Revision C57.19.00					36	22	23	25	36	27
TF Draw Lead Bushings	17		21	23	23	20	16	24	24	21
WG DC Applications of Bushings							0		0	0
WG Revision C57.19.01	28	26	24	33	38	24	22	19	38	27
SC DIELECTRIC TESTS	91	58	71	81	80	52	68	91	91	74
WG Low FrequencyTests	49	40	31	42	20		54	48	54	41
WG Revision of Transient Dielectric Tests					20		35	43	43	33
WG Rev. Dielectric Tests on Distr. Transf.	13		14	21					21	16
TF Rev. Distr. Impulse Guide	13								13	13
TF L.F. Transformers Dielectric Test Table						28	37		37	33
WG Partial Discharge Tests	44	37	43	51	58	41	66	47	66	48
SC DISTRIBUTION TRANSFORMERS	45	11	37	49	29	36	34	53	53	37
WG Dist. Substation Transformers C57.12.36					16	22		40	40	26
WG Overhead Type Distr. Transfs. C57.12.20	23			39	19	35	28	49	49	32
WG Single-Phase Submersible C57.12.23				41		16	10	20	41	22
WG Single-Phase Deadfront Padmount C57.12.25	28		35	41		30		47	47	36
WG Bar Coding			25	40					40	33
WG Loss Evaluation C57.12.33			55	48				45	55	49
WG Electronic Data Transmittal			20		12			22	22	18
WG Three-Phase Padmount C57.12.34						23		42	42	33
WG Step-Voltage and Induction Regs C57.15			26		16	9			26	17
SC DRY-TYPE TRANSFORMERS	33	21	32	22	26	27	25	25	33	26
WG Test Code C57.91	18		20	23	20	22	18	11	23	19
WG Dry-Type Reactors	8	8	7	9	6	13	9	10	13	9
WG Dry-Type Reactors - HVDC Smoothing	6	12		9					12	9
WG Dry-Type Thermal Eval. and Flammability	27	15	24						27	22
WG Dry-Type General Requirements C57.12.01	27	5	30	28	24	18	26	23	30	23
WG Insulation Req. for Specialty Transf.	17		6				10		17	11
WG Cast Coil Loading Guide	18	19	21	18		14			21	18
WG Hot Spot Diferentials	32		27	33	23				33	29
WG Dry-Type Thru Fault Current								15	15	15

Attachment 5

GROUPS	Burl Oct.96	Graz Jul.97	St.Louis Nov.97	Little R Apr. 98	Leon, MX Nov. 98	NO, LA Apr. 99	Monterre Nov. 99	Nash, TN Apr. 00	MAX	AVG
SC HVDC CONVERTER TRANF. & REACTORS	9	8	6	6	7	8	13	7	13	8
SC INSTRUMENT TRANSFORMERS	26	9	10	13	7	11	10	10	26	12
WG C57.13.5 Test Req Instr Transf >115 kVA		7	13	20	13	12	13	10	20	13
WG C57.13.6 Instr Transf for Electronic Meters & Relays					9		20	11	20	13
WG Revision of C57.13		9	10	17	8	12			17	11
SC INSULATING FLUIDS	69	33	71	84	71	56	68	75	84	66
SC INSULATION LIFE	60	18	55	73	58	65	56	51	73	55
WG Loading Liq. Transformer							108		108	108
WG Thermal Tests	32	19		18					32	23
WG Revision of Temperature Test Code					24	24	29		29	26
WG Thermal Duplicate	37		30	34	24	34	40	27	40	32
TF Hottest Spot Temp. Rise	40		56	67	50	50			67	53
TF Winding Temperature Indicators	41	25	26	32	22	16	25	27	41	27
SC PERFORMANCE CHARACTERISTICS	108	49	74	77	52	45	58	69	108	67
WG Loss Tolerance and Measurement	30	27	18	27	25	26	29	33	33	27
WG PCS Rev. C57.12.00	46	23	19	36	32	75	65	49	75	43
WG PCS Rev. C57.12.90 Part I	49		21	33	43	28		42	49	36
WG PCS Rev. Short circuit Testing		29	19						29	24
WG Revision C57.110	42	22	39		11				42	29
WG Semi-Conductor Rectifier Transformers	26	18	19	13		16			26	18
WG Switching Transients		30	22	31	33	40	0	52	52	30
WG DETC Functional Life Testing							50	49	50	50
SC POWER TRANSFORMERS				26	25	42	59	66	66	44
WG LTC Performance Requirements			34	31	29	25	30	24	34	29
WG C57.140 Transformer Evaluation & Reconditioning						31	46	62	62	46
WG Diagnostic Field Testing & Monitoring	94	70	66	83	42	20	54		94	61
TF On-line Monitor Communication		27	28	28	28			54	54	33
WG Revision of C57.12.10								37	37	37
WG West Coast	12	15	13						15	13
WG Phase Shifting Transformers	38	31	26	43	30	31	34	26	43	32
SC STANDARDS	19	9		11	4	5	23	38	38	16
WG Continuous Revision C57.12.00				8					8	8
WG Continuous Revision C57.12.90				8					8	8
WG Terminology,Definitions,Units,& Markings							0		0	0
SC UNDERGRND. TRANF. & NETWK. PROTCS.	13	6	13	11	14	18	21	26	26	15
WG Three-Phase Underground Transfs.	12	5	13	14	16	10	14	27	27	14
WG Liquid-Filled Sec. Network Transfs.	13	6	16	16	16	17	15	16	17	14
WG Secondary Network Protectors	13	5	16	12	9		12	10	16	11
WG Dry-Type Network Transfs.				5	7	5	10	10	10	7

Note: Data maintained for four years only. Filename=tcattend.xls