IEEE PES TRANSFORMERS COMMITTEE

MEETING MINUTES

May 15, 1991
Tempe, Arizona

IEEE PES TRANSFORMERS COMMITTEE

MAY 15, 1991 - TEMPE, ARIZONA

MEMBERS PRESENT 96 voting plus 2 by representation

Adolphson, E.J.
Allen, B.F.
Allustiarti, R.
Altman, M.S.
Arnold, J.C.
Bancroft, R.
Barnard, D.A.
Binder, W.B.
Bonucchi, J.V.
Borst, J.D.
Compton, O.R.
Corkran, J.
Crofts, D.W.
Dahinden, V.
Davis, J.N.
Diamantis, T.
Douglas, D.H.
Dudley, R.F.
Edwards, K.
Elliott, F.E.
Fischer, H.G.
Fleeman, J.A.
Frydman, M.
Gearhart, R.E.
Gerlach, D.W.
Ghafourian, A.A.
Gillies, D.A.
Grubb, R.L.
Gryszkiewcz, F.J.
Hanus, K.
Harlow, J.H.
Heinrichs, F.W.
Highton, K.R.
Hopkinson, P.J.
Howard, J.W.
Howells, E.
Hunt, J.
Iijima, P.
Jonnatti, A.J.
Jordan, R.D.
Kappeler, C.P.
Kelly, J.J.
Kennedy, S.P.
Kennedy, W.N.
Kinney, J.P.
Kline, A.D.
Lackey, J.G.
Lazar, J.P.
Light, H.F.
Lindgren, S.
Lowe, R.I.
Matthews, J.W.
Mehta, S.P.
Miller, C.K.
Miller, J.R.
Mingoia, M.
Minkwitz, R.E.
Mitelman, M.I.
Moore, H.R.
Musil, R.J.
Mutschler, W.H.
McMillen, C.J.
Norton, E.T.
Orehek, P.E.
Paiva, G.A.
Patterson, W.
Payne, P.A.
Pearce, H.A.
*Perco, D.
Peters, D.A.
Pierce, L.W.
Platts, D.W.
Robertson, R.B.
Sampat, M.P.
Savio, L.J.
Saxon, W.E.
Scheu, R.W.
Sharma, D.N.
**Shenoy, V.
Sim, H.J.
Smith, L.R.
Smith, S.D.
Stahara, R.J.
Stein, W.W.
Sundin, D.W.
Takach, D.S.
Thompson, J.A.
Thompson, J.C.
Traub, T.P.
Truax, D.E.
Uhl, W.B.
Uptegraff, R.E.
Vaillancourt, G.H.
Veitch, R.A.
Wagenaar, L.B.
Whitley, D.W.
Wood, J.G.
Wrenn, W.E.

* Perco, D., represented by D. M. Neill
**Shenoy, V., represented by V.S.N.Sankar

MEMBERS ABSENT 32 voting plus 16 emeritus (*)

*Aicher, L.C.
Allan, D.J.
Aubin, J.
Basel, D.
*Bellaschi, P.L
*Bennon, S.
Brown, C.V.
Cook, F.W.
*Dutton, J.C.
*Easley, J.K.
Ebert, J.A.
Fallon, D.J.
*Foster, S.L.
*Gabel, H.E.
Girgis, R.S.
Hall, G.H.
Henning, W.R.
Hoefler, P.J.
Hollister, R.H.
*Honey, C.C.
*Iliff, G.W.
*Johnson, D.C.
*Kaufman, R.B.
Koenig, E.
Lee, R.E.
*Long, L.W.
Lowdermilk, L.A.
*Margolis, H.B.
Massouda, K.T.
Millian, C.
McGill, J.W.
McNutt, W.J.
*Olsson, R.A.
Patel, B.K.
Patton, J.M.
Pollitt, J.M.
Raymond, C.T.
Robbins, C.A.
Stensland, L.R.
Stevens, F.
Swenson, L.
Tanton, A.L.
Teplitsky, A.M.
Thenappan, V.
*Thomas, R.C.
Whearty, R.J.
Wilks, A.
*Wurdack, A.C.

GUESTS PRESENT (77)

Antweiler, J.
Ballard, D.E.
Barker, R.
Betancourt, E.
Bode, T.
Boettger, W.
Boivin, W.
Bowers, T.
Carter, W.J.
Chatterji, C.
Croft, F.
Crouse, J.C.
David, F.
Duckett, D.A.
Feghali, P.
Fox, R.
Frank, J.M.
Garza, J.
Getson, D. M.
Haas, M.E.
Hartgrove, R.H.
Henry, G.E.
Holdway, T.L.
Johnson, C.W.
Johnston, R.P.
Jones, R.
Kallaur, E.
Komlenic, C.H.
Larzelere, B.
Lau, M.
Long, J.
Lowe, D.L.
Lyon, D.S.
Manos, P.
Marek, R.
McCann, F.J.
McNeill,
Moore, S.P.
Morehart, W.E.
Morowski, G.
Murray, C.R.
Nicholas, L.
Norberg, J.
Osborn, S.H.
Parr, D.E.
Pereira, A.
Pham, V.Q.
Poulin, B.
Pregent, G.
Preininger, G.
Puri, J.
Rajadhyakske, M.
Reitter, G.J.
Revell, W.
Rizvi, A.
Rossetti, J.
Rowe, G.W.
Russman, P.
St. Arnaud, R.
Salem, A.
Schauffler, G.
Shah, D.M.
Singh, P.
Sparagowski, G.
Springrose, M.
Steigemeier, C.L.
Stewart, T.
Stoner, R.W.
Tauber, L.A.
Tingen, J.A.
Trummer, E.
Valdes, J.
Wakeam, R.D.
Watson, J.
Willett, F.E.
Williams, C.W.
Windisch, H.J.

IEEE PES TRANSFORMERS COMMITTEE
MEETING MINUTES
TEMPE, ARIZONA
MAY 15, 1991

I. The meeting of the IEEE Power Engineering Society Transformers Committee was called to order at 8:00 a.m. by Chairman Robert Veitch. The agenda for the meeting is provided as Attachment TC-A.

II. Chairman's Remarks

A. Chairman Veitch thanked Host Dennis Gerlach and others from the Salt River Project who assisted him in making the meeting successful. Mr. Gerlach was asked to express to Mr. John McNamara of SRP the appreciation of the Committee for his talk at the Tuesday luncheon regarding recent pollution problems at the Grand Canyon.

B. It is with regret that Chairman Veitch noted the deaths of two active Transformer Committee participants since the last meeting -- Mel Manning and Jack Rodden. It was noted that an IEEE Standards Medallion had been obtained for presentation to Dr. Manning at this meeting.

Note: Correspondence subsequent to the meeting relating to Dr. Manning, including a solicitation from South Dakota State University for a memorial scholarship fund, is provided as Attachment TC-B. It is especially noteworthy that, at age 90, Dr. Manning was surely among the oldest of IEEE members still actively involved in standards activities.

C. Meeting attendance was reported to be 237 members plus 63 guests.

III. Approval of Minutes

The minutes of the October 24, 1990, Montreal meeting were approved as submitted.

IV. Subcommittee Reports

A. Administrative - Robert Veitch
The minutes of the Administrative Subcommittee are provided as Attachment TC-C. Highlight summaries are noted.

1. Mr. Roy Uptegraff is resigning as Chairman of the Dry Type Transformers Subcommittee effective at this meeting. The Chair of the Dry-Type Transformers Subcommittee will be assumed by Mr. Wes Patterson, who had been secretary of the subcommittee.

2. Next meeting: Omni Inner Harbor Hotel, Baltimore, MD, November 3-6, 1991.

   Future meetings:

March 29-April 1, 1992	Birmingham, AL
October 18-October 21, 1992	Cleveland, OH
Spring 1993	Portland, OR (tentative)
Fall 1993	St. Petersburg, FL

3. The addition of two new subcommittees at the Montreal meeting was the major contribution to the acceptance to Transformers Committee membership of 27 new members at this meeting. The names of these new members are included with the AdSub minutes.

4. Report of Technical Council Meeting:
   Chairman Veitch read his report, Attachment ASC-C. Included is the observation that the ultimate status of a text book dealing with power transformers, prepared for publication as an IEEE Press Book, remains unclear. The minutes of the October 24, 1990 meeting report that Chairman Veitch had responded for the Transformers Committee recommending that the book not be published.

5. Review of survey of meeting schedules and hotel accommodations:
   Chairman Veitch had conducted a survey of the membership in order to determine opinions regarding meeting format and hotel considerations. The results of 150 responses to the survey are compiled in Attachment ASC-N, which includes many of the comments and suggestions received.

   In view of the survey results and the needs identified for the next meeting in Baltimore, the Administrative Subcommittee has established the following for that meeting. (This format change will be reviewed again after the Baltimore meeting to determine if further changes are required.)
   a. No regularly scheduled meetings on Sunday except as individual Task Forces may agree to meet.
   b. No tutorial session.
   c. For Monday: Start sessions at 7:50.
      Schedule six 1-hour, 20-minute session.
   d. For Tuesday: Start sessions at 7:50,
      three 1-hour, 20-minute sessions before 1-hour, 30-minute committee luncheon. Two 1-hour, 20-min. sessions after lunch.
   e. For Wednesday: Main Committee

   Note: If any group feels 1 hr. 20 minutes is not adequate, the WG Chairman should request that two sessions be scheduled for his group.

6. Effectiveness of Working Groups.
Mr. Veitch reported having received two documents - "Guidelines for PES Working Group Chairmen"
a) How to Complete a Working Group Assignment
b) How to Conduct Working Group Meetings
These will be sent to all Working Group Chairmen.

B. Audible Sound and Vibration - Alan Teplitzky
Mr. Teplitzky could not attend the meeting. The Audible Sound and Vibration Subcommittee did not meet.

C. Bushing - Loren Wagenaar
See Attachment TC-D

D. Dielectric Tests - Harold Moore
See Attachment TC-E

E. Distribution Transformers - Frank Stevens
See Attachment TC-F, per Jerry Thompson who reported for Mr. Stevens who was unable to attend the meeting.

F. Dry Type Transformer - Roy Uptegraff
See Attachment TC-G

Mr. Uptegraff related his sentiments regarding his retirement as Chairman of the Subcommittee and to emphasize that he intends to remain active in his business and the Transformers Committee. He recognized the accomplishments of Wes Patterson as subcommittee secretary and introduced him as the new Chairman.

Mr. Veitch acknowledged the many contributions of Mr. Uptegraff, recognizing him in particular as always being one of the best prepared of all the subcommittee chairmen.

G. HVDC Converter Transformer and Smoothing Reactor - Bill Kennedy: See Attachment TC-H

H. Instrument Transformer - John Davis
See Attachment TC-I

I. Insulating Fluids - Henry Pearce
See Attachment TC-J

J. Insulation Life - Dave Douglas
See Attachment TC-K

Mr. Douglas noted that two excellent papers, prepared by members Bill McNutt and Linden Pierce, will be presented at the 1991 Summer Power meeting. Those interested in the ongoing work on loading guides should acquaint themselves with this material.

K. Performance Characteristics - John Matthews
See Attachment TC-L

L. Recognition and Awards - Joe Bonucchi
See Attachment TC-M

M. Transformer Standards - Wally Binder
Mr. Binder's comprehensive report is included in the minutes of the Administrative Subcommittee. See ASC-B

Mr. Binder asked the subcommittee chairmen, when preparing their minutes, to please refer to their activities using the proper designations including draft numbers and draft dates.

There are 14 sub-projects related to changes for the 1992 revisions of C57.12.00 and C57.12.90. These are to be complete by the spring meeting of 1992 in order to be included in the revision of those documents.

N. Underground Transformers and Network Protectors - Paul Orehek: See Attachment TC-N

O. West Coast - Lou Tauber
See Attachment TC-O

V. Liaison Reports

A. EPRI - Stan Lindgren
See Attachment TC-P

VI. Technical Papers Report - John Borst

The Vice Chairman's report is Attachment ASC-L. Mr. Borst reported that the Transformers Committee is presently allocated 7 papers for the Winter and 6 papers for the Summer Power Meetings.

Mr. Borst anticipates that we will sponsor 3 technical sessions plus two seminars at the T&D Conference in September.

VII. New Business

There was no new business.

VIII. Adjournment

The meeting adjourned at 11:15 a.m.

Respectfully submitted,

J. H. Harlow 8/12/91

J. H. Harlow
Secretary

ATTACHMENTS TO MINUTES
IEEE PES TRANSFORMERS COMMITTEE
TEMPE, ARIZONA - MAY 15, 1991

TC-A Agenda
TC-B Correspondence relating to death of Dr. Melvin Manning
TC-C Administrative Subcommittee Minutes - Harlow

- ASC-A Administrative Subcommittee Agenda - May 13, 1991
- ASC-B Standards Subcommittee Report - Binder
- ASC-C Chairman's Report - Veitch
- ASC-D Performance Characteristics Subcommittee Report - Matthews
- ASC-E Bushing Subcommittee Report - Wagenaar
- ASC-F Insulating Fluids Subcommittee Report - Pearce
- ASC-G Dielectric Tests Subcommittee Report - Moore
- ASC-H West Coast Subcommittee Report - Tauber
- ASC-I Underground Transformers and Network Protectors Subcommittee Report - Orehek
- ASC-J Insulation Life Subcommittee Report - Douglas
- ASC-K Dry Type Transformer Subcommittee Report - Uptegraff
- ASC-L Vice Chairman's Report - Borst
- ASC-M Transformers Committee Membership Changes - Harlow
- ASC-N Questionnaire Results Regarding Meeting Schedules and Hotel Accommodations - Veitch
- ASC-O IEEE/PES Transformers Committee Attendance Statistics - Matthews
- ASC-P Distribution Transformers Subcommittee Report - Mingoia for Stevens
- ASC-Q Instrument Transformers Subcommittee Report - Davis

TC-D Bushing Subcommittee Report - Wagenaar
TC-E Dielectric Tests Subcommittee Report - Moore
TC-F Distribution Transformers Subcommittee Report - Thompson for Stevens
TC-G Dry-Type Transformer Subcommittee Report - Uptegraff
TC-H HVDC Converter Transformers and Smoothing Reactor Subcommittee Report - Kennedy
TC-I Instrument Transformer Subcommittee Report - Davis
TC-J Insulating Fluids Subcommittee Report - Pearce
TC-K Insulation Life Subcommittee Report - Douglas
TC-L Performance Characteristics Subcommittee Report - Matthews
TC-M Recognition and Awards Subcommittee Report - Bonucchi
TC-N Underground Transformers and Network Protectors Subcommittee Report - Orehek
TC-O West Coast Subcommittee Report - Tauber
TC-P ERPI Liaison Report - Lindgren

TC-A

TRANSFORMERS COMMITTEE

IEEE/PES Transformers Committee Meeting
Wednesday, May 15, 1991

CHAIRMAN: R. A. VEITCH VICE CHAIRMAN: J. D. BORST
SECRETARY: J. H. HARLOW

1.	Chairman's Remarks and Announcements		R. A. Veitch
2.	Approval of Minutes of October 24, 1990		R. A. Veitch
3.	Report of Subcommittees:		
	3.0	Administrative	R. A. Veitch
	3.1	Audible Sound and Vibration	A. M. Teplitzky
	3.2	Bushing	L. B. Wagenaar
	3.3	Dielectric Tests	H. R. Moore
	3.4	Distribution Transformers	F. Stevens
	3.5	Dry Type Transformers	R. E. Uptegraff
	3.6	HDVC Converter Transformers & Reactors	W. N. Kennedy
	3.7	Instrument Transformers	J. N. Davis
	3.8	Insulating Fluids	H. A. Pearce
	3.9	Insulation Life	D. H. Douglas
	3.10	Performance Characteristics	J. W. Matthews
	3.11	Recognition and Awards	J. V. Bonucchi
	3.12	Transformer Standards	W. B. Binder
	3.13	Underground Transformers & Network Protectors	P.E. Orehek
	3.14	West Coast	L. A. Tauber
4.	Reports of Liaison Representatives:		
	4.1	EPRI	S. R. Lindgren
	4.2	Discussion of Other Liaison Reports	
5.	Technical Papers for Future IEEE/PES Meetings		J. D. Borst
6.	New Business		

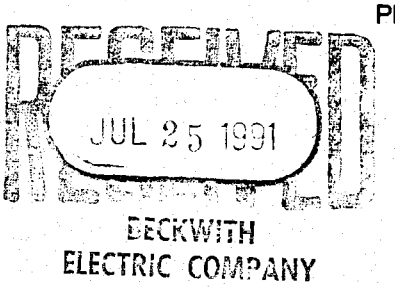
TC-B
1 OF 2

IEEE

TRANSFORMERS COMMITTEE

POWER ENGINEERING SOCIETY

Please Reply To:



July 22, 1991

Mr. J. H. Harlow
Beckwith Electric
P.O. Box 2999
Largo, Florida
U.S.A. 34649

Dear Jim:

Subject: Mel Manning

As we all now know, Mel Manning passed away last February 14, 1991 at the age of 90. Mel had been awarded the IEEE Standards Medallion for outstanding work in standards development, however, we were not able to present his award to him personally. The medallion was sent to Mrs. Manning with a covering letter from myself.

Mel set a record, at least for the Transformers Committee and possibly for the IEEE as a whole, as being the oldest active member. I believe that recognition of this fact should be made in our minutes of the Tempe meeting.

I also received the attached letter from Mr. Walter Conahan, Director Development of the South Dakota State University. I would like to have our minutes also point out that a memorial scholarship fund has been established in his name with the University Foundation.

The fund will provide support for students at South Dakota State, College of Engineering and is open for contributions from any source.

Yours very truly

R. A. Veitch
Chairman

RAV:SH
cc-J.D. Borst

The Greater State Fund

South Dakota State University
SDSU Foundation Building, Box 525
Brookings, South Dakota 57007

TC - B.
2 of 2

SDSU Foundation
Development Office
605-697-7475

July 1, 1991

Mr. Robert A. Veitch, Chairman
Ferranti-Packard Transformers
PO Box 548
St. Catherines, Ontario Canada
L2R 6W9

Dear Mr. Veitch:

I am writing to you at the suggestion of Mrs. Melvin Manning to whom you recently wrote a letter of condolence at the loss of her husband.

She wanted you to know, and any of your colleagues with whom Prof. Manning was associated, that a memorial scholarship fund has been established in his name with our University Foundation.

The fund will provide support for students in our College of Engineering and is open for contributions from any source.

Mrs. Manning made available to us a few copies of the obituary and memorial services leaflet. I thought you might wish to have one of these.

Cordially,

Walt Conahan

Walter C. Conahan
Director Development

WCC/sj
Enclosure

cc: Betty Manning
Dean Duane Sander

IEEE TRANSFORMERS COMMITTEE
ADMINISTRATIVE SUBCOMMITTEE
MAY 13, 1991 - TEMPE, ARIZONA

I. INTRODUCTIONS

Chairman Robert Veitch opened the meeting at 7:40 p.m. with named members and guests present:

MEMBERS:	Wally Binder	Jim Harlow	Henry Pearce
	Joe Bonucchi	Bill Kennedy	Lou Tauber
	John Borst	John Matthews	Roy Uptegraff*
	Olin Compton	Harold Moore	Loren Wagenaar
	John Davis	Paul Orehek	Robert Veitch
	Dave Douglas	Wes Patterson*	

*Messrs. Uptegraff (outgoing) and Patterson (incoming) chair of Dry-Type Transformers Subcommittee

GUESTS: Dennis Gerlach - Tempe Meeting Host
Matt Mingoia - Representing Frank Stevens

Chairman Veitch noted that Mr. Uptegraff is resigning as Chairman of the Dry-Type Transformers Subcommittee after many years of noteworthy leadership in that capacity. Mr. Patterson was named to succeed Mr. Uptegraff as Chairman of the Subcommittee.

Chairman Veitch noted that two subcommittee chairmen (Messrs. Stevens and Teplitzky) are absent. Both of these AdSub members represent user interests. Mr. Veitch expressed regret that our leadership and other members, most often utility personnel, are denied the opportunity to attend Committee meetings with the attendant adverse effects on operations.

II. MINUTES

The minutes of the Montreal Administrative Subcommittee meeting were approved as submitted.

III. AGENDA

The proposed agenda (Attachment ASC-A) was approved without comment.

IV. MEETING ARRANGEMENTS

TEMPE: Mr. Gerlach started as host with a $5,100 surplus. It is expected that this meeting will deplete that reserve by about $2,000.
Attendance as of Monday: 235 members and guests plus 53 spouses.
Luncheon Speaker will be Mr. John McNamara, Associate General Manager of Salt River Project.

BALTIMORE: Mr. Matthews reported the next meeting will be November 3-6 at Omni Inner Harbor Hotel, Baltimore.
Room rate = $110 single or double, plus tax.

V. STATUS OF ANSI C57 COMMITTEE

IEEE staff did not attend to report on any update activity. Mr. Mingoia stated that, in his opinion, all is going well; having the C57.12.2 and C57.12.4 subcommittees folded into the Transformers Committee has resulted in a great association.

VI. REVIEW OF PES STANDARDS COORDINATING COMMITTEE AND STANDARDS PROJECTS

A. IEEE Standards Board is insisting on the procedure that all standards be reaffirmed, revised or active Working Group activity be formally extended when a document is 5 years old. We have been formally notified that about 23 of our standards are in or approaching this category, some of which will be rescinded July 31, 1991, unless action is taken.

All standards identified in Mr. Binder's report (Attachment ASC-B) which indicate a date 5 or more years in age were discussed. Mr. Binder will correspond with the Standards Board on each Standard, as appropriate, regarding: 1) the circulation of a reaffirmation ballot to the full committee, 2) a request for a 1-year time extension where a Working Group is nearing a completion of a revision or 3) a statement of intent to withdraw the standard.

Discussion followed regarding the formal procedures to be followed for treatment of standards due for reaffirmation, extension or withdrawal. A motion was defeated which would have required that authority for such action come from the Administrative Subcommittee. Rather, the procedure will require that such action will follow in same manner as any formal ballot of the full committee. The procedure is:

1) The appropriate subcommittee chairman is made aware that a document maintained by his subcommittee is approaching the 5-year time limit. He, with his subcommittee, will determine that reaffirmation, time extension for revision, or withdrawal is appropriate.

2) The Chairman of the Standards Subcommittee will be advised and directed to communicate the committee wishes to the Standards Board.

These provisions will be inserted as an addendum to the Committee Operating Manual.

B. The question of the date to which the 5-year rule applies (Standards Board Approval Date or publication date) has not yet been answered. This topic is on the agenda for the Standards Coordinating Committee at the Summer Power Meeting.

C. ProCom is advocating that the life of a PAR be limited to four years. While the AdSub agrees that there is a need for timely action on work authorized by a PAR, it does not seem appropriate to arbitrarily establish a time span. The Transformers Committee will go on record as opposing any arbitrary time limit to a PAR.

D. Mr. Binder's report lists those projects which are to be consolidated into the next revision of C57.12.00 and C57.12.90. All applicable Working Groups are again alerted that these standards are due for revision in 1992. The spring meeting of 1992 is the cutoff date for revisions to be included in the 1992 revisions of these standards.

VII. REVIEW OF TECHNICAL COUNCIL ACTIVITIES

Chairman Veitch's report is attached (ASC-C).

Mr. Veitch stressed in particular a goal of PES is to increase the awareness of electric utility and related power industry companies in the importance of power engineering and maintenance of in-house technical capability.

VIII. SUBCOMMITTEE' ACTIVITIES DISCUSSIONS

The various subcommittee chairmen offered reports.

A. Performance Characteristics - Mr. Matthew's report is attached (ASC-D). A new Working Group has been authorized to revise C57.105, Bipin K. Patel, Chairman.

B. Bushings - Mr. Wagenaar's report is attached (ASC-E). Permission was granted by AdSub to establish a Working Group on Revision of C57.19.01, Mr. Prit Singh, Chairman. The need is emphasized to include all procedures of the bushings.

C. Insulating Fluids - Mr. Pearce's report is attached (ASC-F). Permission was granted by AdSub to establish a new Working Group to deal with the Analysis of Gasses in In-Service Silicone Fluid Insulated Transformers.

D. Dielectric Tests Subcommittee - Mr. Moore's report is attached (ASC-G).

E. HVDC Transformers and Smoothing Reactors - Mr. Kennedy plans to split the Working Group dealing with C57.129 into two PAR's:
   1) Converter Transformers
   2) Oil-Filled and Dry-Type Smoothing Reactors

F. West Coast - Mr. Tauber's report is attached, ASC-H. Mr. Tauber was reminded that his subcommittee is charged with identifying a West Coast location and host for the Spring 1993 Committee meeting.

G. Underground Transformers and Network Protectors - Mr. Orehek's report is Attachment ASC-I.

Mr. Uptegraff posed question: Why do we not coordinate with NEMA? NEMA is another standards writing body, why are they treated differently from IEC or others? No satisfactory answer was forthcoming.

H. Distribution Transformers Subcommittee - Mr. Mingoia reported for Mr. Stevens. Notable activity includes the preparation of 7 PAR's and the submission of 17 individuals for Transformers Committee membership. Mr. Mingoia's report, received after the initial mailing of these minutes, is Attachment ASC-P.

I. Insulator Life - Mr. Douglas report is Attachment ASC-J. The AdSub approved the upgrading of the recently organized Task Force on High Temperature Insulation in Liquid Filled Power Transformers to Working Group status. This group will conduct a seminar "High Temperature Insulation" at this meeting.

J. Dry-Type Transformers - Mr. Uptegraff's report is attached ASC-K. Mr. Uptegraff noted a concern that ANSI C57.12.57-1987 is a dry type network transformer standard originally sponsored by NEMA. Does this now properly fall to the Dry-Type Transformer Subcommittee or the Underground Transformers and Network Protectors Subcommittee, wherein activity is now scheduled? The assignment will remain with the Underground Transformers and Network Protectors, but members of the Dry-Type Transformers Subcommittee are encouraged to join the Working Group.

It was noted that Mel Manning and Jack Rhoden, two long-time distinguished members of the subcommittee have recently passed away. Memoriam of Dr. Manning, reporting his illustrious engineering career, is included with Mr. Uptegraff's report.

K. Instrument Transformers Subcommittee. Mr. Davis' report, received after the initial mailing of these minutes, is Attachment ASC-Q.

IX. PES AWARDS

Mr. Bonucchi reported that four certificates of appreciation will be presented at this meeting to past Subcommittee Chairmen:

Dennis Gerlach - West Coast Subcommittee
Roy Uptegraff - Dry-Type Transformers Subcommittee
Ray Smith - Standards Subcommittee
Jim Harlow - Standards Subcommittee

Also, two IEEE Standards Medallions to be awarded: Mel Manning and John Dutton.

X. PAPERS FOR FUTURE MEETINGS

Vice Chairman Borst's report is attached (ASC-L).

For Summer Power Meeting - Six papers to be presented, of 20 submitted.

For T & D Conference, also 20 papers submitted. These are still under review. A higher acceptance rate of these papers is expected than for the summer meeting. We will also sponsor two panel sessions at the T & D Conference: Low Side Surges and Amorphous Metals.

XI. COMMITTEE MEMBERSHIP REVIEW

Mr. Harlow's report of member status is Attachment ASC-M. The invitation list has been pared by 82, being indicative of persons who have not participated in the recent past.

Twenty-six new member applications were approved, as follows:

Vincenz Dahinden, H. Weidmann AG
Tom Diamantis, Niagara Mohawk Power Corp.
Kevin Edwards, Hevi-Duty/Dowzer Electric
Jeffery Fleeman, AEP Service Corp.
Ali Ghafourian, Cooper Power Systems
Ken Hanus, Texas Utilities Co.
Philip Hopkinson, Cooper Power Systems
James Howard, Pennsylvania Power & Light
John Hunt, Kentucky Assoc. of Elec. Coop.
Ronald Jordan, San Diego Gas & Electric
Sheldon Kennedy, Niagara Transformer Co.
John Lazar, Northern States Power
James Miller, ABB Power T & D Co.
Matthew Mingoia, Edison Electric Inst.
Gerald Paiva, Southern California Edison Co.
Jesse Patton, Central Power & Light
Paulette Payne, Potomac Electric Power Co.
Dale Peters, Georgia Power Co.
Donald Platts, Pennsylvania Power & Light
R. B. Robertson, Tampa Electric Co.
Robert Scheu, General Electric Co.
Jin Sim, Square D Company
Steven Smith, Kuhlman Electric Co.
Ronald Stahara, Kuhlman Electric Co.
Jerry Thompson, Duke Power Co.
Dorman Whitley, ABB Power T & D Co.

Two applications were denied by virtue of lack of IEEE or PES affiliation. A resignation was received from Charles Hoesel just prior to the meeting.

With all changes, the Transformers Committee membership status now stands at:

Members (Voting)	130
Producers	51
Users	48
General Interest	31
Members (Emeritus)	16

All subcommittee chairmen are alerted that the PES Technical Committee roster will be circulated for update in the next 3 to 4 months.

XII. REVIEW OF QUESTIONNAIRE CONCERNING MEETING SCHEDULES AND HOTEL ACCOMMODATIONS

Mr. Veitch led discussion on his report of the recent questionnaire, Attachment ASC-N.

At least in part as a result of this questionnaire, the following will apply to the next (Baltimore) meeting:

A. No regularly scheduled meetings on Sunday except as individual Task Forces may agree to meet.
B. No tutorial session.
C. For Monday: Start sessions at 7:50.
Schedule six 1-hour, 20-minute sessions.
D. For Tuesday: Start sessions at 7:50,
three 1-hour, 20-minute sessions before 1-hour, 30 minute committee luncheon. Two 1-hour, 20-minute sessions after lunch.
E. For Wednesday: Main Committee

XIII. REVIEW OF PROPOSALS TO REVIEW EFFECTIVENESS OF WORKING GROUPS

There was no time to discuss this topic. Chairman Veitch will assemble the ideas sent to him and send to IEEE.

XIV. NEW BUSINESS

The listing of IEEE/PES Transformers Committee Attendance Statistics as compiled by John Matthews is attached (ASC-O).

XV. ADJOURNMENT

The meeting was adjourned at 11:50 p.m.

Respectfully submitted,

J. H. Harlow 6/6/91
Secretary

JHH:mk
Attachments

IEEE

TRANSFORMERS COMMITTEE

ASC-A
1 OF 1

POWER ENGINEERING SOCIETY

IEEE/PES TRANSFORMERS COMMITTEE

Please Reply To:

Administrative Subcommittee Meeting

Monday, May 13, 1991 at 6:30 p.m.

Tempe Mission Palms Hotel, Phoenix, AZ

AGENDA

1. Introduction of Members & Guests
2. Approval of the Montreal Meeting Minutes
3. Addition to and/or Approval of the Agenda
4. Committee Finances & Meeting Arrangements
   Denis Gerlach - Phoenix Host
   John Matthews/Joe Pollitt - Baltimore Hosts
5. Status of ANSI C57 Committee - S.Vogel/A. Salem
6. Review of PES Standards Co-Ordinating Committee, Standards Projects and other Standards concerns-W. Binder
7. Review of Technical Council Activities - R. A. Veitch
8. Subcommittees' Activities Discussions - Subcommittee Chairmen
9. Papers for Future Meetings - J. Borst
10. Committee and Subcommittee Membership Review - J. Harlow
11. PES Awards - J. Bonucchi
12. Review of Questionnaire Concerning Meeting Schedules and Hotel Accommodations - R. A. Veitch
13. Review of Proposals to Improve the Effectiveness of Working Groups
14. New Business
15. Adjournment

FN:RAVIEEE

ASC-B
1 OF 24

OHIOEDISON
The Energy Makers

76 South Main St.
Akron, Ohio 44308
216-384-5100

DATE: April 24, 1991

TO: Members of the Administrative Subcommittee

FROM: Wallace B. Binder, Jr.

SUBJECT: STANDARDS ACTIVITIES FROM OCTOBER 22, 1990, THRU MAY 10, 1991

TRANSFORMER STANDARDS

The status of all transformer standards sorted by responsible subcommittee is reported on the attachment. There are now over 100 active projects or approved transformer standards. A majority of these will need attention from the Transformers Committee within the next 12 months.

Attachment 2 is a listing of the current status of unconsolidated changes under way on standards C57.12.00 and C57.12.90. In order to collect these changes, it may be necessary to submit a Project Authorization Request (PAR) to consolidate the revisions which have been approved by the Transformers Committee. I will continue to investigate how to incorporate all of the changes into the 1992 revision of these two standards.

Since the status of all transformer standards is now listed, the former Attachment 3 showing standard submittals is now discontinued. The status report will indicate when Board approval has occurred, and the IEEE Standards Catalog will indicate when published standards are available.

Under separate cover, each of you should have received my report on revision/reaffirmation requirements involved in the five-year review process. This will be a topic of discussion at the Adsubcomm meeting on Monday, May 13.

STANDARDS COORDINATION

At the Winter Power Meeting, I attended the Standards Coordinating meeting where there was continued discussion on streamlining procedures. We discussed a revised SCC operations manual and a common PES coordination procedure. These two topics were not resolved and review will continue at the Summer Power Meeting. Another subject briefly mentioned was the possible adoption of a common PES balloting procedure. As additional details on this proposal become available, I will report to the committee. A fourth item of discussion involved circulation of negative ballots. The proposal was to limit the need for circulation if the number of negative ballots was sufficiently small. This proposal, although approved by the SCC, was rejected by the Standards Board at their March meeting. The fifth proposal was made to limit the lifetime of PARs to four years. In a close vote, the SCC approved recommending this lifetime to the Standards Board. The proposal was well received by the Procedures Committee of the Standards Board.

There was also considerable discussion of issues relating to the streamlining process. The following are those I feel should be highlighted:

1. The Standards Office does not disseminate all of a revised ballot when a negative ballot is circulated; that is, editorial changes are not included and comments with affirmative votes are not forwarded to the Working Group chairman.

2. NESCOM only requires technical committees as coordinating entities on the PAR; that is, ANSI coordination is not required.

3. Having the Standards Staff do the balloting will help streamline the process, as they will cover the costs of mailing, keep adequate documentation and follow up on coordination. Recently, several transformer standards have been delayed at the Standards Board due to lack of coordination documentation. The standards staff can help locate a coordinator or, if balloting is already complete, feel free to call me and I will contact the proper technical committee liaison. There are two cautions you should be aware of if the Standards Office does the balloting: 1) The staff records ballots received after the cut-off date as "Not Voting," and 2) Comments received with those ballots are not forwarded to the Working Group chairman. How they would treat a late "Negative" is not certain.

4. Parts of our discussion on a common balloting procedure pointed out that IEC does not ballot Working Groups, but only the subcommittee. In contrast, PES Committees almost universally ballot the Working Group. Some technical committees do not ballot subcommittees but go directly to the main balloting group.

An item of old business at the SCC meeting was the Transformers Committee's concern over the date which triggers the five-year review. The Standards Manual states that the review shall take place five years after the publication date. Since 1988, the year approved was the year which appeared on the standard date. Many C37 and C57 standards which were approved as early as 1984 but published after January 1, 1988, due to ANSI approval delays may have their review triggered earlier than necessary. Two conflicting opinions existed. The first is that a standard approved in 1984 and published in 1988 has only had public exposure for three years. The other opinion is that the standard approved in 1984 represents technology that is seven years old. The standards staff has asked REVCOM to decide on a course of action and give them a recommendation.

OTHER COORDINATION ACTIVITY

Coordination activities since the last meeting consist of submission of the new projects from the new subcommittees and three other projects. Unfortunately, problems were encountered with all but two of these PARS. In one case, we attempted to submit PARs that were hand written. These were found to be unacceptable by the Standards Office and were returned. In an effort to reduce the workload for my secretary, I am requesting that all future PARs be typed. A second problem encountered was with a PAR submitted directly to the Standards Office instead of sending it to my attention for coordination. This

PAR was approved by NESCOM, but when additional coordination was identified through the SCC, I was required to resubmit the PAR showing coordination. A third concern expressed by the Standards Board is that ANSI coordination is not required as it will be the Standards Board's decision to forward standards to ANSI for approval. A final item was that the title must appear exactly the same as the standard being revised unless an intentional change is being made, as in removing the word "American" from an internationally accepted standard.

Coordination was established with other technical committees for new projects. An attachment to this memo indicates those activities.

STANDARDS BOARD MEETINGS

The Standards Board has met two times since our last meeting. At the December meeting they addressed the procedural issues described above which were discussed at the SCC meeting. At the March meeting, the Standards Board approved the PAR for C57.16 and approved the reaffirmation of C57.91, C57.92 and C57.95. They also elevated IEEE 756 to full use. At the same meeting, C57.12.14 was withdrawn. Additional procedural issues which were discussed by the Standards Board included their concerns over submittal of PARs at the same time the complete standard is submitted. This, of course, is discouraged by all current procedures. It was indicated that a PAR with no coordination raises a flag. Awareness of international emphasis on coordination has been encouraged by the Standards Board.

The next meeting of the Standards Board will be on June 27, 1991, with a submittal deadline of May 13, 1991. The following meeting will be September 26, 1991, with a submittal deadline of August 19, 1991.

WBB/smw
Attachments

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
** SUBCOMMITTEE:		Chairman:		
* WORKING GROUP:		Chairman:		
VARIOUS C57.12.00	GEN REQ. FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	/ /		/ /
VARIOUS C57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS & GUIDE FOR SC TESTING OF	/ /		/ /
** SUBCOMMITTEE: ANSI C57.12.1		Chairman:		
* WORKING GROUP:		Chairman:		
NONE C57.12.10	TRANSFORMERS 230kV AND BELOW -8333/10417kVA 1 PH, -100000 kVA 3 PH w/o LTC, -100000kVA w/ LTC - SAFETY REQUIREMENTS	/ /		/ /
** SUBCOMMITTEE: ANSI C57.12.5		Chairman:		
* WORKING GROUP:		Chairman:		
NONE C57.12.50	REQ. FOR VENTILATED DRY-TYPE DISTRIBUTION TR, 1-500kVA, 1 PHASE, AND 15-500kVA, 3-PHASE HV 601-34500VOLTS,LV 120-600V	/ /		/ /
NONE C57.12.51	REQ. FOR VENTILATED DRY-TYPE POWER TR, 501kVA & LARGER, 3 PHASE, WITH HV 601-34500V, LV 208Y/120 TO 4160 VOLTS	/ /		/ /
NONE C57.12.52	REQ. FOR SEALED DRY-TYPE POWERTRANSFORMERS, 501kVA & LARGER,3 PHASE, WITH HV 601-34500V,LV208Y/120 TO 4160 VOLTS	/ /		/ /

ASC-B
5 OF 24

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
** SUBCOMMITTEE: AUDIBLE SOUND & VIBRATION			Chairman: A. M. TEPLITSKY	
* WORKING GROUP: SUBCOMMITTEE			Chairman: A.M.TEPLITSKY	
P523 C57.112	GUIDE FOR THE CONTROL OF TRANSFORMER SOUND	12/28/73	D01 TF TO START WORK	11/01/89
* WORKING GROUP: SUBCOMMITTEE			Chairman: A. M. TEPLITSKY	
PC57.12.90b C57.12.90	TRANSFORMER SOUND POWER MEASUREMENT	03/01/86	D11 BALLOTING MAIN COMMITTEE	10/01/90
** SUBCOMMITTEE: BUSHING			Chairman: L. B. WAGENAAR	
* WORKING GROUP: BUSHINGS FOR DC APPLICATION			Chairman: WAGENAAR	
PC57.19.03 C57.19.03	STANDARD REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR BUSHINGS FOR DC APPLICATIONS	11/09/89	D01 WORKING ON DRAFT	/ /
* WORKING GROUP: BUSHING APPLICATION GUIDE			Chairman: F. E. ELLIOTT	
P800 C57.19.100	GUIDE FOR APPLICATION OF APPARATUS BUSHINGS.	09/27/79	D05 RESOLVING NEGATIVE VOTES	/ /
* WORKING GROUP: LOADING POWER APPARATUS BUSH.			Chairman:	
P757 C57.19.101	TRIAL-USE GUIDE FOR LOADING POWER APPARATUS BUSHINGS	/ /	END OF TRIAL USE-MAKE FULL USE	/ /
* WORKING GROUP: NONE			Chairman: L. B. WAGENAAR	
PC57.19.00 IEEE 21	GENERAL REQUIREMENTS AND TEST PROCEDURES FOR OUTDOOR APPARATUS BUSHINGS	04/01/79	D10 BALLOTING MAIN COMMITTEE	01/31/90

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

ASC-B

6 OF 24

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
* WORKING GROUP: NONE			Chairman: NONE	
PC57.19.01 IEEE 24	STANDARD PERFORMANCE CHARACTERISTICS AND DIMENSIONS FOR OUTDOOR APPARATUS BUSHINGS	11/01/89	D04 BALLOTTING MAIN COMM. (TAB.10)	02/04/91
** SUBCOMMITTEE: DIELECTRIC TESTS			Chairman: H. R. MOORE	
* WORKING GROUP: P. D. TESTS FOR TRANSFORMERS			Chairman: W. J. CARTER, TF CH	
P545 C57.113	TRIAL USE GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN LIQUID-FILLED POWER TRANSFORMERS AND SHUNT REACTOR	05/28/74	UPGRADING TO FULL USE GUIDE	/ /
* WORKING GROUP:			Chairman: R. A. VEITCH	
PC57.12.00j C57.12.00	NEW SEC 6.8 MINIMUM EXTERNAL CLEARANCES BETWEEN LIVE PARTS	/ /	COMPLETE	/ /
* WORKING GROUP: REV. DIELECTRIC TESTS/DIST TR			Chairman: JOHN ROSETTI	
PC57.12.90c C57.12.90	ROUTINE IMPULSE TESTS FOR DISTRIBUTION TRANSFORMERS	/ /	D06 MAIN COMMITTEE BALLOT COMPLETE	/ /
* WORKING GROUP: REVISION OF DIELECTRIC TESTS			Chairman: M. ALTMAN, T.F. CH.	
PC57.12.90d C57.12.90	ENHANCEMENT VOLTAGE TIME DURATION DURING POWER TRANSFORMER INDUCED TESTS	/ /	D01 DRAFT 1 BEING PREPARED	/ /
* WORKING GROUP: P. D. TESTS FOR TRANSFORMERS			Chairman: E.HOWELLS, T.F. CH	
PC57.127 C57.127	GUIDE FOR THE DETECTION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS	03/10/88	D02 SUBMIT TO REVCOM	10/01/89
* WORKING GROUP: DIELC TESTS OF SHUNT REACTORS			Chairman: W. N. KENNEDY	
PC57.21a C57.21	REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR SHUNT REACTORS OVER 500kVA	12/11/86	COMPLETE	/ /

ASC-B
7 OF 24

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
* WORKING GROUP: REV. DIELECTRIC TESTS DIST TR			Chairman: D.BALLARD, T.F. CH.	
NEW C57.98	ROUTINE TEST GUIDE FOR DISTRIBUTION TRANSFORMERS	/ /	SUBMITTING PAR	/ /
* WORKING GROUP: REVISION OF DIELECTRIC TESTS			Chairman: R.E. MINKWITZ, T.F.	
PC57.98 C57.98	IEEE GUIDE FOR TRANSFORMER IMPULSE TESTS	02/01/86	D02 D2 OF SWITCHING IMP. -REAFFIRM	/ /
** SUBCOMMITTEE: DISTRIBUTION TRANSFORMERS			Chairman: FRANK STEVENS	
* WORKING GROUP: OVERHEAD TYPE DISTRIBUTION TR			Chairman: J. C. THOMPSON	
PC57.12.20 C57.12.20	OVERHEAD-TYPE DISTRIBUTION TRANSFORMERS, 500 kVA AND SMALLER: H V 34500 VOLTS AND BELOW, L V 7970/13800Y & BELOW	/ /	PAR SUBMITTED TO STD BOARD	/ /
* WORKING GROUP: 1 PHASE LIVE FRONT PADMOUNT TR			Chairman: A. GHAFOURIAN	
PC57.12.21 C57.12.21	STANDARD REQUIREMENTS FOR PAD-MOUNTED, COMPARTMENTAL-TYPE, SELF-COOLED, SINGLE-PHASE DISTTRANSFORMERS WITH HV BUSHINGS	/ /	D05 PAR SUBMITTED TO STD BOARD	/ /
* WORKING GROUP: 3 PHASE LIVE FRONT PADMOUNT TR			Chairman: KEN HANUS	
PC57.12.22 C57.12.22	PAD-MOUNTED,COMPARTMENTAL-TYPE SELF-COOLED,3-PHASE DIST. TR WITH HV BUSHINGS,2500kVA AND SMALLER:...REQUIREMENTS.	/ /	PAR SUBMITTED TO STD BAORD	/ /
* WORKING GROUP: 1-PHASE SUBMERSIBLE TR			Chairman: GERRY PAIVA	
PC57.12.23 C57.12.23	UNDERGROUND-TYPE,SELF-COOLED, 1-PHASE DISTRIBUTION TR WITH SEPERABLE INSULATED HV CONNECTHV 24940GrdY..LV,240.. 167kVA.	/ /	PAR SUBMITTED TO STD BOARD	/ /

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
* WORKING GROUP: 1-PHASE DEADFRONT PADMOUNT TR			Chairman: NORVIN MOHESKY	
PC57.12.25	REQUIREMENTS FOR PAD-MOUNTED	/ /		/ /
C57.12.25	COMP-TYPE,SELF-COOLED,1-PHASE DISTRIBUTION TR W/SEP INS HV CONN,HV 34500GrdY...167kVA...		PAR SUBMITTED TO STD BOARD	
* WORKING GROUP: 3-PHASE DEADFRONT PADMOUNT TR			Chairman: GARY PAIVA	
PC57.12.26	PAD-MOUNTED	/ /	D04	/ /
C57.12.26	COMPARTMENTAL-TYPESELF-COOLED, 3-PHASE DIST TR for USE W/ SEPERABLE INSULATEDHV CONN.,HV 34500GrdY..2500kVA		PAR SUBMITTED TO STD BOARD	
* WORKING GROUP: CONF SPEC FOR PADMOUNT & UNIT			Chairman: JIM MILLER	
PC57.12.27	CONFORMANCE REQUIREMENTS for	/ /	D03	/ /
C57.12.27	LIQUID-FILLED DISTRIBUTION TR USED IN PAD-MOUNTED INSTALL., INCL. UNIT SUBSTATIONS		PAR SUBMITTED TO STND. BD.	
* WORKING GROUP: JOINT WG ON CABINET INTEGRITY			Chairman: FRANK STEVENS	
PC57.12.28	PAD-MOUNTED EQUIPMENT -	/ /		/ /
C57.12.28	ENCLOSURE INTEGRITY			
PC57.12.31	COATING STANDARD FOR POLE	/ /		/ /
C57.12.31	MOUNTED TRANSFORMERS		UNKNOWN, NO PAR	
* WORKING GROUP: NONE			Chairman: NONE	
NEW	DISTRIBUTION TRANSFORMER BAR	/ /		/ /
NEW	CODE STANDARD		PAR SUBMITTED TO STD BOARD	
** SUBCOMMITTEE: DRY-TYPE TRANSFORMERS			Chairman: R. E. UPTEGRAFF	
* WORKING GROUP:			Chairman:	
NONE	GENERAL REQUIREMENTS FOR DRY-	/ /		/ /
C57.12.01	TYPE DIST. AND POWER TR INCL THOSE WITH SOLID CAST &/or RESIN-ENCAPSULATED WINDINGS			

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
* WORKING GROUP: THERMAL EVALUATION OF DRY-TYPE			Chairman: NONE	
NONE	TEST PROCEDURE FOR THERMAL	/ /		/ /
C57.12.56	EVALUATION OF INSULATION SYST FOR VENTILATED DRY-TYPE POWER & DISTRIBUTION TRANSFORMERS			
* WORKING GROUP: DRY TYPE DIELECTRIC PROBLEMS			Chairman: A. D. KLINE	
P745	GUIDE FOR CONDUCTING	06/28/78	D7	10/01/84
C57.12.58	TRANSIENTVOLTAGE ANALYSIS OF A DRY- TYPE TRANSFORMER COIL		DOCUMENTING COORDINATION	
* WORKING GROUP: DRY-TYPE THRU FAULT DUR GUIDE			Chairman: NONE	
NONE	GUIDE FOR DRY-TYPE	09/13/84		12/19/85
C57.12.59	TRANSFORMERTHROUGH-FAULT CURRENT DURATION			
* WORKING GROUP: TEST CODE FOR DRY TYPE TR			Chairman: EGON KOENIG	
PC57.12.91	TEST CODE FOR DRY-TYPE	06/01/89	D03	12/22/90
C57.12.91	DISTRIBUTION AND POWER TRANSFORMERS		BALLOTING SUBCOMMITTEE	
* WORKING GROUP: DRY TYPE DIELECTRIC PROBLEMS			Chairman: A. D. KLINE	
PC57.124	RECOMMENDED PRACTICE FOR THE	03/28/86	D08	/ /
C57.124	DETECTION OF PD AND THE MEAS. OF APP. CHARGE IN DRY-TYPE TR		BALLOTING MAIN COMMITTEE	
* WORKING GROUP: DRY TYPE REACTORS			Chairman: RICHARD DUDLEY	
PC57.16	REQUIREMENTS FOR CURRENT	03/21/91	D01	04/03/86
C57.16	LIMITING REACTORS		PAR SUBMITTED TO STND. BOARD	

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
PC57.21 C57.21	REQUIREMENTS TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS OVER 500kVA	/ /	D10 SUBMITTED TO STD BOARD	/ /
* WORKING GROUP: APPLICATION OF DRY-TYPE TR			Chairman:	
NONE C57.94	RECOMMENDED PRACTICE FOR INSTALLATION, APPLICATION,OPERATION & MTCE OF DRY-TYPE GEN PURPOSE DIST & POWER TR	/ /	PUB. 1982, REAFFIRMED 1987	/ /
* WORKING GROUP: GUIDE FOR LOADING DRY-TYPE TR			Chairman: W. H. MUTSCHLER	
NONE C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANS-FORMERS	/ /		/ /
* WORKING GROUP: CAST COIL LOADING GUIDE			Chairman: LINDEN PIERCE	
PC57.96 C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS	/ /	INCORP CAST COIL IN C57.96	/ /
* WORKING GROUP:			Chairman:	
NONE C57.99	GUIDE FOR LOADING DRY-TYPE AND OIL IMMERSED CURRENT-LIMITING REACTORS	/ /	APPENDIX TO C57.16	/ /
* WORKING GROUP: SPECIALTY TRANSFORMERS			Chairman: MAX CAMBRE	
P259 IEEE 259	TEST PROCEDURE FOR EVALUATION OF SYSTEMS OF INSULATION FOR SPECIALTY TRANSFORMERS	09/18/86	D07 PROGRESS UNKNOWN	01/31/91
* WORKING GROUP: THERMAL EVALUATION OF SPEC TR			Chairman: R. L. PROVOST	
PC57.12.60 NONE	TEST PROCEDURES FOR THERMAL EVALUATION OF INSULATION SYSTEMS FOR SOLID-CAST & RESINENCAP POWER & DIST TRANSFORMER	08/17/89	D07 READY FOR REVCOMM	11/03/87

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
** SUBCOMMITTEE: HVACC ON HIGH VOLTAGE TR			Chairman:	
* WORKING GROUP:			Chairman:	
NONE C57.12.13	CONFORMANCE REQUIREMENTS FOR LIQUID-FILLED TRANSFORMERS USED IN UNIT INSTALLATIONS INCL. UNIT SUBSTATIONS	/ /	TO BE ASSUMMED BY TR COMM	/ /
NONE C57.12.55	CONFORMANCE STANDARD FOR TR-DRY-TYPE TRANSFORMERS USED IN UNIT INSTALATIONS, INCL. UNIT SUBSTATIONS	/ /		/ /
** SUBCOMMITTEE: HVDC CONVERTER TR & REACTOR			Chairman: W. N. KENNEDY	
* WORKING GROUP: SUBCOMMITTEE			Chairman:	
PC57.129 C57.129	GENERAL REQUIREMENTS & TEST CODE FOR OIL IMMERSED HVDC CONVERTER TR AND SMOOTHING REACTORS FOR DC POWER TRANSM.	06/01/89	D03 TO SUBMIT REVISED PAR(S)	/ /
** SUBCOMMITTEE: INSTRUMENT TRANSFORMERS			Chairman: J. N. DAVIS	
* WORKING GROUP: SUBCOMMITTEE			Chairman:	
P546 C57.13	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS	05/29/80	D07 BALLOTING MAIN COMMITTEE	/ /
NONE C57.13.2	CONFORMANCE TEST PROCEDURES FOR INSTRUMENT TRANSFORMERS	/ /	ASSUMED BY TR COMM FROM HVACC	/ /
* WORKING GROUP: SUBCOMMITTEE			Chairman: A. J. JONNATTI	
P832 C57.13.4	DET. OF PARTIAL DISCHARGE AND MEASUREMENT OF APPARENT CHARGE WITHIN INSTRUMENT TRANSFORMERS	05/28/80	PREPARED OUTLINE	/ /

ASC-B

12 of 24

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
** SUBCOMMITTEE: INSULATING FLUIDS			Chairman: H. A. PEARCE	
* WORKING GROUP:			Chairman:	
P76	GUIDE FOR ACCEPT. & MAINT. OF	/ /		/ /
C57.102	TR ASKAREL IN EQUIP		WITHDRAWN 09/10/87	
* WORKING GROUP: NONE			Chairman: F. W. HEINRICHS,SEC	
PC57.104	GUIDE FOR THE DETECTION AND	05/31/90	D12	/ /
C57.104	DETERMINATION OF GENERATED GAS IN OIL-IMMERSEDTRANSFORMERS & THEIR RELATION TO SERVICEABILITY		RECIRCULATING DRAFT 12	
* WORKING GROUP: NONE			Chairman: NONE	
PC57.106	GUIDE FOR ACCEPTANCE AND MTCE	06/19/86	D06	/ /
C57.106	OF INSULATING OIL IN EQUIPMENT		RECIRCULATING DRAFT 6	
* WORKING GROUP: SUBCOMMITTEE			Chairman:	
NONE	GUIDE FOR ACCEPTANCE OF	12/10/87		/ /
C57.111	SILICONE INSULATING FLUID AND ITS MAINTENACE IN TRANSFORMERS		PUBLISHED	
P954	GUIDE FOR ACCEPTANCE AND	04/12/82	D08	06/10/87
C57.121	MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS			
* WORKING GROUP: GAS ANLYSIS DURING FACT. TESTS			Chairman: J. P. KINNEY	
PC57.130	GUIDE FOR THE DETECTION AND	06/01/89	D01	02/11/91
C57.130	DETERMINATION OF GASES GENERATED IN OIL-IMMERSED TR DURINGFACTORY TESTS		BALLOTTING SUBCOMMITTEE	
* WORKING GROUP:			Chairman:	
P637	GUIDE FOR THE RECLAMATION OF	/ /		/ /
IEEE 637	INSULATING OIL AND CRITERIA FOR ITS USE		TO BE REAFFIRMED	

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
P799	GUIDE FOR HANDLING AND	09/27/79		/ /
IEEE 799	DISPOSING OF ASKARELS		UNKNOWN	
* WORKING GROUP: NONE			Chairman: NONE	
NEW	GUIDE FOR INTERPRETATION OF	/ /		/ /
NEW	GASES IN SILICONE LIQUID		PAR SUBMITTED	
	FILLED TRANSFORMERS		TO STD BOARD	
* WORKING GROUP:			Chairman:	
PC57.103	NEW/UNUSED TRANSFORMER-TYPE	/ /		/ /
NONE	ASKERELS		NO FILE	
** SUBCOMMITTEE: INSULATION LIFE			Chairman: D. H. DOUGLAS	
* WORKING GROUP: THERMAL EVALUATION			Chairman: L. A. LOWDERMILK	
PC57.100	TEST PROCEDURE FOR THERMAL	10/20/88		/ /
C57.100	EVALUATION OF OIL-IMMERSED		DISCUSSING	
	DISTRIBUTION TRANSFORMERS		CRITERIA FOR	
			MODELS	
* WORKING GROUP: GUIDES FOR LOADING			Chairman: D. A. TAKACH	
P756	GUIDE FOR LOADING	/ /		/ /
C57.115	MINERAL-OIL-IMMERSED POWER TR		UPGRADED TO	
	RATED IN EXCESS OF 100MVA		FULL USE	
	(65 C WINDING RISE)		03/21/91	
* WORKING GROUP: THERMAL TESTS			Chairman: R. L. GRUBB	
P838	GUIDE FOR PERFORMING OVERLOAD	09/18/80	D11	03/04/90
C57.119	HEAT RUNS FOR OIL IMMERSED		BALLOTING	
	POWER TRANSFORMERS		MAIN	
			COMMITTEE	
* WORKING GROUP: PROJECT			Chairman: R. L. GRUBB	
PC57.12.001	DEFINITION OF THERMAL DUPLI-	05/31/90	D11	/ /
C57.12.00	CATE		BALLOTTING	
			MAIN	
			COMMITTEE	

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

ASC-B

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
* WORKING GROUP: GUIDES FOR LOADING			Chairman: D. A. TAKACH	
PC57.91 C57.91	GUIDE FOR LOADING MINERAL-OIL-IMMERSED TRANSFORMERS	06/13/85	D06 PUB. 1/12/81, REAFFIRMED 1991	10/09/90
PC57.91 C57.92	GUIDE FOR LOADING MINERAL-OIL-IMMERSED POWER TRANSFORMERS UPTO & INCL 100 MVA WITH 55 C OR65 C AVE. WINDING RISE	06/28/85	D06 PUB. 1/12/81, REAFFIRMED 1991	10/09/90
NONE C57.95	GUIDE FOR LOADING LIQUID-IMMERSED STEP-VOLTAGE AND INDUCTION-VOLTAGE REGULATORS	/ /	PUB. 08/19/85, REAFFIRMED 1991	/ /
** SUBCOMMITTEE: NONE ASSIGNED			Chairman: NONE ASSIGNED	
* WORKING GROUP:			Chairman:	
NONE C57.12.70	TERMINAL MARKINGS AND CONNECTIONS FOR DISTRIBUTION &POWER TRANSFORMERS	/ /	APP. 05/02/78, REAFFIRMED 1986	/ /
NONE C57.12.80	TERMINOLOGY FOR POWER & DIST TRANSFORMERS	/ /	APP. 04/07/77, REAFFIRMED 1986	/ /
** SUBCOMMITTEE: NONE ASSIGNED			Chairman: J. H. HARLOW	
* WORKING GROUP:			Chairman:	
NONE C57.15	REQ, TERMINOLOGY, & TEST CODE FOR STEP-VOLTAGE AND INDUCTIONVOLTAGE REGULATORS	/ /		/ /

ASC-B

15 of 24

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
** SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS		Chairman: J. W. MATTHEWS		
* WORKING GROUP: NONE ASSIGNED		Chairman: NONE		
NONE C57.105	GUIDE FOR APPLICATION OF TRANSFORMER CONNECTIONS IN THREE-PHASE DISTRIBUTION SYSTEMS	/ /	APP 05/19/78, REAFFIRMED 1987	/ /
* WORKING GROUP: SHORT-CIRCUIT DURATION		Chairman: B. K. PATEL		
NEW C57.109	GUIDE FOR THROUGH-FAULT CURRENT DURATION	/ /	PAR ISSUED FOR COORDINATION	/ /
* WORKING GROUP: NONE ASSIGNED		Chairman:		
NONE C57.110	RECOMMENDED PRACTICE FOR ESTABLISHING TRANSFORMER CAPA-BILITY WHEN SUPPLYING NONSINU-SOIDAL LOAD CURRENTS	/ /	NO ACTIVE W.G.	/ /
* WORKING GROUP: TR DIRECTLY CONNECTED TO GEN		Chairman: B. K. PATEL		
NONE C57.116	GUIDE FOR TRANSFORMERS DIRECTLTY CONNECTED TO GENERATORS	/ /		/ /
* WORKING GROUP: TRANSFORMER RELIABILITY		Chairman: H. F. LIGHT		
P786 C57.117	GUIDE FOR REPORTING FAILURE DATA FOR POWER TRANSFORMERS AND SHUNT REACTORS	/ /		/ /
* WORKING GROUP: LOSS TOLERANCE AND MEASUREMENT		Chairman: W. R. HENNING		
P462C(1) C57.12.00	REV. OF SECTION 5.9 REFERENCE TEMP FOR NO-LOAD LOSS	06/28/79	RESOLVING NEGATIVE	/ /
P462C(2) C57.12.00	ADD TO SEC 9.3.1 ACCURACY REQUIREMENT FOR MEASURED LOSSES	/ /	D05 BALLOTTING WG	/ /

ASC-B
16 of 24

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
P787 C57.12.00	TRANSFORMER LOSS MEASUREMENT AND TOLERANCES	06/28/79	MERGED INTO P462	/ /
* WORKING GROUP: PROJECT			Chairman: R. H. FRAZER	
PC57.12.00h C57.12.00	LTC TAP POSITION INDICATION	09/28/86	D02 BALLOTTING MAIN COMMITTEE	/ /
* WORKING GROUP: PROJECT			Chairman: J. W. MATHEWS	
PC57.12.00i C57.12.00	NAMEPLATE INFORMATION CHANGE DIRECTED vs. NON-DIRECTED FLOW	12/28/86	D03 BALLOTING MAIN COMMITTEE	/ /
* WORKING GROUP: PROJECT			Chairman: C. J. McMILLEN	
PC57.12.00k C57.12.00	TABLE 16-C ROUTINE DIST TR RESISTANCE TEST	03/12/87	DOCUMENTATION TO BOARD	/ /
* WORKING GROUP: PROJECT			Chairman:	
NONE C57.12.90	SECTION 7.3 FIGURES 9 & 10 REVERSED	/ /	READY	/ /
* WORKING GROUP: LOSS TOLERANCE AND MEASUREMENT			Chairman: W. R. HENNING	
P262E C57.12.90	REVISION TO SEC 9 IMPEDANCE AND LOAD LOSSES	06/28/79	D09 BALLOTTING SUBCOMMITTEE	/ /
P262E3 C57.12.90	REVISION TO SEC 8 NO-LOAD LOSSES & EXCITATION CURRENT	06/28/79	BALLOTTING SUBCOMMITTEE	/ /
P1098 C57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT	06/13/85	TF WORKING	/ /

ASC-B

17 of 24

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
* WORKING GROUP: FAILURE ANALYSIS			Chairman: W. B .BINDER, JR.	
PC57.125 C57.125	GUIDE FOR FAILURE INVESTIGATION, DOCUMENTATION AND ANALYSIS FOR POWER TRANSFORMERS AND SHUNT REACTORS	06/28/87	D10 CIRCULATING CHANGES FROM D09	10/16/90
* WORKING GROUP: LTC PERFORMANCE REQUIREMENTS			Chairman: T. P. TRAUB	
PC57.131 C57.131	REQUIREMENTS FOR LOAD TAP CHANGERS	08/17/89	D04 BALLOTTING W.G.	/ /
* WORKING GROUP: SEMI-CONDUCTOR RECT TR			Chairman: C. G. POUNDS	
PC57.18.10 C57.18.10	REQUIREMENTS FOR SEMICONDUCTORRECTIFIER TRANSFORMERS	12/28/81	D07	/ /
* WORKING GROUP: TEST CODE FOR SHUNT REACTORS			Chairman: J. W. McGILL	
PC57.21 C57.21	REQUIREMENTS,TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS OVER 500kVA	06/09/88	D10 APPROVED BY BOARD 08/13/90	/ /
* WORKING GROUP: QUALIFICATION OF TR FOR 1E APP			Chairman: L. W. PIERCE	
P638 IEEE 638	QUALIFICATION OF CLASS 1E TR FOR NUCLEAR POWER GENERATING STATIONS	12/06/90	PREPARING SUBMITTAL TO BOARD	/ /
** SUBCOMMITTEE: PSRC RELAY INPUT SOURCES			Chairman:	
* WORKING GROUP:			Chairman:	
NONE C57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS	/ /		/ /
** SUBCOMMITTEE: PSRC RELAY PRACTICES			Chairman:	
* WORKING GROUP:			Chairman:	
NONE C57.13.3	GUIDE FOR THE GROUNDING OF INSTRUMENT TR SECONDARY CICUITS AND CASES	/ /		/ /

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

ASC-B

18 of 24

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
** SUBCOMMITTEE: UG TR & NETWORK PROTECTORS			Chairman: P. E. OREHEK	
* WORKING GROUP: 3-PHASE UG-TYPE TRANSFORMERS			Chairman: J. W. HOWARD	
PC57.12.24	UNDERGROUND-TYPE 3-PHASE	/ /		/ /
C57.12.24	DIST-RIBUTION TRANSFORMERS,2500kVA AND SMALLER: HV,34500GrdY..& BELOW,LV,480 V AND BELOW		PAR SUBMITTED TO STND. BD.	
* WORKING GROUP: LIQUID-FILLED NETWORK TRANSFMR			Chairman: E. A. BERTOLINI	
PC57.12.40	REQUIREMENTS FOR SECONDARY	/ /		/ /
C57.12.40	NETWORK TRANSFORMERS, SUBWAY &VAULT TYPES (LIQUID IMMERSED)		APP '87 TO BE PUBLISHED 1990	
* WORKING GROUP: SECONDARY NETWORK PROTECTORS			Chairman: R. B. ROBERTSON	
PC57.12.44	REQUIREMENTS FOR SECONDARY	/ /	D03	/ /
C57.12.44	NETWORK PROTECTORS		PAR SUBMITTED TO STND. BD	
* WORKING GROUP: DRY-TYPE NETWORK TRANSFORMERS			Chairman: B. NUTT	
PC57.12.57	REQUIREMENTS FOR VENTILATED	/ /	D03	/ /
C57.12.57	DRY-TYPE NETWORK TRANSFORMERS 2500kVA AND BELOW, W/HV 34500VAND BELOW,LV 216Y..AND 480Y..		NEED PAR	
** SUBCOMMITTEE: WEST COAST			Chairman: L. A. TAUBER	
* WORKING GROUP: SIESMIC GUIDE			Chairman: S. OKLU	
P513	SEISMIC GUIDE FOR POWER	09/06/73	D17	07/28/88
C57.114	TRANSFORMERS AND REACTORS			
* WORKING GROUP: CONSOLIDATION OF INST. GUIDES			Chairman: D. A. GILLIES	
PC57.93	GUIDE FOR INSTALLATION OF	/ /		/ /
C57.12.11	OIL-IMMERSED TRANSFORMERS (10MVA &LARGER, 69-287kV RATING)		TO BE REPLACED BY C57.93	

ASC-B

19 of 24

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
PC57.93 C57.12.12	GUIDE FOR INSTALLATION OF OIL-IMMERSED TRANSFORMERS 345kV AND ABOVE	/ /	TO BE REPLACED BY C57.93	/ /
PC57.93 C57.93	GUIDE FOR INSTALLATION OF LIQUID IMMERSED POWER TRANSFORMERS.	06/01/89	D05 BALLOTING MAIN COMMITTEE	/ /
* WORKING GROUP: LOSS EVALUATION GUIDE			Chairman: R. JACOBSEN	
P842 C57.120	LOSS EVALUATION GUIDE FOR POWER TRANSFORMERS AND REACTORS	05/01/80	D16 CONDITIONALLY APPROVED NESCOMM	05/23/89
* WORKING GROUP: FIRE PROTECTION			Chairman: DAVID SUNDIN	
PC57.128 C57.128	FIRE PROTECTION OF OUTDOOR LIQUID IMMERSED POWER TRANSFORMERS	06/01/89	D01 DRAFT BEING PREPARED	/ /

WORK UNDERWAY ON C57.12.00 AND C57.12.90
ATTACHMENT 2

ASC-B

20 of 24

PROJECT No.	TITLE	STATUS WG CHAIRMAN & PHONE
** STANDARD No. C57.12.00		
* SUBCOMMITTEE:		
VARIOUS	GEN REQ. FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	
* SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS		
P462C(1)	REV. OF SECTION 5.9 REFERENCE TEMP FOR NO-LOAD LOSS	RESOLVING NEGATIVE W. R. HENNING (414)547-1251
P462C(2)	ADD TO SEC 9.3.1 ACCURACY REQUIREMENT FOR MEASURED LOSSES	BALLOTTING WG W. R. HENNING (414)547-1251
P787	TRANSFORMER LOSS MEASUREMENT AND TOLERANCES	MERGED INTO P462 W. R. HENNING (414)547-1251
PC57.12.00h	LTC TAP POSITION INDICATION	BALLOTTING MAIN COMMITTEE R. H. FRAZER (919)734-8900
PC57.12.00i	NAMEPLATE INFORMATION CHANGE DIRECTED vs. NON-DIRECTED FLOW	BALLOTING MAIN COMMITTEE J. W. MATHEWS (301)281-3775
* SUBCOMMITTEE: DIELECTRIC TESTS		
PC57.12.00j	NEW SEC 6.8 MINIMUM EXTERNAL CLEARANCES BETWEEN LIVE PARTS	COMPLETE R. A. VEITCH (416)685-6551
* SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS		
PC57.12.00k	TABLE 16-C ROUTINE DIST TR RESISTANCE TEST	DOCUMENTATION TO BOARD C. J. McMILLEN (704)322-6297
* SUBCOMMITTEE: INSULATION LIFE		
PC57.12.00l	DEFINITION OF THERMAL DUPLICATE	BALLOTTING MAIN COMMITTEE R. L. GRUBB (414)549-5000
** STANDARD No. C57.12.90		
* SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS		
NONE	SECTION 7.3 FIGURES 9 & 10 REVERSED	READY

ASC-B

21 OF 24

WORK UNDERWAY ON C57.12.00 AND C57.12.90
ATTACHMENT 2

PROJECT No.	TITLE	STATUS WG CHAIRMAN & PHONE
* SUBCOMMITTEE:		
VARIOUS	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS & GUIDE FOR SC TESTING OF	
* SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS		
P262E	REVISION TO SEC 9 IMPEDANCE AND LOAD LOSSES	BALLOTTING SUBCOMMITTEE W. R. HENNING (414)547-1251
P262E3	REVISION TO SEC 8 NO-LOAD LOSSES & EXCITATION CURRENT	BALLOTTING SUBCOMMITTEE W. R. HENNING (414)547-1251
* SUBCOMMITTEE: AUDIBLE SOUND & VIBRATION		
PC57.12.90b	TRANSFORMER SOUND POWER MEASUREMENT	BALLOTING MAIN COMMITTEE A. M. TEPLITSKY (212)460-4859
* SUBCOMMITTEE: DIELECTRIC TESTS		
PC57.12.90c	ROUTINE IMPULSE TESTS FOR DISTRIBUTION TRANSFORMERS	MAIN COMMITTEE BALLOT COMPLETE JOHN ROSETTI (901)528-4743
PC57.12.90d	ENHANCEMENT VOLTAGE TIME DURATION DURING POWER TRANSFORMER INDUCED TESTS	DRAFT 1 BEING PREPARED M. ALTMAN, T.F. CH. (317)289-1211

COORDINATION ACTIVITIES
PES TRANSFORMERS COMMITTEE

PROJECT	TITLE	TRANSFORMER COMMITTEE COORDINATOR
** TECHNICAL COMMITTEE: T&D		
IEEE 656	STANDARD FOR THE MEASUREMENT OF AUDIBLE NOISE FROM OVERHEAD TRANSMISSION LINES	ALAN M. TEPLITSKY
** TECHNICAL COMMITTEE: SPD		
IEEE 1038	STANDARD TEST SPECIFICATION FOR SURGE PROTECTIVE DEVICES FOR LOW VOLTAGE AC POWER CIRCUITS	MAHESH P. SAMPAT
PC62.42	GUIDE FOR THE APPLICATION OF LOW-VOLTAGE SURGE PROTECTIVE DEVICES	MAHESH P. SAMPAT
** TECHNICAL COMMITTEE: SWGR		
PC37.04h	MECHANICAL LOADING REQUIREMENTS OF CIRCUIT BREAKER TERMINALS	LOREN B. WAGENAAR
** TECHNICAL COMMITTEE: ED&PG		
NEW	GUIDE FOR THE COMMISSIONING OF ELECTRICAL SYSTEMS IN HYDROELECTRIC POWER PLANTS	D. A. GILLIES
** TECHNICAL COMMITTEE: PSR		
NEW	STANDARD INVERSE-TIME CHARACTERISTIC EQUATIONS FOR OVERCURRENT RELAYS	NONE
** TECHNICAL COMMITTEE: T&D		
NEW	GUIDE FOR THE PREDICTION, MEASUREMENT, AND ANALYSIS OF AM BROADCAST RE-RADIATION BY POWER LINES	NONE
** TECHNICAL COMMITTEE: IC		
P83	TEST PROCEDURE FOR RADIAL POWER FACTOR TESTS ON INSULATED TAPES IN LAMINAR INSULATED POWER CABLES	NONE
** TECHNICAL COMMITTEE: PSR		
PC37.90.2	WITHSTAND CAPABILITY OF RELAY SYSTEMS TO RADIATED ELECTROMAGNETIC INTERFERENCE FROM TRANSCEIVERS	NONE

COORDINATION ACTIVITIES
PES TRANSFORMERS COMMITTEE

PROJECT	TITLE	TRANSFORMER COMMITTEE COORDINATOR
** TECHNICAL COMMITTEE: SWGR		
PC37.63	REQUIREMENTS FOR OVERHEAD, PAD-MOUNTED, DRY-VAULT AND SUBMERSIBLE AUTOMATIC LINE SECTIONALIZERS FOR AC SYSTEMS	NONE
PC37.71	THREE PHASE MANUALLY OPERATED SUBSURFACE LOAD INTERRUPTING SWITCHES FOR ALTERNATING CURRENT SYSTEMS	NONE
NEW	STANDARD FOR INTERRUPTER SWITCHES FOR ALTERNATING CURRENT, RATED ABOVE 1,000 VOLTS	NONE
PC37.36b	GUIDE TO CURRENT INTERRUPTION WITH HORN-GAP AIR SWITCHES	NONE
PC37.38	SWITCHING RATINGS AND DESIGN TESTS FOR GAS INSULATED SWITCHES	NONE
PC37.59	STANDARD REQUIREMENTS FOR CONVERSIONS OF POWER SWITCHGEAR EQUIPMENT	NONE
PC37.20.3	STANDARD FOR METAL-ENCLOSED INTERRUPTER SWITCHGEAR	NONE
PC37.30	STANDARD DEFINITIONS AND REQUIREMENTS FOR HIGH VOLTAGE AIR SWITCHES, INSULATORS, AND BUS SUPPORTS	NONE
PC37.34	STANDARD TEST CODE FOR HIGH VOLTAGE AIR SWITCHES	NONE
PC37.20.1	STANDARD FOR METAL-ENCLOSED LOW-VOLTAGE POWER CIRCUIT BREAKER SWITCHGEAR	NONE
PC37.20.2	STANDARD FOR METAL-CLAD AND STATION-TYPE CUBICLE SWITCHGEAR	NONE
PC37.09	STANDARD TEST PROCEDURES FOR AC HIGH-VOLTAGE CIRCUIT BREAKERS RATED ON A SYMETRICAL CURRENT BASIS	NONE
PC37.04f	OPERATING MECHANISM REQUIREMENTS	NONE

COORDINATION ACTIVITIES
PES TRANSFORMERS COMMITTEE

PROJECT	TITLE	TRANSFORMER COMMITTEE COORDINATOR
PC37.011	APPLICATION GUIDE FOR TRANSIENT RECOVERY VOLTAGE FOR AC HIGH VOLTAGE CIRCUIT BREAKERS RATED ON A SYMETRICAL CURRENT BASIS	NONE
** TECHNICAL COMMITTEE: ED&PG		
P1050	GUIDE FOR INSTRUMENTATION AND CONTROL EQUIPMENT GROUNDING IN GENERATING STATIONS	NONE
** TECHNICAL COMMITTEE: SUBS		
NEW	GUIDE FOR ANIMAL DETERRENTS FOR ELECTRIC POWER SUPPLY SUBSTATIONS	NONE
NEW	GUIDE FOR THE DEVELOPMENT OF SPECIFICATIONS FOR TURNKEY SUBSTSTION PROJECTS	NONE
NEW	GUIDE FOR EVALUATION AND DEVELOPMENT OF SUBSTATION LIFE EXTENSION PROGRAMS	NONE
P525	GUIDE FOR THE DESIGN AND INSTALLATION OF CABLE SYSTEMS IN SUBSTATIONS	NONE

IEEE

POWER ENGINEERING SOCIETY

TRANSFORMERS COMMITTEE

CHAIRMANS' REPORT

Please Reply To:

TRANSFORMERS COMMITTEE MEETING
PHOENIX, ARIZONA, MAY 12 - 15, 1991

REPORT FROM THE TECHNICAL COUNCIL

The Technical Council (TC) met at the Winter Power Meeting in New York, February 5, 1991. The following are highlights from this meeting.

A. HIGHLIGHTS OF THE TECHNICAL COUNCIL CHAIRMANS' REPORT

- A proposed book on "Transformers" was received by IEEE Press and forwarded to the Technical Council seeking a critical review of the proposal, outline, and sample chapters. The Transformers Committee provided the review and discovered several shortcomings and serious errors in the material. These were reported to the Publications Department who then recommended to the IEEE Press that the publication in its present form not be sanctioned. IEEE Press stated that they intend to go ahead and publish without IEEE endorsement. The Executive Board objects to this position and requested Bob Dent pass this to IEEE Press. If they still intend to proceed, Hal Scherer will take action to head this off.

- It was noted that some 74 standards need to reaffirmed by 31 July 1991 and that some 52 more were added to the list last week. Sue Vogel noted that from now on she will be sending out letters at the end of the four year period following approval allowing one year for reaffirmation action. She also noted that time extensions are available if the Committee is actively pursuing reaffirmation.

- It has been proposed that a "Letters to the Editor" column be added to the Transactions. The proposal would be for the Letters to complement technical discussion that has previously been submitted and reviewed as Discussion and Closure and not intrude upon the normal Discussion and Closure nor provide a home for late discussions.

B. HIGHLIGHTS OF THE EXECUTIVE BOARD MEETING

- IEEE President Eric Summer has suggested that at least one of the major Society meetings be held abroad to demonstrate that we are truly International in scope. Following a discussion of the pros and cons, a motion was passed to target the 1997 Summer General Meeting at a location in Western Europe. Prior to finalizing the decision, PES needs to hold a preliminary meeting in 1993 on a special topic to determine if logistics and arrangements can be satisfactorily accomplished. Further discussion needs to be held on whether the Technical Council committees, subcommittees, and working groups will meet in Europe.

- A motion in favour of continuation of co-sponsorship of the Joint Power Generation Conference, finding a way to support it and assigning specific responsibility to a committee for it was approved without dissent. A separate committee within the Meetings Department has been established solely for the purpose of coordinating all activities within PES to provide the necessary support. The recently held International Joint Power Generation Conference in Boston was a success with both IEEE and ASME support and cooperation.

- The Publications Department reported that 4516 pages were printed in the 1990 PES Transactions versus the 4000 pages budgeted. It was requested and approved by the Executive Board to change the pricing of the Transactions in 1991. New prices at $120 for members and $410 for non-members. The PES Review will be using 880 pages with a budget of 800. Approval was granted for the extra pages.

The 1990 Sections Congress took place on October 4 - 7, 1990 in Toronto, Ontario, Canada. Approximately 650 delegates from almost 100 countries attended. A list of 26 issues that need to be addressed by the IEEE was developed. The number one issue was "Develop plans to enhance corporate support of employee involvement in the IEEE, emphasizing to the employer the value of membership".

- President Scherer presented the PES goals for 1991 (a copy of these goals are attached to this report).

C. **PUBLIC AFFAIRS COUNCIL**

During the Winter Power Meeting, your Chairman also attended the Public Affairs Council meeting and the EMF Ad Hoc Committee meeting. Two position statements regarding EMF were reviewed. These are:

1. Regulation & Standards
2. EMF Research

Copies of Draft 6 of each of these position statements is attached.

D. **RESULTS OF SURVEY RE MEETING SCHEDULES & HOTEL ACCOMMODATIONS**

On March 1, 1991, a questionnaire and covering letter was sent to every member of the Main Committee, Subcommittees and Working Groups. A total of 150 completed questionnaires were received. The response was gratifying, if somewhat overwhelming. A summary of results is attached to this report.

The following are a few editorial comments on the results of this survey.

- With respect to meeting schedules, I don't see a clear consensus as to which direction to go. I believe any changes that are made will be acceptable to some and unacceptable to others. The Administrative Subcommittee's challenge will be to develop a new schedule which will be acceptable to the majority of members. We certainly will not be able to please everyone.

- A number of excellent comments were received suggesting more work should be done between meetings, thereby leaving the meeting period available to discuss contentious issues. This ties in closely to a new topic to be reviewed by Adsubcom, i.e. improving the effectiveness of working groups. Presently, the effectiveness of working groups varies widely depending on the capabilities and dedication of the chairman and members.

- With respect to hotel accommodations, I find a greater consensus which will guide future meeting hosts. Although the price of hotel rooms is important, the suitability of meeting rooms, easy access to airports, reasonable nearby restaurants and shops is of greater importance. We will amend our Meeting Host Guide to reflect the results of this survey.

E. **UTILITY MEMBER ATTENDANCE OF TRANSFORMERS COMMITTEE MEETINGS**

You will note that in the list of IEEE/PES goals, the objective of Number 4 is, "To increase the awareness of electric utility, related power industry company and university managements of the importance of power engineering and of the maintenance of in-house technical capability and, in particular, the need to support membership and participation in the Power Engineering Society". At the Phoenix meeting, we will be missing two subcommittee chairman, plus a number of other hard working members because their utility employers are restricting their travel, as a means of expense reduction. We wish President Scherer good luck in achieving this objective.

Robert A. Veitch
Chairman

IEEE POWER ENGINEERING SOCIETY - 1991 GOALS

The Executive Board of the Power Engineering Society has adopted the following eight goals to guide our overall activities through the year 1991.

1. To enhance membership services by emphasizing the quality and relevance of conferences and publications, by broadening the support to the Society's chapters, and by finding additional ways to encourage and recognize engineering excellence and professional achievement.

2. To expand membership by developing new chapters in sections and student branches, by strengthening existing chapters, by expanding student and regular chapters, by enrolling young engineers in the Society, and by identifying various means for both new and existing members to participate in Society activities.

3. To search out new approaches to international activities, to actively promote such activities, and to develop increased awareness of the problems and opportunities resulting from increasing global communications and ongoing organizational changes in the power equipment manufacturing industry.

4. To increase the awareness of electric utility, related power industry company, and university managements of the importance of power engineering and of the maintenance of in-house technical capability and, in particular, the need to support membership and participation in the Power Engineering Society.

5. To further strengthen relationships with institutions concerned with the status and nurturing of power engineering such as utility trade associations, universities, research institutes, and reliability councils.

6. To expand the participation of Society members in the development of domestic and international standards and to increase the awareness of the industry as a whole to the needs for internationalizing standards.

7. To stress emphases on science, mathematics and engineering at the elementary and high school levels and to further address power engineering education at the college and graduate school levels. In particular, to expand existing and to develop new programs to provide continuing education opportunities for the membership.

8. To actively participate in discussions on public policy at the local, state, and federal levels when power engineering expertise can contribute to a better understanding of the issues.

ASC-C

4 of 4

IEEE POWER ENGINEERING SOCIETY

ELECTRIC AND MAGNETIC FIELDS ISSUE

POSITION STATEMENT

REGARDING: "EMF RESEARCH"

A comprehensive international program of EMF research is now underway to address and help resolve the concern over possible health effects from Power frequency EMF exposures. The research includes epidemiologic studies of human health in residential and occupational environments, characterization of field sources, exposure experiments, and investigations of biological processes in cell and tissue systems.

The US Department of Energy (DOE) has sponsored a program dealing mostly with laboratory studies. The National Cancer Institute (NCI) is conducting a major study on childhood leukemia in which EMF will be treated as one of the risk factors. Several states have been active in EMF research at various times; currently, California, Florida and New York have major efforts. The Electric Power Research Institute (EPRI), the research arm of the electric utility industry, has been involved in EMF research for the past 15 years. Its current program is the largest in the world, and with Electric Utility support will continue to consider EMF as an extremely important area for research.

The Power Engineering Society (PES) strongly supports the continuation of EMF research in order to provide the scientific basis for decision-making in this complicated area. Since the EMF issue affects all areas of society, the PES supports an increase of funding for basic and applied research by both the private and government sectors.

REGARDING: "STANDARDS"

Currently there is no scientific basis for establishing numerical limits for power frequency electric and magnetic fields. However, in support of achieving a higher degree of confidence in research findings, appropriate organizations need to proceed with the evaluation of certain procedures, concepts and mechanisms for evaluation of EMF and health related issues. Several Professional Societies within IEEE have technical interest in fields and field management; therefore, it is appropriate that a Standards Coordinating Committee with participation from a number of Power Engineering Society (PES) members with technical expertise in appropriate areas (particularly in the development of standards for laboratory and field measurement) determine standards needs and participate in their development.

To promote the technical, scientific, literary and educational understanding of how biological response and electric and magnetic field stimulation are related, the Power Engineering Society promotes/encourages coordination with the Bioelectromagnetics Society and other Societies of IEEE regarding all aspects of this issue.

Approved by:

IEEE Power Engineering Society
Executive Board - February 1991

ADMINISTRATIVE SUBCOMMITTEE MEETING ASC-D

MAY 13, 1991 1 OF 1

PERFORMANCE CHARACTERISTICS SUBCOMMITTEE ACTIVITIES

Membership - Committee:

Nomination of H. Jin Sim to membership on the Transformers Committee.

Working Groups - Through-Fault-Current Duration:

Formed new working group to revise C57.109-1985, with Bipin K. Patel , Chairman.

Projects - Failure Analysis Guide:

Submitted draft 10 of C57.125 to Standards Board for approval.

Action Notices - From Standards Board:

1) C57.109-1985, Through-Fault-Current Duration Requested Life Extension, submitted PAR, and formed new working group.

2) C57.110-1986, Recommended Practice for Nonsinusoidal Load Current Capability. Will pursue reaffirmation.

3) C57.117-1987, Failure Data Guide, referred to working group on failure analysis for action.

Miscellaneous - ANSI/IEEE C57.12.90-1987:

Received letter from Mr. Bruce W. Webb, ABB Power T&D Co., indicating an error in Equation 24 of Section 11.6 - Altitude Temperature Correction. The units of measurement are inconsistent.

John J. Matthews
PCS Chairman

lm

ADMINISTRATIVE SUBCOMMITTEE MEETING - 5/13/91

Bushing Subcommittee Items

1. C57.19.00 and C57.19.01. Transformers Committee ballots on both documents passed. The Bushing Subcommittee will review editorial comments at tommorrow's meeting. Both documents will then be sent on to the IEEE Standards Board.

2. Coordination with Switchgear Committee. As a coordination contact, I received a Switchgear Committee proposal to add mechanical loading requirements for 800 kV circuit breaker terminals to ANSI/IEEE 37.04. Although oil-type bushings, such as those covered by C57.19.00, are not presently used on 800 kV circuit breakers, the mechanical requirements of the proposal are greater than presently recommended by PC57.19.100/d6, Bushing Application Guide. This item will be discussed at tomorrow's Bushing Subcommittee meeting. Two of the possible responses which we might make are to propose 1) limiting the requirements to the technologies which are presently used or 2) specifically excluding oil-type bushings.

3. Dimensional Standardization of Bushings. Leo Savio, Harold Moore and I were all involved with an EEI questionaire on dimensional standardization of bushings for power transformers at the October, 1990 EEI meeting in Hartford, CN. The results of the questionaire clearly indicate that utilities are very interested in further standardization of these bushings. Discussion in the Bushing Subcommittee meeting in Montreal last fall confirmed this and further, we learned that some utilities have already started bushing standardization programs of their own. The Bushing Subcommittee wishes to set up a new working group to work on this project and revise C57.19.01, the standard in which dimensional standards are presently given. Prit Singh of ABB has agreed to become chairman. Permission is requested from the Ad Com to establish a Working Group on Revision of C57.19.01 with Prit Singh as its chairman.

L.B. Wagenaar

ASC-F

1 of 1

INSULATING FLUIDS SUBCOMMITTEE

IEEE Guides - C57.104, Gas Guide and C57.106, Oil Guide - have been approved by the Transformers Committee and should be issued in the near future.

The primary item to be discussed at this meeting is C57.130, Gas Analysis During Factory Test. This is being handled by a Working Group chaired by James Kinney.

A Working Group on Gas Analysis for HTH Liquid Filled Transformers and Gas Analysis for Small Transformers is investigating the need for one or the other of these guides.

PAR 1258 has been issued for Gas Analysis of Silcione Liquid Filled Transformers. Work will begin on this guide.

Henry A. Pearce, Chairman
Insulating Fluids Subcommittee

ASC-G

1 of 1

DIELECTRIC TESTS SUBCOMMITTEE ACTIVITIES

ADMINISTRATIVE SUBCOMMITTEE - 5/13/91

1. Membership - 70

2. Standards Activities

   - C57.113 "Trial Use Guide on Apparent Charge Measurement in Oil-Filled Transformers and Shunt Reactors" is being submitted to RevCom for elevation to full-use status.

   - Draft 3 of the Switching Impulse Test Document was prepared and balloted in the Working Group on Revision of Dielectric Tests and the Dielectric Tests Subcommittee prior to the May 1991 meeting.

   - The impulse test guide C57.98 will be revised to include the Switching Impulse Test Document when it is prepared. There are a number of other changes to be made including the proposed change in the low frequency test enhancement voltage time duration. Since the guide will be revised, members of the Dielectric Tests Subcommittee and the Transformers Committee are requested to send any needed changes to the Task Force on Revision of Impulse Test Guide.

3. Liason Activities

   Working Group 3.4.8 for Metal Oxide Surge Arrester (MOSA) Protection requested that a member of the Dielectric Tests Subcommittee be available to provide assistance on the coordination of transformer insulation with metal oxide arresters. Loren Wagenaar has agreed to provide this liason.

Harold R. Moore

Harold R. Moore
May 1, 1991

ASC-H
1 OF 5

West Coast Transformer Subcommittee
Meeting Minutes

Portland, Oregon
September 18, 1990

Meeting Attendees:

Name	Company	Member/ Guest	
Dave Allaway	Puget Power	G	
David Brucker	Cooper Power Systems	M	
Long Duong	Tacoma City Light	G	
Jens Erlingsson	Pacific Gas & Electric	M	
Dennis Gerlach	Salt River Project	M	(Chairman)
D.A Gillies	Consultant	M	
Dale Jensen	B.C. Hydro	G	
Dennis Johnson	Bonneville Power Administration	G	
James Kinney	General Electric	M	
Samuel Oklu	LA Dept. of Water & Power	M	(Vice Chairman)
T.W. Prange	Idaho Power	G	
Fred L. Rose	Tacoma City Light	G	
Don Schafer	Puget Power	G	
David Sundin	Cooper Power Systems	M	
Louis Tauber	Corps of Engineers	M	(Secretary)
Chuck Todd	Tacoma City Light	M	

The meeting was called to order by Dennis Gerlach, the Chairman. Introductions of the meeting attendees were made.

The meeting minutes from the previous meeting, held in Denver Colorado were distributed during this meeting, and were quickly reviewed. The following corrections were requested:

-Jim Kinney was not included in the membership listing, and should be included in future listings.

-The spelling of Don Schafer's name in the minutes should be corrected.

-Chuck Todd should be included in the list of attendees.

I made a motion that the changes outlined in these minutes serve as the record for these changes, and the minutes not be reissued. The motion was passed.

-Membership-

Leonard Zachrison sent a letter explaining that he would no longer be able to attend. His name will be dropped from the membership roster.

The following new members were admitted for membership into the West Coast Transformer Subcommittee:

Dave Allaway, Puget Power
Dave Brucker, Cooper Power Systems
Jens Erkingsson, Pacific Gas & Electric

David Sundin asked if admission into the West Coast Transformer Subcommittee meant automatic admission into the working groups. It was suggested that this was not necessarily the case.

Robert Norton retired from Cooper Power Systems, and would therefore not be attending future meetings. His name would be dropped from the membership roster.

Chuck Todd spoke to Denise Roth, and she requested that her name not be dropped from the membership roster yet.

-Election of Officers-

Sam Oklu explained that he would not be able to take over the Chairmanship Therefore, I was nominated and elected to be the next Chairman of the West Coast Transformer Subcommittee.

ASC-H
3 of 5

There was a discussion regarding the need for a Vice Chairman. It was suggested that a Vice Chairman would not be needed at this stage, but should it be felt by the subcommittee that a Vice Chairman be needed at a later date, then one could be appointed.

Bill Isberg was nominated and elected to be the next Secretary of the West Coast Transformer Subcommittee.

There was a discussion regarding the need for a West Coast Transformer Subcommittee. Jim Gillies recommended that a task force be appointed to look at what the need for the committee should be. A similar discussion was held regarding the West Coast Substations Subcommittee. Both of these topics of discussion will be reopened through task force discussions.

-Old Business-

There was no old business.

-New Business-

David Sundin asked about the procedures to follow regarding the starting of future topics. Some of these topics were outlined in the March 27, 1990 Denver meeting minutes, and were as follows:

-Transformer Monitoring and Control Systems
-Scada Ready Transformers
-Applications of Liquid Filled CT's
-Spill Containment and Clean-up

Future Meetings-

Future Main Transformer Committee meetings are as follows:

-October 24-26, Montreal Canada
-May 12-15, Phoenix, Arizona
-September 22-27, Dallas, Texas
-Spring 92, Birmingham, Alabama
-Fall 92, Cleveland, Ohio
-Spring 93, to be arranged.

A motion was made and passed that the next meeting of the WCTSC should be during the Main Committee Meeting in Phoenix..

It was suggested that for the Dallas meeting, reservations be made early.

-Working Group Reports-

-Loss Evaluation Guide. Dennis Gerlach reported that all negative ballots were resolved, and the standard was approved by the standards board. Liaison approval is not yet completed. There has been IEC approval

-Consolidation of Installation Guides. The Chairman of the working group, Jim Gillies gave the report. A copy of the draft which was approved by the working group was sent to the IEEE Standards Bureau to assist in balloting the Main Transformers Committee. The ballots will be due back to the Chairman by the end of November.

-Fire Protection. David Sundin, the Chairman, reported that there was a slide presentation by Dennis Johnson of BPA regarding a transformer failure, and subsequent fire on a BPA transformer bank at Custer substation. The working group continued their discussion regarding indoor versus outdoor fires.

-Seismic Guide. Sam Oklu reported that the Guide was published. Comments from the Nuclear Liaison would be brought up during the 5 year affirmation period. A new working group will need to address these items.

-Additional New Business-

There was discussion regarding the need to assess a conference fee when the West Coast Transformer Subcommittee meetings are not held in conjunction with the Main Transformer meetings.

-Topics of Discussion-

Dennis Johnson of the Bonneville Power Administration gave a presentation on "The Development of an On-line Performance Analysis System". This presentation was given at a previous Doble conference.

Jim Gillies presented a video tape on the failure of oil filled CT's.

A video tape was presented by Dennis Johnson regarding transformer inspections via a borescope .

The meeting was then adjourned.

Respectfully submitted,

Louis A. Tauber
Secretary, West Coast Transformer Subcommittee

IEEE TRANSFORMERS COMMITTEE
UNDERGROUND TRANSFORMERS AND NETWORK PROTECTORS SUBCOMMITTEE
ADMINISTRATIVE SUBCOMMITTEE REPORT - MAY 13, 1991

1.0 Subcommittee Membership - 22 Members

1.1 R. L. Grun of Central Power and Light resigned from the Subcommittee and Working Groups and was replaced by A. L. Robinson of Central Power and Light.

1.2 H. J. Maestri of Florida Power and Light resigned from Working Group C57.12.44 and A. M. Velazquez of Florida Power and Light resigned from the Subcommittee and the Transformer Working Groups. Both were replaced by J. Valdes, also of Florida Power and Light.

2.0 Transformer Committee Membership

2.1 Two members of the Subcommittee, Messrs. J. W. Howard of Pennsylvania Power and Light and R. B. Robertson of Tampa Electric applied and were recommended for membership.

3.0 Standards Activities

3.1 The Underground-Type Three-Phase Distribution Transformers Working Group is working on the 1993 Revision.

3.2 C57.12.40 - "Requirements for Secondary Network Transformers, Subway and Vault Types (Liquid-Immersed)" was published in December, 1990.

3.3 The Secondary Network Protectors Working Group is presently in Draft #3 of a new product Standard. The Working Group will meet as scheduled on May 13, 1991 for four hours and plans an all day meeting on May 15, 1991.

A Task Force Group met in Allentown, Pa. in January, 1990 to review and modify the Sections on Design and Production Tests. The Working Groups goal is to complete the Standard by the fall of 1992.

3.4 The Ventilated Dry-Type Network Transformers Working Group is working on the 1992 Revision.

3.5 PAR's have been submitted for C57.12.24, C57.12.40 and C57.12.44. The PAR for the remaining Standard the Subcommitte is responsible for will be submitted in the near future.

Respectfully submitted,

Paul E. Orehek

Paul E. Orehek

INSULATION LIFE SUBCOMMITTEE REPORT

At our last subcommittee meeting in Montreal:

- A new T. F. has been formed in our Subcommittee, entitled:

  High Temperature Insulation in Liquid Filled Power Transformers

- The new T. F. has hit the ground running by organizing a Symposium on the subject for Tuesday afternoon May 14.

- I recommend that we upgrade this group to W/G status.

A true copy of Mr. Douglas' handwritten report.

IEEE TRANSFORMERS COMMITTEE
Administrative Subcommittee
Phoenix, AZ 05/13/91

ASC-K

Dry Type Subcommittee Proposals

1. Recently, the 1991 ANSI C57 Committee Annual Report was issued by NEMA, which is the administrative arm of the IEEE-NEMA cosecretariat. As Chairman of the C57.12.5 Subcommittee, I checked the status of Dry Type Transformer Standards and found the report significantly flawed. Attached is my report of the current status, which has been sent to the Standards Subcommittee and also to NEMA. I suggest the status of the other standards in the NEMA report be reviewed for error.

2. On Sunday, May 12, a planning committee of the Dry Type Transformer Subcommittee considered the following concerns:

   a) ANSI C57.12.57-1987 is a dry type network transformer standard originally sponsored by NEMA. Normally this would fall in the province of the Dry Type Transformer Subcommittee for review. However, it is presently scheduled for consideration by a WG under B. McNutt for tomorrow at 8:00 AM. Please clarify.

   b) It was noted that Monday meeting slots provide 1 hour and 50 minutes of meeting time. Tuesday meetings are allowed 1 hour and 10 minutes except for 8:00 AM (1 hour and 50 minutes) and 3:15 PM (2 hours). Because of the various time requirements, the Subcommittee proposes to request specific assignments. However, it is also planned to reduce the number of working groups from 7 to 5. Unfortunately the Subcommittee agenda is increased and more than the present 1 hour and 10 minute meeting time is required for future meetings. The 3:15 to 5:15 Tuesday meeting slot would be better than the present 1:50 to 3:00 PM period. In any case a revised schedule will be proposed to the host for the next meeting.

   c) ANSI C57.12.55, a conformance standard for dry type transformers, is due for revision/reaffirmation. This was originally sponsored by HVAC (High Voltage Apparatus Committee). It is suggested that it be presented to the Transformers Committee for reauthorization by letter ballot without enclosure. If it fails to pass, it would be returned to the Dry Type Subcommittee for review. Is this an appropriate procedure?

3. At the Thermal Problems WG meeting the status of C57.110 (Guide for Nonsinusoidal Currents) was discussed. It was published in 1986 and is central to a number of current issues within the industry. It was balloted to request the Administrative Subcommittee consider the following:

   a) Propose that C57.110 be extended for 2 years.

   b) Propose that the Performance Subcommittee undertake establishing a Working Group to revise this Guide ASAP.

Submitted By: Mr. R. E. Uptegraff, Jr
Chairman, IEEE Dry Type Transformer Subcommittee

PS: Melvin Manning and Jack Rodden passed away this past winter (1990-1991) and should be removed from the roster of the Transformers Committee

ASC-K

2 of 2

MELVIN LANE MANNING, son of James David Manning and Linnie (Durrin) Manning, was born November 26, 1900, at Miller, South Dakota. He died Thursday, February 14, 1991, at the Brookings Hospital at the age of 90 years.

He spent his early years and received his education at Miller and later received his B.S. in Electrical Engineering at South Dakota State College in 1927. He received his M.S. at the University of Pittsburg in 1932 and college teacher's certificate in 1933. He worked in various engineering capacities at Westinghouse Electrical Corporation from 1928 until 1931 and from 1936 to 1942. He was an instructor in the Mathematics Department at the University of Pittsburg from 1931 to 1935. Dean Manning was associate professor of Electrical Engineering at Illinois Institute of Technology in 1942 and 1943, at Cornell University from 1943 to 1945, and was chief engineer at Kuhlman Electric Co. at Bay City, Michigan, from 1945 to 1949. From 1949 to 1958 he was research engineer at McGraw-Edison Company in Canonsburg, Pennsylvania. From 1958 to 1972 he was with the South Dakota State University College of Engineering. During those years he served as Dean from 1958 to 1966. He was also Director of the Engineering Experiment Station and Professor of Electrical Engineering. He was a Registered Professional Engineer in South Dakota and Pennsylvania.

Dean Manning was a fellow of the I.E.E.E. and was

(Continued on Back Page)

IN MEMORY OF

Melvin Lane Manning

DATE OF BIRTH
November 26, 1900

DATE OF DEATH
February 14, 1991

PLACE AND TIME OF SERVICE
First United Methodist Church
2:00 P.M.
Monday, February 18, 1991

CLERGY
Rev. Penny Eberhart

ORGANIST
Maxine Lingren

CONGREGATIONAL HYMNS
What A Friend We Have In Jesus
Our God, Our Help In Ages Past

PALLBEARERS

Junis Storry
Wayne Knabach
Burton Brage
H.M. Briggs
Melvin Henrichsen
Walter Morgan

INTERMENT
Greenwood Cemetery

IEEE/PES TRANSFORMERS COMMITTEE
VICE CHAIRMAN'S REPORT
MAY 13, 1991

1991 WINTER POWER MEETING – TRANSFORMERS SESSIONS

Two Transformers Sessions were held at the Winter Power Meeting; Robert Veitch served as Chairman for both. Of the nine papers accepted and scheduled for presentation, four were not presented due to the authors' inability to attend. None of the four has as yet been resubmitted for future presentation.

1991 SUMMER POWER MEETING – TRANSFORMERS SESSIONS

Of twenty papers submitted, six were accepted for two sessions which will be held on Wednesday and Thursday afternoons at the Summer Power Meeting (7/31 and 8/1/91).

1991 T&D CONFERENCE

Twenty papers are currently under review for the September 22–27, 1991 T&D Conference; fifteen are Transactions Grade and five are Conference Grade. In addition, two Panel Sessions will be sponsored: one on "Low Side Surges" (Bruce Uhl, Chairman) and another on "Amorphous Metal Application" (Paul Orehek, Chairman).

IEEE/PES TECHNICAL COUNCIL PUBLICATIONS COMMITTEE

The volume of papers/pages is the main focus of attention; the volume continues to exceed "authorized" targets which are primarily a function of affordability. In view of the competition for publication, the Committee concluded that verbosity is sufficient grounds for rejection. A six page limit (instead of the current seven page limit) is under consideration.

Subsequent to the Winter Power Meeting, Chairman Don Volzka established "permanent" paper quotas for each technical committee. The Transformers Committee is allotted seven papers for the Winter Meeting and six papers for the Summer Meeting.

ASC-L
2 OF 2

IEEE/PES TECHNICAL COUNCIL TECHNICAL SESSIONS IMPROVEMENT COMMITTEE

The quality of visuals continues to receive attention:

- **The document "Guidelines for Visuals" will be included in future Author's Guide Kits**
- **The policy for pre-review of visuals was judged ineffective and has been rescinded.**
- **A formal presentation on acceptable visuals will be developed and presented at each Author's breakfast**
- **A method of evaluating visuals is under development for inclusion with the technical session feedback.**

John D. Borst
Vice Chairman
IEEE/PES Transformers Committee

ASC-M

1 of 1

Transformers Committee Membership Changes

October 22, 1990 - May 12, 1991

Added at Montreal Meeting

Frank Stevens	Northeast Utilities (US)
Paul Orehek	Public Service Electric & Gas (US)
Mahesh Sampat	General Electric (Hickory) (PR)
Fred Elliott	Bonneville Power Admin. (US)
John Wood	Pacific Gas & Electric Co. (US)

Status Change

Ed Adolphson	change from EM to VM by request (GI)
Ralph Stetson	delete from EM - no longer IEEE member

Deleted since Montreal Meeting

Carl Hurty	consecutive absences, no response to letter
Roger Jacobsen	consecutive absences, no response to letter
E.G. Strangas	consecutive absences, no response to letter
Mel Manning	death
Dennis Johnson	resignation
Ed Yasuda	resignation

Membership as of May 12, 1991

Members (voting)	=	105
Producers	=	39
Users	=	37
General Interest	=	29
Members (Emeritus)	=	16

SUMMARY OF QUESTIONNAIRE RESULTS REGARDING MEETING SCHEDULES AND HOTEL ACCOMMODATIONS

PART A - MEETING SCHEDULES

Question #1 - How many Task Force, Working Group and Subcommittee meetings do you wish to attend?

There was a total of 150 respondents with 133 replying to Question #1. The results are:

Minimum	1
Maximum	19
Average	7.21

Question #2 - Do you personally have a conflict in meeting schedules?

Yes	83 (55%)
No	67 (45%)

Question #3 - If you have a conflict, would you be prepared to:

(a) Begin formal working group sessions on Sunday at 1:00 p.m.?

Yes	66 (44%)
No	63 (42%)
Undecided	21 (14%)

(b) Extend the meeting to three full days with the main committee meeting on Wednesday afternoon?

Yes	101 (67.33%)
No	26 (17.33%)
Undecided	23 (15.33%)

(c) Extend the meeting to 3.5 days with the main committee meeting Thursday morning?

Yes	63 (42%)
No	63 (42%)
Undecided	24 (16%)

COMMENTS/SUGGESTIONS

The following is a selection of comments/suggestions received:

- The cost is the plane ticket--another day would not impact my attendance.

- Make better use of Tuesday afternoon.

- Opposed to having subcommittee meetings Wednesday morning and main committee Wednesday afternoon, as it does not give the subcommittee chairmen time to prepare for the main committee meeting.

- I recommend scheduling additional meetings Sunday afternoon rather than extend meetings to Wednesday afternoons. Extending meetings to Wednesday afternoon or Thursday will probably reduce overall attendance.

- Consider shorter sessions and give task forces and working groups the option of one or two sessions.

- Don't schedule meetings on Mother's Day.

- There is a need to improve the process and have work done efficiently between meetings.

- Keep Sunday afternoons for task force meetings.

- I believe it is possible for working groups and task forces to do most of their job in between meetings, therefore, meetings could be limited to 50 minutes.

- It would appear that an analysis of member meeting priorities could be analyzed using a computer.

- To get low air fares you have to include Saturday, therefore, Sunday afternoon is better than extending Wednesday or Thursday.

- Encourage more working group activities by mail starting early in each six month period so that only truly controversial points need to be discussed in a meeting. Therefore meeting times can be reduced so that fewer meeting times will have to be scheduled in parallel.

- Have a one hour time slot from 5:00 to 6:00 p.m. Mondays for shorter meetings.

- Reduce working group meetings from one hour, 50 minutes to one hour, 20 minutes or one hour, 40 minutes. The number of meetings on Monday could be increased from 4 to 5 or 6 depending on length or completion time, i.e. 5:00 p.m. or 6:00 p.m.

- Do not schedule any meetings on Sunday.

- Possibly schedule some task force or working group meetings at the winter or summer Power Meetings.

- I strongly oppose having to attend task force meetings on Sunday afternoon. We do need to extend the length of the meeting.

- Three day meeting with overflow task force meetings on Sunday seems to be a good compromise.

- Schedule meetings from 7:00 a.m. to 7:00 p.m. Shorter meetings are worthless.

PART B - HOTEL ACCOMMODATIONS

Question #1 - Do you recommend that the meeting host primarily consider room costs when booking a hotel?

Yes	65	(43%)
No	79	(53%)
Undecided	6	(4%)

Question #2 - What is your recommended upper limit for room cost?

- Recommendations ranged from a low of $40 to a high of $200. The average of 132 recommendations was $108.64

- The top four recommendations were:

#1	$100	(55 people)
#2	$150	(14 people)
#3	$125	(12 people)
#4	$ 80	(10 people)

- From the survey, it appears that a range of $100 to $110 is the overwhelming choice.

COMMENTS/SUGGESTIONS:

The following is a selection of comments/suggestions received.

- Decor and flamboyancy is less important than cost and convenience.

- Meeting accommodation and adequate restaurants should also be a consideration.

- Convenience to airport and quality of meeting rooms are higher priority (than price).

- Shift meeting dates to avoid peak season (one of many such comments).

- Stay away from the prestigious downtown hotels with inflated prices and favour some of the more suburban complexes where prices may be lower.

- The meeting host should consider room costs but not ignore other important issues e.g. downtown location, easy access, etc.

- Hotel should be accessible to areas of sightseeing, entertainment and shopping. It should also have good services such as fitness rooms, swimming, etc.

- Suggest room cost for single or double occupancy be the same.

- When host sends out hotel data, always show applicable taxes (for budgeting purposes).

- Limit room costs to that covered by government agencies (this was one of many).

- Don't be afraid to have meetings in Las Vegas or Atlantic City. Air fares are cheap, rooms are $30 and food is cheap!

- Leave meeting schedules as in the past - early April and late October.

- Location and suitability of accommodation should be of prime consideration in selecting a hotel.

I would summarize the vast number of comments by saying that although room cost is important, the suitability of meeting room accommodations, easy access to airports, reasonable nearby restaurants and shops also are important considerations. There were many comments approving of a shift in meeting time to take advantage of lower rates, as we have done for the Phoenix meeting. A number of government employees suggested keeping rates within approved levels.

Robert A. Veitch
Chairman - Transformers Committee

Figure 3 - IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUP	New Orleans Nov. 1987	Wash. DC Apr. 1988	Long Beach Nov. 1988	Chicago Apr. 1989	Charlotte Oct. 1989	Denver Mar. 1990	Montreal Oct. 1990	MAXIMUM	AVERAGE
Committee Registration: Members and Guests	130	122	177	160	200	202	257	257	178
Spouses	?	?	47	37	42	52	74	74	50
Luncheon	?	?	?	90	?	110	128	128	109
SC ADMINISTRATIVE	18	17	17	19	18	20	24	24	19
SC AUDIBLE SOUND AND VIBRATION	19	21	24	27	29	26	19	29	24
SC BUSHINGS	20	15	16	21	14	16	23	23	18
WG Bushing Application Guide	20	13	13	0	13	21	29	29	18
WG DC Applications of Bushings	-	-	7	16	14	12	14	16	13
SC DIELECTRIC TESTS	97	79	76	67	77	81	88	97	81
WG Revision of Dielectric Tests	32	30	22	27	32	33	35	35	30
TF Rev. Dielectric Tests for Shunt Reactors	23	22	?	18	19	?	-	23	21
TF Rev. of Impulse Test Guide	?	15	19	22	41	41	55	55	32
TF Enhancement Voltage Time	-	-	-	-	-	16	?	16	16
WG Rev. Dielectric Tests on Distr. Transf.	19	30	29	29	39	28	30	39	29
TF Low Side Surge Req. for Distr. Transf.	-	29	20	23	27	26	19	29	24
WG Partial Discharge Tests	40	30	44	41	46	44	24	46	38
TF Acoustic Detection of Partial Discharge	?	16	13	19	16	22	-	22	17
TF Measurement of Apparent Charge	?	23	29	21	21	13	16	29	21
SC DRY-TYPE TRANSFORMERS	25	27	23	26	25	28	31	31	26
WG Test Code C57.91	-	-	-	-	23	28	29	29	27
WG Dry-Type Dielectric Problems	24	25	28	16	30	25	21	30	24
WG Dry-Type Reactors	8	6	7	8	8	12	10	12	8
WG Dry-Type Thermal Eval. and Flammability	0	25	18	18	23	22	-	25	21
WG Dry-Type Thermal Problems	25	27	26	16	30	27	24	30	25
WG Insulation Req. for Specialty Transf.	17	7	8	13	11	10	10	17	11
WG Cast Coil Loading Guide	-	-	-	-	-	-	20	20	20
SC HVDC CONVERTER TRANSFS. AND REACTORS	15	11	10	9	12	15	15	15	12
SC INSTRUMENT TRANSFORMERS	?	22	13	17	12	11	22	22	16
SC INSULATING FLUIDS	?	25	33	22	25	33	34	34	29
WG Gas Analysis During Factory Tests	-	-	-	-	39	36	36	39	37
SC INSULATION LIFE	70	65	44	64	50	71	61	71	61
WG Guides for Loading	50	47	49	38	41	47	44	50	45
TF Loss of Insulation Life	-	-	-	-	-	-	12	12	12
WG Thermal Eval. of Distr. and Power Transf.	35	31	?	?	46	44	67	67	45
WG Thermal Tests	16	23	14	14	16	20	22	23	18

Figure 3(cont'd) - IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUP	New Orleans Nov. 1987	Wash. DC Apr. 1988	Long Beach Nov. 1988	Chicago Apr. 1989	Charlotte Oct. 1989	Denver Mar. 1990	Montreal Oct. 1990	MAXIMUM	AVERAGE
SC PERFORMANCE CHARACTERISTICS	74	73	76	67	77	77	85	85	76
WG Failure Analysis Guide	37	52	53	50	33	42	31	53	43
WG Loss Tolerance and Measurement	31	35	41	31	24	35	37	41	33
TF Loss Measurement Guide	40	?	?	?	24	?	?	40	32
WG LTC Performance Requirements	-	-	20	35	28	31	30	35	29
WG Qualification of Class 1E Nuclear Tr.	3	5	5	5	10	6	4	10	5
WG Rev. Test Code for Shunt Reactors	11	9	11	11	11	10	-	11	11
WG Semi-Conductor Rectifier Transformers	18	19	21	19	17	0	23	23	20
SC WEST COAST	0	0	12	20	0	18	0	20	17
WG Consolidation of Installation Guides	0	0	10	?	0	?	0	10	10
WG Seismic Guide	0	0	8	?	0	?	0	8	8
SC DISTRIBUTION TRANSFORMERS	-	-	-	-	-	-	34	34	34
WG Overhead Type Distr. Transfs.	-	-	-	-	-	-	?	0	0
WG Single-Phase Live Front Padmount	-	-	-	-	-	-	?	0	0
WG Three-Phase Live Front Padmount	-	-	-	-	-	-	?	0	0
WG Single-Phase Submersible	-	-	-	-	-	-	?	0	0
WG Single-Phase Deadfront Padmount	-	-	-	-	-	-	?	0	0
WG Three-Phase Deadfront Padmount	-	-	-	-	-	-	?	0	0
WG Conform. Specs. Padmount & Submersible	-	-	-	-	-	-	?	0	0
WG Joint C57/37 on Cabinet Integrity	-	-	-	-	-	-	?	0	0
SC UNDERGROUND TRANSFS. AND NETWORK PROTECTORS	-	-	-	-	-	-	25	25	25
WG Three-Phase Underground Transfs.	-	-	-	-	-	-	19	19	19
WG Liquid-Filled Sec. Network Transfs.	-	-	-	-	-	-	19	19	19
WG Secondary Network Protectors	-	-	-	-	-	-	17	17	17
WG Dry-Type Network Transfs.	-	-	-	-	-	-	31	31	31

NOTE: Maintain data for last four years only.

/123DATA/TCATTEND

IEEE TRANSFORMERS COMMITTEE

Administrative Subcommittee Meeting

Monday, May 13, 1991 6:30 P.M.

Agenda Item 8. Subcommittee Reports

Distribution Transformers Committee:

I am sorry that I am not able to present this report in person. Matt Mingoia has graciously consented to represent the Distribution Subcommittee at the Adcom meeting.

The Subcommittee is enjoying its association with IEEE Transformers and are find the opportunities that it affords for interchange of information very rewarding. So rewarding in fact, that we are receiving requests for us to find a way such that our membership can attend Working Group meetings outside the ambit of the Distribution Subcommittee.

Subsequent to our Montreal Meeting, PARs were prepared for the Seven Standards (C57.12.20, .21, .22, .23, .25, .26, .27) the Subcommittee writes. These were forwarded to the Standards Co-ordinator.

Earlier today four Distribution Working Groups held meetings. Overhead/Pole Mounted (.20), Single Phase PadMounted, Dead Front (.25), Three Phase Padmounted Live Front, (.22) and Padmounted Unit Substations (.27). Attendance was as follows, .20/23, .25/27, .22/15, and .27/10, respectively. The single phase, padmount, live front working group (.21) meets tomorrow morning, prior to the Subcommittee meeting.

Two Distribution Subcommittee Standards were balloted in the Subcommittee (a first!) over the winter. These were our single phase submersible (.23) and three phase, padmount, dead front (.26) Standard.

These ballots were "affirmative" under the IEEE Operating Procedures and will be passed along to IEEE for balloting in the Main Committee.

As Adcom knows, the Subcommittee is also associated with four enclosure integrity Standards, the first of which C57.12.28 was published in 1988. A sister document, .29 was successfully balloted in ASC C57 in Spring 1990, but has not yet been sent to ANSI for publication. NEMA is the Secretariat for these four Standards. It is the Subcommittee's intention to prepare PARs for all four Standards and bring this Joint Working Group (C57/C37) into our Subcommittee. Indeed, a meeting was originally scheduled for Phoenix, but

subsequently canceled because the "Coatings" members of the WG were unwilling to travel so far for only a 2 or 4 hour meeting. (Customarily, the Group meets for 1 1/2 or 2 days). We are confident something can be worked out such that future meetings can be coincident with IEEE Transformers.

The Subcommittee also prepared a PAR for a Bar Coding Standard which was submitted appropriately. An early denouement is sought for this document, because the Standard is much needed in the industry. The Subcommittee is under no little pressure from user elements to form a WG to formalize this Standard. Prior to submittal of the PAR the document had been cleared by the American Identification Manufacturers Association.

Later this evening we will be pleased to submit 17 applications for membership on the Transformers Committee.

We feel very comfortable in this association, and look forward to a long and warm relationship with IEEE Transformers.

Respectfully submitted,

Matthew C. Mingoia
for
Frank Stevens, Chairman
Distribution Subcommittee

91F14WG5

ASC-Q

1 OF 1

IEEE/PES TRANSFORMER COMMITTEE
INSTRUMENT TRANSFORMER SUB-COMMITTEE

Administrative Sub-committee Report
May 13, 1991

1. The letter ballot C57.13/Draft 7 closed on Nov. 29, 1990. Five negative ballots have not been resolved. Since the total response was 77% and 90% of those were affirmative, the standard will be submitted to the standards board after preparation of the forward.

2. One of the standards transferred from the HVACC was C57.13.2-1986, "Conformance Test Procedures for Instrument Transformers". The reaffirmation ballot closed on May 3, 1991. The ballot received an 83% response with 98% affirmative. The recent closing date has precluded any attempt to reconcile the lone negative ballot.

3. The subcommittee activity is currently to produce a guide for partial discharge detection and testing.

Respectfully submitted,

John N Davis

John N. Davis, Subcommittee Chairman

BUSHING SUBCOMMITTEE
Report to the Transformers Committee
May 15, 1991

The Bushing Subcommittee met on Tuesday, May 14, 1991, with 16 members and ten guests present. The following two guests requested membership after the meeting:

Eugene Kallaur - Hartford Steam Boiler

Russ Nordman - MagneTek Electric

Two people have resigned from the Bushing Subcommittee since the last meeting so that the membership remains at 31.

After introductions and correction and approval of the minutes of the October 23, 1990 meeting, the subcommittee heard the reports of its two working groups:

Working Group on Bushing Application Guide

Chairman Fred Elliott reported that the working group met on Tuesday morning (5/14) with nine members and 16 guests present. Four of the quests requested membership on the working group after the meeting. The working group first reviewed the results of the subcommittee ballot on PC57.19.100/d6, Guide for Application of Apparatus Bushings. A total of 33 ballots, with coordination ballots, were sent out and 28 ballots were returned. There were 18 ballots approved, 8 approved with comment, no negative ballots and two not voting. All of the comments were reviewed and there are four items identified for further refinement. An attempt will be made to resolve these items before the next meeting.

It was also reported that the IEEE Standards Office has notified us that C57.19.101, Trail-Use Guide for Loading Power Apparatus Bushings, is approaching the end of its two-year life. The working group recommended to the subcommittee that it be ballotted to become a full guide. The loading guide, which has also been inserted into C57.19.100, will be withdrawn as soon as C57.19.100 is approved and published. The Subcommittee received the working group recommendation and voted to ballot the Transformers Committee for upgrading C57.19.101 to a full guide.

Working Group on Bushings for DC Application

Acting Chairman Wagenaar reported that the working group met on Monday afternoon (5/13) with ten members and three guests present and continued to review the draft of PC57.19.03, Bushings for DC Application. It was reported to us that no word has been received from the Substations Committee regarding that committee's reasons

for requesting that epoxy and SF6 bushings be included in the scope of C57.19.03.

The working group then heard a report from Fred Elliott on the dc ratings for dc bushings. The conclusion of this report and the ensuing discussion was that it is premature to standardize on ratings. DC test values will therefore be specified in the form of formulas, as is presently done in PC57.129, General Requirements and Test Code for Oil-Immersed Converter Transformers and Smoothing Reactors for DC Transmission. The working group then discussed specific tests. The contamination test is a very important test for dc bushings, but there is not yet a standard contamination test procedure available. We will await on IEC document which is forthcoming and ask testing organizations what direction they are taking. The working group also discussed cantilever test requirements and ac electrical test levels. These will be derived from existing tables in C57.19.01.

Additional Bushing Subcommittee Discussion

It was reported that the latest Transformer Committee ballots on C57.19.00, General Requirements and Test Procedures for Outdoor Apparatus Bushings, and C57.19.01, Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings, were both successful. The results of the ballots were as follow:

	Recirculation of C57.19.00/d10		Table 10 and Forward of C57.19.01	
Ballots sent out	106		106	
Ballots returned	100	94%	84	79%
Affirmative votes	90	100%	72	100%
Negative votes	0		0	
Abstention votes	10		8	

The subcommittee reviewed the comments, all editorial in nature, and a few changes were made as a result of them. Both documents will be sent on to the IEEE Standards Board for Approval after all of the ballots from other committees have been received.

At the Montreal meeting of the Bushing Subcommittee, it was agreed that a new working group should be set up for reviewing the dimensional standards in C57.19.01 and to establish new ones where needed. The new working group was approved at the Administrative Subcommittee meeting on Monday night (5/13) and Prit Singh has agreed to be Chairman. The scope of the new working group will cover all of the contents of C57.19.01, the standard in which the dimensional standards are given. Changes are already anticipated for the cantilever requirements. The working group will meet at the Baltimore meeting.

The Subcommittee also heard a report from Prit Singh, technical advisor to IEC/SC 36A. Prit reviewed the major changes proposed for IEC 137, Bushings for Alternating Voltages Above 1000V, and provided a list of the comments he had made on the document.

The last order of business was to review a Switchgear Committee ballot which adds mechanical loading requirements for 800kV circuit breaker terminals in C37.04. The consensus of the subcommittee was that the proposed requirements are in line with present practice on lower voltage switchgear bushings and we will respond that we find the requirements acceptable for circuit breaker application.

L.B. Wagenaar
Chairman

MEETING MINUTES

DIELECTRIC TESTS SUBCOMMITTEE
May 14, 1991
Phoenix, Arizona

1. INTRODUCTION/ATTENDANCE

The Dielectric Tests Subcommittee met at 1:50 P.M. with 38 members and 40 guests in attendance.

2. APPROVAL OF MINUTES

The minutes of the October 23, 1990 meeting in Montreal, Quebec were approved as submitted.

3. WORKING GROUP REPORTS

A. Working Group on Revision of Dielectric Tests

J. B. Templeton, Chairman

The Working Group met at 3:05 P.M. on May 13, 1991 with 21 members and 27 guests present.

The minutes of the October 22, 1990 meeting were approved as submitted.

The Task Force reports were as follows:

1. Task Force on Revision of Impulse Test Guide
R. E. Minkwitz

The Task Force met at 10:05 A.M. on May 13 with 18 members, 14 guests, and 6 new members in attendance. The minutes of the October 22, 1990 meeting were approved as written.

(a) Review of Draft 3, Switching Impulse Test Guide

Draft 3 had been prepared and balloted in the Working Group and the Dielectric Tests Subcommittee. The result of the ballot was as follows:

Number of ballots sent out:	99
Approved	63
Approved with comments	8
Not approved	2
Not voting	7
No response	19
Total	99

During the course of the meeting, proposals were reviewed in detail for resolving the "Approved With Comments" and the two negative ballots. It appears that all items can be resolved and Draft 4 will be prepared and balloted in the Working Group and Dielectric Tests Subcommittee before the next meeting.

A strategy for revising the Impulse Test Guide was then proposed. This will consist of balloting Draft 4 of the Switching Impulse Test Guide as described above and also revise and ballot the Impulse Test Guide before the Spring 1992 meeting to include the following items:

- Digital Measurement
- Frequency Response of Dividers
- Impulse Testing of Low Impedance Windings
- Neutral Terminal Tests

The objective is to have these items and the Switching Impulse Test document completely revised and included in the Impulse Test Guide.

(b) A committee within the Task Force met on May 12, 1991 at 7:00 P.M. with 6 members and 6 guests present. The purpose of the session was to discuss the information required in ANSI C57.98, Impulse Test Guide to explain the use of digital recording of high voltage impulse tests. This group will develop the information base needed from ANSI Standard 1122 and will concentrate on the following two areas:

- Measurement of Impulse Voltages
- Failure Detection

It is planned that this material be transmitted to the Task Force Chairman by July 1, 1991 and be reviewed by the Task Force membership at the next meeting.

2. Task Force on Enhancement Voltage Time During Power Transformer Induced Tests
M. S. Altman

The Task Force met at 8:00 A.M. on May 13, 1991. The minutes from the October 22, 1990 meeting were approved as submitted.

The Task Force submitted a proposal including the time duration of the enhancement voltage, the point at which the base line partial discharge reading would be taken, and when the first partial discharge reading would be recorded for the one hour test after completing the enhancement level. In previous meetings, the concensus of the Task Force was that the duration of the enhancement voltage should be reduced to 1500 cycles.

In this Task Force meeting, there were a number of persons that wanted to keep the time duration at 7200 cycles rather than reducing it to 1500 cycles.

The issues relating to the enhancement voltage during induced tests were discussed in the Working Group in order to determine the concensus from this group.

The issues discussed were as follows:

- Time duration of the enhancement voltage.
- When to record the base partial discharge reading for the acceptance criteria.
- When to record the first partial discharge reading after the enhancement.
- Are readings to be recorded during the enhancement?

The Working Group voted on motions for each of the items listed above. The results were as follows:

- Enhancement duration to be 1500 cycles approved by a vote of 12 in favor and 5 opposed.
- The base partial discharge reading is to be taken at the one hour test level prior to the enhancement. This was approved by a vote of 18 in favor and none opposed.
- The first partial discharge reading after the enhancement is to be recorded within 5 minutes of reaching the one hour test level. This was approved by 22 in favor and none opposed.
- The Standard document would require partial discharge measurements on all terminals during the enhancement. This was rejected by 5 in favor and 10 opposed.

It was requested that a statement be inserted to encourage the recording of partial discharge measurements during the enhancement although they would not be required.

Liason With Surge Arrester Protection Committee

A request had been received from the surge arrester protection committed to establish a liaison between them and the Dielectric Test Committee. The purpose of the liaison is to consider the protective margins between the transformer insulation and the characteristics of metal oxide arresters.

A committee was formed within the Working Group to discuss this matter and provide the requested liaison.

The Working Group meeting was adjourned at 5:10 P.M.

B. Working Group for Revision of Dielectric Testing of Distribution Transformers

J. R. Rossetti

The Working Group[met at 1:00 P.M. on May 13, 1991 with 15 members and 12 guests present. The minutes of the previous meeting were approved as submitted.

The Task Force reports were as follows:

1. Task Force on Low Side Surge Requirements for Distribution Transformers

W. B. Uhl

Bruce Uhl gave a status report on the Low Side Surge Task Force paper which will be presented at the Dallas T & D Exposition. The paper has been reviewed and accepted for presentation without any comments. The Task Force went over the four areas that will be discussed at the T & D panel session. The presenters will be as follows:

(a) Chuck McMillen will speak on the history of low side surge phenomena.

(b) Roger Dugan will describe the test set up used for the low side surge tests.

(c) John Borst will speak on the solutions and the effectiveness of each in preventing low side failures.

(d) Charlie Williams will discuss the users viewpoint.

2. Routine Test Guide for Distribution Transformers, C57.98

D. E. Ballard

Don Ballard has prepared and transmitted the PAR for the Routine Impulse Test Guide.

The Task Force discussed what should be addressed in the scope of the guide. Among the items discussed were the following:

(a) Safety of Impulse Tests

(b) Capacity of Surge Generators

(c) Ability to Repeat Results of Fault Detection.

(d) Grounding Practices in C57.98.

(e) Maintenance and Calibration.

A. Bolliger reviewed a paper written by K. Feser "Circuit Design of Impulse Generators for the Lightning Impulse Voltage Testing of Transformers" which covered the sizing of impulse generators.

The Task Force discussed the use of a transformer equipped with a staged fault for use as a calibration standard. The location of the staged fault was also discussed. There was some concern that the fault might not be detected depending on the location.

3. C57.12.90 c/D6 Routine Impulse Test for Distribution Transformers
W. R. Henning

Bill Henning gave a status report on the Routine Test for Distribution Transformers. The negative ballot has been resolved in the Transformers Committee. The approved draft will now be submitted to the Standards Board.

A request had been received from Mr. Armando Guarnaschelli of Argentina through the IEEE Standards Office for background information on the low frequency test values for 1.2 KV class insulation. This information is in IEEE Standard C57.12.00 - 1987 "IEEE Standard Requirements for Liquid - Immersed Distribution, Power, and Regulating Transformers". There is no way to determine the exact background information on this standard since it was written many years ago. It was decided that a discussion written by Mr. David Smith in 1982 which outlines some of this background information would be provided. This action was approved by the Dielectric Tests Subcommittee.

The meeting was adjourned at 1:35 pm.

C. Working Group on Partial Discharge Tests for Transformers
G. H. Vaillancourt

The Working Group met at 8:00 am on May 14, 1991 with 22 members and 20 guests present. The minutes of the Montreal meeting were approved as written.

The Task Force reports were as follows:

1. Task Force on Acoustic Location of Partial Discharges in Oil-Filled Transformers
E. Howells

The Task Force met at 10:15 am on May 13, 1991 with 5 members and 15 guests present.

The chairman presented a third technique designed for location use in the factory or laboratory which is to be included in the new location guide. It differs from other techniques in that electrical PD detection techniques can be used to provide an absolute time reference for the acoustic signals involved.

Several changes were made in the material that had been drafted.

(a) The clause that precluded contact with an energized transformer for safety reasons was deleted.

(b) The apparent charge method will be mentioned only as an example of a system for supplying the electrical timing reference rather than a mandatory method because other techniques can be used.

A draft of the complete document will be prepared for discussion at the next meeting.

Georges Vaillancourt presented information on a solid state digital PD location system which had recently been constructed at IREQ.

2. Task Force on the Measurement of Apparent Charge
W. J. Carter

This Task Force met at 8:00 am on May 13, 1991 with 7 members and 10 guests present.

Mr. Vaillancourt reviewed the status of the trial use Guide for the Measurement of Apparent Charge in Oil - Filled Power Transformers and Shunt Reactors, C57.113. The ballot of this document in the Transformers Committee to elevate it to full use status resulted in two negative ballots. At the past Transformers Committee meeting, the two negatives were withdrawn. A vote was taken at the Transformers Committee meeting to have the document raised to full-use status. It was discovered later that the number of votes did not agree with the number of members that had signed the attendance sheet. The vote was not accepted by the IEEE.

It was decided that the document would be balloted through the Transformers Committee during the next six months. The agreed upon changes to satisfy the two negative votes will be made in the body of the document rather than in a footnote. These are editorial changes that clarify Sections 5.2.1 and 5.2.2. The Working Group and Dielectric Tests Subcommittee later approved the balloting of the document in the Transformers Committee.

The Task Force discussed further work to be performed on the document. It is expected that the document will eventually become a recommended practice. One recommendation was to include an acceptance level of 500 p.c which was previously agreed upon by the Task Force and Working Group. Other items that should be considered were discussed.

A PAR will be requested for the work required to revise the guide for use as a recommended practice including acceptance levels. When this PAR is approved, a new Task Force will be formed to conduct this effort since the present Task Force has completed its assigned tasks.

The Working Group meeting was ajourned at 8:45 am.

4. OTHER BUSINESS

Mr. Ed Howells reported that the Standards Office could not locate C57.127 which had been completely approved and submitted to the Standards Board approximately 18 months ago. This situation was checked and the document cannot be resubmitted on the basis of the previous approval. It must be again balloted in the Transformers Committee and resubmitted to the Standards Board.

5. NEW BUSINESS

None

6. ADJOURNMENT

The Subcommittee meeting adjourned at 2:50 P.M.

Harold R. Moore
Chairman

IEEE POWER ENGINEERING
TRANSFORMER COMMITTEE
DISTRIBUTION TRANSFORMER SUBCOMMITTEE

MEETING MINUTES

Tempe Mission Palms Hotel, Tempe, Arizona - May 14, 1991
10:05 a.m.

Present:

Jerry C. Thompson	Duke Power
Kevin Edwards	Hevi-Duty Electric
Donald L. Weierbach	Philadelphia Elec.
Barnes Scott Wilson	Philadelphia Elec.
Jorge Valdes	Florida Pwr. & Lt.
Dorman Whitley	ABB Power T & D
John Hunt	KAEC
Jim Arnold	USDA REA
Matthew C. Mingola	Edison El. Inst.
Alan L. Wilks	ERMCO
Ronald J. Stahara	Kuhlman Corp.
Dale A. Peters	Georgia Power Co.
Tom Diamantis	Niagara Mohawk Pwr.
Ali Ghafourian	Cooper Power Sys.
Robert Scheu	GE
Dave Lyon	Wisconsin El. Pwr.
Ron Jordan	San Diego Gas & Elec.
Richard Hollingsworth	Howard Industries
John P. Lazar	Northern States Pwr.
G. Paiva	Southern Cal. ED.
Jerry Corkran	Cooper Power
Chris Ambrose	Florida Power & Lt.
Bruce Uhl	Commonwealth Edison
Jim Antwerler	Square D Co.
Peter Krause	Western Area Power
Alain Bolliger	Haefely Test Sys.
Kris Ginthwain	GE
Peter Manos	Allied Signal Metglass

PRESIDING OFFICER: JERRY C. THOMPSON

1. **COMMITTEE PERSONNEL:** Tommy Cooper is leaving Carolina Power & Light to join a transformer Repair Company, therefore; he will no longer be a Committee member. Barnes Scott Wilson (Scott), Philadelphia Electric, will be replacing Jim Malloy who retired. Ali Ghafourian will replace Myron Gruber as the Chairman of the C57.12.21 working group. C57.12.2 transformer subcommittee chairman Frank Stevens was unable to attend the Arizona meeting due to travel restraints.

2. Minutes from the October 23, 1991 Montreal meeting were approved as presented.

3. Matt Mingola reviewed the results from the Administration Committee meeting:

   a. Seven PAR's for standards have been prepared and forwarded to the IEEE. PAR's will not have any time limit. A list of the PAR's were distributed to the subcommittee.

   b. Two standards, C57.12.23 and C57.12.26, have been approved by subcommittee ballot and forwarded to the Main committee for approval.

   c. A proposal has been made to include the C57/37 Finish Standards working group into the C57.12.2 subcommittee.

   d. PAR 1265, bar coding has been issued by the IEEE.

   e. There will not be any Sunday meetings or tutorials at the Baltimore meeting. Rooms will cost $110 plus tax. Matt also reported 235 members in attendance.

4. Jerry Paiva briefly discussed the voting process required to approve a new or revised C57 specification. The only time the working group will vote on a specification will be at the subcommittee level. When a document leaves the working group, the draft is acceptable to the group. Then when balloted, 75% of the ballots must be returned. After attempts are made to resolve the negative ballots, only a majority vote is required to approve a specification. All subcommittee members will vote on ALL ballots even if they are not a member of the working group. PLEASE RETURN YOUR BALLOTS!

5. **C57.12.20 REPORT:** This specification was last published in 1988 and is scheduled to be republished in 1993. At this meeting the working group discussed the following issues: draft 1 dated May 91, transformer drawings in various tables and figures to bring them up to date, formed a task force chaired by Dave Lyon to review transformer mounting brackets, low voltage eyebolts and whether aluminum can be installed directly in them and other miscellaneous topics. There were 23 attendees at the meetings.

6. **C57.12.21 REPORT:** This specification was last published in 1980. Draft 8 of the specification was reviewed. A tank pressure issue was resolved which will permit the specification to be balloted after the Fall 91 meeting. There were 14 attendees at the meeting.

7. **C57.12.22 REPORT:** This specification was published in 1989. Dave Lyon reported for Ken Hanus that the working group has proposed to align this document with the .26 document since they are so similar. The group hopes to publish this document in 1992. There were 15 attendees at the meeting.

8. **C57.12.23 REPORT:** This working group did NOT MEET. This specification was published in 1986. Minor changes, approved by the subcommittee have permitted the document to be forwarded to the C57 Main and EEI T&D Committees for approval.

9. **C57.12.25 REPORT:** This specification was published last in 1990. Numerous issues have arisen regarding the switchability of the type 2 faceplate. Most of the issues relate to Dimensions "A" and "D" of Figure 2. A March 1990 user survey was discussed, Commonwealth Edison presented their viewpoint and documentation from Pennsylvania Power & Light and Puget Sound Power & Light were presented. A model of the type 2 faceplate has been built and will be used to resolve these issues. Users were urged to bring any connectors or accessories to the next meting so their impact can be evaluated. Twenty-eight (28) participants attended the meeting.

10. **C57.12.26 REPORT:** This specification was last published in 1987. This working group did NOT meet. A revised draft of this specification has been approved by the subcommittee and forwarded to the C57 Main Committee.

11. **C57.12.27 REPORT:** Since utilities do not use this specification and there is no interest in it, the working group proposed to eliminate it. The working group is presently working from Draft 4. The subcommittee will be balloted on this proposed elimination. There were 9 attendees at this meeting.

12. **C57.12.28 REPORT:** Tom Diamantis reported on the 2/90 meeting of this group. This specification was last published in 1988. This working group (C57/37) has also developed coating specifications for severe environments (.29), submersible transformers (.30) and overhead transformer (.31).

    The .29 specification for severe environmental coatings has been approved by the subcommittee, however, it has not been forwarded to the Bureau of Standards Review yet.

    The working group met in San Francisco with PG&E in February of 90 to see installations and discuss test methods and success criteria. A General Motors "scab" test will replace the salt spray test. Rust spreading from a scribe and impact tests with a chisel point or stylist were discussed. Stainless steels were considered but will not be included in the document. The working group has appealed to the users for more definitive tank wall temperature and load cycling data; this data is critical to the development of realistic coating criteria. Users were urged to participate on this working group and submit any data to Frank Stevens. The next meeting of this group will be in Boston in September.

    After the working group proved a need exists for standard overhead transformer coatings, a performance specification was developed (C57.12.31). The draft is ready to begin its journey of approval.

13. **BAR CODING REPORT:** Chairman Stevens has prepared PAR 1265 and has submitted it to the IEEE for approval. Hopefully, it will be approved so that the working group can meet this coming Fall.

14. **FUTURE MEETINGS:** The next Transformer Committee meeting will be on November 3-6, 1991 in Baltimore, Maryland at the Omni Interhabor Hotel. Rooms will cost $110 plus tax. The Spring 92 meeting will be in Birmingham, Alabama; the Fall 92 meeting has not been finalized yet, it may be in Portland, Oregon.

These minutes were prepared from notes taken by John Lazar of Northern States Power.

IEEE PES TRANSFORMERS COMMITTEE

DRY TYPE TRANSFORMER SUBCOMMITTEE

MEETING MINUTES

PHOENIX, ARIZONA - May 14, 1991

Chairman: Mr. R. E. Uptegraff, Jr.

1. Chairman Remarks and Announcements

The Dry Type Transformer Subcommittee met at 2:10 PM with 18 members and 14 guests present. The first order of business was the approval of the minutes of the October 23, 1990 meeting in Montreal. The minutes were approved as written.

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

Sec.2	Dry Type Reactors	R. Dudley
Sec.3	Specialty Transformers	M. Cambre
Sec.4	Test Code Revision	D. Barnard
Sec.5	Dielectric Problems	A. Kline
Sec.6	Thermal Problems	W. Mutschler
Sec.7	Cast Coil Loading Guide	L. Pierce
Sec.8	Thermal Evaluation and Flammability	R. Provost

1.2 During Mr. Dudley's report on the Dry Type Reactors WG, his need for establishing a Task Force subordinate to the Dry Type Reactor WG was discussed. It was agreed that said Task Force should be established to adequately provide input for both current-limiting reactors (the WG's current activity) and upcoming efforts on HVDC smoothing reactors.

1.2.1 It was noted that the proposal within the Dry Type Reactor WG to change the title of C57.16 from "current limiting" to "series connected" dry type reactors may require a revision to their PAR.

1.3 Following Mr. Cambre's presentation, a problem concerning the official status of IEEE 259 was discussed. This standard is due to expire within the coming year. As the PAR for Mr. Cambre's WG is for the "revision" of an existing standard, this would result in Mr. Cambre having to initiate a new PAR for the creation of a "new" standard. In order to avoid this needless delay, Mr. Patterson agreed to petition Mr. Veitch, Chairman of the Transformer Committee, to have the existing IEEE 259 reaffirmed with no revision.

1.4 Mr. Barnard explained that Mr. Egon Koenig had retired as Chairman of the Dry Type Test Code Working Group. Mr. Barnard, the Secretary for the WG, has succeeded Mr. Koenig as Chairman. Mr. Henry Windisch has gratuitously accepted to assume the Secretary's responsibilities.

Mr. Koenig will continue as an active member of the Dry Type Transformer Subcommittee. The Subcommittee wishes to extended their sincere appreciation to Mr. Koenig for the many contributions to our activities through his Chairmanship of a number of our Working Groups.

1.4.1 The problem of consolidating the C57.12.91 was discussed following Mr. Barnard's presentation. Mr. Patterson agreed to obtain through IEEE an ASCII and WordPerfect copy of the standard. Messrs Pierce, Gearhart, Croft and Barnard each volunteered to assume responsibility for coordinating the revisions into 25% of the document.

1.5 Mr. Kline reported that the Partial Discharge Guide was indeed balloted by the IEEE Standards Board yesterday, 05/13/91.

He also noted that he submitted a revised PAR to Ms. S. Vogel to bring the exact title of the document into coordination with the PAR.

1.6 During Mr. Mutschler's report on the Thermal Problems WG, the current status of C57.110 was discussed. Mr. Uptegraff noted that at the previous meeting of the Administrative Subcommittee it was decided that C57.110 would be sent to the Transformer Committee for a vote to reaffirm. If negative ballots are received from the ballot then C57.110 will be returned to the Performance Subcommittee for disposition. It was noted that the Chairman of the Performance Characteristics Subcommittee was attempting to organize a Task Force in anticipation of negative ballots. Members of the Dry Type Subcommittee were encouraged to participate on this Task Force.

1.7 A discussion on the need to continue the Thermal Problems Working Group ensued after Mr. Mutschler's presentation. Mr. Mutschler noted that since the Loading Guide WG was addressing some of the issues of the Thermal Problems WG, the activity of his WG had decreased significantly.

Mr. Uptegraff suggested that the Thermal Problems WG be continued as an agenda item during the Dry Type Transformer Subcommittee meeting. Mr. Mutschler agreed to proceed with this suggestion.

1.8 Following the presentations by the WG Chairman, Mr. Uptegraff reviewed the key issues discussed at the planning meeting of the working group chairman held the previous Sunday evening, 05/13/91. See Section 9.0 for details.

1.9 The Chairman reported on the passing of two of our members; Mr. Melvin Manning and Mr. Jack Rodden. They will be truly missed in our activity.

1.10 The Chairman reported that he had requested that Mr. J. R. Sullivan of Tampa Electric, Mr. R. B. Powell of Utah Power Light, and Mr. C. E. Griffith of Potomac Electric Power be accepted as members to the Dry Type Subcommittee. He noted that these fellows come to us from the NEMA delegation C57.12.5 which has been incorporated into IEEE and have been "active" members in the NEMA Standards activity.

The Chairman requested that Mr. Patterson pursue this issue at the next AdCom meeting.

The Chairman also noted the importance of gaining membership for our subcommittee from "users".

1.11 The Chairman announced his retirement as Chairman of this Subcommittee. He stated that Mr. Wesley Patterson, the current Secretary, would assume the Chairmanship at the close of this meeting. Mr. Uptegraff will continue his association with this Subcommittee as an active member.

Secretary's Note: The Subcommittee expressed it's sincere appreciation for the excellent stewardship afforded by Mr. Uptegraff. Considerable progress was made within this Subcommittee during Mr. Uptegraff's ten year plus term. His superb leadership abilities coupled with his excellent technical talents and extreme personal integrity will surely be missed by the Subcommittee at large and by the individuals upon whom he has made significant impact.

1.12 The Chairman then reported on the status of the ANSI C57 standards. IEEE handles the standards production for ANSI while NEMA handles the front office work. The Secretary of the C57 Subcommittee under ANSI is Mr. John Gauthier of NEMA. Mr. Gauthier had recently distributed the 1991 summary of the C57 Subcommittee. The Chairman, in reviewing dry type portion of this summary, found a number of errors.

As the time allotment for this Subcommittee meeting had expired, the Chairman was unable to review his revisions to this status list. See Section 10 for the data that was to be covered.

1.13 The Chairman noted that a meeting of the NEMA 8 ST was to take place the following day at this meeting place and encouraged the Subcommittee members to attended.

1.11 The meeting was adjourned at 3:10 PM.

1.12 Attendance Roster

MEMBERS PRESENT

B. Allen
R. Bancroft
D. Barnard
A. Bimbiris
M. Cambre
R. Dudley
R. Gearhart
A. Jonnatti
S. Kennedy
A. Kline
R. Marek
W. Mutschler
W. Patterson (Secretary)
P. Payne
L. Pierce
R. Provost
R. Uptegraff (Chairman)
H. Windisch

MEMBERS ABSENT

T. Darr
J. Frank
H. Gabel
E. Koenig
J. Nay
J. Sullivan
V. Thenappan

GUESTS PRESENT

N. Apostolakis
T. Bowers
F. Croft
M. Haas
T. Holdway
M. Iman
C. Johnson
J. Lackey
G. Marowski
K. Papp
G. Pregent
J. Rowe
E. Sapp
R. Simpson

ATTENDANCE SUMMARY

	Present	Absent
Members:	18	7
Guests.:	14	

Prepared by:

Wesley F. Patterson Jr, Secretary
Dry Type Transformer Subcommittee
July 25, 1991

2. Working Group on Dry Type Reactors

Chairman: Mr. Richard Dudley

Ref: C57.16 - "Requirements for Current Limiting Reactors"

This working group participates as a task force in the activities of the Shunt Reactor Working Group chaired by Mr. J. McGill. The working group provides recommendations relating to dry type reactors as distinguished from liquid-filled reactors. The working group is currently undertaking revisions to C57.16.

2.1 The working group met on 05/13/91 at 10:05 AM with 9 members present. Following circulation of the attendance list, the minutes of the 10/22/90 meeting were approved as written.

2.2 A discussion followed on how to best contribute to the drafting of a standard for HVDC smoothing reactors. Originally it had been proposed that the Dry Type Reactors Working Group would provide inputs to Mr. Bill Kennedy's Subcommittee (HVDC Converter Transformers and Smoothing Reactors) for the dry type smoothing reactor portions of the new standard. It was now agreed that a separate Task Force responsible to the Dry Type Reactor Working Group be set up to deal with HVDC smoothing reactors. This would provide optimum input to Mr. Kennedy's Subcommittee and at the same time not jeopardize the focus of the Dry Type Reactor WG on the revision of C57.16. The Chairman agreed to discuss this proposal at the Dry Type Transformer Subcommittee meeting.

2.3 The format of the revision of C57.16 was discussed. It was agreed to abandon the existing format and use essentially the format of the recently completed revision of C57.21 in order to be in line with current practice and to offer consistency in reactor standards. The Chairman agreed to check the IEEE manual covering document procedures to insure consistency with it.

2.4 The remainder of the meeting involved detailed discussions on the revisions to C57.16/D2.

2.4.1 It was agreed that it is more appropriate to include the section "Construction and Installation of Dry Type Series Reactors" in an appendix. The consensus being that it was supplemental information and inclusion in an appendix would offer more latitude in content.

2.4.2 Section 16-08.112 covering the duration of the short circuit was discussed. Where did the 3 second value come from? ANSI transformer standards specify 2 seconds and IEC reactor standards specify 1 second. The Chairman agreed to investigate and include a proposal in D3.

2.4.3 The maximum mechanical rating of 33 1/3 times rated currents was discussed. Why this value? Is it related to the lower voltage distribution networks of the past? ANSI transformer standards use a value of 20 times. In summary, it was felt that the user should specify the level. The Chairman agreed to investigate and make a proposal in D3. It was also agreed that if the 33 1/3 limit is removed, it will be noted and explained in a "note" in order not to lose the history.

2.4.4 In section 16-07.751 it was agreed that the short time current rating should be included on the nameplate.

2.4.5 It was agreed that forced air cooled reactors will not be included in the revision of C57.16. Such reactors are usually components of a system and should be covered by a system specification or standard; for example, solid state power conditioning equipment.

2.4.6 In section 16-80.100 dealing with definitions, reactors used for power flow control should be included.

2.4.7 Section 16-00.011 defining the scope should be made more specific by using the describer "series connected dry type reactors" as opposed to "current limiting".

As noted during the Dry Type Transformer Subcommittee meeting, this issue may require a revision to the WG's PAR.

2.4.8 In order to be in line with the new scope of the revision of C57.16, the title should be changed to: "Requirements, Terminology, and Test Code for Dry Type Air-Core Series Connected Reactors".

2.4.9 Section 16-03.190 dealing with tolerance on losses should be reviewed and perhaps brought into line with C57.21. Another alternative is to state that losses should be less than the specified values. The Chairman agreed to investigate and produce a proposal in D3.

2.4.10 Section 16-03.100 should define the reference temperature and the "basis of losses" in sufficient detail so that there is no misconception as to what losses are included for evaluation and test purposes.

2.4.11 The rationale behind the BIL levels in Table 16-02.110 was discussed. It was noted that in the case of series reactors that the BIL across the coil could be different than the BIL to ground (across the insulators). After the discussion it was agreed that the end user must make the decision if the BIL across the coil is to be a reduced level as the decision would be based on knowledge of the system characteristics and protection practices. However, any BIL level would be selected from the standard values in the table and for this reason the title of the table should be changed to: "Standard Insulation Test Levels ....". The above philosophy will be reflected in a note to the table in D3.

2.4.12 Other sources of installation and application (such as the W handbook) will be researched and assessed for inclusion in the appendix on construction and installation. Basically now that this subject will be covered in an appendix, it was agreed to make it as complete as possible and thus maximize its use to the end user.

2.4.13 The subject of EMF and exposure to personnel was discussed but it was agreed not to include any material on the subject in the appendix covering construction and installation. This decision was taken since the information on the subject is not definitive enough and in fact new studies are continually being published.

2.4.14 The IEEE dictionary of standard terms should be consulted to confirm that common terminology is to use "type tests" versus "design tests" which is used in the current standard.

2.4.15 Section 16-00.210 and the associated table needs to be clarified as to how it is to be used.; especially the 3300 feet criteria.

2.4.16 Several new editorial errors in section 16-80.100 defining types of reactors were discussed.

16-80.164 "... limiting the starting current of a machine or device".

16-80.163 "... capacitor banks..."

2.4.17 In D3 the pages will be numbered and a new, consistent, section numbering system will be used.

2.4.18 Table 16-05.110 was discussed on the approach and rationale to establishing temperature rise limits. The Chairman agreed to prepare backup information for further discussions at the next meeting. The issues appear to be consistent with other standards and recognition that series reactors are load cycled and do not see continuous rated currents.

2.5 The Chairman agreed to produce C57.16/D3 for the next meeting in Baltimore incorporating the results of the discussions outlined above.

2.6 The meeting was adjourned at 12:00 PM.

2.7 **Attendance Roster**

MEMBERS PRESENT	MEMBERS ABSENT
R. Allustiarti	J. Erlingsson
M. Altman	R. Jonas
R. Dudley (Chairman)	S. Kennedy
K. Papp	F. Lewis
P. Payne	C. Pounds
R. Pierre	V. Raff
T. Traub	M. Sharp
J. Watson	S. Silberman
J. Wood	R. Stojanovic
	R. Uptegraff
	B. Whearty

GUESTS PRESENT

ATTENDANCE SUMMARY

	Present	Absent
Members:	9	11
Guests.:	0	

3. Working Group on Specialty Transformers - P259

Chairman: Mr. Max Cambre
Secretary: Mr. R. W. Simpson, Jr.

Ref: IEEE Std 259 - Standard Test Procedures for Evaluation of Systems of Insulation for Specialty Transformers

This WG is charged with the revision of IEEE 259-1979. This standard relates to evaluating the thermal and environmental degradation of small, low voltage, dry type transformers.

3.1 The working group met on 05/13/91 at 1:00 PM with 6 members and 13 guests present. Following the introductions of those present, the minutes of the 10/22/90 meeting were approved as written.

3.1 The results of the ballot on draft D6 were reviewed. Seven ballots were returned with six approvals and one with comments.

3.1.1 A number of editorial changes were discussed. These mainly consisted of typographical mistakes.

3.1.2 The elimination of the phrase "or less" from the table for induced test was discussed. The Chairman explained that this was necessary to maintain consistency with the 7200 cycle / 60 second maximum duration.

3.1.3 The cycle times for the aging tests (third paragraph of section 3.2) were discussed. They were revised for the lowest aging temperature; from 168 - 672 hours to 336 - 1008 hours. This was necessary to make the average cycle time 672 hours as required in Table 3.

3.2 The Chairman agreed to prepare draft D7 incorporating the suggested revisions. This draft will be balloted by both the Working Group and the Dry Type Subcommittee prior to the next meeting in October, 1991.

3.8 The meeting was adjourned at 2:00 PM.

3.9 Attendance Roster

MEMBERS PRESENT

R. Bancroft
D. Barnard
M. Cambre (Chairman)
J. Frank
R. Provost
R. Simpson (Secretary)

MEMBERS ABSENT

A. Bimbiris
R. Mayschak
R. Uptegraff
R. Wagner
G. Zguris

GUESTS PRESENT

N. Apostolakis
B. Allen
V. Barot
W. Boivin
J. Davis
T. Diamantis
R. Gearhart
D. Getson
T. Holdway
A. Jonnatti
S. Kennedy
M. Mitelman
S. Mort

ATTENDANCE SUMMARY

	Present	Absent
Members:	6	5
Guests.:	13	

4. Working Group on Test Code PC57.12.91

Chairman: Mr. David Barnard
Secretary: Mr. Henry Windisch

Ref: C57.12.91 - Test Code for Dry Type Transformers

This working group is pursuing the revision/reaffirmation of the Dry Type Test Code - C57.12.91.

4.1 The working group met on 05/13/91 at 10:10 AM with 19 members and 9 guests present. Following the introductions of those present, the minutes of the 10/22/90 meeting were approved as written.

4.2 It was announced that Mr. Egon Koenig, the previous Chairman of this Working Group, had retired as Chairman. Mr. Barnard has succeeded Mr. Koenig as Chairman. Mr. Windisch has gratuitously accepted to support the Working Group as Secretary.

4.3 The Chairman announced that 26 ballots were sent out and only 12 have been returned. One additional ballot was returned during the meeting. The Chairman requested that everyone return their ballots to make this vote a valid process. All remaining ballots should be sent to Mr. Barnard. Copies need not be sent to Mr. Patterson.

4.4 One negative ballot was received and dealt with the metering diagram shown in Chapter 9. Much discussion centered around the proper metering connections and whether the diagram (Figure 9) was too detailed. It was proposed that for watt measurements the Figures 14, 15, and 16 be repeated. For impedance measurement a separate circuit should be shown. Resolution could not be reached and the matter was referred back to the Chapter 9 Task Force for resolution.

4.5 Comment to Chapter 11 suggested that Figures 28 and 29 in Section 11.6 be given titles. Additional comments will be forthcoming with a ballot to be submitted. The issues will be given to the appropriate Task Forces for resolution.

4.6 The Chairman indicated that references to standards with old dates will be corrected by the Standards Board.

4.7 Cold resistance definitions shown in two different places will be combined for one definition.

4.8 References to "primary" and "secondary" should be changed to "high voltage" and "low voltage" to resolve the situation surrounding step-up and step-down use.

4.9 It was suggested that the entire standard be editorially reviewed such that language and appearance are consistent throughout. The Chairman indicated he did not have the resources to accomplish this but would make some arrangements to get it accomplished.

4.10 The meeting was adjourned at approximately 11:55 AM.

4.11 **Attendance Roster**

MEMBERS PRESENT	MEMBERS ABSENT
B. Allen	R. Hollister
R. Bancroft	E. Koenig
D. Barnard (Chairman)	M. Mitelman
M. Cambre	J. Nay
J. Frank	R. Simpson
R. Gearhart	V. Thenappan
M. Haas	
R. Hayes	
A. Jonnatti	
A. Kline	
W. Mutschler	
W. Patterson	
L. Pierce	
G. Pregent	
R. Provost	
W. Schwartz	
T. Singh	
R. Uptegraff	
H. Windisch (Secretary)	

GUESTS PRESENT

F. Croft
T. Holdway
C. Johnson
T. Lanoue
R. Marek
G. Marowski
M. Rajadhyaksha
E. Sapp
J. Sullivan

ATTENDANCE SUMMARY

	Present	Absent
Members:	19	6
Guests.:	9	

5. Working Group on Dry Type Dielectric Problems

Chairman: Mr. Don Kline

Ref: PC57.124 - Recommended Practice for the Detection of Partial Discharges and the Measurement of Apparent Charge in Dry Type Transformers

The mission of this working group is the development of C57.124 which is presently being reviewed by the Standards Board.

5.1 This working group and the Thermal Problems Working Group met concurrently on 05/13/91 at 3:05 PM.

The Dielectric Problems Working Group had 17 members and 12 guests present. Following the introductions of those present, the minutes of the 10/23/90 meeting were approved as written.

5.2 The Chairman reported that the Partial Detection Guide was currently being reviewed by the Standards Board on 05/13/91.

5.3 The Chairman also reported that the Transient Analysis Guide was finally going to be reviewed by the Standards Board, also on 05/13/91.

5.4 The meeting was adjourned at approximately 4:00 PM

5.5 **Attendance Roster**

MEMBERS PRESENT	MEMBERS ABSENT
B. Allen	A. Bimbiris
R. Bancroft	D. Brazier
D. Barnard	O. Compton
M. Cambre	H. Gabel
J. Frank	R. Gearhart
R. Hayes	R. Hollister
A. Jonnatti	E. Koenig
S. Kennedy	V. Thenappan
A. Kline (Chairman)	G. Vaillancourt
R. Marek	S. Wiencek
M. Mitelman	
W. Mutschler	
W. Patterson	
R. Provost	
R. Simpson	
R. Uptegraff	
H. Windisch	

5.5 Attendance Roster - Continued

GUESTS PRESENT

V. Barot
T. Bowers
F. Croft
R. Goethals
M. Haas
T. Holdway
C. Johnson
T. Lanoue
G. Marowski
G. Pregent
E. Sapp
W. Schwartz

ATTENDANCE SUMMARY

	Present	Absent
Members:	17	10
Guests.:	12	

6. Working Group on Dry Type Thermal Problems

Chairman: Mr. William Mutschler

This working group is undertaking the review of various temperature related issues involved in loading, overloading, and aging of dry type transformers. The two main issues currently being investigated are: hot spot allowances and thermal time constants.

6.1 This working group and the Dielectric Problems Working Group met concurrently on 05/13/91 at 3:05 PM.

The Thermal Problems Working Group had 12 members and 17 guests present. Following the introductions of those present, the minutes of the 10/23/90 meeting were approved as written.

6.2 The Chairman reported that no significant new data had been received since the last meeting concerning hottest spot allowance and thermal time constants. It was the consensus of the WG that existing information will continue to be used in appropriate standards. The Chairman will analyze submitted data for further consideration.

6.3 A question was raised concerning the need for rating information (thermal, KVA) for transformers used on systems with more than 5% harmonic content but less than dedicated load. It was agreed that C57.110 covered the subject. However, it was in need of updating based on current loading practices. A motion was made to refer this concern to the AdCom for recommendations and action.

6.4 The meeting was adjourned at approximately 4:00 PM.

6.5 **Attendance Roster**

MEMBERS PRESENT	MEMBERS ABSENT
R. Bancroft	R. Gearhart
D. Barnard	R. Hollister
J. Frank	E. Koenig
A. Jonnatti	L. Pierce
S. Kennedy	V. Thenappan
A. Kline	
R. Marek	
W. Mutschler (Chairman)	
W. Patterson	
R. Simpson	
R. Uptegraff	
H. Windisch	

6.5 Attendance Roster - Continued

GUESTS PRESENT

V. Barot
T. Bowers
M. Cambre
F. Croft
R. Goethals
M. Haas
R. Hayes
T. Holdway
C. Johnson
T. Lanoue
G. Marowski
M. Mitelman
G. Pregent
R. Provost
M. Rajadhyaksha
E. Sapp
W. Schwartz

ATTENDANCE SUMMARY

	Present	Absent
Members:	12	5
Guests.:	17	

7. Working Group on Cast Coil Loading Guide

Chairman: Mr. Linden Pierce

This working group was created to investigate loading guide criteria unique to cast coils for inclusion in the Dry Type Loading Guide C57.96.

7.1 The working group met on 05/14/91 at 10:05 AM. There were 13 members and 17 guests present. Eight (8) guests were added to the WG membership bringing the membership to 23. The new members are:

Robert Gearhart	Anthony Jonnatti
Alfons Bimbiris	Rohn Grant
Mike Iman	Mengesh Ravadhyaksha
Gerald Marowski	William Mutschler

7.2 The minutes of the 10/22/90 meeting were approved as written.

7.3 A summary report of test data on a 2000 KVA cast resin transformer with imbedded thermocouples was reported by the Chairman. This was discussed by the WG. Test data included hot spot rises, time constants, and exponents for loading guide equations. The need for test data by other manufacturers was emphasized.

7.4 A comparison of the IEC Loading Guide (IEC 905) and the IEEE Loading Guide (C57.96-1989) was reviewed. IEC 905 includes cast coil transformers and a table of maximum temperatures during overloads. IEEE C57.96 does not include cast coil units and maximum permissible temperatures are not given.

7.5 The major issues to be addressed were summarized as follows:

- insulation classes used
- insulation life curves
- maximum permissible temperatures
- hot spot allowances
- equations for loading
- thermal time constants

7.6 The WG plans are as follows:

1) members to submit comments to the Chairman by 07/15

2) the Chairman will prepare the first draft (D1) by 10/01/91 and mail it to the members for discussion at the fall meeting in Baltimore.

7.4 The meeting was adjourned at 11:00 AM.

7.5 Attendance Roster

MEMBERS PRESENT

B. Allen
R. Bancroft
D. Barnard
J. Frank
R. Goethals
M. Haas
R. Hayes
C. Johnson
W. Patterson
L. Pierce (Chairman)
G. Pregent
R. Simpson
H. Windisch

MEMBERS ABSENT

E. Koenig
J. Sullivan

GUESTS PRESENT

A. Bimbiris
T. Bowers
M. Cambre
F. Croft
R. Gearhart
R. Grant
M. Iman
A. Jonnatti
A. Kline
T. Lanoue
R. Marek
G. Marowski
W. Mutschler
R. Provost
M. Rajadhyaksha
E. Sapp
W. Schwartz

ATTENDANCE SUMMARY

	Present	Absent
Members:	13	2
Guests.:	17	

8. **Working Group on Thermal Evaluation of Dry Type Transformers**
Working Group on Flammability Issues

Chairman: Mr. Richard Provost

This working group has been charged with developing C57.12.60. The work on this standard has been mostly completed and the standard was submitted to be issued for trial use. Trial use was employed due to the WG being unable to define an existing system to use as a control for comparison with an insulation system under test.

Subordinate to this WG is a working group charged with monitoring developments in flammability and toxicity of dry type transformers.

8.1 The working group met on 05/14/91 at 11:15 AM. There were 12 members and 16 guests present. Following the introductions of those present, the minutes of the last meeting, 03/27/90, were approved as written.

8.2 The Chairman noted that the final draft (D9) of C57.12.60 was ready to be sent to the Standards Board. Since it is a "Trial Use" standard, the Chairman emphasized the need for manufacturers to conduct tests to verify the procedure.

8.3 The Chairman noted that C57.12.56, issued in 1986, is now due for reaffirmation. The Transformer Committee will be asked to ballot it's members for reaffirmation. Assuming there are no objections, the standard will be reaffirmed. If it is voted down, a working group will be appointed to address the problems.

8.4 In a review of flammability issues, the Chairman discussed work ongoing in various standards / certification bodies. Of particular note is document "HD 464" of CENELEC TC14. This is an amendment to the dry type power transformer standard, titled: "Trial Use Guide For Special Tests To Prove Suitability To Fire Behavior Classes". The main points of this draft document were outlined. CENELEC aims to issue the final version of this document later this year. Once issued, this would replace the EDF document which is a similar standard related to flammability and toxicity.

8.5 The meeting was adjourned at 11:45 AM.

8.6 Attendance Roster

MEMBERS PRESENT

B. Allen
R. Bancroft
D. Barnard
M. Cambre
V. Dahinden
A. Kline
R. Marek
W. Patterson
L. Pierce
R. Provost (Chairman)
R. Simpson
R. Uptegraff

MEMBERS ABSENT

J. Frank
J. Nay

GUESTS PRESENT

N. Apostolakis
V. Barot
T. Bowers
F. Croft
R. Gearhart
R. Goethals
J. Goudie
M. Haas
T. Holdway
C. Johnson
A. Jonnatti
T. Lanoue
G. Marowski
G. Pregent
E. Sapp
W. Schwartz

ATTENDANCE SUMMARY

	Present	Absent
Members:	12	2
Guests.:	16	

9. Planning Meeting of the Working Group Chairmen

Chairman: Mr. Roy Uptegraff
Secretary: Mr. Wesley Patterson

9.1 The meeting was held at 5:00 PM on Sunday, 05/12/91. All working group chairmen were present except Mr. Mutschler (Thermal Problems).

9.2 The meeting began with a discussion on meeting sessions being conducted by the Dry Type Subcommittee Working Groups. It was agreed that future room assignments would be obtained for those activities which have "tangible" PAR's. This would result in the Dielectric Problems and Thermal Problems Working Groups becoming "agenda" items at the Dry Type Subcommittee meeting as opposed to having separate meetings. This would reduce the number of rooms required for Dry Type Subcommittee activities from 7 to 5. It would also reduce the number of "conflicts" a number of the members have with attending other meetings.

9.3 The Chairman reported on a discussion at the previous AdCom Meeting concerning the Dry Type Network Transformer Standard, C57.12.57. It was reported that it was time for it to be revised or reaffirmed. This standard is assigned to the Dry Type Network Transformer Working Group of the Underground Transformer & Network Protector Subcommittee. This group came from a NEMA delegation activity which was absorbed by IEEE. The Chairman believed that this WG has had 2 meetings to date.

Mr. Uptegraff stressed the need for members of the Dry Type Subcommittee to provide active support for this WG.

9.4 The Chairman reported on a plan to reorganize the time duration of the working group meetings. He noted that this plan was also discussed at the previous night's AdCom meeting.

The proposal was:

Monday:	organized the day into (6) 1 hour and 20 minute periods with a 10 minute break after the first and fourth meetings
Tuesday:	organize the day into (5) 1 hour and 20 minute periods. The missing period will allow more time for the Tuesday luncheon and speaker.
Wednesday:	after 12:00 noon reserved for any symposiums

This results in (11) sessions of 1 hour and 20 minutes. In addition, the Chairman believed (2) of these periods could be reserved for those WG's requiring more time.

The Secretary, Mr. Patterson then queried the WG Chairmen for their meeting needs under this structure. The following was decided:

Dry Type Subcommittee	(2) periods
Dielectric Problems	agenda item to Dry Type Subcommittee
Thermal Problems	agenda item to Dry Type Subcommittee
Flammability Issues	agenda item to Dry Type Subcommittee
Specialty Transformers	(1) period
Dry Type Test Code	(1) period
Dry Type Reactors	(2) periods
Cast Coil Loading Guide	(2) periods

An alternative for the Dry Type Reactor and Cast Coil Loading Guide would be to reserve (3) periods for both of these activities.

The Secretary agreed to attempt to accommodate these changes for the next meeting.

9.10 The meeting was adjourned at approximately 6:00 PM.

10. **Status of ANSI Dry Type Standards as of 04/28/91**

IT	NUMBER	FROM	STATUS	TITLE
2	C57.12.01-1989	IEEE	Published	General requirements for dry type distribution and power transformers
20	C57.12.50-1989	NEMA	Published	Requirements for ventilated dry type distribution transformers 500 KVA and smaller, single and three phase, 34500 volts and less
21	C57.12.51-1989	NEMA	Published	Requirements for ventilated dry type power transformers 501 KVA and larger, three phase, 34500 volts and less
22	C57.12.52-1989	NEMA	Published	Requirements for sealed dry type power transformers 501 KVA and larger, three phase, 34500 volts and less
23	C57.12.53-xxxx	xxxx	Designation available for assignment	
24	C57.12.54-xxxx	xxxx	Designation available for assignment	
25	C57.12.55-1987	NEMA	Published	Conformance standard for dry type transformers
26	C57.12.56-1987	IEEE	Published. WG to review for reaffirmation or revision Chmn: R. Provost	Test procedure, thermal evaluation of insulation systems for ventilated dry type power and distribution transformers
27	C57.12.57-1987	NEMA	Published	Requirements for ventilated dry type network transformers 2500 KVA and smaller, three phase, 34500 volts and less
28	C57.12.58-1991	IEEE	Submitted to Standards Board	Guide for conducting a transient voltage analysis of a dry type transformer coil
29	C57.12.59-1989	IEEE	Published	Dry type transformer through-fault current duration guide

IT	NUMBER	FROM	STATUS	TITLE
30	C57.12.60-xxxx	IEEE	Submitted to Standards Board	Guide for thermal evaluation of insulation systems for solid cast and/or resin encapsulated power and distribution transformers
34	C57.12.91-xxxx	IEEE	Draft D3 of revision for ballot by WG Chmn: D. Barnard	Test code for dry type distribution and power transformers
45	C57.94-1982	IEEE	Published	Recommended practice for installation, application, operation, and maintenance of dry type distribution and power transformers
47	C57.96-1989	IEEE	Published. Under review for application to cast coils Chmn: L. Pierce	Guide for loading dry type distribution and power transformers
58	C57.124-xxxx	IEEE	Draft D8 being balloted by Transformer Comm. Chmn: A. Kline	Guide for conducting partial discharge tests on dry type transformers
59	C57.16-xxxx	IEEE	PAR requested. WG in early stages work Chmn: R. Dudley	Requirements, terminology, and test code for current limiting reactors
	IEEE Std. 259	IEEE	Draft D7 being balloted by the WG Chmn: M. Cambre	Standard test procedure for evaluation of systems of insulation for specialty transformers

Note: The working group on loading guide requirements for cast coil may require a new project number. Presently it is listed under C57.96 and no PAR has been issued.

Minutes of the May 13, 1991 Meeting of the
HVDC Converter Transformer and Smoothing Reactor Subcommittee
Tempe, Arizona

The meeting was called to order at 8:00 AM with nine members and two guests present. The first item to be discussed was the March meeting of the CIGRE JWG 12/14-10 in Boston. One of the major objections of that group is to study the adequacy of present dielectric tests and provide recommendations to IEC for incorporation into a new standard. As we have discussed at earlier meetings, their analysis shows that adequate stress levels are achieved in solid during the dc applied test and in the oil during the polarity reversal test. There are two factors which can make it difficult to relate the polarity reversal stresses to operating voltage stresses - the transient nature of the stress in oil and the difficulty in obtaining meaningful partial discharge measurements, particularly during the reversal itself. As a result the working group has been studying several alternative tests including elevated temperature dc and elevated temperature ac + dc tests. At the March meeting a none-hour ac applied test on the valve winding was proposed and manufacturers were asked to analyze the feasibility and impact of such a test on their designs. Comments were requested for the next meeting in June.

A considerable portion of our Subcommittee meeting was devoted to the continuing discussion on dielectric testing. Sections on dc insulation from Weidmann's Transformerboard II book were distributed with the minutes from our October 22, 1990 meeting, and Vince Dahinden provided additional information on the material at the present meeting. Their analysis suggests a time constant of about 2000 sec. (33 minutes) for charging an insulation structure during a dc test. This tends to reinforce the proposal that the dc applied test be extended from one to two hours to allow sufficient time for testing the solid insulation after the final distribution is achieved. We discussed that no preconditioning with a lower voltage would be allowed with the dc applied test.

We deferred on the discussion regarding whether the time period should also be lengthened for the polarity reversal test, but agreed that the 2000 second time constant should allow the upper limit on the reversal itself to remain at two minutes. We also agreed that the dc applied test and the polarity reversal test should be described as two separate tests and should not be combined.

The other topic discussed was harmonic losses. Dr. Stein provided a curve of harmonic loss factors performed on several transformers at Siemens which were somewhat higher than previous data. Pierre Riffon from Hydro Quebec

volunteered to calculate load losses in an actual converter transformer using the different harmonic loss factors to determine their influence on the total losses.

Progress in the Subcommittee is encouraging. We are receiving excellent support from members in preparing worthwhile contributions, and have suggested enough changes in draft 3 of PC57.129 to require a fourth draft be prepared and distributed to members prior to the next meeting.

The meeting was adjourned at 9:45 AM.

Respectfully submitted,

Bill

William Kennedy
Chairman, HVDC Converter Transformers
and Smoothing Reactors Subcommittee

TC-I
1 OF 1

IEEE/PES
TRANSFORMERS COMMITTEE
INSTRUMENT TRANSFORMER SUBCOMMITTEE
Phoenix, Arizona
May 15, 1991

1. The Instrument Transformer Subcommittee met May 14, 1991. Eight members and five guests attended.

2. The minutes of the Montreal meeting were approved.

3. The dates and places of future meeting were announced.

4. Dr. Edy So, National Research Council of Canada, presented information on that organization's calibration methods and equipment for fiber optic instrument transformers. Voltages range from 1 to 10 volts and secondary currents for CT's are in the milliampere range implying much higher ratios than the present standard 120 volts and 5 amperes. This requires the calibrations to be measured in parts per million--not parts in 10,000.

5. The subcommittee agreed to do as much work as possible by mail in preparing the guide for partial discharge detection and testing. We expect to resolve much of the working and phrasing through correspondence. Meetings will then be devoted to resolving technical problems.

6. The balance of the meeting was devoted to work on the draft for partial discharge detection and testing.

7. The meeting was adjourned at 12:05 PM.

Respectfully submitted,

John N Davis

John N. Davis, Subcommittee Chairman

IEEE

TRANSFORMERS COMMITTEE

POWER ENGINEERING SOCIETY

Please Reply To:

MINUTES
INSULATING FLUIDS SUBCOMMITTEE
May 15, 1991
Phoenix, Arizona

The Subcommittee met on Monday and Tuesday, May 13-14 1991. There were 23 members and 13 guests present.

The minutes of the meeting held in Montreal (October 22-23, 1990) were approved as submitted.

MEMBERS PRESENT:

C. Baranowski
C. B. Berry
D. W. Crofts
M. Frydman
J. P. Gibeault
J. Goudie
F. J. Gryszkiewicz
F. W. Heinrichs
B. G. Hunter
R. P. Johnston
J. J. Kelly
J. P. Kinney
J. G. Lackey
R. I. Lowe
M. M. McGee
C. K. Miller
R. J. Musil
H. A. Pearce
G. J. Reitter
L. J. Savio
D. W. Sundin
J. A. Thompson
T. P. Traub

GUESTS PRESENT:

V. M. Barot
P. T. Feghali
D. G. Getson
R. Jones
E. Kallaur
C. H. Komlenic
M. Lau
H. F. Light
A. J. Pereira
G. H. Preininger
C. L. Stiegemeier
E. R. Trummer
H. J. Wimdisch

PROJECTS:

- C57.104 & C57.106 at Standards Board final editing and printing.

o PAR #1258 has been assigned to cover a guide for gas analysis in silicone liquid filled transformers. A Working Group was setup with the following members:

Jim Goudie - Chairman
Henry Pearce
Frank Heinrichs
Frank Gryszkiewicz
Tom Rouse
Eugene Kallaur
John Lackey
James Goudie
James Kinney
Leo Savio
Jean-Pierre Gibeault

o The Working Group on feasibility of a separate guide for gas analysis of HTH Fluids and Small Power Transformers reported that a survey will be made of all parties who may have interest in a HTH Gas Guide to determine its need, if any. Members are:

Dave Sundin - Chairman
Mike Gragg
Jean-Pierre Gibeault
Ted Haupert
Frank Gryszkiewicz
Frank Heinrichs
Bob Hollister
Joe Kelly
James Kinney

o The Working Group and Subcommittee consensus was to report to the Transformers Committee that there does not appear to be need or data for a gas guide for "small" transformers.

o The Subcommittee moved to request the Transformers Committee to reaffirm P637-85, Oil Reclaim Guide, and P799-87, Guide for Handling PCB Contaminated Mineral Oil.

o The Working Group on Gas Analysis During Factory Test (PC57.130) met May 13-14 in Tempe, Arizona, with 28 members and 44 guests present. Results of the ballot on Draft 1 were reported as: Approved - 24 (12 with comment), Disapproved - 15, and Abstentions - 4. The two sessions were devoted to discussion of the submitted comments. A Task Force was formed to conduct a survey for data to assist in establishing values for Tables. There are 13 members of this Task Force with Caroline Komlenic as chairperson.

o Attached are a membership list, and a list of documents under Insulating Fluids Subcommitte.

o There being no new business, the Subcommittee was adjourned until November 3, 1991 in Baltimore, Maryland.

Henry A. Pearce
Chairman

Frank W. Heinrichs
Secretary

TRANSFORMER STANDARDS UNDER INSULATING FLUIDS SUBCOMMITTEE

C57.102	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF TR ASKAREL IN EQUIPMENT [Withdrawn 9/10/87]
C57.104	GUIDE FOR THE DETECTION AND DETERMINATION OF GENERATED GAS IN OIL-IMMERSED TRANSFORMERS AND THEIR RELATION TO SERVICEABILITY
C57.106	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF INSULATING OIL IN EQUIPMENT
C57.111	GUIDE FOR ACCEPTANCE OF SILICONE INSULATING FLUID AND ITS MAINTENANCE IN TRANSFORMERS [Published]
C57.121	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS
C57.130	GUIDE FOR THE DETECTION AND DETERMINATION OF GASES GENERATED IN OIL-IMMERSED TRANSFORMERS DURING FACTORY TESTS [Ballotting Subcommittee]
IEEE 637	GUIDE FOR THE RECLAMATION OF INSULATING OIL AND CRITERIA FOR ITS USE [To be reaffirmed]
IEEE 799	GUIDE FOR HANDLING AND DISPOSING OF ASKARELS [To be reaffirmed]
P1258	GUIDE FOR INTERPRETATION OF GASES IN SILICONE LIQUID FILLED TRANSFORMERS
P954	HIGH TEMPERATURE HYDROCARBON LIQUIDS [Became C57.130]

TC-K
1 OF 7

Meeting Minutes
Insulation Life Subcommittee
of the
IEEE Transformer Committee
at the
Sheraton Tempe Mission Palms Hotel
Phoenix, Arizona
May 14, 1991

The Insulation Life Subcommittee met on Tuesday, May 14, 1991, at 10:05 A.M. There was a total attendance of 81, consisting of 29 members and 52 guests. After introductions were made, the minutes of the previous meeting in Montreal were approved as issued. The Chairman introduced and welcomed three new members to the Subcommittee:

Ron Barker	- Virginia Power
Stan Lindgren	- EPRI
Jack McGill	- Siemans

It also was mentioned that one of our most faithful members, Mel Manning, passed away in February of 1991. We will miss Mel.

An item from the Administration Subcommittee meeting mentioned, was that meeting times for the next meeting in Baltimore will be revised to incorporate more meeting times.

The first Working Group report was given by Dave Takach, Chairman of the Working Group on Guides for Loading. Dave reported that they met at 8:00 A.M. on Monday, may 13, 1991, with 27 members and 24 guests present.

Minutes of the Montreal meeting were approved as issued.

The Chairman indicated that since the last meeting, three loading guides, C57.91, C57.92 and C57.95, were re-affirmed by letter ballot of the main committee. Also, IEEE 756, the Trial Use Guide for Loading Mineral Oil Immersed Power Transformers Rating in Excess of 100 MVA, was approved by the IEEE Standards Board as a full-use guide and is now designated C57.115.

Draft 7 of the new combined loading guide for both Distribution and Power Transformers was issued prior to the meeting.

The significant additions in Draft 7 are as follows:

1. In accordance with the unanimous vote of the working group at the Montreal meeting, all Loading Capability Tables have been removed.

2. The T.F. on Insulation Loss of Life, which met on Sunday afternoon with an attendance of 32, has contributed to Draft 7 a completely new approach to the subject of Loss of Insulation Life. The Arrehnius Curves and the text on loss of life in the Distribution and the Power Transformer sections of the Guide has been removed. An addition to the General Section has been proposed which introduces a P.U. life vs temperature curve and an aging acceleration factor curve. Two excellent tutorials on insulation loss of life have been prepared for the Appendix of the Guide, the first prepared by Olin Compton entitled Historical Perspectives and the second prepared by Bill McNutt entitle "Thermal Aging Principles".

Discussions at the Task Force meeting concerned the effects of moisture and oxygen on transformer insulation life and whether or not the guide should specify limits for these quantities. The Task Force also debated whether or not the guide should recommend a single value of transformer insulation life corresponding to one per unit normal life, or outline several possible choices and let the user decide upon which one to use. Bill McNutt agreed to add to the General Section a discussion of the range of possible values, and to indicate, in the appendix, guidelines as to which life value one might use.

The Task Force also discussed and decided to add to the new guide sample calculations illustrating the use of aging acceleration factors, per unit life, percent loss of life, and accumulative aging acceleration factors.

A discussion was held on the fact that many of the existing Tables in the guide are no longer accurate. Assignments were made for review of these Tables.

Following this discussion, three significant presentations were made to the Working Group.

1. Don Platts gave a demonstration of the PC based transformer temperature calculation software that he, Olin Compton, and Paulette Payne had developed over the last six months. Don indicated that the software package is not yet complete, as the distribution transformer temperature calculations have not been programmed. Don demonstrated program input, outputs, as well as actual execution of the program for power transformers normal life expectancy loading, planned loading beyond nameplate, long term emergency loading, and short-time emergency loading calculations.

   To furnish a computer program diskette as part of an ANSI standard or guide is a first, and IEEE is very supportive of this effort.

   Initially, the software package was envisioned as having only two parts - one for distribution transformers and one for power transformers. However, discussions at the meeting indicate that the loading type, duration, temperature range and temperature limits found in the proposed guide, were developed for transformers greater than 100 MVA and may not be suitable for transformers 100 MVA or less.

   If that is the case, the software will be developed in three parts:

   1) Distribution
   2) Power $\leq$ 100 MVA
   3) Power > 100 MVA

   Development of the transformer temperature calculation software will continue.

   Many thanks to our hosts, Salt River Project, for their help and the use of their computer and display equipment.

2. Ed Norton gave the next presentation on his findings with regard to fiber optic temperature sensor measurements in transformers. undergoing factory heat run test, Ed made the following observations:

   1) Winding oil duct temperatures are much higher than the top oil and, in ducts, can approach the hottest spot temperature.

   2) Winding oil duct thermal time constants approach the hottest spot thermal time constant (minutes versus hours).

3) Characteristics revealed by the fiber optic sensors indicate that these characteristics are design specific.

Based on these observations, Ed drew the following conclusions:

1) transient heating characteristics of power transformers and the corresponding loading guide calculations need to be re-examined.

2) the basic assumption that the bulk oil of the transformers tends to moderate the rate of rise of the hottest spot temperature needs to be seriously questioned.

3) reliance on using top oil temperatures as a reference base for all of the transmit gradients needs to be re-evaluated.

4) new test methods need to be developed to more effectively reveal these new characteristics.

5) and finally, fiber optic sensors monitoring needs to be included as a routine tool during heat run testing of power transformers.

3. Linden Pierce gave a presentation of his recent excellent work regarding temperature distributions in power transformer windings. This work served as the basis for an IEEE paper that he will present at the upcoming summer power meeting. A sample of conclusions that he drew from his temperature measurements are as follows:

1) The temperature distribution within helical or disc type windings is not a linear variation with height. For OA and FA cooling, the temperature distribution consists of a number of peaks and valleys up the winding height. The temperature distribution for FOA cooling is more uniform.

2) The temperature distribution for OA and FA cooling may shift with load. The location of the hot spot may change during overloads.

3) The temperature distribution for FOA cooling was consistent for all values of load. The location of the hot spot does not change during overload.

4) The location of fiber optic hot spot sensors should be considered carefully.

5) During overloads the oil duct temperature rises rapidly at a time constant equal to the winding time constant.

6) For OA and FA cooling, the top oil rise over bottom oil rise at steady state conditions can be used to determine the duct oil rise during overloads provided all windings in the transformer have similar heat flux.

7) For OA and FA cooling, the exponent for duct oil rise calculations may be determined from heat run data at two values of load.

8) For FOA cooling, a method to measure or determine the duct oil rise is needed.

9) An improved calculation of the hot spot rise over bottom oil was developed and confirmed by tests. This calculation considers resistance change with temperature, viscosity change, duct oil temperature rise, and location of the hot spot. The calculation uses exponents based on heat transfer correlations and thus should be constant for all transformer designs with natural circulation of the oil within the winding.

At this point in the Subcommittee meeting, it was announced that there will be two papers presented at the Summer PES meeting that deal with state-of-the art thinking in regard to transformer loading.

1. Insulation Thermal Life Considerations For Transformer Loading Guides - by Bill McNutt (#91SM320-2PWRD).

2. An Investigation Of The Thermal Performance Of An Oil Filled Transformer Winding - by Linden Pierce (#91SM324-4PWRD).

The second working group report was given by Bob Grubb, Chairman of the Working Group on Thermal Tests, which met at 3:05 P.M. on May 13th with 15 members and 15 guests in attendance.

A report was given by the chairman on the status of project P838/ANSI PC59-119 The Overload Test Guide.

All of the recommended revisions and changes received with the "approved with Comments" and "Negative Ballots" of Draft 11 had been incorporated into Draft 12 of the document. During the final proofreading of the document, the chairman discovered that the previous efforts to correct Section 8, "Evaluation Of Data", were not adequate to resolve an error which was the basis of negative ballots by Orrean Chew and Bill McNutt. The document did not present a clear procedure on how to determine the values of K (ratio of load to rated load) and R (ratio of load loss to core loss) needed to determine the exponents "n" and "m" from the test data. The chairman and Orrean Chew had worked on the problem but had failed to come to an agreement on how to correct it. They did agree, that since they couldn't agree, this section of the document needs more work to assure that everyone evaluates the data the same way to determine the exponents. Volunteers were solicited to assist with this problem and Linden Pierce, Bill McNutt, and Chuck McMillian volunteered to review Orrean Chews' data and help resolve the problem. The chairman will send them Orrean Chews' data for evaluation.

Project PC57.12 L "Definition of Thermal Duplicate"

A preliminary copy of Draft 1 of document was reviewed by those present prior to a formal ballot by the working group. The document defines the thermal characteristics of a transformer necessary to evaluate its thermal performance compared to one previously tested, which thermal characteristics should be identical and suggested tolerances for those thermal characteristics which were not required to be identical. It was the consensus of those present that the following changes be made:

1) Eliminate the requirement that the values "n" and "m" be the same as the tested transformer, because of difficulty of verifying this requirement without a test.

2) Correct "type" errors in equation 8.2.3.4-3.

3) It was generally felt that the tolerances on winding cooling, winding gradients, thermal test losses, and external cooling were too broad and should be reduced. A value of $\pm$ 10% was suggested for the trial draft.

These changes will be incorporated into the first draft to be balloted in the W.G.

Old Business -

Ed Norton presented a copy of a document titled "Direct Reading Fiber Optic Temperature Measurements". This was in response to the chairman's request for specific changes to resolve his negative ballot of Draft 11 of P838.

Linden Pierce requested to know if changes necessary to resolve his negative ballot of Draft 11 had been incorporated into Draft 12 of P838. They had been.

Being no new business, the meeting adjourned.

The next report was given by Larry Lowdermilk, Chairman of the Working Group on Thermal Evaluation of Liquid Immersed Power and Distribution Transformers. They met at 8:00 A.M. on Tuesday, May 14, with a total attendance of 56, including 15 Working Group members and 41 guests.

The paperwork has been submitted to the IEEE Standards Board to re-affirm the Thermal Evaluation Guide C57.100 before it is withdrawn. However, work is continuing on a major revision of C57.100 as follows:

Chuck McMillen discussed Arrhenius curves he had prepared to illustrate a comparison of normal Kraft and upgraded paper testing that was conducted several years ago. This comparison demonstrates how the Arrhenius curves for power and distribution transformers that are being transferred from the loading guides can be used as a basis of comparison to sealed tube aging tests for a new insulation.

A draft write up of a proposed test procedure for sealed tube aging of transformer insulations was presented to the Working Group by Chuck McMillen and was accepted with a few suggested modifications.

Vince Dahinden also presented a proposal for an appendix to introduce "degree of polymerization" (DP) as an additional indicator of end of life for an insulating material. He also indicated that there is a 30 to 50% difference in the DP test results using the five different types of DP test procedures. Weidmann is working to correlate the results of the different procedures and identify the best method to use in the test procedure. It was suggested that the ASTM method be used unless reasons are identified that another method would be more appropriate.

Bill McNutt proposed that the tensile strength criteria be the primary gauge for end point tests, but that the DP test be used as a parallel criteria to develop a correlation between the two measurements with the goal of eventually using the DP test as the main criteria at some time in the future. Chuck McMillen agreed to draft an addition to include the DP test as a supplementary measurement for both the sealed tube tests and the full scale tests. It was agreed that he would coordinate this with Bill McNutt and Vince Dahinden.

Lin Pierce proposed that one common Arrhenius curve be included for power and distribution transformers for the functional life testing. Chuck McMillen agreed to determine a common curve to be included in the test procedure. It was agreed that the curve should basically be the present distribution transformer curve, but with a slope equal to the per unit life curve that is being proposed in the revised loading guide.

A discussion was held on the importance of the measurement of insulation moisture content in the sample to be tested. A suggestion was made to include a minimum of .25% and a maximum of .50% moisture content for the sample being tested. A question was then raised

as to whether a test procedure for measuring moisture content should also be specified in the test procedure. The method recommended by Vince Dahinden is the Karl Fischer titration method.

The Working Group then agreed that the proposed test procedure for thermal evaluation should be balloted at the Working Group level once the above modifications have been incorporated. A goal was established to have this ballot complete for review at the Fall Committee meeting in Baltimore.

The meeting was adjourned at 9:16 A.M.

The final subcommittee report was given by Heinz Fischer, Chairman of our new Task Force on High Temperature Insulation for Liquid-Filled Transformers. The initial meeting of this new Task Force took place at 10:05 A.M. on May 13, with 16 members and 30 guests present.
Heinz Fisher gave introductory remarks concerning the growing interest in the application of high temperature insulation and the products in which it has been used. It was based on this interest that the need for the Task Force was recognized.

Discussion took place concerning the types of materials to be considered, namely:

Fiber Insulation (Paper and Pressboard)
Film Insulation (Wire enamels)
Binding Adhesives

It was concluded that high temperature insulating fluids should be omitted, since they were in the province of the Insulating Fluids Subcommittee.

The need for a scope statement for the Task Force was recognized and the following thoughts were advanced for inclusion in it.

1. Define Standards & Guides needed for the application of high temperature insulation.
2. Limit scope to liquid-filled transformers.
3. Application in hybrid systems in combination with lower temperature materials.
4. Identify new test methods needed, which could be developed by ASTM.
5. Mention liassion required.

Items identified for Task Force activity were:

(a) A position paper describing the technical state-of-the-art plus additional needs.

(b) Technical Standards work.
   1. Material Application Temperature Rating
   2. Insulation System Temperature Qualification
   3. Loading Guide
   4. Gas Evolution Guide
   5. Performance Standards

(c) Liaisson work with other Transformer Committee Working groups & Subcommittees.

(d) Definition of constraints imposed by use in conjunction with mineral oil.

Finally, the Symposium sponsored by this Task Force to be held on Tuesday afternoon was called to the attention of the group.

There being no further old business and no new business, the Subcommittee meeting was adjourned at 10:58 A.M.

Respectfully submitted:

David H. Douglas
Subcommittee Chairman

May 16, 1991

Performance Characteristics Subcommittee

Meeting Minutes - Phoenix, Arizona - May 14, 1991

I. Introduction/Attendance

The Performance Characteristics Subcommittee (PCS) met at 11:15 a.m. on Tuesday, May 14, 1991 with 34 members and 52 guests in attendance.

II. Approval of Minutes

The minutes of the October 23, 1990 PCS Meeting were approved with one correction. Page 3, Part V.C. Test Code for Shunt Reactors was corrected to state that project PC57.21 had received approval of the Standards Board.

III. Chairman's Remarks

A. Administrative Subcommittee Notes

The following information, obtained at the May 13, 1991 meeting of the Administrative Subcommittee was presented:

1. Wes Patterson is replacing Roy Uptegraff as Chairman of the Dry Type Transformers Subcommittee.

2. The Standards Board has issued action notices on numerous standards requiring review for revision or reaffirmation. PCS has received three notices which will be discussed later in the agenda.

3. The Standards Coordinating Committee has proposed a four year limit to the life of project authorizations. The purpose of this proposal is to streamline the standards development process. This was discussed at length in the Administrative Subcommittee (AS). The AS determined it will not have the desired effect and will register opposition.

4. The status report on PCS Projects will be attached (Attachment PCS-A) to the minutes. Again, note that C57.12.00 and C57.12.90 projects must be completed and submitted to the Standards Board by Spring 1992.

5. To ensure coordination of main committee ballots with other standards organizations, be sure to send a copy of the IEEE Standards Office balloting request to the Standards Subcommittee Chairperson (presently Wally Binder).

6. The schedule for the next meetings, which will be held in Baltimore, will be revised to avoid conflicts with meetings held during the same time period. All Monday and Tuesday sessions will be changed to 80 minutes. Six sessions will be held on Monday. Five sessions, with no seminar, will be held on Tuesday. Only small special meetings will be scheduled on Sunday.

7. It was sadly noted that Dr. Mel Manning passed away this past February.

B. Membership

Bill Boettger (ABB), Pierre Feghali (NAT), Jerry Frank (International Transformer), Eugene Kallaur (Hartford Steam Boiler), Peter Krause (Western Area Power Adm.), Lin Pierce (GE), and Craig Stiegemeier (ABB), were added to the roster. Jeff Fleeman, Sam Foster, Sam Oklu, Len Stensland, Len Swenson and Vis Thenappan were removed from the roster. Membership now stands at 62.

IV. Agenda Changes

Project "D. Interpretation C57.109" was changed to working group "G. Revision C57.109 - B. K. Patel, Chairman".

V. Working Group Reports

A. Qualification of Transformers for Class IE Application in Nuclear Power Stations - L. W. (Lin) Pierce

The Working Group did not meet during this session. Lin Pierce submitted the attached status report (Attachment PCS-B) on IEEE638.

B. Test Code for Shunt Reactors (C57.21) - J. W. (Jack) McGill

This Working Group did not meet during this session. Jack McGill was not present. Wally Binder, Standards Subcommittee Chairman, confirmed that C57.21 is ready for publication. The work of this Working Group is completed.

C. LTC Performance Requirements - T. P. (Tom) Traub

Members Present: D. Dohnal, L. Savio, R. Wokeam, P. Feghali, R. Veitch, J. Wood, W. Wrenn, G. Sparogowski, D. Douglas, R. Stoner, S. Lindgren, C. Stigemeier, S. Moore, J. Crouse.

Guests Present: P. Payne, J. Watson, M. Lau, J. Lackey, A. Rizvi, J. Ebert, W. Boettger, R. Garcia, J. Puri, J. Gibeault, J. Harlow.

The LTC Performance Requirements Working Group met at 3:05 p.m. on Monday, May 13, 1991 with 14 members and 11 guests in attendance. Introductions were made and the minutes of the previous meeting in Montreal were approved without comment.

Mr. Dieter Dohnal made a 20 minute presentation which described oscillograms taken during LTC testing. Oscillograms for both the service duty and breaker capacity tests were presented. It was described how arcing times are determined from the oscillograms and how the number of required operations is determined when the tests are performed at reduced step voltage rather than at rated step voltage. Also described was how the results of the tests are analyzed statistically.

The remaining portions of the meeting consisted of reviewing comments on Draft 4 of PC57.131, Standard Requirements for Load Tap Changers. This review started at the last meeting, but was not completed because of insufficient time. The following major items were discussed:

a. Draft 4 requires that 10 oscillograms be taken at the end of the mechanical endurance design test. For LTCs located in the main tank, half of the number of operations are required to be performed at 75C and the other half at a lower temperature. It was agreed that "lower temperature" means "approximately ambient temperature".

b. The mechanical endurance design test will not be allowed to be made separately on individual components. It must be performed on a fully assembled LTC.

c. The sequence test will be retained for now as a design test for all types of LTCs; however, the need for this test for LTCs that utilize arcing tap switches was discussed and may be subject to change later.

d. It was agreed that the RIV limit during partial discharge tests for Category 2 LTCs would be 50 microvolts.

e. Voltage levels for partial discharge tests will not be included in the new standard for rated insulation levels of 500 kV and 765 kV since such LTCs do not currently exist. This applies to Category 2 LTCs where the LTC is not applied at the neutral point of the transformer windings.

f. There was considerable discussion about whether the requirements for load tap changers applied to power transformers and to large voltage regulating transformers should also apply equally to single phase, small KVA, step voltage regulators. More discussion on this subject will continue at the next meeting.

The review of Draft 4 was completed and Draft 5 will be prepared and sent out for review prior to the next meeting. The Working Group meeting adjourned at 4:45 p.m.

D. Failure Analysis - W. B. (Wally) Binder, Jr.

Wally Binder presented the attached report (Attachment PCS-C).

Following this report, the Subcommittee discussed the need to revise or reaffirm C57.117. It was decided to have this Working Group ballot the Main Committee for reaffirmation. The results of this ballot will determine if further action is required.

E. Loss Tolerance and Measurement - W. R. (Bill) Henning

The Working Group on Loss Tolerances and Measurement met on Monday, May 13, at 10:05 a.m. with 14 members and 8 guests present. Minutes of the previous meeting were accepted without change. Three items of business were discussed.

The first item of business was a report by Eddy So that the Power System Instrumentation and Measurement Committee has formed a Working Group to write a guide on low power factor power measurement. A PAR should be submitted for this project. We will want to coordinate this with our own transformer loss measurement guide. This PSIM task force might hold their meeting in conjunction with the Transformers Committee.

The second item of business was a task force report by Ramsis Girgis on progress on the transformer loss measurement guide. Draft 4 has been prepared and was reviewed by the Task Force.

The third item of business was a discussion on how to proceed to resolve negative ballots on revisions to the Test Code. There are three points:

1. The reference temperature, 85 C vs. 20 C.

2. Return to original intent of standard, "Ordinary variations of temperature do not influence no-load losses materially and no corrections for temperature variation are made". This is why Working Group proposes a range, 10 C-30 C, for which no corrections shall be made.

3. A 5% limit imposed on the correction for phase-angle error.

The Working Group discussed these three points. The Working Group could address items 1 and 2 by choosing the proposal. Item 3 could not be reconciled, and the negative vote stands.

A ballot of this proposal will now be conducted of the Main Transformers Committee.

F. Semi-Conductor Rectifier Transformers - G. C. (Charlie) Pounds

Sheldon Kennedy, Working Group Secretary, presented the following report in the absence of Charlie Pounds.

1. The Working Group met on Monday, May 13, 1991, at 8:00 a.m. There were 15 members and 15 guests present.

2. In the absence of Chairman, Charlie Pounds, Working Group Secretary, Sheldon Kennedy, chaired the meeting.

3. Minutes of the October 22, 1990 meeting were read and approved.

4. A liason contact was to be established with the Insulation Life Subcommittee. This had not been accomplished and still needs a volunteer from the Working Group.

5. Draft 7 of C57.18.10 was again not available for this meeting. Chairman, Charlie Pounds, will be contacted to determine its status.

6. A point of order was called from the floor. The Chairman, Charlie Pounds, has been absent for the last three meetings. The Working Group Secretary was directed to contact Performance Characteristics Subcommittee Chairman, John Matthews, concerning Charlie Pounds interest in continuing as chairman of the Working Group. The status of the PAR and Draft 7 were also to be checked.

7. Don Kline has not completed the proposed temperature rise methods for single-way rectifier transformers when a rectifier is not available for a combinational test.

8. It was decided to postpone discussions on further treatments of harmonic current heating losses until after balloting of the next draft.

9. Either Draft 6 will be re-balloted, or if available, the new Draft 7 will be balloted in the Working Group. A task force has been formed to analyze and address the negative ballots before the next meeting. This action should get the Working Group back on track. A draft will then be prepared for balloting before the Working Group and the Performance Characteristics Subcommittee.

10. A request was made to have a group formed to address the application of new transformers on power systems containing harmonics. This is not meant to be merely a means to derate standard transformers. It is also not meant specifically for rectifier transformers, so it is outside the scope of this Working Group. It was recommended to refer this matter to the Performance Characteristics Subcommittee for discussion within the C57.110 work.

11. At the end of the meeting, Bob Gearhart and Mike Iman requested membership on the Working Group.

12. The meeting was adjourned at 9:50 a.m.

Following this report, John Matthews reported that he spoke with Charlie Pounds yesterday concerning item #7 above. Draft 7 had not been completed. He did not know the present status of the PAR, but will check. Charlie assured him that he was interested in maintaining Chairmanship of the Working Group, and will take steps to redirect his efforts.

Item #10 above is discussed further under New Business.

G. Revision C57.109 - B. K. (Bipin) Patel

This new Working Group was formed in response to an action notice received from the Standards Board. Life extension to the end of 1992 has been requested.

Bipin Patel presented the attached report (Attachment PCS-D).

VI. Project Reports

A. PC57.12.00h - LTC Position Indication - R. H. (Bob) Frazer

Draft 2 of this proposal will be balloted in the Transformers Committee shortly.

B. PC57.12.00i - Nameplate Information Change - J. W. (John) Matthews

John reported that Draft 3 of this proposal has been sent to the Standards Office for balloting of the Transformer Committee. Definitions of the terms "Directed Flow" and "Non-Directed Flow", developed by the Guides for Loading Working Group, accompany this proposal.

C. PC57.12.00k - Revision of C57.12.00, Table 16 - C. J. (Chuck) McMillen

Chuck reported that documentation of this project for submission to the Standards Board is complete except for coordination activity.

VII. Old Business - None

VIII. New Business

A. C57.110-1986 Action Notice

An action notice for reaffirmation, revision or withdrawal of C57.110-1986, IEEE Recommended Practice for Establishing Transformer Capability When Supplying Nonsinusoidal Load Currents was recieved from the Standards Board.

TC-L
6 OF 12

Discussion from the Working Group on Semi-Conductor Rectifier Transformers (Report V.F. Item #10 above), lead to the formation of a task force to determine what action is required. Dave Barnard, Max Cambre, Jerry Frank and Sheldon Kennedy volunteered for this Task Force.

The Transformers Committee will be balloted for reaffirmation of this document. The Task Force will assemble the responses from the ballot and recommend action on this document and/or the need for another document.

B. C57.16 Request

A letter was received from the Dry Type Transformers Subcommittee concerning revision of C57.16: American Standard Requirements, Terminology and Test Code for Current Limiting Reactors. Richard Dudley, the writer, requested input from PCS, if interested in including oil-immersed current limiting reactors in the revision of this standard.

Discussion of this item in PCS led to the conclusion that virtually no interest exists to include oil-immersed reactors in this standard.

The PCS Chairman will respond to Richard Dudley with this conclusion.

C. C57.12.90 Error

A letter was received from Mr. Bruce Webb, ABB Power T&D Co., indicating an error in C57.12.90-1987, Section 11.6, Equation 24 for Correction of Temperature with Altitude Change. He pointed out that the units of measurement do not balance in the equation.

Peter Krause volunteered to investigate this problem.

IX. Next Meeting

The next meeting will be held on Tuesday, November 5, 1991 in Baltimore, Maryland.

The meeting was adjourned at 12:30 p.m.

Respectfully submitted,

John W Matthews
7/12/91

John W. Matthews
PCS Chairman

PCSMIN.DOC

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
** SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS			Chairman: J. W. MATTHEWS	
* WORKING GROUP: NONE ASSIGNED			Chairman: NONE	
NONE C57.105	GUIDE FOR APPLICATION OF TRANSFORMER CONNECTIONS IN THREE-PHASE DISTRIBUTION SYSTEMS	/ /	APP 05/19/78, REAFFIRMED 1987	/ /
* WORKING GROUP: SHORT-CIRCUIT DURATION			Chairman: B. K. PATEL	
NEW C57.109	GUIDE FOR THROUGH-FAULT CURRENT DURATION	/ /	PAR ISSUED FOR COORDINATION	/ /
* WORKING GROUP: NONE ASSIGNED			Chairman:	
NONE C57.110	RECOMMENDED PRACTICE FOR ESTABLISHING TRANSFORMER CAPA-BILITY WHEN SUPPLYING NONSINU-SOIDAL LOAD CURRENTS	/ /	NO ACTIVE W.G.	/ /
* WORKING GROUP: TR DIRECTLY CONNECTED TO GEN			Chairman: B. K. PATEL	
NONE C57.116	GUIDE FOR TRANSFORMERS DIRECTLTY CONNECTED TO GENERATORS	/ /		/ /
* WORKING GROUP: TRANSFORMER RELIABILITY			Chairman: H. F. LIGHT	
P786 C57.117	GUIDE FOR REPORTING FAILURE DATA FOR POWER TRANSFORMERS AND SHUNT REACTORS	/ /		/ /
* WORKING GROUP: LOSS TOLERANCE AND MEASUREMENT			Chairman: W. R. HENNING	
P462C(1) C57.12.00	REV. OF SECTION 5.9 REFERENCE TEMP FOR NO-LOAD LOSS	06/28/79	RESOLVING NEGATIVE	/ /
P462C(2) C57.12.00	ADD TO SEC 9.3.1 ACCURACY REQUIREMENT FOR MEASURED LOSSES	/ /	D05 BALLOTTING WG	/ /

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. / STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
P787 / C57.12.00	TRANSFORMER LOSS MEASUREMENT AND TOLERANCES	06/28/79	MERGED INTO P462	/ /
* WORKING GROUP: PROJECT			Chairman: R. H. FRAZER	
PC57.12.00h / C57.12.00	LTC TAP POSITION INDICATION	09/28/86	D02 BALLOTTING MAIN COMMITTEE	/ /
* WORKING GROUP: PROJECT			Chairman: J. W. MATHEWS	
PC57.12.00i / C57.12.00	NAMEPLATE INFORMATION CHANGE DIRECTED vs. NON-DIRECTED FLOW	12/28/86	D03 BALLOTING MAIN COMMITTEE	/ /
* WORKING GROUP: PROJECT			Chairman: C. J. McMILLEN	
PC57.12.00k / C57.12.00	TABLE 16-C ROUTINE DIST TR RESISTANCE TEST	03/12/87	DOCUMENTATION TO BOARD	/ /
* WORKING GROUP: PROJECT			Chairman:	
NONE / C57.12.90	SECTION 7.3 FIGURES 9 & 10 REVERSED	/ /	READY	/ /
* WORKING GROUP: LOSS TOLERANCE AND MEASUREMENT			Chairman: W. R. HENNING	
P262E / C57.12.90	REVISION TO SEC 9 IMPEDANCE AND LOAD LOSSES	06/28/79	D09 BALLOTTING SUBCOMMITTEE	/ /
P262E3 / C57.12.90	REVISION TO SEC 8 NO-LOAD LOSSES & EXCITATION CURRENT	06/28/79	BALLOTTING SUBCOMMITTEE	/ /
P1098 / C57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT	06/13/85	TF WORKING	/ /

ATT. PCS-A3

23-Apr-91

TC-L
9 OF 12

STATUS REPORT ON STANDARDS
IEEE/PES TRANSFORMERS COMMITTEE

PROJECT No. / STANDARD No.	TITLE	PAR DATE	DRAFT STATUS	DRAFT DATED
* WORKING GROUP: FAILURE ANALYSIS			Chairman: W. B .BINDER, JR.	
PC57.125 / C57.125	GUIDE FOR FAILURE INVESTIGATION, DOCUMENTATION AND ANALYSIS FOR POWER TRANSFORMERS AND SHUNT REACTORS	06/28/87	D10 CIRCULATING CHANGES FROM D09	10/16/90
* WORKING GROUP: LTC PERFORMANCE REQUIREMENTS			Chairman: T. P. TRAUB	
PC57.131 / C57.131	REQUIREMENTS FOR LOAD TAP CHANGERS	08/17/89	D04 BALLOTTING W.G.	/ /
* WORKING GROUP: SEMI-CONDUCTOR RECT TR			Chairman: C. G. POUNDS	
PC57.18.10 / C57.18.10	REQUIREMENTS FOR SEMICONDUCTORRECTIFIER TRANSFORMERS	12/28/81	D07 NEED COPY OF APPROVED PAR	/ /
* WORKING GROUP: TEST CODE FOR SHUNT REACTORS			Chairman: J. W. McGILL	
PC57.21 / C57.21	REQUIREMENTS,TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS OVER 500kVA	06/09/88	D10 APPROVED BY BOARD 08/13/90	/ /
* WORKING GROUP: QUALIFICATION OF TR FOR 1E APP			Chairman: L. W. PIERCE	
P638 / IEEE 638	QUALIFICATION OF CLASS 1E TR FOR NUCLEAR POWER GENERATING STATIONS	12/06/90	PREPARING SUBMITTAL TO BOARD	/ /
** SUBCOMMITTEE: PSRC RELAY INPUT SOURCES			Chairman:	
* WORKING GROUP:			Chairman:	
NONE / C57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS	/ /		/ /
** SUBCOMMITTEE: PSRC RELAY PRACTICES			Chairman:	
* WORKING GROUP:			Chairman:	
NONE / C57.13.3	GUIDE FOR THE GROUNDING OF INSTRUMENT TR SECONDARY CICUITS AND CASES	/ /		/ /

ATT. PCS-B

TC-L
10 OF 12

May 8, 1991

To: John Mathews, Chairman
Performance Characteristics Subcommittee

Subject: Status Report, Working Group on Class 1E Transformers for Nuclear Power Generating Stations.

Since the last meeting the following has been accomplished:

1. All negative and conditionally affirmative ballots resolved and written documentation of resolutions obtained.

2. Coordination completed with all other groups and committees. Coordination letters received for transmittal to standards board.

3. A revised PAR form was submitted to the Standards Board and was approved. The primary purpose was have a copy on file and to confirm the required coordinations.

The major work remaining is to summarize approximately 300-400 ballots, fill out the standards submittal forms, and mail the final document with 30 copies to the standards board. I had expected to finish this by the May meeting in Phoenix however this proved impossible due to other working group commitments and my work load at GE. I am anxious to complete this work and will attempt to give it priority over other IEEE working group commitments. You indicated the IEEE Standards office may be able to assist in the ballot summary. I will explore this when I return from Phoenix.

Linden W. Pierce

Linden W. Pierce,
Chairman, Working Group

ATT. PCS-C

TC-L
11 OF 12

MEETING MINUTES

WORKING GROUP ON TRANSFORMER FAILURE ANALYSIS

TEMPE, ARIZONA

MAY 13, 1991

The Working Group met at 1:00 p.m. on Monday, May 13, 1991, in the Augustine Room of the Tempe Mission Palms Hotel. There were 15 members and 13 guests present. Each person in attendance introduced himself.

The minutes of the Montreal meeting which were previously issued to members were approved as submitted.

Chairman Binder reported on the status of C57.125, the Failure Analysis Guide. On February 1, 1991, a letter circulating changes to the balloting group on changes which resolved negative votes was issued. Members of the Working Group received copies. Since no objections were received, a package was sent to the Standards Office to submit PC57.125 in its approved form on May 1, 1991.

There was no old business.

Under new business a discussion was conducted on whether the Working Group should revise or reaffirm C57.117, the Reliability Reporting Guide. After some discussion, the Working Group agreed to ask for direction from the Performance Characteristics Subcommittee. It was agreed that the Working Group would volunteer to revise C57.117 if that is the decision of the Subcommittee.

There was no further new business. If no action is required on C57.117, the Working Group will not meet in Baltimore.

The meeting was adjourned at approximately 1:40 p.m.

Respectfully submitted,

Wallace B Binder Jr.

Wallace B. Binder, Jr.

smw

ATT. PCS-D1

TC-L
12 OF 12

MEETING MINUTES

WORKING GROUP ON REVISION OF GUIDE FOR TRANSFORMER THROUGH-FAULT-CURRENT DURATION (C57.109-1985)

TEMPE, ARIZONA

MAY 12, 1991

The working group (WG) met for the first time at 3:00 p.m. on Sunday, May 12, 1991 with 12 members and 14 guests present. The meeting began with individual introductions.

The attendance list is enclosed for information.

The WG was established last month to revise the guide for two reasons: 1) to define transformer fault impedance for fault calculations consistent with the design requirements of C57.12.00-1987 and 2) to revise or reaffirm the guide for its continuation by the IEEE five-year revision rule.

A PAR for the WG was reported to be in works at the IEEE. Proposed revision markings on the guide were discussed at the meeting. The following major changes were discussed:

- New Foreword will be added
- New section on "Definition" will be added for defining "Short-Circuit Transformer Impedance" and "Times Normal Current" in Figures 1-4.
- A note will be added to each figure clarifying applicable fault impedance.
- Table 1 will be eliminated and its footnote will be moved to the last subsection of the text.

A revised marked-up guide will be balloted in the working group and Performance Characteristics Subcommittee prior to the next meeting.

The meeting adjourned at 4:25 p.m. with no new business discussed.

Respectfully submitted,

B K Patel

B. K. Patel

TC-M
1 OF 1
May 30, 1991

IEEE/PES Transformers Committee

Recognition and Awards Subcommittee Report
May 15, 1991

Certificate of Appreciation Awards were presented to:

Dennis Gerlach for services as Chairman, West Coast Subcommittee

James H. Harlow for services as Chairman, Standards Subcommittee

Roy E. Uptegraff for services as Chairman, Dry-Type Transformers Committee

L. R. Smith for services as Chairman, Standards Subcommittee

IEEE Standards Medallions were awarded to:

John C. Dutton
Melvin L. Manning

Since John Dutton was not present, John Crouse of General Electric, Rome, Georgia, accepted the award.

With great regret, we learned of the passing of Mel Manning on February 14, 1991. His award will be forwarded to his wife.

As there were no prize paper awards from the Transformers Committee, this completed the awards presentation.

J. V. Bonucchi

J. V. Bonucchi
Chairman,
Recognition & Awards
Subcommittee

TC - N
1 OF 8

IEEE PES TRANSFORMERS COMMITTEE

UNDERGROUND TRANSFORMERS AND NETWORK PROTECTORS SUBCOMMITTEE

MEETING MINUTES

PHOENIX, ARIZONA - MAY 14, 1991

CHAIRMAN - PAUL E. OREHEK

1. Introduction/Attendance

The Underground Transformers and Network Protectors Subcommittee met at 2:05 P.M. on May 14, 1991, with 16 members and 5 guests present.

2. Approval Of Minutes

The minutes of the October 23, 1990, meeting in Montreal, Canada were approved with one editorial change.

3. Chairman's Comments From Administrative Subcommittee

3.1 J. W. Howard of Pennsylvania Power and Light Company, R. B. Robertson of Tampa Electric Company and M. C. Mingoia of Edison Electric Institute were approved as members of the Main Transformers Committee. Members were reminded that applicants for membership must be members of the Power Engineering Society and active for at least one year on a Subcommittee or Working Group.

3.2 The meeting in Baltimore in November will have no tutorial on Tuesday afternoon. Also, the time allotted for each meeting will be changed from 1 hour 50 minutes to 1 hour 20 minutes. Six meeting time periods will be scheduled for Monday beginning at 7:50 a.m. and ending at 5:10 p.m. On Tuesday, three meeting sessions will be scheduled in the morning and two in the afternoon. More than one time period may be requested for a Working Group meeting if required and the Working Group Chairman will coordinate with the Subcommittee Chairman for getting the necessary time periods.

3.3 The Chairman was asked to check with IEEE Staff to get a ruling on when a standard has to be revised or reaffirmed; that is, is it based on the approval date or the date of publication. Subsequent to the meeting, the Chairman spoke to Mr. A. Salem of IEEE Staff and was told to use the approval date. Future revisions for the five year review will now be based on the approval date of a standard.

3.4 PAR's have been completed for all four standards the Subcommittee is responsible for. One still has to be transmitted to the Standards Coordinator. It was recommended that on future PAR's no coordination be included since IEEE follows this function.

3.5 The Dry-Type Transformers Subcommittee questioned as to which Subcommittee should have responsibility for dry-type network transformers. After some discussion, it was decided that responsibility shall remain with the Underground Transformers and Network Protectors Subcommittee.

4. Working Group Reports

Presentation of the various reports were made by each Working Group Chairman. See the following Sections for their individual Reports:

Sec. 5 - Three-Phase Underground-Type Transf. - J. H. Howard
Sec. 6 - Liquid-Filled Sec. Network Transf. - E.A. Bertolini
Sec. 7 - Secondary Network Protectors - R. B. Robertson
Sec. 8 - Dry-Type Network Transformers - B. Nutt

5.0 Working Group on Three-Phase Underground-Type Transformers

Chairman: Mr. J. H. Howard, Pennsylvania Power & Light Co.

Ref: C57.12.24 - "Requirements for Underground-Type Three-Phase Distribution Transformers, 2500 kVA and Smaller; High Voltage, 34 500GrdY/19 920 Volts and Below; Low Voltage, 480 Volts and Below."

5.1 The Working Group met at 1:00 P.M. on May 13, 1991 with a total of 16 members and guests present.

5.2 The minutes of the October 22, 1990 meeting in Montreal, Canada were approved as submitted.

5.3 The Working Group has been trying to include other insulating liquids into the standard but no information was received from the requested NEMA survey. Therefore, the next revision of the standard will only include requirements relating to oil-filled units.

5.4 The Table for Low Voltage Insulation Levels was removed as it was easier to include the information in the text.

5.5 Mr. Jorge Valdes of Florida Power Light and Light resigned from the Working Group.

5.6 No new business was presented and the meeting was adjourned at 2:50 P.M.

6.0 Working Group on Liquid-Filled Network Transformers

Chairman: Mr. E. A. Bertolini, Con Ed of N. Y.

Ref: C57.12.40 - "Requirements for Secondary Network Transformers, Subway and Vault Types (Liquid Immersed)."

6.1 The Working Group met at 3:05 P.M. on May 13, 1991 with a total of 21 members and guests present.

6.2 The minutes of the October 22, 1990 meeting in Montreal, Canada were approved with some minor editorial changes.

6.3 The Working Group reviewed a proposal on whether Percent Impedance, Impedance Voltage or Impedance was the correct terminology to use in the standards. It was concluded that Percent Impedance is the most understood term by suppliers and users but the IEEE dictionary defines its use for rectifier transformers only. It does not encompass all types of transformers. Therefore, the Chairman will formally request the Subcommittee Chairman to direct the request to the proper IEEE Subcommittee to review this matter.

6.4 The item from the last meeting to revise Figure 1 for high voltage terminal chamber details was held in abeyance since the person was not present to discuss the details.

6.5 Maximum transformer heights and throat heights for each transformer were reviewed. It was agreed the dimensions of transformers covered in Part II would be separated from those in Part I. Also, the Chairman will put together a recommended list of all the dimensions based upon data received from manufacturers.

6.6 The publication of C57.12.40 was in December, 1990. It was approved in 1987. It was noted that the names of the people who were members of the Working Group at the time the document was approved were incorrect.

6.7 Robert Fisher of Potomac Electric Power Company, Richard Graham of General Electric and Matthew Mingoia of Edison Electric Institute requested membership on the Working Group.

6.8 No new business was presented and the meeting was adjourned at 4:05 p.m.

7.0 Working Group on Secondary Network Protectors

Chairman: Mr. R. B. Robertson, Tampa Electric Co.

Ref: C57.12.44 - "Requirements for Secondary Network Protectors."

7.1 The Working Group met on May 13, 1991 from 8:00 a.m. to noon with 12 members and 4 guests present. The Working Group is also having an all day session on May 15, 1991. A task force of seven members met on January 23-24, 1991, in Allentown, Pennsylvania to develop Design and Production Test Requirements and Relay Characteristics.

7.2 The minutes of the October 23, 1990 meeting in Montreal, Canada were approved as submitted.

7.3 Old business regarding "Capacitive Current Interrupting Rating" was deleted from the proposed standard due to lack of information.

7.4 Discussions, corrections and additions were made to seven sections of Draft #3.

7.5 The goal for completion of the standard is the fall of 1993.

7.6 R. L. Plaster of ABB Power T&D Company requested membership on the Working Group.

7.7 The meeting was adjourned at 12 noon until 8:00 a.m. on May 15, 1991.

8.0 Working Group on Dry-Type Network Transformers

Chairman: Mr. B. Nutt, Texas Utilities

Ref: C57.12.57 - "Requirements for Ventilated Dry-Type Network Transformers 2500 kVA and Below, with High Voltage 34 500 Volts and Below, Low Voltage 216Y/125 and 480Y/277 Volts."

8.1 The Working Group met at 8:00 a.m. on May 14, 1991 with 29 members and guests present.

8.2 The minutes of the October 23, 1990 meeting in Montreal, Canada were approved as submitted.

8.3 Action was taken to significantly reduce the "shopping list" or better known as the "When Specified" Section in the document.

8.4 It is the intent of the Working Group to include a three-position and two-position high-voltage switch in the standard and not in the "shopping list."

8.5 The manufacturers present were solicited for input as to the numbers of cast-coil network transformers that are being specified. There was limited response so the Working Group will continue to monitor the need for this type of unit before taking any further action.

8.6 The Chairman will mail out Draft #4 to the members of the Working Group for review and comments and resolve any differences at the Baltimore meeting. After that the Standard will be submitted for approval through the normal process.

8.7 No new business was presented and the meeting was adjourned at 8:50 a.m.

9.0 Other Business

9.1 Working Group Chairmen were reminded it is their responsibility to publish minutes of their meetings promptly after a meeting. Also, a meeting notice and agenda should be sent to members at least three weeks prior to a meeting.

9.2 Richard Graham of General Electric Company requested membership on the Subcommittee.

9.3 The Subcommittee had many fine complimentary remarks with regards to the reception we have received from IEEE. Attendance at meetings is also up since we joined IEEE giving much better input into the development of the standards. We look forward to keeping this relationship at a high level.

10.0 Future Meetings

The location and dates scheduled for future meetings are as follows:

Nov 3-6, 1991	Baltimore (Omni Inner Harbor), Maryland
Mar 29-Apr 1, 1992	Birmingham (Winfrey Hotel), Alabama
Oct 15-18, 1992	Cleveland (Sheraton City Center), Ohio
Spring, 1993	Portland, Oregon

11.0 There being no further business, the meeting was adjourned at 3:00 P.M.

Paul E. Orehek

Paul E. Orehek
Chairman

Attendance Roster Attached

11.0 Attendance Roster

Members Present

E. A. Bertolini	Consolidated Edison of New York
K. Ginthwain	General Electric Co.
J. L. Harper	Arizona Public Service
J. W. Howard	Pennsylvania Power & Light
M. C. Mingoia	Edison Electric Institute
J. R. Moffat	Westinghouse Electric
D. H. Mulkey	Pacific Gas & Electric
C. G. Niemann	Commonwealth Edison
B. Nutt	Texas Utilities
P. E. Orehek	Public Service Electric & Gas
F. Perri	NEI Ferranti-Packard
R. L. Plaster	ABB Power T&D
P. Risse	Georgia Power
R. B. Robertson	Tampa Electric
H. J. Sim	Square D
J. Valdes	Florida Power & Light

Members Absent

T. R. Balgie	Virginia Power
W. Caldwell	ABB Power T&D
R. W. Fisher	Potomac Electric Power
C. E. Griffith	Potomac Electric Power
J. Nay	Hevi-Duty Electric Co.
A. L. Robinson	Central Power and Light

Guests

C. Ambrose	Florida Power and Light
J. P. Gibeault	Syprotec Inc.
R. Graham	General Electric
J. Lazar	Northern States Power
P. Manos	Allied Signal

Attendance Summary

	Present	Absent
Members	16	6
Guests	5	

WEST COAST TRANSFORMER SUBCOMMITTEE
MEETING MINUTES

Tempe Arizona
May 14, 1991

MEETING ATTENDEES

Name	Company	Member/Guest
Lou Tauber	B.P.A.	Member/Chairman
Bob Weaver	Isberg & Assoc	Guest (Secretary)
Mike Lau	B.C. Hydro	Guest
Joe Watson	L.A. D.W.& P.	Member
D.A. Gillies	Consultant	Member
Ray Illustiarti	S.A.I.	Member
John G. Wood	PG&E	Member
Sharon Mort	Dow Corning	Guest
Bill Revell	Nevada Power	Member
David Sundin	Cooper Power	Member

The meeting was called to order at 10:05 a.m. by Lou Tauber. All meeting attendees introduced themselves.

The minutes of the previous meeting were deferred until the end of this meeting.

MEMBERSHIP

1. No new applications nor resignations have been received.

2. Denise Roth (WABB) will be contacted by Lou Tauber to determine if she wishes to remain a member.

3. Joe Watson of L.A. Department of Water & Power announced that he will be replacing Sam Oklu of L.A.D.W.P. Joe was duly elected as a new member. Sam Oklu will continue any work on the Seismic Guide.

4. Mike Lau of B.C. Hydro announced that he has taken Joe Laakso's place. Mike was duly elected to membership

Continued . . .

OLD BUSINESS

1. A discussion was held regarding requirements for membership and functions of this committee. Is it to be basically for West Coast people, or is it to include other interested persons? And is the work to be undertaken to be strictly directed toward writing standards particular to West Coast installations? Lou Tauber states that it appears that this subcommittee is to take on any assignments that may not fit into a particular sub-committee mandate. Lou will send a letter to all members not present to review this.

NEW BUSINESS

1. Lou attended the Ad Com meeting Monday night (at least the first four hours). There was much discussion regarding reaffirmation and extension of the balloting on C57.12 & 13 together. The working group chairman must go to the Transformer Committee for an extension.

2. The C57.12 & 13 Guide needs to be revised. Lou said he will look it over and see if it is something this subcommittee should take on.

3. The West Coast Subcommittee has been asked to host a meeting of the main committee on the West Coast in the Spring of 1993. We need to determine a suitable location. Lou & D.A. Gillies will discuss this and make a recommendation.

WORKING GROUP REPORTS

1. The Transformer Loss Evaluation Guide has been approved by IEEE but there is still a question of liaison. Lou will check with Roger Jacobsen and report back at the next meeting.

Continued . . .

2. Transformer Installation Guide - Jim Gillies reports that there are three items to be resolved technically. Most negatives are in the organization of the guide. Will probably need to get an extension and re-affirmation of C57.11 & 12. Jim hopes to have the new document out to subcommittee no later than September.

3. Transformer Fire Protection Guide - Dave Sundin reported on work done. Reference was made to a recent fire at Bonneville Custer Substation.

TOPICS FOR DISCUSSION

The subject of the Transformer Cooling Study done by PG&E and North American Transformer Company was brought up. Lou Tauber suggested this would be a good topic and place for a meeting. John Wood of PG&E was familiar with this study which consisted of a separate "Super-Cooler" attached to a transformer with heat sensors, and comparing the oil temperature exiting the transformer to the hot spot. Study showed the two temperatures to be quite close togerher with a time lag after loading to be rather short. John did not think it would be beneficial to see an installation but the study is most worthwhile. Perhaps John Wood and Bill Isberg can coordinate and arrange a discussion of this.

FUTURE MEETINGS

Future Main Transformer Committee Meetings are as follows:

1991	September 22-27, Dallas Texas in conjunction with the T&D Show
1991	November 3 - 6, Baltimore, MD
1992	Spring Meeting, Birmingham, AL
1992	Fall Meeting, Cleveland, Ohio

Continued . . .

Page 4, West Coast Transformer Subcommittee

It was suggested by Jim Gillies that the West Coast Subcommittee meetings be held separately from the main transformer committee meetings.. Lou suggested our next meeting be held in the Seattle/Tacoma area. The group agreed on August 25-28, 1991 in the Seattle/Tacoma area.

MINUTES OF LAST MEETING

Corrected spelling Page 2 of Lens Erlingsson's name.

Minutes approved as amended.

GENERAL DISCUSSION

1. Jim Gillies suggested we need a policy on charges for future meetings, such as meeting room, rental, refreshments, etc. Lou will draft up a recommended charter for discussion and send it out to members for discussion at our next meeting.

2. Jim Gillies feels that we need to take a good look at our charter. The reasons for the initial founding has disappeared and we are taking on projects that extend beyond West Coast interest. Dave Sundin feels that perhaps we should consider a change of name. Lou said he will have some ideas to present at the next meeting.

Meeting was adjourned at 11:15 a.m.

TC-P
1 of 3

EPRI
Electric Power
Research Institute

Leadership in Science and Technology

May 10, 1991

TO: Mr. James H. Harlow
Secretary, IEEE Transformers Committee
Beckwith Electric, Inc.
P.O. Box 2999
Largo, FL 34649

FROM: Stan Lindgren, Project Manager

SUBJECT: **EPRI LIAISON REPORT**

The following report is for inclusion in your minutes for the May 15, 1991 meeting.

1. EHV Converter Transformer:

   - Test results confirmed 25% or greater major insulation size reduction can be attained with some further work.
   - Final report will be published pending patent filing.

2. Amorphous Steel For Power Transformers:

   - A pilot facility automated cutting line is now in use.
   - No problems have been reported with 500 kVA unit installed and placed in service June 1987. Core loss has declined several percent since the unit was installed. However, the first core using consolidated material had higher losses than expected. Work is in progress to understand why this is the case and to find solutions.
   - A second prototype is planned.

3. Advanced Power Transformer:

   - Reduced load loss feasibility has been demonstrated.
   - Detailed analytical studies exploring individual design aspects has been completed.
   - Phase II is underway which involves building a number of physical models to verify the design studies. A full scale dielectric model has been tested successfully. A 47 MVA three phase core form prototype was successfully short circuit tested March, 1991 and delivered to HL&P for installation and operation.
   - Two 80 MVA three phase units are being built for one end of ESEERCO's six-phase demonstration project.
   - Development of shell form conductor and physical models continues.

4. Static Electrification in Power Transformers:

- Suspected failure mechanism in over 20 core form and shell form FOA transformers worldwide.
- Work continues on monitoring instruments and quantification of parameters for mathematical models. Tests on representative transformer cooling components have been completed.
- A project is underway to monitor a large FOA transformer in the field. The instrumentation systems have been tested and are close to being ready for use.

5. Bubble Evolution in Overloaded Transformers:

- Very rapid load changes can cause bubble formulation under some conditions and reduce 60 Hz and impulse dielectric strength. This has been demonstrated in models with rapid/high O.L.
- A project to better identify moisture conditions associated with bubbles and verify GE mathematical model was completed (Final Report EL6761) but raised questions about nitrogen blanketed transformers.
- A supplemental project has been initiated to obtain more data for revised mathematical model.

6. Active Transformer Noise Cancellation System:

- Noise reduction in one direction is being pursued first.
- An initial evaluation on a substation transformer was completed that demonstrated over 10 decibel reduction of 120 Hz with a small trial system.
- Two systems are being linked together to handle a larger transformer and improve reduction of higher frequencies.
- A field demonstration is being installed and will take place in 1991.

7. High Voltage Instrument Transformers

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 roundtable in Washington DC 4/88. Project is in approval stage.

8. Power Transformer Tank Rupture - Risk Assessment and Mitigation

This project started early 1991. Over 20 well documented cases have been collected from which a group will be selected for detailed study.

9. Geomagnetic Induced Currents (GIC)

EPRI has two projects underway and two are in RFP stage.

- A feasibility demonstration in process to detect the presence of transformer dc neutral currents and a reporting system. Useful data was collected from the 3/24/91 GIC event.
- Two transformer neutral GIC blocking devices will be installed in 1991 for field trials
- The other two projects involve relaying and anticipation of GIC events

SRL:sf:9897.L

cc: Stig Nilsson
Bob Veitch