MEETING MINUTES

IEEE/PES TRANSFORMERS COMMITTEE MEETING

NOVEMBER 3, 1993

ST. PETERSBURG, FL

IEEE/PES TRANSFORMERS COMMITTEE MEETING
ST. PETERSBURG, FL
NOVEMBER 3, 1993

ATTENDANCE SUMMARY

MEMBERS PRESENT:

E. J. Adolphson
R. Allustiarti
J. C. Arnold
J. Aubin
T. R. Balgie
R. L. Barker
D. A. Barnard
W. B. Binder
W. E. Boettger
J. V. Bonucchi
J. D. Borst
C. V. Brown
D. J. Cash
D. Chu
J. L. Corkran
D. W. Crofts
V. Dahinden
J. N. Davis
T. Diamantis
D. H. Douglas
R. F. Dudley
K. Edwards
F. E. Elliott
D. J. Fallon
P. T. Feghali
H. G. Fischer
M. Frydman
D. L. Galloway
A. A. Ghafourian
R. S. Girgis
R. L. Grubb
F. J. Gryszkiewicz
N. W. Hansen
K. S. Hanus
J. H. Harlow
F. W. Heinrichs
W. R. Henning
P. J. Hopkinson
J. W. Howard
E. Howells
J. Hunt
P. Iijima
A. J. Jonnatti
R. D. Jordan
E. Kallaur
C. P. Kappeler
J. J. Kelly
S. P. Kennedy
W. N. Kennedy
J. P. Kinney, Jr.
A. D. Kline
J. G. Lackey
F. A. Lewis
H. F. Light
S. Lindgren
L. A. Lowdermilk
D. L. Lowe
R. I. Lowe
D. S. Lyon
W. A. Maguire
K. T. Massouda
J. W. Matthews
S. P. Mehta
M. C. Mingoia
R. E. Minkwitz, Sr.
M. I. Mitelman
W. E. Morehart
D. H. Mulkey
R. J. Musil
W. H. Mutschler, Jr.
J. W. McGill
W. J. McNutt
C. G. Niemann
E. T. Norton
P. E. Orehek
G. A. Paiva
K. Papp
B. K. Patel
W. F. Patterson
J. M. Patton
P. A. Payne
H. A. Pearce
D. Perco
M. D. Perkins
V. Q. Pham
L. W. Pierce
R. L. Plaster
D. W. Platts
J. Puri
C. T. Raymond
C. A. Robbins
R. B. Robertson
J. R. Rossetti
M. P. Sampat
W. E. Saxon
R. W. Scheu
D. N. Sharma
H. J. Sim
J. E. Smith
J. E. Smith
S. D. Smith
R. J. Stahara
W. W. Stein
R. W. Stoner
J. C. Sullivan
D. W. Sundin
J. P. Templeton
A. M. Teplitzky
V. Thenappan
J. A. Thompson
J. C. Thompson
T. P. Traub
D. E. Truax
G. H. Vaillancourt
R. A. Veitch
L. B. Wagenaar
R. J. Whearty
A. L. Wilks
C. W. Williams, Jr.
H. J. Windisch

MEMBERS ABSENT:

D. J. Allan
B. F. Allen
M. S. Altman
R. A. Bancroft
D. Brucker
M. Cambre
J. C. Crouse
R. C. Degeneff
L. E. Dix
J. A. Ebert
J. A. Fleeman
J. M. Frank
D. W. Gerlach
D. A. Gillies
G. H. Hall
K. R. Highton
P. J. Hoefler
J. P. Lazar
C. K. Miller
C. Millian
H. R. Moore
C. R. Murray
C. J. McMillen
C. P. McShane
S. H. Osborn
P. Riffon
L. J. Savio
V. Shenoy
L. R. Smith
D. S. Takach
L. A. Tauber
R. W. Thompson
W. B. Uhl
B. H. Ward
D. W. Whitley

GUESTS PRESENT:

S. Aguirre
G. Andersen
J. Antweiler
J. Arteaga
M. P. Austin
D. E. Ayers
D. E. Ballard
D. Barnanowski
A. Bartek
B. L. Beaster
D. L. Billings
J. H. Bishop
T. Bode
A. Bolliger
J. L. Brown
W. E. Carter
R. E. Chadwick
S. D. Cooke
F. David
K. P. Ellis
R. Fausch
J. Foldi
G. E. Forrest
M. A. Franchek
R. Garcia
J. S. Garza
D. Getson
J. P. Gibeault
D. F. Goodwin
R. D. Graham
R. L. Grunert
M. E. Haas
W. D. Hamilson
E. Hanique
J. W. Harley
R. R. Hayes
G. E. Henry III
T. L. Holdway
J. Holland
R. H. Hollister
E. W. Hutter
J. Jeske
C. W. Johnson
G. Kozer
P. E. Krause
B. Kumar
M. Y. Lau
M. J. Lee
J. E. Long
R. P. Marek
S. P. Moore
R. McTaggart
L. Napoli
T. Nelson
V. G. Neumann
L. C. Pearson
T. J. Pekarek
A. J. Pereira
B. Poulin
N. Powers
G. Preininger
R. L. Provost
R. I. Psyck
D. R. Purohit
M. Rajadhyaksha
J. D. Ramboz
G. J. Reitter
A. L. Robinson
D. Rolling
G. W. Rowe
P. Russman
M. Salvant
H. Schenner
W. Schwartz
D. M. Shah
G. B. Shattuck
T. Siebert
P. Singh
K. R. Skinger
G. Sparagowski
A. A. Speegle
L. R. Stensland
M. Thaden
R. C. Thomas
A. Traut
E. Trummer
J. Vaschak
R. D. Wakeam
F. N. Weffer
R. C. Wicks
F. E. Willett
D. J. Woodcock
F. N. Young

TRANSFORMERS COMMITTEE

IEEE/PES TRANSFORMERS COMMITTEE MEETING
WEDNESDAY, NOVEMBER 3, 1993

Chairman: J. D. Borst Vice Chairman: J. H. Harlow

Secretary: W. B. Binder, Jr.

1.0 CHAIRMAN'S REMARKS AND ANNOUNCEMENTS - J. D. BORST

J. D. Borst called the meeting to order at 8:02 a.m.

J. H. Harlow reported there are 283 members and guests in attendance.

There will be a C57 meeting on Wednesday afternoon at the Horizon East Room.

Officer changes were announced. Subcommittee chairmen changes were announced.

IEEE/PES TRANSFORMERS COMMITTEE
Chairman's Report
1993 Fall Committee Meeting

1.1 US CIRED Liaison Committee

The US CIRED (International Conference on Electricity Distribution) Liaison Committee (USCLC) met Tuesday, July 20, 1993, at the 1993 Summer Power Meeting (SPM) in Vancouver. In the absence of Chairman Virgil Rose (PG&E) the meeting was chaired by John Grainger (NC State) who is the US Representative to CIRED.

1.1.1 The USCLC currently has an associate member status in CIRED. Consideration has been given to requesting elevated status as a full SDC (Scientific Directing Committee). Because CIRED is characterized as not being open to non-European input, benefits are not obvious; the sense of the USCLC is to retain the current status.

1.1.2 The 1993 Spring meeting of CIRED was held in Birmingham, UK; the USCLC sponsored a number of technical papers. There was no discussion of content. The next CIRED meeting is in Brussels in 1995.

1.2 IEEE PES Technical Council

The Technical Council (TC) held its regular meeting Tuesday evening, July 20, 1993, at the 1993 SPM with Chairman Jerry Hagge presiding. Highlights include:

1.2.1 A policy of cooperation between PES and CIGRE has been reaffirmed (see next page).

1.0 CHAIRMAN'S REMARKS AND ANNOUNCEMENTS - J. D. BORST (Cont'd)

Policy for Cooperation

Between the
International Conference on Large High Voltage Electric Systems (CIGRE)
and the
Power Engineering Society (PES) of the Institute of Electrical and Electronics Engineers (IEEE)

It is the policy of CIGRE and PES to coordinate their respective activities and to cooperate to further the objectives of both CIGRE and PES.

Specifically, it is agreed that:

1. CIGRE and PES Committee Chairmen will exchange information regarding meeting dates to minimize conflicts and may suggest topics. Committee Chairmen are encouraged to invite one or more members of the corresponding committee of the other organization to attend the committee meetings.

2. Each organization will make available to the other a list of the membership of its committees.

3. To enhance mutual understanding of the technical work performed by committees dealing with similar areas, the Chairmen of appropriate committees may organize liaison and an exchange of information between the corresponding committees and report on the activities to the Administrative Bodies on a regular basis. Preference will be given to the best suited individuals who are members of both CIGRE and PES. Suggested points of contact are included in the Addendum to this agreement.

4. When Chairmen of committees with common interests agree that a particular topic deserves active cooperation, they may form a joint working group, task force or other entity consisting of members or appointees of both committees to prepare a common publication. Such publication would require the coordination and approval through the normal approval process of the respective organizations.

5. The joint effort is intended to develop the information and to publish that information as a report, the latter only after the approval process is completed.

6. If the Chairmen of the corresponding technical committees decide a publication is useful, it may be published by either or both CIGRE and PES/IEEE with the appropriate acknowledgement that it was prepared as a result of a joint effort. Preliminary documents leading to the preparation of the publication would retain their confidential characteristics and not be published except as the final document.

If either organization wishes to amend or modify this "Policy for Cooperation," it should provide 60 days written notice to the other organization indicating the proposed changes.

1.0 CHAIRMAN'S REMARKS AND ANNOUNCEMENTS - J. D. BORST (Cont'd)

This statement of "Policy for Cooperation" will be distributed to members of the CIGRE Administrative Council, Technical Committee and Study Committee Chairmen and the PES Executive Board, Technical Council and Technical Committee Chairmen.

Approved: _____ Date: _____
President, PES

Approved: _____ Date: _____
President, CIGRE

1.2.2 Berlin has been chosen as the location for the 1997 SPM.

1.2.3 A restructuring of the PES Executive Board has been proposed and is described in the June 1993 issue of the Power Engineering Review (pp. 31-32). The 1994 PES officer candidates are also listed (p. 48).

1.2.4 The 1994 TC officers will be:

Chairman - Don Volzka, Wisconsin Electric
Vice Chairman - Steve Lambert, PTI
Secretary - Clark Gellings

1.2.5 The results of a questionnaire on TC organization provided no mandate for change.

1.2.6 The IEEE Standards Board is seeking nominees for its committees by 9/1/93. The standards coordinators have details; Chairman Hagge will formalize the request.

1.2.7 The 1994 SPM (San Francisco) will have a global focus.

1.2.8 PES will withdraw from formal participation in IJPGC after 1993.

1.2.9 The PES Executive Board and TC continue to struggle with PES direction regarding the standards "Vision for the Future." Short-term implementation goals have been proposed (see next page); IEEE staff and the TC SCC will have major roles. IEEE staff is to provide each TC Technical Committee with a cross reference to relevant IEC standards and working groups.

1.0 CHAIRMAN'S REMARKS AND ANNOUNCEMENTS - J. D. BORST (Cont'd)

Implementation Plan: Standards: Vision for the Future

What is IEC?

IEC is and has been the main force in place in International Standards. One accomplishable near-term goal is to fully explore the IEC organization and identify cross organizational ties to their counterparts in IEEE and PES. Andy Salem has been working on development of a comparison between the organizations. TC will be working with Standards Department Staff to identify synergies and make effective use of them. The PES Standards Coordinating Committee will be the focal point within PES. One of our biggest problems at present is that the people in the trenches really do not know who their counterparts in IEC are nor what they are doing.

What IEC Standards?

A corollary to developing a good knowledge of the IEC organization is to develop an equally good knowledge at the PES Committee or subcommittee level of the standards that exist or are being developed and their degree of compatibility with their IEEE counterparts. Again, the PES Standards Coordinating Committee will be the focal point of the effort to get each committee, subcommittee, and working group focused on expanding their horizons from one primarily national in nature to international. Each technical committee's management team should aggressively pursue efforts to develop standards compatible with IEC.

Standards Department Staffing

The degree of effort required to facilitate coordination between PES and IEC is substantial and beyond the capability of the present IEEE Standards staff. PES should give serious consideration to funding such a person to work with Andy Salem's staff to accomplish this. It was very clear from John Estey and my visit to Piscataway last month that his staff is extremely talented and dedicated. They are also blessed with a very substantial workload and could not absorb this need with their present staffing level. Jerry Hagge will discuss this with the Executive Board on Thursday.

SPAsystem

One of the early recommendations in the *Standards - Vision for the Future* was to improve the standards developing process through the use of new techniques and technologies. The goal was to allow the standards developers to interact more frequently and in depth without the cost and time penalty associated with travel. The Standards Department has developed such a system, the ***S**tandards **P**rocess **A**utomation **system***, and it is ready for first use on a demonstration basis. We are seeking candidates to work through the process in developing an identified new standard in its initial stages of development. Fred Kimsey will take the lead to identify candidate projects and get them into the process of using this new system and evaluating it as a tool for broader use. This technology has the capability to bring very substantial change to the way we develop standards. The use of the SPAsystem would begin toward the end of this year.

INTCOM

The IEEE Standards Board, through their International Committee, has been working on a guide to coordinate efforts between IEEE and IEC. PES has a substantial stake in this development, and should

become directly involved. Jerry Hagge is prepared to take such a recommendation to the Executive Board. Fred Kimsey will investigate present representation or lack thereof and provide a recommendation to Jerry Hagge.

1.2.10 The annual update of the PES organizational manual will be initiated shortly.

1.2.11 The PES publications policy has changed for 1994 to decrease the number of no-charge pages per paper from 7 to 6. The review form has also been modified.

1.2.12 The process of which standards interpretations are developed is under review by the Standards Board.

1.2.13 A brief report of Transformers Committee status was submitted as follows:

IEEE/PES TRANSFORMERS COMMITTEE

Report to the IEEE/PES Technical Council
1993 Summer Power Meeting
Vancouver
July 20, 1993

Committee Meetings

The most recent meeting of the Transformers Committee was held March 29-31, 1993, in Portland, Oregon. The meeting was attended by 259 members and guests plus 57 spouses. The luncheon speaker was Mr. Richard Perless of BPA.

Future meetings are scheduled as follows:

Date	Location
October 31-November 3, 1993	St. Petersburg, FL
March 20-23, 1994	Dallas/Ft. Worth, TX
September 24-28, 1994	Milwaukee, WI
Spring 1995	Kansas City, MO
November 5-9, 1995	Boston, MA
Spring 1996	San Francisco, CA

Nine new members were approved at the meeting, bringing the total Committee membership to 167 of whom 15 are classified Emeritus.

Transformer Standards and Coordination Activities

A status report of all transformer standards or projects sorted by responsible subcommittee was provided to the membership.

1.0 CHAIRMAN'S REMARKS AND ANNOUNCEMENTS - J. D. BORST (Cont'd)

Technical Papers

1993 Winter Power Meeting - Columbus - January 31-February 4, 1993. Six papers were presented at the meeting. One additional paper was presented at the Transformers Committee meeting in Portland (March 1993).

1993 Summer Power Meeting - Vancouver - July 18-22, 1993. Eleven papers were submitted, of which five will be presented at one session at the Power Meeting, July 20, 1993.

John D. Borst
Chairman

1.3 IEEE PES General Membership Meeting

The general membership meeting was held Wednesday, July 21, at the 1993 SPM with President John Pope presiding.

1.3.1 Ted Hissey provided an overview of the PES restructuring mentioned above (see 1.2.3). The Executive Board is renamed the Governing Board and an Executive Committee is established. PES officer terms are changed from one year to two years.

1.3.2 The 1997 SPM in Berlin was discussed.

1.3.3 The PES financial position was discussed; net worth is strong ($4.4M). The T&D Conference is a major source of funds. A detailed report to the membership was promised.

1.4 US National Committee of IEC

A briefing on IEC was provided by US National Committee (USNC) Chairman Ron Reimer on Wednesday, July 21, at the 1993 SPM.

1.4.1 IEC is highly structures; all input must flow through a national committee such as USNC.

1.4.2 USNC is an ANSI Committee; ANSI pays the IEC dues.

1.4.3 CENELEC has close cooperative agreements with IEC; 90% of CENELEC standards are IEC based.

1.4.4 An "in some countries" clause may be used to include specific national practices in IEC standards.

1.0 CHAIRMAN'S REMARKS AND ANNOUNCEMENTS - J. D. BORST (Cont'd)

1.4.5 Lively discussion on IEEE/PES role took place; this will continue to evolve slowly.

John D. Borst
Chairman

2.0 APPROVAL OF MINUTES OF NOVEMBER 3, 1993 - J. D. BORST

The minutes of the Portland meeting were approved as published.

3.0 VICE CHAIRMAN'S REPORT - J. H. HARLOW

IEEE PES TRANSFORMERS COMMITTEE
VICE CHAIRMAN'S REPORT
NOVEMBER 1, 1993

3.1 Reports of PES Committees to which the Vice Chairman serves as liaison. All meetings held in conjunction with 1993 Summer Power Meeting, Vancouver, B.C., July 19-20, 1993.

3.1.1 Publications Committee

3.1.1.1 1994 WPM Paper Quota. All Technical Committees are subject to the same 44% acceptance limit on papers submitted for the 1994 SPM. The Transformers Committee received 16 papers for review of which 7 will be presented at the WPM.

One additional paper, prepared by the Task Force on High Temperature Insulation in Liquid-Filled Power Transformers, is not subject to the quota and will be presented.

3.1.1.2 Effective with papers submitted for 1994 SPM, the "free" page limit for a Transactions Paper is reduced from 7 to 6 pages. Pages in excess of 6 will be charged to the author at a rate to be determined (discussion ranged from $110 to $200 per extra page).

3.1.1.3 The Technical Paper review form is being revised. The form allows for 3 grades only:

Accept
Accept with Mandatory Changes
Reject

A "Reject" allows for one resubmittal for a later conference.

3.1.1.4 In concert with the free page limit reduction from 7 to 6 sheets per Transaction Paper is the increase in total pages to be published from 4,500 to 5,000, effective in 1994. These two actions are designed to hold the paper submission acceptance rate at 40% to 50%.

3.1.2 Technical Sessions Improvement Committee

3.1.2.1 An effort to send an anonymous critique of a presentation at the SPM met with mixed success. Reviews from the Transformers Committee session were not returned to the presenters due to lack of anonymity.

3.1.2.2 A new rule will be published regarding use of company logo on slides. It will require that the logo be displayed on no more than the first slide shown.

3.0 VICE CHAIRMAN'S REPORT Cont'd)

3.1.2.3 A mechanism is being established whereby papers submitted from IEEE Regions 8, 9 and 10 (Europe, South America, SE Asia) will be subject to an English language review.

3.1.3 Organization and Procedures Committee

3.1.3.1 ED & PGC has established a "Transnational Practices" Subcommittee. The question is posed to all other Technical Committees--is this needed by other TC's?

3.2 Matters Concerning T&D Conference, April 10-15, 1994.

3.2.1 The conference will accept Transaction Papers and Conference Papers. An author much declare at time of submittal for Transactions or Conference status. If rejected for Transactions, the paper may not be degraded to "Conference."

3.2.2 There will be preprints of only Transactions papers. All papers, Transactions and Conference, will be printed in a Conference record, the price for which is included in the registration charge. An attempt will be made to send this record to all pre-registrants in advance of the meeting.

3.2.3 The Transformers Committee has committed to sponsor three panel sessions at the T&D Conference:

1. Ferroresonance
   Coordinator: M. P. Sampat
2. Underground Transformers and Network Protection
   Coordinator: P. E. Orehek
3. Transformer Tapchanging Under Load
   Coordinator: T. P. Traub

3.3 Future Meetings Schedule

March 20-23, 1994	Dallas, TX	Ken Hanus
September 24-28, 1994	Milwaukee, WI	Sam Mehta
April 23-26, 1995	Kansas City, MO	Henry Windisch
November 5-9, 1995	Boston, MA	Ken Skinger
Spring 1996	San Francisco, CA	Dan delaCruz

Respectfully submitted,
J. H. Harlow, Vice Chairman

4.0 ADMINISTRATIVE SUBCOMMITTEE - J. D. BORST

IEEE/PES TRANSFORMERS COMMITTEE
ADMINISTRATIVE SUBCOMMITTEE MEETING MINUTES

NOVEMBER 1, 1993
ST. PETERSBURG, FL

4.1 Introduction of Members and Guests

Chairman Borst called the meeting to order at 7:00 p.m. in the Tarpon Key Room of the Tradewinds Hotel.

The following members of the subcommittee were present:

W. B. Binder, Jr.	J. D. Borst	J. N. Davis
J. H. Harlow	J. W. Matthews	B. K. Patel
W. Patterson	H. A. Pearce	L. W. Pierce
J. Puri	P. E. Orehek	J. E. Smith
J. B. Templeton	A. M. Teplitzky	J. C. Thompson
G. H. Vaillancourt	R. A. Veitch	L. B. Wagenaar

In January 1994, the incoming officers will be as follows:

J. H. Harlow, Chairman W. B. Binder, Vice Chairman

J. W. Matthews, Secretary

J. E. Smith will succeed Mr. Davis.
B. K. Patel will succeed Mr. Matthews.
J. Puri will succeed Mr. Teplitzky.
L. W. Pierce will succeed Mr. Douglas.
David Brucker, incoming chairman of the West Coast Subcommittee, was not present.

Mr. Henry Pearce announced that this was his last meeting and that Frank Grysziewicz will succeed him.

Guests present were as follows:

Ken Hanus - Dallas host
Henry Windisch - Kansas City host
Luigi Napoli - IEEE Standards Board Staff

4.2 Approval of the Portland Meeting Minutes

There were no additions or corrections to the minutes. They were approved as published.

4.0 ADMINISTRATIVE SUBCOMMITTEE (Cont'd)

4.3 Additions to and/or Approval of the Agenda

There were no changes to the published agenda.

4.4 Committee Finances and Meeting Arrangements

St. Petersburg Host - J. H. Harlow announced that 276 members and guests were registered as of Monday. There were also 97 spouses registered.

Dallas Meeting - Mr. Hanus reported that the meeting will be held at the Grand Kempinski Hotel. Room rates are from $100-$110.

Kansas City Meeting - Mr. Windisch reported the meeting will be held at the Hyatt Regency Crown Center. Rooms will be $90 for single or double occupancy, $100 triple and quadruple occupancy. The meeting dates are April 23-26, 1995.

The next fall meeting will be held in Milwaukee in late September.
Pfister Hotel - $85

4.5 Standards Subcommittee - G. H. Vaillancourt

Standards Status - Mr. Vaillancourt reviewed the attachments to his report which have been changed from the last report. A separate page or pages will be incorporated into the Main Committee minutes after each subcommittee report showing the current status of each subcommittee's assignments. These pages are currently Attachment 1 of the Standards Report. This report also now incorporates the coordination responsibilities of each subcommittee and a listing for each standard of the entities requesting coordination. Attachment 2 is a list of all standards for which the Committee is responsible, sorted by standard number. This attachment will continue to be included as an appendix to the Transformers Committee minutes. Attachment 3 lists coordination activities; Attachment 4 is a list of acronyms for coordination activities.

Mr. Vaillancourt reviewed the status of C57.12.90 and C57.12.00. Both standards have been approved as ANSI standards and are published.

Mr. Vaillancourt then covered the balance of his report, including the events at the PES Standards Coordinating Committee meeting at the SPM, and NESCOM and REVCOM activity since our March meeting. The complete text of Mr. Vaillancourt's report is included as part of the Committee minutes.

Mr. Vaillancourt reminded Subcommittee chairmen that PARs should be submitted to him two months prior to the Standards Board Agenda deadline. Reaffirmations and life extensions may be sent directly to Mrs. Linda Gargiulo of the Standards Board staff.

A discussion by the members of the Adsubcom was conducted on the lack of a memorandum of understanding between NEMA, ANSI, and IEEE regarding C57 standards. Luigi Napoli clarified the meaning of motions which Mr. Vaillancourt excerpted from the minutes of the IEEE Standards Board in his report. One motion of particular concern to this committee is one which proposed dropping the C57 designation

from transformer standards to bypass this perceived roadblock by ANSI or the co-secretariat. A motion was made that the Transformers Committee is in favor, if at all possible, of retaining the C57 numbering system on transformer standards because of the constituent recognition of the numbered series. The motion carried with no dissenting votes.

The secretariat claims control of the C57.12.2x and C57.12.4x copyrights. It will grant licenses, but IEEE won't publish under a license. The C57 Executive committee met Monday but made no progress in resolving the copyright issues.

Mr. Vaillancourt also reported on a Standards Process Automation System (SPA). The goal of the system is to serve as a communication tool by providing up-to-the minute status of changes to a standard project. Mr. Vaillancourt proposed that two working groups be set up in the Standards Subcommittee (W.G. on Continuous Revision of C57.12.00 and W.G. on Continuous Revision of C57.12.90) to coordinate the revision of these documents. The work will be split up into the subcommittees where the expertise lies. The consensus of the Adsubcom was to proceed.

Mr. Vaillancourt reviewed the history of our review and coordination on IEEE 62. Mr. Veitch has agreed to be liaison to PSIM with the W.G. on Revision of IEEE 62.

4.6 Status of IEEE Standards - L. Napoli

Mr. Napoli had nothing more to report beyond what had been discussed during Mr. Vaillancourt's report.

4.7 Status of ANSI C57 Committee - L. Savio

Mr. Savio was not present. There will be a meeting of the C57 Committee on Wednesday afternoon.

4.8 Review of the PES Awards Committee - R. A. Veitch

Mr. Veitch announced seven members who will receive recognition awards at the Wednesday meeting of the Committee. They are:

Don Cash	Bipin Patel
John Davis	Lou Tauber
Dave Douglas	Allan Teplitzky
John Matthews	

In addition, three have been identified and will receive their awards at the next meeting. They are Henry Pearce, Heinz Fisher, and Mike Altman.

Mr. Veitch's full report will be part of the Transformers Committee minutes.

4.0 ADMINISTRATIVE SUBCOMMITTEE (Cont'd)

4.9 Review of Technical Council Activities - J. D. Borst

Mr. Borst presented his report on the IEEE/PES Executive Board meeting and the SPM meeting of Technical Council and a "report to IEEE/PES Technical Council" which he presented at the meeting of the Technical Council. Both of these reports were previously mailed to the members of the Administrative Subcommittee and will be incorporated into the Transformers Committee minutes.

Mr. Borst reported on attending the CIRED meeting. No additional involvement is warranted.

The Summer Power meeting in 1997 will be held in Berlin.

Mr. Borst's report contains an implementation plan for the Standards Vision for the Future.

4.10 Subcommittees' Activities Discussion - Subcommittee Chairmen

a) Audible Sound and Vibration - A. M. Teplitzky reported that three projects are under way.

b) Bushing - L. B. Wagenaar reported that the Bushing Application Guide will ballot the Transformers Committee before the next meeting. Prit Singh is an informal liaison to SC36 on Bushings. The Subcommittee would like to formalize this liaison. He also distributed copies of a letter to members of the Bushing Subcommittee on the subject of Loadability of Draw-Lead Bushings.

c) Dielectric Tests - J. B. Templeton reported that the Task Force on Revision of the Impulse Test Guide will disband and Russ Minkwitz, the chairman, has resigned following approval of C57.98.

d) Distribution Transformers - J. C. Thompson reported that seven working groups are meeting in St. Petersburg. His full report is incorporated below:

Distribution Transformers Subcommittee Report
November 1, 1993

The fall meeting of the Distribution Transformer Subcommittee will have seven of its Working Groups meeting. Those scheduled to meet are as follows:

C57.12.20 - Overhead Type Transformers
C57.12.21 - Single Phase Live Front Padmounted Transformers
C57.12.22 - Three Phase Live Front Padmounted Transformers
C57.12.25 - Single Phase Dead Front Padmounted Transformers
C57.12.26 - Three Phase Dead Front Padmounted Transformers
Bar Coding for Distribution Transformers
Electronic Reporting of Transformer Test Data (New)

4.0 ADMINISTRATIVE SUBCOMMITTEE (Cont'd)

The joint Working Group C57/C37 on Enclosure Integrity, which our subcommittee has a participating relationship, will meet in conjunction with IEEE Transformers this fall. This team meets three times a year. Their other two meetings are at various geographic locations as a function of data input requirements.

C57.12.20, having successfully balloted at the Working Group level, is being balloted in concurrence at EEI/T&D, Distribution Subcommittee, and NEMA. C57.12.21 is being prepared for IEEE Main Committee ballot by Luigi Napoli of IEEE. C57.12.22 has successfully balloted C57 Main and the IEEE Main Committee. Both C57.12.23 and C57.12.26 have been approved by the Standards Board and are in the process of being re-balloted by C57 Main via its NEMA Secretariat.

Work will continue at this meeting to combine the two, three-phase padmounted transformer documents into one standard. Work will begin on the same type of combining process for the single phase padmounted transformer documents. The Bar Coding Standard is nearing completion and continues to enjoy active participation from our IEEE members.

Our newest Working Group, under the leadership of Dave Lyon of Wisconsin Electric Power, will continue their work towards a standard on the electronic transmittal of transformer test data at the St. Petersburg meeting.

Members of the former ANSI Transformers Committee continue to prosper from being part of IEEE Transformers and particularly appreciate the work on our behalf over the summer months to resolve publishing conflicts with our former Secretariat, NEMA.

Jerry C. Thompson, Chairman
IEEE Transformers Subcommittee

e) Dry-Type Transformers - W. Patterson reported that IEEE 259 was never submitted to the Standards Board. He also reported continuing problems in obtaining copies of CENELEC standards.

f) HVDC Converter Transformers & Reactors - W. N. Kennedy was not present and there was no report.

g) Instrument Transformers - J. N. Davis' report relates to two projects under way. This report is incorporated below.

Transformers Subcommittee
IEEE/PES
Instrument Transformers Subcommittee

The standard, C57.13, Requirements for Instrument Transformers, has been approved by IEEE and ANSI. The IEEE editor preparing the draft for publication has informed us that the copy should be ready for review during the week of November 1, 1993.

The guide, C57.13.4, Detection of Partial Discharges and the Measurement of Apparent Charge Within Instrument Transformers (Project P832/D6), will be submitted to the IEEE Standards Board at their next meeting.

Two questions on interpretation of Par. 6.3.2 in C57.13 were answered since the 1993 spring meeting.

Respectfully submitted,
John N. Davis

h) Insulating Fluids - H. A. Pearce had nothing to report.

i) Insulation Life - Mr. Pierce distributed a report on four Working Groups and two Task Forces. He also indicated that Mike Franchek will replace Heinz Fischer as Chairman of the W.G. on High Temperature Insulation. His report is incorporated below.

IEEE/PES TRANSFORMERS COMMITTEE
ADMINISTRATIVE SUBCOMMITTEE MEETING

St. Petersburg Beach - November 1, 1993

INSULATION LIFE SUBCOMMITTEE ACTIVITIES

Subcommittee - Membership 74 Chairman: L. W. Pierce

Attendance and W.G. ballot returns will be reviewed by the Chairman after the meeting to purge the membership list of inactive members.

W.G. Guide for Loading Mineral Oil Immersed Transformers

Membership - 66 Chairman: L. W. Pierce

Balloting of SC and WG of Draft 11 of Loading Guide completed October 16, 1993. Ballot met required 75% return. Comments on four negative ballots and other comments incorporated into draft 11.1 for review at the November 1 meeting. Letters sent to those voting approved stating that if they wish to change vote to negative as a result of the changes in

4.0 ADMINISTRATIVE SUBCOMMITTEE (Cont'd)

Draft 11.1, they are to return form by November 12. WG expects to resolve negative ballots and begin balloting Transformers Committee November/December 1993.

W. G. on Thermal Tests

Membership - Chairman: R. L. Grubb
Secretary: D. J. Fallon

The ballot on Draft 13 of P838/ANSI PC57.119, Recommended Procedures for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Ratings, has been delayed to incorporate experience from recent testing. Changes to be reviewed at the meeting.

T.F. on Thermal Duplicate

Membership - Chairman: R. L. Grubb

Ballot on PC57.12.00L has been delayed due to the difficulty in finding a volunteer to chair the T.F. Will discuss at W.G. meeting.

W.G. on Thermal Evaluation of Liquid Immersed Distribution and Power Transformers

Membership - Chairman: L. A. Lowdermilk

Project No. PC57.12.00.100-199X, Standard Test Procedure for Thermal Evaluation of Liquid-Immersed Distribution and Power Transformers, Draft 3, June 30, 1993, Balloted in W.G. and Insulation Life Subcommittee. Ballot results to be reviewed at meeting.

W.G. on High Temperature Insulation

Membership - 39 Chairman: H. Fischer
Secretary: W. McNutt

The W.G. paper "Background Information on High Temperature Insulation for Liquid-Immersed Power Transformers for Liquid-Immersed Power Transformers" was accepted by IEEE for presentation at the 1994 Winter Meeting in New York.

P1266, Guide for the Application of High Temperature Insulation Materials in Liquid-Immersed Power Transformers, Draft 1, Rev. 2, October 7, 1993, will be reviewed at the W.G. meeting on November 1.

Heinz Fischer has resigned as chairman. A new chairman must be appointed.

T.F. on Loss of Insulation Life Due to Dielectric Stress

Membership - Chairman: M. Mitelman

This T.F. will have its first meeting on November 1.

L. W. Pierce
10/26/93

j) Performance Characteristics - J. W. Matthews reported on progress on the LTC Performance Requirements (C57.131). He also indicated that the Failure Analysis Working Group will disband. His report is incorporated below.

Administrative Subcommittee Meeting - 11/1/93
Performance Characteristics Subcommittee Activities

Working Groups:

- LTC Performance Requirements

Since the last meeting, a ballot was sent to the Working Group on Dielectric Tests on the dielectric tests portion of C57.131. A number of negative ballots and other significant comments were received. A Joint Task Force has been formed to resolve these problems.

- Failure Analysis

Mike Altman has resigned as Chairman of this W.G. The Survey of GSU Transformer Failures is the only project being handled by the W.G. A new W.G. chairperson will not be appointed at this time, and the W.G. may be disbanded.

Projects:

- Project Authorization Requests for C57.12.00 and C57.12.90

Luigi Napoli has indicated that PARs should only be submitted for entire documents. This is a change from our present practice of requesting authorization for projects on individual items within these documents. How should we manage projects on individual items within the Committee? Should the PCS or the Standards Subcommittee submit PARs for these two documents?

John W. Matthews
PCS Chairman

4.0 ADMINISTRATIVE SUBCOMMITTEE (Cont'd)

k) Underground Transformers & Network Protectors - P. E. Orehek submitted a written report on four projects and reported that his subcommittee would sponsor a panel session at the T&D Conference in Chicago. His report is incorporated below.

IEEE/PES Transformers Committee
Administrative Subcommittee Report
St. Petersburg, FL
November 1, 1993

1) Membership - 18

2) Standards Activities

C57.12.24 - Three-Phase Underground-Type Transformers

The revised standard was balloted in the Transformers Committee, and two negative ballots were received. IEEE staff is in the process of recirculating a ballot for the revisions.

C57.12.40 - Secondary Network Liquid-Immersed Transformers

The revised standard was balloted in the Transformers Committee and has been sent to the IEEE Standards Board for approval.

C57.12.44 - Secondary Network Protectors

The proposed standard was balloted in the Transformers Committee and one negative ballot was received. The W.G. is in the process of trying to resolve the negative ballot and is awaiting coordination reply from the Switchgear Committee. Seventy-six percent of the ballots were returned, with 99% voting affirmative.

C57.12.57 - Three-Phase Dry-Type Network Transformers

Draft 6 is presently being balloted in the subcommittee.

3) IEEE T&D Conference & Exposition in Chicago - April 1994

The subcommittee will sponsor a panel session at the conference related to Maintenance, Reconditioning Practices, Reliability and Design of Network Transformers and Protectors.

Respectfully submitted,
Paul E. Orehek

l. West Coast - There was no report.

4.0 ADMINISTRATIVE SUBCOMMITTEE (Cont'd)

4.11 Vice Chairman's Report - J. H. Harlow

Mr. Harlow submitted his report on the activities of the Publications Committee, the Technical Sessions Improvement Committee, and the Organization and Procedures Committee. A copy of the report is included in the minutes of the Transformers Committee. He also requested that volunteers come forward to host the Fall 1996 and Spring 1997 meetings of the Committee.

Mr. Harlow reviewed changes proposed to the Transformers Committee Operations Manual. Adsubcom members reviewed the draft of the Transformers Committee Operations and Procedures Manual following the last meeting. A request was made to revise paragraph 4.5.1 to clarify that the primary reason for discontinuing working group membership will be failure to respond to ballots. Another request to add a new paragraph covering W.G. papers was tabled until the next revision. After other minor editorial corrections, Mr. Wagenaar moved to accept as revised, with Mr. Matthews seconding. The motion to adopt the revised Operations and Procedures Manual was approved unanimously. The final manual will be distributed with the minutes of the St. Petersburg meeting.

4.12 Secretary's Report - W. B. Binder, Jr.

Membership Review - the following changes to the membership have occurred:

The following changes in membership have occurred:

Resigned:

D. L. Basel
H. C. Fischer
R. H. Hollister
D. A. Peters
L. R. Stensland (requested EM status which was granted)
J. G. Wood
W. E. Wrenn (requested EM status which was granted)

You have probably heard of the passing of Dr. Peter Bellaschi.
Wolfgang Lampe also recently passed away.

Prior to the addition of new members at the Adsubcom meeting, the membership stood at 146 voting members and 15 emeritus members. Membership is well balanced with 58 producers, 53 users, and 35 general interest members. The invitation list consists of 444 names.

4.0 ADMINISTRATIVE SUBCOMMITTEE (Cont'd)

New Membership Application Approval:

The Adsubcom reviewed the following new applications for membership:

Donald Chu, Consolidated Edison Co., New York, NY - user
Larry Dix, P.T. Corp, Warren, OH - producer
Pierre Fegali, NAT, Milpitas, CA - producer
Wayne Hansen, Doble Engineering, Watertown, MA - general int.
Klaus Papp, Trench Electric, Linz, Austria - producer
Jeewan Puri, Square D, Monroe, NC - producer
Jim Smith, ABB, Pinetops, NC - producer
J. E. (Ed) Smith, Central Moloney, Pine Bluff, AR - producer
Henry Windisch, Black & Veatch, Kansas City, MO - general int.

Following these additions, membership stands at 155, with 64 producers, 54 users and 37 general interest.

Inactive Members:

Members of the Subcommittee are asked to review the membership list to remove inactive names. Fifteen members have not been listed on the attendance roster for three consecutive meetings. Each was sent a letter reminding them of their obligation to attend meetings and requesting an explanation of extenuating circumstances. Two resigned from the Committee, and one requested emeritus status.

Based on their responses, the remaining members are contributing at the Working Group and Subcommittee levels. Adsubcom members should explain the membership requirements, being sure to include these important points:

1. Members' continuing obligation to respond to ballots
2. Members' obligation to attend Main Committee meetings and the fact that attendance is measured by signing the roster on Wednesday morning
3. Members' willingness to review technical papers

The voting records of these members and others (failures to respond to Main Committee ballots) for 1993 were also supplied by the Standards Department Staff. Six ballots were reviewed. Two members failed to respond to all six; six members failed to respond to five ballots; seven members failed to respond to four ballots; and ten members failed to respond to three of the six ballots. The Secretary was directed to write letters to non-responders reminding them of their obligation to respond to ballots.

4.0 ADMINISTRATIVE SUBCOMMITTEE (Cont'd)

Membership Roster

The galley proofs for the PES Directory were reviewed, updated and forwarded to Ms. Nancy Heitmann, Manager of PES Special Services on October 8, 1993. Thank you to all Subcommittee and Working Group chairmen who responded to my request for updates.

Meeting Minutes

Minutes of the Portland meeting were reproduced at a cost of $4.44 per set. This is an increase more in line with available rates compared with the $2.50 per set for the Cleveland minutes. Postage costs are in addition to reproduction costs. A copy of the minutes was mailed to every voting member and emeritus member and to all non-members who registered (and paid for minutes) for the Portland meeting. This was a total of 275 copies, an increase of 40 copies over the Cleveland minutes. With this volume, the $10 registration fee increase for minutes is still appropriate.

Each member of Adsubcom should submit their minutes within 60 days (no later than January 15, 1994) as a text file or as a WordPerfect 5.1 format file on a 3-1/2" diskette as they did for the Cleveland and Portland meetings. It was proposed at the last meeting that the minutes for each subcommittee follow the numbering format of the Chairman's Agenda. A request was made to facilitate searching the minutes by keeping the order of the report the same from one set of minutes to the next. The Chairman agreed to continue this practice. These practices have greatly facilitated assembling the minutes. It is proposed to continue these practices for the St. Petersburg meeting. Anyone desiring a WordPerfect 5.1 format file or an ASCII format text file of the complete minutes should contact the Committee Secretary.

Other Miscellaneous

David Train, Chairman of the PSIM Committee of PES, contacted the secretaries of the technical committees of the IEEE/PES at the direction of the Organization and Procedures Committee to inform us that if we desired formal coordination on revision of IEEE 62, we should so inform the standards department. This was completed August 25, 1993, when George Vaillancourt was designated the party to received correspondence on the project. During the Adsubcom meeting, Mr. Veitch was designated liaison.

4.13 Adjourn

There being no further business, Mr. Borst adjourned the meeting at 10:29 p.m.

Respectfully submitted,
Wallace B. Binder, Jr., Secretary
IEEE/PES Transformers Committee

5.0 TRANSFORMER STANDARDS - G. H. VAILLANCOURT

5.1 Transformers Standards and Coordination Activities

The status of all transformer standards or projects sorted by responsible subcommittees is reported in Attachment 1. A box format is used in the report to make it clearer. For an existing standard, the field labeled REV_DUE_YEAR should be checked to verify that the revision work will be completed on time, otherwise an extension will have to be requested from the IEEE Standards Department to allow sufficient time to complete the project. A digit 0 in this field indicates a new standard. The working group chair phone number is listed in the field labeled WG_PHONE. The sheets in Attachment 1 are separated according to the subcommittee name. These sheets should be placed at the end of the corresponding subcommittee report section and published with it in the Transformers Committee minutes. C57 standards that are not under the responsibility of the Transformers Committee, or have not been yet assigned to a subcommittee, are listed under the Standards Subcommittee. The chairman of each subcommittee is responsible for checking that the information in his part of this attachment is correct. If he finds incorrect information, he should notify the Standards Subcommittee Chairman as soon as possible and before the final version of the attachment is handed over to the IEEE Transformers Committee Secretary for publication in the minutes. This usually occurs one to two months after the meeting. Also listed now in Attachment 1 is the coordination activity with other PES committees. That information was listed in Attachment 4 in previous reports.

Attachment 2 contains roughly the same information as in Attachment 1, except for the working group chairman phone number that is missing. In it, the standards are listed in numerical order instead of being grouped according to the subcommittee names. Subprojects under way on standards C57.12.00 and C57.12.90 are therefore automatically placed in adjacent positions in this attachment so no separate listings are needed for these projects. After publication of the 1993 revisions of those two documents by the Standards Department, only the projects that are still active will continue to be listed in this attachment.

Attachment 3 is a report on coordination activity for documents that are sponsored by other PES committees and for which the Transformers Committee has in the past requested coordination. That listing is sorted by committee names.

One of the most frequent causes of delay for getting a new standard approved by REVCOM is coordination that was not properly done. In order to help improve this situation, the acronyms of the bodies that have requested coordination are listed in attachments 1 and 2, and an index of these acronyms along with the name of the contact for each committee or society can be found in attachment 4. By calling these persons it should be possible to find out who, in each committee, has been appointed to look after coordination for each individual standard sponsored by the Transformers Committee. The original information on who requested coordination is normally listed in the approved PAR which is on file at the IEEE Standards Department with copy in the Transformers Committee standards coordinator files.

5.0 TRANSFORMER STANDARDS (Cont'd)

5.2 Status of C57.12.00 and C57.12.90

C57.12.00	Approved by C57 Committee August 4, 1993; published in August 1993.
C57.12.90	Approved by ANSI on August 19, 1993; due to be published on October 30, 1993.

5.3 Documents Submitted to the Standards Board

5.3.1 NESCOM 06/16/93 (PAR's)

None

5.3.2 REVCOM 06/16/93 (Standards)

C57.12.00	Revision approved
C57.12.56	Reaffirmed
C57.13	Revision approved

5.3.3 NESCOM 09/14/93 (PAR's)

C57.110	Approved ("Recommended Practice for Establishing Transformer Capability When Supplying Non-sinusoidal Load Currents")
C57.132	Approved ("Standard for the Electronic Reporting of Transformer Test Data")

5.3.4 REVCOM 12/01/93 (Standards)

C57.12.40	On the agenda
C57.98	On the agenda

5.4 Standards Due for Reaf., Revision, or Withdrawal Before December 1994

C57.12.01, C57.12.59, C57.96, C57.111, C57.116, C57.121

5.5 Next Standards Board Meetings

Deadline for Submittal	Meeting Date
October 22, 1993	December 2, 1993
February 4, 1994	March 17, 1994
May 6, 1994	June 14, 1994
August 12, 1994	September 22, 1994
November 4, 1994	December 13, 1994

5.0 TRANSFORMER STANDARDS (Cont'd)

5.6 Standards Board Meeting of September 15, 1993

Three motions of concern to the IEEE Transformers Committee were made at the last IEEE Standards Boards meeting on September 15, 1993. They appear below in an excerpt from the minutes of that meeting:

"4.1 C37/C57 Update

"4.1.1 Numbering

"Secretary Salem gave an update on the numbering problems with the C37 standards. He proposed that IEEE renumber revisions of existing documents by dropping the "C" (i.e., IEEE 37.20.1) and assign new IEEE numbers to all new projects.

"A motion was made that legal counsel write to ANSI Executive Standards Council, explaining that the IEEE is considering renumbering its switchgear and transformers standards, and asking for their insurance that, once renumbered, submittals of such standards, will be placed on the ANSI Board of Standards Review agenda, and not returned because they didn't come through the administrative co-secretariat for C37 & C57. The motion was approved. [ACTION ITEM - Salem]

"4.1.2 C37 Service Mark

"Secretary Salem reported that NEMA has applied for registration of the "C37" service mark on behalf of the ASC C37 committee, and that IEEE is in the process of objecting to the registration, IEEE has been advised by legal counsel that registration will be unsuccessful once opposition is expressed.

"4.1.3 C57 Copyright

"A motion was made that the IEEE Standards Board recommends that the Power Engineering Society withdraw from any agreements in which the maintenance and revision of specific standards have been transferred to IEEE Committees and IEEE has not been granted the right to publish those transferred standards, specifically C57.12.10/ .13/ .20/ .21/ .23/ .24/ .25/ .26/ .27/ .40/ .50/ .51/ .52/ .55 and .57. Withdrawal from such agreements is to be followed by Standards Board withdrawal of any existing PARs based on the noted standards within 6 months if acceptable copyright terms are not obtained. Further, no future work is to be accepted by the IEEE Committees without the transfer of the right to publish and appropriate copyright release letters and approval by the IEEE Standards Board. The motion was approved, with Ron Reimer and Richard Engelman abstaining. [ACTION ITEM - Napoli]"

5.0 TRANSFORMER STANDARDS (Cont'd)

COORDINATION OFFERS FROM OTHER PES COMMITTEES

Committee	Title
SPD	PC62.22 - Guide for Application of Metal-Oxide Surge Arresters for Alternating-Current Systems
Substations	New - Guide for Commissioning HVDC Converter Stations and Associated Transmission Systems

5.7 PES Standards Coordinating Committee Meeting

The Standards Coordinating Committee met, Monday, July 19, 1993 in Vancouver, Canada. The chairman Fred Kimsey reported that the implementation of internationalizing of IEEE standards is under way and will continue, and IEEE will provide financial and administrative support to several IEC technical committees and subcommittees. Mr. Marco Migliaro, the chairman of the Nominations and Appointments Committee for the IEEE Standards Board had sent him a letter soliciting nominations for membership on committees of the Standards Board (RevCom, NesCom, IntCom, NosCom). Mr. Migliaro was requesting that any suggestion should include the person's name, address, phone number, and a short bio. and be sent to him before September 1.

Later, Mr. Andy Salem of the IEEE Standards Department gave a presentation on a new development under way in Piscataway called the Standards Process Automation System (SPA), this is a new computer system that is intended to help the standards developers by providing a computer-platform-independent hypertext database along with a number of standards development tools to speed up the process of writing and maintaining standards.

If you have access to a computer that is connected to INTERNET, you can access the SPA system as a guest by entering the command Telnet stdsbbs.ieee.org, the numeric address is [140.98.1.11], and you can log on as "guest". A user manual is available on the system as file GUEST_0.TXT. It can be downloaded directly from the LOBBY directory where you are located when you first log in. If you are not hooked up to INTERNET but you have a MODEM, set the baud rate to 2400 bps and call (908) 981-0290. You should be in VT100 emulation mode and use even parity, 7 data bit, 1 stop bit (E71). For connection up to 14400bps (V.32bis) call (908) 981-0035.

Under old business, the matter of IEEE Standard 62 "Guide for Diagnostic Testing of Power Apparatus" was again discussed. Mr. David Train, the chairman of the Power Instrumentation and Measurement Committee who is responsible for revising that standard, was present. He argued that his committee should continue the work on the standard because they have already done a lot of work on it and he cited many other examples of standards that are currently being revised that do not necessarily match the scopes of the committees doing the work. He thinks that in a case where historically, a given committee has had the responsibility of a document, it should continue to be responsible for it even though part of it may fall outside of its scope. He acknowledged that most of the

comments that have been made in the reviews provided by the Transformers Committee were valid and his working group would incorporate them into the document in as much as possible. Although he objected to the style of one of the reviews, he recognized the expertise and the experience of its author in the field of transformers, and suggested him as possible liaison representative between PSIM and the Transformers Committee. The consensus amongst the other participants of the meeting, at the end of this discussion, was that PSIM should be allowed to continue writing the standard but it should seek to work more closely with the other PES committees.

Respectfully submitted by:
George H. Vaillancourt
Standards Subcommittee Chairman

6.0 RECOGNITION AND AWARDS - R. A. VEITCH

TRANSFORMERS COMMITTEE
RECOGNITION & AWARDS REPORT
November 3, 1993

6.1 Certificates of Appreciation

Certificates of Appreciation will be presented to the following individuals on November 3, 1993:

Don Cash	Former Chairman, Working Group on Failure Analysis
John Davis	Former Chairman, Instrument Transformer Subcommittee
Dave Douglas	Former Chairman, Insulation Life Subcommittee
John Matthews	Former Chairman, Performance Characteristics Subcommittee
Bippin Patel	Former Chairman, Working Group on Revision of C57-109
Lou Tauber	Former Chairman, West Coast Subcommittee
Allan Teplitzky	Former Chairman, Audible Sound & Vibration Subcommittee

6.2 Review of PES & Technical Committee Prize Paper and Working Group Award Criteria & Procedures

On April 19, 1993, John Hetrick, Chairman of the PES Awards Committee, wrote to each member of the committee to survey their thinking on methods to improve the inequities (perceived and real) in the committee prize award distribution. Attached to Mr. Hetrick's letter was a one-page "Review of Award Distribution Selection Criteria," comments by the PES Awards Chair and a ballot on "Award Criteria & Procedures."

This data was sent out to the Transformers Committee executives for their comment and recommendations. A major criticism was that the procedures define a very "formal and regimented" selection process. The ballot was completed and returned to Mr. Hetrick with our comments. Our comments were as follows:

PES Award Committee
Comments by the PES Awards Chair

The basis for this procedural review is the disparity between the various technical committees in the number of publications eligible for prize awards. Committee size, activity, and scope are factors that influence the number of eligible publications. Larger committees with many publications have unequal opportunities relative to the smaller committees to receive an award recognition for a publication.

The existing PES Prize Paper and Working Group Awards, based on one entry per committee, should probably remain the same since the effort in grading all entries by the peer committees would become unmanageable if the number of entries are increased.

6.0 RECOGNITION AND AWARDS (Cont'd)

The Technical Committee Prize Paper and Working Group Recognition Awards could be increased to provide recognition based on the number of eligible entries generated by each committee over the past three-year period. For example, each committee could select one paper award for every 40 papers published during the past three years. The existing rules limit each technical committee to one selection to Technical Committee Prize Paper and Working Group Recognition Awards.

In proposing changes to the existing award procedures, keep in mind who will be doing the additional grading and selection, if any, and how the process can be made more equitable.

J. A. Hetrick
April 19, 1993

Respectfully submitted
Robert A. Veitch
Chairman, Awards & Recognition

7.0 REPORT OF TECHNICAL SUBCOMMITTEES

The following reports are those of the Subcommittees of the Transformers Committee. In most cases they are the complete minutes of meetings held earlier and they are identified as minutes. Some are summary reports of the Subcommittee activities during the preceding week. Any discussion from the floor presented during the Subcommittee reports precedes the formal report.

Secretary's Note: Subcommittee reports have been edited to match the format of the remainder of the minutes. No changes have been made to the content of these reports except dropping the list of members' and guests' names in attendance where provided by the subcommittee. A summary of attendance is included.

Following each subcommittee report is a listing of the current status of each of the subcommittee's assigned standards, as described in G. H. Vaillancourt's report to the Administrative Subcommittee.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.1 AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE - A. M. Teplitzky

AUDIBLE SOUND SUB-COMMITTEE
NOVEMBER 2, 1993 MEETING MINUTES

The Audible Sound and Vibration Subcommittee met at 2:00 p.m. The progress of various projects was reviewed. Six guests and fourteen members were present.

After introduction of participants, the chairman of the subcommittee announced that due to other pressing priorities, he has resigned from the chairmanship of this subcommittee and the Jeewan Puri has been appointed the new chairman of the Subcommittee.

Mr. Subhas Tuli expressed his inability to chair the Task Force for Developing Standards for Making Transformer Noise Intensity Measurements.

Jeewan Puri will contact Mr. Mark Perkins of ABB Transformer plant in Muncie, IN, for consultations on this noise measurement procedures. Mr. Teplitzky indicated that he has had good experience with noise intensity measurements.

Mr. Jack McGill (Chairman, WG Transformer Siting Guide) opened the discussions toward defining the content of the Transformer Siting Guide.

After some discussion, it was agreed that:

1. The Guide should help the user as well as the manufacturer.

2. This document should provide the user guidelines for selecting the noise level of a transformer.

3. The methods for reducing the transformer noise levels should be included.

4. The document should describe the methods available for noise reductions and their costs.

5. Should give a methodology for calculating the noise level at a desired distance from the transformer.

6. List references for books, papers and other material on this subject.

7. The document should be approximately 15 pages long.

Mr. Jack McGill and Mr. Bob Degenef will prepare an outline of this document and send a copy to Jeewan Puri and to the members of this subcommittee.

On the subject of revising the standard transformer noise level table in NEMA TR 1, I reported that revision will have to be justified with new test data on modern transformers.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.1 AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE - A. M. Teplitzky

I will contact NEMA and ask them to:

1. Reaffirm the present transformer noise level tables with a note stating that this data is only for historical purposes and may not apply to modern transformers.

2. Give us permission to revise this noise level table with more modern information.

There being no further business, this meeting was adjourned at 3:15 p.m.

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 1
ATTACHMENT 1

SUBCOMMITTEE——— AUDIBLE SOUND & VIBRATION / CHAIRPERSON: JEEWAN PURI / PHONE: (704)282-7413 / FAX: (704)282-7425

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS COMMENTS
C57.112	GUIDE FOR THE CONTROL OF TRANSFORMER SOUND			NONE				NEW TASK FORCE TO START WORK
P523	SUBCOMMITTEE	PURI J.		- -	12-28-73	0	(704)282-7413	CHECK FILES FOR NEWER PAR
C57.12.90	TRANSFORMER SOUND POWER MEASUREMENT			EM	NEMA SUB			
PC57.12.90b	SUBCOMMITTEE	J. PURI		- -	03-01-86	1998	(704)282-7413	INCLUDED IN 1993 REVISION
C57.12.90	STANDARD ON SOUND INTENSITY MEASUREMENT							NEW TASK FORCE TO DRAFT STD
PC57.12.90x			TULI S.	- -	- -	0		ON MEASURING SOUND INTENSITY
NEW	TRANSFORMER SITING GUIDE							NEW GUIDE
NEW		McGILL J.		- -	- -	0	(414)475-3422	NEW WG FORMED

COORDINATION ACTIVITY OF AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*P656	STANDARD FOR THE MEASUREMENT OF AUDIBLE NOISE FROM OVERHEAD TRANSMISSION LINES					
03-08-91	T&D	JAMES R. STEWART	518-395-5025	ALAN M. TEPLITSKY	AUDIBLE SOUND AND VIBRATION	212-460-4859

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.2 BUSHINGS SUBCOMMITTEE - L. B. WAGENAAR

MINUTES OF MEETING BUSHING SUB-COMMITTEE
St. Petersburg Beach, Florida
November 2, 1993

Chairman L. B. Wagenaar opened the meeting at 2:00 PM and welcomed the attendees. The meeting was attended by fourteen members and four guests. After the introduction of members and guests, the subcommittee attended to the following:

7.2.1 Chairman's Remarks

Mr. Wagenaar made the following announcement after attending the Administrative Subcommittee meeting.

The 1994 meeting schedule will be as follows:

Dallas, TX	March 20-23
Milwaukee, WI	Sept. 24-28

The following Working Groups have been established in the Transformer Committee.

C57.12.00 - Main Standard
C57.12.90 - Test Code

There will be a four-year limit on the PAR and a one-year extension thereafter.

Transformer Committee is looking for meeting locations for 1996 and 1997.

New appointments have been made for the posts of Chairman, Vice Chairman, and the Secretary for the Transformer Committee for 1994/1995. Transformer Committee members are advised to attend every meeting. Ballots should be returned to meet the minimum requirement.

7.2.2 Approval of March 30, 1993 Minutes of Meeting held in Portland Oregon

The minutes were approved as written.

7.2.2.1 Working Group on Performance Characteristics and Dimensions for Outdoor Apparatus Bushings (PC57.19.01)

Chairman P. Singh reported that his working group met on November 1, 1993 with eight members and five guests present.

The following were discussed in his working group.

The working group spent much of their two-sessions time discussing the ways by which the number of standard bushings can be reduced. This discussion was prompted by the 1990 EEI survey and a proposal from Russ Nordman to reduce the number of standard ratings and add information on high voltage bushings.

The working group agreed to standardize on eight voltage ratings and 3 or 4 current ratings for each voltage class as follows:

kV	25	46	69	138	230	345	500	765
BIL	150	250	350	650	900	1300	1675	2050

. Transformers

26 to 69 kV : 400, 1200, 3000, 5000 Amps.
Above 69 kV : 800, 1200, 2500 Amps.

400 and 800 Amps. are draw-lead ratings

. Breakers

69 to 345 kV : 600, 2000, 3000 Amps.

The following specific creepage values were agreed.

mm/kV(L-G)	inch/kV(L-G)
28 *	1.10 *
35	1.38
44	1.73
54	2.13

* C57.19.01 covers this requirement.

In order to determine the acceptability of the above values, the working group agreed to a set of questions which Stan Osborn offered to circulate in Doble Engineering Annual Technical Questionnaire. In addition to the questions on voltage, current, and creepage, a question was included to see whether there is a requirement for transformer breaker interchangeable bushings.

Results from the questionnaire are expected before the 1994 spring meeting and would be very helpful to the working group in standardizing the ratings.

7.2.2.2 Working Group on Bushings for DC Applications (PC57.19.03)

Chairman Olof Heyman reported that his working group met on November 1, 1993 with seven members and six guests present. He was reported that:

The definitions for current and voltage ratings as proposed by Fred Elliott were accepted with minor modifications and will be included in the next draft. These definitions differentiate between bushings that operate under DC only and the those which experience both DC and AC voltages.

The equivalent AC current level during a thermal test (7.2.8) was discussed. It was proposed that the current should be calculated as:

$$I_{AC} = \frac{\sqrt{2}}{\sqrt{3}} \times I_{DC} \times 1.05$$

Where 1.05 is the correction factor for skin effect and is to be confirmed by Olof Heyman.

A proposal from P. Singh was accepted to change the service condition (4.1(3)) for immersion oil from 95 C temperature to 65 C rise above ambient. It was also agreed to change the thermal basis of rating (5.4.1(1)) for immersion oil from 55 C to 65 C rise with the lower end of the bushing completely immersed.

The need for standardized test voltages for each DC rating was discussed with no final resolution. Olof Heyman agreed to contact ABB Power Systems in Ludvika for their opinion and review their recommendations with Siemens. In the mean time, it was agreed to stay with the present recommendations to pick BIL and BSL from ANSI Standard C92.1.

For DC test level (7.2.5.1), it was agreed to include the equations as they appear in the DC converter transformer draft standard with a 1.15 multiplier shown separately.

In order to be in line with the DC converter transformer and the reactor standard, it was agreed to start the polarity reversal test (7.2.5.4) with a negative polarity and measure PD after each reversal.

Draft D8 will be prepared and balloted within the working group before the next meeting.

Working Group on Bushing Application Guide (PC57.19.100)

Chairman Fred Elliott reported that his working group met on November 2, 1993 with eleven members and eight guests present. He reported that:

Draft 9 was balloted within the bushing subcommittee with the following results.

Approved	21
Approved with comments	2
Not approved	1
Not voting	2
Total ballots	26

Two additional approved ballots were returned by liaison representatives.

The negative ballot from P. Singh on the definition of thermal time constant (4.2.2) was resolved by accepting his second proposal.

A proposal on performance testing (4.3.1) was accepted to change the temperature rise of the bus 3 feet from the bushing to be at least 30°C.

Since all the negatives comments were resolved without substantial changes, it was decided to ballot the draft within the transformer committee.

To start the work on topics for future business, the working group will require assistance from members with expertise in the areas of seismic and operation at temperatures below -30°C.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.2 BUSHINGS SUBCOMMITTEE (Cont'd)

Other Business

Two proposals on the subject of "CT length" were discussed but could not be resolved. Chairman Loren Wagenaar offered to combine the two proposals and ballot within the subcommittee.

On the subject of draw-lead rating, two responses were received but could not be discussed because of lack of time. Members were requested to submit written comments. This issue may be referred to the WG on Transformer Loading as draw-lead conductor design is the responsibility of the transformer designer.

Adjournment

The meeting was adjourned at 3:15 PM.

Minutes by:
Pritpal Singh, Secretary

SUBCOMMITTEE——— BUSHING / CHAIRPERSON: L. B. WAGENAAR / PHONE: (614)223-2259 / FAX: (614)223-2205

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS COMMENTS
C57.19.00	GENERAL REQUIREMENTS AND TEST PROCEDURES FOR OUTDOOR APPARATUS BUSHINGS (IEEE 21)			T&D	PSR	IC	SWGR	PUBLISHED 1992
PC57.19.00	SUBCOMMITTEE	WAGENAAR L. B.		07-23-76	04-01-79	1997	(614)223-2259	APPROVED BY ANSI 03/31/92
C57.19.01	STANDARD PERFORMANCE CHARACTERISTICS AND DIMENSIONS FOR OUTDOOR APPARATUS BUSHINGS (IEEE 24)			SPD	IAS	IC	SWGR	PUBLISHED 1992
PC57.19.01	REVISION TO C57.19.01	SINGH PRITPAL		08-05-83	11-01-89	1997	(901)696-5228	APPROVED BY ANSI 03/20/92
C57.19.03	STANDARD REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR BUSHINGS FOR DC APPLICATIONS			SPD	IC	SWGR		WORKING ON DRAFT
PC57.19.03	BUSHINGS FOR DC APPLICATION	HEYMAN OLOF		- -	11-09-89	0		SF6 BUSHINGS NOT INCLUDED
C57.19.100	GUIDE FOR APPLICATION OF APPARATUS BUSHINGS.			SWGR	SUB	PSR		RESOLVING BALLOT COMMENTS
P800	BUSHING APPLICATION GUIDE	ELLIOTT F. E.		- -	09-27-79	0	(503)230-3900	WORKING ON D09
C57.19.101	GUIDE FOR LOADING POWER APPARATUS BUSHINGS							APPROVED AS FULL-USE 06/17/92
P757	BUSHING APPLICATION GUIDE	ELLIOTT F. E.		10-20-88	- -	1997	(503)230-3900	ANSI APPROVED 7/93

COORDINATION ACTIVITY OF BUSHINGS SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*P957	GUIDE FOR CLEANING INSULATORS					
04-01-92	T&D	WILLIAM L. GIBSON	415-973-3747	L. B. WAGENAAR	BUSHINGS	614-223-2259
*PC37.04h	MECHANICAL LOADING REQUIREMENTS OF CIRCUIT BREAKER TERMINALS					
01-07-91	SWGR	GEORGE R. HANKS	615-751-4020	LOREN B. WAGENAAR	BUSHINGS	614-223-2259

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.3 DIELECTRIC TESTS - J. B. Templeton

DIELECTRIC TEST SUBCOMMITTEE
November 2, 1993, St. Petersburg, FL

The Subcommittee met at 10:55 A.M. on November 2, 1993 with 52 members and 46 guests present.

The minutes of the March 30, 1993 meeting in Portland, Oregon were approved as submitted.

7.3.1 Chairman's Comments

Four items from the ADCOM meeting were reviewed. First, the deadlines for submitting documents to the Standards Board for the next three Standards Board meetings are as follows: October 22, 1993, February 4, 1994, and May 6, 1994. Next, two new working groups were formed within the ADCOM; one to address C57.12.00 and the other to address C57.12.90. Thirdly, the Subcommittee was reminded of the minimum requirements for Main Committee members to retain active status:

1) Members' continuing obligations to respond to ballots

2) Members' obligation to attend Main Committee meetings and the fact that attendance is measured by signing the roster on Wednesday morning

3) Members' willingness to review technical papers

Lastly, the Subcommittee was solicited for volunteers to host the Fall 1996 and Spring 1997 Transformers Committee Meeting.

7.3.2 Working Group Reports

7.3.2.1 Working Group on Revision of Dielectric Tests - Bertrand Poulin, Chairman

The Working Group met at 4:15 P.M. on November 1, 1993 with 34 members and 26 guests present.

The minutes of the Portland, Oregon meeting were approved as submitted.

The Task Force reports were as follows:

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

The Task Force met at 9:30 A.M. on November 1, 1993 with 15 members and 16 guests present. The minutes of the Portland meeting were approved as submitted.

The revised C57.98 document has been submitted to the Standards Board for approval.

The ballot for revising C57.12.00 and C57.12.90 dealing with impulse testing of neutral terminals and buried windings was discussed. The ballot was successful with an 83.5% return rate and there were no negative votes but there were three submitted approved with comments. The comments were cleared through editorial changes.

This Task Force has completed the assignments outlined in the PAR and the Chairman requested that it be disbanded. Mr. Minkwitz also submitted his resignation as chairman.

The Subcommittee recognizes Mr. Minkwitz for his five years of work to complete the work in this Task Force.

7.3.2.1.2 Task Force on Metal Oxide Surge Arrester Coordination with Power Transformer Insulation - R. Degeneff, Chairman

The Task Force met at 10:55 A.M. on November 1, 1993 with 13 members and 22 guests present.

Dr. Preinger and Mr. Trummer presented an analysis of internal transient voltages for a 765 kV autotransformer using full waves with various tail times. The results of internal transient voltages were compared to internal responses when the transformer was protected with silicon and zinc oxide surge

arresters. The conclusion was that there was not an insulation coordination problem if the insulation structure was also designed to withstand standard switching surge waves.

Two questions will be addressed at the next meeting; the effect of long tail switching surges and the effect of oscillatory waves with magnitude under the surge arrester cut-off voltage.

Loren Wagenaar then presented measurements of transients occurring on a 765 kV transformer at the AEP Rockport Station. The measurements confirmed the existence of fast front switching surges.

Bob Degeneff presented an analytical technique used to reduce large lumped parameter transformer models which can then be used in EMTP. Loren Wagenaar and Bob will use this technique to study more cases for the next meeting.

7.3.2.1.3 Task Force on Revision of the Induced Test - M. Perkins, Chairman

The Task Force met at 8:00 A.M. on November 1, 1993 with 11 members and 22 guests present. The minutes of the Portland meeting were approved as submitted.

The Task Force discussed the IEC Standard for the induced test. The standard methods include two options: (1) 150% voltage for five minutes, a five second enhancement at 170% voltage, then a thirty minute test at 150% voltage. The guarantee value of partial discharge is 500 pC. (2) The next method uses 130% voltage for 30 minutes with a 300 pC guarantee.

The next area of discussion concerned measurement devices. There are several questions in this area; example, measuring each peak value versus averaging the peak values in a given time. It was agreed that a group of transformer manufacturers and test

equipment manufacturers will collectively submit a proposal to the Task Force.

It was also agreed that a group of Task Force members will submit a written document for ballot before the next meeting on a proposed revised induced test.

7.3.2.1.4 Old Business

At the Portland meeting Loren Wagenaar proposed that additional dielectric tests be included in the standards for EHV transformers. The recommendations were based on a paper co-authored by Loren dealing with this subject. Two of the tests are a fast front switching surge and special termination lightning impulse test. In addition, the following modifications were suggested:

1) Modifications to the induced tests. These are to be handled by the Task Force working on the induced test.

2) The switching surge test should be a routine test for 345 kV and above.

3) Impulse test voltage magnitude be increased if the waveform does not meet the minimum standard of a 1.5 x 40 microsecond wave.

The Working Group adjourned at 5:30 P.M.

7.3.2.3 Working Group on Revision of Dielectric Tests for Distribution Transformers - J. R. Rossetti, Chairman

The Working Group met at 1:30 P.M. on November 2 with 15 members and 9 guests present. The minutes of the Portland meeting were approved.

Don Ballard reported on the Task Force meeting that was held earlier at 8:00 A.M. on the Routine Impulse Test Guide for Distribution Transformers. Ralph Wakeam presented his test results on step voltage regulators with and without a staged single turn fault using a neutral impedance. Ralph's results showed that shorting the series winding inhibited detection of the single turn fault; a

440 ohm resistor connected across the series winding did not inhibit fault detection. This has application in testing step voltage regulators and autotransformers. Information on the need and value of the terminating resistor may be included in the guide.

Next, the Scope and Purpose of the Guide was read and no changes were recommended. The first five paragraphs of the "General Theory of Failure Detection in Distribution Transformer" were read. Considerable discussion was generated but no changes were made.

Terry Thorton noted that the Test Guide specifies that all current flowing through the transformer must flow through the fault detector shunt. This is only a requirement if an analogue fault detection method is used to sense a fault by an increase in current. It is not necessary and may not be desirable using a digital detection system which analyzes the waves for differences. The Working Group may consider amending the test code.

The writing members of the Task Force plan on having a draft of the Guide to send to the Task Force members by February. This will allow a discussion of the Guide at the spring meeting.

The IEEE Standards Department informed Don that the PAR we were working under had the same number as a PAR which is currently at Standards. This was causing confusion. Don sent a letter to the Standards Department requesting that the PAR be renumbered as C57.98A and the completion date be changed to 1995.

The Task Force then adjourned at 9:20 A.M.

The next item was the discussion of the Guide for Protection of Distribution Transformers. The Working Group recommended that an outline of the Guide be written in order to determine which parts of the Guide belong in the Transformers Committee and which parts should be addressed by the Surge Protective Devices Committee.

Mehesh Sampat presented the following as a suggested outline:

7.0 REPORT OF TECHNICAL SUBCOMMITTEESS (Cont'd)
7.3 DIELECTRIC TESTS SUBCOMMITTEE - (Cont'd)

Topic	Content
Overview	Limited to Lightning Related Surges. Dist. Class Ratings
Introduction	Type of Surges - Primary & Secondary Side (H-V & L-V).
High Side	Background - Lightning Types, Frequency
Protection	Type of Arresters. SIC vs Mov, Duty
Considerations	Various Methods of Protection. Lead Length Issue Best Practices. Overhead, Underground
Low Side	Background - EPRI Report, IEEE TF Paper
Protection	Surge Phenomenon - Causes in Both Overhead
Considerations	Underground Dist. Systems. Its effect on transformers and system. Various methods of protection: Secondary, arresters, Interlacing, Spark Gap, Improved Grounding Resistance, etc.
Informative	Identification of Transformer Failure Modes
Annex	Low Side Surge Testing

Mahesh will expand the portion of the outline covering the primary (high-voltage) side and John Rossetti will expand the secondary (low-voltage) side. This will be prepared in time for review by the Working Group at the Spring meeting. Al Maguire will then present the outline to the SPD Working Group involved with surge protection application at SPD's April meeting.

There being no new business the Working Group adjourned at 2:00 P.M.

7.3.2.3 Working Group on Partial Discharge Tests For Transformers - E. Howells, Chairman

The Working Group met at 1:20 P.M. Monday, November 1. There were 28 attendees, consisting of 12 members and 16 guests.

Following the usual introductions the minutes of the Portland meeting were accepted as written. A report was then presented on the work of "The Task Force on the Location of Partial Discharges in Transformers" which had met at 9:30 A.M. and 10:55 A.M. that morning. Thirty-nine people had attended those meetings - 10 members and 29 guests.

The majority of the time was then given over to the "Trial Use Guide". Given the extra time allowed, we were able to get through the complete document. Several changes were suggested. These were mainly editorial in nature, generally aimed at clarifying some of the educational/descriptive passages.

Given these changes the Task Force recommended that the Working Group consider accepting the document for a first ballot.

As the bulk of the work is now complete, the Task Force will now revert to requiring only one time slot in the future.

The next order of business (in the Working Group) was a discussion of the requirements for the proposed data base for known installations of PD monitoring systems. As a start, Jack Harley presented basic data on 24 full time monitoring systems currently operating in the field.

It was then decided that the data base should include such information as:

1) Type of acoustic sensors - either internal wave guides or externally mounted sensors.

2) Location of sensor locations (inside/outside) transformer.

3) Type of sensor used.

4) Geographical location of transformer being monitored.

5) Comments regarding any particular difficulties being encountered.

6) Any results. Particularly regarding success or lack of success in detecting PD activity.

An attempt will be made to gather together the type of data using Jack Harley's basic listing and any other monitoring systems which can be found.

Other than the full time monitoring systems, an interest was also shown in obtaining some information from the single channel acoustic detection systems now in use. Ed Howells pointed out that many of these were in use, but ascertaining the actual number would be difficult because at least six manufacturers had offered them for sale over a period of time. He would however, try to get some information together and present it at the next meeting so that the group could decide whether or not it was worth pursuing a data base on that technique.

The Working Group decided to ballot the Trial Use Guide produced by the Task Force. As it is to some extent editorial in nature, it was felt that the group's input would be worthwhile at this time. The ballot will be carried out before the Dallas meeting.

There being no further business the meeting was closed at 2:30 P.M.

7.3.3 New Business

7.3.3.1 Tom Traub reported that the Dielectric Tests for Load Tap Changer Task Force met on November 1.

The main purpose of the meeting was to review comments received from members of the Revision of Dielectric Tests Working Group on the dielectric test portion of the draft standard "Standard Requirements for Load Tap Changers". The ballots were received last May with 19 approvals, 5 approved with comments, and 5 not approved.

The main items discussed at the meeting are as follows:

- The term "Nominal Voltage Level of LTC" will be used instead of "Rated Insulation Level of LTC" as the main identifier of an LTC from the standpoint of dielectric capability.

- Chopped wave tests will not be included in LTC dielectric testing.

- Lightning impulse tests will consist of three positive and three negative polarity impulse voltages.

- Switching impulse tests, when applicable, will consist of three negative polarity voltage applications.

- The duration of the enhancement test level for the partial discharge test will be five seconds.

- Partial discharges during the half hour portion of the test (the extended period) will be required to be zero instead of 50 μV and the ambient level must be no more than 10 μV or 50 pC.

It was agreed that appropriate changes would be made and that the Dielectric Test Subcommittee would ballot the dielectric portion of the LTC document.

The meeting adjourned at 3:30 P.M.

7.3.3.2 Stan Osborne sent the attached letter to the Subcommittee Chairman concerning power factor tests as described in C57.12.90. It was agreed that this issue would be addressed by the new Working Group assigned to C57.12.90.

7.3.3.3 A question was raised during the meeting about the existence of standards dealing with tests of low voltage wiring and current transformer circuits on power transformers. There was not a definitive answer from the group so it was decided that the issue would be researched and reported upon at the next meeting.

The meeting adjourned at 11:40 A.M.

Respectfully Submitted,
James B. Templeton, Subcommittee Chairman

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 3
ATTACHMENT 1

SUBCOMMITTEE——— DIELECTRIC TESTS / CHAIRPERSON: J. B. TEMPLETON / PHONE: (317)289-1211 / FAX: (317)286-9352

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.113	GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN LIQUID-FILLED POWER TRANSFORMERS AND SHUNT REACTOR							PUBLISHED AS FULL-USE 1992
P545	P. D. TESTS FOR TRANSFORMERS	HOWELLS E.		12-05-91	09-25-91	1996	(414)835-1500	
C57.127	GUIDE FOR THE DETECTION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS			T&D	ED&PG CIGRE	IEC		REBALLOT MAIN COMMITTEE
PC57.127	P. D. TESTS FOR TRANSFORMERS	HOWELLS E.		- -	03-10-88	0	(414)835-1500	WAITING FOR BALLOT
C57.12.00	NEW SEC 6.8 MINIMUM EXTERNAL CLEARANCES BETWEEN LIVE PARTS							APPROVED BY SB 09/16/92
PC57.12.00j	NOT SPECIFIED	VEITCH R. A.		- -	12-28-86	1997	(416)685-6559	CONSOLIDATED IN 1993 REVISION
C57.12.90	ROUTINE IMPULSE TESTS FOR DISTRIBUTION TRANSFORMERS			RMC	PSC			
PC57.12.90c	REV. DIELECTRIC TESTS DIST TR	ROSSETTI J.	BALLARO D.	- -	09-10-87	1998	(901)528-4743	INCLUDED IN 1993 REVISION
C57.12.90	REVISION OF THE INDUCED TEST							DRAFT 1 BEING PREPARED
PC57.12.90d	REVISION OF DIELECTRIC TESTS	POULIN B.	M. PERKINS	- -	09-28-90	0	(408)957-8326	NEW WORKING GP TO WORK ON THIS
C57.21	REQUIREMENTS,TERMINOLOGY AND TEST CODE FOR SH. REACTORS OVER 500kVA			NONE				COMPLETE
PC57.21a	DIELC TESTS OF SHUNT REACTORS	KENNEDY W. N.		04-02-91	12-11-86	1995	(317)286-9387	ANSI APPROVED 08/09/91
C57.98	IEEE GUIDE FOR TRANSFORMER IMPULSE TESTS			NONE				REVISION APP. BY SB 12/02/93
PC57.98	REVISION OF DIELECTRIC TESTS	POULIN B.	R. E. MINKWITZ, SR.	06-01-86	02-01-86	1992	(408)957-8326	WAITING PUBLICATION
C57.98	GUIDE FOR PERFORMING ROUTINE LIGHTNING IMPULSE TESTS ON DISTRIBUTION TRANSFORMERS			T&D	PSIM PSC	ASC 62	EM	TARGET COMPLETION DATE 1995
PC57.98a	REV. DIELECTIC TESTS DIST TR	ROSSETTI J.	D. E. BALLARD	- -	04-30-91	0	(901)528-4743	SUPPLEMENT TO C57.98
IEEE1350	GUIDE FOR PROTECTION OF DISTRIBUTION TRANSFORMERS WITH EMPHASIS ON SECONDARY (LOW VOLTAGE SIDE) SURGES			SPD	T&D IC			PAR APPROVED BY SB 03/17/93
P1350	REV. DIELECTRIC TESTS DIST TR	ROSSETTI J.		- -	03-17-93	0	(901)528-4743	JOINT PROJECT WITH SPD
NEW	GUIDE FOR THE LOCATION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS							BALLOTTING WORKING GROUP
NO PAR YET	P. D. TESTS FOR TRANSFORMERS	HOWELLS E.		- -	- -	0	(414)835-1500	SUBMIT PAR AS SOON AS POSSIBLE

COORDINATION ACTIVITY OF DIELECTRIC TESTS SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*C37.112	GUIDE FOR PARTIAL DISCHARGE MEASUREMENTS IN POWER SWITCHGEAR					
10-22-91	SWGR	E. F. VEVERKA	414-835-1544	GEORGES VAILLANCOURT	DIELECTRIC TESTS	514-652-8515
*P1038	STANDARD TEST SPECIFICATION FOR SURGE PROTECTIVE DEVICES FOR LOW VOLTAGE AC POWER CIRCUITS					
12-03-90	SPD	LEWIS DOUGLAS SWEENEY	602-834-9372	MAHESH P. SAMPAT	DIELECTRIC TESTS	704-462-3226
*P1122	DIGITAL RECORDERS FOR MEASUREMENTS IN HIGH VOLTAGE IMPULSE TESTS					
08-05-92	PSIM	T. R. McCOMB	613-990-5826	R. MINKWITZ, SR.	DIELECTRIC TESTS	617-828-3241
*P1223	POWER SYSTEM DIGITAL TESTING TECHNIQUES					
- -	PSIM	T. R. McCOMB	613-990-5826	R. MINKWITZ, SR.	DIELECTRIC TESTS	617-828-3241
*PC37.107	STANDARD FOR DIGITAL PROTECTION SYSTEM DESIGN					
12-28-85	PSR	STIG L. NILSSON	415-855-2314	BERTRAND POULIN	DIELECTRIC TESTS	408-957-8326
*PC62.11	STANDARD FOR METAL-OXIDE SURGE ARRESTERS FOR AC POWER CIRCUITS					
- -	SPD	R. M. SIMPSON	919-836-7059	W. A. MAGUIRE	DIELECTRIC TESTS	501-377-4273
*PC62.42	GUIDE FOR THE APPLICATION OF LOW-VOLTAGE SURGE PROTECTIVE DEVICES					
01-21-91	SPD	MICHEAL M. FLACK	404-551-4904	MAHESH P. SAMPAT	DIELECTRIC TESTS	704-462-3226
*PC62.22	GUIDE FOR APPLICATION OF METAL OXIDE SURGE ARRESTERS FOR AC SYSTEMS					
08-16-93	SPD	J. J. WOODWORTH	716-375-7270	R. C. DEGENEFF	DIELECTRIC TESTS	518-276-6367

7.4 DISTRIBUTION TRANSFORMERS - J. C. Thompson

TRANSFORMER COMMITTEE
DISTRIBUTION TRANSFORMER SUBCOMMITTEE WG C57.12.2
MEETING MINUTES
St. Petersburg, Florida
November 2, 1993

7.4.1 Chairman's Remarks and Announcements

The meeting convened at 2:00 p.m. in the Sawgrass Room with the introduction of the members and guests and signing of the attendance roster.

Minutes of the last meeting in Portland, Oregon, were approved with no changes.

The chairman covered key points of the ADCOM meeting from the evening before. These key points were:

Attendance for this meeting was 276 registered with 97 spouses registered.

Future meeting dates:

March 20-23, 1994	Dallas
September 24-28, 1994	Milwaukee
Spring 1995	Kansas City
Fall 1995	Boston
Spring 1996	San Francisco

Hotel information for next meeting: Dallas, Grand Kempinski Hotel, rated $100/$110 single/double.

Also, it was mentioned the committee is looking for persons to host the meeting beyond the dates listed above.

The submission of PARS and approved documents to the standards board was reviewed. Approved standards should be submitted to the standards board by the submission date and can be sent directly to Luigi Napoli of IEEE staff. PARs need to be sent to George Vaillancourt first so he may route the proposed PARs for coordination among the other groups. George will then submit the PAR to IEEE for consideration by the standards board, therefore for George to get PARs to IEEE by the submission date, you must send them to George two months prior to the IEEE Standards Board submission date. Future IEEE Standards Board dates are:

Deadline for Submittal	Meeting Date
February 4, 1994	March 17, 1994
May 6, 1994	June 14, 1994
August 12, 1994	September 22, 1994
November 4, 1994	December 13, 1994

The status of C57.12.00 and C57.12.90 was discussed and both documents will be published in the next few months. IEEE has stated only one PAR will be approved for a particular standard by the Standards Board, therefore, the revision of these two documents will be coordinated by George Vaillancourt who will submit one PAR for each document. Internal PARs for the individual task forces within the subcommittee will be used to coordinate each task force's project. These internal PARs will then be combined into one for submission to IEEE.

7.4.2 Working Group on Revision of C57.12.20

The current document has a 1988 publication date. The current Draft 4 has passed EEI T&D and Distribution Transformer Subcommittee ballot with IEEE Transformers Committee and C57 Main concurrent ballot the next step. Voting results were: Subcommittee 26-0-8 (Yes-Negative-No Return) and EEI T&D 75-8 (Yes-Negative). The working group reviewed the comments from the eight EEI T&D negative ballots. The most important comment was from the deletion of a note in Table 2 which stated for 34.5 kV an alternate BIL is 125 kV. The working group decided to add a note to the table which would refer to the 34.5 kV rating and say "When specifying 125 kV BIL, adequate grounding and surge protection studies should be performed."

The working group chairman will work to resolve other negative ballots.

7.4.3 Working Group on Revision of C57.12.21

The current Draft 12 has been approved by the working group, EEI T&D and NEMA. The draft will now go to C57 Main and IEEE Transformers Committee for approval. Comments received from the ballots were discussed and will be considered in the next revision.

7.4.4 Working Group on Revision of C57.12.22

The current Draft 4 has been approved by the IEEE Transformers Committee and C57 Main. Two negative votes remain and will be resolved before the draft is submitted to the Standards Board.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.4 DISTRIBUTION TRANSFORMERS (Cont'd)

7.4.5 Working Group on Revision of C57.12.23

The current document has a 1986 publication date, and the current draft has passed all approvals and is awaiting publication. The publication is being held until copyright/ownership issues between NEMA and IEEE can be resolved.

7.4.6 Working Group on Revision of C57.12.25

The working group reviewed Draft 2, and the changes made from Draft 1. Discussion on air compartment dimensions was the major topic of the meeting. After much discussion, it was decided that a task force was needed to investigate appropriate dimensions. A task force headed up by Glenn Anderson is to be by next meeting research and report back to the working group on air compartment dimensions. Two other comments concerning threaded stud lengths on secondary terminals and limits on induced potential tests at BILs below 125 kV were discussed and given to the task force to resolve.

The group discussed and decided to publish .25 one more time before embarking on the task of combining .21 and .25.

7.4.7 Working Group on Revision of C576.12.26

The document was approved by the Standards Board in July and has passed all other approval bodies and is now awaiting publication pending the outcome of the copyright issues between NEMA and IEEE.

7.4.8 Working Group on Standard for Bar Coding

The working group reviewed the changes that were made in Draft 4. The working group is to be balloted before the next meeting.

7.4.9 Working Group on Coating Integrity

The working groups have met since the last meeting but the status of each document is as follows:

.28 (Padmounted Enclosures) The document is being revised by the working group with completion in 1994.

.29 (Padmount enclosures-coastal environments) The document was published in 1992.

.30 (Submersible Enclosures) The document is about to be balloted in the working group and the .30 number assigned to the document has been assigned to another document by ANSI, therefore, the submersible document will be assigned another number.

.31 (Pole Enclosures) The document is currently in Draft 3 with the document expected to be completed by the working group by the end of 1994.

7.4.10 Working Group on Electronic Data Transmittal

The PAR for the project was approved at the September Standards Board meeting. The group was given a presentation on EDI (electronic data interchange) by Frank Koper, a representative from the UIG (utility industry group) on the benefits of using EDI for the transmission medium for test data from the manufacturer to the user. The working group then discussed issues such as transmission medium, test and information parameters to be transmitted and the format of the information. To resolve these issues, a task force was formed. It will be chaired by Tom Diamantis with Angie McCain, Glenn Andersen, Richard Hollingsworth and Don Duckett as members. The task force is to look at four areas - distribution transformers, power transformers, transmission medium and data. They will survey users by the next meeting and also investigate a similar Canadian standard already in place. The task force will report back by the next meeting.

7.4.11 Working Group Assignments

Chairman Thompson started out discussing the fact that co-chairs have worked out well in the two working groups, combining live front and dead front transformers. He put to the group a proposal to have co-chairs for all active working groups with one chair a user and one a manufacturer. The proposal was accepted by the group. The assignments will be as follow:

.20	Glenn Andersen/Allen Wilks
.21	Ali Ghafourian
.22	Ken Hanus/Ron Stahara
.23	Dave Lyon/Bob Scheu
.25	John Lazar/Norvin Mohesky
.26	Gerry Paiva
EDT	Dave Lyon/David Rollins
Bar Coding	Ron Jordan/Ed Smith

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.4 DISTRIBUTION TRANSFORMERS (Cont'd)

Chairman Thompson announced to the group of a request to form a working group to develop a loss evaluation guideline as a result of legislation passed in 1992 which requires the DOE to respond regarding efficiency improvement of distribution equipment. It was announced that Don Duckett and Tom Pekarek will co-chair the working group. Drafts of the document will be passed on the DOE for information. This document will be a guide to the economic purchase of distribution transformers based on a user's financial statistics.

Chairman Thompson discussed the current situation with the publication of the documents prepared by the working groups transferred form under C57 Main Committee to IEEE Transformers Committee. The issue is the requirement of IEEE to have the copyright to the documents before publishing and the reluctance of NEMA to relinquish the copyrights. NEMA has offered to license the copyrights to IEEE, but IEEE has stated it is not their policy to operate under a license. The chairman and others will continue to resolve this issue so these documents can be published in a timely manner.

An alternative suggested by the chairman was for the working groups to take a dual role of working under IEEE Transformers for documents created under IEEE (Bar Coding, Electronic Data Transmittal & Loss Evaluation) and under the C57.12.2 subcommittee of C57 Main for documents originally under it (.20, .21, .22, .23, .25, & .26). The chairman will mail a mail ballot to the subcommittee to see if this alternative is acceptable to the group. This issue is being pushed because the IEEE Standards Board has voted that if copyrights are not obtained by March 1994, the Board will not accept any PARs or documents for approval.

No new business was brought to the attention of the group and the subcommittee adjourned at 3:30.

These minutes are from notes taken by Ken Hanus.

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 5

ATTACHMENT 1

SUBCOMMITTEE——— DISTRIBUTION TRANSFORMERS / CHAIRPERSON: J. C. THOMPSON / PHONE: (704)373-5139 / FAX: (704)382-2579

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.12.20	OVERHEAD-TYPE DISTRIBUTION TRANSFORMERS, 500 kVA AND SMALLER: H V 34500 VOLTS AND BELOW, L V 7970/13800Y & BELOW	T&D	IAS/REP SCC14					PAR APPROVED BY NESCOM
PC57.12.20	POLE MOUNTED DISTRIBUTION TR THOMPSON J. C.	01-11-88	12-05-91	1993	(704)373-5139			BALLOTING SUBCOMM.
C57.12.21	STANDARD REQUIREMENTS FOR PAD-MOUNTED, COMPARTMENTAL-TYPE, SELF-COOLED, SINGLE-PHASE DIST TRANSFORMERS WITH HV BUSHINGS	T&D	IAS/REP					BALLOTING MAIN COMMITTEE
PC57.12.21	3-PHASE PADMOUNT TR LIVE FRONT GHAFOURIAN A.	10-22-79	06-27-91	1985	(601)796-4255			COPYRIGHT NOT RELEASED
C57.12.22	PAD-MOUNTED,COMPARTMENTAL-TYPE SELF-COOLED,3-PHASE DIST. TR WITH HV BUSHINGS,2500kVA AND SMALLER:...REQUIREMENTS.	T&D	IAS/REP IAS/PSE					AWAITING ANSI APPROVAL
PC57.12.22	3 PHASE PADMOUNT TR LIVE FRONT HANUS K.	05-10-89	06-27-91	1994	(214)954-5930			COPYRIGHT NOT RELEASED
C57.12.23	UNDERGROUND-TYPE,SELF-COOLED, 1-PHASE DISTRIBUTION TR WITH SEPERABLE INSULATED HV CONNECT HV 24940GrdY..LV,240..;167kVA.	T&D	IC IAS/REP IAS/PSE					BALLOTING C57
PC57.12.23	1-PHASE SUBMERSIBLE TR PAIVA G.	09-19-85	06-27-91	1996	(818)302-8409			HELD FROM DIST. UNTIL BAL.C57
C57.12.25	REQUIREMENTS FOR PAD-MOUNTED COMP-TYPE,SELF-COOLED,1-PHASE DISTRIBUTION TR W/SEP INS HV CONN,HV 34500GrdY...167kVA...	T&D	IC IAS/REP IAS/PSE					WORKING ON DRAFT 1
PC57.12.25	1-PHASE PADMOUNT TR DEADFRONT MOHESKY N.	05-11-90	06-27-91	1995	(314)239-6783			COPYRIGHT NOT RELEASED
C57.12.26	PAD-MOUNTED COMPARTMENTAL-TYPE SELF-COOLED,3-PHASE DIST TR for USE W/ SEPERABLE INSULATED HV CONN.,HV 34500GrdY..2500kVA	T&D	IC IAS/REP IAS/PSE SCC14					REV. APP. BY ANSI 07/09/93
PC57.12.26	3-PHASE PADMOUNT TR DEADFRONT PAIVA G.	06-17-92	12-05-91	1997	(818)302-8409			HELD FROM DIST PENDING C57 APP
C57.12.28	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY							EXTENSION TO BE REQUESTED
PC57.12.28	JOINT WG ON CABINET INTEGRITY MARTIN J.	06-24-87	- -	1994				NOT TRANSFERED TO TC YET
C57.12.29	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY IN COASTAL ENVIRONMENTS							PUBLISHED IN 1992
PC57.12.29	JOINT WG ON CABINET INTEGRITY MARTIN J.	- -	- -	1996				NOT TRANSFERED TO TC YET
C57.12.30	SUBMERSIBLE EQUIPMENT - ENCLOSURE INTEGRITY							TO BE BALLOTED
PC57.12.30	JOINT WG ON CABINET INTEGRITY MARTIN J.	- -	- -	1994				NOT TRANSFERED TO TC YET

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 6
ATTACHMENT 1

SUBCOMMITTEE——— DISTRIBUTION TRANSFORMERS / CHAIRPERSON: J. C. THOMPSON / PHONE: (704)373-5139 / FAX: (704)382-2579

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION: PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.12.31	COATING STANDARD FOR POLE MOUNTED TRANSFORMERS							PAR TO BE SUBMITTED
PC57.12.31	JOINT WG ON CABINET INTEGRITY	MARTIN J.		- -	- -	1994		NOT TRANSFERED TO TC YET
IEEE1265	STANDARD FOR BAR CODING FOR DISTRIBUTION TRANSFORMERS (POLE-MOUNTED, PAD-MOUNTED AND UNDERGROUND)			A1M/TSC 1AS/REP				PAR APPROVED 06/27/91
P1265	BAR CODE STANDARD	JORDAN RON		- -	06-27-91	1994	(619)482-3239	
IEEE1388	STANDARD FOR THE ELECTRONIC REPORTING OF TRANSFORMER TEST DATA			EEI	NEMA	ASC X12 PSR	CS SAB	APPROVED BY NESCOM 09/15/93
P1388	ELECTRONIC TEST DATA	LYON D. S.		- -	09-15-93	0	(414)221-2398	NO. CHANGED FROM C57.132

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.5 DRY-TYPE TRANSFORMERS - W. Patterson

DRY TYPE TRANSFORMER SUBCOMMITTEE
MEETING MINUTES
ST. PETERSBURG, FLORIDA - NOVEMBER 2, 1993
CHAIRMAN: MR. W. F. PATTERSON, JR.

7.5.1 Chairman Remarks and Announcements

The Dry Type Transformer Subcommittee met at 2:00 p.m. with 21 members and 17 guests present. The first order of business was the approval of the minutes of the 03/30/93 meeting in Dallas. Guy Pregent noted that the loss evaluation figures being adapted by CSA were incorrectly reported. The correct values for the ratio of no load dollar/watt versus load loss dollar/watt are:
for KVA < 500: 3.0 to 1
for KVA > 500: 4.5 to 1
Aside from this correction, the minutes were approved as written.

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

Sec.2 Dry Type Reactors - HVDC Smoothing - R. Dudley
Sec.3 Dry Type Reactors - Current Limiting - R.Dudley
Sec.4 Test Code Revision - D. Barnard
Sec.5 Specialty Transformers - R. Simpson
Sec.6 General Requirements Revision - A. Jonnatti
Sec.7 Thermal Evaluation & Flammability - R. Provost
Sec.8 Hot Spot Differentials - P. Payne
Sec.9 Cast Coil Loading Guide - L. Pierce

7.5.1.2 Following Mr. Dudley's presentations, he commented on the tremendous effort made behind the scenes by the clerical staffs who support the working group chairmen in production of the standards. In particular the question was raised if IEEE could have some mechanism to recognize or reward this effort which quite often exceeds that of the members themselves.

7.5.1.3 Mr. Barnard noted that C57.12.91 was sent to IEEE for balloting of the Main Transformers Committee prior to the next meeting in Dallas.

7.5.1.4 Mr. Simpson noted that IEC was forming a committee with the purpose of adapting IEEE 117 and 259 for insulation systems evaluation on an international scale. He also noted that the membership on the IEEE 259 WG mainly consists of materials manufacturers and requested that transformer

manufacturers take a more active role in the development of this standard. Interested parties should contact him.

7.5.1.5 The Chairman noted that there were not enough members of the Thermal Evaluation WG present in order for a valid ballot to be taken at the meeting. The Chairman advised the committee of their responsibilities as WG members which includes attendance of the WG meetings.

7.5.1.6 In the absence of Mr. Pierce, the Chairman gave a brief synopsis of the activities of the WG on Cast Coil Loading Guide.

7.5.1.7 The Chairman reviewed the status of the following standards which require some action before 12/94:

C57.12.01: General Requirements
The Chairman will request a one-year extension of the existing document to allow the WG time to complete its activities

C57.96: Loading Guide
Following an explanation that Lyn Pierce's WG was working on an addendum to C57.96 which is independent of the current standard, a motion was made and approved to request IEEE to ballot for reaffirmation the existing Loading Guide without modification. The Chairman agreed to submit the request.

C57.12.59: Through-Fault Guide
It was also agreed to request IEEE to ballot this document for reaffirmation. The Chairman agreed to submit the request.

7.5.1.8 The Chairman discussed the status of the ANSI/IEEE C57.12.5 series of standards. Currently the Chairman has been informed that IEEE cannot perform any work on these documents as IEEE does not have full ownership of these standards. The Chairman noted that no action is required on these documents for at least two years and that he hopes that IEEE and ANSI can arrive at a sensible resolution to the situation prior to that time.

The Chairman noted that this situation may have direct impact on Paulette Payne's WG on Hot Spot Differentials as her WG is investigating possible changes to these documents.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.5 DRY-TYPE TRANSFORMERS (Cont'd)

7.5.1.9 The Chairman reported on issues related to the Transformers Committee:

New Board Members

Chairman:	Mr. J. Harlow
Vice Chairman:	Mr. W. Binder
Secretary:	Mr. J. Mathews

Future Meetings:

1994, 03/20-03/23	Dallas, TX
1994, 09/24-09/28	Milwaukee, WI
1995, 04/23-04/26	Kansas City, MO
1995, 11/05-11/09	Boston. MA
1996, Spring	San Francisco, CA

The Transformers Committee has requested that any parties interested in sponsoring these meetings please contact Jim Harlow or Wally Binder regarding meetings for Fall, 1996 and Spring, 1997.

7.5.1.10 Attendance Roster

Members Present: 21 Members Absent: 11
Guests: 17

7.5.2 Working Group on Dry Type Reactors - TF Smoothing Reactors
Chairman: Mr. Richard Dudley
Ref: Dry Type HVDC Smoothing Reactors

This working group is currently undertaking revision of C57.16 which will include only dry type reactors, as approved by the Main Transformers Committee. The original document included both oil and dry.
A Task Force of the Dry Type Reactor WG has been created to provide input to the Subcommittee on HVDC Converter Transformers and Smoothing Reactors for a future standard on Smoothing Reactors including both liquid and dry. The following are the minutes from this Task Force.

The Dry-Type Air Core HVDC Smoothing Reactor Task Force met on November 1, 1993 at 8:00 AM in the Citrus Room of the Tradewinds Hotel in St. Petersburg, Florida. There were 5 members and 1 guest present. The following are the highlights of the meeting.

7.5.2.1 The attendance list was circulated.

7.5.2.2 The minutes of the previous meeting were approved.

7.5.2.3 It was agreed that Bill Kennedy should use information in the Task Force meeting minutes in preparing future drafts of the standard. Also substantial inputs will be passed to Bill Kennedy by the Task Force Chairman, as before.

7.5.2.4 There were no comments on Draft 2 of "General Requirements and Test Code for Dry-Type and Oil-Immersed Smoothing Reactors for D.C. Power Transmission".

7.5.2.5 The submission by Klaus Papp was accepted and should be included in D3 of the standard. This now completes a first draft of the test code for dry-type air core smoothing reactors.

7.5.2.6 Testing and test code was discussed at length. Highlights are:

7.5.2.6.1 Test procedures should focus on or highlight the desired results and test methods included should be presented as suggested or acceptable thus leaving the door open to future new technology that would produce improved results. To emphasize this point it was suggested to include a note in the foreword of the standard or the beginning of Section 7 stating that the test method (procedures) in the document are "state-of-the-art", but new equipment and procedures which give equivalent or improved capability are acceptable.

7.5.2.6.2 In the testing area it was agreed that, as a rule of thumb, sufficient detail should be included to avoid any misconceptions. To this end the test code will be reviewed by the Chairman. More detail will be provided in the section on short circuit testing (11.6.1 "Short-Circuit Withstand Test").

7.5.2.6.3 Recommended air clearance under the dry type smoothing reactor should be included in the procedures for the temperature rise test. It is not necessary to perform the temperature rise test on the "contract" support structure (due to the heights involved performance of the heat run could

be extremely difficult.) but a minimal air clearance is required to insure realistic results.

7.5.2.6.4 It is not necessary to perform the routine impulse test or modified turn to turn test on the contract support structure.

7.5.2.6.5 A warning should be included in the test procedure for the modified turn to turn test to check the magnitude of the overshoot of the first peak as it can be quite substantial.

7.5.2.6.6 It was agreed that an application guide should be prepared for dry-type air core smoothing reactors. The Chairman will prepare a draft for the next meeting in Dallas. This should be placed in an appendix.

7.5.2.6.7 Bill Kennedy will be requested to produce Draft 3 of the standard for the Dallas meeting.

7.5.2.6.8 The Chairman agreed to make all changes based on the discussions above in preparation for the Dallas meeting.

7.5.2.6.9 The meeting was adjourned at 9:15 AM.

7.5.2.6.10 Attendance Summary
Members Present: 5 Members Absent: 15
Guests: 3

7.5.3 Working Group on Dry Type Reactors
Chairman: Mr. Richard Dudley
Ref: C57.16 - "Requirements for Current Limiting Reactors"

This working group is currently undertaking revision of C57.16 which will include only dry type reactors, as approved by the Main Transformers Committee. The original document included both oil and dry.

A Task Force of the Dry Type Reactor WG has been created to provide input to the Subcommittee on HVDC Converter Transformers and Smoothing Reactors for a future standard on Smoothing Reactors including both liquid and dry. See Sec.2 for the minutes of this Task Force.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.5 DRY-TYPE TRANSFORMERS (Cont'd)

The Dry-Type Reactor WG met on November 01, 1993 at 2:50 PM in the Palm Room of the Tradewinds Hotel in St. Petersburg, Florida. There were 7 members present. The following are the highlights of the meeting:

7.5.3.1 The attendance list was circulated.

7.5.3.2 The minutes of the Portland meeting were approved.

7.5.3.3 Draft 6 of the revision of C57.16 was discussed. The following are the highlights:

7.5.3.3.1 A number of editorial comments were noted. The Chairman made appropriate changes to what will become Draft 7.

7.5.3.3.2 Discussion took place on a number of subjects resulting in modification of a minor nature. Again, these were made to the working copy of the standard that will become Draft 7.

7.5.3.3.3 The appendix on wave shape control will be moved into the main text. Section 11.3.5.5 will be titled "Wave Shape Control".

7.5.3.3.4 Section 11.3.5 covering impulse testing was discussed. It was proposed that for the type test that both terminals of the reactor should be impulsed whereas for the routine test only one terminal need be tested. For dry type air core reactors this is a valid proposition since the voltage distribution is quite linear under impulse conditions and thus the grounded end of the reactor under test will be subjected to voltage stress levels sufficient to verify insulation integrity and hence quality.

7.5.3.3.5 Section 4.2.1 on the effect of high altitude was discussed as to its clarity of meaning. It was decided to leave it as is.

7.5.3.3.6 Section 8.7 which covers the temperature rise test was discussed regarding connection to and temperature rise of the reactor terminal during the test. It was agreed that since eddy loss heating effects are so

significant for dry type air core reactors that no specific test connection details can be provided in the standard and that test details should be worked out between the manufacturer and end user.

7.5.3.3.7 It was pointed out that a 60°C maximum terminal temperature rise may be unrealistic for high current reactors. Experience with higher terminal temperature rises has been good providing precautions are taken on clamping force and terminal preparation. This subject will be covered in Draft 7.

7.5.3.3.8 Fig.3 in Section 11.6 covering short circuit testing was discussed. The title will be changed to reflect that the illustrated test setup is a guideline. Other variations are acceptable as long as the intent is met. General note 3 will be changed to emphasize that the flexible connector should not become taut during short circuit test or its isolating function will be compromised.

7.5.3.3.9 Feedback on the temperature rise limits in Table 4 and the supporting information on insulation systems in Section 2.4 has been positive.

7.5.3.4 The Chairman agreed to produce Draft 7 for the Dallas meeting. Working Group members are requested to submit any inputs to him in sufficient time so that they can be included. The objective will be to ballot the Dry Type Transformers Subcommittee after the Dallas meeting.

7.5.3.5 The meeting adjourned at 5:00 PM.

7.5.3.6 Attendance Roster

7.5.4 Working Group on Dry Type Test Code PC57.12.91
Chairman: Mr. David Barnard
Secretary: Mr. Henry Windisch
Ref: C57.12.91 - Test Code for Dry Type Transformers

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

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.5 DRY-TYPE TRANSFORMERS (Cont'd)

7.5.4.1 The meeting was called to order at 10:56 AM Monday, November 01, 1993 in the Citrus Room at the Tradewinds Hotel. Twenty-one (21) members and six (6) guests were in attendance.

7.5.4.2 Introductions of those attending were made and then the Portland meeting minutes were approved.

7.5.4.3 Chairman Barnard announced that Draft 6 had been sent to IEEE headquarters to prepare the ballot for the Main Committee.

7.5.4.4 The floor was opened for discussion of the forward presently in Draft 6. Bill Mutschler read his proposed replacement for paragraph three (3) of the forward. After discussion it was agreed that paragraph three (3) presently in Draft 6 was suitable; although, it was a little wordy.

7.5.4.5 Article 11.1 relating to the temperature test was read; as it appears in Draft 6. Discussion about the repeatability of the tests was held. Bill Mutschler read his proposed revision to the paragraph as it exists in Draft 6 It was agreed to leave the paragraph as it now reads. Main Committee members will get the opportunity to comment during the balloting.

7.5.4.6 Don Kline asked about the Octave Band sound level requirements in the Guide. The requirement is in the Guide.

7.5.4.7 The spelling of Wayne Hansen's name in the membership list was corrected.

7.5.4.8 No other new business was discussed.

7.4.4.9 The meeting was adjourned at 11:33 AM.

7.4.4.10 Attendance Roster

Members Present: 21 Members Absent: 13
Guests: 6

7.5.5 Working Group on Specialty Transformers - P259
Chairman: Mr. R. W. Simpson, Jr.
Ref: IEEE Std 259 - Standard Test Procedures for Evaluation of Systems of Insulation for Specialty Transformers

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

7.5.5.1 The Working Group met on 11/01/93 at 1:20 PM with 2 members and 9 guests present. Three guests requested membership in the WG. Following introductions, the minutes of the 03/30/93 meeting in Portland, Oregon were approved as written.

7.5.5.2 IEEE Std. 259, Draft 8, having been reviewed and approved by all necessary coordinating committees, will be submitted to REVCOM for final approval. Formal submittal had not taken place.

7.5.5.3 A new Draft of 259 will be prepared with "Shall/Should" statements reviewed for correctness. This Draft will be distributed to members and interested parties.

The Chairman noted that IEC was forming a committee with the purpose of adapting IEEE 117 and 259 for insulation systems evaluation on an international scale.

7.5.5.4 As there was no other new business, the meeting was adjourned at 1:40 PM.

7.5.5.5 Attendance Roster

Members Present: 2 Members Absent: 2
Guests: 9

7.5.6. Working Group on Dry Type General Requirements
Chairman: Mr. Anthony J. Jonnatti
This working group is preparing revisions for General Requirements for Dry Type Distribution, Power, and Regulating Transformers Standard C57.12.01.

7.5.6.1 The meeting started at 8:05 AM November 02, 1993 with 11 members and 20 guests present.

7.5.6.2 The meeting started by advising the membership that one (1) year remained in the five (5) year life of this standard. Three options were discussed to determine what should be done with this standard. After some discussion it was decided to apply for a one (1) year extension of this standard.

7.5.6.3 Some preliminary work was done to help determine what was needed to up-date the information in this standard; however, after some discussion, it was decided that the best approach would be to focus on some special items and ballot these items one at a time.

7.5.6.4 A letter, submitted by Roy Bancroft, listing some of the items he considered important that should be worked on, was discussed. Eight items were identified to be considered. These items are:

7.5.6.4.1 Sound Level - John Sullivan agreed to work on this subject.

7.5.6.4.2/3 Table 3B - Interrelationships of dielectric insulation levels for Dry-Type Transformers used on systems with BIL 200 kv and below, and Table 1 on altitude connection. J. Puri agreed to work on this item.

7.5.6.4.4 Derating factor for altitude (thermal) Table A-2. Linden Pierce agreed to work on this item.

7.5.6.4.5 Review of temperature limitation during short-circuit testing. Chuck Johnson agreed to work on this item.

7.5.6.4.6 Specific reference for partial-discharge testing and measurements. Bill Mutschler agreed to work on this.

7.5.6.4.7 Nameplate information. As yet unassigned.

7.5.6.4.8 Hot Spot. A separate WG chaired by Paulette Payne is working on this item.

7.5.6.5 During this meeting some issues were raised to establish performance on partial discharge values and also Linden Pierce indicated that hot spot issues cannot be ignored.

7.5.6.6 After these assignments, the meeting was adjourned.

7.5.6.7 Attendance Roster

Members Present: 13 Members Absent: 4
Guests: 20

7.5.7 Working Group on Thermal Evaluation of Dry Type Transformers

Working Group on Flammability Issues
Chairman: Mr. Richard Provost

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

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

This working group is also monitoring the status of C57.12.56, the thermal evaluation guide for conventional dry type transformers.

7.5.7.1 The Working Group met at 10:55 AM on Tuesday, November 2, 1993, with 6 members and 14 guests present. Following introductions of those present, the minutes of the March 30, 1993 Working Group meeting in Portland, Oregon were reviewed and approved as written.

7.5.7.2 The Chairman notified the Working Group that ANSI/IEEE C57.12.56, "Standard Test Procedure For Thermal Evaluation of Insulation Systems for Ventilated Dry Type Power & Distribution Transformers", was approved for reaffirmation by the Standards Board in June 1993. This document must be updated within 5 years.

7.5.7.3 The Chairman also announced that the matching document on 'Solid Cast and Resin Encapsulated Dry-Type Power & Distribution Transformers', IEEE C57.12.60, was finally published in May 1993. Since this is a trial-use Standard, verification of the Standard must occur within two years.

7.5.7.3.1 Due to the short time frame for action on the document, the Chairman opened the floor for discussion around sections of the document which may require modification or clarification, since no data has been presented to indicate whether the Standard could be applied. Three areas generated considerable discussion: size and design of the test models, the criteria for failure, and method of test. It was generally agreed that

there will not be enough time to resolve these issues and generate data before action must be taken on this document.

7.5.7.3.2 A motion was made to submit the document for reaffirmation within six months to allow more time. Since a majority of the Working Group members were not present, the Chairman agreed to ballot the members on this motion and solicit comments or suggestions for changing the document. This will be done quickly and reviewed at the next meeting.

7.5.7.3.3 Meanwhile, several members agreed to propose a new expanded description for test models to be reviewed by the Working Group. Also, information regarding correlation of partial discharge testing as a criteria for testing failure will be obtained and circulated for review.

7.5.7.4 With no further discussion around this document, the Chairman opened the discussion to flammability issues. It was noted that CENELEC Document HD 464 was about to be finally issued and the Chairman would issue copies through IEEE when available.

7.5.7.5 Six guests requested membership for the Working Group. The Chairman welcomes them.

7.5.7.7 With no new business, the meeting was adjourned at 12:05 PM.

7.5.7.8 Attendance Roster

Members Present: 6 Members Absent: 7
Guests: 14

7.5.8 Working Group on Hot Spot Differentials
Chairperson: Ms. Paulette Payne

This WG was formed to investigate hot spot differential criteria in dry type transformers standards and develop modifications to existing standards if needed.

7.5.8.1 The first meeting of the Working Group on Hot Spot Differentials was held on November 1, 1993. The meeting was called to order at 4:20 PM. There were 15 members and 12 guests present. Three guests, Messrs. Mike Schacker, William Henning, and R. W. Simpson, Jr. requested membership.

The following are the highlights of the meeting:

7.5.8.2 The scope and purpose of the Working Group was discussed for preparation of the Project Authorization Request (PAR).

7.5.8.2.1 Project Title: Evaluation of Hot Spot Differentials and Temperature Classifications

7.5.8.2.2 Project Scope: Review of temperature limits of dry type transformers for Standards C57.12.01, C57.12.50, C57.12.51, C57.12.52 and C57.12.57.

7.5.8.3 The remainder of the session was devoted to planning strategy. Bill Mutschler gave a brief history on the establishment of temperature rise limits for dry type transformers, and later in the meeting he also provided a historical perspective of thermal evaluation of transformers.

7.5.8.4 Linden Pierce discussed the establishment, from Whitman's 1944 data, of the 30°C hot spot allowance for 80°C average winding temperature, as well as how the limiting temperatures for 220°C insulation temperature class for sealed units, was extended by NEMA to all dry type transformers. For 220°C insulation temperature class, Linden proposes a ratio of average winding temperature rise to hottest spot temperature rise of 1.4 for small transformers and 1.5 for large transformers; the ratio increases with winding length. Also suggested was the removal of average winding temperature and specification of hot spot limits from Table 4A of C57.12.01. Further discussion ensued on the relation of core loss to the hot spot ratio and the reduction of the ratio by design modifications.

7.5.8.4.1 Don Kline suggested that the average winding temperature rise not be lowered, but the hottest spot temperature rise be

raised to establish the appropriate hot spot ratio.

7.5.8.4.2 Wes Patterson provided the basis for the IEC temperature limits. There is a fixed relation between average winding temperature and hot spot temperature of ratio 1.32 to 1.40 referenced to an ambient temperature of 20°C.

7.5.8.5 In bringing the meeting to a close, the agreed upon direction for the Working Group was restated as follows:

7.5.8.5.1 To review insulation system temperature limits which includes the suggestion to raise the hot spot temperature limits proposed by Don Kline.

7.5.8.5.2 To compare temperature limitations established with International Standards to attempt to achieve harmonization. Chuck Johnson volunteered to make the comparison.

7.5.8.6 The meeting was adjourned at 5:28 PM.

7.5.8.7 Attendance Roster
Members Present: 15 Members Absent: 1
Guests: 12

7.5.9 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.

7.5.9.1 The Working Group met November 02, 1993 at 9:30 AM in St. Petersburg Beach, Tradewinds Hotel with 12 members and 5 guests in attendance.

The minutes of the March 30, 1993 meeting in Portland, Oregon were approved.

7.5.9.2 Draft 2.1 which was an editorial revision of Draft 2 was distributed and reviewed briefly.

7.5.9.3 The only open issue and a major one, is a time constant

equation. The Chairman hopes to complete this by year end. Bill Mutschler suggested that additional data such as winding weights be shown on the nameplate to allow users to calculate time constants. This is similar to a breakdown into oil volumes, tank weight, and core and coil weights shown on outline drawings for liquid-filled transformers and used in time constant equations for the liquid core and coil guides.

7.5.9.4 Reference 11 giving background data for an application curve for motor starting loading will be mailed to the Working Group members.

7.5.9.5 The meeting adjourned at 9:55 AM

7.5.9.6 Attendance Roster

Members Present: 15 Members Absent: 1
Guests: 12

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 7
ATTACHMENT 1

SUBCOMMITTEE——— DRY-TYPE TRANSFORMERS / CHAIRPERSON: W. PATTERSON / PHONE: (703)688-3325 / FAX: (703)688-4588

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.124	RECOMMENDED PRACTICE FOR THE DETECTION OF PD AND THE MEASUREMENT OF APPARENT CHARGE IN DRY-TYPE TRANSFORMERS			NONE				PUBLISHED 1992
PC57.124	DRY TYPE DIELECTRIC PROBLEMS	KLINE A. D.		06-29-91	06-27-91	1996	(404)762-1642	ANSI APPROVED 10/11/91
C57.12.01	GENERAL REQUIREMENTS FOR DRY-TYPE DIST. AND POWER TR INCL THOSE WITH SOLID CAST &/or RESIN-ENCAPSULATED WINDINGS							MUST REAF. OR REV. BY DEC 94
NONE	NOT SPECIFIED	JONATTI A.		02-02-89	- -	1994		APP. BY SB 02/02/89
C57.12.50	REQ. FOR VENTILATED DRY-TYPE DISTRIBUTION TR, 1-500kVA, 1 PHASE, AND 15-500kVA, 3-PHASE HV 601-34500VOLTS,LV 120-600V							COPYRIGHT NOT RELEASED
NONE	NONE ASSIGNED			06-12-89	- -	1994		REAFFIRMED 06/12/89
C57.12.51	REQ. FOR VENTILATED DRY-TYPE POWER TR, 501kVA & LARGER, 3 PHASE, WITH HV 601-34500V, LV 208Y/120 TO 4160 VOLTS							COPYRIGHT NOT RELEASED
NONE	NONE ASSIGNED			06-12-89	- -	1994		REAFFIRM 06/12/89
C57.12.52	REQ. FOR SEALED DRY-TYPE POWER TRANSFORMERS, 501kVA & LARGER, 3 PHASE, WITH HV 601-34500V,LV 208Y/120 TO 4160 VOLTS							COPYRIGHT NOT RELEASED
NONE	NONE ASSIGNED			06-12-89	- -	1994		REAFFIRMED 06/12/89
C57.12.55	CONFORMANCE STANDARD FOR TR- DRY-TYPE TRANSFORMERS USED IN UNIT INSTALLATIONS, INCL. UNIT SUBSTATIONS							COPYRIGHT NOT RELEASED
NONE				04-07-86	- -	1992		BALLOT REAFFIRMATION
C57.12.56	TEST PROCEDURE FOR THERMAL EVALUATION OF INSULATION SYST FOR VENTILATED DRY-TYPE POWER & DISTRIBUTION TRANSFORMERS							REAFFIRMED BY SB 06/16/93
PC57.12.56	THERMAL EVALUATION OF DRY-TYPE	PROVOST R. L.		08-27-84	- -	1995	(302)999-2225	SUBMIT TO ANSI
C57.12.58	GUIDE FOR CONDUCTING TRANSIENT VOLTAGE ANALYSIS OF A DRY-TYPE TRANSFORMER COIL			IEC	IAS			PUBLISHED 1992
P745	DRY TYPE DIELECTRIC PROBLEMS	KLINE A. D.		06-27-91	06-28-78	1996	(404)762-1642	ANSI APPROVED 10/11/91
C57.12.59	GUIDE FOR DRY-TYPE TRANSFORMER THROUGH-FAULT CURRENT DURATION							MUST REV. OR REAF. BY DEC 94
NONE	DRY-TYPE THRU FAULT DUR GUIDE	NONE		01-01-89	09-13-84	1994		ANSI APPROVED 08/09/91

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 8
ATTACHMENT 1

SUBCOMMITTEE——— DRY-TYPE TRANSFORMERS / CHAIRPERSON: W. PATTERSON / PHONE: (703)688-3325 / FAX: (703)688-4588

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.12.60	TEST PROCEDURES FOR THERMAL EVALUATION OF INSULATION SYSTEMS FOR SOLID-CAST & RESIN ENCAP POWER & DIST TRANSFORMER			IAS	NEMA	IEC		APPROVED BY SB 10/25/92
PC57.12.60	THERMAL EVALUATION OF DRY-TYPE	PROVOST R. L.		10-25-92	08-17-89	1994	(302)999-2225	BEING BALLOTTED IN C57
C57.12.91	TEST CODE FOR DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			SPD	EM			BALLOTING REV.IN MAIN COMM.
PC57.12.91	TEST CODE FOR DRY TYPE TR	BARNARD D.		11-29-78	06-01-89	1984	(919)738-4251	WORKING ON REVISION
C57.16	REQUIREMENTS FOR CURRENT LIMITING REACTORS			NEMA	IAS	T&D		PREPARING DRAFT 6
PC57.16	DRY TYPE REACTORS	DUDLEY R.		09-19-58	03-21-91	1976	(416)298-8108	INCLUDES ONLY DRY TYPE REACTOR
C57.21	REQUIREMENTS TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA							COMPLETE
PC57.21	DRY TYPE REACTORS	DUDLEY R.		04-02-91	- -	1995	(416)298-8108	ANSI APPROVED 08/09/91
C57.94	RECOMMENDED PRACTICE FOR INSTALLATION, APPLICATION,OPERATION & MAINTENANCE OF DRY-TYPE GEN PURPOSE DIST & POWER TR							PUB. 1982, REAFFIRMED 1987
NONE	APPLICATION OF DRY-TYPE TR			12-09-87	- -	1987		BALLOTTING REAFFIRMATION
C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			SCC14				MUST REAF. OR REV. BY DEC 94
NONE	GUIDE FOR LOADING DRY-TYPE TR	PIERCE L.		04-26-89	04-26-89	1994	(706)291-3166	
C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			T&D	SCC14	SCC10		INCORP CAST COIL IN C57.96
PC57.96	CAST COIL LOADING GUIDE	PIERCE L.		04-26-89	05-06-91	1994	(706)291-3166	COMPLETE BY 10/93
IEEE 259	TEST PROCEDURE FOR EVALUATION OF SYSTEMS OF INSULATION FOR SPECIALTY TRANSFORMERS							TO SUBMIT TO REVCOM
P259	SPECIALTY TRANSFORMERS	SIMPSON R. W. JR.		06-22-72	09-26-91	1979	(603)284-4362	LIFE EXTENDED TO 12/92 100%

COORDINATION ACTIVITY OF DRY TYPE SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*P1303	,GUIDE FOR, STATIC VAR COMPENSATOR FIELD TESTS					
01-10-92	SUBS	PHILIP R. NANNERY	914-577-2591	R. F. DUDLEY	DRY TYPE	416-298-8108

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.6 HVDC CONVERTER TRANSFORMERS & REACTORS - W. N. Kennedy

HVDC Converter Transformer and Smoothing Reactor
Subcommittee Meeting Minutes - St. Petersburg, FL - November 2, 1993

7.6.1 Introduction

The meeting was called to order at 3:30 PM with eight members and nine guests present. Messrs. Olof Heyman. Joseph Foldi, Min Jea Lee, and Florian Costa joined the subcommittee, increasing the total number of members to 18.

7.6.2 Discussion of Negative Ballots on PC57.129 D6

The meeting concentrated on two negative ballots that were received on our ballot of Draft 6 of PC57.129 "General Requirements and Test Code for Oil-Immersed Converter Transformers for DC Power Transmission." The two objections of the first negative ballot regarded the magnitude of the polarity reversal wave, and the statement in draft 6 that the pumps should not be running during the dc tests.

The equation used to determine the magnitude of the polarity reversal wave has both an ac and a dc component. An earlier CIGRE paper used a multiplier of 1.1 over service voltage for both components, while our 1985 IEEE paper recommended increasing the dc component multiplier to 1.25. Subsequently, CIGRE has recommended the 1.25 multiplier for both the ac and dc components. The CIGRE formula has been proven on several recent HVDC systems, and we agreed at the meeting to accept their formula in our standard.

We discussed the statement regarding running the pumps during the dc tests and confirmed that we want to leave the restriction in the standard. The consensus is that allowing the pumps to run would reduce the partial discharge activity during the tests, while requiring that the pumps not be running would permit accurate comparisons in test data between different transformers.

The second negative ballot provided important comments regarding the specification and testing sections of our draft 6. We agreed to rewrite the paragraphs for "Loading at other than rated conditions" and "Unusual temperature conditions" to emphasize that converter transformers are significantly different from conventional units and that these conditions must be discussed with the manufacturer on an individual basis. We also agreed to clarify the "Total losses" paragraph to separate the no-load and load losses, and to rewrite the restrictions for grounding the transformers between and after the dc tests in the "Test procedure" sections.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.6 HVDC CONVERTER TRANSFORMERS & REACTORS (Cont'd)

7.6.3 Next Ballot

The comments discussed above, together with those included in the affirmative ballots, will be included in Draft 7 which should be circulated to members in January 1994.

In addition, it is expected that a new draft of our smoothing reactor standard (P1277) will be available before our next meeting.

Respectfully submitted,
William Kennedy, Chairman

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 9
ATTACHMENT 1

SUBCOMMITTEE——— HVDC CONVERTER TR & REACTOR / CHAIRPERSON: W. N. KENNEDY / PHONE: (317)286-9387 / FAX: (317)286-9549

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION: PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.129	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED HVDC CONVERTER TRANSFORMERS AND SMOOTHING REACTORS FOR DC POWER TRANSM			EM	T&D	PSIM	SUB	REVISED PARS TO STD BOARD
PC57.129	SUBCOMMITTEE	KENNEDY W. N.		- -	09-26-91		0 (317)286-9387	BALLOTING IN SUBCOMMITTEE
IEEE1277	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED AND DRY-TYPE HVDC SMOOTHING REACTORS			SUB				FIRST TF MEETING TOOK PLACE
P1277	SUBCOMMITTEE			- -	09-25-91		0	PAR APPROVED 09/26/91

COORDINATION ACTIVITY OF HVDC CONVERTER TR & REACTOR SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*P1030.3	GUIDE FOR SPECIFICATION OF HVDC PERFORMANCE - PART III, DYNAMIC PERFORMANCE					
08-19-91	T&D	CLIFFORD C. DIEMOND	503-222-2109	WILLIAM N. KENNEDY	HVDC CONVERTER TR & REACTOR	317-286-9387
*NEW	GUIDE FOR COMMISSIONNING HVDC CONVERTER STATIONS AND ASSOCIATED TRANSMISSION SYSTEMS					
08-30-93	SUBS	D. R. TORGERSON	303-231-7459	W. N. KENNEDY	HVDC CONVERTER TR & REACTORS	317-286-9387

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.7 INSTRUMENT TRANSFORMERS - J. N. Davis

INSTRUMENT TRANSFORMERS SUBCOMMITTEE
TRANSFORMERS COMMITTEE PES/IEEE
November 2, 1993, St. Petersburg, Florida

The Subcommittee meeting was opened at 8:00 a.m. by Chairman John Davis. Fourteen members and fourteen guests attended.

7.7.1 The minutes of the March 30, 1993, meeting at the Red Lion Lloyd Center in Portland, Oregon, were approved as written.

7.7.2 The following announcements were made:

7.7.2.1 The spring meeting will be held March 20 to March 23 in Dallas, TX.

7.7.2.2 Future meetings

September 24-28, 1994	Milwaukee, WI
March 23-26, 1995	Kansas City, MO
November 5-9, 1995	Boston, MA
Spring 1996	San Francisco, CA

7.7.3 Status Reports

7.7.3.1 C57.13 - Standard Requirements for Instrument Transformers
Approved at the June Standards Board meeting.
Galley proof will be sent to John Davis for review the week of 11-07-93.

7.7.3.2 C57-13.4 - Guide for Detection of Partial Discharge and the Measurement of Apparent Charge within Instrument Transformers

Will be sent to the March Standards Board for approval.

7.7.4 Old Business

7.7.4.1 Switchgear Committee Coordinator - Andy McCabe

No report.

7.7.4.2 Suggested new pars:

7.7.4.2.1 Test requirements for EHV instrument transformers (new document; Joe Ma - working group chairman)

7.7.4.2.2 Partial discharge limits (changes to existing document)

7.7.4.2.3 Instrument transformers for use with electronic meters (Guide - STD - or part of C57.13)

7.7.4.2.4 Changes to C57.13 (Tables 2 + 3)

7.7.4.3 Joe Ma reported on Working Group on Test Requirements for EHV Instrument Transformers (report attached).

7.7.5 New Business

7.7.5.1 John Davis introduced Jim Smith as the new chairman of the Instrument Transformer Committee.

7.7.5.2 Tom Nelson was introduced as the new representative on the committee from Nist.

7.7.6 Adjournment

The meeting was adjourned at 8:30 a.m.

Respectfully submitted,
W. E. Morehart

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 10
ATTACHMENT 1

SUBCOMMITTEE——— INSTRUMENT TRANSFORMERS / CHAIRPERSON: J. E. SMITH / PHONE: (919)827-2121 / FAX: (919)827-2121

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION: PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.13	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS			PSIM	PSR	SPD		WAITING ANSI APPROVAL
P546	SUBCOMMITTEE			03-30-78	05-29-80	1992		APPROVED BY SB 06/16/93
C57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS							APPROVED BY ANSI 12/02/92
NONE	SUBCOMMITTEE			08-25-87	- -	1992		REAFFIRMED 03/18/92
C57.13.2	CONFORMANCE TEST PROCEDURES FOR INSTRUMENT TRANSFORMERS							PUBLISHED 1992
NONE	SUBCOMMITTEE			04-16-86	09-26-91	1996		RECOGNIZED BY ANSI 12/23/92
C57.13.3	GUIDE FOR THE GROUNDING OF INSTRUMENT TR SECONDARY CICUITS AND CASES							TRANSFER FROM PSRC COMMITTEE
NONE	SUBCOMMITTEE			01-23-87	- -	1991		
C57.13.4	DETECTION OF PARTIAL DISCHARGE AND MEASUREMENT OF APPARENT CHARGE WITHIN INSTRUMENT TRANSFORMERS			T&D				D6 BEING BALLOTTED IN TC
P832		JONNATTI A. J.		- -	05-28-80	0	(813)785-2788	RESOLVING 3 NEGATIVES

COORDINATION ACTIVITY OF INSTRUMENT TRANSFORMERS SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*P1304	CURRENT MEASURING SYSTEMS WHICH USE OPTICAL TECHNIQUES					
01-31-92	PSIM	T. R. McCOMB	613-990-5826	J. N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
*PC37.110	GUIDE FOR THE APPLICATION OF CURRENT TRANSFORMERS USED FOR PROTECTIVE RELAYING PURPOSES					
05-31-90	PSR	L. J. SHULZE	312-255-5760	JOHN N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
*PC37.97	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER SYSTEM BUSES					
12-10-87	PSR	STEVE CONRAD	505-848-2642	JOHN N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
*PC57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS					
- -	PSR	D. R. VOLZKA	414-221-2750	JOHN N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.8 INSULATING FLUIDS - H. A. Pearce

IEEE
POWER ENGINEERING SOCIETY
TRANSFORMERS COMMITTEE MINUTES
INSULATING FLUIDS SUBCOMMITTEE
NOVEMBER 1-2, 1993
ST. PETERSBURG, FLORIDA

7.8.1 The Insulating Fluids Subcommittee met on Monday morning, November 1, and Tuesday morning, November 2, with 29 members and 33 guests present. On Monday, the working group on PC57.130 and the subcommittee met simultaneously.

The minutes of the meeting held in Portland, Oregon (March 29-30, 1993) were approved as submitted.

7.8.2 SUBCOMMITTEE PROJECTS:

7.8.2.1 C57.130 Trial Use Guide for the Use of Dissolved Gas Analysis During Factory Thermal Tests for the Evaluation of Oil Immersed Transformers and Reactors

The Limit Task Force and Working Group met together and reviewed Draft 6 of the Guide. The Task Force effort to establish limit tables from manufacturers' heat run data was reported. A recommendation was made to the Working Group to combine the trial limit table from Draft 6 with an additional generating rate procedure currently used by the Canadian Electrical Association (CEA) and derived from the IEC method. Minimum gas detection levels using current ASTM procedures will be applied. The new combined procedure will be included in Draft 7.

Draft 6 was then discussed in detail by the Working Group. Substantial revision, including the Task Force Recommendation discussed above, will be incorporated in Draft 7 which will be sent out for Subcommittee review prior to the next meeting in Dallas.

In view of the difficulties encountered while trying to establish gas limits and generation rates, the Subcommittee Chairman was requested to contact the National Institute of Standards and Technology (NIST) and ASTM D27 for assistance with developing a gas-in-oil standard and improved extraction procedures for both mineral oil and silicone fluid.

7.8.2.2 P1258 Guide for the Interpretation of Gases Generated in Silicone-Immersed Transformers

Draft 3 was reviewed in detail. It was recommended that a "threshold" gas concentration table replace the "Normal" and "Abnormal" dissolved gas concentration levels table which was in Draft 3. In addition, an attempt will be made to include gas generation rates in the Guide. A consensus was reached that the gas extraction procedure is the most significant contributor to test variability. As previously mentioned, this will be brought to the attention of ASTM Committee D27.

Draft 4 of the Guide will be sent out for Subcommittee review prior to the next meeting in Dallas.

7.8.3 OTHER BUSINESS:

7.8.3.1 The Subcommittee voted to reaffirm C57.111 (Silicone Guide) and C57.121 (High Temperature Hydrocarbon Guide).

7.8.3.2 Water-in-Oil and Water-in-Paper Insulation

Harold Moore addressed these topics at our meeting. Water migrates between the solid and liquid insulation in a transformer with changes in temperature. Therefore, the concentration of water-in-oil alone, expressed in ppm, does not provide sufficient information to obtain an adequate evaluation of the insulation system dryness. Even using percent saturation to evaluate insulation system dryness has some inherent biases due to the fact that water never reaches equilibrium in the solid and liquid insulation.

In view of these discussions, a Task Force was established to review this subject and recommend a course of action for the Subcommittee at our next meeting in Dallas. The Task Force consists of the following:

Harold Moore	Ted Haupert
Paul Griffin	Ed Howells
Joe Kelly	James Kinney
Frank Heinrichs	Jean-Pierre Gibeault
Dan Crofts	

7.8.3.3 Insulating Fluids Subcommittee Chairman

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.8 INSULATING FLUIDS (Cont'd)

Henry Pearce announced that he was resigning as Chairman of the Subcommittee. His contributions and service as Chairman for 20 years were recognized.

The new Chairman, Frank Gryszkiewicz, was approved by the Administrative Subcommittee and assumed his duties as Chairman at the completion of the St. Petersburg meeting.

This concluded the business for the Insulating Fluids Subcommittee at this session. The Subcommittee will next meet in Dallas, Texas during the period of March 20-23, 1994.

Frank Gryszkiewicz, Chairman
Frank Heinrichs, Secretary

DATE: 01-10-94

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

SUBCOMMITTEE——— INSULATING FLUIDS / CHAIRPERSON: F. GRYSZKIEWICZ / PHONE: (617)926-4900 / FAX: (617)926-0528

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.104	GUIDE FOR THE DETECTION AND DETERMINATION OF GENERATED GAS IN OIL-IMMERSED TRANSFORMERS & THEIR RELATION TO SERVICEABIL.			PSR	T&D			STARTED REVISING
PC57.104		HEINRICHS F. W.		06-07-92	05-31-90	1996	(412)941-6924	PUBLISHED 1992
C57.106	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF INSULATING OIL IN EQUIPMENT			NONE				PUBLISHED 1992
PC57.106	SUBCOMMITTEE			11-20-91	06-19-86	1995		ANSI APPROVED 11/20/91
C57.111	GUIDE FOR ACCEPTANCE OF SILICONE INSULATING FLUID AND ITS MAINTENANCE IN TRANSFORMERS			IAS	T&D	ED&PG	IEC	MUST REAF. OR REV. BY DEC 94
NONE	SUBCOMMITTEE			02-02-89	12-10-87	1994		NOT AN ANSI STANDARD
C57.121	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS			PSRC	T&D	IAS	IEC	ANSI APPROVED 08/09/91
P954	SUBCOMMITTEE			02-22-88	04-12-82	1994		MUST REAF. OR REV. BY DEC 94
C57.130	GUIDE FOR USE OF DISSOLVED GAZ ANALYSIS DURING FACTORY THERMAL TESTSFOR THE EVALUATION OF OIL-IMMERSED TRANS. AND REACT.			NONE				NEW PAR APP. BY SB 03/17/93
PC57.130	GAS ANALYSIS DURING FACT.TESTS KINNEY J. P.		F. W. HEINRICHS	- -	03-17-93	0	(706)291-3163	CHANGE IN TITLE AND SCOPE
IEEE 637	GUIDE FOR THE RECLAMATION OF INSULATING OIL AND CRITERIA FOR ITS USE							REAFFIRMED 03/18/92
P637	SUBCOMMITTEE			06-04-84	- -	1997		
IEEE 799	GUIDE FOR HANDLING AND DISPOSING OF ASKARELS			EIS	IAC	T&D		REAFFIRMED 03/18/92
P799	SUBCOMMITTEE			11-17-86	09-27-79	1997		
IEEE1258	GUIDE FOR INTERPRETATION OF GASES IN SILICONE LIQUID-FILLED TRANSFORMERS			T&D	SCC14			PAR APPROVED BY SB 12/05/91
P1258	GUIDE FOR GAS ANALYSIS-SILICON GOUDIE JIM			- -	12-05-91	0	(517)496-6826	PREPARING D02

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.8 INSULATING FLUIDS (Cont'd)

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COORDINATION ACTIVITY OF INSULATING FLUIDS SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*P980	GUIDE FOR THE CONTAINMENT AND CONTROL OF OIL-SPILLS IN SUBSTATIONS					
06-15-92	SUBS	RICHARD G. COTTRELL	517-788-0817	H. A. PEARCE	INSULATING FLUIDS	412-376-3182

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.9 INSULATION LIFE - D. H. Douglas

MEETING MINUTES INSULATION LIFE SUBCOMMITTEE
OF THE IEEE TRANSFORMERS COMMITTEE
NOVEMBER 2, 1993, ST. PETERSBURG, FLORIDA

The Insulation Life Subcommittee met on Tuesday, November 2, at the Trade Winds Hotel, St. Petersburg, Florida with 30 members and 30 guests in attendance.

The Chairman and Subcommittee expressed thanks to outgoing chairman, Dave Douglas for many years of dedicated service to the Subcommittee. Dave was given a standing ovation by the membership.

The reports from the four Working Groups and one Task Force were then given.

7.9.1 Working Group on Guides for Loading, L. W. Pierce, Chairman

The Chairman of the Working Group on Guides for Loading, reported that they met on Monday November 1 with 41 Guests and 32 Members in attendance. The minutes of the March 29, 1993 meeting in Portland, Oregon were approved.

Balloting of the Subcommittee and Working Group of Draft 11 of the Loading Guide was completed October. 16, 1993. Ballot results were as follows:

Mailed	96
Returned	73 (76%, met required 75 % return)
Returned Late	5
Approved	69 (94.5 %)
Negative	4

Comments on 4 negative ballots and other comments were incorporated into draft 11.1 and mailed to the members for review at the meeting. A review of negative ballots and changes were as follows:

James Long: Changes shown in Draft 11.1 satisfactorily resolved this negative ballot.

Don Platts: Changes shown in Draft 11.1 satisfactorily resolved this negative ballot.

Tom Traub: Changes shown in Draft 11.1 resolved negative comments with one exception. The unresolved issue was whether to raise the limit on top oil temperature during overload to 120°C for power transformers as given in the IEC overload guides. The IEC loading guide has other limiting temperatures for hot spot temperatures, maximum per unit loads, etc. which are also different than the IEEE Loading

Guide. The opinion of the Chairman was that this change might result in negative ballots by others and that the change should be reviewed in more depth. A task force with Tom Traub as Chairman was appointed to review this for the next meeting. Members were Bipin Patel, Ron Barker, Don Ayers, Donald Chu, and Lin Pierce. Tom Traub agreed to withdraw his negative ballot on this issue since he will have another opportunity to vote when the draft is balloted in the Transformers Committee.

Bob Grubb: Bob's negative ballot was based on a changes from Draft 10 to Draft 11 of the symbols used to designate temperature, temperature rise over ambient, and temperature differences. This change was different than a list of symbols given in a 1988 Task Force report. For consistency the symbols in the Overload Test Procedure being worked on by Bob's Working Group would require change. The addition of the alternate temperature calculation method in Clause G necessitated a different symbology. This appeared to be a procedural issue and not a technical issue. It was proposed by the Chairman that both documents proceed as written and resolve the symbols when the documents are finally approved and assigned a project editor by IEEE Standards Board. Bob will also have the opportunity to submit a negative ballot on this issue when balloted in the Transformers Committee.

Comments on other ballots were then reviewed.

Don Fallon: Table 4 from draft 10 was removed from draft 11. This was a tabulation of permissible times and temperatures for four types of loading of power transformers. It was the consensus that this table was not needed. A table was added giving temperature and time duration values for various per cent loss of life.

L. B. Wagenaar: Loren believed that gassing needed more attention in the document. This was a valid point however the document contains all data available in the open literature. Final Reports of development work under EPRI contracts are not available unless purchased under the EPRI licensing requirements.

Robert Veitch: Bob suggested that limits for no-load tap changer contacts be the same as for load tap changer contacts. Since there are no design limits in standards and this is a guide and not a standard the sentences containing limits will be removed from the next draft.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.9 INSULATION LIFE (Cont'd)

Olan Compton: Olan proposed changes to definitions and made other comments. Copies were given to the membership and will be incorporated by the Chairman into the next draft as appropriate.

The Chairman reported that a form was sent with Draft 11.1 to those approving draft 11 stating that if as a result of the changes they wished to change their vote to negative they should return the form by November 12, 1993. Draft 11.2 with be sent to the IEEE Standards Headquarters in Nov./Dec. for balloting of the Transformers Committee.

The meeting adjourned after completion of the first scheduled session. A second scheduled session was not required.

7.9.2 Working Group on Thermal Tests - R. L. Grubb, Chairman, D. L Fallon Secretary

The second report was given by Bob Grubb, Chairman of the Working Group on Thermal Tests. They met at 1:20 PM on November 1 with 18 members and 21 guests in attendance. After the normal introductions, the minutes of the previous meeting in Portland were approved.

The first order of business was a status report and discussion of Project P838/ANSI PC57.119, **"Recommended Procedures for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Rating"**. Chairman Bob Grubb indicated that there had been some difficulty in preparing Draft 13 for balloting because of the very substantial nature of several comments on approved ballots to Draft 12, and also because experience this summer in running overload tests and calculating thermal characteristics in accordance with the draft procedures had pointed out some potential problems. The test data must be properly analyzed understanding that the equivalent K to be used for determining the oil rise exponent "n" is different than the K value used in determining the winding rise exponent "m". There was also some question as to whether the 70% load current was perhaps too low. After much discussion, the consensus of the Working Group was to leave the test procedures the same for Draft 13 (additional current to approximate the core losses used for the 100 % test, but not for the 70% or 125% tests), but to include in the draft some wording differentiating between the two methods of calculating K for determination of the different exponents.

The second potential problem area pointed out by recent use of the draft procedures was a question whether the gradient of average winding rise over average oil can be accurately used as the basis for determining winding hottest spot gradient over top oil.

The Chairman, with Subhash Tuli's assistance, will incorporate the

changes necessary from comments to the ballot of Draft 12, and will work towards sending out a ballot of Draft 13 (listing only the changes from Draft 12, which had a successful ballot) within the next few months. The ballot will be at the Transformers Committee level.

The next item of business was a status report on Project PC57.12.00L, **"Definition of Thermal Duplicate"**. A volunteer, Barry Beaster of ABB, has come forward to take over Chairmanship of the Task Force. Barry will be reviewing the past documentation of this project, and will plan to put together another draft of the definition for balloting to the Task Force, and possibly the Working Group, before the next meeting.

Under new business (as suggested in the March Insulation Life SC meeting) a **Task Force on Hottest Spot Temperature Rise Determination** was formed and Don Platts, of Pennsylvania Power and Light, agreed to Chair the task force. The first impromptu meeting of the Task Force took place just after the conclusion of the Working Group meeting.

The meeting adjourned at 2:15 PM.

7.9.3 Working Group on Thermal Evaluation of Liquid Immersed Power & Distribution Transformers. Larry Lowdermilk, Chairman.

The working group met on Monday, Nov. 1, 1993 with a total attendance of 35, including 8 members and 27 guests. After introduction of the attenders, the minutes of the March 29, 1993 meeting in Portland were read and approved as written.

The ballot results from Draft 3 of the proposed standard were then reviewed. The total number of ballots mailed was 79. Prior to the Working Group meeting date, 44 ballots or 56 % had been returned with additional returns expected in the next few weeks. The breakdown of the returned ballots was 33 affirmative, 5 affirmative with comments, 1 negative and 5 abstentions.

Discussion was then held to attempt to resolve the one negative ballot which was submitted by Jerry Corkran of Cooper Power Systems. Comments submitted by Jerry with his negative vote for consideration by the Working Group were as follows: "Traditional practice has been to design power transformers to a more conservative criterion than distribution transformers. Section 11 of Part 3 of Draft 3 is based on a 180,000 hour life expectancy at 110 °C hot spot. This section requires that the insulation model windings test to a 5 times safety margin for distribution transformers, and only a 2 times margin for power transformers. Even though tests made many years ago yielded a 5 times margin for distribution transformers, there is no demonstrated need to

specify more than a 2 times margin for distribution transformers. Recent test data for power transformer models apparently substantiates the requirement for a 2 times margin. My vote will change to affirmative if the standard is changed to call for the same 2 times margin for distribution transformers as for power transformers."

A comment during the following discussion by the Working Group was that a good reason for the higher safety margin on distribution transformers is that the loading on them is less controlled than for power transformers. Distribution transformers therefore, are more likely to experience greater overloads for longer periods of time.

It was agreed that further discussion would be held with Bill McNutt and Chuck McMillan, who were not in attendance at the Working Group meeting, to provide additional background to substantiate why the proposed thermal life test procedure should maintain different levels of safety margin for distribution and power transformers.

If the negative ballot is resolved and enough additional ballots are returned to meet the 75 % criteria, then a ballot of the Transformers Committee will be made prior to the next meeting.

The meeting was adjourned at 12:05 PM.

7.9.4 Working Group on High Temperature Insulation for Liquid-Immersed Power Transformers. Heinz Fischer, Chairman, Bill McNutt, Secretary.

The Working Group met at 8:00 AM on November 1, 1993 with 29 members and 29 guests present. 3 guests requested membership, which increases the Working Group to 42 members. After introductions, the minutes of the March 29, 1993 meeting in Portland, Oregon were approved.

The Chairman reported that the Working Group paper "Background Information on High Temperature Insulation for Liquid-Immersed Power Transformers" has been accepted for presentation at the 1994 Winter Power Meeting. Copies have been distributed to the membership.

The Chairman also reported that a first draft of "IEEE Guide for the Application of High Temperature Insulation Materials in Liquid-Immersed Power Transformers" has been prepared and has been reviewed by a Task Force of the Working Group. Their comments were incorporated into a Revision 2 of Draft 1, and that document was distributed for discussion. Some wording changes were requested and the following points were made:

1. Page 4 - It would be desirable to add a statement projecting the expected MVA rating increase which could be achieved by raising the average winding rise over ambient from 65 °C to 95 °C.

2. There is no section covering fault gas evolution and one is needed. It should discuss gases evolved in normal operation and possible gases which could be evolved under abnormal conditions.

3. The insulation life equations on pages 11 and 12 need to be modified to be in the same form, with definition of A and B constants.

4. Insulation life equations are needed for both aramid based solid insulation and high temperature wire enamels in oil.

5. It was requested that certain lines of text (29-32) be eliminated.

6. Section 10 on page 13 should be reviewed and possibly be removed or changed.

When these comments have been accommodated a revised draft will be distributed to the Working Group for Ballot.

The meeting was adjourned at 9:10 AM.

Heinz Fischer resigned as Chairman due to retirement. The appointment of Michael Franchek, of EHV Weidmann, as new Chairman was confirmed by the Administrative Subcommittee Monday Night Nov. 1.

7.9.5 Task Force on Combined Effects of Thermal and Dielectric Stresses on Insulation Life. Mike Mitelman, Chairman.

The first Task Force meeting was held November 1, 1993 with 8 members and 32 guests in attendance.

This Task Force was initiated to investigate combined effects of dielectric stresses and temperature on transformer insulation life. The current issue was to decide what type of document the Task Force will develop. Possibilities are:

a) Task Force paper to be presented to the Transformers Committee.

b) A guide to establish guidelines on combined stress levels, test procedures, failure analysis, etc.

At a previous Insulation Life Subcommittee meeting Bob Veitch presented some results of studies made at Ferranti Packard on this subject showing

the effects of voltage stresses and temperature on insulation life. The results demonstrated some reduction in insulation life with voltage stresses varied from 20 to 100 volts per mil. Such stresses are not uncommon in distribution and power transformers. Other publications, (e.g. H. Weidmann's Transformerboard II by H. P. Moser and V. Dahinden) also show some dependence of insulation life on dielectric stresses.

Some participants mentioned a possible impact of other factors (mechanical stress, materials, other factors) on insulation life. The Task Force plans to concentrate on two main factors (Thermal and Dielectric Stresses) on cellulose/oil systems.

The suggestion has been made before proceeding any further to investigate the information published (known) to-date on the subject. This will be discussed at the next Task Force meeting. If there is enough information found on this subject, a symposium will be developed for a future IEEE Transformers Committee Meeting.

The meeting was adjourned at 10:30 AM.

7.9.6 New Business

A letter requesting investigation of loading of draw leads in bushings was submitted to the Chairman by L. B. Wagenaar. Copies will be mailed to the Working Group on Guides for Loading for investigation.

The Insulation Life Subcommittee meeting was then adjourned.

Respectfully Submitted by:

Linden W. Pierce
Insulation Life Subcommittee Chairman

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 13
ATTACHMENT 1

SUBCOMMITTEE——— | INSULATION LIFE / CHAIRPERSON: L. W. PIERCE / PHONE: (706)291-3166 / FAX: (706)291-3167

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.100	TEST PROCEDURE FOR THERMAL EVALUATION OF OIL-IMMERSED DISTRIBUTION TRANSFORMERS			NPE EM T&D SPD				APPROVED BY ANSI 12/02/92
C57.100	THERMAL EVALUATION	LOWDERMILK L. A.		03-18-92	10-20-88	1997	(704)462-3113	REAFFIRMED 03/18/92
C57.115	GUIDE FOR LOADING MINERAL-OIL-IMMERSED POWER TRANSFORMERS RATED IN EXCESS OF 100MVA (65 C WINDING RISE)							BEING REVISED
P756	GUIDES FOR LOADING	PIERCE L. W.		03-21-91	- -	1996	(706)291-3166	ANSI APPROVED 01/13/92
C57.119	RECOMMENDED PRACTICE FOR PERFORMING TEMP. RISE TESTS ON OIL-IMMERSED POWER TRANSFORMER AT LOADS BEYOND NP RATING (P838)			SWGR SUBS SCC4	PSRC	IAS EI		NEW PAR APPROVED 09/17/92
PC57.119	THERMAL TESTS	GRUBB R. L.		- -	09-17-92	0	(414)547-0121	REVISED PAR (TITLE & SCOPE)
C57.12.00	DEFINITION OF THERMAL DUPLICATE			EM IAS				
PC57.12.00I	THERMAL TESTS	GRUBB R. L.	R. L. GRUBB	- -	05-31-90	1997	(414)547-0121	
C57.91	GUIDE FOR LOADING MINERAL OIL-IMMERSED TRANSFORMERS			SUB T&D PSE				PUB. 1/12/81, REAFFIRMED 1991
PC57.91	GUIDES FOR LOADING	PIERCE L.		03-21-91	06-13-85	1997	(706)291-3166	APPROVED BY ANSI 01/13/92
C57.92	GUIDE FOR LOADING MINERAL OIL-IMMERSED POWER TRANSFORMERS UP TO & INCL 100 MVA WITH 55 C OR 65 C AVE. WINDING RISE			T&D SUB PSE				PUB. 1/12/81, REAFFIRMED 1991
PC57.91	GUIDES FOR LOADING	PIERCE L.		03-21-91	06-28-85	1997	(706)291-3166	TO BE COMBINED INTO C57.91
C57.95	GUIDE FOR LOADING LIQUID-IMMERSED STEP-VOLTAGE AND INDUCTION-VOLTAGE REGULATORS							PUB. 08/19/85, REAFFIRMED 1991
NONE	GUIDES FOR LOADING	TAKACH D. S.		03-21-91	- -	1997	(314)554-3097	ANSI APPROVED 01/13/92
IEEE1276	TRIAL-USE GENERAL REQUIREMENTS FOR LIQUID-FILLED DISTRIBUTION AND POWER TR UTILIZING HIGH TEMP SOLID INSULATING MATERIAL			T&D				SUBMITTING PAR
P1276	HIGH TEMPERATURE INSULATION	FISCHER H.		- -	09-25-91	0	(802)748-8106	WILL CONDUCT SURVEY ON HI-T M.

7.10 PERFORMANCE CHARACTERISTICS - J. W. Matthews

November 2, 1993
Performance Characteristics Subcommittee Meeting Minutes
St. Petersburg, Florida

7.10.1 Introduction/Attendance

The Performance Characteristics Subcommittee (PCS) met at 9:30 a.m. on Tuesday November 2, 1993 with 54 members and 43 guests in attendance.

7.10.2 Approval of Minutes

The minutes of the March 30, 1993 PCS Meeting were approved as written.

7.10.3 Chairman's Remarks

7.10.3.1 Administrative Subcommittee Notes

The following information was obtained at the November 1, 1993 Administrative Subcommittee meeting:

1. The next Committee meeting will be held in Dallas, Texas at the Grand Kepinski Hotel during March 20-23, 1994. Ken Hanus will be the host.
   Hosts are being solicited for the Fall 1996 and Spring 1997 Committee meetings.

2. Standards Coordination Notes:
   The 1993 Revisions of C57.12.00 and C57.12.90 have been published.

   A working group is being formed in the Standards Subcommittee to coordinate all projects involved with C57.12.00 and C57.12.90. One PAR will be submitted by this Working Group to cover all the revisions to these Standards.

   A status report on all PCS projects is attached. (Attachment 7.10.A)

3. The Committee Administration requested us to remind all Committee Members of their obligations to respond to Committee ballots, attend Main Committee meetings, and

7.10.3.2 Membership

Sam Aguirre (Southwest), Tim Bode (Puget Power), Tito Massouda (Moloney), Nigel McQuin (PSM Technologies), Paulette Payne (PEPCO), and Aslam Rizvi (Magnetek) were added to the roster. J. Bergeron, F. Elliott, J. Frank, R. Hartgrove, R. Johnston, C. Kappeler, D. Lowe, M. Mitelman, D. Takach, and J. Watson were removed from the roster. Membership now stands at 81.

7.10.4 Agenda Changes - None.

7.10.5 Working Group Reports

7.10.5.1 LTC Performance Requirements -T.P. (Tom) Traub
The Dielectric Tests for Load Tap Changers Task Force met in place of the LTC Performance Requirements Working Group at 1:20 p.m. on Monday, November 1, 1993. There were 17 members and 20 guests present.

The main purpose of the meeting was to review comments received from members of the Revision of Dielectric Tests Working Group on the dielectric test portion of the draft standard "Standard Requirements for Load Tap Changers". The WG ballots were received last May with 19 approvals, 5 approved with comments, and 5 not approved.

The main items discussed at the meeting are as follows:

- The term "Nominal Voltage Level of LTC" will be used instead of "Rated Insulation Level of LTC" as the main identifier of an LTC from the standpoint of dielectric capability.
- Chopped wave tests will not be included in LTC dielectric testing.
- Lightning impulse tests will consist of three positive and three negative polarity impulse voltages.
- Switching impulse tests, when applicable, will consist of three negative polarity voltage applications.

- The duration of the enhancement test level for the partial discharge test will be five seconds.
- Partial discharges during the half hour portion of the test (the extended period) will be required to be zero instead of 50 microvolts and the ambient level must be no more than 10 microvolts or 50 picoCoulombs.

The meeting adjourned at 3:30 p.m.

The revisions made by this TF will be balloted in PCS and the Dielectric Tests Subcommittee prior to the next meeting. Revisions to the Annexes (not related to dielectric tests) will also be balloted in PCS prior to the next meeting. With the results of these ballots, we hope to be ready to ballot the Main Committee on the entire document.

7.10.5.2 Failure Analysis - M. S. (Mike) Altman

The Task Force to Survey Failures of Generator Step-Up Transformers met in place of the Working Group at 11:00 a.m. on Monday November 1, 1993 in St. Petersburg, FL., Hal Light chaired the meeting with 10 Members and 14 guests in attendance.

Only 14 responses have been received from the Survey which had been sent to 120 utilities. After discussion as to whether this work should continue, the TF Chairman agreed to send a follow-up letter to those not responding to the first request (roughly 105 utilities). Assignments will also be given to TF members for telephone follow-up to the written request. We will continue this work, hopefully getting a better response between now and the next meeting.

John Matthews, the PCS Chairman, then announced that Mike Altman has resigned as WG Chairman. Due to no current projects other than the Survey, a new chairman will not be appointed and the WG will be disbanded. The TF will now report directly to the PCS. The meeting was then adjourned.

7.10.5.3 Revision C57.110 - R. P. (Rick) Marek

The meeting was held on Monday November 1, 1993 at 2:50 p.m. with 18 members and 14 guests present.

The first order of business was the approval of the Portland, Oregon minutes. They were approved without comment.

The Chairman reported that the PAR had been approved by the IEEE Standards Board. The next item was a report by the Chairman on the task force meetings that were scheduled for Sunday October 31, 1993. It was noted that these meetings were in conflict with the NEMA meetings being held and that most of the TF members were unable to attend. For the benefit of those not present at the previous meeting, the chairman then read a list of the task force groups and the members. He also asked that the TF Chairmen supply him with their data by the end of November. He will then compile their work into a complete document and distribute it to the general membership. This target date was set for early January. The Chairman also stated that as part of his preliminary work he has defined a "Harmonic Loss Factor" and has differentiated this from the "K Factor" which is currently used by UL.

The meeting was then centered on new business. A paper by Mr. James Deffenbaugh was presented as an example of the confusion that exists in the industry when using the current issue of C57.110. Linden Pierce, who was unable to attend due to a conflict, also submitted a letter to the Chairman illustrating some of this confusion. The Chairman stated that he hoped that the Task Forces would use these comments in their work and try to make the document more clear cut and easier to use. In conjunction with this discussion, Don Kline stated that the document was now being used by manufacturers to design new transformers. However, the original document was started to solve a specific field problem and was not intended to be used to design new transformers. The Chairman noted that he had received a comment to his preliminary work which had a section titled

"New Transformer Design". It was suggested in the meeting that this section be retitled "New Transformer Specification". This suggested title change was referred to the appropriate task force for a resolution. The change would help to eliminate some confusion as to whether the transformer manufacturer was responsible for the harmonic profile or whether it was the responsibility of the specifying engineer. It was universally agreed that it was the responsibility of the specifying engineer since the transformer manufacturer had no way of determining this data.

A discussion was held as to whether to normalize the harmonic factor to the fundamental current or the RMS current. There was no resolution to this discussion during this meeting.

Further discussion was held as to how to get feedback from end users concerning the harmonics that are on a system for which the transformer is intended to be installed. It was noted that harmonic analysis is normally performed after a problem is encountered, and not supplied to the manufacturer before the design stage. This issue was not resolved during this meeting. However, it was agreed to address it in the final document.

Ed Hutter felt that a note must be included in the document pertaining to the third harmonic content on transformers supplying office systems. The Chairman agreed with this and also asked that all the members contribute their experiences in the revision of this document in order to make it as complete as possible.

Following much discussion as to including theoretical harmonic profiles in order to cover all circumstances, the Chairman reiterated that the scope of this document limits the coverage to known harmonic profiles.

Don Kline then presented a method for performing an RMS K Factor Test using a back-to-back thyristor regulator, a personal computer, a data acquisition board, and a Basic program. He stated that to date, the setup has been successfully used

with a 25 kVA transformer. He then invited other members of the WG to try the test and report their results to the group.

The final item of business was a suggestion by Charlie Williams that the document should add equations to modify the formulas found in the loading guides in order to conform to "real world" applications. This was suggested because it is known that some units are not running at nameplate temperature rise due to design considerations such as loss evaluation. It was stated that since the units are not operating at nameplate temperatures, the derating factor as applied to kVA alone may be the wrong approach. He also indicated that he would require the additional necessary information from his transformer suppliers in order to analyze these units.

The meeting was adjourned at 4:10 p.m.

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

The WG on Loss Tolerances and Measurement met at 9:30 a.m. on Monday November 1, 1993 with 17 members and 15 guests present. Minutes of the previous meeting were reviewed and accepted.

The first agenda item was task force reports. The Task Force on Transformer Loss Measurement Guide met on Sunday afternoon at 3:00 p.m. Ballot results of a WG ballot on the no-load loss portion of the Guide were discussed. One negative vote and other comments were as follows:

1. Core loss does not necessarily always decrease with an increase in temperature.

2. The average to RMS voltage ratio, by itself, does not prove acceptability of the applied voltage wave. The wave should be observed on an oscilloscope to assure that there are no multiple zero crossings.

3. It was suggested that a limit of 15% on the total harmonic distortion of the voltage wave be imposed.

The Task Force was adjourned by the Chairman, Dr. Ramsis Girgis, at 5:00 p.m.

At 8:00 a.m. Monday morning, Dr. Eddy So chaired the Task Force meeting on Low Power Factor Power Measurement. A mathematical analysis of the measurement error in the two wattmeter method had been prepared by Bertrand Paulin and was discussed at the meeting. Also discussed was the low power factor measurement guide being proposed by the TF, which covers the conventional measuring system and the advanced measuring system.

This Task Force meeting ended at 9:15 a.m., and the Working Group meeting began at 9:30 a.m. Correction methods for the losses and the effect on impedance voltage measurement caused by the impedance of the shorting connection during the load loss test when a high current winding is shorted was discussed.

Time did not allow discussion of the three topics which were on the agenda:

1. Resistance measurement proposal

2. Limits on the allowable correction for phase angle error

3. A proposal on tolerances for losses

These will be addressed after the meeting by conducting a WG ballot on these proposals.

The WG meeting ended at 10:45 a.m.

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

The Working Group met on Monday, November 1, 1993 at 8:00 a.m. and 9:30 a.m. There were 15 members and 8 guests present.

Minutes of the March 29, 1993 meeting in Portland, Oregon were approved.

Draft 8 of the Standard was mailed out to the membership prior to the meeting. Revisions of the tables and graphs were discussed. These were mostly editorial in nature. Table 11, which gave theoretical harmonic spectrums, was removed per the previous WG meeting.

Table 10 refers to the hottest-spot temperature limits. This will not be a tested value. Language will be added to the forward regarding this. Hottest-spot temperatures cannot be practically measured on production units. Therefore, average winding temperature rise plus a hottest-spot increment may be used.

Clause 8.6 on loss tests has been changed. Sinusoidal losses will be used for thermal tests and may be provided when requested.

Much discussion ensued regarding temperature rise tests. The present draft provides for the use of thermal tests conducted by applying sufficient current to produce service load losses. Several other methods were discussed. Use of a load bank, with an appropriate harmonic spectrum, was discussed as a possible method. Mike Iman stated that his test experience indicates discrepancies when compared to the method of applying sinusoidal losses with a magnitude equal to the calculated service load losses. Don Kline proposed a test method of harmonic injection. It was decided not to reference test methods which were not supported in C57.12.90 and C57.12.91. Members were asked to submit modifications to the present draft thermal tests. These will be mailed to the WG for consideration and ballot.
Harmonization with the IEC Convertor Draft was discussed. This Draft was distributed to the WG membership.

It was decided to use the IEC method of rating a transformer. The IEC method uses the fundamental current as the basis for the kVA. Our method has been to use RMS current as the basis for the kVA. This change will result in a lower nameplate kVA with a higher compensation for harmonic losses. The physical transformer supplied would still be the

same by either method. The sinusoidal losses tested will be lower since the kVA is lower. The service load losses would be the same with both methods, if loss calculations methods were the same.

Since impedance as a percentage value is based on the nameplate kVA, it was felt that it would be preferable for users to specify the commutating impedance in ohms rather than as a percent of nameplate kVA. Don Kline will provide the WG with a discussion of this subject.

The next item of discussion, regarding IEC harmonization, was with regard to the harmonic exponent values used in service loss calculations. Our draft uses the eddy losses amplified by an I2h2 multiplier. Other stray losses were multiplied by the summation of I2h2 values. The IEC draft used the summation of I2h2 value as the multiplier for winding eddy current losses as well. However, bus bar connection eddy losses are multiplied by the summation of I2h0.8 values. Other stray losses are also multiplied by the summation of I2h0.8 values. This results in lower calculated service losses than the present IEEE Draft method. The WG members will take both methods into consideration. In approximately 30 days the WG will be balloted on this issue.

It was also brought to the attention of the WG that secondary BIL ratings are now mentioned in the present draft. The old C57.18 Standard excluded the windings connected to the rectifier from impulse tests. There were several reasons for this. The windings are often high current, low voltage windings, which will not produce ANSI Standard waveforms when tested. Interleaved or bifilar secondaries cannot be impulse tested. Usually, the rectifier and transformer are close coupled in a throat connection. They are then not subject to lightning strikes. However, this is not always true. The WG will also be balloted on this issue.

After these individual issue ballots are resolved, a new draft will be mailed to the membership. This draft will be balloted prior to the next meeting.

The meeting adjourned at 10:45 a.m.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.10 PERFORMANCE CHARACTERISTICS (Cont'd)

7.10.6 Project Reports

A. Request for Addition of PCB Content to Nameplate Information in C57.12.00

No progress has been made on this project since the last meeting. Chuck Murray reported to me that he has been ill and unable to work since June. He could not attend this meeting, but he is recovering and will soon be active again.

Note that this Project will now be handled by a new WG detailed in Part 7.10.8.A below.

B. Revision of Cooling Class Designations in C57.12.00

Don Platts reported the following results on Draft #1 within the Task Force.

Ballots issued	6
Ballots returned	5
Negative	1
Approved w/Comments	2
Approved	1

Comments provided with the negative ballot have been incorporated. Most of the other comments have also been incorporated. The remaining comments will be reviewed by the TF prior to completing Draft #2 for ballot in the PCS.

Note that this Project will now be handled by a new WG detailed in Part 7.10.8.A below.

C. Addition of Data Required on Manufacturer's Test Reports in C57.12.90

Pete Krause reported on the PCS ballot regarding the addition of thermal test and calculated data to this report and to move the report from the annex into the main part of the Standard.

A good response was received on this ballot. The majority agreed that the report should be a requirement. The negative ballots mainly indicated that additional data should be added or modifications should be made.

Pete volunteered to lead a task force, mainly consisting of the major respondees to this ballot, to draft a new proposal for the PCS.

Note that this Project will now be handled by a new WG detailed in Part 7.10.8.A below.

D. Revision of C57.12.90 Part II - Guide for Short-Circuit Testing of Distribution and Power Transformers - Low Voltage Impulse Test

Nigel McQuin reported on the survey of the PCS to determine if this test procedure should be revised and updated, or deleted. The survey resulted in a mixed review, with a small majority indicating that the test procedure is necessary, and that it should be revised and updated.

Further discussion in the PCS led to a consensus that a task force should be formed to review the entire Part II of C57.12.90. Nigel subsequently volunteered to lead this TF and he will contact some of the interested survey respondees to participate.

Note that this Project will now be handled by a new WG detailed in Part 7.10.8.A below.

7.10.7 Old Business - None

7.10.8 New Business

A. New WG for Revisions to C57.12.00 and C57.12.90

The Committee Chairman had approved the formation of a new WG to handle all PCS projects for revisions to C57.12.00 and C57.12.90.

Subsequent to this PCS meeting, it was decided that these projects were too cumbersome for one WG to handle. Two WG's were then formed with the approval of the Committee Chairman.

Pete Krause volunteered to chair the WG for Revisions to C57.12.00 and Nigel McQuin volunteered to chair the WG for Revisions to C57.12.90. These WG's will manage all PCS projects for these two Standards, except for those regarding Loss Tolerance and Measurement.

B. C57.116 - Guide for Transformers Directly Connected to Generators

The PCS has been notified that this document is due for

reaffirmation, revision, or withdrawal in December 1994. Discussion in the PCS led to the decision to ballot for reaffirmation. The Committee Chairman gave permission to ballot the Main Committee. George Reitter volunteered to handle this project.

C. New Subcommittee Chairman

John Matthews announced that he is stepping down as PCS Chairman and that Bipin Patel will become the new PCS Chairman.

John thanked the WG leaders and all the members for their active participation in the PCS activities during his Chairmanship.

7.10.9 Next Meeting

The next meeting will be held on Tuesday, March 22, 1994 in Dallas, Texas.

The meeting was adjourned at 10:46 a.m.

Respectfully submitted,
John W. Matthews
PCS Chairman

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE
ATTACHMENT 1

SUBCOMMITTEE——— PERFORMANCE CHARACTERISTICS / CHAIRPERSON: BIPIN PATEL / PHONE: (205)877-7740 / FAX: (205)868-5103

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.105	GUIDE FOR APPLICATION OF TRANSFORMER CONNECTIONS IN THREE-PHASE DISTRIBUTION SYSTEMS							REAFFIRMED BY SB 06/17/92
PC57.105	PROJECT	REITTER G.		06-17-92	- -	1997	(415)591-4463	BEING BALLOTED IN C57
C57.109	GUIDE FOR THROUGH-FAULT CURRENT DURATION			PSR				WILL BALLOT C57
PC57.109	SHORT-CIRCUIT DURATION	PATEL B. K.		03-16-93	06-27-91	1998	(205)877-7740	REV. APPROVED BY SB 03/16/93
C57.110	RECOMMENDED PRACTICE FOR ESTABLISHING TRANSFORMER CAPABILITY WHEN SUPPLYING NONSINUSOIDAL LOAD CURRENTS			T&D PSR NEMA				REAF. ANSI 07/93
PC57.110	REVISION OF C57.110	MAREK R. P.		12-03-92	09-15-93	1997	(804)838-8080	PAR APPROVED 09/15/93
C57.116	GUIDE FOR TRANSFORMERS DIRECTLTY CONNECTED TO GENERATORS							APPROVED BY SB 01/03/89
NONE	TR DIRECTLY CONNECTED TO GEN	PATEL B. K.		01-03-89	- -	1994	(205)877-7740	MUST REAF. OR REV. BY DEC 94
C57.117	GUIDE FOR REPORTING FAILURE DATA FOR POWER TRANSFORMERS AND SHUNT REACTORS							REAFFIRMED BY SB 06/17/92
P786	TRANSFORMER RELIABILITY	ALTMAN M.		06-17-92	- -	1997	(407)694-4975	ANSI APPROVED 7/93
C57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT							TF WORKING
P1098	LOSS TOLERANCE AND MEASUREMENT	HENNING W. R.	RAMSIS GIRGIS	- -	06-13-85	0	(414)547-0121	
C57.125	GUIDE FOR FAILURE INVESTIGATION, DOCUMENTATION AND ANALYSIS FOR POWER TRANSFORMERS AND SHUNT REACTORS			T&D ED&PG PSE		SWGR		
PC57.125	FAILURE ANALYSIS	ALTMAN M.		06-27-91	06-28-87	1996	(407)694-4975	ANSI APPROVED 11/20/91
C57.12.00	TRANSFORMER LOSS MEASUREMENT AND TOLERANCES (P787,P462)							APPROVED BY SB 09/16/92
PC57.12.00c	LOSS TOLERANCE AND MEASUREMENT	HENNING W. R.		- -	06-28-79	1997	(414)547-0121	CONSOLIDATED IN 93 REVISION
C57.12.00	REVISION OF SECTION 5.9 REFERENCE TEMP FOR NO-LOAD LOSS							APPROVED BY SB 09/16/92
PC57.12.00c1	LOSS TOLERANCE AND MEASUREMENT	HENNING W. R.		- -	06-28-79	1997	(414)547-0121	CONSOLIDATED IN 1993 REVISION
C57.12.00	ADD TO SEC 9.3.1 ACCURACY REQUIREMENT FOR MEASURED LOSSES							APPROVED BY SB 09/16/92
PC57.12.00c2	LOSS TOLERANCE AND MEASUREMENT	HENNING W. R.		- -	06-28-79	1997	(414)547-0121	CONSOLIDATED IN 1993 REVISION

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 15

ATTACHMENT 1

SUBCOMMITTEE——— PERFORMANCE CHARACTERISTICS / CHAIRPERSON: BIPIN PATEL / PHONE: (205)877-7740 / FAX: (205)868-5103

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.12.00	LTC TAP POSITION INDICATION			NONE				APPROVED BY SB 09/16/92
PC57.12.00h	PROJECT	FRAZER R. H.		- -	09-28-86	1997	(919)734-8900	CONSOLIDATED IN 1993 REVISION
C57.12.00	NAMEPLATE INFORMATION CHANGE	DIRECTED VS NON-DIRECTED FLOW		TBA				APPROVED BY SB 09/16/92
PC57.12.00i	PROJECT	MATTHEWS J. W.		- -	12-28-86	1997	(301)597-6775	CONSOLIDATED IN 1993 REVISION
C57.12.00	TABLE 16-C ROUTINE DIST TR RESISTANCE TEST							APPROVED BY SB 09/16/92
PC57.12.00k	PROJECT	McMILLEN C. J.		- -	03-28-87	1997	(704)322-6297	CONSOLIDATED IN 1993 REVISION
C57.12.90	REVISION TO SEC 9 IMPEDANCE AND LOAD LOSSES							
PC57.12.90e	LOSS TOLERANCE AND MEASUREMENT	HENNING W. R.		- -	06-28-79	1998	(414)547-0121	INCLUDED IN 1993 REVISION
C57.12.90	REVISION TO SEC 8 NO-LOAD LOSSES & EXCITATION CURRENT							
PC57.12.90e3	LOSS TOLERANCE AND MEASUREMENT	HENNING W. R.		- -	06-28-79	1998	(414)547-0121	INCLUDED IN 1993 REVISION
C57.131	REQUIREMENTS FOR LOAD TAP CHANGERS			EM	T&D			SC BALLOT COMPLETED
PC57.131	LTC PERFORMANCE REQUIREMENTS	TRAUB T. P.		- -	08-17-89	0	(394)294-2704	
C57.18.10	REQUIREMENTS FOR SEMICONDUCTOR RECTIFIER TRANSFORMERS			NONE				BALLOTTING WG, ONLY 47% RET.
PC57.18.10	SEMI-CONDUCTOR RECT TR	KENNEDY S. P.		- -	12-28-81	0	(716)896-6500	PAR HAS BEEN FOUND
C57.21	REQUIREMENTS,TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA			EM	T&D	PSR		COMPLETE
PC57.21	TEST CODE FOR SHUNT REACTORS	McGILL J. W.		04-02-91	06-09-88	1995	(414)475-3422	ANSI APPROVED 08/09/91
IEEE 638	QUALIFICATION OF CLASS 1E TR FOR NUCLEAR POWER GENERATING STATIONS			NPE	SUB	SC2	SCC10	APPROVED BY SB 03/18/92
P638	QUALIFICATION OF TR FOR 1E APP	PIERCE L. W.		- -	10-29-90	1997	(706)291-3166	NEW PAR APPROVED 12/04/90

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COORDINATION ACTIVITY OF PERFORMANCE CHARACTERISTICS SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*P62	GUIDE FOR DIAGNOSTIC OF POWER APPARATUS					
- -	PSIM	DAVID TRAIN	617-926-4900	R. A. VEITCH	PERFORMANCE CHARACTERISTICS	416-685-6551
*PC37.10	GUIDE FOR DIAGNOSTICS AND FAILURE INVESTIGATION OF POWER CIRCUIT BREAKERS					
05-01-91	SWGR	L. ROLANDO SAAVEDRA	504-363-8765	WALLACE B. BINDER JR.	PERFORMANCE CHARACTERISTICS	216-384-5625
*PC37.109	GUIDE FOR THE PROTECTION OF SHUNT REACTORS					
- -	PSR	LAVERN L. DVORAK	303-231-1636	MIKE ALTMAN	PERFORMANCE CHARACTERISTICS	407-694-4975
*PC37.91	GUIDE FOR PROTECTVE RELAY APPLICATION TO POWER TRANSFORMERS					
- -	PSR	R. J. FERNANDEZ	215-770-5619	B. K. PATEL	PERFORMANCE CHARACTERISTICS	205-877-7740

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.11 UNDERGROUND TRANSFORMERS & NETWORK PROTECTORS - P. E. Orehek

UNDERGROUND TRANSFORMERS AND
NETWORK PROTECTORS SUBCOMMITTEE
MEETING MINUTES ST. PETERSBURG, FLORIDA
NOVEMBER 2, 1993

7.11.1 Introduction/Attendance

The Underground Transformers and Network Protectors Subcommittee met at 9:30 a. m. on November 2, 1993, with 14 members and five guests present.

7.11.2 Approval of Minutes

The minutes of the March 30, 1993 meeting in Portland were approved as submitted.

7.11.3 Chairman's Remarks

7.11.3.1 Administrative Subcommittee Notes

1. C57.12.40 was submitted to the IEEE Standards Board for approval and will be acted upon at the next meeting scheduled for December 1, 1993.

2. At the last IEEE Standards Board meeting, a motion was made to drop the "C" from existing standards and assign new IEEE numbers. This Subcommittee approved a motion to inform the IEEE Standards Board that it recommends the "C" in the transformer standards numbering system should be retained.

3. John Matthews of Baltimore Gas has been appointed the Secretary of the Transformers Committee.

7.11.4 Working Group Reports

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

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.11 UNDERGROUND TRANSFORMERS & NETWORK PROTECTORS (Cont'd)

1. The Working Group met on Monday, November 1, 1993, at 1:20 p.m. with 12 members and four guests present.

2. The minutes of the March 29, 1993, Portland, Oregon, meeting were approved as written.

3. The ballot for the revised Standard is being recirculated for review by IEEE since a negative vote could not be resolved.

4. The meeting adjourned at 1:55 p.m.

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

1. The Working Group met on Monday, November 1, 1993, at 2:55 p.m. with 13 members and two guests present.

2. The minutes of the March 29, 1993, Portland, Oregon, meeting were approved as written.

3. The ballot for this standard has been recirculated for review since a negative vote could not be resolved. It is scheduled to be acted upon by the IEEE Standards Board at their December, 1993 meeting.

4. The meeting adjourned at 3:10 p.m.

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

1. The Working Group met on Monday, November 1, 1993, at 8:00 a.m. for three sessions with 17 members and three guests present.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.11 UNDERGROUND TRANSFORMERS & NETWORK PROTECTORS (Cont'd)

2. The minutes of the March 29, 1993, Portland, Oregon, meeting were approved as written.

3. The proposed Standard was balloted in the Transformers Committee and one negative ballot was received. The Working Group is in the process of trying to resolve this negative ballot and is also awaiting a coordination reply from the Switchgear Committee.

4. Seventy-six percent of the ballots were returned with 99 percent voting affirmative.

5. The meeting adjourned at 12:05 p.m.

7.11.4.4 Dry-Type Network Transformers (C57.12.57)
B. Nutt - Chairman

1. The Working Group met on Monday, November 1, 1993, at 4:15 p.m. with nine members and three guests present.

2. The minutes of the March 29, 1993, Portland, Oregon, meeting were approved as written.

3. The Working Group approved Draft #6 of the revised Standard and balloting is presently being done at the Subcommittee level.

4. The meeting adjourned at 4:45 p.m.

7.11.5 New Business

7.11.5.1 The Subcommittee will sponsor a Panel Session at the IEEE T&D Conference and Exposition in Chicago in April 1994.

The subject matter will be related to Maintenance, Reconditioning Practices, Reliability and Design of Network Transformers and Network Protectors.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.11 UNDERGROUND TRANSFORMERS & NETWORK PROTECTORS (Cont'd)

7.11.5.2 IEEE withdrawal from all agreements with NEMA, in which the maintenance and revision of specific standards that have been transferred to the IEEE Transformers Committee, has created many concerns for the Subcommittee members with regard to publishing Standards and the operation of the Working Groups.

7.11.6 Future Meetings

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

March 20-23, 1994	Dallas, Texas
September 24-28, 1994	Milwaukee, Wisconsin
April 23-26, 1995	Kansas City, Missouri
November 5-9, 1995	Boston, Massachusetts
Spring, 1996	San Francisco, California

The meeting adjourned at 10:40 a.m.

Attendance Summary

	Present	Absent
Members	14	4
Guests	5	-

Respectfully submitted,
Paul E. Orehek, Chairman

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 17
ATTACHMENT 1

SUBCOMMITTEE——— UG TR & NETWORK PROTECTORS / CHAIRPERSON: PAUL OREHEK / PHONE: (201)430-7743 / FAX: (704)382-2579

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.12.24	UNDERGROUND-TYPE 3-PHASE DIST- RIBUTION TRANSFORMERS,2500kVA AND SMALLER: HV,34500GrdY..& BELOW,LV,480 V AND BELOW			T&D IC IAS/REP IAC/PSE				COPYRIGHT NOT RELEASED
PC57.12.24	3-PHASE UG-TYPE TRANSFORMERS	HOWARD J. W.		05-10-88	06-27-91	1993	(215)774-5055	NOW TRANSFERRED TO IEEE
C57.12.40	REQUIREMENTS FOR SECONDARY NETWORK TRANSFORMERS, SUBWAY & VAULT TYPES (LIQUID IMMERSED)			SCC14				REVISION APPR. BY SB 12/02/93
PC57.12.40	LIQUID-FILLED NETWORK TRANSFMR	BERTOLINI E. A.		03-19-92	12-05-91	1997	(212)460-4913	WAITING PUBLICATION
C57.12.44	STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS			T&D SWGR IAS/REP IAS/PSE EEI				PAR APPROVED BY SB 06/17/92
PC57.12.44	SECONDARY NETWORK PROTECTORS	ROBERTSON R. B.		- -	06-27-91	0	(813)228-4111	BALLOTING SUBCOMMITTEE
C57.12.57	REQUIREMENTS FOR VENTILATED DRY-TYPE NETWORK TRANSFORMERS 2500kVA AND BELOW, W/HV 34500V AND BELOW,LV 216Y..AND 480Y..			T&D EEI/T&D SCC14				COPYRIGHT NOT RELEASED
PC57.12.57	DRY-TYPE NETWORK TRANSFORMERS	NUTT B.		03-18-92	12-05-91	1997	(214)698-7447	REAFFIRMED 03/18/92

COORDINATION ACTIVITY OF UG TR & NETWORK PROTECTORS SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*PC37.108	GUIDE FOR THE PROTECTION OF NETWORK TRANSFORMERS					
- -	PSR	THOMAS E. WIEDMAN	312-294-2810	R. B. ROBERTSON	UG TR & NETWORK PROTECTORS	813-228-4081
*PC62.2.01	APPLICATION GUIDE FOR SURGE PROTECTION OF ELECTRIC GENERATING PLANTS					
06-01-84	SPD	G. L. GAIBROIS	313-897-0485	R. B. ROBERTSON	UG TR & NETWORK PROTECTORS	813-228-4081

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)

7.12 WEST COAST - L. A. Tauber

Secretary's Note: The following are minutes of the last meeting held October 14, 1993 at Manhattan Beach, California.

The minutes were accepted as is with reservation for revisions by members not able to attend this meeting.

7.12.1 Membership

Mostafa Jafarnia was accepted as a new member of the subcommittee representing North American Transformer.

7.12.3 Old Business

Lou Tauber asked if all members present attended Wednesday's meeting of the working groups dealing with the revision of C57.128,Fire Prevention and Protection Guide for Liquid-Filled Power Transformers & Reactors chaired by Joe Watson of LADWP and the revision of the Consolidation of Transformer Installation Guides, chaired by Jim Gillies. Everyone present attended. Lou then stated that unless there were further comments, of which there were none, the prior day's meeting is considered as the report on these two items of old business.

7.12.4 New Business

7.12.4.1 Lou Tauber confirmed that he is relinquishing the duties of chairman effective as of the conclusion of this meeting and as is the custom, Dave Brucker moves from the position of Vice Chairman/Secretary to that of Chairman.

Joe Watson nominated Gary McCulla of Salt River Project as the new Vice Chairman/Secretary effective at the conclusion of this meeting. Motion was seconded and carried unanimously.

7.12.4.2 Lou Tauber proposed Portland as the next meeting site with the hotel most likely the Red Lion, Lloyd Center, immediately adjacent to BPA. Lou offered to arrange a tour of BPA's new static VAR station southwest of Portland. The Portland site allows maximum access to participants on limited travel budgets and also offers the opportunity for involvement of other Northwest utilities who are not presently attending. Portland achieved agreement without dissent.

7.0 REPORT OF TECHNICAL SUBCOMMITTEES (Cont'd)
7.12 WEST COAST (Cont'd)

7.12.4.3 After some discussion, the week of March 6, 1994, was chosen for the Portland meeting. The specific dates are Wednesday, March 9 thru Friday, March 11, 1994.

7.12.4.4 Lou Tauber asked all in attendance to indicate the name and address of their supervisor so that he could write each of these individuals, thanking them for their support of the Western Subcommittee.

7.12.4.5 Dave Brucker asked members to update the current membership roster which he was circulating. He will conclude an updated roster with the minutes.

The meeting was adjourned at 9:00 a.m.

Respectfully submitted,

David S. Brucker
Secretary
West Coast Transformer Subcommittee

DATE: 01-10-94 STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE Page no 18
ATTACHMENT 1

SUBCOMMITTEE——— | WEST COAST / CHAIRPERSON: DAVID BRUCKER / PHONE: (415)692-4431 / FAX: (415)692-0483

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG CHAIRPERSON	TF CHAIRPERSON	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.114	SEISMIC GUIDE FOR POWER TRANSFORMERS AND REACTORS			NPE	SUBS.			APP BY SB 02/15/90
P513	SIESMIC GUIDE	OKLU S.		02-15-90	09-06-73	1995	(213)481-4823	ANSI APPROVED 08/09/91
C57.120	LOSS EVALUATION GUIDE FOR POWER TRANSFORMERS AND REACTORS			SUB	EM ED&PG	IAS	IEC	PUBLISHED 1992
P842	LOSS EVALUATION GUIDE	JACOBSEN R.		12-03-91	05-01-80	1996		APPROVED BY ANSI 02/28/92
C57.128	FIRE PROTECTION OF OUTDOOR LIQUID-IMMERSED POWER TRANSFORMERS			NPE	SUB PSR			DRAFT BEING PREPARED
PC57.128	FIRE PROTECTION	SUNDIN D.		- -	06-01-89	0	(414)796-0220	
C57.12.11	GUIDE FOR INSTALLATION OF OIL-IMMERSED TRANSFORMERS (10MVA & LARGER, 69-287kV RATING)							TO BE REPLACED BY C57.93
PC57.93	CON. INSTALLATION GUIDES	GILLIES D. A.		05-09-80	- -	1992	(503)622-4847	LIFE EXTENSION TO 12/92
C57.12.12	GUIDE FOR INSTALLATION OF OIL-IMMERSED TRANSFORMERS 345kV AND ABOVE							TO BE REPLACED BY C57.93
PC57.93	CON. INSTALLATION GUIDES	GILLIES D. A.		05-09-80	- -	1992	(503)622-4847	LIFE EXTENSION TO 12/92
C57.93	GUIDE FOR INSTALLATION OF LIQUID-IMMERSED POWER TRANSFORMERS.			NONE				BALLOTING REVISION IN TC
PC57.93	CONSOLIDATION OF INST. GUIDES	GILLIES D. A.		- -	06-01-89	0	(503)622-4847	WITHDRAW 12.11/12.12 WHEN APP.

COORDINATION ACTIVITY OF WEST COAST SUBCOMMITTEE AS PER: 01-10-94

*PROJECT NO. / DATE	TITLE / PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMER COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*P1248	GUIDE FOR THE COMMISSIONING OF ELECTRICAL SYSTEMS IN HYDROELECTRIC POWER PLANTS					
07-26-90	ED&PG	LOUIS A. TAUBER	503-326-2323	D. A. GILLIES	WEST COAST	503-622-4847
*P1268	GUIDE FOR INSTALLING TEMPORARY SUBSTATIONS					
03-30-91	SUBS	SHASHI G. PATEL	404-362-5386	D. A. GILLIES	WEST COAST	503-622-4847
*P693	RECOMMENDED PRACTICE FOR SEISMIC DESIGN OF SUBSTATIONS					
- -	SUBS	RULON FRONK	213-481-3327	L. A. TAUBER	WEST COAST	503-230-3829
*P979	GUIDE FOR SUBSTATION FIRE PROTECTION					
01-10-92	SUBS	A. J. BOLGER	604-663-2879	D. W. SUNDIN	WEST COAST	414-524-3221

8.0 REPORTS OF LIAISON REPRESENTATIVES

8.1 EPRI - S. R. Lindgren

8.1.1 EHV Converter Transformer

8.1.1.1 Test results confirmed 25% or greater major insulation size reduction can be attained with some further work.

8.1.1.2 Final report will be published pending patent filing.

8.1.2 Amorphous Steel for Power Transformers

8.1.2.1 A pilot facility automated cutting line has been built and tested.

8.1.2.2 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, and no explanation has been found. Final tests are being made to wrap up the project.

8.1.3 Advanced Power Transformer

8.1.3.1 Reduced load loss feasibility has been demonstrated.

8.1.3.2 Detailed analytical studies exploring individual design aspects have been completed.

8.1.3.3 As a part of Phase II, a 47 MVA three phase core form prototype was built and successfully short circuit tested March, 1991, delivered to HL&P, and is now in service.

8.1.3.4 Development of shell form insulation, winding and physical models continues. A 1425 BIL dielectric model was tested successfully. A 25 MVA single phase, 161 kV model will be built and tested.

8.1.4 Static Electrification in Power Transformers

8.1.4.1 This is the suspected failure mechanism in over 24 core form and shell form FOA transformers worldwide. Recent failures involve 20-year-old transformers. One unit had been recently reprocessed after oil was removed for maintenance. The "installed spare" unit subsequently failed January 1992 with original oil that had not been touched.

8.1.4.2 Current work is focused on the effects of temperature and moisture transients. Tests on representative transformer cooling components have been completed. A project is in

process monitoring a large FOA transformer in the field. Data is being collected and monitored at a remote location.

8.1.5 Bubble Evolution in Overloaded Transformers

8.1.5.1 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.

8.1.5.2 A project to better identify moisture conditions associated with bubbles and verify GE mathematical model was completed (Interim Report EL6761) but raised questions about nitrogen blanketed transformers.

8.1.5.3 A final report (EL7291) covering more complete test data is published. A computer program covering bubble evolution plus the ANSI Loading Guide formulas has been developed as an EPRIGEMS, AP-102649, available as of July, 1993.

8.1.6 Active Transformer Noise Cancellation System

8.1.6.1 Only noise reduction in one direction has been pursued.

8.1.6.2 An initial evaluation on a substation transformer was completed that demonstrated over 10 decibel reduction of 120 Hx with a small trial system.

8.1.6.3 Two systems are being linked together to handle a larger transformer and improve reduction of higher frequencies.

8.1.6.4 A field demonstration is under way.

8.1.7 High Voltage Instrument Transformers

EPRI sponsored a workshop 9/90 to provide a forum to compare and categorize failure information, failure modes and potential mitigation measures. This was an outgrowth of the roundtable in Washington, DC 4/88. Proceedings, TR 100205, are published. A project is under way to study fast disconnect switching transient effects on HVCTs. Mathematical modeling was checked experimentally through laboratory tests and switching tests in a 500 kV substation with very high speed instrumentation.

8.1.8 Power Transformer Tank Rupture - Risk Assessment and Mitigation

This project has been completed except for final report which will be published pending patent applications. Over 20 well documented cases have been collected from which several were selected for detailed study.

8.1.9 Geomagnetic Induced Currents (GIC)

EPRI has three projects under way:

8.1.9.1 A feasibility demonstration has been completed for detection of transformer core saturation at 25 locations reporting to a central location. Useful data was collected from several GIC events. GIC activity in 1993 has been low; however, NOAA predicts higher activity in 1994. A dozen or so locations will continue on a routine monitoring basis.

8.1.9.2 Two transformer neutral GIC blocking devices were installed in 1991 and preliminary field trials were performed with good results in June 1991. The systems were moved to active transmission line locations and have bypassed successfully during the past one and one half years.

8.1.9.3 A project to evaluate the response of protective relaying systems to GIC has been completed. A final report is in process.

8.1.10 Thermal Models for Real-Time Monitoring

This project involves all transmission components including power transformers regarding software development and a field test involving two substations on a utility system. The field test is in process.

8.1.11 Microelectronic Fault Gas Analyzer

This project is a continuation of earlier EPRI efforts to develop an on-line low cost gas analyzer that were abandoned because of baseline drift of the sensors. The new project utilizes a different type of sensor to monitor multiple gases.

Added: Furfural in transformer oil.

9.0 NEW BUSINESS

A motion was made to include a roster of voting members with the minutes of the meeting, including addresses, telephone and fax numbers. The motion carried 40 to 12.

There being no additional new business, the meeting was adjourned at 11:10 a.m.

IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUP	Montreal Oct. 1990	Phoenix May 1991	Baltimore Nov. 1991	Birmingham Apr. 1992	Cleveland Oct. 1992	Portland Mar. 1993	St. Pete Nov. 1993	MAX	AVG
Committee Registration: Members and Guests	257	237	247	285	245	213	283	285	252
Spouses	74	63	59	45	40	48	97	97	61
Luncheon	128	140	117	138	120	112		140	126
SC ADMINISTRATIVE	24	19	21	18	18	16	21	24	20
SC AUDIBLE SOUND AND VIBRATION	19	0	25	36	0	26		36	18
SC BUSHINGS	23	26	37	31	22	17	18	37	25
WG Bushing Application Guide	29	25	19	21	27	21	19	29	23
WG DC Applications of Bushings	14	13	14	15	12	17	13	17	14
WG Revision C57.19.01			11	15	13	12	13	15	13
SC DIELECTRIC TESTS	88	78	72	93	104	88	98	104	89
WG Revision of Dielectric Tests	35	48	53	56	58	40	60	60	50
TF Rev. of Impulse Test Guide	55	38	47		45	49	31	55	44
TF on Revision of the Induced Test		22	25			25	33	33	26
TF Metal Oxide Surge Arrester Coordination					27	27	35	35	30
WG Rev. Dielectric Tests on Distr. Transf.	30	27	21	29	19	17		30	24
TF Low Side Surge Req. for Distr. Transf.	19		25					25	22
TF Rev. Distr. Impulse Guide			25					25	25
WG Partial Discharge Tests	24	42	67	46	40	66	28	67	45
TF Acoustic Detection of Partial Discharge		20	22					22	21
TF Measurement of Apparent Charge	16	17	22					22	18
SC DISTRIBUTION TRANSFORMERS			34	28	35	35	52	52	37
WG Overhead Type Distr. Transfs. C57.12.20				23	23	23	35	35	26
WG Single-Phase Live Front Padmount C57.12.21				14	14	14	14*	14	14
WG Three-Phase Live Front Padmount C57.12.22				15	15	15	15*	15	15
WG Single-Phase Submersible C57.12.23				0	0	0	0*	0	0
WG Single-Phase Deadfront Padmount C57.12.25				28	28	28	28*	28	28
WG Three-Phase Deadfront Padmount C57.12.26				0	0	0	0*	0	0
WG Bar Coding					0	0	0*	0	0
WG Joint C57/37 on Cabinet Integrity C57.12.28				0	0	0	0*	0	0
WG Electronic Data Transmittal							5*	5	5

NOTE: Data maintained for four years only.

*=estimated

ATTACHMENT 1

IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUP	Montreal Oct. 1990	Phoenix May 1991	Baltimore Nov. 1991	Birmingham Apr. 1992	Cleveland Oct. 1992	Portland Mar. 1993	St. Pete Nov. 1993	MAX	AVG
SC DRY-TYPE TRANSFORMERS	31	32	29	42	26	39	38	42	34
WG Test Code C57.91	29	28	22	31	25	31	27	31	28
WG Dry-Type Dielectric Problems	21	29	0	0	0	0		29	8
WG Dry-Type Reactors	10	9	12	15	9	12	7	15	11
WG Dry-Type Reactors - HVDC Smoothing							8	8	8
WG Dry-Type Thermal Eval. and Flammability		28	0	27	16	26	20	28	20
WG Dry-Type Thermal Problems	24	29	0	0	0	0	0	29	8
WG Dry-Type General Requirements C57.12.01							31	31	31
WG Insulation Req. for Specialty Transf.	10	19	12	20	11	6	11	20	13
WG Cast Coil Loading Guide	20	30	22	25	19	30	17	30	23
WG Hot Spot Diferentials							27	27	27
SC HVDC CONVERTER TRANSFS. AND REACTORS	15	11	9	11	13	19	17	19	14
SC INSTRUMENT TRANSFORMERS	22	13	22	23	26	21	28	28	22
SC INSULATING FLUIDS	34	36	54	68	61	57	62	68	53
WG Gas Analysis During Factory Tests	36	72				57	62	72	57
SC INSULATION LIFE	61	81	91	71	138	83	60	138	84
WG Guides for Loading	44	51	62	74	70	69	73	74	63
TF Loss of Insulation Life	12	32	18	25	0	0		32	15
WG Thermal Eval. of Distr. and Power Transf.	67	56	35	40	32	38	35	67	43
WG Thermal Tests	22	30	54	48	32	34	39	54	37
WG High Temperature Insulation		46	33	59	60	55	58	60	52
SC PERFORMANCE CHARACTERISTICS	77	77	85	86	69	60	97	97	79
WG Failure Analysis Guide	33	42	31	28	38	20	24	42	32
WG Loss Tolerance and Measurement	24	35	37	26	38	39	32	39	33
TF Loss Measurement Guide	24							24	24
TF Low Power Factor Measurements									
WG LTC Performance Requirements	28	31	30	25	37	38	37	38	32
WG Qualification of Class 1E Nuclear Tr.	10	6	4	0	0	0		10	3
WG Revision C57.109				26	19	13		26	19
WG Revision C57.110						38	32	38	35
WG Semi-Conductor Rectifier Transformers	17	0	23	30	23	31	23	31	21

NOTE: Data maintained for four years only.

* = estimated

IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUP	Montreal Oct. 1990	Phoenix May 1991	Baltimore Nov. 1991	Birmingham Apr. 1992	Cleveland Oct. 1992	Portland Mar. 1993	St. Pete Nov. 1993	MAX	AVG
SC UNDERGROUND TRANSFS. AND NETWORK PROTECTORS			25	21	17	17	19	25	20
WG Three-Phase Underground Transfs.			19	16	14	9	16	19	15
WG Liquid-Filled Sec. Network Transfs.			19	21	17	16	15	21	18
WG Secondary Network Protectors			17	16	19	13	20	20	17
WG Dry-Type Network Transfs.			31	29	15	18	12	31	21
SC WEST COAST	0	18	0	10	14	0		18	7
WG Consolidation of Installation Guides	0		0		0	0		0	0
WG Seismic Guide	0		0		0	0		0	0
WG Loss Evaluation Guide	0		0		0	0		0	0
WG Fire Protection	0		0		0	0		0	0

NOTE: Data maintained for four years only.

*=estimated

STANDARD NO / PROJECT NO	TITLE OF DOCUMENT / SUBCOMMITTEE	SC CHAIRPERSON	WG CHAIRPERSON	COMMITTEES REQUESTING COORDINATION: PUB_DATE	PAR_DATE	REV_DUE_YEAR	SC_CH_PHONE	LATEST STATUS / COMMENTS
C57.12.00	GENERAL REQUIREMENTS FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS							WAITING ANSI APPROVAL
VARIOUS	(STANDARDS)	W. B. BINDER		06-16-93	- -	1998	(216)384-5625	APPROVED BY SB 06/16/93
C57.12.00	TRANSFORMER LOSS MEASUREMENT AND TOLERANCES (P787,P462)							APPROVED BY SB 09/16/92
PC57.12.00c	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	HENNING W. R.	- -	06-28-79	1997	(205)877-7740	CONSOLIDATED IN 93 REVISION
C57.12.00	REVISION OF SECTION 5.9 REFERENCE TEMP FOR NO-LOAD LOSS							APPROVED BY SB 09/16/92
PC57.12.00c1	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	HENNING W. R.	- -	06-28-79	1997	(205)877-7740	CONSOLIDATED IN 1993 REVISION
C57.12.00	ADD TO SEC 9.3.1 ACCURACY REQUIREMENT FOR MEASURED LOSSES							APPROVED BY SB 09/16/92
PC57.12.00c2	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	HENNING W. R.	- -	06-28-79	1997	(205)877-7740	CONSOLIDATED IN 1993 REVISION
C57.12.00	LTC TAP POSITION INDICATION			NONE				APPROVED BY SB 09/16/92
PC57.12.00h	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	FRAZER R. H.	- -	09-28-86	1997	(205)877-7740	CONSOLIDATED IN 1993 REVISION
C57.12.00	NAMEPLATE INFORMATION CHANGE DIRECTED VS NON-DIRECTED FLOW			TBA				APPROVED BY SB 09/16/92
PC57.12.00i	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	MATTHEWS J. W.	- -	12-28-86	1997	(205)877-7740	CONSOLIDATED IN 1993 REVISION
C57.12.00	NEW SEC 6.8 MINIMUM EXTERNAL CLEARANCES BETWEEN LIVE PARTS							APPROVED BY SB 09/16/92
PC57.12.00j	DIELECTRIC TESTS	J. B. TEMPLETON	VEITCH R. A.	- -	12-28-86	1997	(317)289-1211	CONSOLIDATED IN 1993 REVISION
C57.12.00	TABLE 16-C ROUTINE DIST TR RESISTANCE TEST							APPROVED BY SB 09/16/92
PC57.12.00k	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	McMILLEN C. J.	- -	03-28-87	1997	(205)877-7740	CONSOLIDATED IN 1993 REVISION
C57.12.00	DEFINITION OF THERMAL DUPLICATE			EM	IAS			
PC57.12.00l	INSULATION LIFE	L. W. PIERCE	GRUBB R. L.	- -	05-31-90	1997	(706)291-3166	
C57.12.01	GENERAL REQUIREMENTS FOR DRY-TYPE DIST. AND POWER TR INCL THOSE WITH SOLID CAST &/or RESIN-ENCAPSULATED WINDINGS							MUST REAF. OR REV. BY DEC 94
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON	JONATTI A.	02-02-89	- -	1994	(703)688-3325	APP. BY SB 02/02/89
C57.12.11	GUIDE FOR INSTALLATION OF OIL-IMMERSED TRANSFORMERS (10MVA & LARGER, 69-287kV RATING)							TO BE REPLACED BY C57.93
PC57.93	WEST COAST	DAVID BRUCKER	GILLIES D. A.	05-09-80	- -	1992	(415)692-4431	LIFE EXTENSION TO 12/92

ATTACHMENT 2

STANDARD NO / PROJECT NO	TITLE OF DOCUMENT / SUBCOMMITTEE	SC CHAIRPERSON	WG CHAIRPERSON	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	SC_CH_PHONE	LATEST STATUS / COMMENTS
C57.12.12	GUIDE FOR INSTALLATION OF OIL-IMMERSED TRANSFORMERS 345kV AND ABOVE							TO BE REPLACED BY C57.93
PC57.93	WEST COAST	DAVID BRUCKER	GILLIES D. A.	05-09-80	- -	1992	(415)692-4431	LIFE EXTENSION TO 12/92
C57.12.13	CONFORMANCE REQUIREMENTS FOR LIQUID-FILLED TRANSFORMERS USED IN UNIT INSTALLATIONS INCL. UNIT SUBSTATIONS							ASSIGN TO SUBCOMMITTEE
NONE	(STANDARDS)	G. VAILLANCOURT		09-02-81	- -	1987	(514)652-8515	COPYRIGHT WITHELD BY NEMA
C57.12.20	OVERHEAD-TYPE DISTRIBUTION TRANSFORMERS, 500 kVA AND SMALLER: H V 34500 VOLTS AND BELOW, L V 7970/13800Y & BELOW	T&D	IAS/REP SCC14					PAR APPROVED BY NESCOM
PC57.12.20	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	THOMPSON J. C.	01-11-88	12-05-91	1993	(704)373-5139	BALLOTING SUBCOMM.
C57.12.21	STANDARD REQUIREMENTS FOR PAD-MOUNTED, COMPARTMENTAL-TYPE, SELF-COOLED, SINGLE-PHASE DIST TRANSFORMERS WITH HV BUSHINGS	T&D	IAS/REP					BALLOTING MAIN COMMITTEE
PC57.12.21	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	GHAFOURIAN A.	10-22-79	06-27-91	1985	(704)373-5139	COPYRIGHT NOT RELEASED
C57.12.22	PAD-MOUNTED,COMPARTMENTAL-TYPE SELF-COOLED,3-PHASE DIST. TR WITH HV BUSHINGS,2500kVA AND SMALLER:...REQUIREMENTS.	T&D	IAS/REP IAS/PSE					AWAITING ANSI APPROVAL
PC57.12.22	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	HANUS K.	05-10-89	06-27-91	1994	(704)373-5139	COPYRIGHT NOT RELEASED
C57.12.23	UNDERGROUND-TYPE,SELF-COOLED, 1-PHASE DISTRIBUTION TR WITH SEPERABLE INSULATED HV CONNECT HV 24940GrdY..LV,240..;167kVA.	T&D	IC IAS/REP IAS/PSE					BALLOTING C57
PC57.12.23	DISTRIBUTION TRANSFORMERS	J. C. THOMSON	PAIVA G.	09-19-85	06-27-91	1996	(704)373-5139	HELD FROM DIST. UNTIL BAL.C57
C57.12.24	UNDERGROUND-TYPE 3-PHASE DIST- RIBUTION TRANSFORMERS,2500kVA AND SMALLER: HV,34500GrdY..& BELOW,LV,480 V AND BELOW	T&D	IC IAS/REP IAC/PSE					COPYRIGHT NOT RELEASED
PC57.12.24	UG TR & NETWORK PROTECTORS	PAUL OREHEK	HOWARD J. W.	05-10-88	06-27-91	1993	(201)430-7743	NOW TRANSFERRED TO IEEE
C57.12.25	REQUIREMENTS FOR PAD-MOUNTED COMP-TYPE,SELF-COOLED,1-PHASE DISTRIBUTION TR W/SEP INS HV CONN,HV 34500GrdY...167kVA...	T&D	IC IAS/REP IAS/PSE					WORKING ON DRAFT 1
PC57.12.25	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	MOMESKY N.	05-11-90	06-27-91	1995	(704)373-5139	COPYRIGHT NOT RELEASED
C57.12.26	PAD-MOUNTED COMPARTMENTAL-TYPE SELF-COOLED,3-PHASE DIST TR for USE W/ SEPERABLE INSULATED HV CONN.,HV 34500GrdY..2500kVA	T&D	IC IAS/REP IAS/PSE SCC14					REV. APP. BY ANSI 07/09/93
PC57.12.26	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	PAIVA G.	06-17-92	12-05-91	1997	(704)373-5139	HELD FROM DIST PENDING C57 APP

STANDARD NO / PROJECT NO	TITLE OF DOCUMENT / SUBCOMMITTEE	SC CHAIRPERSON	WG CHAIRPERSON	COMMITTEES REQUESTING COORDINATION: PUB_DATE	PAR_DATE	REV_DUE_YEAR	SC_CH_PHONE	LATEST STATUS / COMMENTS
C57.12.28	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY							EXTENSION TO BE REQUESTED
PC57.12.28	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	MARTIN J.	06-24-87	- -	1994	(704)373-5139	NOT TRANSFERED TO TC YET
C57.12.29	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY IN COASTAL ENVIRONMENTS							PUBLISHED IN 1992
PC57.12.29	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	MARTIN J.	- -	- -	1996	(704)373-5139	NOT TRANSFERED TO TC YET
C57.12.30	SUBMERSIBLE EQUIPMENT - ENCLOSURE INTEGRITY							TO BE BALLOTED
PC57.12.30	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	MARTIN J.	- -	- -	1994	(704)373-5139	NOT TRANSFERED TO TC YET
C57.12.31	COATING STANDARD FOR POLE MOUNTED TRANSFORMERS							PAR TO BE SUBMITTED
PC57.12.31	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	MARTIN J.	- -	- -	1994	(704)373-5139	NOT TRANSFERED TO TC YET
C57.12.40	REQUIREMENTS FOR SECONDARY NETWORK TRANSFORMERS, SUBWAY & VAULT TYPES (LIQUID IMMERSED)			SCC14				REVISION APPR. BY SB 12/02/93
PC57.12.40	UG TR & NETWORK PROTECTORS	PAUL OREHEK	BERTOLINI E. A.	03-19-92	12-05-91	1997	(201)430-7743	WAITING PUBLICATION
C57.12.44	STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS			T&D	SWGR	IAS/REP	IAS/PSE EEI	PAR APPROVED BY SB 06/17/92
PC57.12.44	UG TR & NETWORK PROTECTORS	PAUL OREHEK	ROBERTSON R. B.	- -	06-27-91	0	(201)430-7743	BALLOTING SUBCOMMITTEE
C57.12.50	REQ. FOR VENTILATED DRY-TYPE DISTRIBUTION TR, 1-500kVA, 1 PHASE, AND 15-500kVA, 3-PHASE HV 601-34500VOLTS,LV 120-600V							COPYRIGHT NOT RELEASED
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON		06-12-89	- -	1994	(703)688-3325	REAFFIRMED 06/12/89
C57.12.51	REQ. FOR VENTILATED DRY-TYPE POWER TR, 501kVA & LARGER, 3 PHASE, WITH HV 601-34500V, LV 208Y/120 TO 4160 VOLTS							COPYRIGHT NOT RELEASED
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON		06-12-89	- -	1994	(703)688-3325	REAFFIRM 06/12/89
C57.12.52	REQ. FOR SEALED DRY-TYPE POWER TRANSFORMERS, 501kVA & LARGER, 3 PHASE, WITH HV 601-34500V,LV 208Y/120 TO 4160 VOLTS							COPYRIGHT NOT RELEASED
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON		06-12-89	- -	1994	(703)688-3325	REAFFIRMED 06/12/89
C57.12.53	REQUIREMENTS FOR DRY-TYPE, UNDERGROUND, SINGLE-PHASE WITH SEPARABLE INSULATED H-V 24940 grdY/14400 V AND <; LV 240/120 V							NEW STANDARD
NONE	(STANDARDS)	G. VAILLANCOURT		- -	- -	0	(514)652-8515	NOBODY IS WORKING ON IT

STANDARD NO / PROJECT NO	TITLE OF DOCUMENT / SUBCOMMITTEE	SC CHAIRPERSON	WG CHAIRPERSON	COMMITTEES REQUESTING COORDINATION: PUB_DATE	PAR_DATE	REV_DUE_YEAR	SC_CH_PHONE	LATEST STATUS / COMMENTS
C57.12.54	REQUIREMENTS FOR DRY-TYPE, UNDERGROUND 3 PHASE DISTRIBUTION TRANSFORMERS,2500 kVA OR <, HV 24940 grdY/14400 OR <,LV 480V							NEED TRANSFER TO IEEE
NONE	(STANDARDS)	G. VAILLANCOURT		- -	- -	0	(514)652-8515	
C57.12.55	CONFORMANCE STANDARD FOR TR- DRY-TYPE TRANSFORMERS USED IN UNIT INSTALLATIONS, INCL. UNIT SUBSTATIONS							COPYRIGHT NOT RELEASED
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON		04-07-86	- -	1992	(703)688-3325	BALLOT REAFFIRMATION
C57.12.56	TEST PROCEDURE FOR THERMAL EVALUATION OF INSULATION SYST FOR VENTILATED DRY-TYPE POWER & DISTRIBUTION TRANSFORMERS							REAFFIRMED BY SB 06/16/93
PC57.12.56	DRY-TYPE TRANSFORMERS	W. PATTERSON	PROVOST R. L.	08-27-84	- -	1995	(703)688-3325	SUBMIT TO ANSI
C57.12.57	REQUIREMENTS FOR VENTILATED DRY-TYPE NETWORK TRANSFORMERS 2500kVA AND BELOW, W/HV 34500V AND BELOW,LV 216Y..AND 480Y..	T&D	EEI/T&D SCC14					COPYRIGHT NOT RELEASED
PC57.12.57	UG TR & NETWORK PROTECTORS	PAUL OREHEK	NUTT B.	03-18-92	12-05-91	1997	(201)430-7743	REAFFIRMED 03/18/92
C57.12.58	GUIDE FOR CONDUCTING TRANSIENT VOLTAGE ANALYSIS OF A DRY-TYPE TRANSFORMER COIL	IEC	IAS					PUBLISHED 1992
P745	DRY-TYPE TRANSFORMERS	W. PATTERSON	KLINE A. D.	06-27-91	06-28-78	1996	(703)688-3325	ANSI APPROVED 10/11/91
C57.12.59	GUIDE FOR DRY-TYPE TRANSFORMER THROUGH-FAULT CURRENT DURATION							MUST REV. OR REAF. BY DEC 94
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON	NONE	01-01-89	09-13-84	1994	(703)688-3325	ANSI APPROVED 08/09/91
C57.12.60	TEST PROCEDURES FOR THERMAL EVALUATION OF INSULATION SYSTEMS FOR SOLID-CAST & RESIN ENCAP POWER & DIST TRANSFORMER	IAS	NEMA IEC					APPROVED BY SB 10/25/92
PC57.12.60	DRY-TYPE TRANSFORMERS	W. PATTERSON	PROVOST R. L.	10-25-92	08-17-89	1994	(703)688-3325	BEING BALLOTTED IN C57
C57.12.70	TERMINAL MARKINGS AND CONNECTIONS FOR DIST. & POWER TRANSFORMERS							ANSI APPROVED 07/09/93
NONE	(STANDARDS)	G. VAILLANCOURT		06-18-92	- -	1997	(514)652-8515	REAF BY SB ON 06/17/92
C57.12.80	TERMINOLOGY FOR POWER & DISTRIBUTION TRANSFORMERS							REAFFIRMED 05/01/92
NONE	(STANDARDS)	G. VAILLANCOURT		05-01-92	- -	1997	(514)652-8515	APPROVED BY ANSI 12/02/92
C57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS & GUIDE FOR SC TESTING OF							REV APPROVED BY SB 03/16/93
VARIOUS	(STANDARDS)	G. VAILLANCOURT		03-16-93	- -	1998	(514)652-8515	WAITING ANSI C57 APPROVAL

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C57.12.90	TRANSFORMER SOUND POWER MEASUREMENT			EM	NEMA SUB			
PC57.12.90b	AUDIBLE SOUND & VIBRATION	JEEWAN PURI	J. PURI	- -	03-01-86	1998	(704)282-7413	INCLUDED IN 1993 REVISION
C57.12.90	ROUTINE IMPULSE TESTS FOR DISTRIBUTION TRANSFORMERS			RMC	PSC			
PC57.12.90c	DIELECTRIC TESTS	J. B. TEMPLETON	ROSSETTI J.	- -	09-10-87	1998	(317)289-1211	INCLUDED IN 1993 REVISION
C57.12.90	REVISION OF THE INDUCED TEST							DRAFT 1 BEING PREPARED
PC57.12.90d	DIELECTRIC TESTS	J. B. TEMPLETON	POULIN B.	- -	09-28-90	0	(317)289-1211	NEW WORKING GP TO WORK ON THIS
C57.12.90	REVISION TO SEC 9 IMPEDANCE AND LOAD LOSSES							
PC57.12.90e	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	HENNING W. R.	- -	06-28-79	1998	(205)877-7740	INCLUDED IN 1993 REVISION
C57.12.90	REVISION TO SEC 8 NO-LOAD LOSSES & EXCITATION CURRENT							
PC57.12.90e3	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	HENNING W. R.	- -	06-28-79	1998	(205)877-7740	INCLUDED IN 1993 REVISION
C57.12.90	STANDARD ON SOUND INTENSITY MEASUREMENT							NEW TASK FORCE TO DRAFT STD
PC57.12.90x	AUDIBLE SOUND & VIBRATION	JEEWAN PURI		- -	- -	0	(704)282-7413	ON MEASURING SOUND INTENSITY
C57.12.91	TEST CODE FOR DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			SPD	EM			BALLOTING REV.IN MAIN COMM.
PC57.12.91	DRY-TYPE TRANSFORMERS	W. PATTERSON	BARNARD D.	11-29-78	06-01-89	1984	(703)688-3325	WORKING ON REVISION
C57.13	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS			PSIM	PSR SPD			WAITING ANSI APPROVAL
P546	INSTRUMENT TRANSFORMERS	J. E. SMITH		03-30-78	05-29-80	1992	(919)827-2121	APPROVED BY SB 06/16/93
C57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS							APPROVED BY ANSI 12/02/92
NONE	INSTRUMENT TRANSFORMERS	J. E. SMITH		08-25-87	- -	1992	(919)827-2121	REAFFIRMED 03/18/92
C57.13.2	CONFORMANCE TEST PROCEDURES FOR INSTRUMENT TRANSFORMERS							PUBLISHED 1992
NONE	INSTRUMENT TRANSFORMERS	J. E. SMITH		04-16-86	09-26-91	1996	(919)827-2121	RECOGNIZED BY ANSI 12/23/92
C57.13.3	GUIDE FOR THE GROUNDING OF INSTRUMENT TR SECONDARY CICUITS AND CASES							TRANSFER FROM PSRC COMMITTEE
NONE	INSTRUMENT TRANSFORMERS	J. E. SMITH		01-23-87	- -	1991	(919)827-2121	
C57.13.4	DETECTION OF PARTIAL DISCHARGE AND MEASUREMENT OF APPARENT CHARGE WITHIN INSTRUMENT TRANSFORMERS			T&D				D6 BEING BALLOTTED IN TC
P832	INSTRUMENT TRANSFORMERS	J. E. SMITH	JONNATTI A. J.	- -	05-28-80	0	(919)827-2121	RESOLVING 3 NEGATIVES

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C57.15	REQUIREMENTS, TERMINOLOGY, & TEST CODE FOR STEP-VOLTAGE AND INDUCTION VOLTAGE REGULATORS							REAFFIRMED 05/01/92
NONE	(STANDARDS)	G. VAILLANCOURT		03-18-87	06-19-86	1997	(514)652-8515	APPROVED BY ANSI 12/02/92
C57.16	REQUIREMENTS FOR CURRENT LIMITING REACTORS			NEMA	IAS	T&D		PREPARING DRAFT 6
PC57.16	DRY-TYPE TRANSFORMERS	W. PATTERSON	DUDLEY R.	09-19-58	03-21-91	1976	(703)688-3325	INCLUDES ONLY DRY TYPE REACTOR
C57.17	REQUIREMENTS FOR ARC FURNACE TRANSFORMERS							LAST REVISED IN 1986
NONE	(STANDARDS)	G. VAILLANCOURT		- -	- -	1986	(514)652-8515	ANSI DOCUMENT
C57.18.10	REQUIREMENTS FOR SEMICONDUCTOR RECTIFIER TRANSFORMERS			NONE				BALLOTTING WG, ONLY 47% RET.
PC57.18.10	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	KENNEDY S. P.	- -	12-28-81	0	(205)877-7740	PAR HAS BEEN FOUND
C57.19.00	GENERAL REQUIREMENTS AND TEST PROCEDURES FOR OUTDOOR APPARATUS BUSHINGS (IEEE 21)			T&D	PSR	IC	SWGR	PUBLISHED 1992
PC57.19.00	BUSHING	L. B. WAGENAAR	WAGENAAR L. B.	07-23-76	04-01-79	1997	(614)223-2259	APPROVED BY ANSI 03/31/92
C57.19.01	STANDARD PERFORMANCE CHARACTERISTICS AND DIMENSIONS FOR OUTDOOR APPARATUS BUSHINGS (IEEE 24)			SPD	IAS	IC	SWGR	PUBLISHED 1992
PC57.19.01	BUSHING	L. B. WAGENAAR	SINGH PRITPAL	08-05-83	11-01-89	1997	(614)223-2259	APPROVED BY ANSI 03/20/92
C57.19.03	STANDARD REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR BUSHINGS FOR DC APPLICATIONS			SPD	IC	SWGR		WORKING ON DRAFT
PC57.19.03	BUSHING	L. B. WAGENAAR	HEYMAN OLOF	- -	11-09-89	0	(614)223-2259	SF6 BUSHINGS NOT INCLUDED
C57.19.100	GUIDE FOR APPLICATION OF APPARATUS BUSHINGS.			SWGR	SUB	PSR		RESOLVING BALLOT COMMENTS
P800	BUSHING	L. B. WAGENAAR	ELLIOTT F. E.	- -	09-27-79	0	(614)223-2259	WORKING ON D09
C57.19.101	GUIDE FOR LOADING POWER APPARATUS BUSHINGS							APPROVED AS FULL-USE 06/17/92
P757	BUSHING	L. B. WAGENAAR	ELLIOTT F. E.	10-20-88	- -	1997	(614)223-2259	ANSI APPROVED 7/93
C57.21	REQUIREMENTS,TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA			EM	T&D	PSR		COMPLETE
PC57.21	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	McGILL J. W.	04-02-91	06-09-88	1995	(205)877-7740	ANSI APPROVED 08/09/91

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C57.21	REQUIREMENTS TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA							COMPLETE
PC57.21	DRY-TYPE TRANSFORMERS	W. PATTERSON	DUDLEY R.	04-02-91	- -	1995	(703)688-3325	ANSI APPROVED 08/09/91
C57.21	REQUIREMENTS,TERMINOLOGY AND TEST CODE FOR SH. REACTORS OVER 500kVA			NONE				COMPLETE
PC57.21a	DIELECTRIC TESTS	J. B. TEMPLETON	KENNEDY W. N.	04-02-91	12-11-86	1995	(317)289-1211	ANSI APPROVED 08/09/91
C57.91	GUIDE FOR LOADING MINERAL OIL-IMMERSED TRANSFORMERS			SUB T&D PSE				PUB. 1/12/81, REAFFIRMED 1991
PC57.91	INSULATION LIFE	L. W. PIERCE	PIERCE L.	03-21-91	06-13-85	1997	(706)291-3166	APPROVED BY ANSI 01/13/92
C57.92	GUIDE FOR LOADING MINERAL OIL-IMMERSED POWER TRANSFORMERS UP TO & INCL 100 MVA WITH 55 C OR 65 C AVE. WINDING RISE			T&D SUB PSE				PUB. 1/12/81, REAFFIRMED 1991
PC57.91	INSULATION LIFE	L. W. PIERCE	PIERCE L.	03-21-91	06-28-85	1997	(706)291-3166	TO BE COMBINED INTO C57.91
C57.93	GUIDE FOR INSTALLATION OF LIQUID-IMMERSED POWER TRANSFORMERS.			NONE				BALLOTING REVISION IN TC
PC57.93	WEST COAST	DAVID BRUCKER	GILLIES D. A.	- -	06-01-89	0	(415)692-4431	WITHDRAW 12.11/12.12 WHEN APP.
C57.94	RECOMMENDED PRACTICE FOR INSTALLATION, APPLICATION,OPERATION & MAINTENANCE OF DRY-TYPE GEN PURPOSE DIST & POWER TR							PUB. 1982, REAFFIRMED 1987
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON		12-09-87	- -	1987	(703)688-3325	BALLOTTING REAFFIRMATION
C57.95	GUIDE FOR LOADING LIQUID-IMMERSED STEP-VOLTAGE AND INDUCTION-VOLTAGE REGULATORS							PUB. 08/19/85, REAFFIRMED 1991
NONE	INSULATION LIFE	L. W. PIERCE	TAKACH D. S.	03-21-91	- -	1997	(706)291-3166	ANSI APPROVED 01/13/92
C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			SCC14				MUST REAF. OR REV. BY DEC 94
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON	PIERCE L.	04-26-89	04-26-89	1994	(703)688-3325	
C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			T&D SCC14 SCC10				INCORP CAST COIL IN C57.96
PC57.96	DRY-TYPE TRANSFORMERS	W. PATTERSON	PIERCE L.	04-26-89	05-06-91	1994	(703)688-3325	COMPLETE BY 10/93
C57.98	IEEE GUIDE FOR TRANSFORMER IMPULSE TESTS			NONE				REVISION APP. BY SB 12/02/93
PC57.98	DIELECTRIC TESTS	J. B. TEMPLETON	POULIN B.	06-01-86	02-01-86	1992	(317)289-1211	WAITING PUBLICATION
C57.98	GUIDE FOR PERFORMING ROUTINE LIGHTNING IMPULSE TESTS ON DIST.TRANSFO			T&D PSIM PSC		ASC 62	EM	TARGET COMPLETION DATE 1995
PC57.98a	DIELECTRIC TESTS	J. B. TEMPLETON	ROSSETTI J.	- -	04-30-91	0	(317)289-1211	SUPPLEMENT TO C57.98

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C57.100	TEST PROCEDURE FOR THERMAL EVALUATION OF OIL-IMMERSED DISTRIBUTION TRANSFORMERS			NPE EM T&D SPD				APPROVED BY ANSI 12/02/92
C57.100	INSULATION LIFE	L. W. PIERCE	LOWDERMILK L. A.	03-18-92	10-20-88	1997	(706)291-3166	REAFFIRMED 03/18/92
C57.104	GUIDE FOR THE DETECTION AND DETERMINATION OF GENERATED GAS IN OIL-IMMERSED TRANSFORMERS & THEIR RELATION TO SERVICEABIL.			PSR T&D				STARTED REVISING
PC57.104	INSULATING FLUIDS	F. GRYSZKIEWICZ	HEINRICHS F. W.	06-07-92	05-31-90	1996	(617)926-4900	PUBLISHED 1992
C57.105	GUIDE FOR APPLICATION OF TRANSFORMER CONNECTIONS IN THREE-PHASE DISTRIBUTION SYSTEMS							REAFFIRMED BY SB 06/17/92
PC57.105	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	REITTER G.	06-17-92	- -	1997	(205)877-7740	BEING BALLOTED IN C57
C57.106	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF INSULATING OIL IN EQUIPMENT			NONE				PUBLISHED 1992
PC57.106	INSULATING FLUIDS	F. GRYSZKIEWICZ		11-20-91	06-19-86	1995	(617)926-4900	ANSI APPROVED 11/20/91
C57.109	GUIDE FOR THROUGH-FAULT CURRENT DURATION			PSR				WILL BALLOT C57
PC57.109	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	PATEL B. K.	03-16-93	06-27-91	1998	(205)877-7740	REV. APPROVED BY SB 03/16/93
C57.110	RECOMMENDED PRACTICE FOR ESTABLISHING TRANSFORMER CAPABILITY WHEN SUPPLYING NONSINUSOIDAL LOAD CURRENTS			T&D PSR NEMA				REAF. ANSI 07/93
PC57.110	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	MAREK R. P.	12-03-92	09-15-93	1997	(205)877-7740	PAR APPROVED 09/15/93
C57.111	GUIDE FOR ACCEPTANCE OF SILICONE INSULATING FLUID AND ITS MAINTENANCE IN TRANSFORMERS			IAS T&D ED&PG IEC				MUST REAF. OR REV. BY DEC 94
NONE	INSULATING FLUIDS	F. GRYSZKIEWICZ		02-02-89	12-10-87	1994	(617)926-4900	NOT AN ANSI STANDARD
C57.112	GUIDE FOR THE CONTROL OF TRANSFORMER SOUND			NONE				NEW TASK FORCE TO START WORK
P523	AUDIBLE SOUND & VIBRATION	JEEWAN PURI	PURI J.	- -	12-28-73	0	(704)282-7413	CHECK FILES FOR NEWER PAR
C57.113	GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN LIQUID-FILLED POWER TRANSFORMERS AND SHUNT REACTOR							PUBLISHED AS FULL-USE 1992
P545	DIELECTRIC TESTS	J. B. TEMPLETON	HOWELLS E.	12-05-91	09-25-91	1996	(317)289-1211	
C57.114	SEISMIC GUIDE FOR POWER TRANSFORMERS AND REACTORS			NPE SUBS.				APP BY SB 02/15/90
P513	WEST COAST	DAVID BRUCKER	OKLU S.	02-15-90	09-06-73	1995	(415)692-4431	ANSI APPROVED 08/09/91

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C57.115	GUIDE FOR LOADING MINERAL-OIL-IMMERSED POWER TRANSFORMERS RATED IN EXCESS OF 100MVA (65 C WINDING RISE)							BEING REVISED
P756	INSULATION LIFE	L. W. PIERCE	PIERCE L. W.	03-21-91	- -	1996	(706)291-3166	ANSI APPROVED 01/13/92
C57.116	GUIDE FOR TRANSFORMERS DIRECTLTY CONNECTED TO GENERATORS							APPROVED BY SB 01/03/89
NONE	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	PATEL B. K.	01-03-89	- -	1994	(205)877-7740	MUST REAF. OR REV. BY DEC 94
C57.117	GUIDE FOR REPORTING FAILURE DATA FOR POWER TRANSFORMERS AND SHUNT REACTORS							REAFFIRMED BY SB 06/17/92
P786	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	ALTMAN M.	06-17-92	- -	1997	(205)877-7740	ANSI APPROVED 7/93
C57.119	RECOMMENDED PRACTICE FOR PERFORMING TEMP. RISE TESTS ON OIL-IMMERSED POWER TRANSFORMER AT LOADS BEYOND NP RATING (P838)	SWGR	SUBS	SCC4	PSRC	IAS	EI	NEW PAR APPROVED 09/17/92
PC57.119	INSULATION LIFE	L. W. PIERCE	GRUBB R. L.	- -	09-17-92	0	(706)291-3166	REVISED PAR (TITLE & SCOPE)
C57.120	LOSS EVALUATION GUIDE FOR POWER TRANSFORMERS AND REACTORS	SUB	EM	ED&PG	IAS	IEC		PUBLISHED 1992
P842	WEST COAST	DAVID BRUCKER	JACOBSEN R.	12-03-91	05-01-80	1996	(415)692-4431	APPROVED BY ANSI 02/28/92
C57.121	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS	PSRC	T&D	IAS	IEC			ANSI APPROVED 08/09/91
P954	INSULATING FLUIDS	F. GRYSZKIEWICZ		02-22-88	04-12-82	1994	(617)926-4900	MUST REAF. OR REV. BY DEC 94
C57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT							TF WORKING
P1098	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	HENNING W. R.	- -	06-13-85	0	(205)877-7740	
C57.124	RECOMMENDED PRACTICE FOR THE DETECTION OF PD AND THE MEASUREMENT OF APPARENT CHARGE IN DRY-TYPE TRANSFORMERS	NONE						PUBLISHED 1992
PC57.124	DRY-TYPE TRANSFORMERS	W. PATTERSON	KLINE A. D.	06-29-91	06-27-91	1996	(703)688-3325	ANSI APPROVED 10/11/91
C57.125	GUIDE FOR FAILURE INVESTIGATION, DOCUMENTATION AND ANALYSIS FOR POWER TRANSFORMERS AND SHUNT REACTORS	T&D	ED&PG	PSE	SWGR			
PC57.125	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	ALTMAN M.	06-27-91	06-28-87	1996	(205)877-7740	ANSI APPROVED 11/20/91
C57.127	GUIDE FOR THE DETECTION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS	T&D	ED&PG	CIGRE	IEC			REBALLOT MAIN COMMITTEE
PC57.127	DIELECTRIC TESTS	J. B. TEMPLETON	HOWELLS E.	- -	03-10-88	0	(317)289-1211	WAITING FOR BALLOT

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C57.128	FIRE PROTECTION OF OUTDOOR LIQUID-IMMERSED POWER TRANSFORMERS			NPE	SUB	PSR		DRAFT BEING PREPARED
PC57.128	WEST COAST	DAVID BRUCKER	SUNDIN D.	- -	06-01-89	0	(415)692-4431	
C57.129	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED HVDC CONVERTER TRANSFORMERS AND SMOOTHING REACTORS FOR DC POWER TRANSM			EM	T&D	PSIM	SUB	REVISED PARS TO STD BOARD
PC57.129	HVDC CONVERTER TR & REACTOR	W. N. KENNEDY	KENNEDY W. N.	- -	09-26-91	0	(317)286-9387	BALLOTING IN SUBCOMMITTEE
C57.130	GUIDE FOR USE OF DISSOLVED GAZ ANALYSIS DURING FACTORY THERMAL TESTSFOR THE EVALUATION OF OIL-IMMERSED TRANS. AND REACT.			NONE				NEW PAR APP. BY SB 03/17/93
PC57.130	INSULATING FLUIDS	F. GRYSZKIEWICZ	KINNEY J. P.	- -	03-17-93	0	(617)926-4900	CHANGE IN TITLE AND SCOPE
C57.131	REQUIREMENTS FOR LOAD TAP CHANGERS			EM	T&D			SC BALLOT COMPLETED
PC57.131	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	TRAUB T. P.	- -	08-17-89	0	(205)877-7740	
IEEE 637	GUIDE FOR THE RECLAMATION OF INSULATING OIL AND CRITERIA FOR ITS USE							REAFFIRMED 03/18/92
P637	INSULATING FLUIDS	F. GRYSZKIEWICZ		06-04-84	- -	1997	(617)926-4900	
IEEE 638	QUALIFICATION OF CLASS 1E TR FOR NUCLEAR POWER GENERATING STATIONS			NPE	SUB	SC2	SCC10	APPROVED BY SB 03/18/92
P638	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	PIERCE L. W.	- -	10-29-90	1997	(205)877-7740	NEW PAR APPROVED 12/04/90
IEEE 799	GUIDE FOR HANDLING AND DISPOSING OF ASKARELS			EIS	IAC	T&D		REAFFIRMED 03/18/92
P799	INSULATING FLUIDS	F. GRYSZKIEWICZ		11-17-86	09-27-79	1997	(617)926-4900	
IEEE1258	GUIDE FOR INTERPRETATION OF GASES IN SILICONE LIQUID-FILLED TRANSFORMERS			T&D	SCC14			PAR APPROVED BY SB 12/05/91
P1258	INSULATING FLUIDS	F. GRYSZKIEWICZ	GOUDIE JIM	- -	12-05-91	0	(617)926-4900	PREPARING D02
IEEE1265	STANDARD FOR BAR CODING FOR DISTRIBUTION TRANSFORMERS (POLE-MOUNTED, PAD-MOUNTED AND UNDERGROUND)			AIM/TSC	IAS/REP			PAR APPROVED 06/27/91
P1265	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	JORDAN RON	- -	06-27-91	1994	(704)373-5139	
IEEE1276	TRIAL-USE GENERAL REQUIREMENTS FOR LIQUID-FILLED DISTRIBUTION AND POWER TR UTILIZING HIGH TEMP SOLID INSULATING MATERIAL			T&D				SUBMITTING PAR
P1276	INSULATION LIFE	L. W. PIERCE	FISCHER H.	- -	09-25-91	0	(706)291-3166	WILL CONDUCT SURVEY ON HI-T M.

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IEEE1277	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED AND DRY-TYPE HVDC SMOOTHING REACTORS			SUB				FIRST TF MEETING TOOK PLACE
P1277	HVDC CONVERTER TR & REACTOR	W. N. KENNEDY		- -	09-25-91	0	(317)286-9387	PAR APPROVED 09/26/91
IEEE1350	GUIDE FOR PROTECTION OF DISTRIBUTION TRANSFORMERS WITH EMPHASIS ON SECONDARY (LOW VOLTAGE SIDE) SURGES			SPD T&D IC				PAR APPROVED BY SB 03/17/93
P1350	DIELECTRIC TESTS	J. B. TEMPLETON	ROSSETTI J.	- -	03-17-93	0	(317)289-1211	JOINT PROJECT WITH SPD
IEEE1388	STANDARD FOR THE ELECTRONIC REPORTING OF TRANSFORMER TEST DATA			EEI NEMA ASC X12 PSR			CS SAB	APPROVED BY NESCOM 09/15/93
P1388	DISTRIBUTION TRANSFORMERS	J. C. THOMPSON	LYON D. S.	- -	09-15-93	0	(704)373-5139	NO. CHANGED FROM C57.132
NEW	GUIDE FOR THE LOCATION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS							BALLOTTING WORKING GROUP
NO PAR YET	DIELECTRIC TESTS	J. B. TEMPLETON	HOWELLS E.	- -	- -	0	(317)289-1211	SUBMIT PAR AS SOON AS POSSIBLE
NEW	TRANSFORMER SITING GUIDE							NEW GUIDE
NEW	AUDIBLE SOUND & VIBRATION	JEEWAN PURI	McGILL J.	- -	- -	0	(704)282-7413	NEW WG FORMED

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*P1248	GUIDE FOR THE COMMISSIONING OF ELECTRICAL SYSTEMS IN HYDROELECTRIC POWER PLANTS					
07-26-90	ED&PG	LOUIS A. TAUBER	503-326-2323	D. A. GILLIES	WEST COAST	503-622-4847
*P1122	DIGITAL RECORDERS FOR MEASUREMENTS IN HIGH VOLTAGE IMPULSE TESTS					
08-05-92	PSIM	T. R. McCOMB	613-990-5826	R. MINKWITZ, SR.	DIELECTRIC TESTS	617-828-3241
*P1223	POWER SYSTEM DIGITAL TESTING TECHNIQUES					
- -	PSIM	T. R. McCOMB	613-990-5826	R. MINKWITZ, SR.	DIELECTRIC TESTS	617-828-3241
*P1304	CURRENT MEASURING SYSTEMS WHICH USE OPTICAL TECHNIQUES					
01-31-92	PSIM	T. R. McCOMB	613-990-5826	J. N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
*P62	GUIDE FOR DIAGNOSTIC OF POWER APPARATUS					
- -	PSIM	DAVID TRAIN	617-926-4900	R. A. VEITCH	PERFORMANCE CHARACTERISTICS	416-685-6551
*PC37.107	STANDARD FOR DIGITAL PROTECTION SYSTEM DESIGN					
12-28-85	PSR	STIG L. NILSSON	415-855-2314	BERTRAND POULIN	DIELECTRIC TESTS	408-957-8326
*PC37.108	GUIDE FOR THE PROTECTION OF NETWORK TRANSFORMERS					
- -	PSR	THOMAS E. WIEDMAN	312-294-2810	R. B. ROBERTSON	UG TR & NETWORK PROTECTORS	813-228-4081
*PC37.109	GUIDE FOR THE PROTECTION OF SHUNT REACTORS					
- -	PSR	LAVERN L. DVORAK	303-231-1636	MIKE ALTMAN	PERFORMANCE CHARACTERISTICS	407-694-4975
*PC37.110	GUIDE FOR THE APPLICATION OF CURRENT TRANSFORMERS USED FOR PROTECTIVE RELAYING PURPOSES					
05-31-90	PSR	L. J. SHULZE	312-255-5760	JOHN N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
*PC37.91	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER TRANSFORMERS					
- -	PSR	R. J. FERNANDEZ	215-770-5619	B. K. PATEL	PERFORMANCE CHARACTERISTICS	205-877-7740
*PC37.97	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER SYSTEM BUSES					
12-10-87	PSR	STEVE CONRAD	505-848-2642	JOHN N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
*PC57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS					
- -	PSR	D. R. VOLZKA	414-221-2750	JOHN N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
*P1038	STANDARD TEST SPECIFICATION FOR SURGE PROTECTIVE DEVICES FOR LOW VOLTAGE AC POWER CIRCUITS					
12-03-90	SPD	LEWIS DOUGLAS SWEENEY	602-834-9372	MAHESH P. SAMPAT	DIELECTRIC TESTS	704-462-3226

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*PC62.11	STANDARD FOR METAL-OXIDE SURGE ARRESTERS FOR AC POWER CIRCUITS					
- -	SPD	R. M. SIMPSON	919-836-7059	W. A. MAGUIRE	DIELECTRIC TESTS	501-377-4273
*PC62.22	GUIDE FOR APPLICATION OF METAL OXIDE SURGE ARRESTERS FOR AC SYSTEMS					
08-16-93	SPD	J. J. WOODWORTH	716-375-7270	R. C. DEGENEFF	DIELECTRIC TESTS	518-276-6367
*PC62.2.01	APPLICATION GUIDE FOR SURGE PROTECTION OF ELECTRIC GENERATING PLANTS					
06-01-84	SPD	G. L. GAIBROIS	313-897-0485	R. B. ROBERTSON	UG TR & NETWORK PROTECTORS	813-228-4081
*PC62.42	GUIDE FOR THE APPLICATION OF LOW-VOLTAGE SURGE PROTECTIVE DEVICES					
01-21-91	SPD	MICHEAL M. FLACK	404-551-4904	MAHESH P. SAMPAT	DIELECTRIC TESTS	704-462-3226
*P1268	GUIDE FOR INSTALLING TEMPORARY SUBSTATIONS					
03-30-91	SUBS	SHASHI G. PATEL	404-362-5386	D. A. GILLIES	WEST COAST	503-622-4847
*P1303	GUIDE FOR STATIC VAR COMPENSATOR FIELD TESTS					
01-10-92	SUBS	PHILIP R. NANNERY	914-577-2591	R. F. DUDLEY	DRY TYPE	416-298-8108
*P693	RECOMMENDED PRACTICE FOR SEISMIC DESIGN OF SUBSTATIONS					
- -	SUBS	RULON FRONK	213-481-3327	L. A. TAUBER	WEST COAST	503-230-3829
*P979	GUIDE FOR SUBSTATION FIRE PROTECTION					
01-10-92	SUBS	A. J. BOLGER	604-663-2879	D. W. SUNDIN	WEST COAST	414-524-3221
*P980	GUIDE FOR THE CONTAINMENT AND CONTROL OF OIL-SPILLS IN SUBSTATIONS					
06-15-92	SUBS	RICHARD G. COTTRELL	517-788-0817	H. A. PEARCE	INSULATING FLUIDS	412-376-3182
*NEW	GUIDE FOR COMMISSIONNING HVDC CONVERTER STATIONS AND ASSOCIATED TRANSMISSION SYSTEMS					
08-30-93	SUBS	D. R. TORGERSON	303-231-7459	W. N. KENNEDY	HVDC CONVERTER TR & REACTORS	317-286-9387
*C37.112	GUIDE FOR PARTIAL DISCHARGE MEASUREMENTS IN POWER SWITCHGEAR					
10-22-91	SWGR	E. F. VEVERKA	414-835-1544	GEORGES VAILLANCOURT	DIELECTRIC TESTS	514-652-8515
*P1325	RECOMMENDED PRACTICE FOR REPORTING FIELD TROUBLE DATA FOR POWER CIRCUIT BREAKERS					
03-17-92	SWGR	D. M. LARSON	203-634-5739	G. VAILLANCOURT	STANDARDS (INFORMATION)	514-652-8515
*PC37.04h	MECHANICAL LOADING REQUIREMENTS OF CIRCUIT BREAKER TERMINALS					
01-07-91	SWGR	GEORGE R. HANKS	615-751-4020	LOREN B. WAGENAAR	BUSHINGS	614-223-2259

ATTACHMENT 3

*PROJECT NO. TITLE DATE	PES COMMITTEE	CONTACT IN PES COM.	CONTACT PHONE NO.	TRANSFORMERS COMMITTEE COORDINATOR	TRANSFORMERS COMMITTEE SUBCOMMITTEE	COORDINATOR PHONE NO.
*PC37.10 GUIDE FOR DIAGNOSTICS AND FAILURE INVESTIGATION OF POWER CIRCUIT BREAKERS						
05-01-91	SWGR	L. ROLANDO SAAVEDRA	504-363-8765	WALLACE B. BINDER JR.	PERFORMANCE CHARACTERISTICS	216-384-5625
*P1030.3 GUIDE FOR SPECIFICATION OF HVDC PERFORMANCE - PART III, DYNAMIC PERFORMANCE						
08-19-91	T&D	CLIFFORD C. DIEMOND	503-222-2109	WILLIAM N. KENNEDY	HVDC CONVERTER TR & REACTOR	317-286-9387
*P656 STANDARD FOR THE MEASUREMENT OF AUDIBLE NOISE FROM OVERHEAD TRANSMISSION LINES						
03-08-91	T&D	JAMES R. STEWART	518-395-5025	ALAN M. TEPLITSKY	AUDIBLE SOUND AND VIBRATION	212-460-4859
*P957 GUIDE FOR CLEANING INSULATORS						
04-01-92	T&D	WILLIAM L. GIBSON	415-973-3747	L. B. WAGENAAR	BUSHINGS	614-223-2259