IEEE PES
TRANSFORMERS
COMMITTEE

MEETING MINUTES

November 6, 1991
Baltimore, Maryland

IEEE PES TRANSFORMERS COMMITTEE
NOVEMBER 6, 1991 - BALTIMORE, MARYLAND

MEMBERS PRESENT: 84 voting plus 1 by representation plus 1 emeritus (*)

Adolphson, E.J.(Ed)
Altman, M.S.(Michael)
Arnold, J.C.(Jim)
Aubin, J.
Bancroft, R.(Roy)
Barnard, D.A.(Dave)
Binder, W.B.(Wally)
Bonucchi, J.V.(Joe)
Borst, J.D.(John)
Cambre, M.A.
Compton, O.R.(Olin)
Corkran, J.L.(Jerry)
Crofts, D.W.(Dan)
Davis, J.N.(John)
Douglas, D.H.(Dave)
Dudley, R.F.(Richard)
Elliott, F.E.(Fred)
Fallon, D.J.(Don)
Fleeman, J.A.(Jeff)
Frydman, M.(Maurice)
Ghafourian, A.A.(Ali)
Grubb, R.L.(Bob)
Gryszkiewcz, F.J.(Frank)
Hanus, K.(Ken)
Harlow, J.H.(Jim)
Heinrichs, F.W.(Frank)
Henning, W.R.(Bill)
Hollister, R.H.(Bob)
Hopkinson, P.J.(Phil)
Howard, J.W.(Jim)
Howells, E.(Ed)
Iijima, P.(Peter)
Jonnatti, A.J.(Tony)
Jordan, R.D.(Ron)
Kelly, J.J.(Joe)
Kennedy, S.P.(Sheldon)
Kinney, J.P.(James)
Kline, A.D.(Don)
Lackey, J.G.(John)
Light, H.F.(Hal)
Lindgren, S.(Stan)
Matthews, J.W.
Mehta, S.P.(Sam)
Mingoia, M.C.(Matthew)
Minkwitz, R.E.(Russell)
Musil, R.J.
McGill, J.W.(Jack)
Orehek, P.E.(Paul)
Paiva, G.A.(Gerry)
Patel, B.K.(Bipin)
Patterson, W.F.(Wesley)
Patton, J.M.(Jesse)
Payne, P.A.(Paulette)
Pearce, H.A.
Perco, D.(Dan)
Peters, D.A.(Dale)
Pierce, L.W.(Lin)
Platts, D.W.(Don)
Pollitt, J.M.
Savio, L.J.(Leo)
Saxon, W.E.(Bill)
Scheu, R.W.(Robert)
Sharma, D.N.(Devki)
**Shenoy, V.
Sim, H.J.(Jim)
Smith, S.D.(Steve)
Stahara, R.J.(Ron)
Stein, W.W.(Werner)
Sundin, D.W.(Dave)
Swenson, L.(Len)
Takach, D.S.(Dave)
Teplitzky, A.M.(Allan)
Thenappan, V.
*Thomas, R.C.(Ray)
Thompson, J.C.
Traub, T.P.(Tom)
Truax, D.E.(Dave)
Uhl, W.B.(Bruce)
Uptegraff, R.E.(Roy)
Vaillancourt,G.H.
Veitch, R.A.(Robert)
Wagenaar, L.B.(Loren)
Whearty, R.J.(Bob)
Wilks, A.(Alan)
Wood, J.G.(John)
Wrenn, W.E.(Bill)

**V. Shenoy represented by V.S.N. Sankar

MEMBERS ABSENT: 46 voting plus 14 emeritus (*)

*Aicher, L.C.
Allan, D.J.
Allen, B.F.
Allustiarti, R.
Basel, D.L.
*Bellaschi, P.L.
*Bennon, S.
Brown, C.V.
Cook, F.W.
Dahinden, V.
Diamantis, T.
*Dutton, J.C.
*Easley, J.K.
Ebert, J.A.
Edwards, K.
Fischer, H.G.
*Foster, S.L.
*Gabel, H.E.
Gearhart, R.E.
Gerlach, D.W.
Gillies, D.A.
Girgis, R.S.
Hall, G.H.
Highton, K.R.
Hoefler, P.J.
*Honey,C.C.
Hunt, J.
*Iliff, G.W.
*Johnson, D.C.
Kappeler, C.P.
*Kaufman, R.B.
Kennedy, W.N.
Koenig, E.
Lazar, J.P.
Lee, R.E.
*Long, L.W.
Lowdermilk, L.A.
Lowe, R.I.
*Margolis, H.B.
Massouda, K.T.
Miller, C.K.
Millian, C.
Mitelman, M.I.
Moore, H.R.
Mutschler, W.H.
McMillen, C.J.
McNutt, W.J.
Norton, E.T.
*Olsson, R.A.
Raymond, C.P.
Robbins, C.A.
Robertson, R.B.
Sampat, M.P.
Smith, L.R.
Stensland, L.R.
Stevens, F.
Tauber, L.A.
Thompson, J.A.
Ward, B.H.
Whitley, D.W.

GUESTS PRESENT (77)

Andersen, G.(Glenn)
Anderson, R.(Rick)
Antweiler, J.(Jim)
Barker, R.L.(Ron)
Bergeron, J.(John)
Betancourt, E.
Billings, D.L.(Dave)
Bode, T.(Tim)
Boettger, W.E.(Bill)
Bohlk, J.L.(James)
Bosiger, J.(John)
Brown, J.L.(James)
Chadwick, R.(Rayburn)
Clement, T.J.(Terry)
Crouse, J.C.(John)
David, F.(Frank)
Feghali, P.(Pierre)
Franchek, M.A.(Michael)
Frank, J.M.(Jerry)
Frazer, R.H.(Bob)
Galloway, D.L.(Dudley)
Garza, J.
Goodwin, D.F.(David)
Graham, R.D.(Rick)
Haas, M.E.
Hagerman, R.E.(Dick)
Harley, J.W.(Jack)
Hartgrove, R.H.(Bob)
Hartley, D.(Donald)
Henry, G.E.(George)
Holdway, T.L.
Holland, J.(John)
Johnson, C.W.(Chuck)
Kallaur, E.(Gene)
Komlenic, C.H.(Caroline)
Krause, P.E.(Peter)
Lau, M.(Mike)
Lewis, F.(Frank)
Long, J.(Jim)
Lowe, D.L.(Don)
Lyon, D.(Dave)
Maguire, A.(Al)
Manos, P.(Peter)
Marek, R.(Rick)
Marowski, G.K.
McTaggart, R.(Ross)
Middlecamp, S.C.(Steven)
Moore, C.L.(Curt)
Moore, S.P.(Steve)
Osborn, S.H.(Stan)
Parr, D.E.(Davis)
Payerle, G.(George)
Pereira, A.J.(Abel)
Perri, F.(Frank)
Puri, J.(Jeewan)
Rajadhyaksha, M.(Mangesh Raj)
Reitter, G.J.(George)
Rizvi, A.(Aslam)
Rossetti, J.R.
Rowe, G.W.(Jerry)
Russman, P.(Paul)
Salem, A.(Andy)
Sapp, E.M.(Erik)
Schlee, J.J.(John)
Shah, D.M.(Dilip)
Sparagowski, G.(Gary)
Springrose, M.
Stewart, T.(Tom)
Stoner, R.W.(Ron)
Sullivan, J.C.(John)
Templeton, J.B.(John)
Thompson, R.W.(Bob)
Vogel, S.(Sue)
Wakeam, R.D.(Ralph)
Watson, J.(Joe)
Willett, F.E.(Fred)
Windisch, H.J.(Henry)

IEEE PES TRANSFORMERS COMMITTEE
MEETING MINUTES
BALTIMORE, MARYLAND
NOVEMBER 6, 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 hosts John Matthews and Joe Pollitt and others of Baltimore Gas and Electric Co. through whose efforts this meeting was most well organized and accomplished. He also asked that Mr. Pollitt convey to Mr. William A. Keagle, Jr. of BG&E the appreciation of the committee for his Tuesday luncheon presentation "Solar Magnetic Disturbances and Their Impact on the BG&E System."

B. Attendance registration was reported at 237 attendees plus 59 spouses. Those attending this meeting were asked to indicate on the attendance list the name by which they are commonly known so that members can become better acquainted with each other. Names so indicated are included on the attendance list which precedes these minutes.

C. Chairman Veitch noted that he is making his sixth and final report as chairman of the Transformers Committee. He noted that the major accomplishment for the three year term of office has been the establishment of two new subcommittees whose work was previously done under the framework of ANSI C57 subcommittees.

Chairman Veitch noted a second major accomplishment is due to the devotion of the committee membership, the willingness to participate and accept responsibility. For this Mr. Veitch expressed his thanks.

III. Approval of Minutes

The minutes of the May 15, 1991 Tempe meeting were approved as submitted.

IV. Subcommittee Reports

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

1. Transformers Committee officers for 1992-1993 were named:

   Chairman - John Borst
   Vice Chairman - Jim Harlow
   Secretary - Wally Binder

   Mr. Binder's replacement as Chairman, Standards Subcommittee will be Georges Vaillancourt.

2. Next meeting: Wynfree Hotel, Galleria Mall, Birmingham, AL, March 29 - April 1, 1992 with Bipin Patel and Aslam Rizvi, hosts.

   Future meetings:
   October 18 - 21, Cleveland, OH; Dave Douglas
   Spring, 1993, Portland, OR; Lou Tauber
   Fall, 1993, St.Petersburg, FL; Jim Harlow and Charlie Williams
   Spring, 1994, Dallas-Ft.Worth, TX; Ken Hanus
   Fall, 1994, Milwaukee, WI; Sam Mehta

3. Meeting Arrangements:
   The format for meetings established at the Tempe meeting and first implemented in Baltimore has worked well and will be continued.

4. Status of ANSI C57 Committee:
   Many of the standards formerly covered by the now inactive C57 subcommittees have never been formally accepted by the Transformers Committee membership even though PAR's have been issued and work is proceeding on revisions. Ms. Vogel was asked to prepare another letter for signature of Chairman Veitch to cover a new ballot to the committee soliciting formal acceptance of this responsibility.

5. Report of Technical Council:
   Mr. Veitch read his report of the Technical Council. This will be found in Ad Sub minutes, ASC-E.

6. Highlights from Executive Board Meeting:
   Mr. Veitch read the highlights of the April 18, 1991 Executive Board Meeting. This is also to be found in Ad Sub minutes, ASC-E.

7. Three persons were approved by the Ad Sub for membership on the Transformers Committee and were introduced:
   Max A. Cambre, Jr., General Electric Co.
   Lou Tauber, Bonneville Power Authority
   Barry H. Ward, Biddle Instruments

B. West Coast - Lou Tauber:
Mr. Tauber was unable to attend the meeting. He communicated that the West Coast Subcommittee will be meeting in Milpitas, CA, November 19-21, 1991. Note: Mr. Tauber subsequently submitted a report of that meeting, attached as TC-C.

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

D. Transformer Standards - Wally Binder:
Mr. Binder's report is included in the minutes of the Administrative Subcommittee, see Attachment ASC-C.

E. Recognition and Awards - Joe Bonucchi: Mr. Bonucchi's report is with the Administrative Subcommittee, Attachment ASC-D.

F. Insulation Life - Dave Douglas:
See Attachment TC-E.

We have been asked by the Chairman of SCC 4 on Thermal Ratings to name a liaison member, having lost our prior liaison with the death of Dr. Mel Manning. Mr. Douglas solicited volunteers for this appointment from the membership.

G. Insulating Fluids - Henry Pearce:
See Attachment TC-F.

H. Instrument Transformers - John Davis:
See Attachment TC-G.

I. HVDC Converter Transformer and Smoothing Reactor - Bill Kennedy:
Fred Elliott made the report in Mr. Kennedy's absence. See Attachment TC-H.

J. Dry-Type Transformer - Wes Patterson:
See Attachment TC-I.

K. Distribution Transformers - Frank Stevens:
Gerry Paiva made the report in Mr. Stevens' absence. See Attachment TC-J.

L. Dielectric Tests - Harold Moore:
Jim Templeton made the report in Mr. Moore's absence. See Attachment TC-K.

M. Bushing - Loren Wagenaar:
See Attachment TC-L.

N. Audible Sound and Vibration - Allan Teplitzky:
See Attachment TC-M.

O. Performance Characteristics - John Matthews: Bill Henning reported for Mr. Matthews. See Attachment TC-N.

V. Liaison Reports

A. EPRI - Stan Lindgren: See Attachment TC-O.

B. CIGRE SC-12 Transformers - Bill Kennedy: Mr. Veitch read the report in Mr. Kennedy's absence. See Attachment TC-P.

VI. Technical Papers Report - John Borst:

A. We will sponsor nine technical papers at two sessions at the 1992 Winter Power Meeting. Mr. Borst expressed his appreciation to those who he has called upon to review papers.

B. Mr. Borst also took the opportunity to publicly commend Chairman Veitch for his service to the committee, especially for having served three years as chairman.

VII. New Business

In response to a question from Don Fallon, Chairman Veitch stressed that the procedure for introduction of persons attending group meetings is up to the discretion of the individual chairman. He stated that he feels it is desirable for working groups and subcommittees, but that it is not useful at the very large full committee meeting.

Chairman Veitch stressed to the membership that the Transformers Committee is a 12-month per year job. Everyone please not wait until the month before meetings to send out ballots--this places too much of a short term burden on those who must review and return them.

Respectfully submitted,

James H. Harlow
Secretary

JHH:mk

ATTACHMENTS TO MINUTES
IEEE PES TRANSFORMERS COMMITTEE
BALTIMORE, MARYLAND NOVEMBER 6, 1992

TC-A Agenda
TC-B Administrative Subcommittee Minutes - Harlow

- ASC-A Administrative Subcommittee Agenda - Nov. 4, 1991
- ASC-B IEEE/PES Transformers Committee Attendance Statistics - Matthews
- ASC-C Standards Subcommittee Report - Binder
- ASC-D Recognition and Awards Subcommittee Report - Bonucchi
- ASC-E Chairman's Report - Veitch
- ASC-F Audible Sound and Vibration Subcommittee Report - Swenson for Teplitzky
- ASC-G West Coast Subcommittee Report - Tauber
- ASC-H Instrument Transformers Subcommittee Report - Davis
- ASC-I Underground Transformers and Network Protectors Subcommittee Report - Orehek
- ASC-J Distribution Transformers Subcommittee Report - Mingoia for Stevens
- ASC-K Dry Type Transformer Subcommittee Report - Patterson
- ASC-L Bushing Subcommittee Report - Wagenaar
- ASC-M Dielectric Tests Subcommittee Report - Templeton for Moore
- ASC-N Performance Characteristics Subcommittee Report - Matthews
- ASC-O Insulating Fluids Subcommittee Report - Pearce
- ASC-P Vice Chairman's Report - Borst
- ASC-Q Transformers Committee Membership Changes - Harlow
- ASC-R Communication: Copyright Statement for Drafts - Vogel

TC-C West Coast Subcommittee Report - Tauber
TC-D Underground Transformers and Network Protectors Subcommittee Report - Orehek
TC-E Insulation Life Subcommittee Report - Douglas
TC-F Insulating Fluids Subcommittee Report - Pearce
TC-G Instrument Transformer Subcommittee Report - Davis
TC-H HVDC Converter Transformers and Smoothing Reactor Subcommittee Report - Kennedy
TC-I Dry-Type Transformer Subcommittee Report - Patterson
TC-J Distribution Transformers Subcommittee Report - Paiva for Stevens
TC-K Dielectric Tests Subcommittee Report - Templeton for Moore
TC-L Bushing Subcommittee Report - Wagenaar

TC-M Audible Sound and Vibration Subcommittee Report - Teplitzky

TC-N Performance Characteristics Subcommittee Report - Matthews

TC-O Liaison Report - EPRI - Lindgren

TC-P Liaison Report - CIGRE SC-12 Transformers - Kennedy

TRANSFORMERS
COMMITTEE

TC-A
1 of 1

IEEE/PES TRANSFORMERS COMMITTEE MEETING
WEDNESDAY, NOVEMBER 6, 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 May 15, 1991	R. A. Veitch
3.	Report of Subcommittees	
3.0	Administrative	R. A. Veitch
3.1	West Coast	L. A. Tauber
3.2	Underground Transformers & Network Protectors	P. E. Orehek
3.3	Transformer Standards	W. B. Binder
3.4	Recognition and Awards	J. V. Bonucchi
3.5	Performance Characteristics	J. W. Matthews
3.6	Insulation Life	D. H. Douglas
3.7	Insulating Fluids	H. A. Pearce
3.8	Instrument Transformers	J. N. Davis
3.9	HVDC Converter Transformers & Reactors	W. N. Kennedy
3.10	Dry-Type Transformers	W. Patterson
3.11	Distribution Transformers	F. Stevens
3.12	Dielectric Tests	H. R. Moore
3.13	Bushing	L. B. Wagenaar
3.14	Audible Sound and Vibration	A. M. Teplitzky
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 5

IEEE PES TRANSFORMERS COMMITTEE
ADMINISTRATIVE SUBCOMMITTEE
NOVEMBER 4, 1991 - BALTIMORE, MD

I. INTRODUCTION OF MEMBERS AND GUESTS

Chairman Robert Veitch opened the meeting at 6:45 p.m. with named members and guests present:

MEMBERS:

Wally Binder	Dave Douglas	Henry Pearce
Joe Bonucchi	Jim Harlow	Leo Savio
John Borst	John Matthews	Robert Veitch
Olin Compton	Paul Orehek	Sue Vogel
John Davis	Wes Patterson	Loren Wagenaar

GUESTS:

Matt Mingoia - representing Frank Stevens
Bipin Patel - Birmingham co-host
Aslam Rizvi - Birmingham co-host
Len Swenson - representing Allen Teplitzky and Lou Tauber
Jim Templeton - representing Harold Moore
Georges Vaillancourt - incoming chairman, Standards Subcommittee

Mr. Veitch announced the selection of Mr. Binder to become committee secretary effective January, 1992. Mr. Vaillancourt will assume the position of Chairman, Standards Subcommittee.

II. MINUTES

The minutes of the Tempe Administrative Subcommittee meeting were approved, noting that paragraph VIII. I. should read "Insulation" Life.

III. AGENDA

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

IV. COMMITTEE FINANCES AND MEETING ARRANGEMENTS

BALTIMORE: Mr. Matthews reported as noted:

1. The Baltimore committee received $3,956 from Dennis Gerlach after the Tempe meeting.
2. At this time there are approximately 230 members and guests plus 60 spouses registered at Baltimore.

BIRMINGHAM: Messrs. Patel and Rizvi reported as noted:

1. The meeting will be at the Wynfree Hotel at the Galleria Mall, March 29 thru April 1, 1992.
2. The hotel charge will be $92.00 plus 8% tax, single or double accommodations.

FUTURE: The schedule of future meetings is:

DATE	LOCATION	HOST
Oct 18-21 1992	Cleveland, OH	D. Douglas
Spring 1993	Portland, OR (tentative)	L. Tauber
Fall 1993	St.Petersburg Beach, FL	J.Harlow/ C. Williams
Spring 1994	Dallas-Ft.Worth, TX	K. Hanus
Fall 1994	Milwaukee, WI	S. Mehta

GENERAL DISCUSSION

1. It was decided that for future meetings, the maximum registration fee for members and guests will be $70.00 registration at meeting, $60.00 preregistration.

2. There is no cap stated for the spouses fee.

3. The criteria for the Tuesday evening social event is that it be self supporting.

4. The preregistration fee will be refunded if the registrant cannot attend and the host is notified at least 7 days before the start of the meeting.

Mr. Matthews provided updated Transformers Committee Attendance Statistics (Attachment ASC-B). He volunteered to prepare this one more time before the Birmingham meeting. The maintenance of this document will then be assigned to the committee secretary.

MEETING ARRANGEMENTS

The format of three morning plus three afternoon time slots for meetings is working well and will be continued at future meetings.

V. **STATUS OF ANSI C57 COMMITTEE**

The C57 Committee will meet November 6, 1991, following the Transformers Committee. Mr. Savio raised several points regarding continuing difficulties with the tracking of the status of documents within C57. This will be discussed with the secretary, John Gauthier, at the meeting November 6, 1991.

IEEE STANDARDS REPORT

Ms. Vogel reported as follows for the IEEE Standards Office:

1. The IEEE has recently been overloaded on ballots. The largest volume of ballots at present is for the Transformers Committee. The backlog now is 3 to 4 weeks.

2. The Standards Office is looking to automate the procedure. One constraint is that ballots must be returned by mail or FAX because policy requires that each ballot have a signature.

3. In the future, all standards will be printed with 3% image of the IEEE logo on each page. This is essentially imperceptible on the original, but becomes more noticeable after reproduction and is intended to protect the IEEE copyright. Ms. Vogel will provide instructions regarding a copyright statement for draft standards. (Provided after the meeting, included as Attachment ASC-R).

VI. REVIEW OF PES STANDARDS COORDINATING COMMITTEE AND STANDARDS PROJECTS

Mr. Binder circulated his report of Committee Standards Activities, Attachment ASC-C.

1. The updated submittal of C57.12.00 and C57.12.90 will be due after the Birmingham meeting. Mr. Compton volunteered to assist in this regard.

2. A lifetime of four years has been established for any new PAR. If work is not completed in 4 years a new PAR will be required.

3. The NEMA Secretariat of C57 has claimed authority regarding the assignment of new numbers in the C57 series. This function has been administered by the Chairman of the Standards Subcommittee since 1989. The consensus is that the responsibility needs to be formally delegated to the Transformers Committee.

4. It was noted that many of the standards formerly covered by the inactive C57 subcommittees, now absorbed into the Transformers Committee, have never been formally accepted by the Transformers Committee membership, even though PARs have been initiated and work is proceeding on revision of the documents. To close this point, Chairman Veitch asked Ms. Vogel to prepare another letter, for his signature, to cover a new ballot to the Transformers Committee soliciting formal committee acceptance of this responsibility.

VII. ORGANIZATION AND PROCEDURES COMMITTEE

Mr. Savio reported that he has been reviewing a draft of a new Technical Council Organization and Procedures Manual - this to be further discussed at Winter Power meeting.

The Transformers Committee assignment to this committee will now be assumed by the Committee Vice Chairman.

VIII. PES AWARDS COMMITTEE

Mr. Bonucchi's report is attached (ASC-D). This is Mr. Bonucchi's last report. The Chairman of the Recognition and Awards Subcommittee will be handled by the Immediate Past Chairman.

IX. REVIEW OF TECHNICAL COUNCIL ACTIVITIES

Mr. Veitch's report is ASC-E. It was decided that Transformer Committee minutes will continue to be distributed in hard copy, it being recognized that the minutes of some groups are now distributed as floppy disc.

X. SUBCOMMITTEE ACTIVITY DISCUSSION

The various subcommittee chairmen offered reports:

A. Audible Sound and Vibration Subcommittee. Mr. Swenson's report for Mr. Teplitzky is ASC-F.

B. West Coast Subcommittee. Mr. Tauber was not present. His report is ASC-G.

C. Instrument Transformers Subcommittee. Mr. Davis' report is ASC-H. The subcommittee has been requested to start a working group to deal with optical current and voltage transducers.

D. Underground Transformers and Network Protectors Subcommittee. Mr. Orehek's report is ASC-I.

E. Distribution Transformers Subcommittee. Mr. Stevens' report was presented by Mr. Mingoia, Attachment ASC-J.

F. Dry Type Transformers Subcommittee. Mr. Patterson's report is ASC-K.

G. Bushing Subcommittee. Mr. Wagenaar's report is ASC-L. Also to be noted is that C57.19.101 is to be upgraded from trial use to a full use standard. Mr. Wagenaar made special note of the support which we have received from IEEE in recent years. He asked that Ms. Vogel communicate this message to the Standards Office.

H. Dielectric Tests Subcommittee. Mr. Templeton reported in the absence of Mr. Moore, per ASC-M. The subcommittee has been asked regarding the protection margins of transformers protected with MOV surge arresters. Mr. Veitch determined that it is appropriate that a Task Force to deal with this question be under the Dielectric Tests Subcommittee even though the question does not specifically deal with tests.

I. Performance Characteristics Subcommittee. Mr. Matthews' report is ASC-N.

J. Insulating Fluids Subcommittee. Mr. Pearce's report is ASC-O.

XI. PAPERS FOR FUTURE MEETINGS

Mr. Borst's Vice Chairman's report is ASC-P.

XII. COMMITTEE MEMBERSHIP REVIEW

Mr. Harlow's report of membership status is ASC-Q. Additionally, the AdSub accepted to full committee membership the following persons:

Max A. Cambre, Jr., General Electric Co.
Lou Tauber, Bonneville Power Administration
Barry H. Ward, Biddle Instruments

XIII. NEW BUISINESS

Mr. Compton related that this meeting will be his last as an AdSub member. He expressed appreciation to all those who have supported him through the years.

Mr. Borst spoke for AdSub in commending the chairmanship of Robert Veitch, noting especially the extra duty imposed on him by the resignation of an officer. Because of this, Mr. Veitch served the committee as chairman for three years instead of the usual two served by the other officers.

XIV. ADJOURNMENT

The meeting adjourned at 10:15 p.m.

Respectfully submitted,

J. H. Harlow 11/15/91

J. H. Harlow
Secretary

JHH:mk

IEEE

ASC-A
1 of 1

POWER
ENGINEERING
SOCIETY

TRANSFORMERS COMMITTEE

Please Reply To:

IEEE/PES TRANSFORMERS COMMITTEE

Administrative Subcommittee Meeting

Monday, November 4th, 1991 at 6:00 p.m.

Omni Inner Harbor Hotel, Baltimore, MD

AGENDA

1. Introduction of Members & Guests
2. Approval of the Phoenix Meeting Minutes
3. Addition to and/or Approval of the Agenda
4. Committee Finances & Meeting Arrangements
   John Matthews/Joe Pollitt - Baltimore Hosts
   Bippin Patel - Birmingham Host
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 PES Organization & Procedures Committee - L. Savio
8. Review of PES Awards Committee - J. Bonucchi
9. Review of Technical Council Activities - R. A. Veitch
10. Subcommittees' Activities Discussions - Subcommittee Chairmen
11. Papers for Future Meetings - J. Borst
12. Committee and Subcommittee Membership Review - J. Harlow
13. New Business
14. Adjournment

FN:RAVIEEE

Figure 3 - IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUP	Wash. DC Apr. 1988	Long Beach Nov. 1988	Chicago Apr. 1989	Charlotte Oct. 1989	Denver Mar. 1990	Montreal Oct. 1990	Phoenix May 1991	MAXIMUM	AVERAGE
Committee Registration: Members and Guests	122	177	160	200	202	257	237	257	194
Spouses	?	47	37	42	52	74	63	74	53
Luncheon	?	?	90	?	110	128	140	140	117
SC ADMINISTRATIVE	17	17	19	18	20	24	19	24	19
SC AUDIBLE SOUND AND VIBRATION	21	24	27	29	26	19	0	29	24
SC BUSHINGS	15	16	21	14	16	23	26	26	19
WG Bushing Application Guide	13	13	0	13	21	29	25	29	19
WG DC Applications of Bushings	-	7	16	14	12	14	13	16	13
WG Revision C57.19.01	-	-	-	-	-	-	-	0	0
SC DIELECTRIC TESTS	79	76	67	77	81	88	78	88	78
WG Revision of Dielectric Tests	30	22	27	32	33	35	48	48	32
TF Rev. of Impulse Test Guide	15	19	22	41	41	55	38	55	33
TF Enhancement Voltage Time	-	-	-	-	16	?	22	22	19
WG Rev. Dielectric Tests on Distr. Transf.	30	29	29	39	28	30	27	39	30
TF Low Side Surge Req. for Distr. Transf.	29	20	23	27	26	19	?	29	24
TF Rev. Distr. Impulse Guide	-	-	-	-	-	-	?	?	?
WG Partial Discharge Tests	30	44	41	46	44	24	42	46	39
TF Acoustic Detection of Partial Discharge	16	13	19	16	22	-	20	22	18
TF Measurement of Apparent Charge	23	29	21	21	13	16	17	29	20
SC DRY-TYPE TRANSFORMERS	27	23	26	25	28	31	32	32	27
WG Test Code C57.91	-	-	-	23	28	29	28	29	27
WG Dry-Type Dielectric Problems	25	28	16	30	25	21	29	30	25
WG Dry-Type Reactors	6	7	8	8	12	10	9	12	9
WG Dry-Type Thermal Eval. and Flammability	25	18	18	23	22	-	28	28	22
WG Dry-Type Thermal Problems	27	26	16	30	27	24	29	30	26
WG Insulation Req. for Specialty Transf.	7	8	13	11	10	10	19	19	11
WG Cast Coil Loading Guide	-	-	-	-	-	20	30	30	25
SC HVDC CONVERTER TRANSFS. AND REACTORS	11	10	9	12	15	15	11	15	12
SC INSTRUMENT TRANSFORMERS	22	13	17	12	11	22	13	22	16
SC INSULATING FLUIDS	25	33	22	25	33	34	36	36	30
WG Gas Analysis During Factory Tests	-	-	-	39	36	36	72	72	46
SC INSULATION LIFE	65	44	64	50	71	61	81	81	62
WG Guides for Loading	47	49	38	41	47	44	51	51	45
TF Loss of Insulation Life	-	-	-	-	-	12	32	32	22
WG Thermal Eval. of Distr. and Power Transf.	31	?	?	46	44	67	56	67	49
WG Thermal Tests	23	14	14	16	20	22	30	30	20
WG High Temperature Insulation	-	-	-	-	-	-	46	46	46

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

GROUP	Wash. DC Apr. 1988	Long Beach Nov. 1988	Chicago Apr. 1989	Charlotte Oct. 1989	Denver Mar. 1990	Montreal Oct. 1990	Phoenix May 1991	MAXIMUM	AVERAGE
SC PERFORMANCE CHARACTERISTICS	73	76	67	77	77	85	86	86	77
WG Failure Analysis Guide	52	53	50	33	42	31	28	53	41
WG Loss Tolerance and Measurement	35	41	31	24	35	37	26	41	33
TF Loss Measurement Guide	?	?	?	24	?	?	?	24	24
WG LTC Performance Requirements	-	20	35	28	31	30	25	35	28
WG Qualification of Class 1E Nuclear Tr.	5	5	5	10	6	4	0	10	6
WG Revision C57.109	-	-	-	-	-	-	26	26	26
WG Semi-Conductor Rectifier Transformers	19	21	19	17	0	23	30	30	22
SC WEST COAST	0	12	20	0	18	0	10	20	15
WG Consolidation of Installation Guides	0	10	?	0	?	0	?	10	10
WG Seismic Guide	0	8	?	0	?	0	?	8	8
WG Loss Evaluation Guide	0	?	?	0	?	0	?	?	?
WG Fire Protection	0	?	?	0	?	0	?	?	?
SC DISTRIBUTION TRANSFORMERS	-	-	-	-	-	34	28	34	31
WG Overhead Type Distr. Transfs. C57.12.20	-	-	-	-	-	?	23	23	23
WG Single-Phase Live Front Padmount C57.12.21	-	-	-	-	-	?	14	14	14
WG Three-Phase Live Front Padmount C57.12.22	-	-	-	-	-	?	15	15	15
WG Single-Phase Submersible C57.12.23	-	-	-	-	-	?	0	?	?
WG Single-Phase Deadfront Padmount C57.12.25	-	-	-	-	-	?	28	28	28
WG Three-Phase Deadfront Padmount C57.12.26	-	-	-	-	-	?	0	?	?
WG Bar Coding	-	-	-	-	-	-	-	0	0
WG Joint C57/37 on Cabinet Integrity C57.12.28	-	-	-	-	-	?	0	?	?
SC UNDERGROUND TRANSFS. AND NETWORK PROTECTORS	-	-	-	-	-	25	21	25	23
WG Three-Phase Underground Transfs.	-	-	-	-	-	19	16	19	18
WG Liquid-Filled Sec. Network Transfs.	-	-	-	-	-	19	21	21	20
WG Secondary Network Protectors	-	-	-	-	-	17	16	17	17
WG Dry-Type Network Transfs.	-	-	-	-	-	31	29	31	30

NOTE: Maintain data for last four years only.

/123DATA/TCATTEND

OHIOEDISON
The Energy Makers

MEMORANDUM

TO: Members of the Administrative Subcommittee DATE: October 30, 1991

FROM: W. B. Binder, Jr.

SUBJECT: STANDARDS ACTIVITIES - MAY 10, 1991 THROUGH OCTOBER 31, 1991

Transformer Standards

The status of all transformer standards, sorted by responsible subcommittee, is reported on the attachment.

Attachment #2 is a listing of the current status of unconsolidated changes underway 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.

The following transformer standards have been approved by the IEEE Standards Board:

- 5/31/90

  Revised:

  C57.21 - Standard Requirements, Terminology and Test Code for Shunt Reactors Rated over 500 kVA

- 3/20/91

  New - None

  Revised - None

  Reaffirmed:

  IEEE 756 - Guide for Loading Mineral-Oil-Immersed Power Transformers Rated in Excess of 100 MVA (65°C Winding Rise)

  C57.91 - Guide for Loading Mineral-Oil-Immersed Overhead and Pad-Mounted Distribution Transformers Rated 500 kVA and Less with 55°C or 65°C Average Winding Rise

  C57.92 - Guide for Loading Mineral-Oil-Immersed Power Transformers Up to and Including 100 MVA with 55°C or 65°C Winding Rise

- 6/26/91

  New:

  C57.12.58 - Guide for Conducting a Transient Voltage Analysis of a Dry-Type Transformer Coil

  57.124 - Recommended Practices for the Detection of Partial Discharge and the Measurement of Apparent Charge in Dry-Type Transformers

  C57.125 - Guide for Failure Investigation, Documentation and Analysis for Power Transformers and Shunt Reactors

  Revised:

  C57.104 - Guide for Interpretation of Gasses Generated in Oil-Immersed Transformers

  C57.106 - Guide for Acceptance and Maintenance of Insulating Oil in Equipment

  Reaffirmed - None

- 9/26/91

  New - None

  Revised:

  C57.19.00 - General Requirements and Test Procedures for Outdoor Apparatus Bushings (IEEE 21)

  C57.19.01 - Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings (IEEE 24)

  Reaffirmed - None

Outstanding Ballots

Balloting closed 10/3 for extended life without reaffirmation on the following:

IEEE 259
C57.109
C57.12.11
C57.12.12

The first two were unanimously approved. I will prepare a submittal form for the March board meeting. The second two both received one negative vote which must be addressed before submitting for the March meeting.

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Balloting closed 10/17 for reaffirmation of the following standards:

C57.98
C57.110
IEEE 637
IEEE 799
C57.12.80
C57.15

Negative votes were received on C57.110 and IEEE 799 which must be addressed before submittal for the March board meeting.

Balloting will close 11/6 on eight other ballots for transfer to jurisdiction of the Transformers Committee. These must be submitted at the March board meeting as well.

A final item of business is the numbering of the transformer standards. I have discussed this with the Standards Staff and with the NEMA office, and have asked for input from the ADSUBCOM on how to proceed. A handout is available which proposes one possible way of numbering transformer standards.

Standards Coordination

I was unable to attend the summer Standards Coordination meeting where there was continued discussion on streamlining procedures. At the meeting, a revised SCC operations manual and a common PES coordination procedure were discussed. 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 March meeting, the Standards Board approved PARS for P1258, P1265, PC57.12.20, PC57.12.21, PC57.12.22, PC57.12.23, PC57.12.24, PC57.12.25, PC57.12.26, PC57.12.27, PC57.12.44, and PC57.109. They also approved a revised PAR for PC57.124. At the September meeting, they addressed the procedural issues described in my last report. This is defining the lifetime of a new PAR as four years. At the meeting, the Standards Board approved the PARs for P1276, P1277, PC57.13.2, PC57.98, PC57.113, PC57.129 and P259. They withheld approval on PARS for PC57.12.40, PC57.12.57 and PC57.96. Discrepancies have been corrected and these three PARS will be submitted as unfinished business in December.

The next meeting of the Standards Board will be December 3-5, 1991, with a submittal deadline of October 28, 1991. The following meeting will be March 17-19, 1992, with a submittal deadline of February 7, 1992. The deadline for submittal for the June 16-18, 1992, meeting is May 8, 1992 -- one month following our next meeting.

WBB/smw
Attachments

W B Binder Jr

STATUS REPORT ON STANDARDS
OF THE IEEE/PES TRANSFORMERS COMMITTEE
ATTACHMENT 1

PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
** SUBCOMMITTEE:		Chairman:		
* WORKING GROUP:		Chairman:		
VARIOUS C57.12.00	GEN REQ. FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	/ /	CONSOLIDATING CHANGES FOR 1992 SUBMIT REVISIONS BY MAY, 1992	/ /
VARIOUS C57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS & GUIDE FOR SC TESTING OF	/ /	CONSOLIDATING CHANGES FOR 1992 SUBMIT REVISIONS BY MAY, 1992	/ /
** 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	/ /	BALLOTTING TRANSFER TO TR COMM BALLOTTING REAFFIRMATION	/ /
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	/ /	BALLOTTING TRANSFER TO TR COMM BALLOTTING REAFFIRMATION	/ /
NONE C57.12.52	REQ. FOR SEALED DRY-TYPE POWER TRANSFORMERS, 501kVA & LARGER, 3 PHASE, WITH HV 601-34500V,LV 208Y/120 TO 4160 VOLTS	/ /	BALLOTTING TRANSFER TO TR COMM BALLOTTING REAFFIRMATION	/ /

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STATUS REPORT ON STANDARDS
OF THE IEEE/PES TRANSFORMERS COMMITTEE
ATTACHMENT 1

PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	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 APPROVED BY MAIN COMMITTEE INCLUDE IN 1992 REVISION	10/01/90
** SUBCOMMITTEE: BUSHING			Chairman: L. B. WAGENAAR	
* WORKING GROUP: BUSHINGS FOR DC APPLICATION			Chairman: L. B. 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	D06 SUBCOMMITTEE BALLOT COMPLETE	/ /
* WORKING GROUP: LOADING POWER APPARATUS BUSH.			Chairman: F. E. ELLIOTT	
P757 C57.19.101	TRIAL-USE GUIDE FOR LOADING POWER APPARATUS BUSHINGS	/ /	BALLOTTING FULL USE TO MAIN	/ /
* 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 SUBMITTED TO STD BOARD	01/31/90
PC57.19.01 IEEE 24	STANDARD PERFORMANCE CHARACTERISTICS AND DIMENSIONS FOR OUTDOOR APPARATUS BUSHINGS	11/01/89	D04 SUBMITTED TO STD BOARD(TAB.10)	02/04/91
** SUBCOMMITTEE: DIELECTRIC TESTS			Chairman: H. R. MOORE	

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STATUS REPORT ON STANDARDS
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ATTACHMENT 1

PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
* WORKING GROUP: P. D. TESTS FOR TRANSFORMERS			Chairman: GEORGE VAILLANCOURT	
P545 C57.113	TRIAL USE GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN LIQUID-FILLED POWER TRANSFORMERS AND SHUNT REACTOR	09/25/91	BALLOTTING MAIN COMM UPGRADE W. J. CARTER, T.F. CHAIRMAN	/ /
* WORKING GROUP:			Chairman: R. A. VEITCH	
PC57.12.00j C57.12.00	NEW SEC 6.8 MINIMUM EXTERNAL CLEARANCES BETWEEN LIVE PARTS	/ /	COMPLETE INCLUDE IN 1992 REVISION	/ /
* WORKING GROUP: REV. DIELECTRIC TESTS DIST TR			Chairman: JOHN ROSETTI	
PC57.12.90c C57.12.90	ROUTINE IMPULSE TESTS FOR DISTRIBUTION TRANSFORMERS	09/10/87	D06 MAIN COMMITTEE BALLOT COMPLETE INCLUDE IN 1992 REVISION	/ /
* WORKING GROUP: REVISION OF DIELECTRIC TESTS			Chairman: J. B. TEMPLETON	
PC57.12.90d C57.12.90	ENHANCEMENT VOLTAGE TIME DURATION DURING POWER TRANSFORMER INDUCED TESTS	09/28/90	D01 DRAFT 1 BEING PREPARED M. ALTMAN, T.F. CHAIRMAN	/ /
* WORKING GROUP: P. D. TESTS FOR TRANSFORMERS			Chairman: GEORGE VAILLANCOURT	
PC57.127 C57.127	GUIDE FOR THE DETECTION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS	03/10/88	D02 REBALLOT MAIN COMMITTEE E. HOWELLS, T.F. CHAIRMAN	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	/ /

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STATUS REPORT ON STANDARDS
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ATTACHMENT 1

PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
* WORKING GROUP: REV. DIELECTRIC TESTS DIST TR			Chairman: JOHN ROSETTI	
NEW C57.98	ROUTINE TEST GUIDE FOR DISTRIBUTION TRANSFORMERS	09/25/91	SUBMITTED PAR TO STD BOARD D. BALLARD, T.F. CHAIRMAN	/ /
* WORKING GROUP: REVISION OF DIELECTRIC TESTS			Chairman: J. B. TEMPLETON	
PC57.98 C57.98	IEEE GUIDE FOR TRANSFORMER IMPULSE TESTS	02/01/86	D03 D3 BALLOT SUBCOMM, REAFFIRMED R. E. MINKWITZ, T.F. CHAIRMAN	/ /
** SUBCOMMITTEE: DISTRIBUTION TRANSFORMERS			Chairman: FRANK STEVENS	
* WORKING GROUP: POLE MOUNTED 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	06/27/91	D01 PAR APPROVED BY STD BOARD	05/01/91
* WORKING GROUP: 1 PHASE PADMOUNT TR LIVE FRONT			Chairman: A. GHAFOURIAN	
PC57.12.21 C57.12.21	STANDARD REQUIREMENTS FOR PAD-MOUNTED, COMPARTMENTAL-TYPE, SELF-COOLED, SINGLE-PHASE DIST TRANSFORMERS WITH HV BUSHINGS	06/27/91	D08 PAR APPROVED BY STD BOARD PREVIOUSLY APPROVED	/ /
* WORKING GROUP: 3 PHASE PADMOUNT TR LIVE FRONT			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.	06/27/91	PAR APPROVED BY STD BOARD PLAN TO COMPLETE IN 1992	/ /
* 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 CONNECT HV 24940GrdY..LV,240.. 167kVA.	06/27/91	PAR APPROVED BY STD BOARD DRAFT TO MAIN	/ /

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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
			COMMITTEE	
* WORKING GROUP: 1-PHASE PADMOUNT TR DEADFRONT			Chairman: NORVIN MOHESKY	
PC57.12.25 C57.12.25	REQUIREMENTS FOR PAD-MOUNTED COMP-TYPE,SELF-COOLED,1-PHASE DISTRIBUTION TR W/SEP INS HV CONN,HV 34500GrdY...167kVA...	06/27/91	PAR APPROVED BY STD. BOARD NEMA SECRETARIAT	/ /
* WORKING GROUP: 3-PHASE PADMOUNT RE DEADFRONT			Chairman: GARY PAIVA	
PC57.12.26 C57.12.26	PAD-MOUNTED COMPARTMENTAL-TYPE SELF-COOLED,3-PHASE DIST TR for USE W/ SEPERABLE INSULATED HV CONN.,HV 34500GrdY..2500kVA	/ /	D05 BALLOTTING MAIN COMMITTEE D5 TO MAIN COMM	/ /
* WORKING GROUP: UNIT SUBSTATIONS			Chairman: JIM MILLER	
PC57.12.27 C57.12.27	CONFORMANCE REQUIREMENTS for LIQUID-FILLED DISTRIBUTION TR USED IN PAD-MOUNTED INSTALL., INCL. UNIT SUBSTATIONS	06/27/91	D04 PAR TO BE WITHDRAWN ? W.G. RECOMMENDS WITHDRAW STD	/ /
* WORKING GROUP: JOINT WG ON CABINET INTEGRITY			Chairman: FRANK STEVENS	
PC57.12.28 C57.12.28	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY	/ /	PAR TO BE SUBMITTED NO ACTIVITY, REAFFIRM 1992	/ /
PC57.12.29 C57.12.29	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY IN SEVERE ENVIRONMENTS	/ /	APPROVED BY SUBCOMMITTEE PAR TO BE SUBMITTED, NEMA SEC.	/ /
PC57.12.30 C57.12.30	SUBMERSIBLE EQUIPMENT - ENCLOSURE INTEGRITY	/ /	D04 PAR TO BE SUBMITTED	/ /
PC57.12.31 C57.12.31	COATING STANDARD FOR POLE MOUNTED TRANSFORMERS	/ /	UNKNOWN, NO	/ /

STATUS REPORT ON STANDARDS
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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
			PAR HELD UP BY NEMA LEGAL COUNCIL	
* WORKING GROUP: BAR CODE STANDARD			Chairman: RON JORDAN	
P1265 IEEE 1265	STANDARD FOR BAR CODING FOR DISTRIBUTION TRANSFORMERS (POLE-MOUNTED, PAD-MOUNTED, & UNDERGROUND)	06/27/91	PAR APPROVED BY STD BOARD	/ /
** SUBCOMMITTEE: DRY-TYPE TRANSFORMERS			Chairman: W. PATTERSON	
* WORKING GROUP:			Chairman:	
NONE C57.12.01	GENERAL REQUIREMENTS FOR DRY-TYPE DIST. AND POWER TR INCL THOSE WITH SOLID CAST &/or RESIN-ENCAPSULATED WINDINGS	/ /		/ /
* WORKING GROUP: THERMAL EVALUATION OF DRY-TYPE			Chairman: R. L. PROVOST	
NONE C57.12.56	TEST PROCEDURE FOR THERMAL EVALUATION OF INSULATION SYST FOR VENTILATED DRY-TYPE POWER & DISTRIBUTION TRANSFORMERS	/ /	REAFFIRM IN 1991	/ /
* WORKING GROUP: DRY TYPE DIELECTRIC PROBLEMS			Chairman: A. D. KLINE	
P745 C57.12.58	GUIDE FOR CONDUCTING TRANSIENT VOLTAGE ANALYSIS OF A DRY-TYPE TRANSFORMER COIL	06/28/78	D7 APPROVED BY STD BOARD 6/26/91 SUBMITTED TO STD BOARD	10/01/84
* WORKING GROUP: DRY-TYPE THRU FAULT DUR GUIDE			Chairman: NONE	
NONE C57.12.59	GUIDE FOR DRY-TYPE TRANSFORMER THROUGH-FAULT CURRENT DURATION	09/13/84		12/19/85
* WORKING GROUP: THERMAL EVALUATION OF DRY-TYPE			Chairman: R. L. PROVOST	
PC57.12.60 C57.12.60	TEST PROCEDURES FOR THERMAL EVALUATION OF INSULATION SYSTEMS FOR SOLID-CAST & RESIN ENCAP POWER & DIST TRANSFORMER	08/17/89	D09 READY TO SUBMIT TO STD BOARD	/ /

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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
* WORKING GROUP: TEST CODE FOR DRY TYPE TR			Chairman: D. BARNARD	
PC57.12.91 C57.12.91	TEST CODE FOR DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS	06/01/89	D03 BALLOTING SUBCOMMITTEE REAFFIRM IN 1991	12/22/90
* WORKING GROUP: DRY TYPE DIELECTRIC PROBLEMS			Chairman: A. D. KLINE	
PC57.124 C57.124	RECOMMENDED PRACTICE FOR THE DETECTION OF PD AND THE MEAS. OF APP. CHARGE IN DRY-TYPE TR	06/27/91	D08 APPROVED BY STD BOARD 6/26/91 REVISED PAR	/ /
* WORKING GROUP: DRY TYPE REACTORS			Chairman: RICHARD DUDLEY	
PC57.16 C57.16	REQUIREMENTS FOR CURRENT LIMITING REACTORS	03/21/91	D03 PAR APPROVED BY STD. BOARD STANDARD WITHDRAWN ?	/ /
PC57.21 C57.21	REQUIREMENTS TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS OVER 500kVA	/ /		/ /
* 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 REAFFIRM 1992	/ /
* 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	/ /	D01 INCORP CAST COIL IN C57.96 PAR REJECTED. RESUBMITTED	10/01/91

STATUS REPORT ON STANDARDS
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PROJECT No. / STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS / COMMENTS	DRAFT DATED
* WORKING GROUP:			Chairman:	
NONE / C57.99	GUIDE FOR LOADING DRY-TYPE AND OIL IMMERSED CURRENT-LIMITING REACTORS	/ /	APPENDIX TO C57.16 WITHDRAWN? REAFFIRM 1991?	/ /
* 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 REVISED PAR RESUBMITTED LIFE EXTENDED TO 12/92 100%	01/31/91
** 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	/ /	BALLOTTING TRANSFER TO TR COMM BALLOTTING REAFFIRMATION	/ /
NONE / C57.12.55	CONFORMANCE STANDARD FOR TR-DRY-TYPE TRANSFORMERS USED IN UNIT INSTALATIONS, INCL. UNIT SUBSTATIONS	/ /	BALLOTTING TRANSFER TO TR COMM BALLOTTING REAFFIRMATION	/ /
** 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 REVISED PARS TO STD BOARD INCLUDING DRY TYPE REACTORS	/ /
P1277 / IEEE1277	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED AND DRY-TYPE HVDC SMOOTHING REACTORS	09/25/91	NEW PAR SENT TO STD BOARD	/ /

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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
** 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 REQUEST EXTENSION TO 1992	/ /
NONE C57.13.2	CONFORMANCE TEST PROCEDURES FOR INSTRUMENT TRANSFORMERS	/ /	 ASSUMED BY TR COMM FROM HVACC SUBMIT PAR, REAFFIRM IN 1991	/ /
* 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	/ /
** SUBCOMMITTEE: INSULATING FLUIDS			Chairman: H. A. PEARCE	
* WORKING GROUP: NONE			Chairman: F. W. HEINRICHS,SEC	
PC57.104 C57.104	GUIDE FOR THE DETECTION AND DETERMINATION OF GENERATED GAS IN OIL-IMMERSED TRANSFORMERS & THEIR RELATION TO SERVICEABIL.	05/31/90	D12 APPROVED BY STD. BRD. 6/27/91	/ /
* WORKING GROUP: SUBCOMMITTEE			Chairman:	
PC57.106 C57.106	GUIDE FOR ACCEPTANCE AND MTCE OF INSULATING OIL IN EQUIPMENT	06/19/86	D06 APPROVED BY STD. BOARD 6/27/91	/ /
NONE C57.111	GUIDE FOR ACCEPTANCE OF SILICONE INSULATING FLUID AND ITS MAINTENACE IN TRANSFORMERS	12/10/87	 PUBLISHED	/ /
P954 C57.121	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS	04/12/82	NOT AN ANSI STANDARD D08	06/10/87

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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
* WORKING GROUP: GAS ANLYSIS DURING FACT. TESTS			Chairman: J. P. KINNEY	
PC57.130 C57.130	GUIDE FOR THE DETECTION AND DETERMINATION OF GASES GENERATED IN OIL-IMMERSED TR DURING FACTORY TESTS	06/01/89	D02 BALLOTTING SUBCOMMITTEE T. F. formed to conduct survey	05/06/91
* WORKING GROUP: GUIDE FOR GAS ANALYSIS-SILICON			Chairman: JIM GOUDIE	
P1258 IEEE 1258	GUIDE FOR INTERPRETATION OF GASES IN SILICONE LIQUID FILLED TRANSFORMERS	06/27/91	PAR APPROVED BY STD BOARD	/ /
* WORKING GROUP: SUBCOMMITTEE			Chairman:	
P637 IEEE 637	GUIDE FOR THE RECLAMATION OF INSULATING OIL AND CRITERIA FOR ITS USE	/ /	BALLOTTING REAFFIRMATION REAFFIRMED 100%, 85% RESPONSE	/ /
P799 IEEE 799	GUIDE FOR HANDLING AND DISPOSING OF ASKARELS	09/27/79	BALLOTTING REAFFIRMATION REAFFIRMED 97%, 85% RESPONSE	/ /
** SUBCOMMITTEE: INSULATION LIFE			Chairman: D. H. DOUGLAS	
* WORKING GROUP: THERMAL EVALUATION			Chairman: L. A. LOWDERMILK	
PC57.100 C57.100	TEST PROCEDURE FOR THERMAL EVALUATION OF OIL-IMMERSED DISTRIBUTION TRANSFORMERS	10/20/88	D00 DISCUSSING CRITERIA FOR MODELS BALLOTTING REAFFIRMATION	/ /
* WORKING GROUP: GUIDES FOR LOADING			Chairman: D. A. TAKACH	
P756 C57.115	GUIDE FOR LOADING MINERAL-OIL-IMMERSED POWER TR RATED IN EXCESS OF 100MVA (65 C WINDING RISE)	/ /	UPGRADED TO FULL USE 03/21/91 REAFFIRMATION NOT REQUIRED	/ /

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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
* WORKING GROUP: THERMAL TESTS			Chairman: R. L. GRUBB	
P838 C57.119	GUIDE FOR PERFORMING OVERLOAD HEAT RUNS FOR OIL IMMERSED POWER TRANSFORMERS	09/18/80	D12 BALLOTING MAIN COMMITTEE	/ /
* WORKING GROUP: PROJECT			Chairman: R. L. GRUBB	
PC57.12.001 C57.12.00	DEFINITION OF THERMAL DUPLICATE	05/31/90	D01 BALLOTTING MAIN COMMITTEE INCLUDE IN 1992 REVISION	/ /
* WORKING GROUP: GUIDES FOR LOADING			Chairman: D. A. TAKACH	
PC57.91 C57.91	GUIDE FOR LOADING MINERAL-OIL-IMMERSED TRANSFORMERS	06/13/85	D08 PUB. 1/12/81, REAFFIRMED 1991	10/18/91
PC57.91 C57.92	GUIDE FOR LOADING MINERAL-OIL-IMMERSED POWER TRANSFORMERS UP TO & INCL 100 MVA WITH 55 C OR 65 C AVE. WINDING RISE	06/28/85	D08 PUB. 1/12/81, REAFFIRMED 1991 TO BE COMBINED INTO C57.91	10/18/91
NONE C57.95	GUIDE FOR LOADING LIQUID-IMMERSED STEP-VOLTAGE AND INDUCTION-VOLTAGE REGULATORS	/ /	PUB. 08/19/85, REAFFIRMED 1991	/ /
* WORKING GROUP: HIGH TEMPERATURE INSULATION			Chairman: HEINZ FISCHER	
P1276 IEEE1276	TRIAL-USE GENERAL REQUIREMENTS FOR LIQUID-FILLED DISTRIBUTION AND POWER TR UTILIZING HIGH TEMP SOLID INSULATING MATERIAL	09/25/91	SUBMITTING PAR	/ /
** SUBCOMMITTEE: NONE ASSIGNED			Chairman: NONE ASSIGNED	
* WORKING GROUP:			Chairman:	
NONE C57.12.70	TERMINAL MARKINGS AND CONNECTIONS FOR DISTRIBUTION & POWER TRANSFORMERS	/ /	BALLOTTING TRANSFER TO TR COMM BALLOTTING	/ /

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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
NONE C57.12.80	TERMINOLOGY FOR POWER & DIST TRANSFORMERS	/ /	REAFFIRMATION BALLOTTING REAFFIRMATION REAFFIRMED 100%, 88% RESPONSE	/ /
** SUBCOMMITTEE: NONE ASSIGNED			Chairman: J. H. HARLOW	
* WORKING GROUP:			Chairman:	
NONE C57.15	REQ, TERMINOLOGY, & TEST CODE FOR STEP-VOLTAGE AND INDUCTION VOLTAGE REGULATORS	/ /	BALLOTTING REAFFIRMATION REAFFIRMED 100%, 88% RESPONSE	/ /
** 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 REAFFIRM 1992	/ /
* WORKING GROUP: SHORT-CIRCUIT DURATION			Chairman: B. K. PATEL	
PC57.109 C57.109	GUIDE FOR THROUGH-FAULT CURRENT DURATION	06/27/91	D01 BALLOTTING D01 MAIN COMMITTEE LIFE EXTENDED TO 12/92 100%	/ /
* WORKING GROUP: NONE ASSIGNED			Chairman:	
NONE C57.110	RECOMMENDED PRACTICE FOR ESTABLISHING TRANSFORMER CAPABILITY WHEN SUPPLYING NONSINUSOIDAL LOAD CURRENTS	/ /	BALLOTTING REAFFIRMATION REAFFIRMED 97%, 88% RESPONSE	/ /
* WORKING GROUP: TR DIRECTLY CONNECTED TO GEN			Chairman: B. K. PATEL	
NONE	GUIDE FOR TRANSFORMERS	/ /		/ /

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C57.116	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	/ /	UNDER REVIEW BY FAILURE W.G. BALLOT REAFFIRMATION 1992	/ /
* WORKING GROUP: LOSS TOLERANCE AND MEASUREMENT			Chairman: W. R. HENNING	
PC57.12.00c1 C57.12.00	REV. OF SECTION 5.9 REFERENCE TEMP FOR NO-LOAD LOSS	06/28/79	D06 BALLOTTING MAIN COMMITTEE INCLUDE IN 1992 REVISION?	09/04/91
PC57.12.00c2 C57.12.00	ADD TO SEC 9.3.1 ACCURACY REQUIREMENT FOR MEASURED LOSSES	06/28/79	D06 BALLOTTING MAIN COMMITTEE INCLUDE IN 1992 REVISION?	09/04/91
P787 C57.12.00	TRANSFORMER LOSS MEASUREMENT AND TOLERANCES	06/28/79	MERGED INTO P462 (now 12.00c)	/ /
* WORKING GROUP: PROJECT			Chairman: R. H. FRAZER	
PC57.12.00h C57.12.00	LTC TAP POSITION INDICATION	09/28/86	D02 BALLOTTING MAIN COMMITTEE INCLUDE IN 1992 REVISION	06/28/91
* 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	/ /

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			COMMITTEE	
			INCLUDE IN 1992 REVISION	
* WORKING GROUP: PROJECT			Chairman: C. J. McMILLEN	
PC57.12.00k	TABLE 16-C ROUTINE DIST TR	03/12/87		/ /
C57.12.00	RESISTANCE TEST		DOCUMENTATING COORDINATION	
			INCLUDE IN 1992 REVISION	
* WORKING GROUP: PROJECT			Chairman:	
NONE	SECTION 7.3 FIGURES 9 & 10	/ /		/ /
C57.12.90	REVERSED		READY	
			INCLUDE IN 1992 REVISION	
* WORKING GROUP: LOSS TOLERANCE AND MEASUREMENT			Chairman: W. R. HENNING	
PC57.12.90e	REVISION TO SEC 9 IMPEDANCE	06/28/79	D10	09/05/91
C57.12.90	AND LOAD LOSSES		BALLOTTING MAIN COMMITTEE	
			INCLUDE IN 1992 REVISION	
PC57.12.90e3	REVISION TO SEC 8 NO-LOAD	06/28/79	D04	09/04/91
C57.12.90	LOSSES & EXCITATION CURRENT		BALLOTTING MAIN COMMITTEE	
			INCLUDE IN 1992 REVISION	
P1098	GUIDE FOR TRANSFORMER LOSS	06/13/85	D04	/ /
C57.123	MEASUREMENT		TF WORKING	
* WORKING GROUP: FAILURE ANALYSIS			Chairman: W. B .BINDER, JR.	
PC57.125	GUIDE FOR FAILURE INVESTIGA-	06/28/87	D10	10/16/90
C57.125	TION, DOCUMENTATION AND ANALYSIS FOR POWER TRANSFORMERS AND SHUNT REACTORS		APPROVED BY STD BOARD 6/26/91	

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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
* 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 SEMICONDUCTOR RECTIFIER 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 APPROVED, NO ACTION REQUIRED	/ /
* 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 NEW PAR SUBMITTED	/ /
** 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	/ /		/ /
** SUBCOMMITTEE: UG TR & NETWORK PROTECTORS			Chairman: P. E. OREHEK	

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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
* WORKING GROUP: 3-PHASE UG-TYPE TRANSFORMERS			Chairman: J. W. HOWARD	
PC57.12.24 C57.12.24	UNDERGROUND-TYPE 3-PHASE DISTRIBUTION TRANSFORMERS,2500kVA AND SMALLER: HV,34500GrdY..& BELOW,LV,480 V AND BELOW	06/27/91	PAR APPROVED BY STD. BOARD	/ /
* WORKING GROUP: LIQUID-FILLED NETWORK TRANSFMR			Chairman: E. A. BERTOLINI	
PC57.12.40 C57.12.40	REQUIREMENTS FOR SECONDARY NETWORK TRANSFORMERS, SUBWAY & VAULT TYPES (LIQUID IMMERSED)	09/25/91	BALLOTTING TRANSFER TO TR COMM BALLOTTING REAFFIRMATION	/ /
* WORKING GROUP: SECONDARY NETWORK PROTECTORS			Chairman: R. B. ROBERTSON	
PC57.12.44 C57.12.44	STANDARD REQUIREMENTS FOR SECONDARY POWER DISTRIBUTION NETWORK PROTECTORS	06/27/91	D03 PAR APPROVED BY STD. BOARD	/ /
* WORKING GROUP: DRY-TYPE NETWORK TRANSFORMERS			Chairman: B. NUTT	
PC57.12.57 C57.12.57	REQUIREMENTS FOR VENTILATED DRY-TYPE NETWORK TRANSFORMERS 2500kVA AND BELOW, W/HV 34500V AND BELOW,LV 216Y..AND 480Y..	/ /	D03 BALLOTTING TRANSFER TO TR COMM BALLOTTING REAFFIRMATION	/ /
** SUBCOMMITTEE: WEST COAST			Chairman: L. A. TAUBER	
* WORKING GROUP: SIESMIC GUIDE			Chairman: S. OKLU	
P513 C57.114	SEISMIC GUIDE FOR POWER TRANSFORMERS AND REACTORS	09/06/73	D17	07/28/88
* WORKING GROUP: CON. INSTALLATION GUIDES			Chairman: D. A. GILLIES	
PC57.93 C57.12.11	GUIDE FOR INSTALLATION OF OIL-IMMERSED TRANSFORMERS (10MVA & LARGER, 69-287kV RATING)	/ /	TO BE REPLACED BY C57.93 LIFE EXTENSION TO 12/92 99%	/ /
PC57.93 C57.12.12	GUIDE FOR INSTALLATION OF OIL-IMMERSED TRANSFORMERS 345kV AND ABOVE	/ /	TO BE REPLACED BY C57.93	/ /

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PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
			LIFE EXTENSION TO 12/92 99%	
* 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 PENDING COORDINATION DOCUMENTS	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	/ /
* WORKING GROUP: CONSOLIDATION OF INST. GUIDES			Chairman: D. A. GILLIES	
PC57.93 C57.93	GUIDE FOR INSTALLATION OF LIQUID IMMERSED POWER TRANSFORMERS.	06/01/89	D05 BALLOTING MAIN COMMITTEE WITHDRAW 12.11/12.12 WHEN APP.	/ /

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

PROJECT No.	TITLE	STATUS WG CHAIRMAN & PHONE
** STANDARD No. C57.12.90		
* SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS		
NONE	SECTION 7.3 FIGURES 9 & 10 REVERSED	READY
* SUBCOMMITTEE:		
VARIOUS	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS & GUIDE FOR SC TESTING OF	CONSOLIDATING CHANGES FOR 1992
* SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS		
PC57.12.90e	REVISION TO SEC 9 IMPEDANCE AND LOAD LOSSES	BALLOTTING MAIN COMMITTEE W. R. HENNING (414)547-1251
PC57.12.90e3	REVISION TO SEC 8 NO-LOAD LOSSES & EXCITATION CURRENT	BALLOTTING MAIN COMMITTEE W. R. HENNING (414)547-1251
* SUBCOMMITTEE: AUDIBLE SOUND & VIBRATION		
PC57.12.90b	TRANSFORMER SOUND POWER MEASUREMENT	APPROVED BY 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 J. B. TEMPLETON (317)289-1211

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

PROJECT No.	TITLE	STATUS WG CHAIRMAN & PHONE
** STANDARD No. C57.12.00		
* SUBCOMMITTEE:		
VARIOUS	GEN REQ. FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	CONSOLIDATING CHANGES FOR 1992
* SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS		
PC57.12.00c1	REV. OF SECTION 5.9 REFERENCE TEMP FOR NO-LOAD LOSS	BALLOTTING MAIN COMMITTEE W. R. HENNING (414)547-1251
PC57.12.00c2	ADD TO SEC 9.3.1 ACCURACY REQUIREMENT FOR MEASURED LOSSES	BALLOTTING MAIN COMMITTEE 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	DOCUMENTATING COORDINATION 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

COORDINATION ACTIVITIES OF THE PES TRANSFORMERS COMMITTEE
ATTACHMENT 3

PROJECT	TITLE	TRANSFORMER COMMITTEE COORDINATOR
** TECHNICAL COMMITTEE: SUBS		
P525	GUIDE FOR THE DESIGN AND INSTALLATION OF CABLE SYSTEMS IN SUBSTATIONS	NONE
** 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
** 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

COORDINATION ACTIVITIES OF THE PES TRANSFORMERS COMMITTEE
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PROJECT	TITLE	TRANSFORMER COMMITTEE COORDINATOR
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
PC37.011	APPLICATION GUIDE FOR TRANSIENT RECOVERY VOLTAGE FOR AC HIGH VOLTAGE CIRCUIT BREAKERS RATED ON A SYMETRICAL CURRENT BASI	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
** TECHNICAL COMMITTEE: IC		
P48	TEST PROCEDURES AND REQUIREMENTS FOR ALTERNATING-CURRENT CABLE TERMINATIONS 2.5 kV THROUGH 765 kV	NONE

COORDINATION ACTIVITIES OF THE PES TRANSFORMERS COMMITTEE
ATTACHMENT 3

PROJECT	TITLE	TRANSFORMER COMMITTEE COORDINATOR
** TECHNICAL COMMITTEE: SPD		
PC62.45	GUIDE ON SURGE TESTING FOR EQUIPMENT CONNECTED TO LOW-VOLTAGE AC POWER CIRCUITS	NONE
PC62.91	REQUIREMENTS, TERMINOLOGY, AND TEST PROCEDURES FOR NEUTRAL GROUNDING DEVICES	NONE
PC62.92.1	APPLICATION GUIDE FOR NEUTRAL GROUNDING IN ELECTRICAL UTILITY SYSTEMS, PART 1	NONE
PC62.92.4	APPLICATION GUIDE FOR NEUTRAL GROUNDING OF DISTRIBUTION SYSTEMS	NONE
PC62.92.5	APPLICATION GUIDE FOR NEUTRAL GROUNDING OF TRANSMISSION AND SUBTRANSMISSION SYSTEMS	NONE
** TECHNICAL COMMITTEE: PSR		
PC37.102	GUIDE FOR GENERATOR PROTECTION	NONE
** TECHNICAL COMMITTEE: T&D		
P430	STANDARD PROCEDURE FOR MEASUREMENT OF RADIO NOISE FROM OVERHEAD POWER LINES AND SUBSTATIONS	NONE
** TECHNICAL COMMITTEE: SWGR		
PC37.09g	STANDARD TEST PROCEDURES FOR AC HIGH-VOLTAGE CIRCUIT BREAKERS RATED ON A SYMETRICAL CURRENT BASIS	NONE
PC37.100d	DEFINTIONS FOR POWER SWITCHGEAR	NONE
PC37.04i	STANDARD RATING STRUCTURE FOR AC HIGH-VOLTAGE CIRCUIT BREAKERS RATED ON A SYMETRICAL CURRENT BASIS	NONE
PC37.122	STANDARD FOR PRESSURIZED ENCLOSURES FOR GAS INSULATED SUBSTATIONS	NONE
** TECHNICAL COMMITTEE: SPD		
PC62.48	GUIDE FOR INTERACTIONS BETWEEN POWER SYSTEM DISTURBANCES AND SURGE PROTECTIVE DEVICES	NONE
** TECHNICAL COMMITTEE: IC		
P48	STANDARD TEST PROCEDURES AND REQUIREMENTS FOR ALTERNATING	NONE

COORDINATION ACTIVITIES OF THE PES TRANSFORMERS COMMITTEE
ATTACHMENT 3

PROJECT	TITLE	TRANSFORMER COMMITTEE COORDINATOR
	CURRENT CABLE TERMINATIONS 2.5kV THROUGH 765kV	
** TECHNICAL COMMITTEE: SUBS		
NEW	GUIDE FOR DEVELOPMENT OF SPECIFICATIONS FOR TURNKEY SUBSTATION 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
** TECHNICAL COMMITTEE: PSR		
NEW	STANDARD INVERSE-TIME CHARACTERISTIC EQUATIONS FOR OVERCURRENT RELAYS	NONE
** TECHNICAL COMMITTEE: T&D		
NEW	GUIDE ON THE PREDICTION, MEASUREMENT, AND ANALYSIS OF AM BROADCAST RE-RADIATION BY POWER LINES	NONE
P656	STANDARD FOR THE MEASUREMENT OF AUDIBLE NOISE FROM OVERHEAD TRANSMISSION LINES	ALAN M. TEPLITSKY
** TECHNICAL COMMITTEE: SPD		
P1038	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: I&M		
P1223	POWER SYSTEM DIGITAL TESTING	RUSS MINKWITZ

COORDINATION ACTIVITIES OF THE PES TRANSFORMERS COMMITTEE
ATTACHMENT 3

PROJECT	TITLE	TRANSFORMER COMMITTEE COORDINATOR
	TECHNIQUES	
** TECHNICAL COMMITTEE: SWGR		
P1257	GUIDE FOR DIAGNOSTICS AND FAILURE INVESTIGATION OF POWER CIRCUIT BREAKERS	WALLACE B. BINDER JR.
** TECHNICAL COMMITTEE: SUBS		
NEW	GUIDE FOR INSTALLING TEMPORARY SUBSTATIONS	D. A. GILLIES
** TECHNICAL COMMITTEE: IC		
P55	TEMPERATURE CORRELATION OF INSULATED CABLE CONNECTED TO ELECTRICAL EQUIPMENT	L. J. SAVIO
** TECHNICAL COMMITTEE: PSR		
PC37.91	GUIDE FOR PROTECTVE RELAY APPLICATION TO POWER TRANSFORMERS	
PC37.97	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER SYSTEM BUSES	JOHN N. DAVIS
PC37.107	STANDARD FOR DIGITAL PROTECTION SYSTEM DESIGN	
PC37.108	GUIDE FOR THE PROTECTION OF NETWORK TRANSFORMERS	
PC37.109	GUIDE FOR THE PROTECTION OF SHUNT REACTORS	
PC37.110	GUIDE FOR THE APPLICATION OF CURRENT TRANSFORMERS USED FOR PROTECTIVE RELAYING PURPOSES	JOHN N. DAVIS
PC57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS	JOHN N. DAVIS
** TECHNICAL COMMITTEE: SPD		
PC62.2.01	APPLICATION GUIDE FOR SURGE PROTECTION OF ELECTRIC GENERATING PLANTS	
PC62.11	STANDARD FOR METAL-OXIDE SURGE ARRESTERS FOR AC POWER CIRCUITS	
PC62.22	GUIDE FOR APPLICATION OF METAL OXIDE SURGE ARRESTERS FOR AC SYSTEMS	L. B. WAGENAAR

IEEE/PES Transformer Committee
November 6, 1991

Recognition and Awards Subcommittee Report

At the 1991 Spring meeting, we presented the IEEE Standards Medallion, which included a Hewlett-Packard calculator, posthumously to Dr. Melvin L. Manning. I received a note from his wife, Mrs. Elizabeth Manning, thanking the committee for the award and she advised that the Hewlett-Packard Calculator was given to the Dean of Engineering of South Dakota State University to be awarded to a deserving student. On October 4, 1991, I received a copy of a thank you note that the recipient of the calculator, Mr. Immanuel Wiese, had written to Mrs. Manning.

In accordance with the request from Dr. B. Don Russell, Chairman of the Technical Council Awards Committee of the IEEE Power Engineering Society, we have submitted the following nominations for the referenced awards:

I. PES Working Group Recognition Award

IEEE C57.116, Guide for Transformers Directly Connected to Generators, W.G. Chairman, B. K. Patel

II. Technical Committee Prize Paper Award

An Investigation of the Thermal Performance of an Oil-Filled Transformer, by L. W. Pierce

III. Technical Committee Working Group Recognition Award

IEEE C57.116, Guide for Transformers Directly Connected to Generators, W.G. Chairman, B. K. Patel

No nominations for the IEEE Prize Paper Awards have been submitted; however, these nominations are not due until April 1, 1992. These awards include the following:

I. W.R.G. Baker Prize Award

This award is made to the author or authors of the outstanding paper reporting original work in any of the IEEE TRANSACTIONS, JOURNALS, and MAGAZINES of the Societies or in the PROCEEDINGS of the IEEE during the period from January 1 to December 31 of the preceding year.

II. Donald G. Fink Prize Award

This award is made to the author or authors of the most outstanding survey, review or tutorial paper in any of the IEEE TRANSACTIONS, JOURNALS, and MAGAZINES or PROCEEDINGS of the IEEE during the period from January 1 to December 31 of the preceding year.

IEEE/PES Transformer Committee
November 6, 1991
Recognition and Awards Subcommittee Report

III. Browder J. Thompson Prize Award

This award is made to the author or authors under 30 years of age for the most outstanding publication in any of the IEEE publication issued between January 1 and December 31 of the preceding year.

J. V. Bonucchi
Chairman,
Recognition & Awards
Subcommittee

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IEEE

TRANSFORMERS COMMITTEE

POWER ENGINEERING SOCIETY

TRANSFORMERS COMMITTEE MEETING
Baltimore, Maryland, November 3 - 6, 1991

Please Reply To:

This is my sixth and final report as Chairman of the Transformers Committee. Before getting to the more technical aspects of my report, I would like to say that it has been a most gratifying experience in "passing through the chairs" as your Secretary, Vice-Chairman and Chairman. Seven years ago, I looked upon my upcoming term in office with a mixture of challenge and apprehension. Well, seven years have come and gone, almost with the speed of light, and it is now time to reflect on our accomplishments.

I believe that the major accomplishment of the past three year term has been the establishment of two new subcommittees, Distribution Transformers, under Frank Stevens and Underground Transformers & Network Protectors under Paul Orehek. These new subcommittees, with their numerous working groups, set-up shop and got down to work in a very business-like manner. With these new subcommittees, the Transformers Committee has welcomed many new members. This work had formerly been done within the framework of ANSI C57 Committee.

A second major accomplishment is the continued dedication of so many engineers to the successful operation of the Transformers Committee. The credit for this, belongs to the many individuals who have faithfully undertaken new responsibilities in chairing the many Sub Committees, Working Groups and Task Forces. These people are the backbone and life blood of the Transformers Committee and our success is a direct result of their efforts.

Finally, the IEEE Transformers Committee continues to be the leader in standards writing covering the design, construction, testing and operation of transformer products. As members, we can all take immense pleasure and be very proud of the quality standards and guides which this committee has produced.

TRANSFORMER COMMITTEE OFFICERS FOR 1992/93

Effective January 1, 1992 your committee officers will be:

Chairman	- John Borst
Vice-Chairman & Technical Paper Coordinator	- Jim Harlow
Secretary	- Wally Binder

We all wish them well in their new positions.

REPORT FROM THE TECHNICAL COUNCIL

1. The minutes of the Technical Council Winter Power Meeting, were sent out in both hard copy and floppy disk (both WP5.1 and ASCII formats). The Transformers Committee report to the Technical Council Summer Power Meeting, was submitted on floppy disk. This is part of an ongoing experiment to ease the work load on the Committee secretary and to reduce overall cost. It is expected that all upcoming minutes of the Technical Council will be issued on floppy disk only. I would recommend that the Transformers Committee also consider the pros and cons of issuing minutes on floppy disk.

2. A new IEEE Standards Press has been established which is designed to fill a gap between IEEE Standards and the IEEE Press. Its purpose is to publish essential standards related information that would benefit industry but falls outside the scope of an IEEE Standard, Recommended Practice or Guide. The new Standards Press will publish handbooks, that present the rationale behind a standard, training manuals and user guides on how to apply a standard.

3. The IEEE Standards Electronic Bulletin-Board System (BBS) has become operational. Appendix A describes the system as it now operates and plans for future improvements.

4. The proposal to add a "Letters to the Editor" column in the Transactions has been rejected. It was decided that the few times it would be used did not outweigh the problems that could be created.

5. The Awards Committee recommended that the Technical Committee, "Technical Report Award", be open to reports not yet published. A motion to that effect was introduced and passed.

6. The Organization & Procedures Committee has established a new Working Group on Streamlining PES Activities. The assignment of this working group is to evaluate the existing processes of Standards Development, Technical Paper Review and other activities under the control of the PES Technical Council and to develop methods of streamlining and improving those activities.

7. ANSI C92 (Insulation Co-Ordination) has been inactive for many years. A proposal to form an Insulation Co-Ordination Technical Committee, under the umbrella of the PES Technical Council, was defeated.

The Organization & Procedures Committee has recognized the need for PES to accept the technical responsibilities for insulation co-ordination and has assigned the former activities of ANSI C92 to the Surge Protective Devices Committee, who will now start the task of rewriting scopes, defining new subcommittee requirements and possibly renaming the Committee. Close cooperation from the various apparatus committees was encouraged including the use of Joint Working Groups. At this time there have been no requests for co-ordination with the Transformers Committee.

HIGHLIGHTS FROM THE EXECUTIVE BOARD MEETING, MEXICO CITY, APRIL 18TH, 1991:

1. Transactions Editor, Hal Gold, summarized the Transaction Papers published in the 1990 Transactions. He reported that we published 565 papers from 34 countries. Only 49% of the papers originated in the U.S. This is a reduction from 53% in 1987 (and probably over 90% twenty years ago). In 1991, the Transactions will include blocks of 51 papers from the 1990 India Conference and 17 papers from the 1990 meeting on harmonics in Hungary. PES is truly trans-national when it comes to publishing transaction papers.

2. The Executive Board approved the Technical Council's recommendation to rescind the requirement for review of visuals. There is still great concern on the quality of visuals and the Board was assured that the Technical Council was still working to improve the quality.

3. The Executive Board voted to contribute $50,000 to the Power Engineering Education Foundation. As part of the contribution, the Vice-President of PES will represent us on the Board of Directors of the Foundation. In addition, the Vice-President will represent PES on the Pre-College Education Committee of USAB.

4. Considerable discussion was held on the issue of dues increase. There has not been an increase in 4 years and during this time the inflation index has been approximately 7% per year. Many Board members believe that frequent small increases are preferable to infrequent large increases. Following the discussion, the Board voted to increase PES dues by $2.00 effective for 1992.

5. The Executive Board stated that it would prefer to leave the Penta for the 1992 Winter Power Meeting, but will rely on the organizing committee's determination of the site for the meeting. The Board also requested that the Meetings Department solicit bids for the sites of the 1994 and 1995 Winter Power Meetings both with regard to city and hotel. (Since the Board Meeting, a notice was sent out that the 1992 Winter Power Meeting will change to the dates of January 26 to January 30 and be moved to the New York Hilton and Towers at Rockefeller Center).

6. The Power Engineering Education Committee worked with the National Science Foundation and brought 40 students to the 1991 Winter Power Meeting. The executive Board voted to allocate $5,000 to match NSF funding for bringing students to the 1992 WPM. The local organizing committee worked with the hotel to reduce the cost of the attending students.

Good luck to all of you and keep up the good work.

Robert A. Veitch
Chairman

October 28th, 1991

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IEEE STANDARDS BBS

As part of its goal to serve the needs of the membership, the IEEE Standards Department is in the process of mechanizing various elements of the standards-development process. The first major step in this mechanization effort is already under way: the IEEE Standards Electronic Bulletin-Board System (BBS).

The IEEE Standards BBS is currently set up to allow any caller access to information of general interest. In addition, two Standards Coordinating Committees have separate "conferences" on the system, where files and messages can be exchanged among members of those respective groups. The Standards Department is eager to create new conferences on the system for other interested IEEE groups.

There is no charge to use the IEEE Standards BBS. The Department requests that any group interested in having its own conference on the IEEE Standards BBS submit the name of a person in that group who will maintain the conference. The Department believes that the most flexible plan is to allow these conferences to behave as autonomous bulletin-board systems, with central coordination and support.

Currently, the BBS is a single-line system, meaning that only one caller can use the system at a time. Soon, the system will be able to handle two simultaneous callers; as demand increases, so will the number of modems. The Department has had extra phone lines installed and intends to purchase high-speed modems.

The Department is currently formulating its long-term mechanization effort. A central component of this plan involves the Standard Generalized Markup Language (SGML), an International Organization for Standardization (ISO) Standard (8879-1986) that defines a machine-independent language with which one can formalize and mark the structure of a document. A document defined in terms of its underlying structure is potentially much more powerful than one defined as a page image. The long-term goal is to have all IEEE Standards developed, maintained, and distributed in this format, which would allow a standards user to generate database-like queries against the entire body of IEEE Standards. The implications of this methodology are profound.

SGML is powerful and complex, and there are many ways to implement it. The Standards Department is exploring how SGML can be used as the basis of an electronic collaborative system by which the Standards themselves would be written, edited, and critiqued interactively by geographically dispersed participants, using phone lines and magnetic media. The Standards Department views a collaborative SGML system as an ongoing experiment to be designed in conjunction with the users, not as a *fait accompli* to be imposed. The current IEEE Standards BBS is the kernel of this system.

It is with this in mind that the Department is looking for interest on the part of IEEE Standards Working Groups to experiment in this arena. For now, the Department offers its resources to those who would like separate conferences on the BBS. Details of the long-range SGML plan are being worked out, but the current thinking is that working group members would be provided with the software tools and training necessary to participate in this experiment, and the Department would incorporate lessons learned into the next iteration of the experiment. The Power Engineering Society, because of its significance to the IEEE Standards Program, will be an important part of this long-term experiment.

For information on using the IEEE Standards BBS, or on setting up a conference for your group, contact Jay Iorio (718-788-1163) in the IEEE Standards Department.

Report given to Transformers Committee ADCOM Subcommittee 11-4-91

PC57.12.90b Transformer Sound Power Measurement. Approved by main committee. Should be included in 1992 publication.

PC57.112 Guide for the Control of Transformer Sound. This project has been in limbo for many years. It should be reinstated with a new PAR if the subcommittee has sufficient interest which will be discussed in tomorrow's subcommittee meeting.

This subcommittee now has 24 active members.

Len Swenson
Secretary, Audible Sound
& Vibration Subcommittee

A true copy of Mr. Swenson's handwritten report.

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West Coast Transformer Subcommittee
Main Transformer Meeting Report
Baltimore

The West Coast Transformer Subcommittee has not met since the Main Transformer Meeting in Arizona, and therefore, there is no new Working Group activity to report. (A copy of the meeting minutes for the Arizona meeting is included in the latest Main Transformer Meeting Minutes). The next meeting of the West Coast Transformer Subcommittee will be November 19-21, 1991, in Milpitas California. As a part of this meeting, we will be given a presentation at the North American Transformer Facility in Milpitas on the "Installation of New Fiber-Optic Sensors on New and Existing Transformers for Real-time Hot Spot Measurements". I look forward to seeing you all at the next Main Transformers Meeting, and providing you a full report of our activities.

Regards,

Lou Tauber
Chairperson,
West Coast Transformer Subcommittee

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IEEE Transformers Committee
Administrative Subcommittee Meeting
Instrument Transformers Subcommittee Report

Nov. 2, 1991

1. The main effort of the subcommittee is P832, Detection and Measurement of Partial Discharges in Instrument Transformers.

2. The present standard, C57.13, does not adequately cover the loading of current transformers in pad-mounted transformer cabinets. The present limit of 55°C ambient cooling air temperature for the ct was developed for metal-clad switchgear. Preliminary investigation indicates that temperatures in pmt cabinets may exceed 80°C during overload conditions or high ambient temperature conditions. If the subcommittee concurs, a PAR will be requested to investigate and draft an addendum to C57.13 to extend loading of ct's at elevated cooling air temperatures.

3. The subcommittee has been requested to form a working group for optical current and voltage transducers. Further discussion with the requestor will indicate the feasibility of this request.

J.W. Davis

J.W. Davis, Chairman
Instrument Transformers Subcommittee

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IEEE TRANSFORMERS COMMITTEE
UNDERGROUND TRANSFORMERS AND NETWORK PROTECTORS SUBCOMMITTEE
ADMINISTRATIVE SUBCOMMITTEE REPORT - November 4, 1991

1.0 Subcommittee Membership - 23 Members

1.1 Richard D. Graham of General Electric Company became a member of the Subcommittee and the Secondary Network Transformer (Liquid-Immersed) Working Group bringing the subcommittee membership to 23.

2.0 Standards Activities

2.1 C57.12.24 was approved in 1988 and its PAR has been recently approved. The Working Group is working on the 1993 Revision.

2.2 C57.12.40 was approved in 1990 and its PAR will be resubmitted for approval. The Standard was approved by the ASC C57 Committee in 1987 but not published until 1990.

The Working Group requested that the Subcommittee Chairman obtain the standard terminology that should be used for impedance in the Standards. The Chairman wrote a letter to Mr. C. Booth of IEEE requesting that the SCC review the terminology used for impedance in the various standards and to standardize on one term.

2.3 C57.12.44 is a new product standard being developed and should be completed by the fall of 1992. Its PAR has been recently approved. An all day meeting, in addition to its regularly scheduled meeting, will be held on Wednesday, November 6, 1991.

2.4 C57.12.57 was approved in 1986 and its PAR will be resubmitted for approval. Final revisions of the Standard are almost complete and it will be balloted in 1992.

3.0 Dallas T&D Conference and Exposition

3.1 The panel session on amorphous-core distribution transformers, which I chaired, had approximately 300 people in attendance.

Respectfully submitted,

Paul E. Orehek

Paul E. Orehek

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Notes for the Administrative Subcommittee Meeting

Monday, November 4, 1991

For Matt Mingoia

Agenda Item 10 - Subcommittee Reports

Distribution Transformers Subcommittee

I am reporting tonight for Subcommittee Chairman Frank Stevens, who is again not able to attend the Transformers Committee meeting. He is very disturbed about this and he has been speaking to Chairman Veitch and to EEI about his continuance. We have made an alternate arrangement for this meeting, and hope to be able to have a permanent conclusion before the Birmingham meeting in Spring, 1992. Chairman Stevens has asked me to say that his poll of the former .2 EL&P Delegation is that there is great confidence that we have definitely made the right decision in bringing our Subcommittee into IEEE transformers.

The seven PARS referred to at the Phoenix Administration Subcommittee meeting were all subsequently approved, as was a PAR for a Bar Coding Standard, which was submitted during the summer of 1991. Five of the Subcommittee Working Groups held meetings today. These were:

- Overhead type transformers (C57.12.20);
- Single-phase Submersible transformers (C57.12.23);
- Single-phase dead front padmounts (C57.12.25);
- Three-phase live front padmounts (C57.12.22)
- The new Bar Coding Working Group which met for a double session this afternoon.

Tomorrow morning, an additional two working groups will meet.

- Three-phase dead front padmount working group (C57.12.26)
- Single-phase live front padmount (C57.12.21).

Two Distribution Transformers Subcommittee standards were balloted in the Main Committee. The single-phase submersible C57.12.23 standard was balloted 88 to 0 affirmatively. The standard has not been submitted as yet to the IEEE Standards Board because of difficulty with the coordinators, all four of whom did not receive either the original or the second ballot that was mailed to them by Hoes Lane. This problem is in the process of resolution and it is

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expected that the standard will be in the hands of the IEEE Standards Board no later than next week. The .26 three-phase dead front padmount standard was balloted 93 to 4 affirmatively. Working Group Chairman Paiva has been working to reverse the 4 negative votes and this will be re-balloted very soon to illustrate to the members what changes have been made in the standard to accommodate these negative votes.

The Administrative Subcommittee knows that the Distribution Subcommittee is associated with an additional four standards in its former association as an ANSI Joint C57/37 Working Group on Enclosure Integrity. At a meeting of this Working Group held October 3 and 4, 1991, in Boston, MA, the WG voted unanimously to seek to become part of the Distribution Subcommittee of IEEE Transformers Committee. Accordingly, Chairman Stevens is preparing four PARS for the two padmounted enclosure integrity standards .28 and .29, and for the submersible enclosure integrity document .30, and for the pole mounted enclosure standard .31. .28 was first published in 1988 and is due for revision in 93. .29 was approved by ANSI in August, 1991 and will be published before the end of the year bearing a 1991 date. .30 is in Draft 5. .31 is in Draft 2. It is hoped to ballot this Standard in the Spring of 1992. The WG has tentatively scheduled meetings for 1992 in Washington, DC and Buffalo, NY. The group is viewing first hand, corrosion examples of electrical apparatus in different city-type environments. It has previously held meetings in Los Angeles, San Francisco, New York and Boston. The WG has 24 members most of whom are coating specialists.

Chairman Stevens has asked me to say that if he is unable to continue his association with IEEE Transformers because of the financial vicissitudes of Northeast Utilities, he will resign the Chair with great regret, and will look back upon the short time that he spent at IEEE Transformers with much fondness and warm remembrance.

Respectfully submitted,

Matthew C. Mingoia
For Frank Stevens
Chairman, Distribution
Transformers

FS/el
VAX FS 4767

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IEEE/PES TRANSFORMERS COMMITTEE

ADMINISTRATIVE SUBCOMMITTEE MEETING

NOVEMBER 4, 1991

DRY TYPE TRANSFORMER SUBCOMMITTEE ACTIVITIES

1. **Membership** - 25 - see attached roster

1.1 Nominations to Transformers Committee

- Cambre, Max A.	General Electric Co.

1.2 Nominations to Dry Type Transformers Subcommittee

- Haas, Michael E.	National Industri Transformers
- Hayes, Roger R.	Skyway Electric Co. Ltd.
- Johnson Jr, Charles W.	ABB Power T&D Company Inc.
- Mitelman, Michael I.	General Electric Co.
- Papp, Klaus	Trench Electric (Austria)
- Pregent, Guy	Delta Transformers
- Simpson Jr, R. W.	Quin-T Corporation

1.3. Liaison Changes

Mr. Y. I Musa of American Electric Power has replaced Mr. G. L. Gaibrois of Detroit Edison as the liaison with the Surge Protective Devices Subcommittee (SPDC)

2. **Working Groups - Active**

2.1 Working Group on Insulation Requirements for Specialty Transformers - IEEE 259

Draft D7 is in process and expected to be balloted by the Dry Type Transformers Subcommittee in the near future.

2.2 Working Group on Dry Type Reactors - C57.16

Draft D3 will be reviewed by the Working Group at the Baltimore meeting.

2.3 Working Group on Test Code for Dry Type Distribution and Power Transformers - C57.12.91

Draft D1 is being assembled for balloting by the Working Group. Concurrently, negative ballots from sectional task force ballots are being investigated.

2.4 Working Group on Cast Coil Loading Guide - C57.96

This group is in the early stages of producing it's first draft D1.

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3. Working Groups - Inactive

3.1 Working Group on Thermal Evaluation of Insulation Systems for Cast Coil - C57.12.60

Submitted to Standards Board

3.2 Working Group on Guide for Conducting Partial Discharge Tests on Dry Type Transformers - C57.124

Submitted to Standards Board

3.3 Working Group on Guide for Conducting Transient Voltage Analysis of a Dry Type Transformer Coil - C57.12.58

Submitted to Standards Board

3.4 Working Group on Flammability of Dry Type Transformer Insulation Systems

This committee was formed to monitor developments on flammability issues as they relate to dry type transformers. Beginning with the Baltimore meeting it will cease to have formal meetings and will be incorporated into the Dry Type Subcommittee meeting activities.

3.5 Working Group on Thermal Problems

This committee was formed to discuss problems related to thermal issues as they relate to dry type transformers. Beginning with the Baltimore meeting it will cease to have formal meetings and will be incorporated into the Dry Type Subcommittee meeting activities.

Wesley F. Patterson, Jr.
Chairman

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ADMINISTRATIVE SUBCOMMITTEE MEETING

November 4, 1991

C57.19.00 and C57.19.01. Both documents were approved by the IEEE Standards Board on September 26, 1991 and are awaiting publication.

WG on Application of DC Bushings. Mr. Olof Heyman of ABB Ludvika will now chair this working group.

WG on Revision of C57.19.01. A new working group has been formed, under the chair of Mr. Prit Singh of ABB Alamo, to completely revise C57.19.01. The working group met for the first time today. As reported at the last meeting, the major task of this working group will be to concentrate on dimensional standards for bushings.

Coordination with Switchgear Committee. This item was mentioned at the last meeting and was discussed at the Bushing Subcommittee on May 14, 1991. The Switchgear Committee proposal was found acceptable by members of the Subcommittee familiar with the application of bushings to circuit breakers, and a letter of approval was sent to the Switchgear Committee.

L.B. Wagenaar, Chairman
Bushing Subcommittee

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DIELECTRIC TESTS SUBCOMMITTEE ACTIVITIES

ADMINISTRATIVE SUBCOMMITTEE - 11/4/91

1. MEMBERSHIP - 69

Letters have been written to two long time members of the Subcommittee asking if they want to continue their memberships since they have not attended for several sessions.

2. Standards Activities

- G. Vaillancourt resubmitted the PAR and resubmitted the "Guide for Apparent Charge Measurement in Oil-Filled Transformers and Shunt Reactors" for balloting so that it can be elevated to full use status. This action had to be taken as the result of the discrepancies between the number of votes recorded at the Transformers Committee meeting and the number of people reported at the meeting.

- The IEEE Standards Office lost the ballot and other documents for the "Trial Use Guide for Measurement of Acoustic Emissions". The decision is that the Task Force on Acoustic Location of Partial Discharges in Oil Filled Transformers must now resubmit this document for balloting.

- Draft 4 of the Switching Impulse Test Document was completed and mailed for balloting. The results will be available for the Baltimore meeting. It is planned to complete this task so this information will be available for the revision of C57.98.

- Effort is continuing on the complete revision of C57.98 "IEEE Guide for Transformer Impulse Tests". This includes but is not limited to the addition of digital recording of impulse tests and correction of some omissions from the last revision.

- The negative ballot on C57,12.90 c/D6 "Routine Impulse Test For Distribution Transformers " has been resolved so that it can be submitted to the Standards Board.

3. LIAISON ACTIVITIES

- At the Phoenix meeting, it was decided that a group under Loren Wagenaar's direction would be formed to provide liaison with Working Group 3.4.8 for Metal Oxide Surge Arrester [MOSA] Protection. It appeared that there are a number of questions that should be addressed which justified formation of the group. Mr. Musa, Chairman of 3.4.8 has been notified.

- The Subcommittee continues to get requests for background information on standards. One from Argentina on low frequency tests was answered, and a recent request from Australia on power factor correction has been referred to the Working Group on Revision of Dielectric Tests.

Harold Moore

Harold R. Moore
September 27, 1991

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Administrative Subcommittee Meeting - 11/04/91

Performance Characteristics Subcommittee Activities

Membership - Committee

Nomination of Barry H. Ward to membership on the Transformers Committee.

Working Groups - Semi-Conductor Rectifier Transformers

Sheldon Kennedy has replaced Charlie Pounds as Chairman.

Projects - C57.109-1985 Through-Fault Current Duration

Life extension to June 1992 was approved at the 6/26/91 Standards Board meeting.

- C57.18.10 Semi-Conductor Rectifier Transformers

The approved PAR cannot be found. Sheldon Kennedy will follow-up.

Miscellaneous - ANSI/IEEE C57.12.90-1987

Peter Krause has reviewed the reported error in Equation 24 of Section 11.6 - Altitude Temperature Correction. He agrees that the units of measurement are inconsistent and has proposed an editorial correction.

PCS Chairman

ADSPCSA.DOC

INSULATING FLUIDS SUBCOMMITTEE

The primary item being covered at this meeting is C57.130, Gas Analysis During Factory Test. This is progressing & a draft will be balloted by the WG & Subcommittee. A survey will be conducted to collect data for frequency of test & limits.

Work is beginning on a guide for Gas Analysis of Silicone liquid filled Transformers. The PAR # assigned is 1258.

Henry Pearce, Chairman
Insulating Fluids Subcommittee

A true copy of Mr. Pearce's handwritten report.

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IEEE PES TRANSFORMERS COMMITTEE
VICE CHAIRMAN'S REPORT
NOVEMBER, 1991

A. 1991 SUMMER POWER MEETING

1. TRANSFORMER SESSIONS

Two technical paper sessions were sponsored occurring on the afternoons of July 31st and August 1st. A total of seven papers were presented, two of which were authored by Transformers Committee members.

2. IEEE PES TECHNICAL COUNCIL PUBLICATIONS COMMITTEE

The committee met on July 29th with Chairman Don Volzka (Wisconsin Electric) presiding; highlights include:

a. The volume of publication pages continues to exceed target limits. The allocation to the Technical Committees is currently by number of papers; number of pages is being considered as an alternative. The page limit (per paper) may be reduced from 7 to 5. A suggestion was made to also consider the number of submittals in the allocation process.

b. The use of SI units in technical papers, although encouraged, is not a basis for rejection.

c. Technical Paper Coordinator training is tentatively planned for the 1992 WPM.

3. IEEE PES TECHNICAL COUNCIL ORGANIZATION AND PROCEDURES COMMITTEE

The committee met on July 30th with Chairman Jim Edmonds (STI Optronics) presiding; highlights include:

a. The latest draft of the Technical Council Organization and Procedures Manual (assembled by Harry Jones – Southern Co. Services) was reviewed with several revisions being made. A ballot of the committee is planned prior to submittal to the Technical Council.

b. The Procedures Streamlining Working Group has developed guidelines for the operation of working groups. These will be included as appendices in the new Technical Council Organization and Procedures Manual (see A3a above). The July 1991 Drafts were reviewed/discussed.

c. A proposal was introduced to merge the responsibility for ANSI C92 (Insulation Coordination) into the scope of the Surge Protective Devices Committee; further discussion with effected committees will be required.

d. The utilization of an IEEE Standards Electronic Bulletin–Board System for standards coordination/development was discussed. A trial is planned to evaluate this process.

4. IEEE PES TECHNICAL COUNCIL TECHNICAL SESSIONS IMPROVEMENT COMMITTEE

The committee met on July 30th with Chairman John Boyle (Kelco) presiding. The meeting focused on the "Guidelines for Slides/Overheads". Training on this topic was conducted at each Authors' Breakfast during the 1991 SPM; this will be continued at future meetings. The guidelines will be included with future mailings of the Author's Kit.

B. 1991 T&D CONFERENCE

The Transformers Committee held three technical papers sessions having a total of fourteen (14) papers, eight (8) of which were Transactions grade. In addition, two (2) panel sessions were sponsored: Panel #39, "Secondary (Low–Side) Surges in Distribution Transformers" and Panel #40, "Amorphous Core Transformers – The Power Savings Grow".

C. 1992 WINTER POWER MEETING

Of eighteen (18) papers submitted for review, eight (8) were accepted. These, plus one (1) rescheduled from the Summer Power Meeting, will be presented at two sessions which will be held on Wednesday (1/29) and Thursday (1/30) afternoons at the 1992 Winter Power Meeting in New York.

John D. Borst
Vice Chairman Transformers Committee

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TRANSFORMERS COMMITTEE MEMBERSHIP CHANGES
MAY 12, 1991 - NOVEMBER 3, 1991

Added at Tempe meeting:

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

Deleted since Tempe meeting:

Charles Hoesel, Resignation from VM
James Miller, Resignation from VM
Ralph Stetson, Delete from EM - no longer IEEE member
Art Tanton, Resignation from VM
Al Wurdack, Resignation from EM

Membership as of November 3, 1991

Members (Voting)	=	128
Producers	=	49
Users	=	48
General Interest	=	31
Members (Emeritus)	=	15

fwm 10/30/91

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IEEE **STANDARDS DEPARTMENT**
THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.
445 HOES LANE, P.O. BOX 1331, PISCATAWAY, NJ 08855-1331, U.S.A. TELEX 833233, FAX (908) 562-1571

November 11, 1991

To: Jim Harlow

From: Sue Vogel Sue

Subject: Copyright Statement for Drafts

As promised at the Transformers AdCom, enclosed is the copyright statement for draft IEEE standards, which was prepared in consultation with IEEE's legal counsel.

Appropriate placement of this information is on the cover page of an IEEE draft, and on the bottom of each page, as indicated.

Please don't hesitate to contact me if you have any questions.

ASC - R
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IEEE West Coast Transformer Subcommittee Meeting
Minutes, November 20, 1991 Meeting, Milpitas, California

1. Meeting Attendees

Lou Tauber	BPA	Member
Bill Isberg	Isberg & Assoc	Member
David Sundin	Cooper Power Systems	Member
Lens Erlingson	PG&E	Member
Long Duong	Tacome City Light	Guest
Chuck Todd	Tacoma City Light	Member
John Norberg	Seattle City Light	Member
Luther Kurtz	Eng. & Design Assoc	Guest
Bob Stewart	B.C. Hydro	Member
John Galbraith	BPA	Guest
Dave Brucker	Cooper Power Systems	Member
Ray Allustiarti	Consultant	Member
Terry Snow	San Diego Gas & Electric	Member
Jack Bainbridge	San Diego Gas & Electric	Guest
John Wood	PG&E	Member

2. **Membership**

a. Bob Stewart will be taking over from Mike Lau of B.C. Hydro.

b. Denise Roth has indicated that she cannot continue as an active member.

c. Jack Bainbridge was welcomed as San Diego's new representative.

d. James Kinney has indicated that he can not continue to participate as a member.

Continued . . .

3. **Old Business**

a. The question of changing the name and scope of the sub-committee was discussed and it was decided that since the membership predominately consisted of west coast people, the present name and focus should remain. It was also decided to continue to try to arrange for meetings to be held in conjunction with the West Coast Substation group.

b. The concept of staging demonstrations of new technology in conjunction with the meetings was discussed and it was felt that this was a good idea and should be continued.

c. It appears that theSpring 1993 main committee meeting will be held in the Portland area.

4. **New Business**

a. Dave Brucker will investigate the possibility of holding the spring meeting around a demonstration involving a phase shifting transformer installation. Southern Nevada OR UTAH was mentioned as possible meeting locations.

5. **Working Group Reports**

a. LOSS EVALUATION GUIDE - The one negative ballot has been dealt with and this publication will soon be submitted for final approval and printing.

b. INSTALLATION GUIDE CONSOLIDATION - A total of 90% of the ballots have been returned with negative responses dealing mainly with the organization of the guide. Draft 6 incorporating organizational and other improvements was distributed and a number of comments and improvements were suggested. It will soon be sent to the Sub Committee and Main Committee for re-balloting.

Continued . . .

c. FIRE PROTECTION GUIDE - The working group met on November 19, 1991 and will attempt to establish contact with a number of organizations who have specific technical expertise for contributions to this guide. Also, it was pointed out that a new OSHA guide might be useful to review. John Norberg submitted a draft section on containment, which was reviewed.

d. UNIT SUBSTATIONS - This is a new project involving re-writing C57.12 & 13 and the sub-committee agreed to take on this task. Members of the working group will include Dave Brucker, David Sunding, Lou Tauber, Bill Isberg and Chuck Todd.

6. **Future Meeting**

The next meeting will tentatively be May, 1992 at either Salt Lake City or Las Vegas

Underground Transformers and Network Protectors Subcommittee

Meeting Minutes - Baltimore, Maryland - November 5, 1991

I. Introduction/Attendance

The Underground Transformers and Network Protectors Subcommittee met at 10:55 a.m. on November 5, 1991, with 16 members and two guests present. The attendance roster is attached.

II. Approval of Minutes

The minutes of the May 14, 1991, meeting in Tempe, Arizona were approved as submitted.

III. Chairman's Remarks

A. Administrative Subcommittee Notes

1. PAR's have been approved for C57.12.24 and C57.12.44 and PAR's have been resubmitted for C57.12.40 and C57.12.57.

2. All Standards under the responsibility of this Subcommittee and the Distribution Transformers Subcommittee will be balloted for formal adoption into the IEEE Transformers Committee.

3. The same number of Working Group sessions are being planned for Birmingham in April, 1992, since only positive comments had been received on the format of the Baltimore meeting. This Subcommittee's membership suggested that the Monday meetings start 15 minutes earlier and end 15 minutes later to allow adequate time for lunch. The Working Group that had the 1:00 p.m. meeting said about half of the members came in late, delaying the start of the meeting. This item will be discussed at the Administrative Subcommittee meeting in Birmingham.

4. The Chairman requested the IEEE Standards Department to have the appropriate Subcommittee review impedance terminology used in existing distribution transformer standards. Presently, there are at least twelve of these standards that use four different terminologies; that is, Percent Impedance Voltage, Percent Impedance, Impedance Voltage and Impedance.

Some of the reasons for the confusion are:

* Percent Impedance Voltage is not defined in ANSI/IEEE 100-1984.
* Percent Impedance, as defined in ANSI/IEEE 100-1984, refers to rectifier transformers only.
* Impedance Voltage is expressed in volts.
* Impedance is the term most users and manufacturers use but is not defined in ANSI/IEEE 100-1984.

To guide the Working Groups in making the product standards consistent is the reason this review was requested.

B. Membership

Richard D. Graham of General Electric Company became a member of the Subcommittee bringing the membership to 23.

IV. Working Group Reports

A. Three-Phase Underground-Type Transformers (C57.12.24)
J. W. Howard - Chairman

1. The Working Group met on Monday, November 4, 1991, at 1:20 p.m. with 12 members and three guests present.

2. The minutes of the May 13, 1991, Tempe, Arizona meeting were approved as written.

3. It was agreed that a tank pressure of 12 PSIG withstand without rupture be included in the revised standard.

4. The Working Group recommended that the Subcommittee responsible for C57.12.00 consider including in the standard a statement requiring the PCB content be shown on the nameplate. The Subcommittee Chairman will follow up on this recommendation.

5. Table 5 for Audible Sound Levels was revised to include Decibels (dbA).

6. Changed dimension between the parking stand and bushing for 15.2/26.3 kV units from 4.5 inches to 6 inches.

7. Removed "150 kV BIL and below" from Figure 1 title being unnecessary.

8. Changed the Detail of Parking Stand in Figure 3 to indicate that the 0.75 inch depth dimension can be + 1/8 inches (0.125 inches) and -0.0 inches for the parking stand making it comparable to the C57.12.26 standard.

9. Added "kV" to columns 2 and 4 of Table 4 (Electrical Characteristics of Transformer Connectors).

10. The Chairman distributed the approved PAR to the members. The Working Group expects to complete the review of the proposed revisions in Birmingham and to start the balloting process in 1992 to meet the 1993 publication requirements.

11. The Working Group meeting adjourned at 2:25 p.m.

B. Liquid-Filled Secondary Network Transformers (C57.12.40)
E. A. Bertolini - Chairman

1. The Working Group met on Tuesday, November 5, 1991, at 8:00 a.m. with 13 members and nine guests present.

2. The minutes of the May 14, 1991, Tempe, Arizona meeting were approved as written.

3. Figure 1 for High-Voltage Terminal Chamber details will be modified to dimensionally incorporate the location of the bushings. A tolerance of 1/2 inch was added for the front-to-back dimension and the left-to-right dimensions are to be aligned so that the cable entrance lines up with the bushing center.

4. Table 3 with revised maximum tank dimensions was distributed for review. Proposed minimum throat heights are to be reviewed by each member and discussion will continue at the next meeting.

5. Figures 3 and 4 (Transformer Throat for Mounting Network Protector) will be modified for clarity and clearances for the flex connector. Members are to send recommendations to Mr. J. W. Howard who will compile the results and report at the next meeting.

6. Figure 2 (Location of Accessories) will be modified to restrict the length of radiator panels on the low voltage side of the transformer so that they will not interfere with the opening of the network protector door.

7. An audible sound level table will be added to Part II of the standard, which is for transformers with a two-position switch. New figures for the transformer throat will also be added to this section. Mr. Howard will compile these recommendations also.

8. The Chairman of the Subcommittee has requested a review to standardize on impedance terminology.

9. The Working Group expects to complete the review of the proposed revisions in Birmingham and start the balloting process in 1992.

10. The Working Group Meeting adjourned at 9:10 a.m.

C. Secondary Network Protectors (C57.12.44)
R. B. Robertson - Chairman

1. The Working Group met on Monday, November 4, 1991, at 8:00 a.m. for three sessions with 16 members and six guests present.

2. The minutes of the May 13, 1991 and May 15, 1991, Tempe, Arizona meetings were approved as submitted.

3. Twelve sections have been prepared by individual members for the proposed standard. The first four sections (Table of Contents, Scope and Related Standards, Definitions and Service Conditions) have been previously reviewed and approved in concept by the Working Group. On Monday, review of Section 5 (Design Test Requirements) and most of Section 6 (Production Test Requirements) was completed.

4. The Working Group also met for a full day session on Wednesday, November 6, 1991, and is trying to complete a review of the Sections for Relay Requirements, Fuses, Standard Ratings, Mechanical Performance Specifications, Other Requirements, Appendix A - Classification of Insulating Materials and Appendices for Tutorials on use of relay curves and fusing. Once this review is complete, a draft document will be produced.

5. C. Ambrose of FPL resigned from the Working Group and A. L. Robinson of Central Power and Light was appointed to fill his position in the Final Editing Group.

6. The Working Group expects to complete the review of the proposed standard in 1992 and start the balloting process in 1993.

7. The November 4, 1991, meeting adjourned at 12:00 noon.

D. Dry-type Network Transformers (C57.12.57)
B. Nutt - Chairman

1. The Working Group met on Monday, November 4, 1991, at 2:30 p.m. with 14 members and 11 guests present.

2. The minutes of the May 14, 1991, Tempe, Arizona meeting were approved as submitted.

3. Draft 4 was reviewed and changes were made in the switch portion of the standard to clarify the intent for performance and operation of the switch.

4. Bonding of transformer panels was discussed with no resolution being accomplished. Input from members was requested for the next meeting.

5. It was agreed to eliminate Part II (Other Requirements or Alternatives) from the standard and to include those portions needed into the main body of the standard.

6. A Draft #5 will be produced from these proposed changes. The Working Group expects to complete the review of all proposed revisions in Birmingham and start the balloting process in 1992.

7. The meeting adjourned at 5:00 p.m.

V. Other Business

A. Working Group Chairman were reminded it is their responsibility to publish minutes of their meeting promptly. Also, standards need to be revised or reaffirmed five years from the date of approval.

B. Some members include reference to NEMA TR-1 in their specification and some manufacturers state the standard is no longer valid. The Chairman will follow-up with the NEMA secretary to determine its status.

C. This being the last meeting Mr. Veitch will serve as Chairman of the Transformers Committee, the Chairman expressed the appreciation of the Subcommittee to him for all the support he provided to the Subcommittee in transferring their standard activities into the IEEE Transformers Committee. His leadership, guidance and kindness were greatly appreciated.

D. A membership application form for the IEEE PES Transformers Committee is attached. The Chairman urged all members that meet the qualifications to apply and said that all new applications would be considered at the next Administrative Subcommittee meeting in Birmingham.

VI. Future Meetings

The location and dates scheduled for future meetings are as follows:

Mar 29-Apr 1, 1992	Birmingham (Winfrey Hotel), Alabama
Oct 15-18, 1992	Cleveland (Sheraton City Center), Ohio
Spring, 1993	Portland, Oregon
Fall, 1993	St. Petersburg, Florida
Spring, 1994	Dallas, Texas
Fall, 1994	Milwaukee, Wisconsin

The meeting adjourned at 11:45 a.m.

Respectfully submitted,

Paul E. Orehek
Chairman

Attachments

Underground Transformers and Network Protectors Subcommittee Meeting
Attendance Roster - Baltimore, Maryland - November 5, 1991

Members Present

T. R. Balgie	Virginia Power
E. A. Bertolini	Consolidated Edison of New York
C. E. Griffith	Potomac Electric Power
R. D. Graham	General Electric
J. L. Harper	Arizona Public Service
J. W. Howard	Pennsylvania Power and Light
J. R. Moffat	Westinghouse Electric
D. H. Mulkey	Pacific Gas and Electric
J. Nay	Consultant
C. G. Niemann	Commonwealth Edison
B. Nutt	Texas Utilities
P. E. Orehek	Public Service Electric and Gas
F. Perri	Ferranti-Packard
P. Risse	Georgia Power
R. B. Robertson	Tampa Electric
A. L. Robinson	Central Power and Light

Members Absent

W. Caldwell	ABB Power T&D
R. W. Fisher	Potomac Electric Power
K. Ginthwain	General Electric
M. C. Mingoia	Edison Electric Institute
R. L. Plaster	ABB Power T&D
H. J. Sim	Square D
J. Valdes	Florida Power and Light

Guests

D. L. Billings	Qualitrol Corporation
R. Hagerman	Qualitrol Corporation

Attendance Summary

	Present	Absent
Members	16	7
Guests	2	

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Application for Membership
IEEE PES Transformers Committee

Name _____

Company _____

Address _____

_____

Telephone _____ Fax _____

IEEE Member Grade _____ IEEE Member # _____

Member PES? ☐ Yes ☐ No

Please note membership eligibility requirements on reverse.

List principal subcommittee and working group activity. This application is to be signed by the respective chairmen as references. At least one reference must be a subcomittee chairman, who will sponsor the applicant.

1. _____ _____ _____
   Subcommittee/Working Group | Duration | Chairman (Signature)

2. _____ _____ _____
   Subcommittee/Working Group | Duration | Chairman (Signature)

3. _____ _____ _____
   Subcommittee/Working Group | Duration | Chairman (Signature)

Check the classification most appropriate for your position:

☐ Producer or Manufacturer Interests - Those directly concerned with the production of products which are covered by documents prepared by the Transformers Committee.

☐ Consumer or User Interests - Those who apply or use products which are covered by documents prepared by the Transformers Committee.

☐ General Interest - Those who have interests other than those described above.

Signed _____ Date _____

Approved by Administrative Subcommittee:

_____ _____
Chairman | Date

.090

Membership Eligibility Requirements

1. Member in good standing of the IEEE Power Engineering Society.

2. Participation for at least one year in Working Groups and Subcommittees of the Transformers Committee.

3. A demonstrated interest and knowledge of the fields of Distribution, Power and/or Regulating Transformers.

4. Willingness to devote time and effort to contribute to the advancement of the art by:

   - Regular attendance at meetings and participation at the Subcommittee and Working Group level.

   - Reviewing technical papers for presentation and publication, as may be assigned by the Vice Chairman of the Committee.

   - Committing to the timely return of committee ballots.

Notes

1. A member who has been absent for more than two consecutive meetings may be dismissed from the Committee, subject to Administrative Subcommittee review of extenuating circumstances. The designation of a representative (a non-Transformers Committee Member) will count as attendance for the member.

2. A non-member of the IEEE PES may be appointed as a non-voting consultant to Subcommittees and Working Groups of the Transformers Committee.

3. The Administrative Subcommittee of the Transformers Committee is composed of:

   - Officers of the Transformers Committee.
   - Chairmen of the various subcommittees.
   - Immediate Past Chairman of the Transformers Committee.

   The officers may invite others to attend; i.e. IEEE representative, meeting hosts, etc. as the need occurs.

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Meeting Minutes
Insulation Life Subcommittee
of the
IEEE Transformer Committee
at the
Omni Inner Harbor Hotel
Baltimore, Maryland
November 5, 1991

The Insulation Life Subcommittee met on Tuesday, November 5, 1991, at 9:30 A.M. There was a total attendance of 91, consisting of 25 subcommittee members and 66 guests.

After introductions were made, the minutes of the previous meeting in Phoenix, Arizona, were approved as issued.

The Chairman introduced and welcomed six new members to the Subcommittee:

Frank David	- Eastern Electric
Don Duckett	- General Electric
George Henry	- Central Maloney
Phil Hopkinson	- Cooper Power Systems
Ron Stoner	- PSI Energy
Charles Williams	- Florida Power

The first working group report was given by Dave Takach, Chairman of the Working Group on Guides for Loading. Dave reported that his Working Group met at 7:50 A.M. on Monday, November 4, 1991, with 30 members and 32 guests present.

Dave Douglas, Chairman of the Task Force on Insulation Loss-of-Life, indicated that the third meeting of his group was held on Sunday, November 3, 1991, with 8 Task Force members and 10 guests present. This Task Force is attempting to modernize the treatment of insulation loss of life for inclusion in the new loading guide.

For this Task Force meeting, Bill McNutt had submitted some changes to Section 4.2 of the new loading guide on transformer insulation life, and to appendix I-2, on thermal aging principles. The proposed change of Section 4.2 includes a table that provides a possible normal insulation life, each based on different end-of-life criteria. The proposed changes to appendix I-2 includes tutorial information on how a user would select one of the insulation life values to use in loading his calculations.

These proposed changes were reviewed at the meeting, but not without considerable debate. The debate centered around whether or not enough is known about insulation life, to adequately use it as a measure of transformer loadability.

The Chairman, with Task Force approval, agreed to formulate a ballot based on the McNutt changes, and ballot the Task Force prior to the next meeting of the transformer committee.

Olin Compton then shared with the Working Group some of his concerns about the revised loading guide. Olin indicated that there are several categories of transformers to be covered in the new combined guide:

1) Distribution Transformers
2) Distribution Substation Transformers
3) Transmission Tie Transformers
4) Generator Step-Up Transformers

Each category of transformer has its own set of loading considerations. Olin's major concern is that the revised loading guide applies loading criteria developed in C57.115 to all power transformers. C57.115 was specifically written to address loading issues unique to transformers 100 MVA and above, such as heating caused by stray flux and circulating currents, when operated at, or above, nameplate rating. Therefore, the application of C57.115 criteria, the temperature ranges and duration for the various loading categories, as well as the loading categories themselves, may not be appropriate for all types of power transformers. This is a very valid concern and will be addressed before the next meeting.

Next on the agenda was Charles Williams of Florida Power and Light. Charlie informed the Working Group about the various distribution transformer temperature testing projects that are currently underway. Charlie indicated that Dudly Galloway, ABB, and Steve Smith, Kuhlman, are performing laboratory based testing of distribution transformers in order to determine their dynamic thermal response to various types of load cycles. Based on the results of this testing, Charlie will compare the measured test data with that predicted by the ANSI loading guide equations. This comparison will be made using a sophisticated, multipurpose computer program that he and Don Duckett have recently developed. It is hoped to have some comparison data to share with the Working Group at its next meeting.

Stan Lindgren of EPRI announced that EPRI, under the auspices of the Facts Research Project, has contracted with PTI the development of dynamic thermal models of various power system components, including power transformers. The power transformer models will be developed using the ANSI loading guide equations.

Phil Hopkinson of Cooper Power Systems, indicated that he is undertaking a project to determine a distribution transformer's thermal response to harmonically distorted loads, and anticipates having test results ready for the next meeting of the Working Group. This work is very timely, and will be of great interest.

The last presentation was made by Linden Pierce of General Electric. Linden briefly reviewed his recent work on temperature testing of power transformer windings, which formed the basis of his excellent paper presented at the Summer P.E.S. meeting.

Linden also reviewed his proposed alternate set of thermal equations. These equations are based on bottom oil rise and include the effect of:

1) resistance change with temperature
2) oil viscosity change with temperature
3) the use of duct oil temperature rise
4) location of the hottest spot.

George Henry of Central Maloney distributed a copy of the first draft of his paper entitled: "Refined Techniques for Modeling Transformer Top-Oil Temperature Transients" to the Working Group for comment.

This paper develops a method to predict the top oil temperature response to linear variation in ambient temperature and load.

The second Working Group Report was given by Bob Grubb, Chairman of the Working Group on Thermal Tests. Bob reported that his group met on Monday with 12 members and 42 guests in attendance.

Bob indicated that a great milestone has been reached in that all negative ballots have been resolved on the transformer committee ballot of P838/ANSI PC59-119 "Recommended Procedures for Performing Temperature Rise Tests on Oil Immersed Power Transformers at

Loads Beyond Nameplate Ratings". The document has now been revised to correct the shortcomings which resulted in these negative ballots and it will again be sent out for ballot of the Transformer Committee.

The other major Working Group project is PC57.12L which is an effort to generate definitions of a transformer "Thermal Duplicate". The Chairman had submitted a draft of proposed definitions to the Working Group prior to the meeting. The main controversy now centers around tolerances for the various definitive parameters. The Working Group has decided to prepare a survey that will be submitted to both the Insulation Life Subcommittee and the Transformer Committee to gain a broader consensus for these critical tolerance values.

The report on the meeting of the Working Group on Thermal Evaluation of Distribution and Power Transformers was given by its Chairman, Larry Lowdermilk. He reported that they met Monday with a total attendance of 35, consisting of 9 members and 35 guests.

Chuck McMillen discussed the approach he used in developing the common Arrhenius curve for power and distribution transformers that is now proposed to be included in the new thermal evaluation test procedure. There was no disagreement in using the Arrhenius curve as proposed.

The proposed sealed tube aging test procedure was reviewed with most of the discussion centered around the criteria for determining the end of life of the insulation materials being evaluated. It was agreed that the primary criteria should continue to be based upon a 50% reduction in tensile strength for cellulose insulation, but the Degree of Polymerization (DP) measurement, per the technique included in ASTM, is recommended as a supplementary test to determine its correlation with transformer aging. The DP test is believed to hold more potential for evaluating the aging of transformer insulation than the tensile strength retention test.

Chuck McMillan pointed out that the most significant change in this proposed test procedure is decreasing the safety factor of 5 times minimum life used by distribution transformer manufacturers to a safety factor of 2 times minimum life. Linden Pierce commented that based upon the minimum life expectancy of 60,000 hours as specified in the present test procedure, the proposed minimum life of 180,000 hours and a 2 times safety factor should be more conservative than the present criteria for transformers, but less conservative than that being used for distribution transformers. Working Group and Subcommittee members should carefully review this change before voting on the proposed test procedure.

The last Working Group report was given by Mike Franchek, substituting for Heinz Fischer, Chairman of the Working Group on High Temperature Insulation for Liquid Filled Power Transformers.

The Working Group met on Monday, at 10:45 A.M. There were 11 members and 22 guests present.

Since the last meeting the group has been upgraded to the status of a Working Group from a Task Force.

After the last meeting a PAR (Project Authorization Request) was completed and sent to the IEEE Standards Board for approval. The PAR was approved with 3 changes, which were all agreed to by the Working Group at the meeting.
The major item on the agenda for the Working Group meeting was discussion of a "Position Paper" of which draft 1 had been issued during the summer for comments. Many comments were reviewed and included in Draft 2, which was mailed out just prior to the meeting.

In the discussion of Draft 2 in the Working Group meeting meeting, the following major points were raised:

1. The term Position Paper does not seem to be appropriate. A consensus was reached that the name of the paper be changed to "Background Information on High Temperature Insulation Systems for Liquid Filled Transformers".

2. A question was raised as to intent of the paper. The paper is intended to provide a going in point for the Working Group as it begins its task of providing input to ANSI standards and guides on the use of High Temperature Insulation.

3. It was felt that the paper was one-sided on the pluses for the use of High Temperature Insulation and not including the negative side and possible concerns in its application.

Draft 3 of the Background Paper will be proposed and be issued well before the next meeting. It will address the three concerns mentioned plus incorporate all the figures not yet included.

It is hoped that comments on Draft 3 will be received in time to issue a near final Draft 4 before the next meeting.

Old Business - The Chairman received a request from Sheldon Kennedy for liaison from our Subcommittee to the Working Group on Semi-Conductor Rectifier Transformers of which he is Chairman. This liaison job was accepted by Jin Sim of Heavy Duty Electric.

Next, it was indicated that a request was received by the Subcommittee Chairman to provide a Transformer Committee Liaison to SCC-4, the Standards Coordinating Committee, whose basic concern is revision of IEEE #1 covering all types of insulation systems (see attached letter). This document was originally written by Steinmetz and Lamme of G.E. in the early 1920s. Mel Manning, who died recently, was our liaison to SCC- for many years.

I had no volunteers from the Insulation Life Subcommittee and asked if any member of the Transformer Committee, familiar with Insulation System, would agree to act as this liaison. The only meeting of the group is during the Winter PES Meeting. All other work is done by mail. After the meeting, four people indicated an interest in persuing this liaison job.

Also under Old Business, the Chairman read a letter from Mr. Dripps, an outsider, requesting additions to our loading guides to cover limitation of dielectric stress in transformer hottest spot areas. (see attached letter). Significant discussion followed on this controversial subject. It was decided that some background information will be submitted to the Subcommittee with the minutes (see attached paper entitled "Voltage Stress as a Factor in Thermal Evaluation Program for Insulation Systems in Distribution Transformers") and the subject will again be discussed at the Birmingham meeting

With no further Old Business and no New Business, the Subcommittee meeting was adjourned.

Attachments

Respectfully submitted:

David H. Douglas
Subcommittee Chairman

TC-E
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IEEE

TRANSFORMERS COMMITTEE

POWER ENGINEERING SOCIETY

Please Reply To:
BECKWITH ELECTRIC CO.,INC.
P.O. Box 2999
Largo, FL 34649-2999
September 16, 1991

Mr. D. H. Douglas
CENTERIOR ENERGY
6200 Oaktree Blvd.
Independence, OH 44131

Dear Dave:

SUBJECT: Transformer Committee Liaison
Standards Coordinating Committee No. 4:
Thermal Ratings

Due to the death of Dr. Mel Manning, we have no liaison representation to SCC 4. I spoke about this with Mr. Phil Alexander, Chairman of SCC 4. He advises that liaison from the Transformers Committee is definitely desired and that the representative should possess expertise in the field of insulation systems.

I ask for your recommendations in this regard. As Chairman of the Insulation Life Subcommittee, you, or someone from your subcommittee, would be the most logical choice. Mr. Alexander advises that his committee meets once each year at the Winter Power Meeting and that much of the activity is handled by mail at other times through the year. The near-term effort of this committee will be to rewrite IEEE #1.

I have given your name to Mr. Alexander with the suggestion that he call you at 216/447-3370 to further discuss this matter.

Sincerely,

J. H. Harlow
Secretary

JH:mk
cc: P. E. Alexander
R. A. Veitch
J. D. Borst
W. B. Binder

TC-E
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OF
2

RECEIVED
JUL 18 1991
ANSI

July 10, 1991

American National Standards Institute, Inc.
1430 Broadway
New York, NY. 10018

C57.91 C57.92

Attention: Insulation Life Subcommittee of the IEEE Transformers Committee

Subject: Insulation System Life Expectancy

A recent investigation of the failure of some transformers that were thought to be loaded within the guidelines but had obviously failed by deterioration of the paper insulation in the area of highest dielectric stress in the hottest sections of the coil led me to conclude that the life expectancy curve (FIG1 C57.91) omits a key factor. It is based on a particular insulation system and hottest spot temperatures. It does not define the maximum dielectric stress that is allowed in the hottest spot areas.

In the particular transformers the highest dielectric stress was the layer to layer stress. The stress level was satisfactory for passing all the test criteria at normal temperatures. Where transformers are expected to operate at elevated temperatures the electrical stress in the hottest area should be reduced. In my opinion it should have been about 20% lower for the particular case.

Obviously the manufacturers do not want the standards to decree the specific design criteria for layer insulation. In other coil structures the critical dielectric stress may not be the layer to layer stress. In either case the specification should include some definition of the life of the critical insulation under combined electrical and thermal stress. The utility should then specify the expected life at a particular electrical stress and hot spot temperature such as (200 hrs at rated voltage at 150 degrees Celsius).

P6

Copy to: 7/23/91
John Gauthier FYI
Sue Vogel
From Charlie Zegan

Specifically I propose for C57.91 and C57.92:

1. C57.91 paragraph 3.4.1
   C57.92 paragraph 3.2.1
   Include a statement describing the aging process as a combination of electrical and thermal stress.

2. C57.91 paragraph 3.4.2
   C57.92 paragraph 3.2.3
   An additional chart should be added to show the combined effect of temperature and electrical stress (volts/mil - temperature - mean time to failure).
   The new chart in my opinion need only cover the range of time from 100 to 1000 hours and should be labeled as being based on new insulation not repeated tests.

3. C57.91 paragraph 3.4.3
   C57.92 paragraph 3.2.3
   Include a statement that electrical stresses, in a particular design, are assumed to be low enough to establish the base point or 100 hour point on Fig1.

William F. Dripps

William F Dripps S.M.
1404 32ND ST
LAUREL, MS 39440

Wm. F. Dripps
1404 - 32nd Street
Laurel, MS 39440-1415

Report: Insulating Fluids Subcommittee Meeting
November 4 & 5, 1991
Baltimore, Maryland

The Insulating Fluids Subcommittee met on Monday morning, November 4, and Tuesday morning, November 5, with twenty-six (26) members and twenty-eight (28) guests present. On Monday, the working group on PC 57.130 and the subcommittee met simultaneously.

PC 57.130 Guide for Gas Analysis during Factory Tests

In the future, we will be requesting a new title for this guide. Those in attendance discussed the text to be rewritten, and the draft to be prepared for WG & Subcommittee ballot.

At the same time, a task force chaired by Caroline Komlenic will conduct a survey of the Insulating Fluids Subcommittee and the Transformers Committee to gather information for the timing of sampling and recommended test limits.

P 1258 Guide for Gas Analysis on Silicone Liquid filled Transformers

An initial write-up will be prepared, and a survey to gather data will be sent to the Insulating Fluids Subcommittee, Transformers Committee, and Industrial Applications Society.

Gas Analysis on Small Power Transformers and HMWH filled Transformers

A working group with Dave Sundin, Chairperson, will study and collect data for preparing information for inclusion in the next revision of C 57.104.

C 57.104 Gas Guide
C 57.106 Oil Guide
should be issued early next year

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Report: Insulating Fluids Subcommittee Mtg. 11/4 & 5/91 (con't)

The Transformers Committee has voted to reaffirm IEEE 637 - Reclamation of Insulating Oil & Criteria for Its Uses.

It has also been voted to reaffirm IEEE 799 - Handling & Disposal of Transformer Grade Insulating Fluids Containing PCB's.

Henry Pearce

Henry Pearce
Chairman

TC-G

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IEEE/PES TRANSFORMERS COMMITTEE
INSTRUMENT TRANSFORMER SUBCOMMITTEE
Meeting Minutes
Baltimore Md.
Nov. 6, 1991

1. The Instrument Transformer Subcommittee meeting opened at 8:00 AM, Nov. 5, 1991. Eleven members and eleven guests attended.

2. The draft for P832, "Detection of Partial Discharges and the Measurement of Apparent Charge Within Instrument Transformers" was partially reviewed. The subcommittee should complete this project during the next two meetings.

3. Additional information will be acquired for evaluation of current transformer loading in pad-mounted transformers.

4. The subcommittee has been requested to consider a working group for optical current and voltage transducers. The chairman will consult with the other IEEE functions involved and the requestor for the change to determine the need for this change.

Respectfully Submitted,

John N. Davis

John N. Davis, Chairman

Minutes of the Nov. 4, 1991 Meeting of the HVDC Converter Transformer and Smoothing Reactor Subcommittee Baltimore, MD

Members Present:

F. David	Federal Pioneer
R. Dudley	Trench Electric
F. Elliott	Bonneville Power Administration
W. Kennedy	ABB Power T&D Co.
K. Papp	Trench Electric
P. Riffon	Hydro-Quebec
W. Stein	Siemens

Members Absent:

D. Allan	GEC Alsthom
K. Carrender	ABB Ludvika
V. Dahinden	H. Weidmann AG
E. Norton	Consultant
S. Oklu	Los Angeles Dept. of Water & Power
G. Vaillancourt	IREQ

Guest Present:

G. Preininger	Elin
J. Watson	Los Angeles Dept. of Water & Power

Copies to:

L. Wagenaar	American Electric Power Service Corp
O. Heyman	ABB Ludvika
J. Harlow	Beckwith Electric
R. Veitch	NEI-Ferranti Packard
E. So	Nat. Research Council
S. Kennedy	Niagara Transformers
S. Kuznetsov	PSM Technologies
S. Nilsson	EPRI
P. Lips	ABB Baden
D. Sharma	Nova Scotia Electric
A. Lindroth	ABB Ludvika
S. Vogel	IEEE Standards

TC-H
2 OF 8

S. Vogel IEEE Standards
Office Minutes of the Nov. 4, 1991 Meeting of the
HVDC Converter Transformer and Smoothing Reactor Subcommittee
Baltimore, MD

The meeting was called to order at 8:00 AM with six members and three guests present. It was noted that our two PAR's have been approved: PC57.129 has been modified to consider only converter transformers, while P1277 has been issued for "Trial-Use General Requirements and Test Code for Oil-Immersed and Dry-Type Smoothing Reactors." There was some discussion regarding how to handle the two PARs. It is expected that much of the work for smoothing reactors will be covered by a task force chaired by Richard Dudley in the Dry-Type Transformer Subcommittee and that the additional requirements for oil-filled smoothing reactors will closely follow those being developed in the C57.129 standard for converter transformers.

We next briefly covered the work being performed in the CIGRE JWG 12/14.10 on hvdc converter transformers. That group is now recommending either a one-hour ac applied test on the dc-side winding or a combined ac+dc test at elevated temperature as an additional test to demonstrate margin over operating stresses. (The CIGRE working group prefers the ac applied test because it relies on existing established pd criteria and it is much easier to perform.) There were no new developments in the CIGRE working group regarding loss calculations. They are planning to conduct surveys regarding users' experiences with sound level measurements and on impedance tolerances for hvdc equipment. At our meeting is was pointed out that IEC will be adding a discussion on sound intensity measurements in its next standard, and a paper on the subject will be published shortly in ELECTRA. Sound intensity measurements would be necessary on site for converter equipment in order to isolate results from adjacent units, but it could be difficult to obtain measurements all around the perimeter when the transformers are mounted against a valve hall wall. It was pointed out that there are two influences to sound levels of converter equipment in operation - dc magnetization of the core and harmonics. Although the maximum magnitude of the dc magnetization current is specified this may not be achieved in actual operation, and as a result there may be a very large difference in operational sound levels between equipment at different stations even though their designs are similar.

We next discussed draft 4 of our proposed standard for converter transformers (PC 57.129), concentrating on the dielectric tests. Although CIGRE will be recommending either an ac+dc test at elevated temperatures or an ac applied test, we agreed to recommend only the ac applied test because it is more practical. A reference to the CIGRE paper will be added to our document when the CIGRE paper is published.

Pierre Riffon presented an analysis of losses in converter transformers using techniques presented in the IEEE paper by Forrest and comparing those with losses calculated using harmonic multipliers measured on transformers from ABB and Siemens. (A copy of Mr. Riffon's calculations is attached to these minutes.) Results showed quiet a variation between the different techniques for the Radisson transformers; Fred Elliott volunteered to perform similar calculations for transformers used on the BPA system.

Draft 1 of the smoothing reactor standard should be completed and issued by January 1992; comments on draft 4 of PC57.129 are requested by the end of February so that draft 5 may be issued prior to our next meeting.

Respectfully submitted,

William N Kennedy

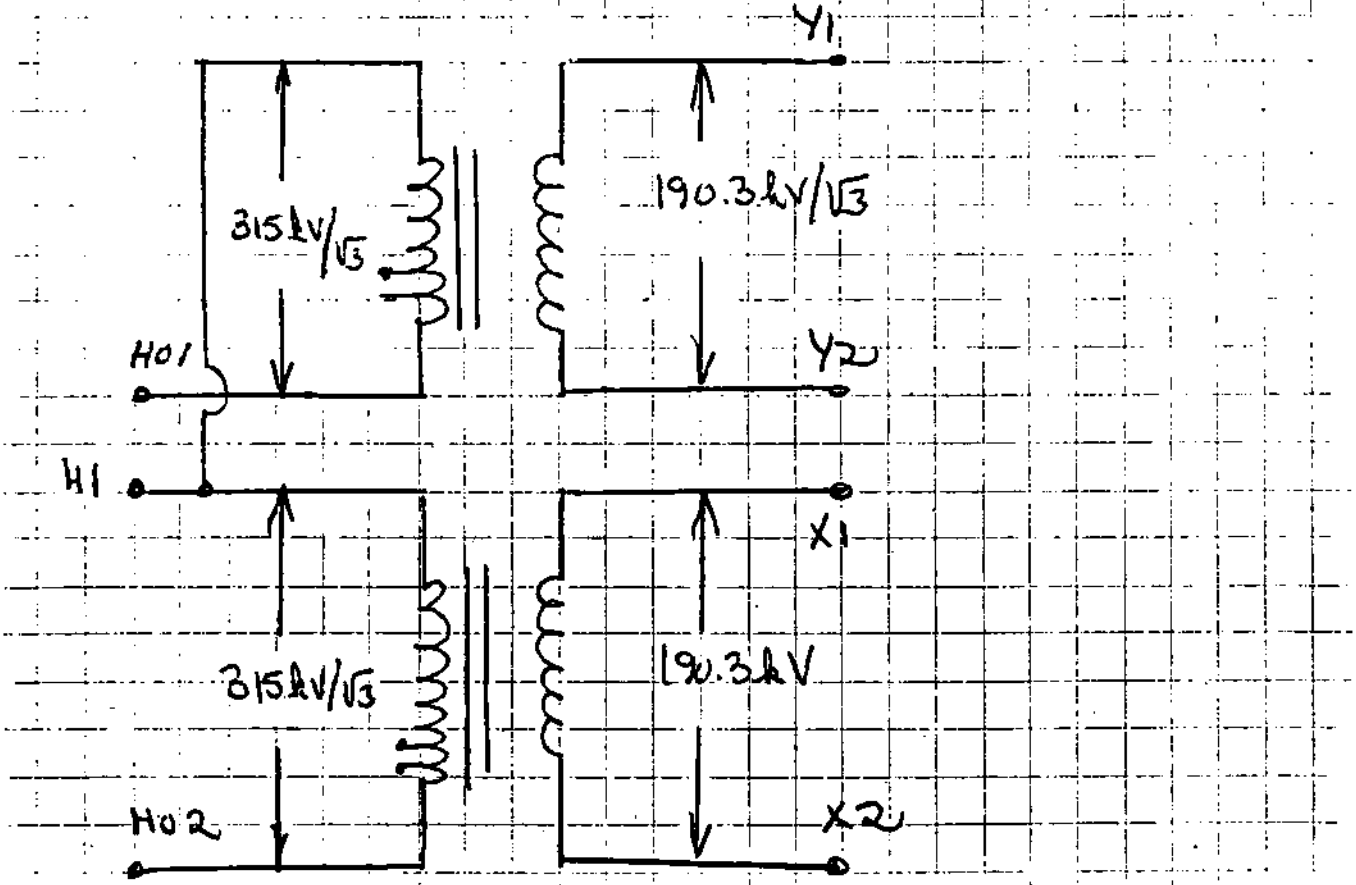
William N. Kennedy
Chairman, HVDC Converter Transformer and Smoothing Reactor Subcommittee

HARMONIC LOSSES ON RADISSON STATION CONVERTER

TRANSFORMER

TRANSFORMER RATINGS:

- POWER : 404 MVA, 1Ø
- PRIMARY WINDINGS : $315\,kV/\sqrt{3}$ rms $\pm$ 11 x 1.25%
- SECONDARY WINDINGS : a) $190.3\,kV/\sqrt{3}$ rms (Y connected)
  b) 190.3 kV (Δ connected)
- IMPEDANCE : 12%



- TOTAL LOSSES AT 75°C (MIN. TAP) : 1.00 p.u.
- RI^2 : 0.844 p.u.
- Stray losses (Total) : 0.156 p.u.

SPECIFIED HARMONIC CONTENT

Harmonic	Current (p.u.)
1	0,955
5	0,190
7	0,130
11	0,072
13	0,055
17	0,031
19	0,023
23	0,014
25	0,013
29	0,010
31	0,009
35	0,008
37	0,007
41	0,007
43	0,006
47	0,005
49	0,004

1 p.u. = 100% rated current based on 404 MVA

CALCULATED HARMONIC LOSSES ACCORDING TO N. Alan C. Forrest paper

a) For $\omega = 0,2$ (20% of the total stray losses in the winding)

Harmonic	Losses (p.u.)
1	0,912
5	0,097
7	0,068
11	0,039
13	0,029
17	0,012
19	0,009
23	0,004

1 p.u = 100% load losses measured during factory tests (corrected to 75°C)

HARMONIC	LOSSES (p.u.)
25	0,004
29	0,004
31	0,003
35	0,003
37	0,003
41	0,003
43	0,002
47	0,002
49	0,002

Total load losses : 1,196 p.u.

b) For $\omega = 0,3$

Harmonic	Losses (p.u.)
1	0,912
5	0,104
7	0,075
11	0,044
13	0,033
17	0,016
19	0,011
23	0,005
25	0,005
29	0,004
31	0,004
35	0,003
37	0.003
41	0.003
43	0.003
47	0.002
49	0.002

Total load losses 1.229 p.u.

2) CALCULATED HARMONIC LOSSES ACCORDING TO A.B.B. CURVE

Harmonic	Losses (p.u.)
1	0,912
5	0,153
7	0,096
11	0,068
13	0,050
17	0,026
19	0,018
23	0,009
25	0,008
29	0,007
31	0,007
35	0,005
37	0,005
41	0,005
43	0,005
47	0,004
49	0,003

Total losses: 1,381 p.u.

3) CALCULATED HARMONIC LOSSES ACCORDING TO SIEMENS CURVE

Harmonic	Losses (p.u.)
1	0.912
5	0,180
7	0,140
11	0,084
13	0,063
17	0,029
19	0,019
23	0,010

Harmonic nb	Losses (p.u.)
25	0,009
29	0,008
31	0,007
Total load Losses	1,461 p.u.

4) COMPARAISON BETWEEN DIFFERENT METHODS

a) Considering harmonic no 1 To 49

1) Classic formula : $P_T = P_{LOAD\ 60Hz} + 0,75$ Stray losses

$P_T = 1.00$ p.u. $+ [0,75 \times 0,156$ p.u.$]$

$P_T = 1,117$ p.u.

2) J.A.C. Forest paper : $\omega = 0,2$: 1,196 p.u. (+7.1%)
$\omega = 0,3$: 1,229 p.u. (+10.0%)

3) A.B.B curve : 1.381 p.u. (+23.6%)

b) Considering harmonic no. 1 To 31

1) J.A.C. Forest paper : $\omega = 0.2$: 1,181 (+5,7%)
$\omega = 0.3$: 1,213 (+8,6%)

2) A.B.B. curve : 1.354 p.u. (+21.2%) ⟩ Δ : +7,9%

3) Siemens curve : 1.461 p.u. (+30.8%) ⟩

IEEE PES TRANSFORMERS COMMITTEE

DRY TYPE TRANSFORMER SUBCOMMITTEE

MEETING MINUTES

BALTIMORE, MARYLAND - November 5, 1991

Chairman: Mr. W. F. Patterson, Jr.

1. Chairman Remarks and Announcements

The Dry Type Transformer Subcommittee met at 2:00 PM with 20 members and 9 guests present. The first order of business was the approval of the minutes of the 05/14/91 meeting in Phoenix. 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	Cast Coil Loading Guide	L. Pierce

Following the W.G. presentations, the following additional agenda items were covered.

Sec.1.6	Thermal Evaluation and Flammability	R. Provost
Sec.1.7	Thermal Problems	W. Mutschler
Sec.1.8	Dielectric Problems	A. Kline
Sec.1.9	New Business	

1.2 During Mr. Dudley's presentation, it was noted that a new task force subordinate to the Dry Type Reactor W.G. was being formed to provide support to Mr. Kennedy's W.G.'s on HVDC Converter Transformers and HVDC Smoothing Reactors. The Chairman will attempt to arrange meeting times for this task force at the first time slot on Monday morning.

The Chairman discussed the status of C57.99, the loading guide for reactors. It is due for reaffirmation and is considered an appendix of C57.16. Mr. Dudley explained that this document is no longer appropriate especially considering that it covers both liquid and dry equipment. Following a brief discussion it was agreed to allow this standard to expire and pursue a new loading guide following completion of C57.16.

1.3 Following Mr. Cambre's report on IEEE 259, he reported on the balloting of the Dry Type Subcommittee. He noted that only 14 of 25 ballots were returned. This was insufficient return rate for a valid ballot (75% minimum return is required). The Chairman reiterated the urgent need for the members to promptly respond on this ballot. This W.G. is due to expire 12/92.

1.4 A poor ballot return was also reported by Mr. Barnard on the Dry Type Test Code. The Chairman reiterated the need for a prompt return of ballots. In addition, the Chairman noted that he is encouraging W.G. Chairmen to drop from their rosters any members who do not actively participate in the W.G. activities. It should be noted that this includes both response to ballots and attendance to W.G. meetings.

The Chairman also noted that C57.12.91 will expire in 1991. Ms. Vogel explained that a ballot of Transformer Committee would be required for either a 2 year extension or reaffirmation. Following the discussion on the possible approaches, the Subcommittee unanimously voted to have IEEE ballot the Transformer Committee for reaffirmation.

1.5 Mr. Pierce reiterated that his W.G. is producing an addition to the Dry Type Loading Guide not a rewrite of it. His intention is to modify the forward somewhat and then build a Part B incorporating the characteristics of the cast coil type units.

1.6 Thermal Evaluation and Flammability

No meetings were held on Flammability or Thermal Evaluation. Mr. Provost was unable to attend this session. However, he requested that a meeting time slot be reserved at the Birmingham Meeting in the Spring of 1992. The Chairman will attempt to accommodate this request.

The Chairman noted that C57.12.56 is coming due for reaffirmation in 1992. He will ask Mr. Provost if he would also accept responsibility to oversee this process.

1.7 Thermal Problems.

Mr. Mutschler was unable to attend this meeting. No issues were addressed on the agenda item.

1.8 Dielectric Problems

Mr. Kline reported that the Partial Discharge standard was approved by the Standards Board in June.

1.9 New Business

1.9.1 The Chairman announced that IEEE will issue guidelines on copyright protection covering not only standards but drafts. All drafts are to have a cover page with a copyright statement. Standards will have the IEEE logo printed on each page.

1.9.2 The Chairman discussed changes in the registration fee announced at the previous AdCom meeting. Transformer Committee meeting registration fees will increase from $50 to $60. The bill will state $70 but will give a $10 discount for early registration - to encourage members to register early.

1.9.3 The following individuals were acknowledged as new members to the Dry Type Subcommittee:

Mike Haas
Roger Hayes
Chuck Johnson
Mike Mitelman
Klaus Papp
Guy Pregent
Bill Simpson

Also it was noted that Mr. Gaibrois (Detroit Edison) was replaced by Mr. Musa (AEP) as the liaison on the Surge Protection Devices Committee.

1.9.4 The following standards were approved:

C57.12.58 - Transient Analysis
C57.124 - Partial Discharge Guide

1.9.5 The following standards are in the process of being balloted for reaffirmation:

C57.12.50 - Conformance Guide - Dry Types ≤ 500 KVA
C57.12.51 - Conformance Guide - Dry Types > 500 KVA
C57.12.52 - Conformance Guide - Sealed Dry's

The standards were under the auspices of HVACC and have since been transferred to the Dry Type Subcommittee. Should they not be approved, the Dry Type Subcommittee will need to form W.G.'s to resolve negative votes.

1.9.6 The status of C57.12.55 was discussed. It is due for a reaffirmation vote in 1992 and has yet to be assigned to an IEEE subcommittee. The Chairman will petition the Chairman of the Transformer Committee to have this document assigned to the Dry Type Subcommittee.

1.9.7 The Chairman noted that C57.94, the Installation and Maintenance Guide, while having just been revised must be reaffirmed in 1992. Following a short discussion, it was agreed that the Chairman would request the Transformer Committee to have it balloted for reaffirmation.

1.9.8 Mr. Uptegraff discussed the need in the industry for a standard covering grounding devices. He noted that such a standard would cover more than dry type devices and perhaps would be more appropriate for the Performance Subcommittee. Following a discussion, Mr. Uptegraff agreed to pursue this issue and report his findings at a later date.

1.10 The meeting was adjourned at 4:00 PM.

1.12 Attendance Roster

MEMBERS PRESENT

R. Bancroft
D. Barnard
M. Cambre
R. Dudley
J. Frank
M. Haas
R. Hayes
C. Johnson
S. Kennedy
A. Kline
R. Marek
J. Nay
K. Papp
W. Patterson (Chairman)
P. Payne
L. Pierce
G. Pregent
J. Sullivan
R. Uptegraff
H. Windisch

MEMBERS ABSENT

B. Allen
A. Bimbiris
T. Darr (NEMA Liaison)
R. Gearhart
A. Jonnatti
E. Koenig
M. Mitelman
Y. Musa (SPDC Liaison)
W. Mutschler
R. Provost
R. Simpson
V. Thenappan

GUESTS PRESENT

F. Grysekiewiez
W. Hansen
T. Holdway
R. Hollister
G. Marowski
M. Rajadhyaksha
E. Sapp
R. Thomas
S. Vogel

ATTENDANCE SUMMARY

	Present	Absent
Members:	20	12
Guests.:	9	

Prepared by:

Wesley F. Patterson Jr, Chairman
Dry Type Transformer Subcommittee
January 17, 1992

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 11/04/91 at 2:30 PM with 9 members present and 3 guests. Following circulation of the attendance list, the minutes of the 05/13/91 meeting were approved as written.

2.2 Dry Type Reactor W.G. input to the drafting of a standard for HVDC smoothing reactors was discussed. Based on input from the Chairman, who had attended Mr. Bill Kennedy's subcommittee meeting, the consensus was that this could best be achieved by creating a Task Force reporting to the Dry Type Reactor W.G. This Task Force would be chaired by R. Dudley and in order to be effective it is suggested that it's meeting be scheduled 7:30 AM to 9:00 AM Monday's and that Bill Kennedy's meeting be moved to 9:20 AM on Monday. Based on Bill Kennedy's objective of issuing a first draft of the HVDC smoothing reactor standard prior to the 1992 Spring meeting, the first meeting of the Task Force should be at that meeting.

2.3 Draft D3 of the revision of C57.16 was discussed (including Mr. Dudley's notes on the revision). The following are the highlights:

2.3.1 The revised format which is in line with that used in C57.21-1990 was accepted.

2.3.2 It was requested that changes in future drafts be denoted in some manner; such as use of bold type.

2.3.3 Section 7.1.1 dealing with tolerances on losses was discussed. Key subjects of discussion were the commercial versus technical aspects, single phase versus three phase stacked coils (coupling impacts), and deviation acceptance criteria. It was decided to use the wording in the recent edition of the shunt reactor standard. One concept to be incorporated is that average losses can exceed the guarantee, and that it is purely a commercial issue, provided that temperature rise limits are not exceeded. It was also agreed that the losses on a single unit should not exceed the average losses of all units by more than 6%.

2.3.4 It was agreed that the maximum short circuit current rating should not be set at 33 times rated continuous current but should be based on actual available fault current including system impedance effect. A sample calculation method should be included.

The duration of the short circuit current should be set by the end user as it depends on system operating procedures. Typical values of 1, 2, and 3 seconds should be mentioned.

These revisions will involve Sections 5.5.1, 5.5.2, and 10.1.

2.3.5 What is included in losses was discussed. The shunt reactor standard will be used as a guide with some additions to include reactors in enclosures. In this case it will be recommended to measure at least one reactor-enclosure combination on a multiple unit order. How to determine losses on remaining reactor-enclosure combinations will be a matter for agreement between manufacturer and end user. Section 2.3.1 will be modified accordingly.

2.3.6 Section 8.3.4 and the subject of terminal temperature rise was discussed. Other sources of information will be sought with an emphasis on temperature limits for various connection options; eg. copper to aluminum, aluminum to aluminum, tin plated terminals, etc. P. Riffon will supply excerpts from an IEC guide. This guide may be included in the list of references along with other pertinent papers. It was also suggested to add to the footnote in this section that it is preferable to perform the temperature rise test with the in service terminal connection.

2.3.7 Axis identification is missing in Figure #5.

2.3.8 Section A.7 of Appendix A was reviewed. It was requested that more information be included on circuit breaker TRV and the use of reactors. Some details on methods of reducing TRV should be included. Is there an appropriate place in the main body of the standard to mention breaker TRV associated with the use of reactors?

2.3.9 A section should be added to Appendix A covering the use of surge arrestors with dry type reactors.

2.3.10 It was suggested to modify Table #4 based on C57.21-1990 with the appropriate note changes.

2.3.11 Section 4.4 should be amended to include 50 Hz or 60 Hz as specified by the user to reflect the international scope of the standard.

2.3.12 Appendix B covering filter reactors should be expanded especially in the areas of audible noise, short circuit(eg. capacitor bank discharge, etc.) and temperature rise tests.

The second sentence in B6.4 should be amended:

> "...an equivalent single frequency current that produces winding losses..."

2.3.13 Section A.3 of Appendix A should be enlarged to include information on magnetic clearances to circuit breakers, current transformers, and substation controls.

2.3.14 Section 11.7 on Short Circuit Calculations will be replaced with a write-up, submitted by a W.G. member, based on C57.12.00 and C57.12.01. This will make the format and terminology more contemporary.

2.3.15 Section 10.3 dealing with short circuit thermal limits was reviewed. It was suggested to revise the text and Table 7 to be more in-line with IEC documents. Inputs were requested by the Chairman.

2.3.16 In Section 2.6.2.1 other types of insulators in use today will be referenced; eg. resin, polymer, concrete, etc.

2.3.17 The hipot test on the reactor support structure (insulators) was discussed on the basis of whether the effect of rain in service would be simulated. A test on a fully assembled unit should only be performed on one unit on an order as the insulators are certified by their manufacturer.

2.4 The Chairman thanked all members for their inputs and agreed to produce draft D4 of C57.16 for the next meeting. This draft will include the results of the discussions above plus additional inputs from W.G. members as appropriate.

2.5 The meeting was adjourned at 5:20 PM.

2.6 Attendance Roster

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

GUESTS PRESENT
R. Bancroft
J. Frank
G. Marowski

ATTENDANCE SUMMARY

	Present	Absent
Members:	9	10
Guests.:	3	

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 11/04/91 at 1:00 PM with 5 members and 7 guests present. Following the introductions of those present, the minutes of the 05/31/91 meeting were approved as written.

3.2 Membership of W.G. absentees was discussed. The Chairman will correspond with them concerning future participation in the W.G.

3.3 Balloting of the W.G. on P257/D7 was reviewed; 8 ballots were received with 5 approvals, 2 approvals with comment, and one abstaining. Most comments were purely editorial. Note: total membership stood at 11.

3.4 Review on comments that involved content.

3.4.1 In Section 4.2, the 15-35°C difference will be retained as a guide. Actual differences used will still be a user discretion.

3.4.2 In Section 3.2 "corona" will be replaced with "partial discharge".

3.4.3 Tables #1 and #2 will have references to pertinent sections added to clarify the test methods required.

3.5 The meeting was adjourned at 2:00 PM.

3.6 Attendance Roster

MEMBERS PRESENT

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

MEMBERS ABSENT

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

GUESTS PRESENT

H. Azizian
T. Holdway
A. Jonnatti
A. Kline
R. Marek
R. Thomas
R. Whearty

ATTENDANCE SUMMARY

	Present	Absent
Members:	5	6
Guests.:	7	

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 11/04/91 at 10:45 AM with 10 members and 12 guests present. Following the introductions of those present, the minutes of the 05/13/91 meeting were approved as written.

4.2 The Chairman stressed the importance of returning ballots. The last ballot sent out had a poor response.

4.3 Draft D4 is being prepared based on comments received to date. Mr. L. Pierce will incorporate all comments and prepare D4. D4 is expected to be completed for mailing by January 1992.

4.4 Mr. W. Mutschler has sent Chapter 12 to Mr. L. Pierce for incorporation into D4.

4.5 IEEE is backed-up with paperwork and processing of draft issues is taking 2 to 3 months. The Chairman will decide whether to have IEEE process draft D4 or do it himself. The Chairman was encouraged by the W.G. to process the draft himself since there is a limited mailing.

4.6 Mr. R. Hollister reported on Sections 4 through 9. He indicated that the liquid filled transformer group is revising the Chapter 9. He will coordinate his rewrite of Chapter 9 with Mr. Hemming's W.G. Mr. Hollister distributed copies of the present status of section 4 through 9 so members could read and prepare comments prior to receiving D4. Mr. Hollister's also presented a synopsis of his work to date and a plan for his rewrite.

4.7 Negative ballots and comments had been received on Chapter 11 and those comments were discussed. As chairman of the Chapter 11 Task Force, Mr. L. Pierce will incorporate comments as appropriate into draft D4 of the whole document. It was the consensus of the group that a complete document would be easier to handle than individual sections.

4.8 The meeting was adjourned at approximately 11:57 AM.

3.9 Attendance Roster

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

GUESTS PRESENT

J. Brown
D. Hagerman
T. Holdway
C. Johnson
A. Jonnatti
R. Marek
G. Marowski
P. Payne
G. Pregent
M. Rajadhyaksha
E. Sapp
J. Sullivan

ATTENDANCE SUMMARY

	Present	Absent
Members:	10	14
Guests.:	12	

5. **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.

5.1 The working group met on 11/05/91 at 9:30 AM. There were 14 members and 8 guests present. Following the introductions of those present, the minutes of the 05/14/91 meeting were approved as written.

5.2 The Chairman reported that due to staff mistakes at the IEEE Standards Board, the PAR was not approved. It will be on their December Agenda as unfinished business.

5.3 The Chairman reported on a submittal received from R. Bancroft. The same information was included in reference #2 of the Chairman's handouts.

5.4 The Chairman distributed and briefly reviewed the following references:

5.4.1 F. R. Outer, "The Loading of Solid Insulation Distribution Transformers with Special Reference To the Cast Resin Type", 1977

5.4.2 W. E. Featheringill, "Power Transformer Loading", IAS Transactions, 1983

5.4.3 L. W. Pierce, "An Investigation of the Temperature Distribution in Cast Resin Transformer Windings", IEEE T&D Conference, 1991

5.4.4 L. W. Pierce, supplement to 5.4.3 above

5.4.5 Ref.5.4.1 gives different time constants for LV and HV windings. This characteristic was also noted in Ref.5.4.3. Ref.5.4.2 gives equations for time constants based on size and current. This would be difficult for users to apply. Ref.5.4.2 presented calculations showing the RMS equivalent load cycle calculation technique gives a greater life expected than the step by step hot spot calculation approach. Testing is needed by manufacturers.

5.5 The Chairman discussed the following additional issues.

5.5.1 Scope of W.G. shall be cast coil transformers produced to C57.12.01-1989.

5.5.2 The insulation classes to be covered shall be: 130, 155, and 185°C.

5.5.3 Since the thermal evaluation standard, C57.12.60, has not been issued or used, it is difficult to establish life curves for loading. Therefore adoption of IEC maximum permissible temperatures during overload appears in order as follows:

Class °C	Max Temp °C
130	165
155	190
185	220

Members will submit data to the Chairman by 01/01/92. The first draft, D1, is scheduled for 04/15/92. Plans are to complete the document within a 3 year period.

5.6 The meeting was adjourned at 10:15 AM.

..7 **Attendance Roster**

MEMBERS PRESENT

R. Bancroft
D. Barnard
J. Frank
M. Haas
R. Hayes
C. Johnson
A. Jonnatti
G. Marowski
W. Patterson
L. Pierce (Chairman)
G. Pregent
M. Rajadhyaksha
R. Simpson
H. Windisch

MEMBERS ABSENT

B. Allen
A. Bimbiris
R. Gearhart
R. Goethals
R. Grant
M. Iman
E. Koenig
T. Lanoue
W. Mutschler
J. Sullivan

GUESTS PRESENT

M. Cambre
P. Gafinowitch
D. Galloway
J. Holland
A. Kline
R. Marek
G. Michel
D. Whitley

ATTENDANCE SUMMARY

	Present	Absent
Members:	14	10
Guests.:	8	

IEEE POWER ENGINEERING
TRANSFORMER COMMITTEE
DISTRIBUTION TRANSFORMER SUBCOMMITTEE

MEETING MINUTES

OMNI INNER HARBOR HOTEL, BALTIMORE, MD - NOVEMBER 5, 1991

Present:

Name	Company	Member
Jerry C. Thompson	Duke Power	Yes
Ken Hanus	Texas Utilities	Yes
Gerry Paiva	Southern Calif. Ed.	Yes
S. Riggs (for Ed Smith)	Central Moloney	Requested
Ron Jordan	San Diego Gas & Elec.	Yes
John Lazar	Northern States Power	Yes
Peter Manos	Allied-Signal Metglas	No
Ali Ghafourian	Cooper Power Systems	Yes
Bob Scheu	GE	Yes
Jim Arnold	USDA REA	Yes
Dave Lyon	Wisconsin Electric Power	Yes
Paul Orehek	PSE&G	No
Kevin Edwards	Hevi Duty Electric	Yes
Matt Mingoia	EEI	Yes
Dale Peters	Georgia Power	Yes
Richard Hollingsworth	Howard Industries	Yes
Dorman Whitley	ABB Power T&D	Yes
Ron Stahara	Kuhlman Corporation	Yes
Al Maguire	Entergy Services Inc.	Requested
B. S. Wilson	Philadelphia Electric	Yes
Jim Brown	Detroit Edison	No
Roy Uptegraph	R. E. Uptegraph Mfg. Co.	Yes
Olin Compton	Virginia Power	Yes

Presiding Officer: Gerry A. Paiva

1. The meeting convened at 2:00 p.m. in the Carrol Room with an introduction of the members and guests and the signing of the attendance roster. An explanation of Chairman Frank Stevens' absence due to company travel restrictions was provided. Discussion on Frank's status with the committee is contained within this document.

2. Recognition of two of our retiring members was given by acting chairman Gerry Paiva; those members being Jim Arnold of USDA REA and Jim Miller of ABB, Jefferson City. Their years of work on our committee and experiences will be missed by the whole transformer standards community.

3. A discussion on how memberships in the various transformer committees is obtained was conducted.

   A. WORKING GROUP MEMBERSHIP: Members are appointed by the working Group Chairman based on indication of interest by an individual. Voting rights are given after the attendance and participation in TWO working group meetings.

   B. DISTRIBUTION TRANSFORMER COMMITTEE: Members are appointed by the Committee Chairman and must be approved by the Transformer Committee Chairman (currently John Borst). Membership is only granted after a full year of participation in distribution standards work with the working groups and the transformer committee.

4. A brief report on the Administrative Committee, Monday evening meeting was given by Mat Mingoia who substituted for Chairman Frank Stevens. The report noted that the Spring 1992 meeting of IEEE/Transformers would be in Birmingham, Alabama with the hotel rooms costing $92/night. There was a suggestion to members that they begin registering for meetings earlier in the future to help the IEEE in planning, etc.

5. C57.12.20 REPORT: (OVERHEAD POLE MOUNTED) Published in 1988 and is scheduled to be republished in 1993. The working group for this standard met on Monday. This standards is on schedule for publications. Major issues at the Baltimore meeting, included discussion on mounting brackets, low voltage terminals, non-porcelain bushings, and insulating lids. Draft 1 was reviewed.

6. C57.12.21 REPORT: (SINGLE PHASE LIVE FRONT PADMOUNT) Published in 1980 and is scheduled to be republished in 1992. The working group for this standard met on Monday. This standards is on schedule for 1992 printing.

7. C57.12.22 REPORT: (THREE PHASE LIVE FRONT PADMOUNT) Published in 1998 and is scheduled for republishing in 1993. The working group for this standard met on Monday. A draft 2 is prepared for review at the Spring 1992 meeting. This standard is paralleling C57.12.26 in style and content.

8. C57.12.23 REPORT: (SINGLE PHASE SUBMERSIBLE) Published in 1986 and is scheduled for republishing in 1992. The working group met on Tuesday for a short update meeting. Balloting has been successfully completed and the document has been sent to the Board of Standards for review.

9. C57.12.25 REPORT: (SINGLE PHASE DEAD FRONT PADMOUNT) Published in 1990. The working group met on Monday. In a very productive working group meeting several issues

concerning the face plate dimensions were resolved. Thus, this standard will be published within its assigned time table of 1995.

10. C57.12.26 REPORT: (THREE PHASE DEAD FRONT PADMOUNT) Published in 1987 with republishing scheduled for 1992. This working group met very briefly on Tuesday. The balloting of this standard has been successfully completed with the document, now being prepared for submittal to the Board of Standards.

11. C57.12.27 REPORT: (THREE PHASE PADMOUNT UNIT SUBSTATIONS) This working group did not meet. Based on minimal use of this standard within the industry, the working group has recommended that this standard be withdrawn. Balloting of other interested groups will now be completed to assure concurrence.

12. BAR CODING REPORT: This newly established working group is being chaired by Ron Jordan and held its first meeting on Monday with 29 people in attendance. Using a guide established covering bar coding the working group began immediate work at constructing a new ANSI standard. Chairman Jordan solicited the aid of those in the working group that possess expertise in this area. A special task force was established to investigate several bar coding format potentials. Draft 1 will be prepared for review by the working group at the Spring 1992 meeting. The meeting was highlighted by much interest and enthusiasm for this new standard.

13. C57/37 REPORT ON ENCLOSURE INTEGRITY: Report was given by Tom Diamantis of Niagara Mohawk based on he recent working group meeting in Boston. The joint C57/37 working group was founded in 1983 by the C57 and C37 Main Committees to address a padmounted enclosure for transformers and switchgear. Its first standard, C57.12.28 Enclosure Integrity for Padmounted transformers was published in 1988. The working group continued its work and in 1990 its Padmounted Enclosure Integrity Standard for coastal environments was approved. This document has subsequently been approved by ANSI and will be published with a 1991 date. The working group is presently working on a standard for submersible equipment and will be numbered as C57.12.30. An integrity document for pole mounted transformers is now being considered and will carry the number C57.12.31. This standard is prepared and expected to be balloted in 1991.

14. After review of the standards under jurisdiction of this subcommittee, a further discussion on the future status and availability of Chairman Frank Stevens was conducted by acting chairman, Gerry Paiva. All members expressed the desire that

Frank's unique leadership ability be continued available to this committee and the industry. It is hoped that Northeast Utilities will be able to support this need.

15. A discussion on the need for a standard format for the transmittal of data from manufacturer to user was discussed by Dave Lyon of Wisconsin Electric Power. Much interest in the proposal was noted. Dave will continue with this concept via further study and then discussion at the Spring 1991 meeting. The next logical steps to the formation of a working group to consider would be agreement by the Transformer Committee and determination by C57 Main, if this endeavor would be within the scope of the Transformer Subcommittee.

16. Olin Compton described C5712.00 and C57.12.90 as the "Mother" document of all transformer standards and suggested that our standards utilize their format to the extent possible.

17. Jerry Cochran of Cooper Industries mentioned that Roy Uptegraph will soon chair a task force on pressure relief and tank integrity for transformers.

18. The meeting was adjourned by action of Chairman Paiva at 2:56 p.m.

Notes respectfully submitted by Jerry C. Thompson

MEETING MINUTES

DIELECTRIC TEST SUBCOMMITTEE
November 5, 1991
Baltimore, Maryland

The Dielectric Test Subcommittee met at 2:00 P.M. with 36 members and 36 guests present. The minutes of the May 14, 1991 meeting in Phoenix, Arizona were approved as submitted.

WORKING GROUP REPORTS

I. WORKING GROUP ON REVISION OF DIELECTRIC TESTS
J. B. Templeton, Chairman

The Working Group met at 3:55 P.M. on November 4, 1991 with 19 members and 34 guests present. The minutes of the May 13, 1991 meeting were approved as submitted.

The Task Force reports were as follows:

Task Force on Revision of Impulse Test Guide
R. E. Minkwitz, Sr., Chairman

The Task Force met at 10:45 A.M. on November 4, 1991 with 26 members and 21 guests present. The minutes of the May 13, 1991 meeting were approved as submitted.

A. Review of Draft 4, Switching Impulse Test Guide

Draft 4 had been prepared and balloted in the Working Group and Dielectric Test Subcommittee. The result of the balloting was as follows:

Number of ballots sent out	-	92
Approved	-	55
Approved with comments	-	12
Not approved	-	0
Not voting	-	3
No response	-	22
Total		92

The discussion was directed at resolving the "Approved With Comments" ballots. All comments were editorial in nature and were resolved during the meeting. The appropriate changes will be made in Draft 5 which is to be included in an upcoming ballot in the Working Group of the Impulse Test Guide.

B. Review of Draft 1, Impulse Test Guide Foreward and Table of Contents

Draft 1 was balloted in the Working Group in August, 1991. The result of the ballot was as follows:

Number sent out	-	42
Approved	-	30
Approved with comments	-	2
Not approved	-	0
Not voting	-	0
No response	-	10
Total		42

This was a successful ballot and the "Approved With Comments" were resolved in the meeting.

C. Digital Measurements Study Committee Report

This group has prepared a text on digital measurement of impulse voltages which will be included in the next ballot of the Impulse Test Guide. This material will be included in Section 2.3, "Measurement of Impulse Voltages".

D. Other Topics Related to the Impulse Test Guide

It is intended to include the following items in the next draft of the Impulse Test Guide.

- Impulse Testing of Neutral Terminals
- Impulse Testing of Terminals of Buried Windings
- Frequency Response of Dividers
- Impulse Testing of Low Impedance Windings

Texts are being developed for inclusion in the Impulse Test Guide. The first two items listed above must also be included in C57.12.90 and a PAR must be submitted to accomplish this.

Task Force on Enhancement Voltage Time During Power Transformer Induced Tests

M. Altman

The Task Force met at 7:55 A.M. on November 4, 1991. The minutes from the May 13, 1991 meeting were approved as submitted.

The main topic of discussion involved changing the enhancement duration from 7200 cycles to 1500 cycles. In the May 13, 1991 Working Group meeting a vote was taken of those in favor of reducing the time to 1500 cycles. The result was 12 in favor and 5 opposed. In view of the percentage opposed it was suggested that the Task Force accumulate empirical data from users and manufacturers of induced test results comparing corona levels

before and after the enhancement. In addition, the literature would be searched for information to compare the volt-time characteristics of the 1500 cycle enhancement, 7200 cycle enhancement, and one hour induced test. The data and information are to be sent to M. Altman for analysis.

Liaison With Surge Protection Devices Committee

A committee was formed in the Working Group to address a request from SPD Working Group 3.4.8 on Arrester Protection and Coordination Transformer Insulation concerning insulation coordination between metal oxide surge arresters and transformers. Based on their review of this subject, the committee recommended the formation of a Task Force to study this issue further. It was concluded that the Administrative Subcommittee would be asked for guidance as to which subcommittee should work on this topic.

The meeting adjourned at 5:10 P.M.

II. WORKING GROUP OF REVISION OF DIELECTRIC TESTS OF DISTRIBUTION TRANSFORMERS
J. R. Rosetti, Chairman

The Working Group met at 1:00 P.M. on November 4, 1991 with 12 members and 9 guests present. The minutes of the previous meeting were approved as submitted.

The Task Force reports were as follows:

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

Bill Henning reported on the status of the Routine Impulse Test for Distribution Transformers. The document is being submitted to the Standards Board. The impulse test will be included along with other revised tests in the next revision of C57.12.90 after approval by the Standards Board. The submission process is as outlined on page 24 of the Transformers Committee Operating Manual.

Low Side Surge Requirements for Distribution Transformers
W. B. Uhl, Chairman

Bruce Uhl reported on the comments received from the Task Force paper presentation at the T&D Expo in Dallas. Of the 120 questionnaires passed out only four replies were returned. Although there is an interest in failures due to low-side surge, many utilities do not keep failure data. Utilities may not have the personnel available for teardown of failed units.

John Sklintas gave a presentation on low-side surges caused by ground strokes to buried URD cable used to serve single-phase compartmental transformers. The test showed that direct buried semicon jacketed and direct buried cable with bare concentric neutral made pad mounted transformers more susceptible to low-side surges from induced ground strokes. In summary the tests showed:

- Pole type transformers and pad mounted are both subject to secondary surges.
- Meter gaps tended to balance severely unbalanced surges.
- Both calculated and measured unbalanced currents in the secondary did not exceed 1000 amps for interlaced transformers. This value is less than what is needed to fail the transformer.
- Secondary arresters are not needed to protect interlaced transformers from secondary surges.

Tests comparing interlaced and non-interlace transformers show:

- Interlaced transformers have low voltage at the secondary terminals from high current.
- Non-interlaced transformers have high voltage from low current at the secondary terminals.
- Non-interlaced transformers equipped with secondary surge arresters have the same withstand as interlaced designs.

Chuck McMillen suggested that the Task Force prepare an application guide from the findings presented in the paper. Bruce reminded the Task Force that the original purpose of the group was to draft a low side surge design test. This will be discussed further at the next meeting.

Routine Test Guide for Distribution Transformers, C57.98
D. E. Ballard, Chairman

Don Ballard reported on the discussion of fault detection in the Routine Impulse Test Guide for Distribution Transformers. It was suggested that small, high voltage transformers (10 kVA, 19.9kV) could be used for test purposes with switchable faults to test the detection capabilities. Several members of the Task Force have agreed to build these transformers and check the ability to detect single turn staged faults.

The Task Force plans to have a draft prepared within a year for comment by the Working Group.

Digital fault detection will be discussed at the next meeting.

The meeting adjourned at 2:00 P.M.

III. WORKING GROUP ON PARTIAL DISCHARGE TESTS FOR TRANSFORMERS
G. H. Vaillancourt, Chairman

The Working Group met at 7:55 A.M. on November 5, 1991 with 25 members and 42 guests present. The minutes of the May 14, 1991 meeting were approved as written.

The Task Force reports were as follows:

Task Force for the Acoustic Detection of Partial Discharges In Oil Immersed Power Transformers and Reactors
E. Howells, Chairman

The meeting convened at 9:25 A.M. on November 4, 1991 with 7 members and 15 guests.

The group was informed that the previous guide, approved 18 months ago, was misplaced by the IEEE Standards Board. Therefore, the document must be balloted again through the Transformers Committee.

The main order of business was the Location Guide. Various parts of this had been worked on during previous meetings, but it has now been brought together as one document. Inconsistencies between various sections were identified and alternate wording developed. The major areas of concern were identified as:

1. Ensure that the word "Reactors" was included in the title and subsequent references.
2. Reword the discussion of instrument sensitivity requirement in the first paragraph of page 2.
3. Add a reference to support the expression for the position of the source on the top of age 3.
4. On page 4 further explain the consideration of introducing a dielectric material into an existing transformer.
5. It was decided to change the third paragraph on page 11 to require three hemispheres instead of two.
6. The section on data recording and analysis on page 12 will be rewritten.

The meeting adjourned at 10:45 A.M.

Subsequent to Mr. Howell's report, Ed Norton volunteered to collect and provide representative acoustic data that may be discussed at the next meeting.

Task Force On The Measurement Of Apparent Charge
W. J. Carter, Chairman

The Task Force met at 7:50 A.M. on November 4, 1991 with 12 members and 10 guests present. The minutes of the Phoenix meeting were approved without comment.

The results of the recent ballot for elevation to full use status of C57.113, "Trail Use Guide for Partial Discharge Measurement in Liquid Filled Power Transformers and Shunt Reactors" was discussed. In summary, ballots were sent to 127 members of the Transformers Committee, 101 were returned, and there was a 100% affirmative vote.

The collection of partial discharge data was discussed with the result that no new data had been received since the last meeting.

Mr. Vaillancourt said that CIGRE Coordination was still required on the C57.113 guide before the next REVCOM meeting in December.

The consensus of the Task Force was that it had achieved it's goal with the completion of the guide. The Task Force voted to recommend to the Working Group that the task force work be concluded.

The Task Force discussed goals for a future task force which included:

1. Analysis of Results
    a. Discharge counters
    b. Histogram analysis
    c. Total charge measurement
    d. Discharge averaging techniques
    e. Peak meter characteristics
2. Field Test Problems

The meeting adjourned at 8:35 A.M.

The ensuring discussion dealt with the Task Force recommendation to conclude it's work. Mr. Vaillancourt proposed that the Task Force had met its' goal and should be disbanded. The Working Group concurred with a vote of 23 in favor and none opposed.

A new Task Force was proposed and accepted by the Working Group by a vote of 20 in favor and none opposed. The scope of the Task Force is to study and compare methods of apparent charge evaluation in liquid-filled power transformers and shunt reactors in order to specify an improved acceptance criterion to be used during tests. These methods could include but would not be limited to peak apparent charge level. New circuitry will be developed if needed. Applications for the chairmanship of the new Task Force were solicited.

NEW BUSINESS

1. It was suggested that another Task Force may be needed to address field measurements of partial discharge. This will be discussed with the Dielectric Test Subcommittee chairman.

2. It was suggested that the issue of RIV measurements during induced test and the interpretation of changes in RIV levels during the test should be reviewed. This matter should be handled by the new Task Force.

The meeting adjourned at 9:40 A.M.

Upon completion the Working Group reports the Subcommittee acted upon the recommendation to disband the Task Force on the Measurement of Apparent Charge. The Subcommittee voted 27 in favor and none opposed to disband the Task Force. In addition, the Subcommittee voted 21 in favor and none opposed to the formation of the new Task Force described in the Working Group report.

There was no new business. It was requested that Charles Hoezel be removed from the Subcommittee roster.

The meeting adjourned at 2:40 P.M.

H. R. Moore, Chairman

Minutes Prepared By:

J. B. Templeton

TC-K
8 OF 9

DIELECTRIC TESTS SUBCOMMITTEE MEETING
NOVEMBER 5, 1991

ATTENDANCE RECORD

MEMBERS	PRESENT	ABSENT
E. J. Adolphson	X	
D. J. Allen		X
R. Allustiarti		X
M. S. Altman	X	
R. J. Alton		X
S. W. Arnold		X
D. E. Ballard	X	
D. A. Barnard		X
A. Bartek		X
P. L. Bellaschi		X
J. V. Bonucchi	X	
C. V. Brown		X
W. J. Carter	X	
C. R. Chatterji		X
J. L. Cochran		X
J. C. Crouse	X	
D. H. Douglas		X
D. A. Duckett	X	
D. J. Fallon	X	
H. G. Fischer		X
J. A. Fleeman	X	
M. Frydman		X
R. Garcia		X
W. R. Henning	X	
John Holland	X	
P. J. Hopkinson	X	
E. Howells	X	
Y. P. Iijima	X	
W. N. Kennedy		X
R. E. Lee		X
F. A. Lewis	X	
H. Light	X	
L. Lowdermilk	X	
D. L. Lowe	X	
R. Lowe		X
T. Massouda		X
J. W. Matthews		X
J. T. McAlpin		X
F. J. McCann		X
G. G. McGrae		X
C. J. McMillen		X
S. P. Mehta	X	
C. K. Miller		X
R. E. Minkwitz, Sr.	X	
H. R. Moore		X
H. P. Moser		X

R. J. Musil		X
S. K. Oklu		X
S. H. Osborn	X	
B. K. Patel	X	
D. D. Perco		X
M. D. Perkins	X	
D. W. Platts	X	
J. L. Puri		X
C. A. Robbins	X	
J. R. Rossetti	X	
M. P. Sampat		X
W. E. Saxon	X	
D. N. Sharma		X
V. Shenoy	X	
H. J. Sim	X	
L. R. Smith	X	
W. W. Stein	X	
L. R. Stensland		X
J. B. Templeton	X	
T. P. Traub		X
G. H. Vaillancourt	X	
R. A. Veitch	X	
L. B. Wagenaar	X	
B. H. Ward		X
R. J. Whearty	X	
G. R. Wollerton		X

ATTENDING AND REQUESTING MEMBERSHIP

R. H. Aartgrove
D. E. Ayers
J. J. Bergeron
Paul Russman
V-S. N. Sankar
D. M. Shah
S. D. Smith

GUESTS

R. Barker
Enrique Betancourt
W. Binder
T. Bode
W. Boettger
J. Bosiger
J. Brown
R. Chadwick
T. J. Clement
J. Davis
F. E. Elliott
R. Fausch
D. Getson
D. Goodwin
J. W. Harley
G. Kallaur
J. Long
R. Loss
G. Michel
D. E. Parr
A. Pereira
R. Stoner
M. Thaden
R. W. Thompson
E. Trummer
R. Wakeman
J. Watson
F. Willet
J. Wood

TC-L
1 OF 3

BUSHING SUBCOMMITTEE
Report to the Transformers Committee
November 6, 1991

The Bushing Subcommittee met on Tuesday, November 5, 1991 with 16 members and 21 guests present. The following three guests requested membership after the meeting, bringing the subcommittee membership to 34:

Olof Heyman - ABB Components, Ludvika
James Long - United Illuminating
Dilip Shah - North American Transformer

After approval of the minutes of the May 14, 1991 meeting at Tempe, AZ, Chairman Wagenaar reported that C57.19.00, General Requirements and Test Procedures for Outdoor Power Apparatus Bushings and C57.19.01, Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings, were both approved by the IEEE Standards Board on September 26, 1991. They will both be published after the six month waiting period.

Prit Singh, technical advisor to IEC/SC36A, also reviewed his latest comments and their effect on the revision of IEC 137, Bushings for Alternating Voltages above 1000 V.

The Subcommittee then heard reports from its three working groups:

Working Group on Bushing Application Guide (PC57.19.100)

Chairman Fred Elliott reported that the working group met on Monday (11/4) with 12 members and seven guests present. The results of the Transformers Committee ballot on upgrading C57.19.101-1989, Trial-Use for Loading Power Apparatus Bushings, to a full guide was successful. The vote was 110 (86%) out of 128 ballots returned with 98 affirmative, no negative and 12 abstention votes. The rest of the meeting was spent discussing PC57.19.100, Bushing Application Guide. The following items were discussed.

1) Bushing oil level during temperature performance tests.

2) Inclusion in the guide of connecter information during temperature performance tests.

3) Capacitance charge limits for recommended bushing investigation or removal.

4) References for equivalent salt deposit density (ESDD) test procedures.

5) Revisions to section dealing with isophase bus coordination. The results of these discussions will be used to prepare draft 7 of the document, which will be ballotted by the Bushing Subcommittee.

Working Group on Revision of C57.19.01

Chairman Prit Singh reported that the working group held its initial meeting on Monday (11/4) with ten members and one guest present. Bushing Subcommittee Chairman Wagenaar explained this revision of C57.19.01 would be comprehensive; the revision just completed dealt only with changes associated with C57.19.00. Much of the revision will concern the tables dealing with standard dimensions. These revisions have been prompted by recent activities of EEI which have conveyed the industry's desire to standardize bushing dimensions and expand the scope of the existing standard to include additional ratings.

The working group then discussed Table 1, Electrical Insulation Characteristics for Outdoor Power Apparatus Bushings 15 kV through 196 kV. The following changes were made:

1) In order to line up with transformer standards, replace "insulation class" with "nominal system voltage."

2) For the same reason, remove the 92 kV TR rating and redefine 161 kV TR (750 kV BIL) and 196 kV TR (900 kV BIL) as 230 kV (750 kV BIL) and 230 kV (900 kV BIL), respectively.

3) Remove the note regarding 60 Hz flashover tests and recommend to the Bushing Subcommittee that flashover tests be included in C57.19.00 as special tests.

Working Group on Bushings for DC Application (PC57.19.03)

The working group met on Monday (11/4) with nine members and five guests present. Bushing Subcommittee Chairman Wagenaar opened the meeting by introducing Olof Heyman, the new chairman of the working group. Mr. Heyman has several years of experience with DC bushings at ABB Components, Ludvika, Sweden. Mr. Heyman then led the working group and reported the following discussion of PC57.19.03, Bushings for DC Application:

The working group has not been successful in obtaining an answer from the Substations Committee regarding that committee's reasons for recommending that epoxy and SF6 bushings be included in the scope of C57.19.03. The working group concluded that SF6 insulated bushings is probably a bushing of the future. However, since it is still under development and not a commercial product, it was decided not to include SF6 bushings into the standard at this time.

It was agreed that DC test levels should be calculated by using the same formulas as given in C57.129/d4, General Requirements and Test Code for Oil-Filled Converter Transformers and Smoothing Reactors for DC Transmission, plus a 15% multiplier. Due to lack of recommended test methods for contamination and uneven wetting tests, it was agreed not to include the contamination test in the document. However, a note about the contamination test, as well as a reference to an IEC report regarding a test procedure, will be given.

Requirements for cantilever tests were also discussed. It was decided to make a new table for the DC bushing standard instead of copying the corresponding table from C57.19.01. The need for cantilever tests on the oil side of DC bushings was also questioned. A table will be prepared for the next meeting.

The need for impulse tests as a routine test was discussed and questioned. In order to obtain a better information base for a future decision, it was agreed that CIGRE SC12 would be contacted for the purpose of obtaining statistics about DC bushing failures.

Additional Bushing Subcommittee Discussion

Two additional topics were discussed by the Bushing Subcommittee: First, about ten cases of damaged terminals have been reported to Doble on bushings equipped with isolating test terminals. These test terminals are used by about 1/3 of all utilities to isolate the electrical apparatus from lines during performance of routine power factor/capacitance measurements. The use of these terminals eliminates the need for removing the lines from the bushing, thereby expediting the operation as well as providing for a safer situation. However, the use of the isolating test terminal places a moment on the top of the bushing, and the top terminal of the bushing can bend or cause a leak into the transformer via the central bushing conductor. Substation standards and ANSI C2 will be consulted for advise, and bushing manufacturers will check on the possibility of bushing top terminals withstanding a proposed moment of 800 ft. lbs.

Second, discussion was continued from previous meetings on the use of epoxy weather casings and condenser bodies. It was agreed that ultraviolet light and contamination were both potential causes of deterioration to these materials and that eventually, some type of performance standard should be developed to demonstrate a material's resistance to these types of deterioration. However, it was also agreed that it is too early to standardize on anything yet since this is still a rapidly changing field. Progress on this topic will be watched in the future.

L.B. Wagenaar, Chairman
Bushing Subcommittee

TC-M
1 OF 2

IEEE PES TRANSFORMERS COMMITTEE

AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE

BALTIMORE, MARYLAND

NOVEMBER 5, 1991

Minutes

Chairman Alan Teplitzky opened the meeting at 2:00 p.m. with 5 members and 20 guests present. Seven guests requested membership in the subcommittee for a total membership of 31.

New Members: William Boettger, ABB Power T&D Company, Inc.
Pierre Feghal, North American Transformer
Robert Frazer, Hevi-Duty Electric
Curt Moore, Consultant
Jeenan Puri, Cooper Power Systems
Syed M. Aslam Rizvi, Alabama Power Company
Subhash Tuli, Magnetek Electric

Minutes of the October 23, 1990 meeting in Montreal, Canada were approved.

Draft 13 of the proposed revision of the audible sound measurement portion of C57.12.90 has been approved by the main body of the Transformers Committee. It will now be forwarded to the Standards Board for publication in 1992.

Project PC57.112 Guide for the Control of Transformer Sound has been inactive for several years. A new PAR will be submitted and a task force has been created by vote of the subcommittee to continue this project. Nine persons volunteered for the task force which will be chaired by Len Swenson. The Westinghouse/Bolt Beranek and Newman study performed for ESEERCO is available for this project and will be studied first to determine its suitability.

The use of acoustic intensity for measuring transformer sound was discussed. It was determined that few engineers are familiar with the technology. The possibility of a tutorial at a future Transformers Committee meeting will be explored.

The transformer sound level table from the former NEMA TR1 is still in use despite the lack of a valid standard. In view of NEMA's apparent inaction and the fact that much of TR1 is now part of C57 the subcommittee voted "Audible Sound and Vibration Subcommittee shall pursue inclusion of the NEMA TR1 transformer sound level table as an appendix to C57.12.00".

This action will first be checked with our NEMA liaison. Recognizing the potential obsolescence of some of that table a task force was formed to study and pursue revision. Four persons volunteered with Jeenan Puri as chairman.

Jack McGill brought up the subject of core noise versus winding noise. Core noise has been reduced to the point where winding noise may now be a noticeable component in transformer sound creating a new relationship between sound levels and transformer loading. After some discussion there was no action taken. This subject may be revisited in the future if sufficient data becomes available.

The meeting adjourned at 4:30 p.m.

Respectfully Submitted,

L L Swenson

Lennart Swenson
Secretary, Audible Sound
& Vibration Subcommittee

TC - N
1 of 16

December 2, 1991

Performance Characteristics Subcommittee

Meeting Minutes - Baltimore, Maryland - November 5, 1991

I. Introduction/Attendance

The Performance Characteristics Subcommittee (PCS) met at 11:02 a.m. on Tuesday, November 5, 1991 with 35 members and 54 guests in attendance.

II. Approval of Minutes

The minutes of the May 14, 1991 PCS Meeting were approved as written.

III. Chairman's Remarks

A. Administrative Subcommittee Notes

The following information, obtained at the November 4, 1991 meeting of the Administrative Subcommittee was presented:

1. The Standards Coordinating Committee has adopted a four year limit to the life of project authorizations. Note that this applies only to new projects, and does not affect existing projects.

2. It was noted that IEEE voting procedures allow ballots to be counted as late if either not received by closing date, or if not postmarked by closing date. All ballots on a particular item must be treated in the same manner.

3. The revised format for meeting arrangements appears to be working well and will be continued at future meetings.

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.

B. Membership

Al Bartek (CPS), John Bergeron (Entergy Services), Max Cambre (GE), Don Fallon (PSE&G), Jeff Fleeman (AEP), Rich Johnston (MagneTek), Hal Light (Niagara Mohawk), Don Lowe (Kuhlman), Peter Manos (Allied-Signal), Dilip Shah (NAT), Len Swenson (BPA), Jim Templeton (ABB) and Vis Thenappan (Consultant) were added to the roster. Dennis Allan, Mike Altman, Dana Basel, Felix Cook, Jerry Grimes, Charlie Hoesel, B. Klaponski, Charlie Pounds and Dave Smith were removed from the roster. Membership now stands at 66.

IV. Agenda Changes

Two items were added to the agenda. These will be discussed later under Old Business and New Business.

V. Working Group Reports

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

The LTC Performance Requirements Working Group met at 2:30 p.m. on Monday, November 4, 1991, with 17 members and 24 guests in attendance. Introductions were made and the minutes of the previous meeting in Tempe, Arizona were approved without comment.

The Chairman mentioned that consideration is being given for the Working Group to sponsor a Tuesday afternoon seminar on the subject of load tap changers at a future Transformer Committee meeting.

The majority of the meeting consisted of a discussion of comments on Draft 5 of the proposed Standard Requirement for Load Tap Changers. The comments involved editorial changes, clarifications and the elimination of apparent inconsistencies contained within the proposed standard. The agreed upon changes will be incorporated into Draft 6, which will be sent to the members of the Performance Characteristics Subcommittee for review and ballot. It is planned that this will be accomplished before the end of the year since the changes from Draft 5 to Draft 6 are relatively minor.

Under New Business, the Chairman mentioned that a new future project for the Working Group could be the development of a guide for the application of load tap changers.

The Working Group meeting adjourned at 3:30 p.m.

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

Wally Binder presented the following report.

The Working Group did not meeting during this session. The Guide for Failure Analysis was approved by the IEEE Standards Board on June 26, 1991, and is now awaiting ANSI approval.

IEEE anticipates publication under the 6-month Rule sometime in January.

The next task for the Working Group is to ballot reaffirmation of C57.117, the Reliability Guide. This will be completed between this meeting and the Birmingham meeting.

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

The Working Group on Loss Tolerance and Measurement met on Monday, November 4 at 10:45 a.m. with 12 members and 8 guests present. The minutes of the previous meeting were reviewed and were accepted. Ramsis Girgis presented a report on the Loss Measurement Guide Task Force, which had met at 7:50 a.m. and at 9:20 a.m.

Ramsis had prepared a Draft 5 of the section of the Guide on No-Load Losses, which was read and reviewed at the meeting. In preparing Draft 5, Ramsis had included information that resulted from comments and suggestions of the Task Force members at the previous meeting. There was a discussion of the level of detail and the amount

and type of material to be included in the guide. The organization of the guide was discussed, it being decided to have a section on no-load losses, a section on load losses and a special section of material that applies to loss measurement in general. Ways to accelerate the preparation of the guide were discussed. Ramsis will make some changes that were discussed at the meeting and will conduct a Task Force Ballot.

It was stated at the Working Group meeting, that we have two ballots. One on changes to C57.12.00 on accuracy requirements and reference temperature for no-load losses and another ballot on changes to Sections 8 and 9 of the Test Code C57.12.90, on measurement of no-load and load losses, respectively. At the Working Group meeting, we reviewed a Working Group ballot on changes to Section 5 of the Test Code on "Resistance Measurement". The Working Group has furnished its proposal and would like to ballot the Performance Characteristics Subcommittee on the revision of Section 5 resistance measurement.

On the afternoon of November 5, at 2:30 p.m., there was a joint meeting between a Working Group of PSIM (Power Systems Instrumentation and Measurements Committee) on "Low Power Factor Power Measurements", and the Working Group on Loss Tolerance and Measurement. This meeting was chaired by Eddie So and Co-chaired by Bill Henning. The scope of this working group is:

> "To identify requirements for accurate high voltage low power factor power measurements; to identify suitable measurement techniques (including instrumentation) to meet these requirements; to identify on-site test techniques (including instrumentation), to calibrate high voltage loss measuring systems and the requirements for maintaining their accuracy, including the methodology to obtain traceability to higher echelon standards."

It was decided that we want to continue to hold these meetings. The purpose is to coordinate the content of the Transformer Loss Measurement Guide with the content of this Guide for Low Power Factor Power Measurement. The PSIM would also like our input while the guide is being prepared, since we will be users of the guide.

The sequence and scheduling of meetings was discussed. We would like to ask that:

1. TF Loss Measurements Guide meet on Sunday afternoon.

2. Working Group on Low Power Factor Power Meas. meet on Monday morning.

3. Working Group on Loss Tolerance and Measurement meet after Eddie So's meeting.

D. Semi-Conductor Rectifier Transformers - S. P. (Sheldon) Kennedy

Prior to presenting the following report, Sheldon Kennedy was introduced as the new Chairperson of this Working Group.

The Working Group met on Monday, November 4, 1991, at 7:50 a.m. and 9:20 a.m. There were 16 members and 7 guests present.

Sheldon Kennedy announced that he had been asked to assume the Chairmanship of the Working Group in late September by Performance Characteristics Subcommittee Chairman, John Matthews. Charlie Pounds was the former chairman.

Minutes of the May 13, 1991, meeting were approved.

Working Group ballots for Draft 6 were mailed out in October. Insufficient time had elapsed to have all of the ballots returned. Discussion of comments and negative ballots received proceeded.

A change in the wording of Section 6.1(2) regarding taps on a rectifier transformer used for adjusting output voltage was proposed. According to Draft 6 "the taps providing output voltage above rated voltage shall be rated kVa taps, and the output current shall be reduced in proportion to the increase in output voltage, thereby maintaining rated kW (kilowatt) output".

It was suggested that this wording be changed to rated kVA rather than rated kW. It was decided to leave the wording as is. The term "kW" is consistent with the old C57.18 standard and C34.2. The paragraph refers to primary taps used to adjust the output voltages of a rectifier, whose output is in terms of "kW" not "kVA".

A suggestion that Section 8.6.2(6) and (7) should be revised to separate eddy losses and other stray losses into their primary winding and secondary winding components was made. This was agreed upon. It was suggested that if no data is available, the division of eddy and other stray losses between primary and secondary winding losses should be consistent with C57.110. It was also pointed out that each formula should be revised to show the summation from 1 through 25 instead of 2 through 25. The number "1" in the formula preceding the summation sign would then be dropped.

This section on losses will also be modified with regard to its application to Table 11. Notes will be added when using the respective primary and secondary winding loss calculations so that the proper converter pulse data is applied for the winding under calculation.

It was suggested that Table 11 should be modified to read "per-unit of the RMS current rather than the fundamental current". It was also suggested that a note be added to explain that the cutoff at the 25th harmonic was arbitrary due to the use of the full theoretical per-unit harmonic values.

The definition in Section 8.6.1 will be modified to define "PEC" as eddy current and circulating current stray loss.

Discussion next revolved around the use of the harmonic losses now calculated. How would they be used in loss reporting and how would they be utilized in temperature rise tests? This could have a major impact on loss reporting as the old C57.18 uses only sinusoidal losses for testing and reporting. It was suggested that a Working Group joint report be presented to the Industry Applications Society so that these changes are understood.

Roy Uptegraff and Charles W. Johnson, Jr., requested membership on the Working Group.

After the meeting, Jin Sim agreed to be our liaison to the Insulation Life Subcommittee.

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

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

F. 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-C) on IEEE638.

VI. Project Reports

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

Draft 3 of this proposal has been successfully balloted in the Transformers Committee. Resolution of the two negative ballots will be pursued prior to the next meeting.

B. 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.

C. Reaffirmation C57.110 - M. A. (Max) Cambre

Max Cambre has volunteered to coordinate the activities of the four member Task Force in reviewing this reaffirmation ballot.

The returns from a successful ballot in the Transformers Committee were received yesterday. The Task Force will seek resolution of two negative ballots to meet the February 7, 1992 deadline for submission to the Standards Board.

The Task Force will also recommend action required for revision of this document and/or the need for a separate document to address the application of new transformers on power systems which contain harmonics.

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

Bob presented the attached ballot summary (Attachment PCS-D) for Draft 2 of this proposal in the Transformers Committee.

The two voters who submitted negative ballots were present at this meeting.

Al Bartek presented the reasons for his negative ballot which suggested using the term "nominal" in place of the term "neutral". Following much discussion, it was decided to use the term found acceptable to the majority of the PCS members present. A motion was made, seconded and accepted (28 for, 2 against, 2 abstain) to continue using the term "neutral" with more definition.

Jim Harlow presented the reasons for his negative ballot, which suggested rewording of the exceptional conditions, which can be specified by users. Discussion of this item led to the conclusion that the suggestions should be incorporated.

Resolution of both negative ballots was accomplished with editorial revisions. The revised proposal will be circulated to the balloting group. If no objections are received within 30 days, the proposal will be considered approved.

VII. Old Business

C57.12.90 Error

Peter Krause has reviewed the letter received from Mr. Bruce Webb, ABB Power T&D Co., which indicated that C57.12.90-1987, Section 11.6, Equation 24 for Correction of Temperature Rise with Altitude Change is incorrect.

Peter has verified that the units of measurements do not balance in the present Equation 24 and he has proposed an editorial correction (Attachment PCS-E).

This proposal was not reviewed during this meeting. PCS members are requested to review the attached proposal and notify Peter Krause by January 31, 1992, if they object with the conclusion.

VIII. New Business

C57.105-1987

ANSI/IEEE C57.105-1987 Guide for Application of Transformer Connections in Three-Phase Systems is due for reaffirmation or revision in 1992. George Reitter volunteered to coordinate a ballot for reaffirmation in the Transformers Committee prior to the next meeting.

IX. Next Meeting

The next meeting will be held on Tuesday, March 31, 1992, in Birmingham, Alabama.

The meeting was adjourned at 12:06 p.m.

Respectfully submitted,

John W. Matthews
PCS Chairman

PCSMIN.DOC

ATT. PES-A1

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STATUS REPORT ON STANDARDS
OF THE IEEE/PES TRANSFORMERS COMMITTEE
ATTACHMENT 1

PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
NONE C57.12.80	TERMINOLOGY FOR POWER & DIST TRANSFORMERS	/ /	REAFFIRMATION BALLOTTING REAFFIRMATION REAFFIRMED 100%, 88% RESPONSE	/ /
** SUBCOMMITTEE: NONE ASSIGNED			Chairman: J. H. HARLOW	
* WORKING GROUP:			Chairman:	
NONE C57.15	REQ, TERMINOLOGY, & TEST CODE FOR STEP-VOLTAGE AND INDUCTION VOLTAGE REGULATORS	/ /	BALLOTTING REAFFIRMATION REAFFIRMED 100%, 88% RESPONSE	/ /
** 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 REAFFIRM 1992	/ /
* WORKING GROUP: SHORT-CIRCUIT DURATION			Chairman: B. K. PATEL	
PC57.109 C57.109	GUIDE FOR THROUGH-FAULT CURRENT DURATION	06/27/91	D01 BALLOTTING D01 MAIN COMMITTEE LIFE EXTENDED TO 12/92 100%	/ /
* WORKING GROUP: NONE ASSIGNED			Chairman:	
NONE C57.110	RECOMMENDED PRACTICE FOR ESTABLISHING TRANSFORMER CAPABILITY WHEN SUPPLYING NONSINUSOIDAL LOAD CURRENTS	/ /	BALLOTTING REAFFIRMATION REAFFIRMED 97%, 88% RESPONSE	/ /
* WORKING GROUP: TR DIRECTLY CONNECTED TO GEN			Chairman: B. K. PATEL	
NONE	GUIDE FOR TRANSFORMERS	/ /		/ /

STATUS REPORT ON STANDARDS
OF THE IEEE/PES TRANSFORMERS COMMITTEE
ATTACHMENT 1

PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
C57.116	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	/ /	UNDER REVIEW BY FAILURE W.G. BALLOT REAFFIRMATION 1992	/ /
* WORKING GROUP: LOSS TOLERANCE AND MEASUREMENT			Chairman: W. R. HENNING	
PC57.12.00c1 C57.12.00	REV. OF SECTION 5.9 REFERENCE TEMP FOR NO-LOAD LOSS	06/28/79	D06 BALLOTTING MAIN COMMITTEE INCLUDE IN 1992 REVISION?	09/04/91
PC57.12.00c2 C57.12.00	ADD TO SEC 9.3.1 ACCURACY REQUIREMENT FOR MEASURED LOSSES	06/28/79	D06 BALLOTTING MAIN COMMITTEE INCLUDE IN 1992 REVISION?	09/04/91
P787 C57.12.00	TRANSFORMER LOSS MEASUREMENT AND TOLERANCES	06/28/79	MERGED INTO P462 (now 12.00c)	/ /
* WORKING GROUP: PROJECT			Chairman: R. H. FRAZER	
PC57.12.00h C57.12.00	LTC TAP POSITION INDICATION	09/28/86	D02 BALLOTTING MAIN COMMITTEE INCLUDE IN 1992 REVISION	06/28/91
* 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	/ /

STATUS REPORT ON STANDARDS
OF THE IEEE/PES TRANSFORMERS COMMITTEE
ATTACHMENT 1

PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
			COMMITTEE	
			INCLUDE IN 1992 REVISION	
* WORKING GROUP: PROJECT			Chairman: C. J. McMILLEN	
PC57.12.00k	TABLE 16-C ROUTINE DIST TR	03/12/87		/ /
C57.12.00	RESISTANCE TEST		DOCUMENTATING COORDINATION	
			INCLUDE IN 1992 REVISION	
* WORKING GROUP: PROJECT			Chairman:	
NONE	SECTION 7.3 FIGURES 9 & 10	/ /		/ /
C57.12.90	REVERSED		READY	
			INCLUDE IN 1992 REVISION	
* WORKING GROUP: LOSS TOLERANCE AND MEASUREMENT			Chairman: W. R. HENNING	
PC57.12.90e	REVISION TO SEC 9 IMPEDANCE	06/28/79	D10	09/05/91
C57.12.90	AND LOAD LOSSES		BALLOTTING MAIN COMMITTEE	
			INCLUDE IN 1992 REVISION	
PC57.12.90e3	REVISION TO SEC 8 NO-LOAD	06/28/79	D04	09/04/91
C57.12.90	LOSSES & EXCITATION CURRENT		BALLOTTING MAIN COMMITTEE	
			INCLUDE IN 1992 REVISION	
P1098	GUIDE FOR TRANSFORMER LOSS	06/13/85	D04	/ /
C57.123	MEASUREMENT		TF WORKING	
* WORKING GROUP: FAILURE ANALYSIS			Chairman: W. B .BINDER, JR.	
PC57.125	GUIDE FOR FAILURE INVESTIGA-	06/28/87	D10	10/16/90
C57.125	TION, DOCUMENTATION AND ANALYSIS FOR POWER TRANSFOR- MERS AND SHUNT REACTORS		APPROVED BY STD BOARD 6/26/91	

STATUS REPORT ON STANDARDS
OF THE IEEE/PES TRANSFORMERS COMMITTEE
ATTACHMENT 1

PROJECT No. STANDARD No.	TITLE	PAR APPROVAL DATE	DRAFT No. STATUS COMMENTS	DRAFT DATED
* 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 SEMICONDUCTOR RECTIFIER 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 APPROVED, NO ACTION REQUIRED	/ /
* 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 NEW PAR SUBMITTED	/ /
** 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 CIRCUITS AND CASES	/ /		/ /
** SUBCOMMITTEE: UG TR & NETWORK PROTECTORS			Chairman: P. E. OREHEK	

ATT. PCS-B1

TC.N
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WG - Revision of Transformer Through Fault-Current
Duration Guide - C57.109
Baltimore Meeting - 1991
Minutes of the Meeting

The WG met on November 4, 1991, at 3:55 p.m. with 14 members and 13 guests present. These included six new members as follows who signed up at the meeting.

1) Syed M. Aslam Rizvi
2) John Bergeron
3) Dilip M. Shah
4) Henry J. Windisch
5) Tim Bode
6) P. E. Krause

After usual individual introductions, the minutes of the Phoenix meeting were approved as written.

Draft #1, a marked-up copy of the C57.109 - 1985 guide was balloted last June in the WG and performance characteristics subcommittee. The results of the balloting were discussed as follows:

Total ballots sent out:			57
Ballots returned:		44	
Approved	33		
Approved with comments	6		
Disapproved	5		
Not returned:		13	
Total	44	57	57

The balloting was successful with more than 75% ballots returned.

The chairman summarized that all comments, editorial as well as negatives, were mainly related to the new definitions of impedance and times normal current, lack of explanation of some of the details of various curves, and presentation of curves. He further advised that since last meeting he has tried to research the formulation of the existing guide and its background and discussed the details with some of the original working group members. The system impedance for categories III & IV transformers were discussed in the early work and neglected with reasons. It appeared from the discussions that its overall effect was considered insignificant and for sake of simplicity, only transformer impedance was used. The chairman proposed that the WG can take one of the two routes: 1) Continue the proposed approach of adding new definition for transformer short circuit impedance or 2) leave the guide as is (neglect system impedance) and add an explanation for neglecting system impedance with an option of how to include its effect if someone chooses to do so.

After some discussion, the WG decided to continue the present approach of the new definition. A reference to the table of system impedance in C57.12.00 will be made in the guide for ease of application of the curves.

The ballot comments were discussed next. The comments were mainly editorial and will be reflected in the revised draft. Explanation of Curve sections will be expanded to make them more complete and easier to follow. The revised draft will be balloted prior to the next meeting.

There was no new business discussed. The meeting adjourned at 5:10 p.m.

Bipin K. Patel
November 5, 1991

BKP/dm

ATT. PCS-C

GE Power Delivery

TC-N
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Transformer Business Department
Medium Transformer Operation
General Electric Company
Reamona Circle, Rome, GA 30161
404 291-3000

November 1, 1991

John Mathews, Chairman
Performance Characteristics Subcommittee
IEEE Transformers Committee

Status Report: P638, Working Group on Qualification of Class 1E Transformers.

The final draft of "Standard for Qualification of Class 1E Transformers for Nuclear Power Generating Stations" and the required forms and documentation for final IEEE approval were mailed to the IEEE Standards Department on November 1, 1991.

Linden W. Pierce

Linden W. Pierce, Chairman
Working Group on Class 1E Transformers

ATT. PCS-D1

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TO: PERFORMANCE CHARACTERISTICS SUBCOMMITTEE - 11/5/91

RESULTS OF MAIN COMMITTEE BALLOT ON CHANGE IN WORDING OF C57.12.00
TABLE 9, NOTE 4 "NAMEPLATE INFORMATION"
(Project number C57.12.00h/D2)

BALLOTS SENT TO ACTIVE MEMBERS	130
BALLOTS RETURNED APPROVED (ONE OF WHICH HAD A COMMENT)	100
BALLOTS RETURNED NOT APPROVED	2
NOT VOTING (LACK OF EXPERTISE)	2
NOT VOTING (RETIRED)	1
PERCENT APPROVED (100/130)	76.9%

COMMENT ACCOMPANYING APPROVED BALLOT :

1) USE OF THE WORD "NEUTRAL" HAS CONNOTATION OF NEUTRAL BUSHING -

PREFER "Normal"

COMMENTS ACCOMPANYING NOT APPROVED BALLOTS :

2) USE OF THE WORD "NEUTRAL" HAS CONNOTATION THAT THE LTC IS EITHER NOT ENGAGED OR OR IN A POSITION OF DIS-ENGAGEMENT -

PREFER "Nominal"

3A) "IN THE EVENT OF SYSTEM REQUIREMENTS SUCH AS REVERSAL OF LOAD FLOW" INFERS USER MAY SPECIFY A CHANGE WHEN IT OCCURS.

PREFER "The nominal voltage ratio position shall be referenced the 'Neutral' position and shall be designated by the letter N for load-tap-changers. When the load on the transformer is in the direction of normal forward power flow ---"

3B) "REGULATION OF INPUT VOLTAGE" IS NOT ACCURATE - THE OUTPUT VOLTAGE IS ALWAYS THAT WHICH IS REGULATED.

PREFER "In the event the transformer design is such as to accomplish the voltage regulation by use of taps on the primary (source) winding, the above criteria as to raise and lower ranges of tap positions shall be reversed when specified by the user"

Robert H. Frazer

ROBERT H. FRAZER

EXISTING WORDING OF C57.12.00 TABLE 9, NOTE 4 "NAMEPLATE INFORMATION"

The normal position shall be designated by the letter N for load-tap-changers. The raise range positions shall be designated by numerals in ascending order, corresponding to increasing output voltage, followed by the suffix R, such as 1R, 2R, etc. The lower range positions shall be designated by numerals in ascending order, corresponding to decreasing output voltage, followed by the suffix L, such as 1L, 2L, etc. (this applies to the relationship between two windings of a transformer only, such as the H and X windings).

(PC57.12.00h/D2)

PROPOSED WORDING OF C57.12.00 TABLE 9, NOTE 4 "NAMEPLATE INFORMATION"
(changes from present standard are shown in capital letters)

The NEUTRAL position shall be designated by the letter N for load-tap-changers. The raise range positions shall be designated by numerals in ascending order, corresponding to increasing output voltage, followed by the suffix R, such as 1R, 2R, etc. The lower range positions shall be designated by numerals in ascending order, corresponding to decreasing output voltage, followed by the suffix L, such as 1L, 2L, etc. (this applies to the relationship between two windings of a transformer only, such as the H and X windings). IN THE EVENT OF SYSTEM REQUIREMENTS SUCH AS REVERSAL OF LOAD FLOW, REGULATION OF INPUT VOLTAGE, OR OTHER UNUSUAL CONDITIONS, NAMEPLATES SHALL HAVE RAISE-LOWER DESIGNATIONS AS SPECIFIED BY THE USER.

- ATT. PCS-E

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Department of Energy
Western Area Power Administration
P.O. Box 3402
Golden, CO 80401

AUG 0 5 1991

Mr. John Matthews, Chairman
Performance Characteristics Subcommittee
Baltimore Gas and Electric Company
Electric Test Department-RBC
Baltimore, MD 21203-1475

Dear Mr. Matthews:

Thank you for asking me to investigate the Altitude Correction Formula for transformer temperature rise.

I agree with Mr. Bruce Webb of ABB (copy of his letter of April 29, 1991 enclosed). It appears that in the process of simplifying the equation of the Test Code of 1973 they made the units not balance.

I feel that eq. i) of Bruce's letter is on the right track to correcting the problem but has the disadvantages of returning to having the numerical factor, 100, not lumped in the coefficient, F, and also not really having any clearer unit balance than the equation of the present standard.

As an alternative similar approach to his, I would like to suggest the following:

$$T_A = T_o(A/A_0 - 1)F$$

T_A = Increase in temperature rise at altitude A meters, °C
T_o = observed temperature rise, °C
A = altitude, m
A_0 = 1000 m
F = .04 self-cooled mode
= .06 forced-air cooled mode.

Note this equation has the form of eq. 23, p44 of C57.12.90-1987.

I look forward to discussing this at our next meeting.

Sincerely,

P. E. Krause

Peter E. Krause, Member
Performance Characteristics Subcommittee

Enclosure

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EPRI

Electric Power
Research Institute _____ *Leadership in Science and Technology*

November 1, 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 November 6, 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 has been built and tested.
   - 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.

3. Advanced Power Transformer:

   - Reduced load loss feasibility has been demonstrated.
   - Detailed analytical studies exploring individual design aspects has been completed.
   - As a part of Phase II a 47 MVA three phase core form prototype was built and successfully short circuit tested March, 1991 delivered to HL&P and is now in service.
   - Two 80 MVA 115 kV delta to 161 kV wye, three phase units are being built for one end of ESEERCO's six-phase demonstration project. Although 2 winding, the units are comparable to autotransformers.
   - Development of shell form conductor and physical models continues.

4. Static Electrification in Power Transformers:

- This is the 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 ready for a prototype installation.

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 (Interim Report EL6761) but raised questions about nitrogen blanketed transformers.

- A final report covering more complete test data is in process. A computer program covering bubble evolution plus the ANSI Loading Guide formulas is being developed.

6. Active Transformer Noise Cancellation System:

- Only noise reduction in one direction has been pursued.

- 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 underway.

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. Proceedings, TR 100205, are in process of being published.

8. Power Transformer Tank Rupture - Risk Assessment and Mitigation

This project started early 1991. Over 20 well documented cases have been collected from which several will be selected for detailed study.

9. Geomagnetic Induced Currents (GIC)

EPRI has three projects underway and one in RFP evaluation stage.

- A feasibility demonstration is in process for detection of transformer core saturation at seven locations and reporting to a central location. Useful data was collected from several GIC events. The system is being expanded to 12 locations.
- Two transformer neutral GIC blocking devices were installed in 1991 and preliminary field trials were performed with good results in June, 1991.
- A project to evaluate the response of protective relaying systems to GIC has just been initiated.
- The last project involves work to anticipate GIC events.

10. Thermal Models for Real-Time Monitoring

This new project is getting underway involving all transmission components including power transformers.

SRL:sf:9862.M

cc: Stig Nilsson
Bob Veitch

ABB
ASEA BROWN BOVERI

TC-P
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LIAISON REPORT

CIGRE SC-12 TRANSFORMERS

A. General

The Cigre Study Committee 12 (Transformers) met in Graz, Austria from June 17 through June 21, 1991. There were a total of 85 delegates from twenty countries. IEEE Transformer Committee members present included Stan Lindgren, Bill McNutt, and myself from the US and Bob Veitch, Vic Shenoy, and Jacque Aubin from Canada. There were three main discussion topics: maintenance considerations for transformers (including condition monitoring and equipment surveillance, life assessment, reliability, and life extension, refurbishment, and replacement), static electrification, and new developments in transformers (including GIC, very fast transients, and application of zinc oxide disks). In addition there were meetings of the working groups on hvdc converter transformers and thermal aspects of transformers as well as technical visits to a pump storage hydro plant at Malta, Austria and the high voltage laboratory of the University of Graz.

B. Maintenance Considerations for Transformers

1. Condition Monitoring and Equipment Surveillance. Both on-line and off-line monitoring were examined. The discussion concentrated in four areas - dissolved gas analysis, detection of paper degradation, p.d. detection, and microprocessor-based monitoring systems. DGA is the most commonly used condition monitoring technique but is was concluded that there is a need for an analysis based on the amount of insulation in a particular transformer, its thermal characteristics, loading, and development of gas ratios over time. (CIGRE 15 (Insulation) has a task force on DGA, and a copy of the latest draft of the IEEE Transformers Committee gas guide was given to its chairman.) It was reported that furfural analysis remains basically a laboratory study at the present time, while HPLC is the most common technique to evaluate the degree of polymerization. Several remote systems are available to monitor partial discharges and it was felt that there is a real opportunity to provide a "smart" pd detection system.

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In a related development, CIGRE is planning a symposium in 1993 to discuss "Diagnostic and Maintenance Techniques." Individuals interested in additional information, or in preparing a paper for the meeting, should contact me or any other CIGRE member.

2. Life Assessment. A representative from the USSR provided some statistics on transformer failures in the Soviet Union between 1988 and 1990; most of the failures occurred on transformers between 10 and 25 years old. The more frequent failures involved short circuit (30%), main gap due to contamination (27%), and dielectric, thermal degradation, or core insulation (10% each). Bill McNutt gave a summary of the new IEEE proposal on determining transformer life based on a per unit concept, while another participant presented a concept with two levels of reliability based on the dp of paper (full reliability when dp > 400, and reduced reliability when dp < 400.)

3. Reliability. This group concluded that there was no statistical difference between core form and shell form reliability.

4. Life Extension, Refurbishment, and Replacement. Vic Shenoy led the discussion on this topic. There was concern expressed about the policy of some North American utilities of tightening up coils in the field. Several individuals felt that the units should be taken off site for the procedure. It was also noted that although transformers have been replaced because of high noise levels none have been replaced due to high losses.

C. Static Electrification

Stan Lindgren delivered the keynote speech and led the discussion for this subject, which included discussions from the two task forces regarding latest experimental results.

D. New Developments in Transformers

1. GIC. Mr. Bolduc from Hydro Quebec gave the keynote speech. He reported that Hydro Quebec is now limiting dc current to 11.5 times the rms value of the magnetizing current although he agreed that it could be higher for some designs. A representative from Japan reported that a properly designed GSU should withstand up to 200-300 amps

dc without any problems. Bill McNutt presented slides and discussed the PG&E Salem transformers, which along with some problems in Great Britain were the only GIC incidents discussed.

2. Very Fast Transients. Although we haven't had much experience with this phenomenon in the U.S., failures have been recorded in Europe and Canada. They occur when a series of oscillations in the nanosecond range impinge on the coil and they can excite resonant frequencies between turns, sections and/or taps.

3. Zinc Oxide. Although there is still some reluctance to use nonlinear elements inside transformers in Europe, they are gaining acceptance since last discussed at a CIGRE colloquium in 1987.

E. Working Group Reports

1. Thermal Aspects. Jacque Aubin reported that their working group has completed three papers which were published in the March 1990 Electra - direct measurement of temperatures, heat run test procedures, and maximum safe operating temperatures. They expect to complete a survey on dissolved gas analysis experimental data, and thermal life evaluation this year, and have started on surveys of thermal characteristics and user loading practice which should be completed next year.

2. HVDC Converter Transformers. There is now general agreement on the tests recommended for converter transformers and smoothing reactors; their paper should be finalized this year for publication in Electra. A survey on reliability is being conducted by a task force; results show that bushings are the largest source of failures. It is expected that the task force will recommend separate tests on the bushings and associated insulation structure at elevated levels.

3. Sound Intensity Measurements. This group reported that a draft has been prepared for Appendix B of the IEC standard to give rules for applying sound intensity calculations to test measurements. It was noted that they are in close coordination with Alan Teplitzky, chairman of the Transformer Committee's Acoustic Noise Subcommittee.

4. Reliability of Transformers in Service. This group will be starting on a worldwide survey on transformer reliability, Initial discussions will be directed to establishing a standard format and computer program which could be used by most utilities to report the data.

Please feel fee to contact me for any additional information on any of the subjects listed above.

Bill Kennedy

William Kennedy

US Representative to CIGRE SC 12 (Transformers)