IEEE PES TRANSFORMERS COMMITTEE

MEETING MINUTES

October 24, 1990
Montreal, Quebec, Canada

IEEE PES TRANSFORMERS COMMITTEE
OCTOBER 24, 1990 - MONTREAL, QUEBEC

MEMBERS PRESENT 70 voting plus 1 by representation
plus 2 emeritus (*)

*E. J. Adolphson
B. F. Allen
R. Allustiarti
M. S. Altman
J. Aubin
R. Bancroft
D. A. Barnard
W. B. Binder
J. V. Bonucchi
J. D. Borst
C. V. Brown
O. R. Compton
F. W. Cook, Sr.
J. L. Corkran
J. N. Davis
D. H. Douglas
R. F. Dudley
F. Elliott
D. J. Fallon
H. G. Fischer
R. S. Girgis
R. L. Grubb
F. J. Gryszkiewez
J. H. Harlow
F. W. Heinrichs
W. R. Henning
K. R. Highton
R. H. Hollister
A. J. Jonnatti
J. J. Kelly
W. N. Kennedy
J. P. Kinney, Jr.
A. D. Kline
E. Koenig
J. G. Lackey
R. E. Lee
S. Lindgren
R. I. Lowe
K. T. Massouda
J. W. Matthews
S. P. Mehta
R. E. Minkwitz, Sr.
M. I. Mitelman
H. R. Moore
R. J. Musil
J. W. McGill
W. J. McNutt
E. T. Norton
P. E. Orehek
B. K. Patel
W. Patterson (rep. by C. W. Johnson)
H. A. Pearce
L. W. Pierce
M. P. Sampat
W. E. Saxon
D. N. Sharma
V. Shenoy
L. R. Smith
W. W. Stein
F. Stevens
L. Swenson
D. S. Takach
V. Thenappin
*R. C. Thomas
T. P. Traub
W. B. Uhl
R. E. Uptegraff, Jr.
G. H. Vaillancourt
R. A. Veitch
L. B. Wagenaar
R. J. Whearty
J. G. Wood
W. E. Wrenn

MEMBERS ABSENT — 39 voting plus 16 emeritus(*)

*L. C. Aicher
D. J. Allan
J. C. Arnold
D. Basel
*P. L. Ballaschi
*S. Bennon
D. W. Crofts
*J. C. Dutton
*J. K. Easley
J. A. Ebert
*S. L. Foster
M. Frydman
*H. E. Gabel, Jr.
R. E. Gearhart
D. W. Gerlach
D. A. Gillies
G. H. Hall
P. J. Hoefler
C. R. Hoesel
*C. C. Honey
E. Howells
C. Hurty
P. Iijima
*G. W. Iliff
R. G. Jacobsen
D. L. Johnson
*D. C. Johnson
C. P. Kappeler
*R. B. Kaufman
H. F. Light
*L. W. Long
L. A. Lowdermilk
M. L. Manning
*H. B. Margolis
C. K. Miller
C. Millian
W. H. Mutschler, Jr
C. J. McMillen
*R. A. Olsson
D. Perco
J. M. Pollitt
C. T. Raymond
C. A. Robbins
L. J. Savio
L. R. Stensland
*R. B. Stetson
E. G. Strangas
D. W. Sundin
A. L. Tanton
A. M. Teplitzky
J. A. Thompson
D. E. Truax
A. Wilks
*A. C. Wurdack
E. J. Yasuda

GUESTS PRESENT 83

J. Antweiler
T. R. Balgie
D. E. Ballard
R. Barker
C. B. Berry
T. Bode
J. Bosiger
M. Cambre
R. Chatterji
O. O. Chew
J. C. Crouse
V. Dahinden
P. De Wever
J. A. Fleeman
J. Foldi
G. E. Forrest
J. M. Frank
R. H. Frazer
J. P. Gibeault
R. Goethals
R. L. Grunert
M. Haas
K. Hanus
R. H. Hartgrove
T. J. Haupert
P. J. Hopkinson
D. L. Hornak
C. W. Johnson
R. D. Jordan
S. P. Kennedy
C. H. Komlenic
G. LaCasse
F. A. Lewis
K. R. Linsley
D. L. Lowe
D. S. Lyon
R. Marek
J. R. Miller
M. C. Mingoia
C. L. Moore
W. E. Morehart
D. H. Mulkey
H. Mulzet
C. R. Murray
J. J. Nay
C. G. Niemann
B. W. Nutt
S. K. Oklu
D. E. Orten
G. A. Paiva
D. E. Parr
J. Patton
G. Payerle
P. A. Payne
V. Q. Pham
D. W. Platts
G. Pregent
G. Preininger
G. J. Reitter
P. G. Risse
A. Rizvi
R. B. Robertson
F. Rochon
J. Rossetti
G. W. Rowe
A. Salem
R. W. Scheu
H. J. Sim
P. Singh
H. D. Smith
S. D. Smith
G. Sparagowski
M. Springrose
T. Stewart
C. L. Stiegmeier
R. W. Stoner
J. Sullivan
J. C. Thompson
J. Valdes
S. Vogel
F. E. Willett
H. J. Windisch
J. J. Woods

IEEE PES TRANSFORMERS COMMITTEE
MEETING MINUTES
MONTREAL, QUEBEC, CANADA
OCTOBER 24, 1990

I. The meeting of the IEEE Power Engineering Society Transformers Committee was called to order at 8:05 A.M. by Chairman Robert Veitch, followed immediately by self introduction of all attendees.

II. Chairman's Remarks

A. Chairman Veitch thanked Host Georges Vaillancourt and his very able committee for the excellent hotel and meeting arrangements. Georges reported that total registration for the meeting is 258 members and guests plus 77 spouses.

Appreciation was also extended to Monsieur Louis Masson, Vice President of Hydro Quebec Research Institute, for his presentation regarding Geomagnetically Induced Currents and their effect on Hydro-Quebec's 735 kV system as well as for the hosting of a Tuesday evening tour (with dinner) of the IREQ High Voltage Laboratory.

B. The Transformers Committee Operating Manual, revised effective September 1, 1990, had been mailed to all committee members plus all Working Group chairmen several weeks before the meeting. This effort was coordinated by Leo Savio to whom Chairman Veitch expressed thanks. The job of duplication and distribution was handled by IEEE staff through Sue Vogel in a very timely manner. Others not on the distribution should contact the secretary for a copy, if desired.

III. Approval of Minutes

The minutes of the March 28, 1990, Denver 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. Two new subcommittees for Transformers Committee. As a result of negotiations involving the staffs of IEEE, NEMA and others, ANSI Subcommittees C57.12.2 and C57.12.4, which have operated independently of the Transformers Committee, are now included within the Transformers Committee. The two new subcommittees will be known as 1) Distribution Transformers Subcommittee and 2) Underground Transformers and Network Protectors Subcommittee. By motion, Messrs. Frank Stevens and Paul Orehek respectively are designated to chair the new subcommittees and appointed members of the

Administrative Subcommittee. These gentlemen were introduced to the full committee.

2. The chairmen of two other subcommittees have resigned. The Dielectric Tests Subcommittee chair will pass from Bob Lee to Harold Moore. The new West Coast Subcommittee Chairman is Louis Tauber, replacing Dennis Gerlach.

3. The next meeting will be May 12-15, 1991, at the Sheraton Tempe Mission Palms Hotel, Tempe, AZ. A steak fry is planned for Tuesday evening of the meeting. Those who will attend are encouraged to bring appropriate western attire. A listing of future meetings is included in the AdSub minutes.

4. Membership
Membership changes include the resignation of Gene Arjeski, the reinstatement of Ray Smith following a 3 1/2-year overseas assignment and the elevation of three new members:

Mahesh Sampat - General Electric (Hickory)
Fred Elliott - Bonneville Power Administration
John Wood - Pacific Gas & Electric Co.

5. Technical Council Report
Mr. Veitch read from his report, Attachment ASC-D. He made particular mention of a text book dealing with power transformers prepared for publication as an IEEE Press Book. The Chairman, acting for the Committee, reviewed portions of the document and as a result of his evaluation has recommended that the book not be published.

6. The question of sufficient meeting time was revisited. For the present, we will stay with our 2 1/2-day format. (See also Chairman's concluding remarks, Section VII, New Business).

7. Chairman Veitch endorsed the IEEE emphasis on membership upgrade to Senior Member level. A concise statement of eligibility requirements was provided by Sue Vogel subsequent to the meeting. See Attachment ASC-R.

B. Audible Sound and Vibration - Alan Teplitzky
See Attachment TC-C, per Len Swenson for Mr. Teplitzky

C. West Coast - Lou Tauber
See Attachment TC-D, per Len Swenson for Mr. Tauber

D. Bushing - Loren Wagenaar
See Attachment TC-E

E. Dielectric Tests - Bob Lee
Mr. Lee made his final report as subcommittee chairman. See Attachment TC-F. A part of his report was a move to elevate ANSI/IEEE C57.113 "IEEE Trial-Use Guide for Partial Discharge Measurement in Liquid-Filled Power Transformers and Shunt Reactors" to a full use guide. His motion to this effect was voted by a show of hands- 63 affirmative, zero negative.

F. Distribution Transformers - Frank Stevens
This was Mr. Stevens' initial report as chairman of the new subcommittee. See Attachment TC-G. Mr. Stevens expressed his appreciation to the Transformers Committee for support for the move of the C57.12.2 family into the Transformers Committee. He recognized his seven Working Group Chairmen:

Working Group	Chairman
Overhead Type Distribution Transformers	Jerry Thompson
Single Phase Live Front Pad Mounted Transformers	Myron Gruber
Three Phase Live Front Pad Mounted Transformers	Kenneth Hanus
Single Phase Submersible Transformers	Gerald Paiva
Single Phase Dead Front Pad Mounted Transformers	Norvin Mohesky
Three Phase Dead Front Pad Mounted Transformers	Gerald Paiva
Conformance Specifications for Padmount and Unit Substation Transformers	Jim Miller

A major first effort of the subcommittee will be the preparation of PAR's for all Working Group activity.

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

As part of his report, Mr. Uptegraff made a motion to reaffirm acceptance of a draft balloted four years ago in order to bring the vote status up to date. Thus, PC57.12.58/D7 (P745/D7) "Guide for Conducting Transient Voltage Analysis for a Dry-Type Transformer Coil" was reaffirmed by show of hands - 63 affirmative, zero negative.

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

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

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

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

As part of his report, Mr. Douglas made two motions, to reaffirm ANSI/IEEE C57.91-1981 "IEEE Guide for Loading Mineral-Oil-Immersed Overhead and Pad-Mounted Distribution Transformers" and ANSI/IEEE C57.92-1981 "IEEE Guide for Loading Mineral-Oil-Immersed Power Transformers Up to and Including 100 MVA with 55°C or 65°C Average Winding Rise." The motion carried, 62 affirmative, zero negative.

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

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

Mr. Bonucchi presented a Certificate of Appreciation to Bob Lee for his service to the committee as Chairman of the Dielectric Tests Subcommittee.

N. Transformer Standards - Wally Binder
Mr. Binder's complete report is attached to the minutes of the Administrative Subcommittee. See Attachment ASC-C.

1) Mr. Binder stressed the need for Working Group chairmen to note their individual projects on his report. Where the report reveals no PAR on file, the WG chairman will need to initiate a PAR so that the ultimate submission of the document can occur smoothly.

2) Mr. Binder noted that a standards seminar conducted October 23 was most timely in that the two new subcommittees could become acquainted with the IEEE procedures and requirements.

O. Underground Transformers and Network Protectors - Paul Orehek

This was Mr. Orehek's initial report as chairman of the new subcommittee. See Attachment TC-O.

Mr. Orehek introduced his Working Groups and their chairmen:

Working Group	Chairman
Three-Phase Underground Type Transformers	J. H. Howard
Liquid-Filled Network Transformers	E. A. Bertolini
Secondary Network Transformers	R. B. Robertson
Dry-Type Network Transformers	B. Nutt

Mr. Orehek described his scope of work and expressed appreciation to the Transformers Committee for including his subcommittee.

V. Liaison Reports

A. CIGRE SC-12 (Transformers) - Bill Kennedy
Mr. Kennedy's report is found as an Administrative Subcommittee attachment, ASC-P.

B. EPRI - Stan Lindgren
See Attachment TC-P

VI. Technical Papers Report - John Borst
Mr. Borst's report is found as an Administrative Subcommittee attachment, ASC-N.

VII. New Business (Chairman's concluding remarks) - Robert Veitch

The topic of meeting schedule conflicts was again raised. Several members offered suggestions as to meeting on Sunday, meeting three times a year (but each WG only twice yearly), etc. Chairman Veitch cut off discussion by stating that he will prepare a questionnaire for the membership so that everyone will have a chance to reflect on the point and offer his thoughts.

VIII. Adjournment

The meeting adjourned at 11:35 a.m.

Respectfully submitted,

J. H. Harlow
Secretary

JHH:mk
Attachments

ATTACHMENTS TO MINUTES
IEEE PES TRANSFORMERS COMMITTEE
MONTREAL - OCTOBER 24, 1990

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

- ASC-A Administrative Subcommittee Agenda - October 22, 1990
- ASC-B Gerlach letter - Phoenix meeting - May 12-15, 1991
- ASC-C Standards Subcommittee Report - Binder
- ASC-D Chairman's Report - Veitch
- ASC-E Highlights of the Executive Board Meeting - Veitch
- ASC-F Audible Sound & Vibration Subcommittee Report - Swenson for Teplitzky
- ASC-G Dielectric Tests Subcommittee Report - Lee
- ASC-H Distribution Transformers Subcommittee Report - Stevens
- ASC-I Instrument Transformers Subcommittee Report - Davis
- ASC-J Insulating Fluids Subcommittee Report - Pearce
- ASC-K Performance Characteristics Subcommittee Report - Matthews
- ASC-L Underground Transformers and Network Protectors Subcommittee Report - Orehek
- ASC-M West Coast Subcommittee Report - Swenson for Tauber
- ASC-N Vice Chairman's Report - Borst
- ASC-O IEEE PES Technical Council Organization and Procedures Committee Report - Borst for Savio
- ASC-P Liaison Report, CIGRE SC-12 - Kennedy
- ASC-Q IEEE/PES Transformers Committee Attendance Statistics - Matthews
- ASC-R Letter Vogel to Veitch 10/29/90 Re: IEEE Senior Member requirements

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

IEEE

TC-A

POWER ENGINEERING SOCIETY

TRANSFORMERS COMMITTEE

IEEE/PES Transformers Committee Meeting
Wednesday, October 24, 1990

Please Reply To:

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 March 28, 1990	R.A. Veitch
3.	Report of Subcommittees:	
	3.0 Administrative	R.A. Veitch
	3.1 Audible Sound and Vibration	A.M. Teplitzky
	3.2 Bushing	L.B. Wagenaar
	3.3 Dielectric Tests	R.E. Lee
	3.4 Distribution Transformers	F. Stevens
	3.5 Dry Type Transformers	R.E. Uptegraff
	3.6 HVDC Converter Transformers & Reactors	W.N. Kennedy
	3.7 Instrument Transformers	J.N. Davis
	3.8 Insulating Fluids	H.A. Pearce
	3.9 Insulation Life	D.H. Douglas
	3.10 Performance Characteristics	J.W. Matthews
	3.11 Recognition and Awards	J.V. Bonucchi
	3.12 Transformer Standards	W.B. Binder
	3.13 Underground Transformers & Network Protectors	P.E. Orehek
	3.14 West Coat	D.W. Gerlach
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	

IEEE TRANSFORMERS COMMITTEE
ADMINISTRATIVE SUBCOMMITTEE
OCTOBER 22, 1990 -- MONTREAL, QUEBEC CANADA

1. INTRODUCTIONS

Chairman Robert Veitch opened the meeting at 6:40 p.m. with 13 members and 11 guests present. Of the guests, three would become members by subsequent action of the subcommittee.

MEMBERS:	Wally Binder	Dave Douglas	Roy Uptegraff
	Joe Bonucchi	Jim Harlow	Loren Wagenaar
	John Borst	Bill Kennedy	Robert Veitch
	Olin Compton	Bob Lee	
	John Davis	John Matthews	
GUESTS:	Frank Heinrichs*	Andy Salem	
	Matt Mingoia	Frank Stevens	
	Harold Moore	Len Swenson*	
	Paul Orehek	Georges Vaillancourt	
	Bipin Patel	Sue Vogel	
	Aslam Rizvi		

*Frank Heinrichs - representing Henry Pearce
*Len Swenson - representing Alan Teplitzky and Dennis Gerlach

2. MINUTES

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

3. AGENDA

The proposed agenda (Attachment ASC-A) was approved with the addition of a request to add discussion relative to:
1) potential Transformers Committee Working Group scheduling conflicts;
2) a move to encourage Transformers Committee members to upgrade to IEEE Senior Member status.

4. NEW MEMBERS OF AD SUB AND TRANSFORMERS COMMITTEE

In recognition of the melding of the C57.12.2 and C57.12.4 subcommittees into the Transformers Committee, Messrs. Paul Orehek and Frank Stevens were accepted as members of Ad Sub and the Transformers Committee.

Mr. Orehek of Public Service Electric & Gas will chair the Underground Transformers and Network Protectors Subcommittee; Mr. Stevens of Northeast Utilities, the Distribution Transformers Subcommittee.

The immediate elevation of these gentlemen to committee membership is an ad hoc action by virtue of the special circumstances attendant on the move of the work of the two subcommittees into the Transformers Committee. More about this administrative change to follow.

5. MEETING ARRANGEMENTS

As of Monday night total registration was 257 plus 74 spouses. There were 216 pre-registrations. 199 have signed up for the IREQ visit Tuesday evening. The host committee has arranged for Monsieur Louis Masson , V.P. of Hydro Quebec's Research Institute, to speak at the Tuesday luncheon on the topic of Geomagnetically Induced Currents and their effect on Hydro-Quebec's 735 kV System.. The subcommittee expressed its appreciation to the host, Georges Vaillancourt and his ever present committee for the very excellent arrangements, particularly in view of the short term notice of extra requirements by virtue of the two new subcommittees.

Following is a summary of planned future meetings:

May 12-15, 1991	Phoenix (Tempe Mission Palms)	- Gerlach
Nov. 3- 6, 1991	Baltimore (Omni Inner Harbor)	- Pollitt Matthews
Mar 29-Apr 1, 1992	Birmingham (Winfrey Hotel)	- Patel
	Sheraton City Center	- Aslam Rizvi
Fall 1992	Cleveland (Oct 13-16)	- D. Douglas
Spring 1993	Western Area - Portland?	- D. Gerlach
Fall 1993	St. Petersburg Area	- J. Harlow

A letter relating to the next (Phoenix) meeting is included as Attachment ASC-B.

6. STATUS OF NEW SUBCOMMITTEES

Most of the membership is aware of the very rapid developments concerning the move to transfer the standards writing activities of two ANSI subcommittees, C57.12.2 on Distribution Transformers and C57.12.4 on Underground Transformers and Network Protectors, into the IEEE PES Transformers Committee. This move has gained momentum since the Denver meeting and is effectively in place with the addition of the two subcommittees to our meetings schedule.

Paragraph C of the Chairman's Report (Attachment ASC-D) relates to this matter and was read by the chairman.

The logistics of this change are not seen to impose any particular problems. It is anticipated that the standards preparation process will, rather, become much more efficient.

The C57 Main Committee will meet Wednesday afternoon, October 24, at which time the IEEE delegation will endorse the move. The IEEE Transformers Committee will continue to work toward a common goal, i.e., develop standards which will become ANSI standards while noting that it is not efficient to have two subcommittees doing the same job. It is the opinion of the IEEE Transformers Committee that the ANSI subcommittees, C57.12.2 and C57.12.4, should be converted to inactive status. The members of these committees are welcome to apply for membership in the Transformers Committee.

In principle, it is an IEEE Standards objective to publish a standard within 3 months after Standards Board Approval. However, in view of our close tie to C57, this is extended to 6 months in order to allow that body to act on a submission and allow the publication as an ANSI/IEEE standard. In the event that C57 does not act in the time allocated, IEEE will publish independently using the basis C57.XX number but with a note qualifying that the document does not yet have ANSI concurrence. IEEE will not publish in the event a flaw is identified in the C57 approval process.

7. IEEE STAFF REPORT

Sue Vogel reported that IEEE staff has initiated 6 committee ballots in the past 6 months. Members indicated concern that the "second notice" was being sent prematurely, i.e., much in advance of 10 days before the ballot would close.

IEEE will soon acquire a new and powerful scanning equipment to facilitate the digitizing of existing text material.

8. REVIEW OF TRANSFORMERS COMMITTEE STANDARDS

Wally Binder's standards activity status report is included as attachment ASC-C. This includes his report of the July 16, 1990, Meeting of the PES Standards Coordinating Committee.

9. REVIEW OF TECHNICAL COUNCIL ACTIVITIES

The report from Chairman Veitch is included as Attachment ASC-D. The point is noted that Mr. Veitch has been endorsed for a term of 3 years as Transformers Committee Chairman in view of the special circumstances regarding the recent change of officers.

Highlights of the Executive Board Meeting, published by Mr. W. A. Elmore, Chairman of the Technical Council, was included in Mr. Veitch's report and is included as Attachment ASC-E.

10. SUBCOMMITTEE ACTIVITIES DISCUSSION

The various subcommittee chairmen offered reports.

a. Audible Sound and Vibration. Len Swenson, Secretary, reported for Alan Teplitzky, Attachment ASC-F.

b. Dielectric Tests, Bob Lee's report is Attachment ASC-G. Mr. Lee's resignation, noting that Harold Moore is nominated to succeed him, is included. The committee expressed gratitude to Bob for his able leadership of the Dielectric Tests Subcommittee for many years. The Ad Sub accepted the nomination of Harold Moore to assume the Dielectric Tests subcommittee chair and elected Harold a member of Ad Sub.

c. Distribution Transformers Subcommittee. Frank Stevens' report is Attachment ASC-H.

d. Instrument Transformers Subcommittee. John Davis' report is Attachment ASC-I.

e. Insulating Fluids Subcommittee. Frank Heinrichs reported for Henry Pearce, Attachment ASC-J.

f. Performance Characteristics Subcommittee. John Matthews' report is Attachment ASC-K.

g. Underground Transformers and Network Protectors Subcommittee. Paul Orehek's report is Attachment ASC-L.

h. West Coast Subcommittee. Len Swenson reported for Dennis Gerlach who was unable to attend the meeting. Mr. Gerlach is resigning this chairmanship and has nominated Mr. Louis Tauber for the West Coast Subcommittee Chair. Mr. Tauber was approved for this position and elected a member of the Administrative Subcommittee. See Attachment ASC-M.

11. VICE CHAIRMAN'S REPORT

John Borst's report, dealing largely with technical papers and the Technical Council Publications Committee is included as Attachment ASC-N.

Mr. Borst distributed a report of the Technical Council Organization and Procedures Committee (ASC-O).

12. COMMITTEE MEMBERSHIP REVIEW

Jim Harlow distributed updated copies of the invitation list. One resignation was received, that from Gene Arjeski, since the Denver meeting. Also, L. R. Smith was reinstated as a member in recognition of his long and devoted service prior to a now completed 3-1/2 year overseas assignment. Three others were nominated for membership and accepted by Ad Sub.

Mahesh Sampat - GE - Hickory
Fred Elliott - Bonneville Power Admin.
John Wood - Pacific Gas & Electric

Considering all changes to committee membership, the Transformers Committee stands at:

Members (Voting)	= 110
Producers	= 40
Users	= 40
General Interest	= 30
Members (Emeritus)	= 18

Our membership balance would be the envy of many Technical Committees which must struggle to accomplish a proper producer/user ratio.

Nine Transformers Committee members were identified who have consistently missed recent committee meetings and are, therefore, subject to dismissal from the full committee. Unless present at the Wednesday meeting of the full committee, these persons will be contacted by the secretary to advise of their situation and inquire relative to their future intentions.

13. AWARDS

Joe Bonucchi's discussion centered on the IEEE Standards Medallion. This award is given by the Standards Board, upon Technical Committee nomination, to those who have exhibited long, dedicated and sustained service. Joe will prepare nominations for two members suggested by Ad Sub: John Dutton and Mel Manning.

14. LIAISON REPORT CIGRE SC-12 (TRANSFORMERS)

Bill Kennedy submitted the CIGRE Study Committee #12 liaison report, Attachment ASC-P.

15. ATTENDANCE STATISTICS

John Matthews' listing of Group Attendance for the previous seven meetings is included as Attachment ASC-Q.

16. NEW BUSINESS

1) The question is again before us regarding working group schedule conflicts. There is concern this might be more of a concern because of the new working groups now participating with us. Subcommittee Chairmen are asked to poll their members if the matter is of sufficient concern to warrant a study of alternative schedules.

2) IEEE is placing emphasis on the desirability of member status upgrades. It is felt that many Transformer Committee members probably qualify for Senior Member status, but, for various reasons, have never applied. The application procedure is not difficult; no one here would have any problem gaining the required endorsement of 4 present Fellows or Senior Members from

our membership. A subsequent communication on this topic from Sue Vogel is included as Attachment ASC-R.

There being no further business, the meeting was adjourned at 11:30 p.m.

J. H. Harlow 11/14/90
J. H. Harlow
Secretary

I E E E/P E S T R A N S F O R M E R S C O M M I T T E E

ASC-A

Administrative Subcommittee Meeting

Monday, October 22, 1990 @ 6:30 p.m.

Bonaventure Hilton Hotel, Montreal, Quebec

A G E N D A

1. Introduction of Members & Guests
2. Approval of the Denver Meeting Minutes
3. Addition to and/or Approval of the Agenda
4. Committee Finances & Meeting Arrangements
   George Vaillancourt - Montreal Host
   Denis Gerlach - Phoenix 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 Technical Council Activities - R.A. Veitch
8. Subcommittees' Activities Discussions - Subcommittee Chairmen
9. Papers for Future Meetings - J. Borst
10. Committee and Subcommittee Membership Review - J. Harlow
11. P.E.S. Awards - J. Bonucchi
12. New Business
13. Adjournment

RAVIEEE

ASC-B

SALT RIVER PROJECT
POST OFFICE BOX 52025
PHOENIX, ARIZONA
85072-2025
(602) 236-8900

October 18, 1990

Mr. Robert A. Veitch
Ferranti-Packard Transformer
P. O. Box 548
St. Catharines, Ontario, Canada
L2R 6W9

Dear Bob:

I am sorry I will not be able to attend the Montreal meeting, but I offer the following information for next spring's Phoenix meeting:

Dates: May 12-15, 1991

Location: Sheraton Tempe Mission Palms Hotel

Room Rates: $49.00 single or double

Estimated Total Meeting Room Charges: $500.00

Reservation Due Date: April 26, 1991

The Mission Palms Hotel is located in Tempe next to Arizona State University. There is a wide variety of activities and restaurants in the area. The Hotel is only about 10 minutes from Phoenix Sky Harbor International Airport. The Salt River Project has done a good deal of meeting business with this hotel, always with excellent results. Tuesday evening's activity will be at a local 1880's Old Western Village complete with an outdoor steak fry and other activities.

I have signed the contract with the Mission Palms Hotel based on occupancy at previous meetings. From our conversation, I believe there may be more attending next spring than I anticipated. This shouldn't be a problem because May is the off season here, so securing a larger block of rooms will not be difficult. Please provide me with attendance and room occupancy information from Montreal when they are available.

I look forward to seeing you in Phoenix and helping you to solve your problem with that nasty surplus of funds.

Sincerely,

Dennis W. Gerlach

To: Member of the IEEE PES Transformers Committee
Administrative Subcommittee

From: W.B. Binder, Jr.

Subject: Status of Transformer Standards, March 26 - October 21,1990

The status of active projects is reported on the attached pages. The projects are sorted by Subcommittee.

Attachment II is an updated list of activities on C57.12.00 and C57.12.90 which are expected to be incorporated into the 1992 revision of their respective Standards.

Attachment III is a report on the status of Standards Submittals.

I attended the PES Standards Coordinating Committee Meeting held at the Summer Power Meeting in Minneapolis on July 16, 1990. The minutes of that meeting are attached. Items of special interest include (1) the discussion of communication with the Technical Committees by their respective SCC representatives, (2) the considerationm of multiple ballots from coordinating organizations, and (3) the revisions to the Standards Manual.

Other topics of discussion were the creation of a common coordination process for member committees and the posibility of limiting the life of a PAR to three years. I would appreciate guidance from the Adsubcom on what position to take on these matters at the SCC Meeting in February.

Since the last report, coordination has been requested for the following projects: "Guide for the Commissioning of Electrical Systems in Hydroelectric Power Plants", with the Energy Development and Power Generation Committee; and "Specification Guide for Reliability of HVDC Converter Stations", the Substations Committee.

Since the last report, coordination has been declined on the following projects: P944, ED&PG; P524, T&D; P516, T&D; "Design Guide for Improving Lightning Performance of Transmission Lines", T&D; P421.1, ED&PG; P421.3, ED&PG; "Guide for Computer-based Control Systems for Hydroelectric Plant Automation", ED&PG; P386 (PC119.2), T&D; "Guide for the Measurement and Use of Soil Thermal Stability", IC; P1218, T&D; "Guide for Service to Equipment Sensitive to Momentary Voltage Disturbances", T&D; P666, ED&PG; and "Guide for the Collection of Data on Personal Injuries in Generating Stations and Substations, ED&PG.

The Standards Office Staff was represented and they

reported on new policies and services.

Ms. Sue Vogel, Administrator, PES, IEEE Standards Office is with us and will be conducting a seminar on Standards Development on Tuesday at the 3:00 P.M. session.

Respectfully submitted,

W B Binder

W. B. Binder, Jr.
Chairman, Standards Subcommittee

PES Standards Coordinating Committee
Meeting Minutes for
July 16, 1990

The Chairman convened the meeting. There was considerable confusion about which hotel and which room had been assigned for the meeting. The conference program had incorrect information. The attendees introduced themselves.

The agenda and the minutes of the previous meeting were reviewed and accepted.

Sue Vogel from the IEEE Standards Department discussed material previously sent to the committee on electronic submittal of documents and the use of copyright protected materials in standards. She also distributed information regarding balloting service provided by IEEE Standards Department. A copy is enclosed.

The Chairman gave his report: The content of the recent memos from the chairman to the committee was discussed. The formation of an IEEE SCC22 on Power Quality was discussed; A copy of a letter from William M. Smith and a scope are enclosed.

The appointment of Fred Kimsey to serve as Vice Chairman for the committee was reported. The ongoing search to find a Secretary was discussed. The primary duties of the three committee officers were discussed:

Chairman:	Committee administration, liaison with PES Technical Council, and liaison to IEEE Standards Board
Vice Chairman:	Liaison with Technical Council standing committees including the TC Organization and Procedures Committee, liaison to the PES Review Standards Corner, and committee awards
Secretary:	Minutes of committee meetings, maintenance of the PES Representatives to Accredited Standards database, and maintenance of the PES Standards database.

Robert H. Harner, S&C Electric Company Vice President for Research and Development, visited the meeting and commented on his recent involvement with PES leadership regarding improving the timeliness and quality of standards. The emphasis by the PES officers and IEEE Standards Department on this topic and the impact of transnationalization of standards in light of EC92 was addressed. The committee identified ideas that could be given further consideration. Ways to mitigate the impact of negative ballots were considered. The need for highly experienced personnel to attend standards development activities was stressed. The limitations imposed by short task force sessions

(typically half-day or one-day sessions) at PES Summer and Winter Meetings was contrasted with intensive two-day sessions located apart from general meetings. The value of a specific goal for the task force chairperson to meet was considered including the possibility of a limited PAR lifetime (3 years). The time management principle that 80 percent of the product is generated in 20 percent of the time was applied to standards activities and the engineering tendency toward perfectionism was discussed. Frequent training available to task force members on current standards development processes and issues was deemed valuable. The Chairman will draft a response to the Standards Board Chairman recommending these ideas.

The reports of the committee members were submitted and discussed.

The discussion from the previous meeting regarding a common coordination procedure for use by all PES committees was revisited. The value of a common procedure was recognized. The Chairman agreed to submit the Energy Development and Power Generation procedure as a starting point on a common procedure. Everyone was encouraged to contribute their committee's procedure. Provision for an additional hour during the next meeting was recommended to address this issue.

The next meeting was scheduled for Monday afternoon during the next PES Winter Meeting in New York City.

Subcommittee: Audible Sound and Vibration
Subcommittee Chairman: Allan M. Teplitsky (212/460-4859)

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
P523	PC57.112	A. Teplitsky	Guide for the Control of Transformer Sound	Yes (8/73)	11/1/89 - TF or WG to be established to start work	
	PC57.12.90b	A. Teplitsky	Transformer Sound Power Measurement	Yes (3/86)	10/22/90 - WG Section 13 balloting TR Comm.	RM

Subcommittee: Bushing
Subcommittee Chairman: Loren B. Wagenaar (614/223-2259)

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
P21	PC57.19.00	L. B. Wagennar	General Requirements and Test Procedures for Outdoor Apparatus Bushings (Rev. of ANSI C76.1)	Yes (4/79)	1/31/90 - TC ballot of D10.	T&D PSR IC SWGR
P800	PC57.19.100	F. E. Elliott	Bushing Application Guide	Yes (4/79)	3/27/90 - WG ballot comments being resolved.	SWGR SUB PSR
	PC57.19.03	L. B. Wagenaar (Acting)	Standard Requirements, Terminology and Test Code for Bushings for DC Applications	Yes (11/89)	3/26/90 - WG review of first draft.	SPD IC SWGR

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFCATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
		L. D. Miller	TF Bushings for Distribution Transformers	None Req'd.	11/1/89 - No interest, TF disbanded.	
24	PC57.19.01	L. B. Wagenaar	Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings	Yes (11/89)	1/31/90 - Ballot TC re Table 9.	SPD IC SWGR

Subcommittee: West Coast
Subcommittee Chairman: Dennis Gerlach (602/236-5483)

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
P513	PC57.114	S. Oklu	Seismic Guide for Power Transformers and Reactors	Yes (7/73)	2/15/90 - Approved by Stnd. Bd. w/condx.	NPE SUB
P842	PC57.120	R. Jacobsen	Loss Evaluation Guide for Power Transformers and Reactors	Yes (5/80)	2/15/90 - Approved by RevCom w/condx 3/12/90 - Letters out for coordination	SUB RM PG

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IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
	PC57.93	J. Gillies	Guide for Installation of Liquid Immersed Power Transformers (including C57.12.11 and C57.12.12 consolidation)	Yes (6/82)	10/21/90 - D5 balloting TR Comm.	None
	PC57.128	H. Johnson	Fire Protection of Outdoor Liquid Immersed Power Transformers	Yes (6/89)	11/1/89 - D1 being prepared.	NPE SUB PSR

Subcommittee: Dielectric Tests
Subcommittee Chairman: Robert E. Lee (215/398-5150)

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
		H. R. Moore	WG on Revision of Dielectric Tests			
	PC57.21a	W. N. Kennedy	TF on Revision of Dielectric Tests of Shunt Reactors	Yes (2/86)	3/26/90 - PC 57.21 Complete	None
	PC57.12.00j	R. A. Veitch	New section 6.8 - Minimum External Clearances Between Transformer Line Parts of Different Phases of Same Voltage	Yes (2/86)	6/26/89 - Complete - Hold for C57.12.00 submittal	None
	PC57.98	R. E. Minkwitz	TF Revision for Guide for Transformer Impulse Tests	Yes (2/86)	3/26/90 - D1 reviewed.	None

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IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFCATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
	PC57.12.90	M. S. Altman	Rev. Par 10.7.2 Enhancement No Voltage Time	No	3/19/90 - PAR being circulated to SCC.	
		J. Rosetti	WG for Revision of Dielectric Testing of Distribution Transformers			
	PC57.12.90c	W. R. Henning	TF on Routine Impulse Test for Distribution Transformers	Yes (9/87)	3/26/90 - D6 balloting TR Comm.	RM PSC
		R. E. Lee	TF on Low Side Surge Requirements for Distribution Transformers	None Req'd	3/26/90 - D1 of position paper discussed.	
			TF - Guide for Transformer Impulse Tests	No	10/22/90 - PAR to be prepared, will be in C57.98.	
		G. H. Vaillancourt	WG on Partial Discharge Tests for Transformers			
		W. J. Carter	TF for Measurement of Apparent Charge	None Req'd.	11/1/89 - Considering changes to C57.113.	
	PC57.127	E. Howells	TF on Guide for the Detection of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers	Yes (3/88)	3/26/90 - TC ballot acceptable. Submitted to RevCom.	T&D PG

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Subcommittee: Dry Type Transformers
Subcommittee Chairman: Roy E. Uptergraff, Jr. (412/887-7700)

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
	C57.21 (contrib.)	R. Dudley	Loading Dry Type Reactors	None Req'd	4/18/90 - C57.21/D10 submitted to Std. Brd.	None
P259	None	A. M. Iverson	Standard Test Procedure for Evaluation of Systems of Insulation for Specialty Transformers	No	3/26/90 - D5 Discussion need par.	?
	PC57.96	W. H. Mutschler	Guide for Loading Dry Type Distribution and Power Transformers	No	3/27/90 - WG looking into temperature related parameters.	PSR PSIM
	PC57.124	A. D. Kline	Recommended Practice for Measuring Partial Discharge and Measurement of Apparent Charge in Dry-Type Transformers	Yes (1/86)	3/26/90 - Balloting D7 to W.G.	None
	PC57.12.60	R. L. Provost	Standard Test Procedure for Thermal Evaluation of Insulation Systems for Solid Cast and Resin Encapsulated Power and Distribution Transformers	Yes (11/85)	3/27/90 - Balloting complete. Ready for RevCom.	Unclear
		R. L. Provost	Thermal Evaluation of Insulation Systems of Dry Type Transformers Above 600V	No	11/1/89 - No report.	

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
P745	PC57.12.58	A. D. Kline	Guide for Conducting Transient Voltage Analysis of a Dry-Type Transformer Coil	Yes (6/78)	4/12/89 - TC voted to reapprove and resubmit to Stnd. Bd. 10/22/90 - Materials not yet received for submission	
	PC57.16	R. Dudley	Requirements for Current Limiting Reactors	No	11/1/89 - Discussing proposed revision	
	C57.12.91	E. Koenig	Test Code for Dry-Type Distribution and Power Transformers	Yes (6/89)	3/26/90 - T.F. reviewing chapters	SPD RM

Subcommittee: Instrument Transformers
Subcommittee Chairman: John N. Davis (404/447-7386)

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
P546	PC57.13		Standard Requirement for Instrument Transformers	Yes (5/80)	10/22/90 - D7 balloting TR Comm.	PSIM PSR SPD

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IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
P670	C37.077	J. G. Reckleff (joint with Switchgear)	Requirement for Current Transformers for Use With AC High Voltage Circuit Breakers	No	3/19/90 - Per D. G. Kumbera, no switchgear activity. Reckleff has resigned. Drop project.	
P832	PC57.13.4	A. J. Jonnatti	Detection of Partial Discharge and Measurement of Apparent Charge Within Instrument Transformers	Yes (10/79)	11/1/89 - No report	T&D

Subcommittee: HVDC Converter Transformers and Smoothing Reactors
Subcommittee Chairman: William N. Kennedy (413/494-2322)

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
	PC57.129	W. Kennedy	General Requirements and Test Code for Oil-Immersed HVDC Converter Transformers and Smoothing Reactors for DC Power Transmission	Yes (6/89)	3/26/90 - D2 discussion PAR to be revised to include dry-type reactors.	RM T&D

Subcommittee: Insulating Fluids **Subcommittee Chairman: Henry A. Pearce (412/983-4335)**

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
	PC57.106	F. W. Heinrichs	Guides for Acceptance and Maintenance of Insulating Oil in Equipment	Yes (4/86)	10/22/90 - D6 balloting TR Comm.	None

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IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFCATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
	PC57.104	H. A. Pearce	Guide for the Detection and Determination of Generated Gases in Oil-Immersed Transformers and Their Relation to the Serviceability of Equipment	Yes (12/81)	10/21/90 - D12 balloting TR Comm.	PSR T&D
	PC57.130	J. P. Kinney	Guide for the Detection and Identification of Gases in Oil-Immersed Transformers During Factory Tests	Yes (6/89)	2/22/90 - D2 sent to WG	None

Subcommittee: Insulation Life
Subcommittee Chairman: David H. Douglas (216/447-3370)

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
	PC57.91	D. S. Takach	Guide for Loading Mineral Oil-Immersed Transformers	Yes (3/85)	10/21/90 - D6 balloting W.G.	SUB T&D PSE
	PC57.100	L. A. Loudermilk	Standard Test Procedure for Thermal Evaluation of Oil-Immersed Distribution and Power Transformers	Yes (10/88)	3/27/90 - Discussion of criteria for models	NPE RM T&D SPD
P838	PC57.119	R. L. Grubb	Recommended Procedures for Performing Temperature Rise Tests on Oil-Immersed Power Transformers at Loads Beyond Nameplate Rating	Yes (9/80)	3/4/90 - D11 to TC ballot.	SWGR SUB PSR

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IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFCATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
	PC57.12.00L	R. L. Grubb	Revise Section 8, Define Thermal Duplicate	No (pending)	11/1/89 - Preliminary Discussion 3/13/90 - PAR sent to NesCom	RM

Subcommittee: Performance Characteristics
Subcommittee Chairman: John W. Matthews (301/281-3775)

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFICATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
Consolidated Changes to C57.12.00-1987						
P462C (1)	PC57.12.00	W. R. Henning	Revision of Sec. 5.9 Reference Temp. for No-Load Loss	Yes (6/79)	3/26/90 - Resolving negative.	PSIM T&D
P462C (2)	PC57.12.00	W. R. Henning	Addition to Sec. 9.3.1 Accuracy Requirements for Measured Losses	Yes (6/79)	3/26/90 - Balloting D5	PSIM T&D
	PC57.12.00h	R. H. Frazer	TF - change Sec. 5.12 "Nameplate Voltage Note Changes for LTC"	Yes (9/86)	3/22/90 - Awaiting returns on D2 ballot.	None
	PC57.12.00i	J. W. Matthews	TF - Nameplate Info. "Directed Flow"	Yes (12/86)	3/27/90 - Definitions received	None
	PC57.12.00k	C. J. McMillen	TF - Change Table 16 Routine Resistance Test	No	3/27/90 - Documentation to Std. Bd.	Successful ballot of TC

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Consolidated changes to C57.12.90-1987						
P262 (E3)	PC57.12.90	W. R. Henning	General Revisionof Sec. 8 No-Load Losses and Excitation Current	Yes (6/79)	3/26/90 - Awaiting Subcommittee ballot returns on D	PSIM T&D
P262E	PC57.12.90	W. R. Henning	General Revision of Sec. 9 Impedance and Load Losses	Yes (6/79)	3/26/90 - Awaiting Subcommittee ballot returns on D9	PSIM T&D
			Sec. 7.3, Figures 9 & 10 reversed		4/11/89 - Hold for C57.12.90 submittal.	

IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFCATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
P1098	PC57.123	W. R. Henning R. Girgis	Guide for Transformer Loss Measurement	Yes (3/85)	3/26/90 - Discussion re No Load Loss portion.	PSIM
P638	None	L. Pierce	Qualification of Class 1E Transformers for Nuclear Power Generating Stations	Yes	3/22/90 - Preparing documentation for Std. Bd.	NPE SUB
	PC57.18.10	C. G. Pounds	Practices and Requirements for Semiconductor Power Rectifier Transformers	Yes (6/81)	11/1/89 - Working on D6	None

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IEEE NO.	ANSI NO.	WG/TF CHAIRMAN	IDENTIFCATION	PAR ON FILE TRANS COMM.	AS OF/STATUS	PES COORD.
	PC57.21	J. W. McGill	Requirements, Terminology, and Test Code for Shunt Reactors over 500 kVA	Yes (6/88)	4/18/90 - PC57.21/D10 submitted to Std. Bd.	RM T&D PSR
	PC57.125	W. B. Binder	Guide for Failure Investigation, Documentation and Analysis for Power Transformers and Shunt Reactors	Yes (2/87)	3/22/90 - D9 TC ballot resolving negatives	T&D PGS PSE SWGR
	PC57.131	T. P. Traub	Standard Requirements for Load Tap Changers	Yes (8/89)	3/22/90 - Discussion re D3	RM T&D

ATTACHMENT II

Work complete or presently in process regarding C57.12.00 and C57.12.90

C57.12.00

SUBCOMMITTEE	PROJECT I.D.	DESCRIPTION	STATUS	WG CHAIRMAN Henning
Perf. Char.	PC57.12.00 P462C(1)	Rev. of Sec. 5.9 Reference temp for no-load loss	Resolving negative.	
Perf. Char.	PC57.12.00 P462C(2)	Add to Sec. 9.3.1 Accuracy requirements for measured losses	Balloting D5.	Henning
Perf Char.	PC57.12.00H	Change Sec. 5.12 Nameplate voltage note changes for LTC	Awaiting returns on D2 ballot.	Frazer
Perf. Char.	PC57.12.00I	Nameplate info: Directed Flow	Received definitions.	Matthews
Diel. Tests	PC57.12.00J	New Sec. 6.8 Minimum external Clearances between live parts	Complete, RevCom documentation ready.	Veitch
Perf. Char.	PC57.12.00K	Change Table 16 - Routine Resistance Test	Complete, RevCom documentation pending.	McMillen
Insul. Life	PC57.12.00L	Sec. 8 Define Thermal Duplicate	Work just starting.	Grubb

C57.12.90

SUBCOMMITTEE	PROJECT I.D.	DESCRIPTION	STATUS	WG CHAIRMAN
Perf. Char.	PC57.12.90 P262E3	Rev. Sec. 8 No-load losses and excitation current	Awaiting Subcommittee ballot returns	Henning
Perf. Char.	PC57.12.90 P262E	Rev. Sec. 9 Impedance and Load Losses	Awaiting Subcommittee ballot returns on D9	Henning
Aud. Sound & Vib.	PC57.12.908	Transformer Sound Power Measurement	Balloting TR Comm.	Teplitsky
Diel. Tests	PC57.12.90C	Routine Impulse Test for Distribution Transformers	D6 out to TC ballot	Henning
Diel. Tests	PC57.12.90D	Para. 10.7.2 Rev. Induced Test Enhancement Voltage Time	Work just starting	Altman
Perf. Char.	None	Sec. 7.3, Figures 9 & 10 Reversed	Ready	---

ATTACHMENT III

STATUS OF STANDARDS SUBMITTALS - AS OF MARCH 19, 1990

SubCom	Number	Title	Stnd. Bd. Approved	Published IEEE	C57 Approval	ANSI Approval	Comments
Insul. Fluids	PC57.111	Guide for Acceptance of Silicone Insulating Fluid and Its Maintenance in Transformers	2/2/89	9/11/89	pending		C57 ballot initiated 3/15/89
Dry Type	PC57.12.01	General Requirements for Dry-Type Distribution and Power Transformers	2/2/89	12/27/89	pending		C57 ballot initiated 3/15/89
Dry Type	PC57.12.59	Dry-Type Transformers Through Fault Current Duration Guide	6/1/89	12/1/89	pending		C57 ballot initiated 6/15/89
Insul. Fluids	PC57.121	Guide for Acceptance and Maintenance of Less Flammable Hydrocarbon Fluid in Transformers	12/87 w/condx	12/15/89	pending		C57 ballot initiated 1/30/89
Perf. Char.	PC57.116	Guide for Transformers Directly Connected to Generators	1/30/89	9/29/89	Yes	1/25/90	Complete
Bush.	PC57.19.101	Guide for Loading Apparatus Bushings	10/20/89	7/17/89	Yes	10/20/89	Complete

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SubCom	Number	Title	Stnd. Bd. Approved	Published IEEE	C57 Approval	ANSI Approval	Comments
Dry Type	C57.94	Recommended Practice for Installation, Application, Operation and Maintenance of Dry-Type General Purpose Distribution and Power Transformers	12/10/87 (reaff.'d)	N/A	C. White to advise		C57 ballot initiated 12/14/87
Diel. Tests	PC57.113	Trial Use Guide for Partial Discharge Measurement in Liquid-Filled Power Transformers and Shunt Reactors					On 5/30/90 RevCom agenda for upgrade to full status.
West Coast	PC57.114	Seismic Guide for Power Transformers and Reactors	2/15/90 w/condx				condx: Receipt of coordinating documentation.
West Coast	PC57.120	Loss Evaluation Guide for Power Transformers and Reactors					2/15/90 RevCom Recommend approval subject to coordination documentation.

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IEEE/PES TRANSFORMERS COMMITTEE
Chairmans Report
October 21 - 24, 1990
Montreal, Quebec

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Report from the Technical Council (TC)

The PES Technical Council met at the Summer Power Meeting in Minneapolis MN on July 17, 1990. The following are highlights from this meeting.

A. Technical Council Officers

At the end of 1990, Walt Elmore will be retiring as Chairman of the Technical Council. He will be succeeded by J.W. Hagge of Nebraska Public Power District. Don Volzka of Wisconsin Electric has moved up from the secretary's position to become Vice Chairman. The new Secretary will be Steve Lambert, who was previously Chairman of the Switchgear Committee.

B. Technical Council Chairman's Report

- Highlights of the Executive Board Meeting held on April 19, 1990 are attached.

- The Technical Council Organization and Procedures Manual defines the term of office of Chairperson of a Technical Committee to be one year with reappointment to a maximum of two years. Extraordinary circumstances allow an extension of this. An exception has been granted to Robert Veitch, Chairman of the IEEE Transformers Committee because of the sudden and unexpected resignation of the Vice Chairman of the Transformers Committee. The circumstances appeared to dictate an extension of one year in the term of Mr. Veitch, to allow the new Vice Chairman and Secretary adequate time to progress in their positions before moving up the next step in the ladder.

- John Boyle was approved as Chairman of the Technical Sessions Improvement Committee by the Executive Board at their January 1990 meeting.

- The following IEEE PRESS Books Special Publications and articles have been proposed.

  1. IEEE PRESS Book on "Power System Control Centers" - rejected

  2. Special Publication utilizing the papers presented at a Panel Session "Static Var Compensators-Planning Operating and Maintenance Experience" - revised and accepted

  3. IEEE PRESS Book on Cogeneration - accepted

4. IEEE PRESS Book "Transformers" - being reviewed by the Transformers Committee

   NOTE: Your Chairman reviewed 4 out of the 15 chapters proposed for this book. The remaining 11 chapters were not submitted for review. I have recommended rejection based on serious errors in the chapters reviewed.

5. SPECTRUM article on "Fuel Cells in Japan" - being reviewed by Energy Development and Power Generation Committee

- PES President Hal Scherer has asked all members of the Technical Council to report on progress in meeting the following goals for 1990. These are 3 of the 7 goals noted in my report to the Transformers Committee for the spring meeting in Denver.

  1. Strengthen direct ties between Technical Committees and Chapters. In this regard, our host George Vaillancourt contacted the Chairman of the Montreal chapter regarding our meeting and invited their members to participate if they so desire.

  2. Stimulate international exchange.

  3. Provide closer interaction with student chapters.

I would be pleased to hear of any activities towards these objectives.

C. New Subcommittees of the Transformers Committee

The co-secretariats of ASC C57 committee are IEEE (Executive) and NEMA (Administrative). In the past few years, relations between IEEE and NEMA staff have been strained, in part due to staff reductions within NEMA. There are two large C57 subcommittees which operate independently of the Transformers Committee. These are C57.12.2, Distribution Transformers and C57.12.4, Underground Transformers and Network Protectors. Due to continued problems in the administration of these subcommittees, the various delegates to C57 from IEEE, EEI and NEMA have been looking for ways to improve the effectiveness of the process.

A meeting was held in New York on July 9 to review a proposal to transfer the work of C57.12.2 and C57.12.4 to the Transformers Committee.

The Transformers Committee was represented by your Chairman, Vice Chairman John Borst and Leo Savio. IEEE, EEI and NEMA were also represented.

After considerable discussion, a decision was made to establish two new subcommittees within the Transformers Committee umbrella. The new subcommittees are:

- Distribution Transformers - Acting Chairman, Frank Stevens

- Underground Transformers and Network Protectors - Acting Chairman, Paul Orehek

Scopes for both new subcommittees were submitted to the Organization and Procedures Committee and subsequently balloted by the Technical Council. Except for some minor editorial changes, the new scopes were accepted as submitted.

The two new subcommittees will be participating in our fall meeting in Montreal. I would like to express a personal welcome to all the members of these two new subcommittees and their working groups.

D. Transformers Committee Operating Manual

The new Operating Manual was printed by IEEE and distributed to all members of the Transformers Committee plus Chairmen of Subcommittees and Working Groups who are not members of the main committee. The new manual is up to date in all respects and includes the new subcommittees noted above. I recommend all those receiving a copy of this manual, review it carefully, as it describes the rules and operation of the Transformers Committee. I would like to thank Leo Savio for all the work done on his part to completely update this manual.

Respectfully submitted,

Robert A. Veitch
Chairman

RAV:gw
Encl.

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HIGHLIGHTS OF THE EXECUTIVE BOARD MEETING
Baltimore, April 19, 1990

1. President Scherer stated that the ASME has confirmed their intentions to proceed without PES in conducting the Power Generation Conference after the San Diego meeting in 1991. The ASME will join other groups in conducting a new International Power Generation Conference beginning in the Fall of 1992.

2. Cigre has organized a "Committee 2000" to chart their future course. Lionel Barthold is the U.S. representative and the PES will host the Committee when it meets in the U.S. tentatively on November 19 and 20, 1990.

3. George Fantozzi has been appointed Chairman of a Task Force to recommend how the PES should proceed in addressing the question of biological effects of EMF (Electro-magnetic Fields). W. E. Feero of Electric Research and Management, has agreed to represent the interests of the Technical Council and to provide appropriate input to this Task Force. This Group will consider what is required to bridge the gap between biology and technology.

4. The Meetings Department indicated that the New York Penta Hotel may not be available for the 1992 Winter Power Meeting.

5. A motion was passed unanimously in favor of the Power Engineering Society being a 50% co-sponsor with AKADINPEX of the International Conference on Harmonics and Power Systems to be held in Budapest, October 4 and 5 1990.

6. A motion was passed unanimously to approve Chicago as the host city for the 1994 IEEE/PES T&D Conference and Exposition.

7. A motion was passed unanimously to approve a budget of 800 pages for the Power Engineering Society Review for 1991.

8. Virtually, all of the Transactions Papers are being published within 12 months of the presentation date. Editor Hal Gold recommended a 1991 page budget of 4500 pages for the Transactions. This was approved without dissent.

9. Del Wilson accepted the responsibility to draft objectives and recommend actions relative to the 100th Anniversary of AC Transmission which will occur in 1991.

A 5C - E
2 OF 2

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10. John Kappenman of Minnesota Power and Light Co. and Professor Vern Albertson of the University of Minnesota presented information regarding Geomagnetics Storm Activity and its Effect on Power Systems. They appealed for support by PES for a monitoring satellite. The Executive Board approved the following resolution: "In light of the potentially adverse impact of geomagnetics storms on power systems and the desirability of utilities having advance warning so that preventative and corrective strategies can be implemented, the Power Engineering Society advocates the implementation of an L1 positioned solar wind monitor satellite system. With solar activity projected to peak in 1993, it is urgent that immediate funding be committed by a combination of private and governmental institutions." Copies of the resolution were sent to EPRI, EEI and NERC.

The next meeting of the Executive Board is scheduled for Thursday, July 19, 1990 at the Marriott Hotel in Minneapolis, Minnesota.

W. A. Elmore
Chairman, Technical Council

AUDIBLE SOUND & VIBRATION SUBCOMMITTEE
report to: ADMINISTRATIVE SUBCOMMITTEE 10/22/90

Ballot results of the Test Code for Liquid-Immersed Distribution Power and Regulatory Transformers, Section 13, Audible Sound Emissions were as follows:

71 affirmative, 3 negative, 9 abstentions for a 78% response. Of the three negative votes, only one contains substantive technical material and we expect it will be shortly resolved. Numerous editorial comments were received which may require another ballot for full acceptance.

Since NEMA TR1 was rescinded in 1985 there has been no official transformer maximum sound level table for power transformers 1,000 KVA and above. An inquiry to NEMA indicates work on the table was assigned in 1987 but there has been no action. Reinstatement of the table by either NEMA or ANSI is very desirable and to many customers, essential. The lack of this table was the basis of one negative comment to the above ballot.

A transformer siting guide is planned by the subcommittee. There will be further discussion on this subject at the AS&V subcommittee meeting.

Lennart A. Swenson

AS&V Secretary

A true copy of Mr. Swenson's 10/22/90 hand written report.

DIELECTRIC TESTS SUBCOMMITTEE ACTIVITIES
ADMINISTRATIVE SUBCOMMITTEE - 10/22/90

1. Membership - 59

2. Standards Activities

   Activities are at the Working Group and Task Force levels.

3. IEEE/PES T&D Conference and Exposition - Dallas - 1991.

   The Chairman of the 1991 T&D Conference and Exposition has accepted a Panel Session on Low Side Surge Requirements for Distribution Transformers.

   A paper "Secondary (Low-Side) Surges In Distribution Transformers" is being finalized. This paper will be submitted for review with the intent that it will be the anchor for the panel session.

4. Dielectric Tests Subcommittee reorganization

   I nominate Harold Moore to succeed me as Chairman of the Dielectric Tests Subcommittee.

   Jim Templeton will accept chairmanship of the Working Group on Revision of Dielectric Tests, succeeding Harold Moore.

   Bruce Uhl will accept chairmanship of the Task Force on Low Side Surge Requirements for Distribution Transformers.

Robert E. Lee

Robert E. Lee
October 19, 1990

IEEE

TRANSFORMERS COMMITTEE

ASC-G
2 of 2

POWER ENGINEERING SOCIETY

Please Reply To:

Robert E. Lee
Pennsylvania Power & Light Co
1005 Brookside Road
Allentown, PA 18106-9494

October 22, 1990

Mr. Robert A. Veitch
Ferranti Packard Transformers, Ltd.
P.O. Box 548
St. Catherines, Ontario
Canada L2R 6W9

Dear Robert:

Since PP&L will no longer support my active involvement and participation in the IEEE Transformers Committee, I must submit my resignation as Chairman of the Dielectric Tests Subcommittee.

Harold Moore has graciously accepted to succeed me. Harold's long experience in the Subcommittee makes him an excellent and well qualified candidate for this position.

I appreciate the training and learning experiences afforded me by the Committee since my first attendance in the Fall of 1981. I value the friendships and professional relationships that have developed over the years and will miss participating.

At this time, I would like to defer resignation from the Committee until my work relationship at PP&L is resolved.

Yours truly,

Robert E. Lee

Robert E. Lee, P.E.

REL:rel

IEEE TRANSFORMERS COMMITTEE
ADMINISTRATIVE SUBCOMMITTEE MEETING:
102290 1830 hrs.

Agenda
Item 8. Distribution Transformers Subcommittee

I am honored that you have named me Chairman of the Distribution Transformers Subcommittee and am very pleased to note that IEEE has extended an invitation to the ANSI C57.12.2 Subcommittee to become the Distribution Transformers Subcommittee of IEEE Transformers Committee. The acceptance of your kind offer will be determined by the C57 EL&P/EEI delegations serving on C57.12.2, .4 and the Main Committee, with expected approval of EEI at whose pleasure these delegations serve.

The Subcommittee known as ANSI ASC C57.12.2 writes product standards for the mounted, submersible and pole mounted distribution transformers. There are seven standards in all. Also, in conjunction with ANSI ASC C37 we write four Enclosure Integrity/Coating Standards. The Subcommittee has about 25 members representing the Invester-owned Electric Utility Industry and Transformer Manufacturers. NEMA has historically furnished Secretariat services.

Each Standard is written by a Working Group made up of Subcommittee members. Historically the Working Groups have been known by the ANSI Standard that they write. For example the Pole Mounted Distribution Transformers Working Group is known as ANSI C57.12.20. Earlier today 3 of the seven Working Groups met in conjunction with the IEEE Transformer Committee.

This evening we are happy to be able to be privy to the working of the Administrative Subcommittee of IEEE Transformers Committee. Tomorrow afternoon we are looking forward to attending the IEEE Seminar on Standards Development to further our knowledge of the IEEE Standards development machinery.

In conclusion, I would like to note, on behalf of the Subcommittee, how pleased we are with the manner in which we have been welcomed into the IEEE Transformers fellowship. I want to take this opportunity to thank all those persons and organizations who have worked hard and long on our behalf enabling us to be here with you this evening.

Respectfully submitted,

Frank Stevens
for Distribution Transformers

A true copy of Mr. Stevens' 10/22/90 hand written report.

ASC - I

IEEE/PES TRANSFORMER COMMITTEE
INSTRUMENT TRANSFORMER SUB-COMMITTEE

Administrative Sub-committee Report
Oct. 22, 1990

1. P546/D7a, "Standard Requirements for Instrument Transformers", was sent to the IEEE Standards Office for letter ballot. The balloting is in progress with ballots due by Nov. 26, 1990.

2. Work on a partial discharge guide, P832/D5, has been resumed.

3. The committee will discuss whether or not to request a PAR for a RIV guide at this time.

4. ANSI and IEC harmonization will be discussed. Mr. Joe Ma will lead the discussion.

5. The committee has received a request from Chairman John R. Boyle, PES Power Systems Relaying Committee for a modification of C57.13 to include gapped core current transformers. This is the first communication from the Power Systems Relaying Committee to the Instrument Transformer Sub-committee in over five years. The request will be discussed and a response will be sent to the Power Systems Relaying Committee.

6. The Denver, Colorado, meeting on Mar. 27, 1990 was attended by six committee members and five guests.

Respectfully submitted,

John M. Davis, Chairman

ASC-J

INSULATING FLUIDS SUBCOMMITTEE

The Insulating Fluids Subcommittee ballotted revisions of C57.104 - Gas Guide, and C57.106 - Oil Guide, at the Main Transformers Committee. We hope to get the negative ballots and comments all resolved at this meeting.

A draft of PC57.130 - Gas Analysis During Factory Test has been prepared and will be discussed.

H. A. Pearce, Chairman

10/22/90

ASC-K

Administrative Subcommittee Meeting - 10/22/90

Performance Characteristics Subcommittee Activities

Interpretation Request - ANSI/IEEE C57.12.00-1987,
C57.109-1985, and IEEE C37.91-1985

A request for interpretation of these documents regarding through-fault protection of transformers was received from Mr. L. J. Powell, General Electric Company. Mr. Powell notes inconsistency in that the C57.12.00 Standard allows inclusion of source impedance in through-fault withstand design, but the protection curves in the C57.12.109 and C37.91 Application Guides are based on transformer impedance alone.

Project Request - ANSI/IEEE C57.12.00-1987
Table 9, Note 9, Last Paragraph

A letter was received from Mr. George Reitter, Delta Star, Inc., requesting revision of this paragraph to allow use of a "solid bar" symbol, in addition to the present "scallop" symbol, where development of windings is shown on nameplates.

The latest revisions of IEEE Standard Graphic Symbols for Electrical and Electronics Diagrams, ANSI/IEEE Std. 315-1975 and 315A-1986, do not show a "solid bar" symbol as an acceptable alternate for the "scallop" symbol. Unless advised otherwise, I will respond to Mr. Reitter with this information and refer further pursuit of this request to SCC11.

John Matthews
PCS Chairman

JWMASM

ASC-L

UNDERGROUND TRANSFORMERS AND NETWORK PROTECTORS SUBCOMMITTEE
ADMINISTRATIVE SUBCOMMITTEE REPORT - OCTOBER 22, 1990

1.0 Membership - 22

2.0 The Scope for the Subcommittee approved by the IEEE/PES Technical Council Organization and Procedures Committee with some editorial changes is as follows:

"Develop and maintain related standards for secondary network protectors, and secondary network transformers (liquid-filled and dry-type) and three-phase underground-type distribution transformers rated 2500 kVA and smaller with a high voltage of 35 000 volts and below, and a low voltage of 480 volts and below. Coordinate with other technical committees, groups, societies, and associations as required."

3.0 Standards Activities

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

Working on 1993 Revision.

3.2 C57.12.40 - "Requirements for Secondary Network Transformers, Subway and Vault Types (Liquid-Immersed)." E. A. Bertolini - Chairman

Revised Standard was approved in 1987. It is expected to be published by the end of the year.

3.3 C57.12.44 - "Requirements for Secondary Network Protectors." R. B. Robeertson - Chairman

Developing a new product Standard. Working Group is presently in Draft #3 and goal for completion is the fall of 1992.

3.4 C57.12.57 _ "Requirements for Ventilated Dry-Type Network Transformers 2500 kVA and Below, with High Voltage 34 500 Volts and Below, Low Voltage 216Y/125 and 480Y/277." B. Nutt - Chairman

Working on 1992 revision.

4.0 On behalf of the Subcommittee, I would like to take this opportunity to thank all the members who helped in getting the activities of the C57.12.4 Subcommittee transferred to the IEEE PES Transformers Committee.

Paul E. Orehek

Paul E. Orehek

WEST COAST TRANSFORMER SUBCOMMITTEE
report to: ADMINISTRATIVE SUBCOMMITTEE 10/22/90
meeting Sept. 18, 1990, Portland, Oregon

9 members, 7 guests

Called to order by Dennis Gerlach, Chairman

Sam Oklu, vice chairman, declined to be next chairman.
Louis Tauber, secretary, elected to be new chairman.

The position of vice chairman was suspended until it is felt the position is again needed.

Working Group Reports:

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

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

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

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

The West Coast Transformers Subcommittee will meet next during the Transformers Committee in Phoenix.

This report excerpted from the minutes of the Sept. 18, 1990 meeting of the West Coast Transformers Subcommittee.

Lennart A. Swenson
representing
Louis Tauber, WCTS Chairman

A True copy of Mr. Swenson's 10/22/90 hand written report.

IEEE

TRANSFORMERS COMMITTEE

POWER ENGINEERING SOCIETY

Please Reply To:

IEEE/PES TRANSFORMERS COMMITTEE
VICE CHAIRMAN'S REPORT

OCTOBER 22, 1990

1990 SUMMER POWER MEETING - TRANSFORMERS SESSION

The Transformers Session was held on Wednesday afternoon (July 18th at Minneapolis) with approximately 50 people in attendance. The topics of the six papers presented included transformer modelling, ferroresonant behavior, insulation systems and superconduction. All presentations were of good quality; discussion was limited.

1991 WINTER POWER MEETING - TECHNICAL PAPERS

Twenty papers have been submitted and are currently under review for the 1991 WPM. This higher than normal volume has placed a heavy load on reviewers; the vice-chairman greatly appreciates those who willingly support this process. Since only seven spaces are allocated to us for the WPM, a high reject rate and/ or delayed presentation will be required.

IEEE/PES TECHNICAL COUNCIL PUBLICATIONS COMMITTEE

This Committee met on July 16, 1990 at the Minneapolis Summer Power Meeting and was chaired by J.W. Hagge, Vice Chairman of the PES Technical Council.

A request was submitted to allow an author to provide rebuttal of reviewer's comments. The Committee agreed to accept "adequate rebuttal" from an author for further consideration during the review/approval process. A modification to the Publications Guide will be drafted. It was noted that a revised Guide will be printed shortly.

A request was submitted to limit the number of papers submitted by one author for one meeting. While the Committee was empathetic to this issue, it was felt to be inappropriate to formally limit submittals. Each Coordinator will need to deal with these as they occur.

The Committee also discussed the problem of authors who submit previously rejected papers to a different Technical Committee for consideration; this can be difficult to police.

The allocation of papers for the 1991 Winter Power Meeting were proposed/accepted; total will be 240 of which 7 are allocated to the Transformers Committee. It was noted that Committee/Working Group Papers are not subject the 7 page limit.

The Committee discussed the funding limitations which restrict the total number of pages which can be published. It was noted that the T&D Conference is a major source of PES funding.

Panel sessions will continue to be submitted for scheduling purposes for Winter/Summer Power meetings. The T&D Conference is handled separately.

The Committee Chairman reminded the group of the option to present papers at the Technical Committee meetings. These must be listed/ published as part of the preceding Winter/Summer Power Meeting.

No change was proposed to the 1991 Winter Power Meeting standard meeting schedule. The scheduling process is a significant challenge for Technical Committees which meet in conjunction with the Winter/Summer Power Meetings.

IEEE/PES TECHNICAL COUNCIL TECHNICAL SESSIONS IMPROVEMENT COMMITTEE

This Committee met on July 17, 1990 at the Minneapolis Summer Power Meeting and was chaired by John Boyle.

The 1990 Winter Power Meeting Technical Session Evaluation was reviewed/discussed. Much of this discussion focused on presentation quality, particularly visuals. A revised Author's Publication Guide will be published shortly; it does contain updated information on visuals.

Few, if any, guidelines exist to govern Panel Sessions. It was suggested that panelists be encouraged to provide handouts which summarize their input.

The review of visuals prior to presentation is not effective for several of the Technical Committees.

IEEE/PES TECHNICAL COUNCIL ORGANIZATION AND PROCEDURES COMMITTEE

This Committee met on July 17, 1990 at the Minneapolis Summer Power Meeting and was chaired by J.S. Edmonds. I represented Leo Savio at this meeting.

Power System Engineering intends to add a position to aid the Vice-Chairman in meeting schedules.

Power System Relaying provides an orientation session periodically for new members/participants.

Switchgear has added a separate position to coordinate technical papers.

Surge Protective Devices has added a Standards Coordinator position.

A brief Transformers report was submitted (attached).

An ad hoc Working Group continues an effort to revise the Technical Council Organization and Procedures Manual.

The proposal to form an Insulation Coordination Committee was discussed at length. Several unanswered questions arose: what documents are involved? who is the current secretariat? why is ASC C92 disfunctional? Committee consensus is to not set up a new committee. Because of lack of detailed knowledge, no single alternative proposal emerged. Action was deferred pending further investigation.

Support of the Joint Power Generation Conference was discussed; the Chairman had proposed formation of a new Technical Council Committee. While support of the Conference was weak, the Committee agreed to forward the request to the PES Meetings Department.

The Insulated Conductors Committee Scope revisions were approved subject to minor editorial changes. It was noted that some of the Scopes published in the IEEE PES Organization and Committee Directory are not current.

The Committee discussed now to address FLACT (Flexible AC Transmission) without resolution.

The two new Subcommittees proposed by the Transformers Committee were accepted as submitted and will be forwarded to the Technical Council for review/approval.

John D. Borst
Vice Chairman
IEEE/PES Transformers Committee

ASC - O

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IEEE/PES TECHNICAL COUNCIL ORGANIZATION AND PROCEDURES COMMITTEE

TRANSFORMERS COMMITTEE REPORT - 7/17/90

1. Revision of the Transformers Committee Operating Manual has been completed and will be issued shortly.

2. The addition of two new subcommittees is proposed (attached).

John Borst for Leo Savio
Transformers Committee

IEEE PES TRANSFORMERS COMMITTEE

ASC-O
2 of 2

Two new subcommittees are proposed:

UNDERGROUND TRANSFORMERS AND NETWORK PROTECTOR SUBCOMMITTEE

SCOPE: Develop and maintain related standards for secondary network protectors, and secondary network transformers (liquid filled and dry-type) and three phase underground type distribution transformers rated 2500 kVA and smaller, with a high voltage of 35,000 volts and below, and a low voltage of 480 volts and below. Coordinate with other technical committees, groups, societies and associations as required.

DISTRIBUTION TRANSFORMERS SUBCOMMITTEE

SCOPE: Develop and maintain product Standards for overhead, padmounted and certain underground type distribution transformers rated 2500 kVA and smaller, high voltage 38000 V and below, low voltage 15,000 volts and below. Development and revision of Enclosure Integrity and coating standards for the above apparatus.

John D. Borst
Vice Chairman, Transformers Committee
for
Robert A. Veitch
Chairman, Transformers Committee

July 11, 1990

LIAISON REPORT
CIGRE SC-12 (TRANSFORMERS)

1.0 Introduction

The 33rd general session of CIGRE was held in Paris Aug. 26 through Sept. 1, 1990. Subjects discussed at the Study Committee (SC) 12 general meeting included Thermal Aspects of Transformers and Large Generator Transformers. There were sixteen papers accepted by SC-12 for the meeting, two of which were prepared by U.S. authors. A list of all sixteen papers is included at the end of this report; please contact me for copies of any that you would like. In addition to the general meeting, working groups on static electrification (headed by Stan Lindgren of EPRI) and HVDC Converter Transformers (headed by Anders Lindroth of ABB Ludvika) met earlier in the week, as did several associated task forces.

Preferential subjects chosen for discussion at the SC 12 colloquium next June include maintenance considerations of transformers (condition monitoring, life assessment, surveillance, reliability, life extension, and refurbishment and replacement) and new failure modes (static electrification, geomagnetic induced currents, and fast transients). The application of zinc oxide disks will also be discussed, as well as dielectric testing of converter transformers.

2.0 Thermal Problems of Transformers

Five papers for the meeting presented experiences regarding fiber optic thermal detectors. There are two types presently available - point reading and distributed. The point reading devices are widely accepted throughout Europe and Asia although they have not received very much support in the US. Several speakers including Thomas Fogelberg of ABB Ludvika favored their use in calibrating conventional winding temperature indicators during heat run and disconnecting them in the field. (The sensors would be left in the transformer but would not be brought out, while the electronics would remain in the factory.)

The distributing reading sensors were favored by Mr. White from the CEGB of Great Britain. Although the equipment is

more expensive and the cable itself is quite delicate, these probes eliminate the need to determine the location of the hot spot prior to the test and permit the measurement of hot spots that could develop during operation (due to wearing of the turn insulation for example).

Concern was expressed by several speakers that the present IEC standards do not adequately measure the ability of large power transformers to withstand overloads, particularly with respect to the thermal time constant. Fiber optic devices permit the accurate determination of thermal characteristics of discrete transformers.

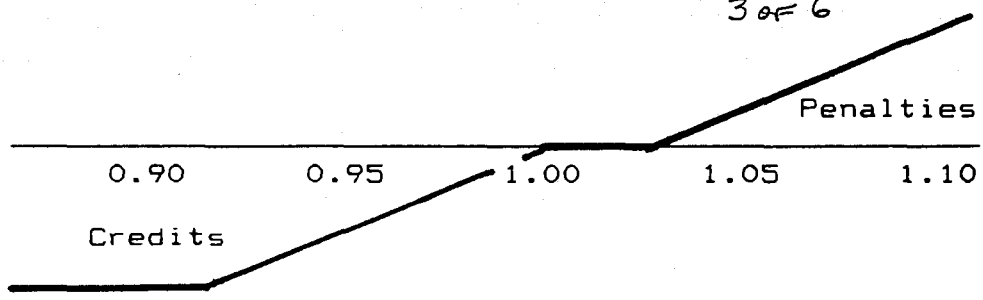
Overloading of transformers is of major concern. One interesting conclusion resulting from the discussion on this subject is that there are at least three conditions which could result in overheating even when the transformers is operating below nameplate rating: geomagnetic induced currents, non sinusiodal currents, and partial or complete loss of cooling.

3. Large Generator Step-Up Transformers

Topics discussed concerning GSUs included: short circuit testing, magnetic shielding arrangements, hot spots, loss evaluation, tap changers, and dielectric testing. Mssrs Calabro (Italy) and Chornogotsky (USSR) reported short circuit tests on GSUs up to 370 MVA, although many other manufacturers urged that with modern analytical techniques and model test results no short circuit tests should be necessary.

There was general agreement that the shielding used on a transformer must be determined on an individual basis - there is no one solution that is best for all situations. Paper 12-102 from Japan presented a novel technique for detecting hot spots in end frames and outer windings of coils - a current of 20% rated is applied to coils after the core and coils are assembled but before vaportherm and an infrared camera is used to obtain the temperature distribution.

Mr. Ravot from Switzerland reported an interesting agreement negotiated between the user and manufacturer in that country regarding loss measurements. Because the accuracy of the measurements is estimated to be approximately 2%, manufacturers do not pay any penalties until the measured losses exceed 1.02 times the guaranteed values (Fig. 1). Credit for lower losses is applied immediately, but are capped if the losses are lower than 86 - 90% of guaranteed.



Loss Credits and Penalties
Fig. 1

Application of tap changers in GSUs vary widely. The Soviet Union and several other countries use no tap changers, while Finland doesn't use them in their 400 kV grid but does at lower voltages. John Provanzana from AEP commented that although the tap changers have been reliable they have experienced several problems with the associated leads and lead supports.

There was quite a lively discussion regarding dielectric testing. John Provanzana showed illustrations from a recent IEEE paper prepared by AEP which did record a negative impulse superimposed on an ac peak which occurred on their system. It resulted in a 1364 kV impulse applied on the high voltage and a 48 kV impulse transferred to the low voltage terminals. Although well below the protective levels of both coils, and well below the 2025 kV maximum superimposed impulse that could theoretically be achieved on a 765 kV system protected by 1400 kV arrestors (illustrated in Fig. 1 of paper 12-202), it received considerable attention from the utilities. His conclusion was that there must be clearer communication between the system engineer and the transformer designer. It is not enough to design for dielectric tests but the transformer must also be good for the voltages it will experience in service. He also expressed the need for better models for transient modelling of power systems and transformers. Mr. Chornogotsky described the experience in the Soviet Union which appears to be different from that of AEP and other utilities. Since 1975 the USSR has built and operated forty eight (48) 750 kV, 417 MVA single phase GSUs with no reported dielectric failures. In addition, he reported that they have successfully operated three 500 kV transformers insulated for 900 BIL for three years, with three more currently being built!

4. Working Group on Static Electrification

This group has two task forces. One headed by Mme. Fallou has developed a new test cell which consists of a small 3 mm thick disk of paper or pressboard which spins at a high rate of speed in oil and the generated charge is measured. Cells are being built for testing in France and Austria; results

should be available early next year. (Dr. Frank Roach from STC is a corresponding member of this task force.)

The other task force is headed by Sam Hall from the CEGB and is developing a survey to gather data on failures due to static electrification. Results from the survey are expected by mid 1991.

5. Working Group on HVDC Converter Transformers

This working group is active in several areas - a specification list which is complete and will be published in ELECTRA, and position papers on dielectric testing, loss measurements, and sound measurements. The dielectric testing paper is in its fifth draft and it is expected that it will be completed by mid 1991. Work in the other two areas remains quite preliminary at present. It will be necessary to obtain additional loss measurement data for several different converter transformer designs to verify a method proposed by ABB Ludvika and based on an IEEE paper published by Manitoba Research. Additional work is also required concerning the acoustic response of hvdc equipment to harmonic losses and more field measurements are necessary before a proposal can be developed in this area.

The working group has tentatively scheduled two meetings form 1991 - one in March somewhere in North America and the other in June at the SC 12 colloquium.

Bill Kennedy

William Kennedy
US Representative to CIGRE SC 12 (Transformers)

Please note my new address!

Development and Product Support Engineering
ABB Power T&D Co.
3500 South Cowan Road
Muncie, IN 47307-2448

Telephone: (317) 286-9387 FAX: (317) 286-9313

List of Papers Accepted for the 33rd CIGRE General Session
Study Committee 12 (Transformers)
Aug. 26 - Sept. 1, 1990

Paper	Title	Author(s)	Country
12-101	How to Eliminate Some Systematic Errors in Transformer Temperature Rise Measurements	Z. Godec	Yugoslavia
12-102	Measurement of Winding Temperature of Power Transformers and Diagnosis of Ageing Deterioration by Detection of CO2 and CO	K. Goto, H. Tsukioka, E. Mori	Japan
12-103	Determination of Hot-Spot Temperature Rise at Rated Load and at Overload	H. Nordman, E. Hiironniemi, A. J. Pesonen	Finland
12-104	Determination of Reliable Transformer Capacity Through Direct Hot-Spot Temperature Measurement and Safe Thermal Loading Limits	S. R. Lindgren, G. I. Addis, S. I. Nilsson, E. M. Petrie	United States
12-105	Thermal Assessment of Transformers	A. White, M. R. Daniels, G. Bibby, S. Fisher	United Kingdom
12-201	Some Designing, Testing and Reliability Problems Related to Large Generator Transformers	P. Jezierski, M. Kazmierski, A. Ketner, M. Koslowski	Poland
12-202	Rationale and Implementation of a New 765 kv Generator Step-Up Transformer Specification	L. B. Wagenaar, J. M. Schneider, J. H. Provanzana, D. A. Yannucci, W. N. Kennedy	United States
12-203	Dielectric Stresses in 735 kv Generator Transformers Under Operating and Test Conditions	R. Malewski, J. Douville, L. Lavallee	Canada
		D. Tschudi	Switzerland

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List of Papers Accepted for the 33rd CIGRE General Session
Study Committee 12 (Transformers)
Aug. 26 - Sept. 1, 1990
(Continued)

Paper	Title	Author(s)	Country
12-204	Large Space Saving Generator Transformer for Seismic Regions	I. A. Boroday, V. M. Chornogotsky, R. P. Doluk	USSR
12-205	Reliability, Availability and Maintenance of Generator Transformers	C. Kroon	Nether-lands
12-206	Aspects of Design, Tests and Operation of an 850 MVA Standardized Generator Transformer	F. Flottmeyer, J. Kotschnigg	Fed. Rep. of Germany
12-207	Electromagnetic Transients in Large Power Step-Up Transformers: Some Design and Testing Problems	A. Babare, A. Bossi, S. Calabro, G. Caprio, S. Crepaz	Italy
12-208	Large Generator Transformers	C. Kroon	Nether-lands

Figure 3 - IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUP	Fort Lauder. May 1987	New Orleans Nov. 1987	Wash. DC Apr. 1988	Long Beach Nov. 1988	Chicago Apr. 1989	Charlotte Oct. 1989	Denver Mar. 1990	MAXIMUM	AVERAGE
Committee Registration: Members and Guests	181	130	122	177	160	200	202	202	167
Spouses	?	?	?	47	37	42	52	52	45
SC Administrative	?	18	17	17	19	18	20	20	18
SC Audible Sound and Vibration	?	19	21	24	27	29	26	29	24
SC Bushings	18	20	15	16	21	14	16	21	17
WG Bushing Application Guide	15	20	13	13	0	13	21	21	14
WG DC Applications of Bushings	-	-	-	7	16	14	12	16	12
SC Dielectric Tests	82	97	79	76	67	77	81	97	80
WG Revision of Dielectric Tests	48	32	30	22	27	32	33	48	32
TF Rev. Dielectric Tests for Shunt Reactors	17	23	22	?	18	19	?	23	20
TF Rev. of Impulse Test Guide	-	?	15	19	22	41	41	41	28
TF Enhancement Voltage Time	-	-	-	-	-	-	16	16	16
WG Rev. Dielectric Tests on Distr. Transf.	42	19	30	29	29	39	28	42	31
TF Low Side Surge Req. for Distr. Transf.	-	-	29	20	23	27	26	29	25
WG Partial Discharge Tests	39	40	30	44	41	46	44	46	41
TF Acoustic Detection of Partial Discharge	?	?	16	13	19	16	22	22	17
TF Measurement of Apparent Charge	?	?	23	29	21	21	13	29	21
SC Dry-Type Transformers	27	25	27	23	26	25	28	28	26
WG Test Code C57.91	-	-	-	-	-	23	28	28	26
WG Dry-Type Dielectric Problems	27	24	25	28	16	30	25	30	25
WG Dry-Type Reactors	7	8	6	7	8	8	12	12	8
WG Dry-Type Thermal Eval. and Flammability	23	0	25	18	18	23	22	25	18
WG Dry-Type Thermal Problems	-	25	27	26	16	30	27	30	25
WG Insulation Req. for Specialty Transf.	16	17	7	8	13	11	10	17	12
SC HVDC Converter Transf. and Reactors	14	15	11	10	9	12	15	15	12
SC Instrument Transformers	11	?	22	13	17	12	11	22	14
SC Insulating Fluids	27	?	25	33	22	25	33	33	28
WG Gas Analysis During Factory Tests	-	-	-	-	-	39	36	39	38
SC Insulation Life	70	70	65	44	64	50	71	71	62
WG Guides for Loading	55	50	47	49	38	41	47	55	47
WG Thermal Eval. of Distr. and Power Transf.	26	35	31	?	?	46	44	46	36
WG Thermal Tests	0	16	23	14	14	16	20	23	15

ASC-Q
1 of 2

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

GROUP	Fort Lauder. May 1987	New Orleans Nov. 1987	Wash. DC Apr. 1988	Long Beach Nov. 1988	Chicago Apr. 1989	Charlotte Oct. 1989	Denver Mar. 1990	MAXIMUM	AVERAGE
SC Performance Characteristics	76	74	73	76	67	77	77	77	74
WG Failure Analysis Guide	34	37	52	53	50	33	42	53	43
WG Loss Tolerance and Measurement	51	31	35	41	31	24	35	51	35
TF Loss Measurement Guide	?	40	?	?	?	24	?	40	32
WG LTC Performance Requirements	-	-	-	20	35	28	31	35	29
WG Qualification of Class 1E Nuclear Tr.	2	3	5	5	5	10	6	10	5
WG Rev. Test Code for Shunt Reactors	9	11	9	11	11	11	10	11	10
WG Semi-Conductor Rectifier Transformers	23	18	19	21	19	17	0	23	17
SC West Coast	0	0	0	12	20	0	18	20	17
WG Consolidation of Installation Guides	0	0	0	10	?	0	?	10	10
WG Seismic Guide	0	0	0	8	?	0	?	8	8

NOTE: Maintain data for last four years only.

/123DATA/TCATTEND

ASC-Q
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ASC-R
1 of 2

IEEE **STANDARDS DEPARTMENT**
THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.
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October 29, 1990

Mr. Robert Veitch
Ferranti-Packard Transformers
P.O. Box 548
St. Catherines, Ontario L2R 6W9
Canada

Dear Bob:

Upon return from Montreal, I looked up the requirements for Senior Member grade of IEEE as I was not sure what these requirements were. Following I have excerpted material from the IEEE Bylaws regarding Senior Member:

> 105.3. Senior Member: The grade of Senior Member is the highest for which application may be made and shall require experience reflecting professional maturity. For admission or transfer to the grade of Senior Member, a candidate shall be an engineer, scientist, educator, technical executive or originator in IEEE designated fields.
>
> The candidate shall have been in professional practice for at least ten years and shall have shown significant performance over a period of at least five of those years, such performance including one or more of the following:
>
> (a) Substantial engineering responsibility or achievement, or
>
> (b) Publication or engineering or scientific papers, books or inventions, or
>
> (c) Technical direction or management of important scientific or engineering work with evidence of accomplishment, or
>
> (d) Recognized contributions to the welfare of the scientific or engineering profession, or
>
> (e) Development or furtherance of important scientific or engineering courses in a "recognized educational program,: or

(f) Contributions equivalent to those of (a) to (e) above in areas such as technical editing, patent prosecution or patent law, provided these contributions serve to advance progress substantially in IEEE designated fields.

106. Application - Requirements

1. Applicants for membership shall furnish names of reference as follows:

For Senior Member - Three Fellows, Senior Members or Honorary Members.

A new member to IEEE may apply as a Senior Member, provided they meet the qualifications above. The application is not contingent upon previous years of membership to IEEE.

I've enclosed a number of Senior Member applications for your use, perhaps at the next Transformers Committee meeting.

Let me know if you need anything else.

Regards,

Sue Vogel
Administrator,
Society Services

cc: Jim Harlow

IEEE TRANSFORMERS COMMITTEE

AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE

MONTREAL, CANADA

OCTOBER 23, 1990

Minutes

Secretary Len Swenson opened the meeting at 10:05 a.m. with 4 members and 15 guests present.

Members: Ramsis Grigis
Robert Grubb
Davis Parr
Lennart Swenson

Guests:

Donald Ballard	Bob Mesher
Tim Bode	James Miller
Max Cambre	Curt Moore
Bob Degeneff	Van Quan Pham
Alfonso Delgado	Roshanlac
Larry Helsenbeck	G. W. Rowe
Anthony Jonnatti	Dorman Whitley
Bill Kennedy	

Minutes of the March 27, 1990 meeting in Denver, Colorado were approved.

Results of Draft 11 of the proposed revision of the audible sound measurement portion of C57.12.90 presented. This was the first ballot of the Transformers Committee. There were 71 affirmative, 3 negative and 9 abstentions. Only one negative vote contained substantial technical matter and should be easily resolved. A large number of valid comments were made which indicated a need to consider them in the final version and another ballot of the Transformers Committee will be required.

The NEMA TR1-1980 standard was rescinded in 1985. NEMA assigned a committee or group to work on the transformer maximum sound level table in 1987. No action occured. The table is urgently needed by power transformer manufactures and users alike. We will check further on whether the Audible Sound and Vibration Subcommittee should be involved.

Work on the proposed siting guide has not started. A table of contents will first be generated to help determine the extent of the guide. It was suggested that the guide include sufficient information to avoid excessive research for sound control and reduction methods. Too many references are available in this area.

The meeting was adjourned at 12:00.

Respectfully submitted,

L A Swenson

Lennart A. Swenson
Secretary, Audible Sound
& Vibration Subcommittee

TC-D
1 of 5

West Coast Transformer Subcommittee
Meeting Minutes

Portland, Oregon
September 18, 1990

Meeting Attendees:

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

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

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

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

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

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

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

-Membership-

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

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

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

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

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

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

-Election of Officers-

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

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

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

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

-Old Business-

There was no old business.

-New Business-

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

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

Future Meetings-

Future Main Transformer Committee meetings are as follows:

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

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

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

-Working Group Reports-

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

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

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

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

-Additional New Business-

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

-Topics of Discussion-

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

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

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

The meeting was then adjourned.

Respectfully submitted,

Louis A. Tauber
Secretary, West Coast Transformer Subcommittee

BUSHING SUBCOMMITTEE
Report to the Transformers Committee
October 24, 1990

The Bushing Subcommittee met on Tuesday, October 23, 1990 with 14 members and nine guests present. The following three people requested membership on the subcommittee after the meeting, bringing the total subcommittee membership to 31 persons:

Robert Hartgrove - Carolina Power & Light
Mangesh Rajadmyaksha - Ciba-Geigy
Craig Stiegemeier - ABB

After introductions and approval of the minutes of the March 27, 1990 meeting at Denver, it was announced that Mr. Prit Singh has replaced John Easley as the Technical Advisor to IEC/SC 36A. The subcommittee then heard the reports of its two working groups:

Working Group on Bushing Application Guide Discussion

Chairman Fred Elliott reported that the working group met on Tuesday morning (10/23) with eight members and 21 guests present. The working group first reviewed the results and comments of the subcommittee ballot of Draft 5 of PC57.19.100, Guide for Application of Apparatus Bushings. A total of 31 ballots were sent out, including three to liaison representatives of other committees. Twenty-four ballots were returned with the following results:

Approved	16
Approved w/Comments	5
Not Approved	2
Not Voting	1

Neither of the negative ballot voters was at the meeting so the working group addressed the seven negative comments as best it could in their absence. One of the negative comments questioned why the guide included the content of IEEE C57.19.101-1989, Trial-Use Guide for Loading Power Apparatus Bushings. In response to this, Chairman Elliott reported that he had researched his files and found that it was always intended that the Loading Guide be a part of the Application Guide; it was worked on first, was approved by the Transformers Committee in 1981 and because of the need for it, was published first by itself. Members of the working group agreed that this was the intent and the loading guide portion would be kept in the Application Guide. This topic was also discussed in the Bushing Subcommittee, which agreed to this approach provided that it be explained in the Forward.

The working group was able to review all comments and the revision will again be ballotted within the subcommittee. The working group also discussed a proposal to include a derating factor for bushing current when applied to transformers with top oil temperature rises between 55 and 65°C. The concensus was that it should be included as a new section in the Application Guide. The new section will also advise that raising the oil level above the minimum oil level on the flange will adversely affect the bushing current rating.

Working Group on Bushings for DC Application Discussion

Acting Chairman Wagenaar reported that the working group met on Monday afternoon (10/22) with nine members and five guests present. Mr. Devki Sharma has agreed to become secretary for the group. The first order of business was to review the Scope with respect to including dry type and SF6 bushings, as requested by the Substations Committee. It was reported that a letter had been sent to Dr. H.M. Schneider, our liaison to the Substations Committee, asking for assistance on these types of bushings. It was also reported that these constructions have been used for wall bushings and that problems have been encountered with them.

The working group then addressed the sections on Testing in the new standard, C57.19.03. It was decided to add the dc pollution test as a design test for outdoor bushings and to make routine impulse tests on bushings rated 200kV and above. The ac low frequency wet test will not be done since the dc pollution test is more demanding on the bushing design. In order to establish ratings and electrical, mechanical and other requirements, the working group will attempt to gather the different configurations which have been specified to date and analyze them for possible consolidation within the standard.

Bushing Subcommittee Discussion

Other discussion in the Bushing Subcommittee covered a variety of subjects. It was first reported that the subcommittee ballot on the latest changes in PC57.19.00/d10, General Requirements and Test Procedures for Outdoor Apparatus Bushings, was successful. These changes were brought about during the resolution of two negative votes and several comments generated during the March, 1990 ballot of this document. These changes will now be ballotted within the Transformers Committee.

The next discussion was Table 10 of C57.19.01. It was reported that Draft 3 of the table, which concerns the power factor limits of bushings, was successfully ballotted within the subcommittee. It was agreed to ballot this table in the Transformers Committee. If this is successful, the two revised

tables (9 and 10) and the remainder of the ANSI/IEEE 24-1984 document, with appropriate changes in its Forward and References, will be submitted to the Standards Board for Approval.

The subcommittee then received results of a recent EEI questionnaire on dimensional standardization of bushings. The results clearly indicate that utilities are very interested in further standardization. Loren Wagenaar and Harold Moore then presented summarized papers which each had been presented at the Hartford, CT EEI meeting on October 17, 1990. Discussion within the subcommittee then revealed that some utilities have already started standardization programs of their own. The concensus was that further dimensional standardization should be done and that a working group needs to be established to accomplish this task.

It was also reported that condenser and SF6 bushings with cycloaliphatic weather casings and bodies were being applied to circuit breakers rated through 145kV. It was noted that these bushings are not covered by any standard and that a standard is needed. It was also reported that the Switchgear Committee is depending on the Bushing Subcommittee to develop such a standard. However, we have received no formal request from the Switchgear Committee or any other committee. We will contact the Switchgear Committee on several levels to determine the basis of any such request.

Loren Wagenaar, Chairman

LBW/vlh

MEETING MINUTES

DIELECTRIC TESTS SUBCOMMITTEE
October 23, 1990
Montreal, Quebec, Canada

1. INTRODUCTION/ATTENDANCE

The Dielectric Tests Subcommittee met at 11:20 A.M. with 30 members, 11 new members and 47 guests in attendance. Ed Adolphson, Don Ballard, John Crouse, Bill Henning, Phil Hopkinson, Frank Lewis, Frank McCann, Mark Perkins, Don Platts, Mahesh Sampat, and Barry Ward have been accepted as new members of the Dielectric Tests Subcommittee.

2. APPROVAL OF MINUTES

The minutes of the March 27, 1990 meeting in Denver, CO were approved as submitted.

3. CHAIRMAN'S COMMENTS from ADMINISTRATIVE SUBCOMMITTEE

The new Transformers Committee Operating Manual has been issued.

Bob Lee announced that, with lack of PP&L support, he was forced to resign as Chairman of the Dielectric Tests Subcommittee. Harold Moore will accept the Chair. Jim Templeton will replace Harold as Chairman of the Working Group on Revision of Dielectric Tests, he will also assume responsibilities as Subcommittee Secretary. Bruce Uhl will become Chairman of the Task Force on Low Side Surge Requirements for Distribution Transformers

Two new Subcommittees were established at the Administrative Subcommittee meeting on Monday night. They are: Distribution Transformers chaired by Frank Stevens and Underground Transformers and Network Protectors chaired by Paul Orehek.

4. WORKING GROUP REPORTS

A. Working Group on Revision of Dielectric Tests
H. R. Moore

The Working Group met on October 22, 1990 with 18 members and 17 guests present.

The minutes of the March 26, 1990 meeting were approved as written.

The Task Force reports were as follows:

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

The Task Force met at 10:05 A.M. on October 22, 1990 with 22 members and 33 guests present. Eight new members were added to the Task Force. The minutes of the Denver meeting were approved as written.

a. Review of Draft 2 of the Switching Impulse Test Document.

Draft 2 had been prepared from comments made on Draft 1 and was balloted in the Working Group and the Dielectric Tests Subcommittee. The results of the balloting was as follows:

Number of Ballots Sent	75
Approved	32
Approved with Comment	15
Not Approved	7
No Response	10
Total	75

An attempt is being made to incorporate the comments received in the "Approved with Comment" category. Copies of Draft 2 marked with changes resulting from the comments were distributed at the meeting.

Each of the 7 negative votes had been given consideration. Proposals for resolving each of them had been prepared and they were distributed at the meeting. The negative ballots were reviewed during the meeting, and plans were made for actions needed to resolve the remaining items. The negative votes involved the following:

Comparison of reduced and full level waves for failure detection.

Transfer of voltages between windings.

Specification of switching impulse levels that are significantly different than 83% of the full wave level.

Reporting of switching impulse tests.

Tolerances for switching impulse tests.

It appears that the negative votes can be resolved.

The Task Force recommends that Draft 3 of the document be prepared and balloted in the Working Group and Subcommittee prior to the next meeting.

It was discussed that the guide will suggest switching impulse testing for 115 kV and above on the basis of present practice in the industry.

b. A committee within the Task Force was established to prepare a section in the guide for the use of digital recording during impulse testing. Three persons have agreed to serve on this group. Additional persons from equipment manufacturers and transformer users are needed on this group.

2) Task Force on Enhancement Voltage Time Duration During Power Transformer Induced Tests

M. Altman

The Task Force met at 8:00 A.M. on October 22, 1990.

The following items were reviewed:

The Task Force minutes outlined the results of the previous meeting on the subject and served as the basis for discussion on recommendations for changes in the enhanced voltage time duration and partial discharge monitoring. The results of the discussion were as follows:

a. The consensus of the group was that the time should be reduced from 7200 cycles to 1500 cycles. The wording in the draft for this section of the guide will cover the following points:

   The time shall be 1500 cycles.

   At least one partial discharge measurement on one of the highest terminals shall be recorded.

   There will be no partial discharge guarantee at the enhancement voltage level.

b. The base partial discharge measurement should be taken at the 150% value prior to the enhancement. The maximum variation between this base value and any reading during the enhancement shall be 30 microvolts. This is a more severe test than at present and is another justifiable reason to decrease the enhancement time.

c. The allowable amount of time for partial discharges to stabilize after the enhancement is five minutes.

d. In case the guaranteed values are exceeded or the allowable variation is exceeded, the user and manufacturer are to agree on a course of action.

Working Group Actions:

Draft 3 of the Switching Impulse Test Guide will be balloted in the Working Group and the Subcommittee prior to the next meeting.

The Working Group was asked to submit any needed corrections or additions to the existing Impulse Test Guide to the Chairman or to the Task Force Chairman.

Draft 1 of the section for changes in the enhancement voltage time during power frequency transformer induced tests will be prepared and balloted in the Working Group and Subcommittee prior to the next meeting.

Under new business, J. B. Templeton will become the new chairman of the Working Group replacing H. R. Moore who will become the Chairman of the Dielectric Tests Subcommittee.

The Working Group meeting was adjourned at 3:45 P.M.

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

The Working Group met at 1:00 P.M. on October 22, 1990 in Montreal, Quebec, Canada with 12 members and 18 guests present.

The minutes of the March 26, 1990 meeting in Denver, CO were approved as written.

1) C57.12.90 c/D6 Routine Impulse Test for Distribution Transformers

Bill Henning reported on the one negative ballot had been resolved and the Standard will be submitted to IEEE.

2) Task Force on Low Side Surge Requirements for Distribution Transformers
R. E. Lee

The Task Force met at 8:05 A.M. on October 22, 1990 with 11 members, 3 new members and 5 guests in Montreal, Quebec, Canada. John Borst, Ed Boyd and Steve Smith are welcomed as new members.

The minutes of the March 26, 1990 meeting in Denver, CO were approved as submitted.

Bob Lee announced that, with lack of PP&L support, he was forced to resign as Chairman of the Task Force and that Bruce Uhl will accept the Chair.

Bob lee also announced that a Panel Session on Low Side Surge Requirements for Distribution Transformers will be scheduled for the 1991 IEEE/PES T&D Conference and Exposition in Dallas, TX.

Bruce Uhl was introduced as the new Chairman. He reviewed the effort put into the Task Force Report - "Secondary (Low Side) Serges In Distribution Transformers".

The remainder of the meeting was spent reviewing the paper and incorporating many of Dave Smith's suggestions and comments.

The Task Force has agreed that this version of the draft paper meets a consensus opinion of the information available on this subject.

The objective of the T&D Panel Session will be to educate the user so the user can recognize whether there is a problem on the user's system. A secondary objective is to solicit feedback from the user community.

Bruce Uhl will chair the Panel Session. Speakers will be Chuck McMillen and John Borst. Charlie Williams and Roger Dugan will be asked to be speakers.

Bruce will finalize the paper, distribute it for Task Force review and comment and submit it to IEEE.

The Task Force meeting adjourned at 11:55 A.M.

3) Routine Test Guide for Distribution Transformers, C57.98
Don Ballard

The Task Force is in the process of submitting a PAR for the Guide. The Guide will address the methodologies needed to perform Routine Impulse Tests on Distribution Transformers. The Task Force will coordinate with Russ Minkwitz's Task Force on Revision of Impulse Test Guide.. The Routine Impulse Test Guide will be included as a new section of C57.98.

The Working Group meeting adjourned at 1:45 P.M.

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

The Working Group met in Montreal on October 22, 1990 at 1:00 P.M. with 13 members and 11 guests present. Three new members were accepted into the Working Group bringing membership to 47.

The minutes of the Denver meeting were accepted as written.

Only one Task Force report was presented since Mr. Howells, the chairman of the Task Force on Acoustic Location of Partial Discharge, had to cancel his trip at the last moment and it was too late for him to find a replacement. Bill Carter, Chairman of the Task Force for Measurement of Apparent Charge had arranged for Heinz Fischer to substitute as Chairman. Heinz did an excellent job. Bill was unable to arrange approval to attend this meeting.

1) Task Force on Acoustic Location of Partial Discharge
E. Howells

No Report.

2) Task Force for Measurement of Apparent Charge
W. J. Carter (Heinz Fischer)

The Task Force met at 8:00 A.M. on October 22, 1990 with 11 members and 5 guests present. Two new members were added to the Task Force.

The minutes of the Denver meeting were approved as written.

Data provided by Mark Perkins of ABB was presented to the TAsk Force. He remarked that his data indicates that a target limit of 500 pC would perhaps be more appropriate than the 400 pC limit previously agreed to by the Task Force. After discussion, a vote was taken to change the limit to 500 pC with 10 votes for and no negatives.

George Vaillancourt discussed a paper "Broad and Narrow Band Partial Discharge Measurement on Power Transformers" by Kachler and Nieschwietz, presented in Germany in August 1987.

The paper deals with attenuation of simulated partial discharge pulses in a winding designed for an 1100 MVA, 3 phase generator transformer of 420 kV. The tests were done for a range of three broad bandwidth and for two narrow bandwidth (9 kHz) measuring frequencies. For this winding, data in the paper clearly shows that a bandwidth of between 90 kHz to 300 kHz - located as low as possible in the frequency spectrum produces less attenuation and more uniform response than a bandwidth that is too wide. A bandwidth of between 100 khz to 230 kHz is presently specified in C57.113 "Trial Use Guide on Apparent Charge Measurement in Oil-Filled Power Transformers and Shunt Reactors". The data in the paper also shows that narrow band measurements at 9 kHz bandwidth are more dependent on the following parameters:

the measuring frequency used,

the type of winding - interlaced, non-interlaced and tap changer windings,

the way discharges occur - to ground, between disks or to tap changer windings.

The last agenda item was discussion to elevate C57.113 to full-use status to RevCom. The previous ballot, prior to the Denver meeting, resulted in 2 negatives. The Task Force decided that the guide should be submitted to RevCom for elevation to full-use status.

The Task Force also decided to start immediately to revise the Guide for presentation to the Dielectric Tests Subcommittee as a recommended practice by Spring of 1992. That version will include the 500 pC objective limit.

The Task Force adjourned at 9:40 A.M.

Following the Task Force report, the same subjects were discussed by the Working Group. The Working Group voted to submit C57.113 to RevCom for elevation to full-use status and to accept 500 pC as the acceptance level.

The Working Group meeting adjourned at 2:30 P.M.

Prior to the Subcommittee meeting, one of the negative ballots on C57.113 was resolved. During the Subcommittee meeting the second negative was withdrawn. By unanimous voice vote, the Subcommittee recommended adoption of C57.113 as a Full-Use document.

5. NEW BUSINESS

None

6. ADJOURNMENT

The Subcommittee meeting adjourned at 12:07 P.M.

Robert E. Lee
Chairman

DIELECTRIC TESTS SUBCOMMITTEE
MEMBERSHIP

ATTENDANCE

Montreal, Quebec
October 23, 1990

Robert E. Lee, Chairman

Attendance Status

Membership of Record	Present	Absent
Adolphson, E. J.	X	
Allan, D. J.		X
Allustiarti, R.	X	
Altman, M. S.		X
Alton, R. J.		X
Arnold, S. W.		X
Ballard, D. E.	X	
Barnard, D. A.		X
Bartek, Allan	X	
Bellaschi, P. L.		X
Bonnucchi, J. V.	X	
Brown, C. V.	X	
Carter, W. J.		X
Chatterji, C. Ron	X	
Cook, F. W., Sr.	X	
Corkran, J. L.		X
Crouse, J. C.	X	
Douglas, D. H.		X
Duckett, D. A.		X
Fallon, D. J.	X	
Fischer, H. G.	X	
Fleeman, J. A.	X	
Frydman, M.		X
Garcia, R.	X	
Henning, W.	X	
Hoesel, C.		X
Holland, J.		X
Hopkinson, P. J.	X	
Howells, E.		X
Hurty, C.		X
Iijima, Y. P.	X	
Kennedy, W. N.	X	
Lee, R. E.	X	
Lewis, F. A.	X	
Lowdermilk, Larry		X
Lowe, Richard		X
Massouda, K. Tito	X	
Matthews, J. W.	X	
McAlpin, J. T.		X
McCann, F. J.	X	
McCrae, G. G. (Substitute)	X	
McMillen, C. J.	X	

Attendance Status

Membership of Record	Present	Absent
Mehta, S. P.	X	
Miller, C. K.		X
Minkwitz, R. E.		X
Moore, H. R.	X	
Moser, H. P.		X
Musil, R. J.	X	
Oklu, S. K.	X	
Osborn, S. H.		X
Patel, B. K.	X	
Perco, D. D.	X	
Perkins, M. D.	X	
Platts, D. W.	X	
Puri, J.		X
Robbins, C. A.	X	
Sampat, M. P.	X	
Saxon, W. E.		X
Sharma, D. N.		X
Shenoy, V.	X	
Sim, H. J.	X	
Stein, W. W.	X	
Stensland, L. R.		X
Traub, T. P.		X
Vaillancourt, G. H.	X	
Veitch, R. A.	X	
Wagenaar, L. B.		X
Ward, B. H.	X	
Whearty, R. J.	X	
Woolerton, G. R.		X

GUESTS

Ahmed, N.	Kranich, N. J.	Preininger, G.
Beaster, B. L.	Lackey, J. G.	Reitter, G. J.
Binder, Wallace	Lindgren, S.	Riffon, P.
Bode, Tim	Linsley, K. R.	Rizvi, S. M. Aslam
Bosigen, John	Lowe, D. L.	Roshanlal, K.
Boyd, Edward	McNutt, W. J.	Rossetti, J. R.
Breault, Serge	Michel, G.	Russman, Paul
Chew, Orrean O.	Mulzet, H.	Smith, S. D.
Delgado, A.	Murray, C. R.	Sparagowski, Gary
Foldi, Joseph	Orten, D. E.	Stiegmeier, G. L.
Freyhult, T.	Parent, J.	Stoner, Ron
Goethels,Roel	Payne, Paulette	Templeton,J. B.
Hartgrove, R. H.	Perri, F.	Wakeam, Ralph
Highton, K. R.	Petit, Nic	Willet, F. E.
Hilsenbech, Larry	Plaster, R. Leon	Windisch, H. J.
Kampshoff, Ken		

IEEE POWER ENGINEERING SOCIETY
TRANSFORMERS COMMITTEE
DISTRIBUTION TRANSFORMERS SUBCOMMITTEE

MEETING MINUTES

HOTEL BONAVENTURE, MONTREAL, QUEBEC CANADA - October 23, 1990

Presiding Officer: Mr. Frank Stevens

ATTENDEES

M - Guest
G - Guest
U - User
P - Producer
GI - General Interest

Name	Company	
Jerry C. Thompson	Duke Power	M U
Jim Malloy	Philadelphia Electric Co.	M U
Ken Hanus	T.U. Electric	M U
Jim Miller	ABB Power T&D	M P
Paul De Weaver	Pauwels Transformer	G P
Norvin Mohesky	Pauwels Transformer	M P
Ron Jordan	San Diego Gas & Electric	M U
Alan Wilks	ERMCO	M P
Paul Orehek	PSE&G	G U
Carl Nieman	Commonwealth Edison	G U
Sue Vogel	IEEE	G GI
Andy Salem	IEEE	G GI
Matt Mingoia	Edison Electric Institute	M U
Frank Stevens	Northeast Utilities	M U
Jorge Valdes	Florida Power and Light	M U
Jerry Corkran	Cooper Power Systems	M P
Ron Stahara	Kuhlman Corporation	M P
Dale Peters	Georgia Power	M U
Bob Scheu	General Electric	M P
Ali Ghafourian	Cooper Power Systems	M P
Dorman Whitley	ABB Power T&D	M P
Gerry Paiva	Southern California Edison	M U
Vis Thenappan	Virginia Transformer	G P
Dave Lyon	Wisconsin Electric Power	M U
Bruce Wite	Commonwealth Edison	G U
Wm. E. Wrenn	Consultant	G GI
Brian Klaponski	Carte International Inc.	G P
R. H. Hollister	ABB South Boston	G P
Olin Compton	Virginia Power	G U
Edward Bertolina	Con. Edison of N.Y.	G U
Cezary Gerniakow	Ontario Hydro	G U
John Borst	ABB	G P
Jim Antweiler	Square D Co.	M P
J. W. Howard	Pennsylvania Power & Light	G U

MEMBERS ABSENT

Jim Arnold	USDA (REA)
Myron Gruber	Cooper Power Systems
John Lazar	Northern States Power
Tommy Cooper	Carolina Power & Light
John Hunt	KAEC

ATTENDANCE SUMMARY

Members present	19	10 Users	9 Producers	
Members absent	5	3 Users	2 Producers	
Guests	15	7 Users	5 Producers	3 General Interest

1. **Chairman Remarks and Announcements**

The meeting convened at 10:00 am with the Chairman stating this was the first meeting of the new IEEE subcommittee on Distribution Transformers. It was officially created not less than 24 hours ago. The subcommittee was formerly under the auspices of the ASC57 committee. The meeting then proceeded with everyone introducing themselves.

The Chairman reported that the scope of the subcommittee had been approved by the IEEE Technical Committee & Transformers Administrative Subcommittee.
It is:

Develop and maintain product Standards for overhead, padmounted and certain underground type distribution transformers rated 2500 kVA and smaller, high voltage 38000 V and below, low voltage 15,000 volts and below. Development and revision of Enclosure Integrity and coating standards for the above apparatus.

The Chairman stated that each Working Group Chairman should have, or will be soon receiving an "IEEE Standards Submittal Kit." If these are not received soon, please contact IEEE's Sue Vogel or the Chairman.

Working Group Chairmen will be receiving an IEEE Organizational and Balloting Procedures booklet also.

The Chairman passed out application forms for application to the IEEE Power Engineering Society, Transformers Committee and covered the requirements for membership. He urged members that met the qualifications to apply, and told them that applications would be considered at the next administrative subcommittee meeting in May 1991. The Chairman also noted that in order to vote in Subcommittee, former ANSI C57.12.2 members must be IEEE members in good standing.

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2. Working Group Reports

Overhead Type Distribution Transformers (.20)
Chairman--Jerry C. Thompson

The working group met October 21 at 8:00 a.m. The current document has a 1988 date with the next revision due in 1993. It is proposed to have a first draft of the 1993 document by the spring 1991 meeting. The Chairman briefed the group on the status of the related coating standard .31, and the need of supporting data to resolve the concerns of NEMA legal counsel. Data supplied by Houston Lighting & Power and Central Power & Light of Corpus Christi, Texas was presented to support the need for a coating performance standard for pole mount transformers. The user community has expressed a need for the document through surveys taken in the past. The evidence will be passed on to the chairman of the joint C37/C57 working group responsible for the .31 document.

The Overhead Type Distribution Transformers working group will meet in the spring.

Single Phase Live Front Padmount Transformers (.21)
Chairman - Myron Gruber (not in attendance) Frank Stevens provided report

The last date of publication was 1980. Retired Chairman Cal Kappler had the document ready for ballot in timely fashion in 1985/86 but no action has been taken by the NEMA Secretariat subsequent to the ballot. The document has since been lost by the Secretariat. Frank Stevens is to take the last draft (5) and process the document through the machinery, and get it published.

Chairman Stevens stated that each working group document required a PAR (project authorization request) and that he would prepare one for each document.

Three Phase Live Front Padmount Transformers (.22)
Chairman - Ken Hanus

The working group did not meet because of several parallel issues the three phase deadfront padmount transformer working group has been working to resolve. Many of these issues were resolved in the working group meeting this week, therefore this working group will meet at the spring meeting. The current document carries a 1988 publication with the next revision due by 1993.

Single Phase Submersible Transformers (.23)
Chairman - Gerry Paiva

The working group met on October 22, 1990 at 1:00 p.m. and draft #4 was discussed and several editorial changes were made. Chairman Paiva will produce draft #5 and submit this draft for balloting in the subcommittee. No meeting is planned for next spring.

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Single Phase Deadfront Padmount Transformers (.25)
Chairman - Norvin Mohesky

No meeting was held. The current document has a 1981 publication date. The approved revision of this document is at ANSI and the latest words from ANSI are the document will go to the printers in early December. The working group will meet in the spring to discuss surveys performed by John Lazar concerning switchability problems.

Three Phase Deadfront Padmount Transformers (.26)
Chairman - Gerry Paiva

The working group met on October 22, 1990 at 3:05 p.m. The current document carries a 1987 date and is due for revision by 1991/1992. The working group discussed draft #4 and made minor editorial changes. Chairman will produce a draft #5 which the working group proposed to go to the subcommittee for balloting. The working group agreed to postpone resolving several issues for the next revision of the document. There will be no meeting next spring.

Conformance Specifications for Padmount and Unit Substation Transformers (.27) Chairman - Jim Miller

The working group did not meet. The document was last balloted in 1987. The Chairman will take the last draft (#3) and make necessary revisions and produce draft #4 to discuss at the spring 1991 meeting. The Chairman stated because of prior commitments he will not be able to attend the spring meeting, but Dave Lyon will chair the meeting.

Joint C57/C37 Working Group on Cabinet Integrity
Chairman - Frank Stevens

Chairman reported that the Joint Working Group was formed in 1983 to write a standard on cabinet integrity for padmounted equipment which is now the ANSI C57.12.28 standard. The working group has completed a companion document, a standard for padmounted equipment in a coastal environment. The document balloted the C57 main committee this summer, the status is that the IEEE and EL&P delegations voted affirmatively and per Mr. Charles White there is no problem with the NEMA ballot.

The working group has also produced a coatings standard for pole mount transformer (.31): the current holdup is with NEMA legal counsel requiring documentation. Documentation presented in the .20 meeting will be sent to NEMA legal counsel, so that the document can be processed and published.

The group has met during 1990 at the properties of Southern California Edison in Westminster, CA and Consolidated Edison in New York City to examine firsthand actual installations. SCE, Con. Edison and PG&E are users of 97% of all submersible transformers produced.

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NEW BUSINESS

Ron Stahara questioned bar coding requirements? Frank Stevens stated he had a document specifying a bar coding system and would ask direction from the C57 main committee.

John Borst stated that there is a separate invitation list from the subcommittee and main committee membership lists. He urged persons eligible to become members of the IEEE transformers committee.

Chairman Stevens stated on behalf of the Subcommittee he was pleased in the manner in which the former ANSI C57 subcommittees have been received by the IEEE transformers committee. He thanked them for allowing the product standards to come under the umbrella of the IEEE committee.

The Chairman went on to say that he believed that the new arrangement was a win-win situation for all parties. Certainly as a user representative he felt that the EEI Community and its customers would be better served.

Chairman reminded everyone to sign the attendance roster.

Jerry Corkran asked about the subcommittee membership list. Chairman said the last one was dated 1987-88 and he would work to produce a more updated listing. The next meeting will be held on Tuesday, May 14, 1991 in Phoenix, Arizona.

The meeting was adjourned at 12:00 Noon.

FS/jgc
WPDISK8.3
11/27/90

cc: J. Harlow, Secretary
R. A. Veitch, Chairman
P. E. Orehek

These minutes were prepared from notes prepared by Ken Hanus of Texas Utilities.

IEEE PES TRANSFORMERS COMMITTEE

DRY TYPE TRANSFORMER SUBCOMMITTEE

MEETING MINUTES

MONTREAL, QUEBEC, CANADA - October 23, 1990

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

1. Chairman Remarks and Announcements

The Dry Type Transformer Subcommittee met at 2:05 PM with 16 members and 15 guests present (see Section 2). Following the introductions of those present a motion was made to approve the minutes of the 03/27/90 meeting (Denver, CO). 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.4	Dry Type Reactors
Sec.5	Specialty Transformers
Sec.6	Test Code Revision
Sec.7	Dielectric Problems
Sec.8	Thermal Problems
Sec.9	Cast Coil Loading Guide

Regrettable, Mr. R. Provost was unable to attend the Montreal meetings. Consequently, there was no report for the Thermal Evaluation Working Group meeting which was cancelled.

1.2 During Mr. Dudley's presentation the Chairman reported a discussion at the AdCom meeting concerning the need for standards to be "stand alone" documents. It was reported that the working groups should endeavor to make the standards as nearly "stand alone" as possible unless the standard will be literally stuffed with material that could be readily attained elsewhere. Recognizing that it is a judgement call, the final standard should be as self-contained as is practical.

1.3 A discussion ensued on the typing format to be used by the members when submitting a draft standard during Mr. Koenig's review of the Test Code. The Chairman reported on a similar conversation during the recent AdCom meeting. The Chairman noted that IEEE eventually used a scanner in the process of preparing a document for publication and that standard type written pages were easier to scan as opposed to the two column format existing in the finalized document. The Chairman recommended that under

the current conditions the members use whatever typing format is easiest for the individual.

1.4 The Chairman reported that the Working Group on Cast Coil Loading Guide was legitimatized the previous night by petition at the AdCom meeting. In addition, Mr. Pierce was recognized as the chairman of the working group.

1.5 The Chairman gave the report for the Working Group on Thermal Problems whose meeting he also chaired in Mr. Mutschler's absence.

1.6 The Chairman presented the report for the Working Group on Cast Coil Loading Guide in the absence of Mr. Pierce.

1.7 The Chairman provided a summary of a working group chairman's meeting that he conducted at 5:00 PM, Sunday, 10/21/90. See Sec.3 for the minutes from this meeting.

1.8 The Chairman reported on the existence of two new subcommittees: PC57.12.2 on Distribution Transformers with 7 working groups and PC57.12.40 with 4 working groups. These were operating under NEMA and due to problems associated with getting standards published, IEEE agreed to take over the working group functions. It was noted that in PC57.12.40 there is a working group on Dry Type Network Transformers.

1.9 The Chairman announced that an ANSI C57 meeting was to be held on 10/24/90 in Montreal and encouraged any member who could to attend the meeting.

1.10 The Chairman noted that ANSI C57.12.5 is the ANSI subcommittee for dry type transformers and that he was also the chairman of it. In this capacity, the Chairman tries to keep abreast of the current status of these standards. He noted that to his knowledge all are current aside from those currently being pursued within the Dry Type Transformers Subcommittee. He also expressed his desire to see this activity merged into IEEE.

1.11 The meeting was adjourned at 3:10 PM.

Prepared By: Wesley F. Patterson, Jr.
Secretary, Dry Type Transformer Subcommittee
January 13, 1991

2. Attendance Roster

MEMBERS PRESENT

B. Allen
R. Bancroft
M. Cambre
R. Dudley
J. Frank
A. Jonnatti
S. Kennedy
A. Kline
E. Koenig
R. Marek
J. Nay
W. Patterson (Secretary)
P. Payne
V. Thenappan
R. Uptegraff (Chairman)
H. Windisch

MEMBERS ABSENT

D. Barnard
A. Bimbiris
T. Darr
H. Gabel
G. Gaibrois
R. Gearhart
M. Manning
W. Mutschler
L. Pierce
R. Provost
J. Rodden

GUESTS PRESENT

M. Haas
R. Hayes
C. Johnson
F. McCann
M. Mitelman
C. Moore
K. Papp
C. Paradis
G. Pregent
C. Robbins
G. Rowe
R. Simpson
J. Sullivan
D. Sundin
B. Ward

3. Meeting of the Working Group Chairmen

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

3.1 The meeting was held at 5:00 PM on Sunday, 10/21/90. All working group chairmen were present with the exception of Messrs. Mutschler and Provost.

3.2 The Chairman requested to know if all working group chairmen had received the 09/01/90 revision of the "IEEE Transformers Committee Operating Manual". It was reported that the following individuals had not:

Mr. D. Kline
Mr. M. Cambre
Mr. W. Patterson
Mr. R. Provost (possibly)
Mr. W. Mutschler (possible)

This document contains all the statutory requirements and forms for the Transformers Committee. It was the Chairman's understanding that all members of the Transformers Committee had received it. The Chairman will arrange for copies to be sent to them.

3.3 Mr. R. Dudley is proceeding with preparation of a PAR for the revision/reaffirmation of the current limiting reactor standard C57.16 as a Dry Type Transformer Subcommittee project. It was decided that should oil immersed interests object, a request would be sent to the Performance Subcommittee to establish a task force to cooperate in preparing input pertinent to oil immersed current limiting reactors. It should be noted that a recent survey indicates there is practically no interest in oil immersed current limiting reactors.

3.4 It was decided that a working group be formed under the chairmanship of Mr. Linden Pierce to develop a loading guide for cast coil transformers. Mr. Pierce will proceed to develop a PAR.

3.5 The question arose as to possible participation in the work of the newly formed Subcommittee on HVDC Converter Transformers and Smoothing Reactors. A policy was developed to serve in a supporting role with a task force, if requested in writing by the chairman of the Subcommittee.

3.6 The Chairman requested volunteers be proposed to serve as an alternate to Code Making Panel 13 of the NEC. Joe Hupp was the alternate. Dave Barnard has indicated his willing to be a candidate.

3.7 The question was raised whether the working group chairmen should supply agendas for their meetings. It was noted that this is an IEEE requirement and that henceforth agendas would be prepared accordingly.

3.8 The question of disqualifying members for poor attendance was discussed. It was noted that the Transformers Committee policy is to dismiss a member after failure to attend two (2) consecutive meetings (a period of only one year). It was noted that if a member could not attend, he could send someone to represent him and that person need not be a member of the Transformers Committee or even IEEE.

It was decided that after two (2) years of no attendance, the Secretary of the Dry Type Transformers Subcommittee would write a letter requesting the subject member to advise why he should not be dropped from membership. Depending on the response the members of the Subcommittee would accept his resignation or consider his reinstatement.

3.9 The Chairman noted that a Transformers Committee policy is that working group should be disbanded when the standard they were producing is published. He also noted that the 5 year reaffirmation rule does not bind one from reviewing or revising a standard in a shorter period of time.

3.10 The meeting was adjourned at 6:00 PM.

4. Working Group on Dry Type Reactors

Chairman: Mr. Richard Dudley

Ref: C57.21 - "Requirements for Shunt Reactors"
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. Work on C57.21 is essentially complete. The working group is currently undertaking revisions to C57.16.

4.1 The working group met on 10/22/90 at 10:05 AM with 7 members and 3 guest present. Following the introductions of those present, the minutes of the 03/26/90 meeting were approved as written.

4.2 The Chairman briefed the members on the work taking place on HVDC converter transformers and smoothing reactors. Based on discussions at a meeting on 10/21/90 of the Dry Type Subcommittee Working Group Chairmen, Mr. Bill Kennedy, Chairman of the HVDC Converter Transformer and Smoothing Reactor Subcommittee, has been asked to formally request (by letter to Mr. Roy Uptegraff) inputs from the Dry Type Reactor Working Group (re dry type HVDC smoothing reactors). Information is currently being provided to Mr. Kennedy's subcommittee and this request is to formalize the situation.

4.3 The scope of the revision of C57.16 was discussed. The following were the key points covered:

4.3.1 It was reported by the Chairman that at the 10/21/90 meeting of the Dry Type Subcommittee Working Group Chairmen it was decided that a PAR would be sought on the basis that the overall work to revise C57.16 would be borne by the Dry Type Reactor Working Group within the Dry Type Transformer Subcommittee. In order to meet the needs of protocol and to attempt to formally resolve the issue of whether the revision of C57.16 should include oil immersed reactors, it was decided that the Chairman should write a letter to Mr. J. W. Matthews, Chairman of the Performance Characteristics Subcommittee, and to Mr. J. McGill, Chairman of the Working Group on Shunt Reactors, requesting in writing whether a task force will be established to address revisions of the oil immersed reactor portions of C57.16. Should no interest be reported by Messrs. Matthews or McGill, this working group will proceed to revise C57.16 as a dry type standard.

4.3.2 The consensus of the working group members was again that the revision of C57.16 should include dry type reactors only as the use of oil immersed current limiting reactors has

virtually disappeared. Other oil immersed reactors such as those that are built into transformers were discussed. The group felt that these items were no different than other components of large power transformers. It was agreed that such items should be covered in a transformer standard and not in C57.16.

4.3.3 It was agreed that the revised version of C57.16 should be a "stand alone" document. All major pertinent information should be included and references should be limited to peripheral documentation.

4.3.4 The members agreed that the revision of C57.16 should not include water cooled reactors as current usage seems to be associated with solid state power conditioning equipment (drives, etc) and thus these reactors are part of a specialized system. The general consensus was again that if a reactor were a stand alone device it should be covered by the standard. However, if it were a component or subassembly of a larger piece of equipment covered by other standards then it should not be included in C57.16.

4.3.5 The issue was raised if filter reactors should be covered. They are a component of a specialized system. It was agreed that since C57.16-1958 is used in the specification of filter reactors (in the absence of a filter reactor standard) that an appendix be added to the revision of C57.16 describing how the standard can be applied to such reactors (as a tutorial).

4.3.6 It was also agreed to include a tutorial in the appendix of C57.16 on the use and applicability of the standard for series capacitor reactors.

4.3.7 A general discussion took place on the question of what is a subassembly and not to be covered in a separate standard.

4.3.8 It was also agreed that the introduction written for the new version of C57.16 should definitively specify what is covered and what is not covered. The scope of the new standard should also be as simple as possible.

4.4 The rest of the meeting was devoted to a discussion of the Chairmans first draft revision (10/90) of C57.16. The following were the major issues discussed:

4.4.1 Section 16-00.260 should include a table covering correction factors for sphere gap spacings at reduced air densities.

4.4.2 Table 16-05.110 covering temperature rise limits was discussed. It was agreed that allowable temperature rise limits should include such factors as load cycling, reactors

installed in generator lines and "back to back" interties (fully loaded most of the time) and current dynamic loading philosophy. It was agreed that temperature rise limits should reflect the approach in the revision of C57.21 but with detailed notes to explain the application of and deviation from tabulated values.

4.4.3 Table 16-00.110 extends to 765 kV to cover high voltage capacitor switching reactors.

4.4.4 The title of the revised standard should be "Dry Type Series Reactors".

4.4.5 It was noted that the short circuit type test should be included in Table 16-06.015.

4.4.6 Table 16-02.110 should be clarified. Blanks in column 21 should be "*" with a directive note to see note (3). Note (3) should be expanded to state that common practice would be to use the next available insulator of higher rating.

4.4.7 It was agreed to keep the switching surge test but state that it was only applicable to the support structure. An explanation should also be included.

4.4.8 Higher voltage class series reactors should be subjected to an RIV type test. Levels should be part of Table 16-02.110. The ANSI/IEEE line trap standard will be used as a guide. Section 16-06.015 will be modified to reflect the foregoing.

4.4.9 The section titled "Rating" has now been titled "Specification" to emphasize the swing away from standard rating and to availability of custom designs. In the revision a detailed explanation will be provided.

4.5 The Chairman agreed to include discussed changes in a draft and the meeting was adjourned at 10:00 AM.

4.6 Attendance Roster

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

5. 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

5.1 The working group met on 10/22/90 at 1:00 PM with 4 members and 6 guest present. Following the introductions of those present, the minutes of the 03/26/90 meeting were approved as written.

5.2 Mr. J. Frank requested membership to the working group and was accepted.

5.3 It was agreed that the cold shock temperature in P259/D6 will be adjusted to harmonize with UL 1446.

5.4 It was also agreed that the aging oven temperature differential be changed to ± 2°C to coincide with the temperature variation allowed in C57.12.56 and UL 1446.

5.5 It was recommended that C57.12.56 and IEEE Std 266 be included in the bibliography. It was also agreed that ASTM E104-51(R1971) be included as a reference for alternative methods of moisture exposure.

5.7 The Chairman agreed to incorporate the changes in the meeting into P259/D7 together with additional bibliography data (to be supplied by Messrs. Manning and Provost). Further, the Chairman will distribute P259/D7 to the working group members for balloting by 01/31/91.

5.8 The meeting was adjourned at 1:40 PM.

5.9 Attendance Roster

MEMBERS PRESENT	MEMBERS ABSENT	GUESTS PRESENT
R. Bancroft	D. Barnard	J. Frank
M. Cambre (Chairman)	A. Bimbiris	A. Jonnatti
R. Simpson (Secretary)	M. Manning	A. Kline
R. Uptegraff	R. Mayschak	J. Nay
	R. Provost	W. Patterson
	J. Rodden	R. Thomas
	R. Wagner	
	G. Zguris	

6. Working Group on Test Code PC57.12.91

Chairman: Mr. Egon Koenig
Secretary: Mr. David Barnard

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.

6.1 The working group met on 10/22/90 at 10:05 AM with 16 members and 13 guests present. Following the introductions of those present, the minutes of the 03/26/90 meeting were approved as written.

6.2 The task force chairmen reported on their respective responsibilities concerning the review and updating of the standard. Each task force was scheduled to meet the previous day, Sunday 10/21/90. A summary of each task force meeting follows. The minutes of each task force is on file with the Chairman.

6.2.1 Forward and Chapters 1,2,3,4 - Mr. R. Uptegraff

The review of chapters 1,2,3 and 4 is complete. Further review is pending completion of the work of the other task forces. A copy of a proposed Foreword will be mailed out for balloting within the working group within the next two weeks.

6.2.2 Chapters 5,6,7,8,9 - Mr. R. Hollister

A recent ballot produced one negative vote which will be resolved subsequent to the meeting and prior to leaving Montreal.

6.2.3 Chapter 10 - Mr. J. Rodden

This task force did not meet on Sunday, 10/21/90. Mr. W. Patterson had submitted a negative ballot which was discussed at the working group meeting. Mr. V. Thenappan, a member of the task force, will rewrite the areas in conflict and distribute the rewrite by mail to the members of the task force for comment.

6.2.4 Chapter 11 - Mr. L. Pierce

The items agreed upon at the task force meeting on Sunday will be incorporated into CH11/D5 and sent to the task force members for comment by 11/30/90.

6.2.5 Chapter 12 - Mr. W. Mutschler

This task force did not meet on Sunday, 10/21/90. Per the last minutes, an appendix is to be added similar to Part 2 of C57.12.90.

6.2.6 Chapters 13,14,15 - Mr. M. Cambre

There were two (2) negative ballots received and much discussion concerning them. The task force will rewrite the draft incorporating the comments received.

6.3 The Chairman requested that each task force chairman have a final draft ready for balloting by the Dry Type Subcommittee not later than 12/10/90. The Chairman will send out PC57.12.91/D3 by 12/22/90 for balloting by the Dry Type Subcommittee. Assuming a successful balloting there, the Chairman would like to ballot the Transformers Committee by mid January.

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

6.5 Attendance Roster

MEMBERS PRESENT	MEMBERS ABSENT	GUESTS PRESENT
B. Allen	R. Gearhart	B. Beaster
R. Bancroft	R. Hayes	K. Brockhausen
D. Barnard (Secretary)	C. Kirsch	J. Cross
M. Cambre	A. Kline	J. Frank
M. Haas	M. Manning	J. Harlow
R. Hollister	W. Mutschler	O. Iwanusin
A. Jonnatti	R. Provost	C. Johnson
E. Koenig (Chairman)	J. Rodden	C. Murray
M. Mitelman	W. Schwartz	G. Pregent
J. Nay	T. Singh	W. Saxon
W. Patterson		G. Sparagowski
L. Pierce		C. Stiegemeier
R. Simpson		R. Thomas
V. Thenappan		
R. Uptegraff		
H. Windisch		

7. Working Group on Dry Type Dielectric Problems

Chairman: Mr. Don Kline

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

The mission of this working group is the development of C57.124 which is presently in Draft #8.

7.1 The working group met on 10/23/90 at 8:05 AM with 15 members and 6 guests present. Following the introductions of those present, the minutes of the 03/26/90 meeting were approved as written.

7.2 The Chairman reported on the status of P745, the Transient Analysis Guide. P745/D7 was issued and voted upon four (4) years ago. It reached the Standards Board who requested that it be coordinated with IAS and IEC. Mr. J. Frank coordinated with IAS with the result of their expressing no interest in the project. Mr. W. McNutt coordinated with IEC with the same no interest response.

Subsequently four years have past since the document was voted upon by the Transformers Committee. In order to resurrect this standard, the Dry Type Transformer Subcommittee Chairman will request a voice vote at the Transformers Committee meeting on 10/24/90 to bring the vote status up to date. Assuming a successful ballot, the document will again be forward to the Standards Board.

7.3 The Chairman reported that PC57.124/D8 was issued on an advance basis to task force members. Subsequently, draft #8 is being issued by IEEE services to the Transformers Committee for balloting.

7.4 The meeting was adjourned at 8:15 AM.

7.5 Attendance Roster

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

8. Working Group on Dry Type Thermal Problems

Chairman: Mr. William Mutschler

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

8.1 The working group met on 10/22/90 at 3:00 PM with 12 members and 12 guests present. In the absence of Mr. Mutschler, Mr. Uptegraff chaired the meeting. Following the introductions of those present, the minutes of the 03/27/90 meeting were approved as written.

8.2 Considerable discussion ensued on the issues of hot spot allowance and thermal time constants. The survey data requested at previous meetings was discussed and the need for additional data from manufacturers was reiterated. It was noted that the response to date had been very dismal.

8.3 A cursory review on the time constant survey data indicated that there was considerable variations in the results with little correlation. The format of the survey was discussed with no definitive resolutions determined. Messrs. Barnard, Thenappan, and Patterson agreed to attempt to perform a more detailed analysis of the data. The Chairman will need to forward existing survey results to these individuals.

8.4 The 30°C hot shot allowance was again discussed at length. It was noted that C57.12.01-1989 (the latest revision) allows lower values to be used provided an agreement between the manufacturer and user has been attained.

8.5 The acting chairman, Mr. Uptegraff, questioned the advisability of continuing this working group. When the issue was put to a vote, it was unanimously agreed to continue to try to find a way to deal with these problems.

8.6 The following individuals requested membership in this working group. Their acceptance will be deferred to the Chairman, Mr. Mutschler.

Max Cambre	General Electric Company
Michael Haas	ABB National Industri
Charles Johnson	ABB Power T&D Company
Michael Mitelman	General Electric Company

8.7 The meeting was adjourned at 4:30 PM.

8.8 Attendance Roster

MEMBERS PRESENT	MEMBERS ABSENT	GUESTS PRESENT
R. Bancroft	R. Gearhart	J. Aubin
D. Barnard	A. Jonnatti	M. Cambre
J. Frank	E. Koenig	X. Combey
R. Hollister	M. Manning	R. Goethals
S. Kennedy	W. Mutschler (Chairman)	M. Haas
A. Kline	L. Pierce	R. Hayes
R. Marek		C. Johnson
W. Patterson		M. Mitelman
R. Simpson		G. Pregent
V. Thenappan		M. Raj
R. Uptegraff		C. Robbins
H. Windisch		R. Thomas

9. 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.

9.1 The working group met on 10/22/90 at 10:05 AM. As this is a new working group, 15 attendees requested membership. In addition, there were 5 "guests" present.

9.2 Much discussion involved the scope of the work to be included on the PAR forms. The following was unanimously agreed upon by a vote of the working group members:

> A revision of IEEE Guide C57.96-1989 to incorporate the unique characteristics of the dry type transformers containing epoxy resin in the windings.

It was noted that Mr. Mutschler's Working Group on Dry Type Thermal Problems is charged with monitoring the existing loading guide.

9.3 The initial plan of attack will be to review the present loading guide C57.96-1989 and the IEC loading guide IEC-905. The Chairman will forward copies to the working group members. The Chairman requested that the working group members submit written comments for consideration at the next meeting.

9.4 The meeting was adjourned at 10:50 AM.

9.5 Attendance Roster

MEMBERS PRESENT		GUESTS PRESENT
B. Allen	E. Koenig	R. Hollister
R. Bancroft	W. Patterson	R. Marek
D. Barnard	L. Pierce (Chairman)	P. McKenny
J. Frank	G. Pregent	J. Nay
R. Goethals	R. Simpson	R. Uptegraff
M. Haas	J. Sullivan	
R. Hayes	H. Windisch	
C. Johnson		

Minutes of the Oct. 22, 1990 Meeting of the
HVDC Converter Transformer and Smoothing Reactor Subcommittee
Montreal, Quebec, Canada

The meeting was called to order at 8:00 AM with ten members and five guests present. The first item to be discussed was the August 28th meeting of the CIGRE JWG 12/14-10 in Paris. Their overall activities have been discussed in earlier minutes; an update is summarized below.

- o Harmonic Losses - ABB Ludvika presented a report showing results on loss measurements performed on three transformers, including two converter transformers. The converter transformers showed good agreement with results published by Mr. Alan Forrest in a recent IEEE paper; the other transformer was a generator step-up and results were not as close. As a result of these tests they presented a draft document giving a table to be used in calculating harmonic losses.

- o Specifications - This paper is complete and has been approved by both Study Committees 12 (Transformers) and 14 (DC Links). It should be published shortly in ELECTRA.

- o Noise Measurement - The first draft of a position paper has been prepared which gives general recommendations for measuring transformer noise in the field. At present there is no attempt to relate test and operating noise levels.

- o Dielectric Testing - This paper is on its fifth revision. Additional data has been requested on the response of insulation structures to dc voltages, which is related to the necessary duration of the dc and polarity reversal tests. It now appears that the paper will allow the use of an elevated temperature dc (or ac + dc) tests to verify oil duct stresses if the polarity reversal test is not considered to be sufficient for that purpose.

The remainder of the meeting was devoted to a discussion on our present C57.129 draft 3, which was distributed at our March 26th meeting in Denver. Two general areas included:

1) We confirmed the decision made at the March meeting to split the present document into two standards - one for converter transformers and the other for smoothing reactors (both dry type and oil filled). I will submit revised PARs to initiate these changes.
2) There is some question regarding how many references should be made to other standards - should the new

document stand alone or should extensive references be made to C57.12.00 and C57.12.90, for example. This was discussed at the Administrative Subcommittee meeting and it was recommended to quote from another document only if the amount of material is small (up to several paragraphs) or if the reference is not readily available.

We discussed recommended tolerances on impedances for converter transformers. These tolerances should be smaller than used on conventional transformers because variations influence the harmonic contents on networks, and affect the design and size of filters. We agreed to recommend in our next draft ± 5% on rated and either extreme high or low tap positions. This would allow the manufacturer some flexibility in the design with respect to impedance variation at the other extreme tap position.

Issues discussed regarding dielectric testing included the profile of the applied dc voltage test, its duration and magnitude. We agreed that a description should be added to the next draft that insures no preconditioning of the insulation structure would take place prior to the dc and polarity reversal tests, and recommending that the two tests be separate. Weidmann in Switzerland has performed some interesting analytical work to calculate the time response of an oil-pressboard insulation which indicates that it might take more than one hour to achieve a resistive distribution at room temperature. An open invitation was issued for other parties to share any information concerning the time constant for dc testing; any data received will be distributed with the minutes.

We are also interested in sharing information concerning harmonic loss measurements. Dr. Stein reported that Siemens has data which showed results approximately 10% higher than predicted by Forrest's paper. A summary of their results will also be distributed with the minutes.

The discussions have identified a need for a guide describing partial discharge techniques for dc tests. The matter will be referred to the Dielectric Test Subcommittee.

The meeting was adjorned at 9:45 AM.

Respectfully submitted,

Bill Kennedy

William Kennedy
Chairman, HVDC Converter Transformers
and Smoothing Reactors Subcommittee

TC-J

IEEE/PES
TRANSFORMERS COMMITTEE
INSTRUMENT TRANSFORMER SUBCOMMITTEE
Montreal, Quebec
Oct. 24, 1990

1. The Instrument Transformer Subcommittee met Oct. 23, 1990. Ten members and twelve guests attended.

2. The letter ballot for C57.13, "Requirements for Instrument Transformers", of the Transformers Committee is in progress. The ballot deadline is Nov. 26, 1990.

3. Harold Moore and Stan Lundgren summarized the recent EPRI workshop on high voltage instrument transformer failures. (Workshop attendance was by invitation and no standards writing body was invited.) Contrary to the consensus of opinion at the Transformer Committee meeting in Washington, D.C., this workshop felt that instrument transformer failure rates were excessive. Pertinent data such as type, age, maintenance and operating history were unavailable.
[3.1 Following the meeting the chairman was contacted by Mr. Lundgren who stated that proceedings of the workshop when published would be made available to the subcommittee.]

4. The subcommittee re-activated work on partial discharge and apparent charge, PAR 832. A tentative document outline was made. Both C57 documents for liquid filled and dry type transformers and IEC standards will be used in preparation of the instrument transformer document.

5. ANSI and IEC standard "harmonization" was briefly discussed. Industry accuracy trends were also discussed. One manufacturer has a product offering which meets the 0.15% accuracy class requirement from 5% to 100% rated current.

6. The request from Mr. John Boyle, Chairman, PES Power System Relaying Committee, to include gapped core CT's in C57.13 was discussed. His committee will be invited to attend a meeting to discuss inclusion of gapped core CT's and to establish liaison with us.

Respectfully submitted,

John N. Davis, Chairman

IEEE

POWER ENGINEERING SOCIETY

TRANSFORMERS COMMITTEE

TC-K

1 of 2

MINUTES
INSULATING FLUIDS SUBCOMMITTEE
October 22-23, 1990
Montreal, Quebec

The Subcommittee met on Monday and Tuesday, October 22-23, 1990. There were 19 members and 15 guests present.

The minutes of the previous meeting in Denver were approved as written.

MEMBERS PRESENT:

D. H. Douglas
J. P. Gibeault
F. M. Gragg
F. J. Gryszkiewicz
T. J. Haupert
F. W. Heinrichs
B. G. Hunter
J. J. Kelly
J. P. Kinney
J. G. Lackey
R. I. Lowe
G. G. McCrae/H. Mulzet
M. M. McGee
R. J. Musil
H. A. Pearce
G. J. Reitter
D. W. Sundin
T. P. Traub
L. Wagenaar

GUESTS PRESENT:

C. B. Berry
D. Fallon
R. H. Hollister
I. Hussain
R. P. Johnston
E. Koenig
C. H. Komlanic
G. W. Lacasse
P. J. McKenny
G. Michel
P. Russman
P. Singh
W. W. Stein
R. D. Wakeam
W. A. Young

The following projects are presently being handled by the Subcommittee:

PROJECT C57.104 - GAS GUIDE:

The Gas Guide was balloted by the Transformers Committee. The results were:

116 Eligible
85 Affirmative
3 Negative
11 Abstentions for 85% response

The negatives and other comments were resolved. We will request approval by the Standards Board.

PROJECT C57.106 - OIL GUIDE:

The Oil Guide was also balloted by the Transformers Committee. The results were:

TC-K
2 OF 2

116 Eligible
78 Affirmative
3 Negative
11 Abstentions for 79% response

Two negatives were resolved and one withdrawn. We will request approval by the Standard Board.

PROJECT C57.130 - GAS ANALYSIS DURING FACTORY TEST:

The project was reviewed, and Draft 1 will be prepared for Subcommittee Ballot. Anyone who has data regarding the project and is willing to share it, should give information to James Kinney.

WORKING GROUP PC57.130 ON GAS ANALYSIS DURING FACTORY TEST:

Working Group PC57.130 met on October 22 at the Montreal Bonaventure Hotel with 9 members and 27 guests present. Seven of the guests requested membership on the Working Group. They are:

Richard Lowe	Hartford Steam Boiler
Gary Sparagowski	Detroit Edison
Ron Chatterji	Sargent & Lundy
Joseph Foldi	ABB/Guelph
Allan Barter	Cooper Power Systems
Orrean O. Chew	Cooper Power Systems
Caroline H. Kamlenic	Cooper Power Systems

Several changes in the preliminary draft were agreed upon including issuing the document as a "Trial Use Guide".

The changes will be incorporated in Draft 1 and balloted before the next meeting.

OTHER BUSINESS:

The Subcommittee voted to request a PAR for a Silicone Gas Guide.

A Working Group was appointed to review Gas Analysis of units with HTH, and also small oil filled transformers which may have higher ratios of cellulose. Members of the Working Group are:

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

H. A. Pearce
Chairman

F. W. Heinrichs
Secretary

MEETING MINUTES

INSULATION LIFE SUBCOMMITTEE

OF THE

IEEE TRANSFORMER COMMITTEE

AT THE

BONEVENTURE HILTON HOTEL

MONTREAL, QUEBEC CANADA

OCTOBER 23, 1990

TC-L

1 OF 7

The Insulation Life Subcommittee met on Tuesday, October 23, 1990, at 1:50 P.M. A total attendance of 61 consisted of 23 members and 38 guests.

After the introductions were made, the minutes of the previous meeting in Denver Colorado were approved as issued.

The Chairman introduced and welcomed two new members to the Subcommittee.

Mike Altman - Florida Power and Light
Dave Takach - Union Electric

Items from the Administration Subcommittee meeting Monday evening were discussed.

1. The Transformer Committee Operating Manual has been printed and is available.

2. New Main Committee membership forms are available from the Chairman.

3. The Subcommittee was polled for number of meeting conflicts. There were only about five indicated. These will be addressed by investigating T.F. and W/G meeting rescheduling at the next Transformers Committee meeting.

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 on Monday, October 22, 1990, with 24 members and 20 guests present.

The first item of business in the Working Group meeting was discussion on the need for re-affirmation of loading guides C57.91 and C57.92. The IEEE Standards office has indicated that

as of July 31, 1991, both of these guides would be withdrawn as official IEEE guides unless re-affirmed or revised. The Working Group then voted unanimously to re-affirm both C57.91 and C57.92.

Chairman reports from the task forces assigned sections of the new combined loading guide were as follows:

Task Force on Revision of the General Section

John Matthews indicated that the Distribution Section 5.5.2, entitled "Load Cycles", had been moved to the General Section, as Section 4.4.5. in draft 6 of the proposed loading guide.

Task Force on Revision of the Distribution Transformer Section

Dave Takach indicated that no further changes had been made in the Distribution Section beyond what had been indicated by John Matthews.

Task Force on Revision of the Power Transformer Section

Jerry Grimes indicated that their latest revisions had been incorporated into draft 6 of the Loading Guide, and that the Section entitled "Operation with Part or all of the cooling out of Service" had been moved to the Appendix.

Task Force on Revision of Appendices

Dan Perco reviewed with the Working Group some proposed changes to the Appendices. These changes will be incorporated in draft 7 of the combined loading guide.

Task Force on Insulation Loss-Of-Life

Dave Douglas, Chairman of the Task Force on Insulation Loss of Life, reported that they met Sunday, October 21, 1990, and proposed the following recommendations for consideration by the Working Group:

1) An Aging Acceleration Factor (Relative to 110°C) vs hottest spot temperature curve be used in the guide that would represent both distribution and power transformers.

2) The slope of this curve should be set to a nominal value of 15000, i.e., B=15000.

3) The entire loss-of-life subject be placed in the general section of the guide, as it would now apply to both distribution and power transformers.

4) The existing Arrhenius curves for both distribution and power transformers be retained in the thermal evaluation guide, to be used as a guideline for insulation system checking.

5) Appendix "I" be added to the guide that would discuss various end-of-life-point criteria, and include a qualitative discussion of how insulation life relates to transformer life.

6) % Loss of Insulation Life be calculated using an equation that incorporates an insulation life factor (ILF). Two ILF's would be proposed for power transformers, and one would be proposed for distribution transformers.

John Matthews, Olin Compton, and Dave Douglas agreed to work on a proposal for incorporation of the entire insulation loss-of-life subject into the general section of the guide. Bill McNutt agreed to work on the proposed new appendix.

Very Significant Discussions and Actions of the Working Group

The working group members discussed and voted on, with unanimous approval, the following two actions:

1) Loading capability tables for both Distribution and Power Transformers are to be removed from the proposed loading guide.

2) The working group will develop PC-based software able to perform the typical transformer temperature and insulation life calculations. The Working Group envisions that IEEE would distribute this software with the loading guide. (Olin Compton, Donald Platts, and Paulette Payne have agreed to develop this software).

The Working Group has also agreed to include various sample temperature and insulation loss-of-life calculations in the guide as additional tutorial information.

Ed Norton indicated that he thought that the proposed loading guide should address the impact of real-time, direct, transformer temperature measurement on transformer temperature calculation. Ed agreed to write a proposed appendix on the subject for review by the Working Group for the next meeting.

The Working Group also agreed to develop and incorporate into the guide a bibliography that would contain a comprehensive listing of literature relevant to transformer loading.

Linden Pierce indicated that he would supply values for the X and Y exponents used in the alternate temperature calculation method outlined in Appendix G by the next meeting of the Working Group. Linden also indicated that he would improve the definitions of the X, Y and Z exponents.

The Working Group also discussed incorporation of suggested design limits for new transformers as found in IEEE standard 756, Table 3. Discussions of this subject will continue at the next Working Group meeting.

There being no further business, the meeting was adjourned at 9:55 A.M.

NOTE:

At this point in the Insulation Life Subcommittee Meeting, a vote was taken and it was unanimously recommended that the Subcommittee Chairman recommend to the main committee that C57.91 and C57.92 be re-affirmed.

The next Working Group report was given by Bob Grubb, Chairman of the Working Group on Thermal Tests which met at 3:05 P.M. on October 22, 1990, with 13 members and 9 guests in attendance. Two of those guests, Jeff Fleeman of American Electric Power Service Corp., and James Cross of Carte International, signed on as new members.

Project Status Reports

A) The Status of Project P838, "recommended procedure for performing temperature rise tests at loads beyond nameplate rating" was reported. Draft 11 had been sent out for ballot of the main Committee prior to the last meeting. The ballot summary is as follows:

76	ballots approved or approved with comments
4	ballots not approved
9	ballots abstained
18	ballots not returned
107	Total

The Chairman indicated that in addition to the negative ballots, many of the comments sent with the approved ballots were significant in that they went beyond editorial comments. The result is that quite a few changes are being made for the next Draft. The Chairman will put together a listing of all these suggested changes and send it out to the Working Group for review and consensus. It is hoped that the review by the Working Group will be complete in time to submit the next Draft for ballot to the main committee prior to the next meeting. Discussion was held on several of these areas in conflict.

1) Testing under this recommended Procedure document is performed by holding current constant at 70% , 100%, and 125% of maximum nameplate rating, without the use of additional current to approximate core losses. (As performed in this manner, the 100% test is not a standard temperature rise test as described in C57.12.90). This was a conscious decision by the Working Group as being an appropriate means to evaluate the accuracy of the equations and empirical constants used in the loading guides.

2) There is a question of an interpretational conflict between the NOTE in Section 5.1 where the quantity $(K^2R+1)/(R+1)$ is used to approximate losses in determining the exponent "n" and the Evaluation of Data Section 8.1, where the data is plotted to determine the exponent. These Sections will be evaluated to assure that the appropriate data and curves are used.

3) Discussion on Section 15.2 related to user requests to calculate temperatures for winter ambients, resulted in the conclusion that this section will be dropped as unnecessary.

4) The negative ballot requesting changing the procedure to require the use of direct reading hot spot temperature devices was discussed at length. There was some degree of consensus in the group that the method for testing proposed in this document appears to be good, and that the use of direct reading devices could be a useful tool in evaluating the loading guide equations. The consensus continued, however, that before the use of direct reading devices would be included as a requirement for this test procedure, opportunity should be allowed for review of data collected by direct reading devices as reported in technical literature. A CIGRE survey of such data has been published, but there is not a great amount of other literature yet. It was agreed that for now information will be included in this document indicating what measurements might be suggested as appropriate <u>if</u> direct reading devices are used.

B) Project PC 57.12.00 L, <u>Definition of Thermal Duplicate</u>

The Chairman handed out the next draft of this definition, based on the discussion held at the last meeting. Much of the discussion at this meeting centered on whether the tolerances on losses and temperatures were based on available data. It was pointed out that these values were simply chosen as starting points for review of this definition. A suggestion will be considered to list these tolerances as quantities "A", "B", and "C", and to then include as suggested values for these quantities those which were shown in this version (20% on losses, $\pm$5 degrees on top oil and winding rise, and 20% on winding gradients). These values would be used unless other values are negotiated between user and manufacturer at the time of contract.

A suggestion was also made that some equations, and perhaps examples be included to show how the tolerances discussed are to be calculated. This will be reviewed . Orrean Chew will submit a draft to the Task Force Chairman of suggested equations.

<u>OLD BUSINESS</u>

1) L. W. Pierce indicated that he had done some work prior to last meeting and raised questions related to needed revisions to Section II of C57.12.9 on temperature rise testing. The Sound and Vibration Subcommittee is working on a draft

revising their related section of C57.12.90, and he felt it appropriate that we do the same. He could put together some editorial changes before the next meeting, but a PAR should be prepared defining this work. The Chairman recognized the need for this revision, but due to the lack of active volunteers he indicated he would have to check with Subcommittee Chairman Dave Douglas to determine whether we should take on this task at present, while we are still trying to get a successful ballot on P838.

2) Orrean Chew indicated that, as a result of discussion after the last meeting, he had checked on one production unit and found no significant impact in the determination of winding temperatures related to the status of the fans during shutdown (on or off). No conclusions were drawn since only one unit was reviewed, but he wished to point out his observation.

ADJOURNMENT

There being no other business, the meeting was adjourned.

The final Working Group Report was given by Lin Pierce on the meeting of the Working Group on Thermal Evaluation of Oil Immersed Distribution and Power Transformers. Larry Lowdermilk could not attend this meeting so Chuck McMillan very ably chaired the meeting and because Chuck had to leave early Lin Pierce agreed to present the WG report. The Working Group met at 8:00 A.M. Tuesday, October 22, 1990. 15 members and 52 guests were present.

The second draft of the revised standard C57.100, Standard Test Procedure for Thermal Evaluation of Oil Immersed Distribution and Power Transformers, was mailed to the working group members and distributed at the meeting. Chuck McMillan pointed out that the most significant change was to increase the minimum insulation life expectancy from 60000 hours to 175000 hours and a change of the 5 times safety factor to 2.5 times. It was reported that the Insulation Life Task Force, which met Sunday, recommended removing the insulation life curves for both distribution and power transformers from the loading guide and include them in the thermal evaluation standard.

Bill McNutt stated that new insulation should be tested with sealed tube aging tests prior to the functional life tests. A curve for the maximum life expected for cellulose will be included with which to compare new insulation.

Chuck McMillan handed out a draft of a sealed tube aging test procedure to be used, based on an IEEE paper supplied by James Kinney and EPRI reports supplied by Stan Lindgren.

Vince Dahinden of H. Weidmann AG suggested that degree of polymerization reduction could be used in lieu of tensile reduction. Vince will supply a write-up for an Appendix on this subject.

Some of the discussion which followed involved background material about the sources of the various insulation life curves going back to the early 1960's. Work done by Al Phillips past Chairman of this W. G. was discussed.

Bubble evolution was discussed and the need to include a caution that rapid load application may initiate bubbling and this should be considered in model evaluation. The scope does not involve evaluation of bubbling, since the aging is accelerated by application of temperatures in excess of those the transformer may see in service.

Chuck McMillan asked for any other proposed changes. None were suggested.

Another working group ballot on the revised standard will be made before the next meeting. The meeting was adjourned at 9:05 A.M

NEW BUSINESS

Finally, under New Subcommittee Business, the Chairman raised a question on Nomex Insulation Systems.

1. Nomex Systems have been used in Mobiles for many years.

2. Nomex Systems are becoming attractive in transformer repair rewinds to reduce loses and/or upgrade the MVA rating.

The question was asked as to what should be included in guides and standards handled by this subcommittee to address the use of Nomex high temperature insulation systems.

Olin Compton suggested that the scope should include all non-cellulose insulation systems. There seemed to be much interest in this subject. A Task Force of 10 volunteers was set up to determine what needs to be done in this area. Heintz Fisher agreed to chair this Task Force.

It was also suggested that a Tuesday afternoon panel discussion symposium might be appropriate to educate the Main Committee on the state of the art of high temperature insulation systems in oil immersed transformers.

There being no further business the Subcommittee Meeting was adjourned at 3:00 P.M.

Respectfully submitted

David H. Douglas
Subcommittee Chairman

October 24, 1990

Performance Characteristics Subcommittee

Meeting Minutes - Montreal, Que., Canada - October 23, 1990

I. Introduction/Attendance

The Performance Characteristics Subcommittee (PCS) met at 10:05 a.m. on Tuesday, October 23, 1990 with 31 members and 54 guests in attendance.

II. Approval of Minutes

The minutes of the March 27, 1990, PCS Meeting were approved as written.

III. Chairman's Remarks

A. Administrative Subcommittee Notes

The following information, obtained at the October 22, 1990, meeting of the Administrative Subcommittee was presented:

1. The next Committee meeting will be held at The Tempe Mission Palms Hotel in Phoenix, Arizona - May 12-15, 1991.

2. The Committee Operating Manual has been printed. The manual has been mailed to all Committee members and Working Group chairmen.

3. Two new subcommittees have been added to the Committee, Distribution Transformers, and Underground Transformers and Network Protectors.

   Harold Moore is replacing Bob Lee as Chairman of the Dielectric Tests Subcommittee. Lou Tauber is replacing Dennis Gerlach as Chairman of the West Coast Subcommittee.

4. The Working Group Chairmen are again asked to note and expedite the various C57.12.00 and C57.12.90 projects which must be completed by Spring, 1992.

5. The Subcommittee was polled regarding meeting schedule conflicts. No one responded with significant schedule conflicts at this time.

B. Membership

Ron Barker (Virginia Power), John Crouse (GE), Robert Hartgrove (Carolina Power and Light), Phil Hopkinson (Cooper Power Systems), Brian Klaponski (Carte International), Frank McCann (Ebasco Services), Don Platts (PA Power & Light), and Ron Stoner (PSI Energy) were added to the membership roster. Gene Arjeski, J. D. Marlow, and L. D. Miller were removed from the roster. Membership now stands at 61.

IV. Agenda Changes

The next meeting date, shown as April 16, 1991, was changed to May 14, 1991.

No other changes were requested.

V. Working Group Reports

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

1. The Working Group met on Monday, October 22, 1990 at 8:00 a.m. and 10:05 a.m. There were 11 members and 12 guests present.

2. In the absence of Chairman Charles Pounds, Working Group Secretary, Sheldon Kennedy chaired the meetings.

3. Max Cambre, Joseph Foldi and Jerry Frank requested membership on the Working Group.

4. Draft 7 of C57.18.10 was not available for this meeting, however, it will be available by the next meeting.

5. The discussion during the first session was concentrated on "Table 10 - Limits of Transformer Winding Temperatures for Defined Load Cycles". The column headings were inconsistent in their treatment of liquid immersed and dry type transformers. The heads for both types will be "Average Winding Temperature Rise" and "Hottest Spot Temperature". The heading "Insulation System" will be removed from the dry type columns. The heading of the table will state that "temperature limits are given in a 30°C ambient over a 24 hour period". A footnote will be added to the table stating that "these are the maximum temperatures allowed. Lower temperature rises and/or higher temperature insulation systems may be specified for specific applications". Verbage will also be included from C57.12.00 and C57.12.01 with regard to hottest spot temperature allowances.

Note 1 of the table will be changed to indicate that "One overload cycle per 24 hour period will be allowed unless otherwise specified". This was done so that loss of life calculations may be performed with a known overload allowance.

6. The second session discussed testing of single-way transformers and harmonic current heating.

7. Don Kline will write some proposed temperature rise test methods for single-way rectifier transformers when a rectifier is not available for a combinational test.

8. The problems of accounting for harmonic current heating losses were discussed at length. A letter will be circulated to all Working Group members to request their opinions on how to report losses for the purposes of the specification.

Following this Working Group report to the PCS, Olin Compton recommended liaison be established between this Working Group and the Insulation Life Subcommittee. The PCS Chairman will contact Charlie Pounds regarding establishment of this coordination.

B. Qualification of Transformers for Class 1E Application in Nuclear Power Stations - L. W. (Len) Pierce

The Working Group on Class IE Transformers met at 10:05 a.m., October 22, 1990. Three members and one guest were present.

This draft standard is nearing completion and should be submitted to the IEEE Standards Board before the next meeting.

All negative ballots have been resolved. Three ballots with conditional affirmatives remain to be resolved.

Coordination with the following IEEE Groups has been completed:

1. SC-2 Committee of Nuclear Power Engineering Committee
2. West Coast Subcommittee of Substations Committee
3. SCC-10 - Standards Staff (Definitions - IEEE dictionary)

Wally Binder searched files for an approved PAR. Wendy Eato, Nescomm Secretary wants a new PAR form completed. This will be discussed with the IEEE Standards Staff. We do not wish to have further delays.

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

This Working Group did not meet during this session.

Jack McGill reported that the completed project PC57.21 has been submitted to the Standards Board, but has not received approval.

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

Members Present: M. Altman, J. Wood, R. Frazer, R. Wakeam, A. Bartek, J. McGill, D. Hornak, J. Crouse, R. Veitch, G. Sparagowski, R. Stoner, D. Platts, K. Brockhausen, D. Dohnal, D. Douglas, W. Wrenn, C. Stiegemeier.

Guests Present: F. David, J. Matthews, T. Bode, D. Fallon, E. Koenig, J. Foldi, D. Orten, R. Johnston, O. Compton, C. Krishnagger, B. Kurth, P. Russman, R. Defeneff.

The LTC Performance Requirements Working Group met at 3:05 p.m. on Monday, October 22, 1990 with 17 members and 13 guests in attendance. Introductions were made and the minutes of the previous meeting in Denver were approved without comment.

Previous to the meeting, Draft 4 of PC57.131, Standard Requirements for Load Tap changers, had been sent to the Working Group members for review and ballot. Twenty ballots had been sent out and 12 were returned. Of those returned, 5 were approved without comments, 4 were approved with comments and 3 were not approved.

The major portion of the meeting consisted of reviewing the comments received with Draft 4. Besides various editorial type comments, the following items were discussed and decided upon for inclusion in the next draft.

- The temperature of the LTC environment when immersed in insulating fluid was specified in Draft 4 to be from -25C to 100C, if the LTC is located in the main tank, and from -25C to 40C if the LTC is located in a separate compartment. It was decided to eliminate this distinction and to use the range from -25C to 100C regardless of whether the LTC is in the main tank or in a separate compartment. It was felt that 40C for insulating fluid in a separate compartment was unrealistically low.

- Draft 4 stated that the temperature rise of the LTC contacts and associated leads should not exceed 20C when the LTC is carrying 1.2 times its maximum rated through current. It was decided that the temperature rise of leads and the connections through the barrier board should not be included in the LTC standard since this subject is already covered in C57.12.00.

- The service duty test can be made at either rated step voltage or reduced step voltage. If at rated step voltage, the contacts on arcing switches and arcing tap switches are subjected to a certain number of operations when carrying maximum rated through current. The discussion centered around whether the number of operations should be 20,000 or 50,000. It was decided to use 50,000 which is consistent with IEC-214.

Also, for the service duty test, Draft 4 states that "oscillograms taken at regular intervals during the test shall show that there is no significant alteration in the characteristics of the LTC in such a way as to endanger the operation of the apparatus". It was felt by some members of the Working Group that an attempt be made to determine a more objective requirement. Two Working Group members, representing manufacturers of LTCs, agreed to bring to the next meeting some typical oscillograms taken during service duty testing for the Working Group to review.

About half of the comments received with Draft 4 were able to be reviewed at the meeting. The remaining comments will be on the agenda for discussion at the next meeting. The Working Group meeting adjourned at 5:00 p.m.

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

The Working Group met at 1:05 p.m. on October 22, 1990, in the Lachine Room of the Bonaventure Hotel in Montreal, Que. There were 19 members and 12 guests present.

Following introductions, the minutes of the Denver meeting were approved as submitted.

The remainder of the meeting was devoted to review and discussion of changes resulting from ballotting Draft 9 to the Transformers Committee. To resolve the 3 negative votes, the following changes were incorporated into Draft 10:

1. Reference to "Doble" was removed from paragraph 1.2.

2. Reference to specific sections of C57.106 were removed from Table 5.

3. Reference to Non-Standard Tests were removed from Table 5.

4. Reference to specific sections of C57.104 were removed from Table 6.

5. Changes supplied by the negative ballot were incorporated into sections 6.3.1 and 6.3.2 with editorial changes discussed by the Working Group.

6. Changes were made to Appendix 1 to reference C57.106 for acceptable values from the table on "Suggested Limits for Continued Use of Service Aged Insulating Oil (grouped by voltage class)". These changes occur in paragraph A6.1, A6.2, A6.3.

7. A sentence was added to A6.4 referencing ASTM D1500 and ASTM D152.

Discussion was also conducted regarding the start of analysis for abnormal periodic test results as well as for a transformer tripped condition. Section 4.2 suggests starting into the flow chart when either situation occurs and lists periodic tests as the electrical tests of Table 4 and the tests of gas and insulating fluids in Table 5. The blocks on the flow chart were changed to clarify that analysis could begin if the "Transformer Tripped or Malfunctioned" or if "Routine Tests Show Deviation from Past".

All changes were considered to be editorial by the Working Group and the Working Group recommends that the changes be adopted and the document be forwarded to the Standards Board.

Following this report, the PCS approved the recommendation to submit this document, with the editorial revisions, to the Standards Board for approval.

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

The Working Group on Loss Tolerance and Measurement met on Monday, October 22 at 3:05 p.m. with 16 members and 21 guests present. Minutes of the previous meeting were accepted without change.

The first item of business was a discussion of the proposal for a no-load loss temperature correction method and reference temperature. Two negative votes and one abstention cited disagreement with the reference temperature or with the correction method as reasons for voting negative. A history of temperature correction for no-load losses dating back to 1980 was presented. Bob Veitch expressed his views in a letter written to John Matthews. Discussion followed.

Everyone agreed that the temperature correction formula specified in the proposal is an approximation. It is an empirical equation based upon the correction methods employed by 10 transformer manufacturers that responded to a Working Group survey conducted in 1985. The reason for this inaccuracy can be explained by comparing it with other temperature correction formulas.

For example, the observed change in the resistance of a conductor is due to a single, repeatable physical mechanism that results in a well-defined functional relationship between the resistivity and temperature of the material. The formulas given in C57.12.90 to correct DC winding resistance to a reference temperature are accurate representation of this functional relationship.

The observed decrease in transformer no-load losses with an increase in temperature in full-size transformers, on the other hand, is not due to a single physical mechanism. Along with a change in the resistivity of the core steel, there are changes in the mechanical stress distribution within the core structure. Furthermore, the

actual temperature distribution throughout the core is unknown. These factors, which together contribute to a change in no-load loss, act together in varying and unpredictable ways. This is why the formula specified in the proposal is not accurate enough to correct for temperature over a wide range.

A review of the 10-year history of this proposal shows how the lack of a standard method for temperature correction has prevented the adoption of a standard reference temperature for no-load loss. Paragraph 8.1 of C57.12.90 states, "Ordinary variations of temperature do not influence no-load losses materially and no corrections for temperature variation are made". This statement is true as long as the transformer is in thermal equilibrium for a range of temperature near room temperature, which are the presumed conditions of test. The original intent of the authors of this standard was that no correction be made.

The C57.12.20 series of standards contain statements that "losses and impedance" shall be corrected to 85°C. It was unknown to those present at the Working Group meeting whether the intent of the authors of this statement was for no-load losses to be corrected to 85°C. This statement in C57.12.20 has been interpreted to allow correction of no-load losses to 85°C. This correction has a relative magnitude of 4% and is significant.

It was concluded at the Working Group meeting to return to the original intent of not correcting no-load losses for temperature as long as the temperature at the time of test is within a specified range. This is a return to a 1981 Working Group proposal. The proposal is this: "If no-load losses in distribution and power transformers are measured with temperature within the range of 10-30°C as measured by top oil temperature, no correcting for temperature shall be made. Of no-load losses are measured outside the range of 10-30°C, correction shall be made to 20°C using the following formula:"

The next item of business was a report by Ramsis Girgis on the progress being made in writing the loss measurement guide. Draft 3 was reviewed at the TF meeting, which included some changes in wording. An introduction and list of equipment functions and requirements will be added. Ramsis will send requests to various TF members to write new portions of the guide.

The last item was a decision to conduct a Working Group ballot on Oli Iwanusiw's proposal for a revision of Section 5 of the test code on resistance measurement.

The meeting adjourned around 5:00 p.m.

VI. Project Reports

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

Bob Frazer presented the attached ballot summary for Draft 2 in PCS (attachment PCS-A).

This proposal will now be balloted in the Transformers Committee.

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

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

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

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

VII. Old Business - None

VIII. New Business

A request was received (Attachment PCS-B) for interpretation of possible inconsistency between C57.12.00 through-fault capability requirements, and C57.109 through-fault protection guidelines. This possible inconsistency involves the methods of calculating the fault current magnitude and duration.

A Task Force was formed to investigate this request. The following people volunteered: Bipin Patel, Wally Binder, Robert Hargrove, Chuck Murray, Ron Barker and Ken Linsley.

IX. Next Meeting

The next meeting will be held on Tuesday, May 14, 1991, in Phoenix, Arizona.

The meeting was adjourned at 11:15 a.m.

Respectfully submitted,

John W Matthews

John W. Matthews
PCS Chairman

JWMMIN.PCS

ATT. PCS-A1

TC-M
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October 23, 1990

TO: Members of the Performance Characteristics Subcommittee

FROM: Robert H. Frazer

The following are the results of the ballot for:

C57.12.00h/D2 - REVISED WORDING - C57.12.00 TABLE 9, NOTE 4
LOAD TAP CHANGER NAMEPLATE TAP DESIGNATIONS:

Approved without comment	46
Approved with comments: "Do we need a definition of Output Voltage? Is this the same as Secondary Voltage?"	1
(Note - The word "Output" is presently used in C57.12.00, table 9. "Secondary Winding" is defined in C57.12.80.6.3.2 as "The winding on the energy output side")	
Not Approved	0
Total ballots returned	47
Total ballots sent out	55
Percent Approved returns	85%

Thank you,

Robert H Frazer

Present 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 draft #1 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-B
TC-M
11 OF 11

GE Power
Delivery & Control

Industry Services Engineering Department
General Electric Company
1 River Road, Schenectady, NY 12345
Building 6-300
(518) 385-2999

R. W. Dempsey, Chairman
Substation Protection Subcommittee
IEEE Power System Relay Committee
c/o Potomac Electric Power Company
1900 Pennsylvania Ave, NW
Washington, DC 20068

J. W. Matthews, Chairman
Performance Characteristics Subcommittee
IEEE Transformers Committee
c/o Baltimore Gas and Electric Company
PO Box 1475
Baltimore, MD 21203

Gentlemen:

Recently I encountered a problem interpreting the standards on transformer protection while developing a discussion on that topic for the Standards Board Cogeneration Seminar.

The hierarchy of standards on liquid-filled transformer through-fault protection is as follows:

Standard C57.12-1985 sets forth the required mechanical and thermal withstand capabilities of liquid-filled transformers. In essence, this standards tells us how robust transformers shall be.

Application Guide C57.109-1985 interprets the capabilities established in C57.12 and provides guidance on applying and protecting transformers considering the inherent mechanical and thermal withstand capabilities.

Application Guide C37.91-1985 addressed the general subject of transformer protection. It contains an appendix which illustrates the considerations in through-fault protection using overcurrent devices which is based on information drawn from C57.109.

In defining short circuit withstand requirements, C57.12 states that, for category III and IV transformers, a "short circuit current shall be calculated using *transformer impedance plus system impedance*". C57.109 shows withstand curves (figures 3 and 4) for these two categories and the text describing the curves states that the frequent-fault occurrence curve (thermal plus mechanical limitations) is "dependent upon the *impedance of the transformer* for fault current above 50%." The curves themselves are shown as terminating at a current magnitude of $1/Z_t$. Likewise, the appendix to C37.91 refers to frequent fault limitations for category III and IV transformers based on transformer impedance alone. Also, the example illustrated for a category IV transformer in the text of this appendix uses only transformer impedance.

It seems to me that a transformer which is designed (according to C57.12) to have a withstand capability which takes into account some degree of source-side impedance will be less robust than one which is based on the assumption of an infinite source. To apply protection on the basis of an infinite source would be to assume an unrealistic robustness and would therefore be non-conservative. If this interpretation is correct, there is an inconsistency in these standard documents which should be corrected in the next revision cycle.

Very truly yours,

L. J. Powell

LJP5632.WP - May 18, 1990

TC-N

December 3, 1990

TO: IEEE/PES TRANSFORMERS COMMITTEE

SUBJECT: RECOGNITION AND AWARDS SUBCOMMITEE REPORT

A certificate of appreciation award was presented to Robert E. Lee for services as past chairman of the Dielectric Tests Subcommittee.

An award for outstanding achievement in the development and implementation of standards in electrotechnology is now available in the form of an IEEEE Standards Medallion. Nominations for this award are now being prepared for submittal to the IEEE Standards Board.

J. V. Bonucchi

Chairman,
Recognition and
Awards Subcomittee

IEEE PES TRANSFORMERS COMMITTEE

UNDERGROUND TRANSFORMERS AND NETWORK PROTECTORS SUBCOMMITTEE

MEETING MINUTES

MONTREAL, CANADA - OCTOBER 23, 1990

CHAIRMAN - PAUL E. OREHEK

1. Chairman's Remarks and Announcements

The Underground Transformers and Network Protectors Subcommittee met at 1:50 P.M. on October 23, 1990 with 16 members and 9 guests present. Following the introduction of those present, a motion was made to approve the minutes of the April 5, 1990 meeting in Washington, D. C. of the C57.12.4 Subcommittee. The minutes were approved with one editorial change.

1.1 The Scope of the Subcommittee that was approved by the IEEE Technical Council with some editorial changes is as follows:

> "Develop and maintain related standards for secondary network protectors, and secondary network transformers (liquid-filled and dry-type) and three-phase underground-type distribution transformers rated 2500 kVA and smaller with a high voltage of 35,000 volts and below, and a low voltage of 480 volts and below. Coordinate with other technical committees, groups, societies and associations as required."

1.2 On behalf of the Subcommittee, I would like to take this opportunity to thank the Transformers Committee, especially Chairman Veitch and Vice Chairman Borst, for helping make the transition of the C57.12.4 activities to the Transformers Committee go so smoothly. We appreciated all the assistance also offered by other members, the warm welcome we received, and the professionalism in which the move was made.

2. Chairman's Comments From Administrative Subcommittee

2.1 The Administrative Subcommittee approved the establishment of the Underground Transformers and Network Protectors Subcommittee.

2.2 The new Transformers Committee Operating Manual has been published and distributed to all Subcommittee and Working Group Chairmen.

2.3 Since the Subcommittee has just been established, members not belonging to the IEEE Power Engineering Society were strongly encouraged to join.

2.4 Project Authorization Requests (PAR's) are required for all Standards the Subcommittee is developing or revising. Working Guides and PAR forms were given to all Working Group Chairmen and they were requested to complete the forms as soon as possible.

2.5 The requirements to become a member of the Transformers Committee were discussed and application forms were distributed.

2.6 All members who are IEEE members were encouraged to apply for Senior Membership.

2.7 The Administrative Subcommittee requested that a survey of each Subcommittee be conducted to determine if conflicts with meetings exist. The Underground Transformers and Network Protectors Subcommittee commented as follows:

2.7.1 The C57.12.57 Working Group meeting should be scheduled when other dry-type transformer Working Groups are not meeting. This would allow more dry-type transformer manufacturers, who did not attend this meeting previously, to participate in this Working Group.

2.7.2 One person had a conflict between the C57.12.24 and C57.12.26 Working Group meetings.

2.7.3 One person had a conflict with all Distribution Transformer and Underground Transformer and Network Protector Working Group Meetings. Previously, these two Groups always met at different times and his Company assigned him to both Subcommittees.

2.8 The requirements for membership on the Working Groups and the Subcommittee were discussed.

3. Working Group Reports

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

Sec. 4 - Three-Phase Underground-Type Transf. - J. H. Howard
Sec. 5 - Liquid-Filled Sec. Network Transf. - E.A. Bertolini
Sec. 6 - Secondary Network Protectors - R. B. Robertson
Sec. 7 - Dry-Type Network Transformers - B. Nutt

4.0 Working Group on Three-Phase Underground-Type Transformers

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

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

This WG is charged with the revision of C57.12.24. This Standard is intended for use as a basis for establishing the performance, interchangeability, and safety of the equipment described and to assist in the proper selection of such equipment.

4.1 The Working Group met at 1:00 P.M. on October 22, 1990 with a total of 19 members and guests present.

4.2 The minutes of the April 4, 1990 meeting in Washington, D. C. were approved with changes.

4.3 The recommended changes of Sections 5 to 8, which covers Line Terminal Insulation Levels, Impedance, Tests and Construction, were reviewed in detail. Review will begin with Terminal Marking, Section 8.3.3, at the next meeting.

4.4 The Chairman reported that NEMA promised to send out the survey to the various manufacturers that was provided to them in May, 1990 before the end of October, 1990. The Chairman encouraged any manufacturer who did not receive it to contact him for a copy.

4.5 No new business was presented and the meeting was adjourned at 2:50 P.M.

5.0 Working Group on Liquid-Filled Network Transformers

Chairman: Mr. E. A. Bertolini, Con Ed of N. Y.

Ref: C57.12.40 - "Requirements for Secondary Network Transformers, Subway and Vault Types (Liquid Immersed)."

This WG is charged with the revision of C57.12.40. This Standard is intended for use as a basis for establishing the performance, interchangeability, and safety of the equipment covered and to assist in the proper selection of such equipment.

5.1 The Working Group met at 3:05 P.M. on October 22, 1990 with a total of 19 members and guests present.

5.2 The minutes of the October 3, 1989 (Washington, D. C.) and April 4, 1990 (Washington, D. C.) meetings were approved with many changes. The October 3, 1989 minutes were not available until the April, 1990 meeting so approval was deferred until the October, 1990 meeting.

5.3 A report on impedance voltage, prepared by Mr. A. Velasquez, Florida Power and Light Co., was distributed to the members for their review and discussion at the next meeting. Mr. Velasquez was replaced by Mr. Jorge Valdez on the Subcommittee and he will be prepared to answer all questions on this report at the next meeting.

5.4 Copies of revised Figure 1 (High Voltage Terminal Chamber Details) will be issued to the members with the minutes. Comments are requested by January 15, 1991.

5.5 The paragraph on shipping guards prepared by Mr. C. E. Griffith, Potomac Electric Power Co., was reviewed and modified. It will be included in the revised standard.

5.6 ABB agreed to supply dimensions for their oil-filled units and General Electric will be contacted to supply dimensions for their oil-filled and silicone-filled units by January 15, 1991.

5.7 The publication of C57.12.40, which was approved in 1987, is expected to be completed this year.

5.8 No new business was presented and the meeting was adjourned at 4:00 P.M.

6.0 Working Group on Secondary Network Protectors

Chairman: Mr. R. B. Robertson, Tampa Electric Co.

Ref: C57.12.44 - "Requirements for Secondary Network Protectors."

The mission of this WG is the development of C57.12.44, which is presently in Draft #3. The Standard is intended for use as a basis for establishing the performance, electrical and mechanical interchangeability, and safety of the equipment covered and to assist in the proper selection of such equipment.

6.1 The Working Group met at 8:00 A.M. on October 22, 1990, with 12 members and 5 guests present.

6.2 The minutes of the April 3, 1990 (Washington, D. C.) meeting were approved with corrections.

6.3 The Working Group was restructured into Task Groups and Mr. D. H. Mulkey volunteered to act as the WG Secretary. The following members volunteered to act as Task Group Chairman for the Sections shown below:

Table of Contents		B. Nutt
Sec. 1	Scope	R. B. Robertson
Sec. 2	Related Standards	R. B. Robertson
Sec. 3	Definitions	B. Nutt
Sec. 4	Service Conditions	R. B. Robertson
Sec. 5	Design Test Requirements	J. Moffat
Sec. 6	Production Test Requirements	J. Moffat
Sec. 7	Relay Characteristics	J. Moffat
Sec. 8	Fuses	P. Risse
Sec. 9	Standard Ratings	R. Crowell
Sec. 10	Mechanical Performance Specs	R. Crowell
Sec. 11	Other Requirements	C. Niemann
Appendices		R. Bliss

6.4 Each Task Group Chairman is to obtain assistance from other members and is to arrange all necessary meetings between regular WG meetings. They are to keep the WG Chairman and Secretary notified of their actions and accomplishments. All input is to be sent to D. Mulkey by April 1, 1991 for distribution to all WG members prior to the next meeting.

6.5 The Chairman requested another four hour time slot for the next meeting with a room somewhat larger so that it will accomodate 20 to 25 people.

6.6 Sections 1 to 9 of the proposed standard were reviewed. Time did not allow for a complete review.

6.7 The completion goal for the proposed standard was revised from the fall of 1991 to the fall of 1992.

6.8 Mr. B. Nutt, Texas Utilities, agreed to do the necessary drafting and art work requirements.

6.9 No new business was presented and the meeting was adjourned at 12:00 Noon.

7.0 Working Group on Dry-Type Network Transformers

Chairman: Mr. B. Nutt, Texas Utilities

Ref: C57.12.57 - "Requirements for Ventilated Dry-Type Network Transformers 2500 kVA and Below, with High Voltage 34 500 Volts and Below, Low Voltage 216Y/125 and 480Y/277 Volts."

This WG is charged with revision of C57.12.57. This Standard is intended to set forth characteristics relating to performance, limited electrical and mechanical interchangeability, and safety of the equipment described, and to assist in the proper selection of such equipment.

7.1 The Working Group met at 8:00 a.m. on October 23, 1990 with 31 members and guests present. This was a positive sign for potential opportunity of greater input from manufacturers and users of these transformers.

7.2 The minutes of the October 4, 1989 (Washington, D.C.) and the minutes of the April 4, 1990 (Washington, D.C.) were approved with corrections. The October 4, 1989 minutes were not available until the April, 1990 meeting so approval was deferred until the October, 1990 meeting.

7.3 Members, guests and potential members were requested to provide updated mailing, telephone and fax information.

7.4 The Chairman solicited additional input for the 1992 revision.

7.5 Draft #3 of C57.12.57, prepared by Mr. J. Nay of Hevi-Duty, was distributed and each item was discussed.

7.6 An addition to the Forward was presented for inclusion in the next revision.

7.7 Dimensional information gathered by Mr. J. Nay will be incorporated into Draft #4 along with the agreed upon changes and will be attached to the minutes.

7.8 No new business was presented and the meeting was adjourned at 9:50 A.M.

8.0 Other Business

The services of IEEE Staff for preparing documents were discussed.

9.0 Future Meetings

The location and dates for the meetings scheduled in 1991 are to be as follows:

May 12-15, 1991	Phoenix (Tempe Mission Palms), Arizona
Nov 3-6, 1991	Baltimore (Omni Inner Harbor), Maryland

10.0 There being no further business, the meeting was adjourned at 2:35 P.M.

Paul E Orehek

Paul E. Orehek
Chairman

Attendance Roster Attached

11.0 Attendance Roster

Members Present

T. R. Baglie	Virginia Power
E. A. Bertolini	Consolidated Edison of New York
J. W. Howard	Pennsylvania Power & Light
M. C. Mingoia	Edison Electric Institute
D. H. Mulkey	Pacific Gas & Electric
J. R. Moffat	Westinghouse Electric
J. Nay	Hevi-Duty
C. G. Niemann	Commonwealth Edison
B. Nutt	Texas Utilities
P. E. Orehek	Public Service Electric & Gas
F. Perri	NEI Ferranti-Packard
R. L. Plaster	ABB Power T&D
P. Risse	Georgia Power
R. B. Robertson	Tampa Electric
H. J. Sim	Square D
J. Valdez	Florida Power & Light

Members Absent

W. Caldwell	ABB Power T&D
R. W. Fisher	Potomac Electric Power
K. Ginthwain	General Electric
C. E. Griffith	Potomac Electric Power
R. L. Grun	Central Power & Light
J. L. Harper	Arizona Public Service

Guests

K. Hanus	Texas Utilities
P. J. Hopkinson	Cooper Power Systems
R. E. Lee	Pennsylvania Power & Light
C. R. Murray	C. R. Murray, Inc.
G. Paiva	Southern California Edison
A. Salem	IEEE
F. Stevens	Northeast Utilities
B. Uhl	Commonwealth Edison
S. Vogel	IEEE

Attendance Summary

	Present	Absent
Members	16	6
Guests	9	

TC-P
1 OF 2

EPRI
Electric Power
Research Institute

Leadership in Science and Technology

October 12, 1990

TO: Mr. James H. Harlow
Secretary, IEEE Transformers Committee
Beckwith Electric, Inc.
P.O. Box 2999
Largo, FL 34649

FROM: Stan Lindgren, Project Manager SM

SUBJECT: **EPRI LIAISON REPORT**

The following report is for inclusion in your minutes for the October 24, 1990 meeting.

1. EHV Converter Transformer:

   - Test results confirmed 25% or greater major insulation size reduction can be attained with some further work.
   - Final report is being published.

2. Amorphous Steel For Power Transformers:

   - A pilot facility automated cutting line is now in use.
   - No problems have been reported with 500 kVA unit installed and placed in service June 1987. Core loss has declined several percent since the unit was installed. However, the first core using consolidated material had higher losses than expected. Work is in progress to understand why this is the case and to find solutions.

3. Advanced Power Transformer:

   - Reduced load loss feasibility has been demonstrated.
   - Detailed analytical studies exploring individual design aspects has been completed.
   - Phase II is underway which involves building a number of physical models to verify the design studies. A full scale dielectric model has been tested successfully. Work is progressing toward short circuit testing one unit in January, 1991.

4. Static Electrification in Power Transformers:

   - Suspected failure mechanism in over ~~18~~ 20 core form and shell form FOA transformers worldwide.
   - Work continues on monitoring instruments and quantification of parameters for mathematical models. Tests on representative transformer cooling components have been completed.

- A project is underway to monitor a large FOA transformer in the field. The instrumentation systems have been tested and are close to being ready for use.

5. Bubble Evolution in Overloaded Transformers:

- Very rapid load changes can cause bubble formulation under some conditions and reduce 60 Hz and impulse dielectric strength. This has been demonstrated in models with rapid/high O.L.

- A project to better identify moisture conditions associated with bubbles and verify GE mathematical model was completed (Final Report EL6761) but raised questions about nitrogen blanketed transformers..

- A supplemental project with ABB is nearing completion..

6. Active Transformer Noise Cancellation System:

- Noise reduction in one direction is being pursued first.

- An initial evaluation on a substation transformer was completed that demonstrated over 10 decibel reduction of 120 Hz with a small trial system.

- Two systems are being linked together to handle a larger transformer and improve reduction of higher frequencies.

- A field demonstration may take place in 1991.

7. High Voltage Instrument Transformers

EPRI sponsored a workshop 9/90 to provide a forum to compare and categorize failure information, failure modes and potential mitigation measures. This was an outgrowth of the roundtable in Washington DC 4/88.

8. Power Transformer Tank Rupture - Risk Assessment and Mitigation

This is a new project expected to start late 1990.

SRL:sf:9949.M

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9. CIG