IEEE/PES TRANSFORMERS COMMITTEE MEETING

APRIL 26, 1995

KANSAS CITY, MISSOURI

IEEE/PES TRANSFORMERS COMMITTEE MEETING
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ATTENDANCE SUMMARY

MEMBERS PRESENT

E. J. Adolphson
J. Arteaga
E. A. Bertolini
C. V. Brown
J. L. Corkran
T. Diamantis
D. J. Fallon
R. D. Graham
M. E. Haas
W. R. Henning
C. W. Johnson, Jr.
J. J. Kelly
J. G. Lackey
A. D. McCain
C. K. Miller
C. R. Murray
G. A. Paiva
J. M. Patton
M. D. Perkins
D. W. Platts
S.M.A. Rizvi
W. E. Saxon
H. J. Sim
S. D. Smith
R.W. Stoner
R. W. Thompson
R. A. Veitch
D. W. Whitley
M. S. Altman
J. Aubin
W. B. Binder, Jr.
D. S. Brucker
D. W. Crofts
R. F. Dudley
P. T. Feghali
R. L. Grubb
E. Hanique
P. J. Hopkinson
A. J. Jonnatti
S. P. Kennedy
M. Y. Lau
J. W. McGill
M. I. Mitelman
W. H. Mutschler, Jr.
K. Papp
P. A. Payne
V. Q. Pham
B. Poulin
A. L. Robinson
R. W. Scheu
J. E. Smith
R. J. Stahara
J. C. Sullivan
T. P. Traub
L. B. Wagenaar
A. L. Wilks
G. Andersen
D. E. Ayers
J. H. Bishop
D. J. Cash
V. Dahinden
K. D. Edwards
M. A. Franchek
R. L. Grunert
N. W. Hansen
J. Hunt
R. D. Jordan
W. N. Kennedy
S. R. Lindgren
C. P. McShane
W. E. Morehart
C. G. Niemann
B. K. Patel
L. C. Pearson
L. W. Pierce
J. Puri
J. R. Rossetti
D. N. Sharma
J. E. Smith
W. W. Stein
V. Thenappan
E. R. Trummer
B. H. Ward
C. W. Williams, Jr.
J. C. Arnold, Jr.
R. L. Barker
J. D. Borst
D. Chu
R. C. Degeneff
F. E. Elliott
D. L. Galloway
F. J. Gryszkiewicz
K. S. Hanus
P. Iijima
E. Kallaur
A. D. Kline
J. W. Matthews
R. McTaggart
D. H. Mulkey
P. E. Orehek
W. F. Patterson
T. J. Pekarek
R. L. Plaster
P. G. Risse
G. W. Rowe
V. Shenoy
J. W. Smith
L. R. Stensland
R. C. Thomas
G. H. Vaillancourt
R. J. Whearty

MEMBERS ABSENT

D. J. Allan
R. Allustiarti
R. A. Bancroft
D. A. Barnard
S. Bennon
W. E. Boettger
J. V. Bonucchi
M. Cambre, Jr.
T. F. Clark
O. R. Compton
J. C. Crouse
J. N. Davis
L. E. Dix
J. K. Easley
J. A. Ebert
J. A. Fleeman
S. L. Foster
J. M. Frank
A. A. Ghafourian
D. A. Gillies
R. S. Girgis
G. H. Hall
J. H. Harlow
F. W. Heinrichs
K. R. Highton
P. J. Hoefler
C. C. Honey
J. W. Howard
E. Howells
G. W. Iliff
D. C. Johnson
R. B. Kaufman
J. P. Kinney, Jr.
E. Koenig
J. P. Lazar
F. A. Lewis
H. F. Light
L. W. Long
L. A. Lowdermilk
D. L. Lowe
R. I. Lowe
D. S. Lyon
J. Ma
W. A. Maguire
K.T. Massouda
C. J. McMillen
W. J. McNutt
S. P. Mehta
M. C. Mingoia
R. E. Minkwitz, Sr.
H. R. Moore
R. J. Musil
E. T. Norton
H. A. Pearce
D. Perco
V. Raff
J. D. Ramboz
C. T. Raymond
P. Riffon
C. A. Robbins
R. B. Robertson
M. P. Sampat
L. J. Savio
L. R. Smith
D. W. Sundin
L. A. Tauber
J. B. Templeton
J. A. Thompson
W. E. Wrenn

GUESTS PRESENT

P. AHRENS
R. K. AHUJA
S. H. Aguirre
A. Alcantara, Jr.
D. C. Anderegg
G. W. Anderson
S. Antosz
J. Antweiler
M. F. Barnes
T. E. Blackburn III
A. Bolliger
A. Cancino
J. M. Christini
R. M. DELVECCHIO
D. A. Duckett
K. ECKHOLZ
K. P. Ellis
R. H. Fausch
J. Foldi
G. E. Forrest
R. Fox
M. L. Frazier
J. Frost
N. E. GILBERT
R. Garcia
D. M. Getson
J. P. Gibeault
D. F. Goodwin
D. HELRIEGEL
R. B. HORTON, JR.
S. R. HOWELL
A. F. HUESTON
J. L. Harper
G. E. Henry III
T. L. Holdway
E. W. Hutter
L. M. JACOBSON
J. Jeske
V. C. Jhonsa
L. E. Juhlin
N. G. KOEPPEN
C. P. Kappeler
C. Kelly
L. A. Kirchner
K. S. Knoerr
P. E. Krause
M. C. LOVELESS
T. D. Lewis
J. E. Long
D. J. MEHL
R. P. Marek
W. E. McCain
S. E. Michael
A. Molden
C. L. Moore
A. F. O'NEILL
T. V. Oommen
T. A. PREVOST
P. E. PRIES
G. Pregent
G. Preininger
R. L. Provost
R. I. Psyck
D. R. Purohit
D. W. ROSE
H. RUEVEKAMP
M. Rajadhyaksha
J. C. Riboud
F. Richens
D. J. Rolling
S. SHULL
S. L. SNYDER
S. SUNSHINE
W. W. Schwartz
R. W. Simpson, Jr.
P. Singh
K. R. Skinger
T. H. Stewart
A. Traut
S. C. Tuli
C. E. Valencia
E. W. WERNER
R. D. Wakeam
F. N. Weffer
K. Weidmann
R. C. Wicks
W. G. Wimmer
D. J. Woodcock
F. N. Young

Contents

IEEE PES TRANSFORMERS COMMITTEE MEETING
WEDNESDAY, APRIL 26, 1995

Chair: J. H. Harlow Vice Chair: W. B. Binder, Jr.

Secretary: J. W. Matthews

1.0 Chair's Remarks and announcements - J. H. Harlow

W. B. Binder, Jr. called the meeting to order, in the absence of J. H. Harlow, at 8:00 am. Mr. Binder noted that Mr. Harlow had become ill last week and was hospitalized. His condition has improved and he is heading home today.

G. W. Anderson, Meeting Host, reported on the attendance (see Attachment 4) and acknowledged the help of Liz Rooney, Peggy Anderson, and Wini Windisch. The Committee thanked the Host and Hostesses with a round of applause.

Ken Skinger extended an invitation to the next meeting to be held in Boston during November 5-8, 1995. Arrangements have been made at the Marriott Long Wharf Hotel and room rates will be $140 single and double plus tax. Ken urged everyone to respond promptly with their hotel reservations when they receive the information packet for the Boston meeting.

Mr. Binder proceeded with the reports on the Technical Council and Administrative Subcommittee meetings.

1.1 Report of the Technical Council Meeting, January 31, 1995

The PES Technical Council met at the 1995 Winter Power Meeting January 31, 1995 in New York. Following are points of note.

There is a perception by some that PES is reducing its activities in generation and other non-T&D areas. An appointment was made to investigate this concern and provide recommendations on how to dispel this idea.

1.1.1 Technical Council Goals

The following goals are taken verbatim from those published by Mr. Don Volzka, Chair of the Technical Council.

- **Standards**

  Utilize the PES international program engineer and the PES Standards Coordinating Committee to provide focus for the Technical Committees in the effort to bring IEEE/PES standards into prominence as international standards and establish detailed goals and milestones as necessary.

- **Organization**

  Restructure the Power System Engineering Committee in order to resolve their paper handling deficiencies. It is intended that clearly delineating their different areas of coverage will permit papers to be routed and reviewed more efficiently. This will be in effect to handle papers for the 1996 Winter Meeting.

  Convene a task force charged with recommending to Technical Council the basic changes required in PES structure required to be effective in the electric utility industry worldwide

which is undergoing basic structural change. Interim status report expected at each general meeting.

- **Sister Organizations**

  We have entered the era of cooperation between PES and our sister societies such as CIGRE. Convene a task force, reporting to Technical Council at the 1995 Summer Meeting, whose function it is to define the steps necessary to achieve the level of cooperation desired.

- **Paper Presentations**

  Investigate and report by the 1995 Summer Meeting on the options, benefits, and drawbacks of various methods of relaxation of the presentation before publication rule.

- **Meetings**

  Review the process by which panel sessions are planned and scheduled to improve their quality through better planning, improve the meeting program by properly advertising participants and their intended message, and improvement in meeting room usage through minimizing last minute cancellations. Document the recommended process and present at the Summer Meeting for approval.

  Review the process by which technical meetings are scheduled at general meetings for all of PES. The goal is to reduce peak meeting room requirements by 20% beginning with the 1995 Summer Meeting. Recommend a process which will assure efficient and uniform handling on a long term basis. Document the recommended process and present at the Summer Meeting for approval.

1.1.2 Demonstration of SPA System

Jay Torio of the IEEE Staff presented a very informative demonstration of the Standards Process Automation (SPA) system. He noted that any working group can request a work area on SPA and encouraged full utilization of the system. He also demonstrated the 'future" way of reviewing standards on-line.

1.1.3 Technical Society Balloting Groups

Rosemary Tennis of the IEEE Staff made a presentation of a service that can be provided to the Technical Committees. Upon request, a sponsoring committee (or working group) can request an 'invitation to ballot", which is a survey of other Technical Committees and Technical Societies to determine if interest exists in balloting a specific standard. The mailing list for the invitation is determined as follows:

- Periodically, general topical interest lists are developed by canvassing other Societies to determine interest in the activities of Technical Committees.

- Positive responses to this canvass are then used to develop a mailing list for the 'invitation to ballot."

The responses from the invitation to ballot are forwarded to the sponsoring committee for possible inclusion in document balloting. This is a service offered by the IEEE Staff and use of it is not mandatory. However, Chair Volzka indicated that it is a potential way to demonstrate that PES is indeed not a closed society for standards in balloting.

1.1.4 PES International Program Engineer Report

Anne O'Neill is the PES International Program Engineer. She has been actively pursuing her objective of acquainting the interested parties in the IEEE/IEC relationships. This has included an orientation to six technical committees and the preparation of matrices showing comparable committees of IEEE and IEC.

Anne will actively continue this effort of promoting IEEE/IEC standards harmonization. She will make a presentation at the April 26 Transformers Committee meeting.

All members are encouraged to read Anne's articles relating to GATT and IEC considerations in the PES Review for January 1995 and March 1995 respectively.

1.1.5 1997 Summer Power Meeting (Berlin)

Chair Volzka stressed the need to prepare a plan for our activities at the 1997 Berlin meeting. The plan will address how we organize meetings and how we conduct our business. He has established a Technical Council Task Force to plan and format our activities.

1.1.6 PE PDH Credit for Technical Sessions

A proposal was made for the PES to facilitate member Professional Development credit for technical paper sessions. Professional Development Hours (PDH) are required for renewal of Professional Engineer registration in several states. This proposal was approved by the Technical Council. Harry Jones will work with PES Special Services to develop an appropriate form for use at the Winter and Summer Power Meetings.

1.1.7 Standards Numbering System

There has not yet been a resolution of the NEMA trademark claim to ownership of the "C57" designation. Chair Volzka will prepare a letter to the Standards Board which will recommend a dual numbering system for ANSI copyrighted standards including the C57 and C37 series.

Respectfully submitted,
J. H. Harlow, Chair

2.0 Approval of Minutes of September 28, 1994 - J. H. Harlow

The minutes of the Milwaukee meeting were approved with one typographical correction.

3.0 Vice Chair's Report - W. B. Binder, Jr.

3.1 The following are reports on activities of PES Committees on which the Vice Chair serves as Committee representative.

All of the meetings reported were held at the 1995 Winter Power Meeting in New York, NY on January 30-31, 1995.

3.1.1 Publications Committee (Meeting held Monday, January 30, 1994, 2:00 p.m.)

3.1.1.1 Modified PES Publication Guide

Copies are issued as part of the Author's Kit and can be issued to reviewers if they desire. This is now a living document which is revised as often as every six months.

3.1.1.2 Paper Review Form

The revised form was used for grading WPM papers. The form was not found to be a problem, though a plan was devised where the Paper Coordinator's work would be reduced by having PES Special Services number each paper and print a single copy of the title, author and number for Coordinators to utilize when making up review forms.

The new form allows for only three grades: Accept, Accept with Mandatory Changes or Reject. A Reject grade allows for one resubmission at a later conference. There is no longer a RJO grade to reject outright. Some committees object to the RJO being eliminated, and it will be revisited at the Publication Committee's meeting in Portland.

3.1.1.3 1994/95 Paper Budget

A six page limit per paper is currently in effect. For the 1995 WPM, 140 more papers were submitted than ever before. The number for the SPM is also up from previous years. The trend seems to be due to the many foreign papers being received. The PES has succeeded, at least in this area, in becoming more transnational. The problem now is lack of meeting space to present all the papers at the general meetings. I will report on potential solutions and conflicts of effort further in this report.

3.1.1.4 Presentation Practice

Power System Engineering Committee is attempting one or more "poster" sessions at the SPM. The Paper Coordinator of the PSEC will write a guide for presenting poster papers and issue it with acceptance letters for the next general meeting. This is an attempt to "present" papers in a manner which inspires some discussion and one-on-one question and answer, while allowing up to ten papers to be presented at the same session. The number of papers received by Transformers, Switchgear,

Surge Protective Devices Committees and others does not warrant such practice, however PSEC and T&D Committee receive as many as 300 papers each meeting to be reviewed and presented.

3.1.1.5 Transaction Papers at other Conferences

PSRC is grading, peer reviewing and accepting papers which have been presented but not published at other related conferences. This is being encouraged in the same way presentation at the Committee meetings has been encouraged, and for the same reason.

3.1.1.6 1995 Summer Power Meeting Panel Sessions

Future deadlines are 3/1 and 9/1 for name of Panel Chairs, Panelists, and Title. Transformer Committee had no panels at the 1995 WPM nor will it have any at the 1995 SPM. The due date for 1996 WPM panels is September 1, 1995. The date for the 1996 T&D Conference has not yet been determined.

3.1.1.7 Scheduling of Main Committee Meetings and Panel Sessions

This is a problem for those Committees who meet as a whole at the WPM and SPM. A block of times have been set aside to alleviate problems in schedule conflicts to avoid times when Panel Sessions are held.

3.1.2 Organization and Procedures Committee (Meeting held Tuesday, January 31, 1994, 8:00 a.m.)

3.1.2.1 Technical Committee Reports

To handle the burden of paper reviews (365 for the WPM), the PSEC will split into three sub- groups, each having three subcommittees.

3.1.2.2 Streamlining PES Activities: No action was taken on this matter.

3.1.2.3 Standards Interpretations

The O&P Committee adopted a minimum practice which adheres to the IEEE Standards Board requirements. A need exists to establish a consensus practice to limit risk. No individual response is allowed by Standards Board. Each Technical Committee should incorporate a detailed interpretation procedure after the Standards Board provides some guidance as to how uniform and how rigorous such procedures must be.

3.1.3 Technical Sessions Improvement Committee (Meeting held Tuesday, February 1, 1995, 2:00 p.m.) - Jim Harlow, Chair

3.1.3.1 Sessions Evaluation

Two lists of comments were discussed relative to improvement of meeting rooms and improvement of presentations. The Chair presented graphical material summarizing the grading of sessions. Lee Willis reported on an assignment to generate a checklist for meeting rooms for the organizing committee.

Problems with presentations need to be addressed in the Guide for Session Chairmen. Paper Coordinators ought to send Session Chairs a package including a letter of greeting to be sent to authors, a copy of each of the papers, and some suggestions on how to run the session (including the "Guide for Session Chairman").

We discussed the proposed new forms of presentation: tutorial mode (spend a long time discussing) or presentation by title only (as in the "poster session" or "presentation in essence" only concepts).

3.1.3.2 Improving Foreign Papers

No additional action has taken place. Indication from Keith Gray of Switchgear is that the PES Chapters Council is willing to assist in Regions 9, 10, and 11.

3.1.3.3 Technical Sessions Guide for the Session Chairman

This document will be revised for discussion at the Summer Power Meeting.

3.1.3.4 Guidelines for Slides and Overheads presentation at Author's breakfast

The live presentation now used has been validated and additional presenters for the Authors' Breakfast have been recruited.

3.1.4 IEEE/PES Winter Power Meeting Technical Paper Sessions

The Transformers Committee sponsored two paper sessions at the SPM which were well attended. Eight papers were accepted and presented out of eighteen that were reviewed.

3.2 1995 IEEE/PES Summer Power Meeting Technical Paper Review

We have received thirteen papers for review which were sent out the first week in February for return by the first week in March. Our quota of papers requires that only seven papers be accepted for the two sessions we will sponsor.

3.3 Future Meeting Schedule

November 5-9, 1995	Boston, MA	Ken Skinger
Spring, 1996	San Francisco	Dan delaCruz
Fall, 1996	Vermont	Chris Robbins
Spring/Summer, 1997	Linz, Austria	Edgar Trummer
Fall, 1997	St. Louis, M	Jerry Bishop

This schedule only extends for two more years. Commitments from hosts are needed for meetings Spring, 1998 and beyond. The planning should be starting very soon. Should we consider holding joint meetings with other committees? Should we consider holding some or all future meetings in conjunction with the Summer or Winter Power Meetings? The Vice Chair would appreciate feedback on these questions.

Respectfully submitted, W. B. Binder, Vice Chair

4.0 Administrative Subcommittee - J. H. Harlow

ADMINISTRATIVE SUBCOMMITTEE MEETING MINUTES
APRIL 24, 1995
KANSAS CITY, MISSOURI

4.1 Introduction of Members and Guests

Chair Harlow was absent due to illness. Vice Chair Binder called the meeting to order at 7:04 p.m. in the Freemont Room of the Hyatt Regency Crown Center Hotel.

The following members of the Subcommittee were present:

W. B. Binder, Jr.	W. N. Kennedy	L. W. Pierce
J. D. Borst	J. W. Matthews	J. Puri
D. S. Brucker	P. E. Orehek	J. E. Smith
F. E. Elliott	B. K. Patel	G. H. Vaillancourt
F. J. Gryszkiewicz	W. F. Patterson	L. B. Wagenaar
K. S. Hanus		

The following guests were present:

Greg Anderson - Kansas City Meeting Host
Jerry Bishop - St. Louis Meeting Host
R. S. Girgis - Technical Advisor, IEC TC14
A. J. Jonnatti - Technical Advisor, IEC TC38
Anne O'Neill - PES International Program Engineer, IEEE Standards Office
Ken Skinger - Boston Meeting Host

4.2 Approval of the Milwaukee Meeting Minutes

There were no additions or corrections to the minutes of the previous Administrative Subcommittee meeting. They were approved as published.

4.3 Additions to and/or Approval of the Agenda

Georges Vaillancourt, Secretary to IEC TC42, was added to participate with Anne O'Neill in the discussion of IEC Activities.

4.4 Committee Finances and Meeting Arrangements

4.4.1 Finances

Greg Anderson indicated that he expected to essentially break even on income and expenses for the Kansas City meeting. Mr. Anderson indicated that the meeting host bears a significant cost in setting up the meeting. One specific cost that should be defrayed is the mailing of the invitations, which amounts to approximately $700. The subcommittee agreed that future hosts should include the cost of mailing invitations in the registration fee.

Ken Skinger indicated that he would definitely have to reduce services at the Boston meeting if he is expected to not lose a significant amount of money. Further discussion led to the realization that expenses are going to increase significantly over the next two years. John Borst made a motion to increase the maximum registration fee to $95. This motion was seconded by Georges Vaillancourt. After brief further discussion, the motion was passed by a vote of 14 for, and 0 against.

4.4.2 Meeting Arrangements

The Kansas City meeting host, Mr. Greg Anderson, reported the following registration:

Members and guests	290+
Spouses	45
Tuesday Luncheon	164
Tuesday Outing	200+

Mr. Ken Skinger, host for the next Committee meeting in Boston, announced that the meetings will be held at the Marriott Long Wharf Hotel on November 5 - 8, 1995. The room rates will be $140 single or double plus tax. The Tuesday evening social function will be held at the Boston Museum of Science.

Mr. Skinger questioned if a presentation could be made sometime during the Boston meeting regarding superconducting transformers by American Superconductor. The Insulating Fluids Subcommittee had proposed a symposium for Tuesday afternoon in Boston. That symposium has been postponed. It was suggested that this subject would be good to present at the Tuesday luncheon. Mr. Skinger replied that he had already arranged for the luncheon speaker before this subject appeared. Mr. Harlow had also proposed an IEC symposium for Tuesday afternoon in Boston. At this point, it was apparent that the IEC material might have to be addressed during part of the time normally scheduled for the Main Committee meeting on Wednesday morning. The subject of superconducting transformers would have to have sponsorship by a subcommittee and be presented at a future meeting.

Mr. Binder made the following comments regarding the Summer 1997 meeting in Graz, Austria:

- Edgar Trummer is investigating arrangements with Austrian Airlines to coordinate connecting flights from three locations in the US.

- Georges Vaillancourt will be attending a meeting in Graz this September and should have some information to present at the Boston meeting regarding travel arrangements.

- The schedule for the Graz meeting will be changed to coordinate with the Summer Power Meeting in Berlin which is scheduled for the following week. The Graz meeting will start with the reception on Tuesday evening, July 15 and end with the Main Committee meeting on Friday, July 18. This will allow travel to Berlin over the weekend.

- Anne O'Neill has been asked to request Luigi Napoli to provide us with all information that IEEE may have regarding promotion of the Power Meeting in Berlin.

The Spring 1996 meeting will be hosted by Mr. Dan de la Cruz in San Francisco during April 14-17, 1996 at the Ana Hotel.

The Fall 1996 meeting will be hosted by Mr. Chris Robbins in Burlington, Vermont during October 27-30, 1996.

The Summer 1997 meeting will be held during July 15-18 and the Fall 1997 meeting will be held in St. Louis during November 16-19, 1997. Jerry Bishop will host the St. Louis meeting at the Adams Mark hotel.

4.5 IEC Transformer Activities - Anne O'Neill

Prior to discussion of IEC Activities, Ms. O'Neill presented the Subcommittee members with IEEE brochures for Member Grade Elevation, Standards Press Publications, and the SpaSystem.

Ms. O'Neill then presented the attached information from the Standards Board which details the Implementation Plan for Policy 9.20 (Metrication). Stage III of this Plan is to use metric units exclusively in standards after January 1, 2000.

She also presented the attached information from the Standards Coordinating Committee on the 1995 Goals for implementing the Vision for the Future (Internationalization of Standards). Ms. O'Neill indicated that many of the Transformers Committee Working Groups are fairly well along in these procedures. These will also be addressed in Mr. Vaillancourt's report on Standards activities.

It is hoped that identification of the Technical Committee members who are also members of other international standards groups will help with the harmonization of related standards of between the international groups.

Ms. O'Neill noted that she has established databases of representatives in various international groups. Relative to transformer activities, the lead Canadian delegate to IEC TC14 is J. Foldi and the lead US delegate to IEC TC14 is Ramsis Girgis. The lead US delegate to IEC TC38 - Instrument Transformers is Tony Jonnatti. Georges Vaillancourt is now secretary of IEC TC42 - High Voltage Testing. She also has the names of Canadian and US representatives for IEC TC10 - Insulating Fluids for Electrotechnical Applications, SC22F - High Voltage DC Issues, TC36A - Insulated Bushings, and TC98 - Electrical Insulation Systems. Lists of these representatives will be available through the Standards Coordinating Council.

The Technical Advisor (TA) to a National Committee performs the following functions:

receives ballots from IEC group,
compiles the vote and casts the ballot for the represented country,
receives information on new working groups, and
finds technical experts to populate those working groups.

Ramsis Girgis, US TA to IEC TC14, reviewed some of his activities in this position. He has chosen 12 members for his TA Group. Seven members represent manufacturers, four represent utilities, and one is from EPRI. Ballots and other information regarding transformers are

circulated among this Group to obtain a general consensus to respond to requests from TC14. The TC14 Committee works on a limited number (4 or 5) at one time. Most of the work is performed independently. Small working groups (3 or 4 members) may meet 2 or 3 times on a particular subject. The Committee meets approximately every two years. A delegation comprised of the TA and 2 or 3 other TAG members attends these meetings. Ramsis is now considering having more members of the TAG who are also leaders in the IEEE Transformers Committee. Mr. Binder also stated that Ramsis will be requested to present a report on TC14 activities at future Transformer Committee meetings to provide better coordination of our activities. Ramsis indicated that response for input to IEC requests has always been poor. He believes that implementation of these measures and the SCC's 1995 Goals for the Vision for the Future will improve this response and greatly enhance the IEEE's position in the development of international standards. Ramsis stated that he would furnish a list of the members of the US TAG to IEC 14 for inclusion in the minutes of this meeting.

Tony Jonnatti, US TA to IEC TC38, reported that he has just recently assumed this position. The group is presently reviewing IEC 44, 185, and 186 which will be discussed at their next meeting to be held in Helsinki. Jim Smith and M. Rajadhyaksha are also in the delegation going to Helsinki.

Georges Vaillancourt, secretary of IEC TC42, reported that this group is presently working on techniques for digital impulse measurements, IEC 270 on partial discharge measurements, IEC 52 on voltage measurement by standard gaps, IEC 60-2 procedure for determining uncertainty in high voltage measurements, and IEC 1083 on digital recorders. Georges indicated that he intends to create a list cross-referencing IEEE and IEC transformer standards.

General discussion on the harmonization and internationalization of standards brought out the following points:

- Most of the existing IEEE and IEC standards have been developed independently; some can be readily adopted and some will take a significant amount of time.

- A few IEEE and IEC standards have fundamental differences which will make harmonization very difficult, if at all possible (the case in point being C57.18.10 Requirements for Semiconductor Rectifier Transformers).

- There now appears to be a fair number of Transformers Committee members also working on IEC working groups which should reduce the independent development of standards.

- One point which makes communication with IEC difficult is that there appears to be no published listing of IEC working group chairs.

- The GATT Treaty requires increased recognition and use of IEC Standards.

- The IEC standards permit use of an "in some countries" clause which can be used when some conflicts are of a permanent nature (such as frequency or ambient temperatures), or due to different practices.

- IEEE Standards are developed by volunteers on a consensus basis. This process takes up to four years to complete. Additional input time required to harmonize with other standards could jeopardize the availability of volunteers. Many of the volunteers who develop IEEE PES Standards have no real interest in the application of standards outside of North America.

Ms. O'Neill noted that she had IEC brochures and an IEC Bulletin newsletter which would be available at the main Committee meeting on Wednesday.

4.6 Chair's Report - J. H. Harlow

Mr. Binder presented Mr. Harlow's report which will be included in the Committee meeting minutes.

Mr. Binder also requested all Subcommittee Chairs to identify, by Wednesday, all persons who have become Working Group Chairs since the Milwaukee meeting. A luncheon meeting will be arranged in Boston with the Committee officers and these new Chairs for a presentation on the standards development process.

4.7 Standards Subcommittee - G. H. Vaillancourt

4.7.1 Standards and Coordination Activities

Mr. Vaillancourt had mailed his status report on transformer standards and coordination activities to the Administrative Subcommittee members prior to this meeting. He requested updates and corrections be submitted to him prior to the printing of the Committee meeting minutes.

The complete report is shown as part of the Committee minutes.

4.7.2 Documents Submitted to the Standards Board

Ten PAR's were submitted to NESCOM and fourteen documents were submitted to REVCOM for approval. The three PARs associated with PC57.12.00 and PC57.12.90 Parts I and II were denied approval pending minor revisions. The PAR extension for PC57.18.10 was denied pending further justification. See the complete report for details.

The report includes a two page listing of PARs which require action, mainly request for extension, in the near future to avoid administrative withdrawal.

The Standards Board meeting schedule is shown in the complete report.

4.7.3 Standards Subcommittee

A new Working Group has been established - Terminology, Units, and Terminal Markings - Tom Traub, Chair.

IEEE 62 Part I - Guide for Diagnostic Field Testing of Transformers, Regulators and Reactors has been approved by RevCom and should be published shortly. The Working Group for

Diagnostic Field Testing and Monitoring of Transformers will be maintained to work on the field monitoring aspect of this subject. This Working Group, which has a draft scope and volunteers for both Chair and Vice Chair, should be under some subcommittee other than the Standards Subcommittee. General discussion in the Administrative Subcommittee led to the consensus that this Working Group should be operated as part of the Dielectric Tests Subcommittee with appropriate liaison with other subcommittees.

Mr. Vaillancourt is looking for a Vice Chair for the Standards Subcommittee.

4.7.4 PES Standards Coordinating Committee

This Committee met on January 30, 1995 in New York.

Ms. Anne O'Neill gave an update on PES Vision for the Future - Standards Action Plan. Internationalization of standards is still emphasized. Each technical committee is requested to establish two related goals for 1995.

Rosemary Tennis of the IEEE Standards Office gave a presentation on invitation-to-ballot service. Open to every interested IEEE member, not only members of a particular technical committee.

New PAR form was received and should be used now. It is included as Attachment 7 to the status report. An electronic version will also be available through the SpaSystem as pub/gen/ieeepar.txt.

4.8 Status of IEEE Standards - L. Napoli

Mr. Napoli was not present. Ms. Anne O'Neill was present to represent IEEE Staff. No formal report was presented.

4.9 Status of ANSI C57 Committee - L. Savio

Mr. Savio did not attend this meeting. No formal report was presented.

4.10 Subcommittee Activities - Subcommittee Chairs

4.10.1 West Coast - D. S. Brucker

Mr. Edgar Trummer is the new Chair and Mr. Don Chu is the new Secretary for the WG on Phase Angle Shifting Transformers.

Mr. Gary McCulla will become the new Subcommittee Chair at the Boston Meeting.

4.10.2 Performance Characteristics - B. K. Patel

The Task Force to Survey Failures of Generator Step-Up Transformers should complete it's work by the next meeting. Note that this type of function was formerly performed by the Edison Electric Institute and now there appears to be no organization performing this on a regular basis.

4.10.3 Audible Sound and Vibration - Jeewan Puri

No activities to report.

4.10.4 Dielectric Tests - L. B. Wagenaar

Mr. Binder announced that Mr. Wagenaar has changed positions from Chair of the Bushing Subcommittee to Chair of the Dielectric Tests Subcommittee.

A Task Force was formed to address a request which was received from the Surge Protection Devices Committee approximately four years ago. The Task Force is now ready to ballot the Subcommittee on the resolution of this request concerning a coordination curve which was discontinuous.

We are revising the procedures for Induced Voltage Tests which will incorporate changing the partial discharge measurement basis from microvolts to picoCoulombs. These procedure revisions will make it necessary to form a new WG or TF to make concurrent revisions to C57.113.

4.10.5 Bushings - F. E. Elliott

Mr. Binder announced that Mr. Elliott has become the new Chair of the Bushing Subcommittee.

A new Task Force has been formed to address the loadability of Draw Leads for bushings. Mr. Russ Nordman is Chair. Approval was requested and given for this TF to survey the Committee on issues and concerns related to this subject.

WG C57.19.03 Bushings for DC Applications has completed balloting of this document in the SC. Approval was requested and granted to ballot this document in the full Committee.

Bushing Current Transformer Pocket shielding requirements have been balloted in the SC with several negative ballots which cannot be resolved because they essentially state that the requirements are not necessary. The Administrative SC decided that liaison with the Instrument Transformers SC should be completed and then the issue should be balloted in the full Committee as an addition to C57.12.00.

4.10.6 Instrument Transformers - J. E. Smith

No activities to report.

4.10.7 Insulating Fluids - F. J. Gryszkiewicz

No activities to report.

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

Three Standards were approved by the Standards Board more than a year ago. One (C57.12.44) is the responsibility of IEEE and was published in December. The other two (C57.12.24 and C57.12.40) are the responsibility of NEMA and we do not know the status of them at this time.

Mr. Orehek indicates that the WG members are becoming very frustrated by not seeing their work come to fruition. Mr. Binder suggested that he and Mr. Orehek have a conference call to discuss this matter and determine how to proceed.

4.10.9 Distribution Transformers - K. S. Hanus

This SC also has three Standards which have been approved by IEEE and are waiting to be published by NEMA. These Standards are C57.12.21, C57.12.22, and C57.12.26.

Revisions to C57.15 Step-Voltage and Induction Regulators may require the C57.95 Loading Guide to be changed to recognize the revisions which deal with temperature rise values allowed for insulation systems.

The WG on Bar Coding of Distribution Transformers requests assignment of a C57.XX number to this project which presently has IEEE project number P1265. This is another item which needs to be followed up with Luigi Napoli.

4.10.10 HVDC Converter Transformers & Reactors - W. N. Kennedy

Mr. Kennedy requested all SC Chairs to send correspondence copies of their SC minutes to the other SC Chairs. Mr. Vaillancourt added that this would help the Standards SC Chair to keep the standards status report more up-to-date.

4.10.11 Dry Type Transformers - W. Patterson

No activities to report.

4.10.12 Insulation Life - L. W. Pierce

Mr. Pierce requested guidance on procedures for handling two interpretations. These were discussed later during the Vice Chair's report.

4.11 Awards Subcommittee - J. D. Borst

Mr. Borst's full report will be shown in the Committee minutes.

4.11.1 Committee Service Awards

Mr. Borst announced that Certificates of Appreciation have been prepared for three members. They are:

J. W. Howard
R. B. Robertson
H. J. Windisch

Paul Orehek agreed to accept the certificates for Jim Howard and R. B. Robertson in their absence. The certificate for Henry Windisch will be presented to Wini Windisch on Wednesday.

Dave Brucker, Jim Templeton, Bob Veitch, and Loren Wagenaar have been identified to receive an award at the next meeting. The Subcommittee Chairs were requested to identify any others deserving an award at that time.

4.11.2 IEEE Standards Recognition

The IEEE Standards Board has issued a Working Group Chair Award to Jim Harlow for the C57 Collection. This award will be held for presentation at the next meeting.

4.12 Vice Chair's Report - W. B. Binder, Jr.

Mr. Binder presented his written report. It was not reviewed at this time. This report is included in the Committee minutes.

All Subcommittee Chairs were requested to remind their members that paper reviews are a rapid fire process. Please respond immediately if a review cannot be performed so that another person will have adequate time to perform the review.

4.12.1 Revisions to Organization and Procedures Manual

A draft of the O & P Manual revisions was given to all the Administrative Subcommittee members prior to this meeting.

The description of the balloting procedures has been expanded in a first draft to develop a more detailed explanation of how we make this an open process.

Procedures for standards interpretations need to be made more uniform throughout the technical committees. Basically, these procedures must generate a consensus interpretation and not allow one individual to provide an interpretation.

Lin Pierce posed the question as to whether copies of all the interpretations provided by the Transformers Committee in the last five years are available. The concern is that these interpretations appear to be private communications and not, as they should be, part of the public domain. Another step in the procedures is necessary to place these interpretations in the public domain. It was suggested that all interpretations could be published in the Committee minutes. It was also pointed out that all interpretations are sent to Luigi Napoli, IEEE Staff Engineer, but we are not certain what he does with the document. The only known published interpretations are the National Electric Code and the National Electric Safety Code Interpretations. Anne O'Neill indicated that these interpretations, like some in the Computer Society, are published as documents themselves, due to the number of interpretations which are requested. It was suggested that the Power Engineering Society could publish a compilation of all the technical committee interpretations on an annual basis. It was generally agreed that interpretations of Transformer Committee standards should be made available to the public, but procedures to do this were not established at this time. Mr. Binder will bring this subject up at the next Technical Council O & P Committee.

The other drafted revisions are basically editorial.

Comments on this draft, particularly scope changes, are required by June 1, 1995 so that a new draft can be made before the Summer Power Meeting in July.

4.13 Secretary's Report - J. W. Matthews

4.13.1 Membership Review

Voting Members - Ben Allen, Dave Douglas, Allan Teplitzky, and Dave Truax have resigned since the last meeting. Note that Dave Douglas made a special request that his name be removed from all Subcommittee and Working Group rosters. Dennis Gerlach, Chuck Millian, and Dave Takach could not be contacted, but close associates indicate that they are no longer able to participate in our activities. Stan Osborn recently passed away.

Emeritus Members - Herman Gabel resigned. George Iliff's mail has been returned and he could not be contacted otherwise.

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

Voting Members -	161	
Emeritus Members -	15	
Voting Classifications:	Producers -	73
	Users -	50
	General Interest -	38

At the Administrative Subcommittee meeting, Dave Brucker suggested that Peter Iijima may know George Iliff's status. Lin Pierce also noted that John Dutton recently passed away.

4.13.2 New Member Applications

Membership applications have been received from the following persons for review at this meeting:

Applicant - Company - Voting Classification - Sponsor

Javier Arteaga - Magnetek Ohio Transformer - Producer - Patel, Templeton
Robert L. Grunert - ERMCO - Producer - Hanus, Patel
Ernst Hanique - Smit Transformers - Producer - Patel
Bertrand Poulin - North American Transformers - Producer - Vaillancourt, Wagenaar
Arlise L. (Butch) Robinson, Jr. - Central Power & Light - User - Orehek
Jerry W. Smith - Mississippi Power Company - User - Hanus

Following these additions, membership stands at 167 voting members, with 77 producers, 52 users, and 38 general interest.

4.13.3 Request For Corresponding Membership

Mr. Peter Stewart, Wilson Transformer - Australia, has requested acceptance as a Corresponding member. He has expressed interest in our activities, but would not be able to attend meetings on a regular basis. I believe Mr. Stewart would be our first member under this classification. We need to develop guidelines, including how to handle the associated expenses such as printing and postage, associated with this classification. Note that Mr. Stewart indicated that he would expect to pay a fee of approximately US$20 to cover this type of expense.

This item was discussed at the Administrative Subcommittee. Technical Council Procedures state that a Corresponding member must meet all the same requirements as a Voting member except for the requirement of regular meeting attendance. The Secretary will respond to Mr. Stewart's request and explain the membership requirement of first participating in Working Group activities before being eligible as Corresponding member of the full Committee. A copy of the last Minutes, a membership application form, and a Directory will be included. It was agreed that no service fees would be established until they become a burden.

4.13.4 PES Directory Rosters

At the Milwaukee meeting, I requested all Subcommittee Chairs to submit a roster listing on the same diskette used to submit their Subcommittee minutes. Only three listings were received. Please see the attached listing for the information compiled thus far.

The task of updating the Directory this Fall will be greatly simplified if we compile the information now. This file should include all Working Groups which are listed in the directory. Please review the listings (including Scopes) and provide an updated file on the same diskette used to submit Subcommittee minutes.

4.13.5 Meeting Minutes

Minutes of the Milwaukee meeting were reproduced at no cost, compliments of Ken Hanus and TU Electric. Postage costs were $1,156.62 for 329 mailings, which averages $3.51 per mailing. The total income from the 275 registrants was 2,750.00. Note that the net cost of the minutes varies for each meeting and the $10 portion of the registration fee is a valid nominal fee.

Again, I request the Subcommittee Chairs to submit their minutes within 30 days of the meeting (by June 1, 1995 for this meeting). The submittal should include a printed copy and an electronic file on a 3 1/2" diskette. The file should be formatted in Word 6.0 (or earlier version), WordPerfect 5.1, or text only, in order of preference.

4.13.6 Standards Coordination Activities

A request to obtain copies of the Committee Minutes on a routine basis was received from Mr. James D. Huddleston. The request was made as Liaison to the Transformers Committee for the Power System Relaying Committee. The List of Liaison Representatives (Attachment 3) shows Mr. R. W. Haas as the PSRC Liaison. Which is correct? Also, do we routinely furnish copies of the Committee Minutes to Liaison Representatives who do not attend the Committee meetings?

Attachment 5 - Please split the listings of the Standards Coordination Activities so they may be easily separated for inclusion with the individual Subcommittee reports in the Committee minutes.

4.14 Old Business

No old business items were presented.

4.15 New Business

No new business items were presented.

4.16 Adjournment

There being no further business, Mr. Binder adjourned the meeting at 11:56 p.m.

Respectfully submitted,

John W. Matthews, Secretary

AdSub Attachment 4.5-1

Standards Board Implementation Plan for Policy 9.20

The IEEE Standards Board supports IEEE Policy 9.20, which calls for measured and calculated values of quantities to be expressed in metric units in IEEE publications, following the detailed guidance for SI-based metric practice given in IEEE Standard 268. Many IEEE standards already conform to this policy. For the remainder, the Standards Board has adopted the following transition schedule:

Stage I -- After January 1, 1996: Proposed new standards and revised standards submitted for approval shall include metric units.

Stage II -- After January 1, 1998: Proposed new standards and revised standards submitted for approval may include inch-pound data if that is thought to be necessary, but shall give the metric units in preferred place. [As a general rule, "dual dimensioning", the practice of following the metric unit with the inch-pound-based unit in parentheses, should be avoided because it makes text difficult to read. Alternative means of presenting the inch-pound information, such as tables or footnotes, are preferred.]

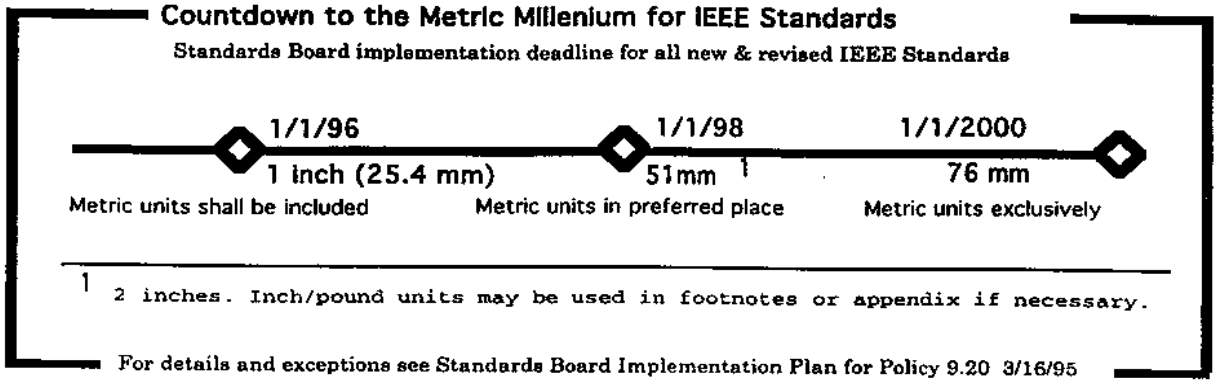
Stage III -- After January 1, 2000: Proposed new standards and revised standards submitted for approval shall use metric units exclusively in the normative portions of the standard. Inch-pound data may be included, if necessary, in footnotes or appendixes that are informative only. Standards that are submitted for reaffirmation must, at a minimum, *include* metric units.

Standards Coordinating Committee 14 shall work with the committees responsible for generating IEEE standards to help them carry out this implementation plan. Policy 9.20 recognizes the need for some exceptions and contains the following statement: "Necessary exceptions to this policy, such as where a conflicting world industry practice exists, must be evaluated on an individual basis and approved by the responsible major board of the Institute for a specific period of time." SCC14, as part of the coordination process, shall review requests for individual exceptions and shall report its recommendations to the Board.

Exceptions: (1) Standard 268 gives a specific exception for trade sizes, such as the AWG wire series and inch-based standards for fasteners. Such data need not be translated into metric terms.

(2) Also excepted are those cases, such as plugs and sockets, where a mechanical fit to an inch-based product is required.

(3) This Implementation Plan does not require metric products to be substituted for inch-based products.



January 31, 1995

To: PES Technical Council
From: Standards Coordinating Committee,
Chuck Lennon and Anne O'Neill
Re: 1995 Goals for Standards --
Implementing the Vision for the Future

The members of the PES Standards Coordinating Council have selected these goals for 1995 to implement the Vision for the Future. The SCC members agreed to report back on these goals at the end of the year.

1. Each newly authorized PAR for a new or revised standard, shall initiate a literature search that includes related IEC standards.

2. Each PES standard going into ballot (whether newly developed standards or revised) shall include a forward that indicates this standard's relationship to IEC standards.

3. Each Technical Committee will identify who among its members are:

- also members of the US TAG of the related IEC TC or SC
- also active in the Canadian or Mexican Committee of the related IEC TC or SC
- also active in non-North American IEC National Committee of the related IEC TC or SC
- also members of related CIGRE SC

These members will be periodically asked to report on activities in these other international groups.

4. Each TC will identify if any of its standards, in whole or in part are or could be advancing in IEC.

ROSTER OF IEC TC14
U.S. TECHNICAL ADVISORY GROUP

AdSub Attachment 4.5-2

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IEC\ROSTER

TRANSFORMERS COMMITTEE

Scope: Treatment of all matters in which the dominant factors are the application, design, construction, testing, and operation of transformers, reactors and other similar equipment. Included is treatment of the following:

Transmission and distribution transformers

Voltage regulators (step and induction regulators)

Reactors and grounding transformers (joint with Surge Protective Devices Committee)

Insulating fluids

Insulating and dielectric problems relating to transformers

Potential devices (in conjunction with Power System Relaying and Switchgear Committees)

Bushing and instrument transformers (in coordination with Power System Relaying and Switchgear Committees)

Outdoor apparatus bushings

Matters relating to transformers and regulators specifically designed for applications covered by certain other technical committees, such as Relays, Electronics, Surge Protective Devices, Communications, may be treated jointly with that committee if emphasis is on general principles, or exclusively by the application committee if emphasis is on the particular requirements of the application.

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Binder, Jr., W. B., New Castle, PA
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Diamantis, T., Syracuse, NY
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Edwards, K., Mt. Vernon, IL
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Paiva, G. A., Rosemead, CA
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Riffon, P., Montreal, PQ, Canada
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Rizvi, S.M.A., Waukesha, WI
Robbins, C. A., Lyndonville, VT
Robertson, R. B., Odessa, FL
Rossetti, J. R., Memphis, TN
Rowe, G. W., Bay City, MI
Sampat, M. P., Athens, GA
Savio, L. J., New York, NY
Saxon, W. E., Charlotte, NC
Scheu, R. W., Hickory, NC
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Shenoy, V., Toronto, ON, Canada
Sim, H. J., Goldsboro, NC

Smith, J. E., Pinetops, NC
Smith, J. E., Pine Bluff, AR
Smith, S. D., Versailles, KY
Stahara, R. J., Pine Bluff, AR
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Sullivan, J. C., Tampa, FL
Sundin, D. W., Milwaukee, WI
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Whitley, D. W., Athens, GA
Wilks, A. L., Dyersburg, TN
Williams, Jr., C. W., St. Petersburg, FL

ADMINISTRATIVE SUBCOMMITTEE

Scope: Plan and coordinate the activities of the Transformers Committee and its Subcommittees. The duties include planning technical sessions for committee meetings and Power Engineering Society meetings; providing for liaison with other IEEE committees, American National Standards Institute and international organizations; and providing for preparation of standards, guides and test codes, or revisions thereof, for specific types of equipment, including review of ANSI proposals, where required, by establishing ad hoc working groups responsible to the Administrative Subcommittee.

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Patterson, W. F., Raleigh, NC
Pierce, L. W., Rome, GA
Puri, J., Monroe, NC
Smith, J. E., Pinetops, NC
Templeton, J. B., Muncie, IN
Vaillancourt, G. H., Varennes, PQ, Canada
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AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE

Scope:

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BUSHING SUBCOMMITTEE

Scope: Preparation and revisions of technical standards, guides, and test codes for outdoor apparatus bushings having BIL of 110 kV or above and used as components of power transformers, reactors and oil circuit breakers.

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Costa, F., Toronto, ON, Canada
Dahinden, V., Rapperswil, Switzerland
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Elliott, F. E., Portland, OR
Ellis, K. P., Woodbridge, VA
Frazier, M. L., Metairie, LA
Frost, J., Koln, Germany
Gillies, D. A., Rhododendron, OR
Hartgrove, R. H., Raleigh, NC
Heinrichs, F. W., McMurray, PA
Heyman, O., Ludvika, Sweden
Highton, K. R., Morgan Hill, CA
Johnson, D. C., Portland, OR
Kallaur, E., New Haven, CT
Long, J. E., New Haven, CT
Lowe, R. I., Bloomfield, CT
Musil, R. J., New Providence, NJ
Nordman, R., Waukesha, WI
Osborn, S. H., Watertown, MA
Patton, J., Corpus Christi, TX
Rajadhyaksha, M., Hawthorne, NY
Richens, F., LeRoy, NY
Saxon, W. E., Charlotte, NC
Shah, D. M., Milpitas, CA
Smith, S. D., Versailles, KY
Sharma, D. N., Halifax, NS, Canada
Stiegemeier, C. L., Alamo, TN
Thompson, R. W., Plainfield, IN
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Working Group on Bushing Application Guide

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Musil, R. J., Murray Hill, NJ
Nordman, R. Waukesha, WI
Osborn, S. H., Watertown, MA
Parr, D. E., Atlanta, GA
Patton, J., Corpus Christi, TX
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Richens, F., LeRoy, NY
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Working Group on Bushings for DC Applications

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Jonnatti, A. J., Clearwater, FL
Lindgren, S., Palo Alto, CA
Parr, D. E., Atlanta, GA
Richens, F., LeRoy, NY
Singh, P., Alamo, TN
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Working Group on Revision of C57.19.01

P. Singh, *Chairman*
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Parr, D. E., Atlanta, GA
Patton, J., Corpus Christi, TX
Rajadhyaksha, M., Hawthorne, NY
Richens, F., LeRoy, NY
Stiegemeier, C. L., Alamo, TN
Thompson, R. W., Plainfield, IN
Wagenaar, L. B., Columbus, OH
Young, W. A., LeRoy, NY

DIELECTRIC TESTS SUBCOMMITTEE

Scope: Determine test voltage requirements for service conditions or conversely voltage tests that will determine that service requirements are met.

J. B. Templeton, *Chairman*
ABB Power T&D Company
3500 S. Cowan Road
Muncie, IN 47307-2448

DISTRIBUTION TRANSFORMERS SUBCOMMITTEE

Scope: Develop and maintain product standards for overhead, padmounted, and certain underground type distribution transformers rated 2500 kVA and smaller, high voltage 38,000 volts and below, low voltage 15,000 volts and below. Develop and revise enclosure integrity and coating standards for the above apparatus.

K. S. Hanus, *Chairman*
TU Electric Company
P. O. Box 970
Fort Worth, TX 76101

DRY-TYPE TRANSFORMERS SUBCOMMITTEE

Scope: Preparation of standards, guides and test codes or revisions thereof, for dry-type transformers and reactors, including liaison with ANSI on matters pertaining to dry-type transformers and reactors. Dry-type transformers and reactors are considered to include those in which a significant component of the transformer or reactor internal insulation is an insulating gas (including air).

W. F. Patterson, *Chairman*
ABB Power T&D Company
Centenial Campus
1021 Main Campus Drive
Raleigh, NC 27606

HVDC CONVERTER TRANSFORMERS AND SMOOTHING REACTORS SUBCOMMITTEE

Scope: Study and review engineering aspects of the specification, design, testing, installation, operation,and maintenance of hvdc converter transformers and smoothing reactors. Develop and maintain related standards, recommended practices, and guides for such equipment as described. Coordinate with other technical committees, groups, societies, and associations as required.

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Foldi, J., Guelph, ON, Canada
Gillies, D. A., Rhododendron, OR
Heyman, O., Ludvika, Sweden
Highton, K., Morgan Hill, CA
Iijima, P., Portland, OR
Juhlin, L. E., Ludvika, Sweden
Norton, E. T., San Jose, CA
Papp, K., Linz, Austria
Pham, V. Q., Varennes, PQ, Canada
Riffon, P., Montreal, PQ, Canada
Stein, W. W., Nuremberg, Germany
Vaillancourt, G. H., Varennes, PQ, Canada

INSULATING FLUIDS SUBCOMMITTEE

Scope: To determine acceptable electrical insulating fluid properties for use in transformers and other electrical apparatus. To prepare standards and guides for the acceptance, maintenance and handling of insualting fluids. To determine the effect of various treatments, aging in service, gas evaluation and other phenomena on the fluids' properties and to determine the criteria for serviceability in the equipment.

F. J. Gryszkiewicz, *Chairman*
Doble Engineering
85 Walnut Street
Watertown, MA 02172

F. W. Heinrichs, *Secretary*

INSULATION LIFE SUBCOMMITTEE

AdSub Attachment 4.13.4

Scope: To prepare or revise standards, guides and test codes for liquid immersed transformers and current limiting reactors, which provide information and testing methods to determine maximum safe insulation temperatures, ambient temperatures, insulation aging characteristics, safe duration of loads in excess of nameplate, including short circuits, and also to determine methods of calculating or measuring temperatures reached during both transient and steady state loads.

L. W. Pierce, *Chairman*
General Electric Company
1935 Redmond Circle
Rome, GA 30165-1319

INSTRUMENT TRANSFORMERS SUBCOMMITTEE

Scope: Preparation of standards, guides, and test codes, or revisions thereof, for instrument transformers, including review of ANSI proposals.

J. E. Smith, *Chairman*
ABB Power T&D Company
P. O. Box 687
Pinetops, NC 27864

W. E. Morehart, *Secretary*

PERFORMANCE CHARACTERISTICS SUBCOMMITTEE

Scope: Treatment of loss, impedance, exciting current, inrush current and other performance characteristics and their methods of measurement and test.

B. K. Patel, *Chairman*
Southern Company Services
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Antweiler, J., Monroe, NC
Arnold, J.C., Jr., N. Conway, NH
Arteaua, J., Palmetto, FL
Ayers, D. E., Ladson, SC
Barker, R. L., Richmond, VA
Barnard, D.A., Phoenix, AZ
Bartek, A., Canonsburg, PA
Beaster, B. L., Muncie, IN
Binder, W. B., Stow, OH
Bode, T., Bellevue, WA
Boettiger, W.E., Muncie, IN
Borst, J. D., Jefferson City, MO
Boniger, J., South Boston, VA
Cambre, M.A., Ft. Wayne, IN
Cash, D. J., Livingston, TX

Chu, D. New York, NY
Corkran, J. L., Waukesha, WI
Crouse, J. C., Rome, GA
Delgado, A., Monterey, Mexico
Douglas, D.H., Cleveland, OH
Dolnal, D., Regensburg, Germany
Dudley, R.F., Scarborough, ON, Canada
Ebert, J., Waukesha, WI
Fallon, D.J., Newark, NJ
Feghali, P., Milpitas, CA
Fleeman, J.A., Columbus, OH
Forsyth, B., Oklahoma City, OK
Frazer, R. H., Goldsboro, NC
Frazier, M.L., Metairie, LA
Girgis, R.S., Muncie, IN
Goodwin, D.F., Philadelphia, PA
Grunert, R.L., Dyersburg, TN
Hanique, E., Netherlands
Hartgrove, R.H., Raleigh, NC
Henning, W.R., Waukesha, WI
Hopkinson, P.J., Monroe, LA
Kallaur, E., New Haven, CT
Kennedy, S.P., Buffalo, NY
Krause, P.E., Golden, CO
Kumar, B., Gold River, CA
Lackey, J.G., Toronto, ON, Canada
Light, H.F., Syracuse, NY
Long, J.E., New Haven, CT
Lowdermilk, L.A., Hickory, NC
Marek, R.P., Hampton, VA
Martinez, A.J., New Orleans, LA
Massouda, K. T., Toronto, ON, Canada
Matthews, J.W., Baltimore, MD
McCann, F.J., San Ramon, CA
McGill, J. W., West Allis, WI
McMillen, C.J., Hickory, NC
McNutt, W.J., Pittsfield, MA
McQuin, N.P., East Pittsburg, PA
Mehta, S.P., Waukesha, WI
Melanson, J., Lynnburst, NJ
Murray, C.R., South Boston, VA
Norton, E.T., San Jose, CA
Orten, D.E., Milpitas, CA
Payne, P.A., Washington, DC
Perkins, M., Muncie, IN
Pierce, L.W., Rome, GA
Platts, D.W., Allentown, PA
Puri, J., Monroe, NC
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Traub, T.P., Chicago, IL
Trummer, E.R., Weiz, Austria
Tuli, S., Waukesha, WI
Vaschak, J.J., Westfield, MA
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Wakeam, R.D., Jackson, MS
Ward, B.H., Blue Bell, PA
Wheatly, R.J., Marlton, NJ
Wood, J.G., San Francisco, CA
Wrenn, W.E., Columbus, NE

STANDARDS SUBCOMMITTEE

Scope: This subcommittee will be responsible for new, revised and reaffirmed Standards for the IEEE Transformers Committee. It will coordinate the inputs from the Technical Subcommittees into a complete and logical document and submit it to the IEEE Standards Board. This Subcommittee will be responsible for seeing that proper liaison is established, where necessary, with other committees on standards activities, and with the IEEE Standards Board.

G. H. Vaillancourt, *Chairman*
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UNDERGROUND TRANSFORMERS AND NETWORK PROTECTORS SUBCOMMITTEE

Scope: Develop and maintain related standards for secondary network protectors, and secondary network transformers (liquid-filled and dry-type) and three-phase underground-type distribution transformers rated 2500 kVA and smaller with a high voltage of 35,000 volts and below, and a low voltage of 480 volts and below.

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Moffat, J. R., Greenwood, SC
Mulkey, D. H., San Francisco, CA
Niemann, C. G., Chicago, IL
Nutt, B., Dallas, TX
Plaster. R. L., South Boston, VA
Risse, P. G., Atlanta, GA
Robinson, A. L., Corpus Christi, TX
Wimmer, W. G., Richmond, VA

Working Group on Network Protectors

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Robinson, A. L., Corpus Christi, TX
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Working Group on Underground Type, Three-Phase Distribution Transformers

C. G. Niemann, *Chairman*
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Nutt, B., Dallas, TX
Orehek, P. E., Newark, NJ
Risse, P. G., Atlanta, GA
Robinson, A. L., Corpus Christi, TX
Wimmer, W. G., Richmond, VA

Working Group on Secondary Network Transformers, Subway and Vault Type

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Nutt, B., Dallas, TX
Orehek, P. E., Newark, NJ
Plaster, R. L.,
Risse, P. G., Atlanta, GA
Robinson, A. L., Corpus Christi, TX
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Working Group on Ventilated Dry Type Network Transformers

B. Nutt, *Chairman*
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Risse, P. G., Atlanta, GA
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Robinson, A. L., Corpus Christi, TX
Thenappan, V., San Angelo, TX
Wimmer, W. G., Richmond, VA

WEST COAST SUBCOMMITTEE

Scope: Participate in all activities of the main committee and its subcommittees by review and action on minutes of these various groups or other information; insure a broader participation of Western IEEE members in standardization activity and allied problems.

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LIAISON REPRESENTATIVES

Organization and Procedures Committee, Power Engineering Society

Binder, W. B., Jr., New Castle, PA

Recognition Committee, Power Engineering Society

Borst, J. D., Jefferson City, MO

Standards Coordinating Committee, Power Engineering Society

Vaillancourt, G. H., Varennes, PQ, Canada

Standards Coordinating Committee No. 4

Payne, P. A., Washington, DC

ANSI C57 Sectional Committee on Transformers, Regulators and Reactors

Savio, L., *Chair, IEEE Delegation*
New York, NY

Binder, Jr., W. B., New Castle, PA
Borst, J. D., Jefferson City, MO
Davis, J., Atlanta, GA
Harlow, J. H. (alternate), Largo, FL
Vaillancourt, G. H., Varennes, PQ, Canada
Veitch, R. A., Thornhill, ON, Canada

IEC & COPANT Standards

McNutt, W. J., Pittsfield, MA

ANSI C62 Committee on Surge Protective Devices

Open

CIGRE, Study Committee 12

Kennedy, W. N., Muncie, IN

5.0 Transformers Standards - G. H. Vaillancourt

5.1 Transformers Standards and Co-ordination Activities

The transformers standards status is given in the first four attachments:

Attachment 1 (12 pages) is a list, in numerical order, of all the C57 standards and others, including five ANSI C57 standards which are being listed under the Standards Subcommittee because they have not been found a home yet in the other Subcommittees. Some standards are also listed more than once, this occurs when more than one group is working on the same standard, i.e. C57.12.00 and C57.12.90. There are in all, 114 standards or projects listed.

Attachment 2 (4 pages) is a report of co-ordination activity on standards belonging to other PES Committees. This attachment is sorted by PES Committee names.

Attachment 3 (1 page) is a list of IEEE Societies or PES Committees that have asked for co-ordination on the standards for which we are responsible.

Attachment 4 (24 pages) is sorted by Subcommittee names. It contains a listing of the projects, for which a given Subcommittee is responsible, and co-ordination activities with other PES Committees. The standards that are not assigned yet, or do not belong to the Transformers Committee, are listed under the Standards Subcommittee. For the publication of the Transformers Committee Minutes, this attachment will be split by Subcommittee names, and each section will accompany, the corresponding Subcommittee report.

5.2 Documents Submitted to Standards Board

5.2.1 REVCOM 09/21/94 (Standards)

IEEE 259	Revision approved
C57.116	Reaffirmation approved

5.2.2 NESCOM 12/12/94 (PAR's)

PC57.93	Extended to June 1997

5.2.3 REVCOM 12/12/94 (Standards)

C57.12.01-1989	Extended to December 1996
C57.12.22	Revision approved
C57.12.59-1989	Extended to December 1996
C57.96-1989	Extended to December 1996
C57.111-1989	Extended to December 1996
C57.121-1989	Extended to December 1996

5.2.4 NESCOM 03/15/95 (PAR's)

PC57.12.00	New PAR disapproved
PC57.12.90-Part I	New PAR disapproved
PC57.12.90-Part II	New PAR disapproved
PC57.12.00h,i,j,k	PAR's withdrawal postponed
PC57.12.90b,c	PAR's withdrawal postponed
PC57.16	Extended to June 1997
PC57.18.10	Extended to June 1997 (project status requested)
PC57.98a	Extended to June 1997
PC57.123	Extended to June 1997

5.2.5 REVCOM 03/15/95 (Standards)

C57.19.100	New standard approved
C57.21	Reaffirmed
C57.111	Reaffirmed
C57.121	Reaffirmed
C57.131	New standard approved
P62-Part I	New standard approved (PSIM)

5.3 Standards Due for Reaffirmation, Revision, Or Withdrawal Well Before December 1995

C57.114

5.4 Par Submittals

Like I said in the previous report, there has been a lot of neglect in the submittal of project authorization requests (PAR's) over the last few years, and also the limit of four year lifetime on PAR's was approved four years ago now. The result is that the IEEE Standards Department is catching up with this and they have mailed out a lot of notices. They are offering to extend the PAR's until June 1997, provided that it is requested by the Working Group Chair responsible for the project. The request can be made by filling up the special form provided (Attachment 5). In some cases it may be more advantageous to apply for a new PAR, but in general I would encourage you to request your working group Chairs, to ask for an extension by completing the form and sending it to Rona Kershner before May 5, 1995. This should solve the problem for at least another two years for a good percentage of the PAR's.

Following is a list of all the PAR's that require action as soon as possible or else they will be up for administrative withdrawal. By the way, there is a now new PAR form that has just been released (Attachment 7). It should be used for all new PAR submittals.

5.4.1 Audible Sound and Vibration Subcommittee

PC57.12.90x	Apply for PAR, if this is separate from C57.12.90
PC57.112 (P523)	Request extension to June 1997
Guide Noise Con.	Apply for a PAR

5.4.2 Bushing Subcommittee

PC57.19.03	Request extension to June 1997

5.4.3 Dielectric Tests Subcommittee

PC57.12.90d	Request PAR withdrawal, work included in new PAR
PC57.21	Request extension to June 1997
PC57.98	Request PAR withdrawal, new PAR will be required later
PC57.113	Request extension to June 1997
PC57.127	Request extension to June 1997, **reballot document**
PD Loc. Guide	Apply for PAR
P1350	Request PAR withdrawal, work to continue in SPD

5.4.4 Distribution Transformers Subcommittee

PC57.12.20	Request extension to June 1997
PC57.12.21	Request extension to June 1997
PC57.12.22	Request extension to June 1997
P57.12.25	Request extension to June 1997
PC57.12.27	Request extension to June 1997
PC57.12.33	Apply for PAR
P 1265	Extension requested

5.4.5 Dry-Type Transformers Subcommittee

PC57.12.91	Request extension to June 1997
PC57.16	PAR extension to June 1997 has been requested
PC57.96	Request extension to June 1997
PC57.99 (P731)	Request extension to June 1997
P 259	Request extension to June 1997

5.4.6 HVDC Converter Transformers Subcommittee

PC57.129	Request extension to June 1997
P 1277	Request extension to June 1997

5.4.7 Instrument Transformers Subcommittee

PC57.13.4 (P832)	Request extension to June 1997, **submit guide to REVCOM**
PC57.13.5	Submit new PAR for title change

5.4.8 Insulating Fluids Subcommittee

PC57.121 (P954)	Request extension to June 1997
P 1258	Submitting new PAR

5.4.9 Insulation Life Subcommittee

PC57.12.001	Request PAR withdrawal, work included in new PAR
PC57.91	Request extension to June 1997
PC57.92	Request PAR withdrawal, work included in PC57.91
P 1276	Request extension to June 1997

5.4.10 Performance Characteristics Subcommittee

PC57.18.10	Extended to June 1997
PC57.131	Request extension to June 1997

5.4.11 UG TR & Network Protectors Subcommittee

PC57.12.24	Request extension to June 1997
PC57.12.40	Request extension to June 1997
PC57.12.57	Request extension to June 1997

5.4.12 West Coast Subcommittee

PC57.93	PAR extended to June 1997
PC57.114 (P513)	Request PAR withdrawal
PC57.128	Request extension to June 1997

5.4.13 Standards Subcommittee

C57.12.10	ANSI Std, needs a home in IEEE
C57.12.13	ANSI Std, needs a home in IEEE
C57.12.53	ANSI Std, needs a home in IEEE
C57.12.54	ANSI Std, needs a home in IEEE
PC57.12.70	Submitting new PAR
PC57.12.80	Submitting new PAR
C57.17	ANSI Std, needs a home in IEEE

5.5 Next Standards Board Meetings and Submittal Deadlines.

Meeting Date	Deadline for PAR (1)	Deadline for STD (2)
June 14, 1995	March 5, 1995	May 5, 1995
September 21, 1995	June 11, 1995	August 11, 1995
December 12, 1995	September 3, 1995	November 3, 1995

Note 1: A PAR must be sent to the Standards Subcommittee Chair before the stated deadline, he then has to circulate it to all the other PES Committees before he can submit it to the IEEE Standards Department. This requires two extra months.

Note 2: Standards must be submitted directly to the IEEE Standards Department before the stated deadline to be considered at the next Standards Board Meeting.

5.6 Standards Subcommittee Meeting

The Standards Subcommittee met on Tuesday, April 25, with 17 people in attendance. The minutes of the Milwaukee meeting were approved as written.

First, the revision procedure that had been published in the minutes of the Dallas meeting, was reviewed. In brief, this procedure consists in collecting all the changes approved by the technical subcommittees over a period of two years and integrating them into the document. The document is then balloted at the Main Committee level. The two year cycle has been chosen to coincide with the publication by IEEE of the C57 collection of standards (phone book). This cycle will be adjusted as we go along if need be. The closing date for submitting changes in time for the 1996 edition is May 15, 1995. All changes submitted after that date will have to wait until the next publication. The present draft will be balloted during the summer and if accepted, should be submitted to REVCOM in time for their September meeting.

Following this, there was some discussion on how to determine which changes are needed and which subcommittee should be responsible to introduce a given change. The consensus was that changes should be proposed in writing to the two Chairs of the working groups on continuous revision of C57.12.00 and C57.12.90, John Borst and Steve Smith. It will then be the responsibility of each Chair to establish and maintain a running list of changes and assign them to the proper subcommittee. The list should contain: the title of the change, the name of the responsible subcommittee, the name of the working group, and the current status of the work.

5.6.1 Working Group on Continuous Revision of C57.12.00

Next John Borst presented the report for his working group. He reported that a new PAR had been submitted to NESCOM at the March 15, 1995 meeting, and it was not approved. NESCOM requested that the scope stated in the PAR, be clarified and other changes were also requested. The changes will be made and the PAR will be resubmitted for the June meeting. John then distributed a new draft of C57.12.00 that he had prepared with the help of Rochelle Stern of the IEEE editorial staff. The draft complies with the current editorial requirements. A few more changes will be made and the draft will be balloted in the Transformers Committee.

Following this, Steve Smith presented the written report which follows:

5.6.2 Report of the Working Group on Continuous Revision of C57.12.90

A new PAR for C57.12.90 Part I was submitted to the IEEE Standards Board (NESCOM) on March 15, 1995. The PAR was rejected because it was proposed to split the existing document into separate documents: the Test Code (Part I), and the Guide for Short Circuit Testing (Part II), and two PAR's were submitted with the same old number. Also it was indicated that there may be other international standards with similar scope that should be co-ordinated with the present standard. The PAR for Part I will be resubmitted to the Standards Board for their next meeting.

Requests for Co-ordination have been received from three other PES committees:

1) Switchgear Committee, Nigel McQuin will act as common member.

2) T&D Committee, James Burke requested circulation of drafts.

3) Power System Relay Committee, Robert W. Haas requested circulation of drafts.

The following are known proposed or pending revisions to C57.12.90:

1) Revision of clause 10 regarding impulse tests, done by Russ Minkwitz of Dielectric Tests Subcommittee. Revisions balloted and accepted.

2) Revision of clauses 1 - 4 to conform to the latest revision of IEEE Style Manual.

3) Revision of subclauses 10.4.1, 10.4.2, and 10.4.3 for clarification of routine impulse test for distribution transformers - Balloted in Dielectric Tests Subcommittee.

4) Revision of clause 11, temperature rise, Working Group on Thermal Tests, Insulation Life Subcommittee - Draft 1 circulated.

5) Revision of certified test report data, Working Group PCS on Revision of C57.12.90, Performance Characteristics Subcommittee - WG balloted proposed revision.

6) Revision of induced test, Task Force on Revision of Induced Test, Working Group on Revision of Dielectric Tests, Dielectric Tests Subcommittee.

7) Revision of resistance test, Working Group on Loss Tolerance and Measurement, Performance Characteristics Subcommittee.

A copy of C57.12.90, Part I is available on Word Perfect 5.1. Format and editorial changes and known errors have been corrected on this copy.

Next Robert Veitch, Chair of the Working Group on Diagnostic Field Testing and Monitoring on Power Transformers, presented his report:

5.6.3 Report of Working Group on Diagnostic Field Testing and Monitoring on Power Transformers

The working group met on April 24, 1995 with 37 people in attendance. First the Chair reviewed the history and objective of the working group.

A few years ago, the Transformers Committee determined that the Power System and Instrumentation Committee (PSIM) was in the process of writing IEEE P62 - Guide for Diagnostic Field Testing of Electric Power Apparatus - Part I: Oil-Filled power Transformers, Regulators and Reactors. The document was written without reference to the Transformers Committee. I was asked to review the document and give my opinion as to its technical content. This was done and my findings revealed that there were many shortcomings and inaccuracies in the document as written. It was then decided to form a working group in the Transformers Committee to review the document and recommend changes. As Chair of this working group I

was asked to join the PSIM working group. After considerable work by the members of our working group and myself, modifications were proposed to the PSIM working group and Part I was modified substantially and finally accepted. This proposal has now passed the IEEE Standards Board and will be published.

At the completion of this review, the Chair noted that the charge of the present working group had been successfully completed. It was now time to disband and obtain a new direction.

At that time, Georges Vaillancourt moved that IEEE 62 - Guide for Diagnostic Field Testing of Electric Power Apparatus - Part I: Oil-filled Power Transformers, Regulators and Reactors, be included in the next edition of the « C57 Collection ». A vote on this proposal taken amongst those present, was passed with 20 in favour and no negative votes.

Georges then moved that the scope of the Working Group be modified to include the following:

a) to deal with all matters related to diagnostic field testing of power transformers, regulators and reactors,

b) to survey all techniques applicable to monitoring of transformers, regulators and reactors in service and develop standards where needed.

The proposal was also voted on and passed with 25 in favour and no negative votes.

The Chair then noted that with the new scope approved, he had accomplished what he set out to do and there now would be a need for new members and a new Chair. He said that he would issue minutes of this meeting as his last official act. The attendance sheet was then re-circulated to the attendees to note whether they wanted to become members of the new working group. A total of 21 individuals indicated a desire to become working group members.

Georges Vaillancourt then remarked that with the new scope, the working group will need a new home and agreed to take this subject to the Administrative Subcommittee Meeting to determine which subcommittee the working group should be transferred to. The job of selecting a new Chair for the working group will be the privilege of the Chair of the subcommittee that will be joined by the new working group.

The working group meeting was then adjourned.

Next at the Standards Subcommittee Meeting, the Chair Georges Vaillancourt, on behalf of all those participating in the Transformers Committee work, thanked Bob Veitch and the members of his working group: R. L. Barker, D. W. Crofts, D. J. Fallon, and J. J. Kelley, for a job well done. At that point, the attendance gave them a hand of applause.

5.6.4 Working Group on Terminology, Units, and Terminal Markings

The last working group to report was the Working Group on Terminology, Units, and Terminal Markings which is Chaired by Thomas Traub. This working group has taken on the task of revising C57.12.70 and C57.12.80. Tom reported that he had already obtained diskette copies of the two standards from the IEEE editorial staff, and started revising C57.12.80 which covers

terminology. Two PAR's had already been submitted for the June meeting of the Standards Board.

Under new business there was a discussion about the matter of cross-references in the transformer standards, It happens very often that a standard that being referenced by another standard is revised before the other one, then the reference to it may become totally incorrect. What would be the best way to minimize this problem? Nobody in attendance could suggest a satisfactory answer.

5.7 PES STANDARDS COORDINATING COMMITTEE MEETING

The Standards Coordinating Committee met, Monday, January 30, 1995 in New York.

First, Ms. Anne O'Neill of the IEEE Standards Department gave an update on PES Vision for the Future - Standards Action Plan that continues to put the emphasis on the internationalization of standards. As part of this vision, each technical committee is requested to choose two goals that it will commit to in 1995. Each standards co-ordinator will be asked to report back about these goals, to the SCC at the end of 1995. She presented a list of suggested goals. The two goals may be selected among the followings:

- Each newly authorised PAR for a new-or-revised standard, shall initiate a literature search that includes related IEC standards.

- Each PES standard going into ballot (whether newly developed standards or revised) shall include a foreword that indicates this standard's relationship to IEC standards.

- Each Technical Committee will identify who among its members are:
  - also members of the US TAG of the related IEC TC or SC
  - also active in the Canadian or Mexican Committee of the related IEC TC or SC
  - also active in non-North American national committee of the related IEC TC or SC
  - also members of related CIGRE SC

  These members will be periodically asked to report on activities in these other international groups.

- Each TC will identify if any of its standards, in whole or in part are or could be advancing in IEC.

Next, Rosemary Tennis of the IEEE Standards Department gave a presentation about a new invitation-to-ballot service that they want to offer to the PES technical committees. With this new service balloting would be open to every interested member of IEEE and not restricted to only members of any particular technical committees. Balloting groups would be formed as necessary from a balloting pools of interested people whose names would be in an IEEE database.

The new PAR form dated 1/95 (Attachment 6) was presented, it has only two pages as compared to 3 in the old one. The old PAR form will be accepted through September, 1995, but it is recommended that the new one be used immediately. An electronic version will be available by March, 1995.
The subject of title clarity on future PAR's was then discussed. At the 21 September NESCOM meeting several PAR's were on the agenda for approval. Much discussion centered around their

titles, in that they were not descriptive enough to be clearly defined by a possible user. For future PAR submission, NESCOM would like to suggest the use of more descriptive and more precise titles. A lack of clarity in the title of a PAR could introduce delay in the approval process.

The next item was a discussion on the newly formed SCC-33 on information structure. The scope of SCC-33 is to co-ordinate IEEE involvement in standardization activities related to information infrastructure projects, nationally and internationally.

Respectfully submitted,

G. H. Vaillancourt, Chair

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

SUBCOMMITTEE: STANDARDS / CHAIRPERSON: G. VAILLANCOURT / PHONE: (514)652-8515 / FAX: (514)652-8555

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	GENERAL REQUIREMENTS FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS	T&D PSRC SWG	SUBS IAS IEC-TC1					NEW PAR NESCOM 06/15/95
VARIOUS	CONTINUOUS REV. OF C57.12.00	BORST J. D.		06/16/93	/ /	1998	(314)659-6119	WG COLLECTING CHANGES
C57.12.10	TRANSFORMERS 230kV AND BELOW -8333/10417kVA 1 PH, -100000 kVA 3 PH w/o LTC, -100000kVA w/ LTC - SAFETY REQUIREMENTS							ANSI STANDARD
ANSI	ANSI C57.12.1			06/04/87	/ /	1993		NEEDS A HOME, DUE FOR REAF.
C57.12.13	CONFORMANCE REQUIREMENTS FOR LIQUID-FILLED TRANSFORMERS USED IN UNIT INSTALLATIONS INCL. UNIT SUBSTATIONS							ASSIGN TO SUBCOMMITTEE
ANSI	HVACC ON HIGH VOLTAGE TRANSFO			09/02/81	/ /	1987		NEMA STANDARD
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 (NO PAR)
ANSI				/ /	/ /	0		NOBODY IS WORKING ON IT
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
ANSI				/ /	/ /	0		NOT IEEE STANDARD
C57.12.70	TERMINAL MARKINGS AND CONNECTIONS FOR DIST. & POWER TRANSFORMERS							ANSI APPROVED 07/09/93
NONE	TERMINOLOY, UNITS AND MARKING	TRAUB T. P.		06/18/92	/ /	1997	(312)394-2704	TO REVISE TERMINOLOGY
C57.12.80	TERMINOLOGY FOR POWER & DISTRIBUTION TRANSFORMERS							WILL START REVISION
NONE	TERMINOLOGY, UNITS AND MARKING	TRAUB T. P.		05/01/92	/ /	1997	(312)394-2704	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							NEW PAR NESCOM 03/15/95
VARIOUS	CONTINUOUS REV. OF C57.12.90	SMITH S. D.		03/16/93	/ /	1998	(606)879-2757	WG COLLECTING CHANGES
C57.17	REQUIREMENTS FOR ARC FURNACE TRANSFORMERS							LAST REVISED IN 1986
ANSI	ANSI DOCUMENT			/ /	/ /	1986		ANSI DOCUMENT

COORDINATION ACTIVITY OF STANDARDS SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
NEW 03/04/94	GUIDE FOR VOLTAGE AND PHASING DETECTORS FOR USE IN HV SYSTEMS IN ELECTRIC POWER UTILITIES	PSIM	PETER H. REYNOLDS	215-646-9200	G. H. VAILLANCOURT	514-652-8515
P 62 03/17/94	GUIDE FOR DIAGNOSTIC OF POWER APPARATUS	PSIM	DAVID TRAIN	617-926-4900	R. A. VEITCH	COMMITTEE BALLOT OF D7 905-731-9178
P 454 03/31/94	PARTIAL DISCHARGE MEASUREMENTS	PSIM	BARRY WARD	215-646-9200	G. H. VAILLANCOURT	WILL ADOPT IEC-270 514-652-8515
PC37.107 12/28/85	STANDARD FOR DIGITAL PROTECTIVE RELAY INTERFACES	PSR	STIG L. NILSSON	408-335-9061	G. H. VAILLANCOURT	EVALUATING BALLOT RESULTS 514-652-8515
NEW 02/20/95	GUIDE FOR RECOMMENDED ELECTRICAL CLEARANCES AND INSULATION LEVELS IN AIR INSULATED SUBSTATIONS	SUBS	RICHARD COTTRELL	517-788-0817	G. VAILLANCOURT	APPLYING FOR PAR 514-652-8515
P1291 10/22/91	GUIDE FOR PARTIAL DISCHARGE MEASUREMENTS IN POWER SWITCHGEAR	SWGR	E. F. VEVERKA	414-835-1544	G. H. VAILLANCOURT	ANSI APPROVED 08/30/93 514-652-8515
P1325 03/17/92	RECOMMENDED PRACTICE FOR REPORTING FIELD TROUBLE DATA FOR POWER CIRCUIT BREAKERS	SWGR	D. M. LARSON	203-634-5739	G. H. VAILLANCOURT	INFORMATION COPY REQUESTED 514-652-8515

Intermission for Address by Police

A detective who works with the Violent Crimes Division of the Kansas City, MO Police Department, addressed the Committee regarding the assault on Larry Lowdermilk. The detective assured us that the assault, which occurred on Sunday morning April 23, 1995, is not a common occurrence. He stated that although visitors are occasionally robbery victims, they are not normally severely assaulted when they appear to be co-operating with the robber. He stated that he had spoken with Larry this morning and that he seemed to be in pretty good spirits. The detective told us that he had a suspect who had been identified by a witness and that the suspect would be captured and prosecuted to the full extent of the law. He hoped that this incident had not spoiled our visit completely, and that we might return another time. (Note that it was announced later that the suspect had been captured.)

6.0 Recognition and Awards - J. D. Borst

6.1 Certificates of Appreciation

Certificates of Appreciation will be presented to the following individuals at the Transformers Committee meeting on April 26, 1995:

James W. Howard	Chair, C57.12.24 Working Group
R. B. Robertson	Chair, C57.12.44 Working Group
Henry J. Windisch	Friend and Dedicated Contributing Member

We congratulate these individuals for their contributions and leadership.

6.2 IEEE Standards Department

The IEEE Standards Board has issued a Working Group Chair Award to Jim Harlow for his contribution in developing the C57 IEEE Standards Collection. This award will be presented at the April 26, 1995, Transformers Committee meeting. We congratulate Jim for his contributions and leadership.

6.3 IEEE PES Awards Committee

The PES Awards Committee met January 30, 1995, in New York in conjunction with the Winter Power Meeting. The 1995 awards for Prize Papers, Working Group Technical Reports and Standards or Guides were discussed and selected. A meeting is tentatively planned for the Summer Power Meeting to review and improve the selection process for the 1996 awards.

John D. Borst
Chair, Awards Subcommittee

Note that the award for Henry Windisch was presented to Wini Windisch and Paul Orehek accepted the awards on behalf of J. W. Howard and R. B. Robertson. Mr. Borst will forward the award for Jim Harlow to him.

7.0 IEC Transformer Activities - Anne O'Neill

Ms. O'Neill first announced that anyone here wishing to purchase the C57 Collection would receive an extra discount from the usual prices, 50% for members and 20% for non-members. Also, copies of the IEC Channel Notes were available in the back of the room.

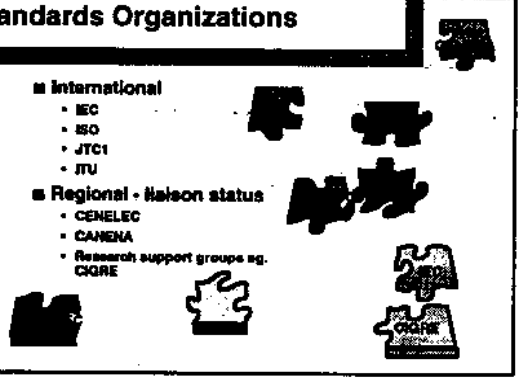
Anne presented information on why and how we should work on harmonizing IEEE Standards with International Standards. Copies of her slide presentation are attached. She also handed out the attached summary of International Standards groups which are related to IEEE Standards groups.

Anne ended the presentation stating that she is available to help in getting started and moving through this process. A panel of experts on the IEC Standards will be presented at the next Transformers Committee meeting.

Why Harmonize IEEE Standards with International Standards

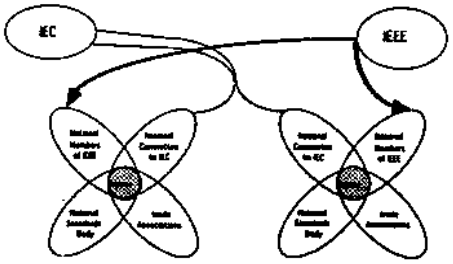
- Market trends
  - favor growing single world-wide market
  - indicate a diminishing role for national standards
- International agreements favor international standards
  - GATT : regulated versus voluntary standards
  - Internationally accepted versus International membership
- Standards Board policy
  - International bodies can adopt IEEE standards
  - International bodies should participate in IEEE's revision process.

Who are the International Standards Organizations

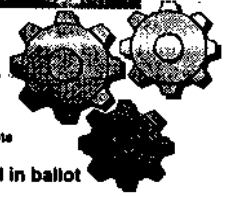


- International
  - IEC
  - ISO
  - JTC1
  - ITU
- Regional - liaison status
  - CENELEC
  - CANENA
  - Research support groups eg. CIGRE

Participation in IEC is through member Countries



How International Standards organizations work



- Member countries
  - appoint delegates
  - advance new work
  - establish national positions on ballots
- TC chairs and secretaries lead in ballot resolution
- Working groups have limited scopes and membership

How IEEE leaders begin harmonization

- Search for related international standards
- Join the TAG
- Encourage global participation in IEEE WGs
- Join other lead-in/research organizations

If you're a US delegate

- Present a united front at TC or SC meetings
- WG experts are individuals
- Encourage fund raising to assure representation at meetings
- Your voice and vote counts
  - Leverage US market strength to weight single vote
  - Use "in-some-countries" clauses

TC 10 Fluids for Electrotechncial Applications

To prepare product specifications, test methods as well as maintenance and use guides for liquid and gaseous dielectrics. Also to prepare specifications and maintenance and use guides for lubricants and control fluids for steam turbines, gnerators and control systems as well as to assist in the preparation of test methods for such methods.

	member country representatives	type	details of interrelationships
Canadian	M. Duval, IREQ	*Individual*	T. Rouse, TA for TC 10 and member in fluids SC of TRF C; common members on TRF C and US TAG
USA	Paul J. Griffin, Doble Engineering Co.		
related CIGRE			

TC 14 Power Transformers

To prepare international standards for power transformers, on-load tap changers and reactors, without limitation of volatage or power (not included are instrument transformers, testing transformers, traction transformers mounted on rolling stock and welding transfromers.)

	member country representatives	type	details of interrelationships
Canadian	J. Foldi	*Publication*	IEC 551 & IEEE 523; IEC 817 & IEEE 851
USA	Dr. Ramsis Girgis, ABB Power T&D	*Individual*	Foldi & Girgis members of TRF
related CIGRE 12, 14		*Scope*	at least 6 Transformer subcommittes have related scopes

SC 22F Converters for high-voltage d.c. power transmission

	member country representatives	type	details of interrelationships
Canadian	L. Vaughan, IREQ	*Project*	IEEE1158-1991 on Power Losses is base for IEC NW; source PES Substations IO
USA	Mark Reynolds, Bonneville Power Admin.		
related CIGRE 14			

SC 36A Insulated Bushings

	member country representatives	type	details of interrelationships
Canadian		*Scope*	possibly with UTNP, analysis & judgement call still needed
USA			
related CIGRE			

TC 37 Surge arresters

To prepare international standards regarding: -- specifications for the different types of surge arresters (with or without gaps) for AC or DC supply systems; - the choice of arresters allowing adquate protection of systems with satisfactory reliability, and the definition of conditions of use enabling this result to be obtained.

	member country representatives	type	details of interrelationships
Canadian	G. St. Jean, HydroQuebec	*Scope*	possibly with UTNP, analysis & judgement call still needed
USA	JL. Koepfinger, Duquesne LIght		
related CIGRE 33			

SC 37A Low-voltage surge protective devices

	member country representatives	type	details of interrelationships
Canadian	G. St.-Jean, Hydro-Quebec	*Scope*	possibly with UTNP, analysis & judgement call still needed
USA	J.L. Koepfinger, Duquesne Light		
related CIGRE			

Report to PES Technical Committee
on related IEC Technical Committees

Transformers
4/25/95

SC 37B Specific components for surge arresters and surge protective devices

	member country representatives	type	details of interrelationships
Canadian	n/a	*Scope*	possibly-with UINP, analysis & judgement call still needed
USA	J.L. Koepfinger, Duquesne Light		

related CIGRE

TC 38 Instrument Transformers

To prepare international standards regarding specifications for instruement transformers.

	member country representatives	type	details of interrelationships
Canadian	P.W. Labaj, Ontario Hydro Research	*Individual*	J. Smith
USA	Anthony Jonnatti, Instrument Transformers		

related CIGRE 34

TC 42 High-voltage testing techniques

To deal with high-voltage testing techniques and to prepare international standards for different types of tests belonging thereto such as high-voltage ac, dc and impulse tests and high-current impulse tests.

	member country representatives	type	details of interrelationships
Canadian	W. Janischewskyj, U. of Toronto	*Individual*	G. Vailllencourt serves as TC Secretary also member of Transfrmrs
USA	Dr. Herman M. Schneider, EPRI/GE		

related CIGRE 33

TC 98 Electrical Insulation systems

n/a

	member country representatives	type	details of interrelationships
Canadian	C. de Tourreil, IREQ	*Individual*	Bill Simpson of SC-Dry & IEEE 259 is alos IEC WG member
USA	Richard F. Weddleton, Westinghouse		

related CIGRE

TC 99 System eng & erection of elec pwr installations >1 kVac w safety focus

Standardization of high voltage installations for power generation, transmission, distribution (for private or public power supply) and application. The new field of activity cover hv installations under indoor or outdoor external influences, e.g. power plants, substations, buildings, other consumer premises and machinery. A portion of its program of work will consider the border line between low voltage and high voltage taking into account physical phenomena like partial discharges, which become significant above 3 kV ac.

	member country representatives	type	details of interrelationships
Canadian	see SCC, Mike Bourassa	*Scope*	TAG & TA needed; 1st mtg 6/95 Frankfurt
USA	still forming, see Sue Vogel, sect to NESC		

related CIGRE

8.0 Reports of Technical Subcommittees

The following reports are those of the technical subcommittees of the Transformers Committee. In most cases they are the complete minutes of meetings held earlier and they are identified as minutes. Some are summary reports of the Subcommittee activities during the previous week.

Secretary's Note: The subcommittee reports have been edited to the format of the IEEE Style Manual. No changes have been made to the content of these reports except removal of attendance lists.

Following each report is a listing of the current status of each of the subcommittee's assigned standards.

8.1 Instrument Transformers - J. E. Smith

April 25, 1995, Kansas City, MO.

8.1.1 Chair's Remarks & Announcements

The Instrument Transformer Subcommittee met at 2:30 p.m. with ten members and three guests present. The minutes of the September 26, 1994 meeting at Milwaukee, WI. were approved as written.

The fall meeting will be held November 5 - 9, 1995 at Boston, MA. Future meetings will be April 13 - 17, 1996 in San Francisco, CA, October 27 - 30, 1996 in Burlington, VT, July 15 - 18, 1997 in Graz, Austria and November 16 - 19, 1997 in St. Louis, MO.

New pars will require a search of all existing IEC Standards:

IEC-185 - Current Transformers
IEC-186 - Voltage Transformers
IEC-44.3 - Current & Voltage Transformers
IEC-44.4 - Partial Discharges
IEC-44.6 - Protective Current Transformers
IEC-270

The next order of business was the reports from the three working groups.

8.1.2 WG on Test Requirements for Instrument Transformers for Nominal Voltage 115 kV and Above - Chair J. Ma

WG on Test Requirements for Instrument Transformers for Nominal Voltage 115 kV and Above met at 8:00 a.m. on April 25, 1995. Nine members and 21 guests attended.

The minutes of WG meeting at Milwaukee, WI were approved as written.

8.1.2.1 Voltage ratings and insulation levels. (Contributor: Vadim Raff)

The revised dielectric table was submitted for review. General concerns were the dry applied voltage test levels were not consistent with the values set in other equipment standards.

Chair indicated we should concentrate on test voltage levels pertaining to system voltage 115 kV and above. Also the partial discharge test procedure has been established in the earlier meeting of WG.

Chair suggested to Vadim that he should check with manufacturer members if there was a problem to induce VT's to the same A/C test voltage as the CT's.

8.1.2.2 Mineral oil test requirements and DGA. (Contributor: Wayne Hansen)

A new oil test table was presented. Hydro Quebec oil specification provided by member Pierre Riffon was also submitted for reference.

Manufacturer members were requested to submit their comments on meeting both processed oil specification per Hansen's table and Hydro Quebec oil specification. (Action = Manufacturer Members)

Manufacturer members are requested to submit comments on dissolved gas analysis (DGA) results. (Action = Manufacturer Members)

8.1.2.3 Test programs for Instrument Transformers

Chair proposed that it was appropriate for WG to begin work on test programs.

VT's - Vadim Raff of Square D would work with Loren Wagenaar of AEP. To review both type test and routine test programs on VT's.

CT's - Ross McTaggart of Haefley-Trench and Pierre Riffon of Hydro Quebec will work jointly on type test and routine test programs for CT's.

8.1.3 WG on the Revision of C57.13 - Acting Chair Jim Smith

WG on the revision of C57.13 met on April 25, 1995. Thirteen members and guests were present.

8.1.3.1 Old Business

The members will send to Tom Nelson, Chair, their suggestions at sections of C57.13 Std. that should be changed with their recommended change before the next meeting.

Tom's address is:
Building 220, RMB 344
Gaithersburg, MD 20899
FAX: 301-926-3972

8.1.4 WG on the use of Instrument Transformers with Electronic Meters and Relays - Chair, Chris TenHaagen

WG on the use of Instrument Transformers with electronic meters and relays met at 2:00 p.m. on April 25, 1995. Sixteen members and guests were present.

8.1.4.1 Old Business

Approval of minutes, Milwaukee, WI.

8.1.4.2 New Business

Reports on assignments from the previous meeting were provided as follows:

Jim Harlow forwarded to the meeting a summary and backup of published CT burden data for electronic relays from seven manufactures (summary attached). Tom Nelson not present. Was to

report on C12.16 electronic meter accuracy standards. Jim Smith, review applicable IEC standards re burdens. Basically, for burdens less than 5 VA, power factor is unity. Chris TenHaagen provided a blind survey of published burden data for 7 electronic meters (summary attached).

There was limited discussion on the subject of any proposed new accuracy requirements and burden requirements, in part due to the lack of users present. This concern was expressed to the C57.13 subcommittee chair. Members were asked to consider proposals for the next meeting, with the intention of balloting a broader audience.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

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		
P546	SUBCOMMITTEE			03/30/94	06/14/94	1999		REV. PAR APPROVED 06/14/94
C57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS							R1992
PSRC	SUBCOMMITTEE			08/25/87	/ /	1997		RELAY COMM. DOCUMENT
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	/ /	1995		R1990
C57.13.4	DETECTION OF PARTIAL DISCHARGE AND MEASUREMENT OF APPARENT CHARGE WITHIN INSTRUMENT TRANSFORMERS			T&D				PAR IS EXPIRING
P832		JONNATTI A. J.		/ /	05/28/80	0	(813)785-2788	DOCUMENT NEVER SUBMITTED TO SB
C57.13.5	GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN INSTRUMENT TRANSFORMERS 69 kV AND ABOVE			SWGR	EM			TITLE CHANGE NEEDED IN PAR
PC57.13.5	SUBCOMMITTEE	MA J.		/ /	06/14/94	0	(706)554-8800	SUBMIT NEW PAR WITH CHANGES
C57.13.6	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS FOR USE WITH ELECTRONIC REVENUE METERS AND RELAYS			PSIM	PSR	TD	PSC	PAR DISSAPROVED **ACTION**
PC57.13.6	SUBCOMMITTEE	TEN-HAAGEN C. W.		/ /	/ /	0	(603)749-8433	MAKE CHANGES AND RESUBMIT PAR

COORDINATION ACTIVITY OF INSTRUMENT TRANSFORMERS SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
P1304	CURRENT MEASURING SYSTEMS WHICH USE OPTICAL TECHNIQUES					
06/18/92		PSIM	T. R. McCOMB	613-990-5826	J. N. DAVIS	404-393-9831
PC37.110	GUIDE FOR THE APPLICATION OF CURRENT TRANSFORMERS USED FOR PROTECTIVE RELAYING PURPOSES					REVISION (D21) BALOTTED IN PSR
05/31/90		PSR	GRAHAM CLOUGH	206-737-6912	J. E. SMITH	919-827-4286
PC37.97	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER SYSTEM BUSES					ANSI APPROVED 05/20/91
12/10/87		PSR	STEVE CONRAD	505-848-2642	JOHN N. DAVIS	404-393-9831
PC57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS					REAFFIRMED 1992
12/31/80		PSR	ARUN G. PHADKE	703-231-7029	JOHN N. DAVIS	404-393-9831

8.2 Insulating Fluids - F. J. Gryszkiewicz

The Insulating Fluids Subcommittee met in Kansas City, Missouri on Monday, April 24 and Tuesday, April 25, 1995 with 28 members and 33 guests in attendance. Of the 33 guests in attendance, one requested membership on the Subcommittee. This brings the Insulating Fluids Subcommittee membership to 72.

The Minutes of the meeting held in Milwaukee, Wisconsin (September 26 and 27, 1995) were approved as submitted.

8.8.1 Current Subcommittee Projects

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

The Working Group met jointly with the Insulating Fluids Subcommittee on Tuesday, April 25. Since the last meeting in Milwaukee, Draft 9 of the Guide was balloted at the Subcommittee level.

The ballots for Draft 9 were reviewed at the meeting and the negative ballots resolved. After considerable discussion, Subcommittee members felt that Drafts 8 and 9 should be combined and a new draft (Draft 9.1) should be prepared. Draft 9.1 will be sent out for Subcommittee ballot prior to the next meeting in Boston.

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

The Working Group met jointly with the Insulating Fluids Subcommittee on Monday, April 24. Since the last meeting in Milwaukee, a new PAR was submitted to include the words "Trial Use" in the title of the subject guide.

Draft 6 of the Guide was balloted at the Subcommittee level since the last meeting in Milwaukee. The ballots for Draft 6 were reviewed at the meeting and negative ballots resolved. Draft 7 will be prepared and sent out for Subcommittee ballot prior to the next meeting in Boston.

8.8.2 Other Business

8.8.2.1 Water-in-Oil and Water-in-Paper Insulation

Frank Heinrichs, the Task Force Chair, was not present at these meetings; therefore, no progress report was presented. After much discussion, it was decided that information on this subject could be included in the next revision of C57.106 which is scheduled for revision or reaffirmation in 1996.

The Subcommittee will address this topic at the next meeting in Boston.

8.8.2.2 ASTM Method D 2298-81 Standard Test Method for Stability of Insulating Oils Under Electrical Stress (Merrell Test)

Mr. Tom Rouse, Chair of ASTM Committee D-27 on Electrical Insulating Liquids and Gases, has been in contact with the Insulating Fluids Subcommittee Chair on this subject. Although ASTM Method D 2298 was discontinued, Committee D-27 has received a proposal to develop a modified Method D 2298. A copy of this modified method was sent to all Insulating Fluids Subcommittee Members with the minutes of the meeting held in Milwaukee.

Subcommittee members discussed this subject on Tuesday, April 25. The Subcommittee had no specific comments on the proposed test method itself since it felt that D-27 was in a better position to evaluate test methods which come under their jurisdiction. Subcommittee members would like to have test data, obtained with the proposed test method, for their evaluation to determine the significance of such a test.

The Chair will communicate the Subcommittee's comments to Committee D-27.

8.8.2.3 C57.111 - Guide for Acceptance of Silicone Insulating Fluid and Its Maintenance in Transformers

This Guide was recently successfully balloted for reaffirmation at the Main Committee level. It was reaffirmed by the IEEE Standards Board on March 16, 1995.

8.8.2.4 C57.121 - Guide for Acceptance and Maintenance of Less Flammable Hydrocarbon Fluid in Transformers

This Guide was recently balloted for reaffirmation at the Main Committee level. Two negative ballots were cast which required mandatory changes. The reaffirmation of this Guide was considered for approval by the IEEE Standards Board on March 16, 1995. The reaffirmation was disapproved because revision of the document is required in order to make the requested changes.

A Working Group was formed to review the subject Guide to determine if other changes are needed. Members of the Working Group are:

Patrick McShane - Chair
Ted Haupert
Frank Gryszkiewicz
Joe Kelly

The Working Group will report it findings at the next meeting in Boston.

8.8.2.5 C57.104 - Gas Guide and C57.106 - Oil Guide

Both of these guides are scheduled for reaffirmation or revision in 1996. The Subcommittee Chair requested that members review these documents and be prepared for discussion at the next meeting in Boston.

This concluded the business for the Insulating Fluids Subcommittee at this session. The Subcommittee will next meet in Boston, Massachusetts during the period November 5-8, 1995.

Frank J. Gryszkiewicz, Chair
Gene Kallaur, Secretary

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

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					NO WORK IN PROGRESS
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					REAFFIRMED 03/15/1995
NONE	SUBCOMMITTEE				02/02/89	12/10/87	2000		REAF. ON REVCOM AGENDA 03/95
C57.121	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS			PSRC T&D IAS IEC					EXT.TO 12/96 ,ACTION ON PAR
P954	SUBCOMMITTEE				02/22/88	04/12/82	1996		REAF DISAPPROVED 03/15/95
C57.130	GUIDE FOR USE OF DISSOLVED GAZ ANALYSIS DURING FACTORY THERMAL TESTSFOR THE EVALUATION OF OIL-IMMERSED TRANS. AND REACT.			NONE					D8 BEING REVIEWED (TRIAL-USE)
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 GENERATED IN SILICONE-IMMERSED 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 D07

COORDINATION ACTIVITY OF INSULATING FLUIDS SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
P 980 09/17/92	GUIDE FOR THE CONTAINMENT AND CONTROL OF OIL-SPILLS IN SUBSTATIONS	SUBS	RICHARD G. COTTRELL	517-788-0817	F. GRYSZKIEWICZ	GUIDE EXTENDED TO 12/94 617-926-4900

8.3 Insulation Life - L. W. Pierce

The Insulation Life Subcommittee met on Tuesday, April 25, 1995 in Kansas City, Missouri with 32 members and 17 guests in attendance. The minutes of the Sept. 27, 1994 meeting in Milwaukee, Wisconsin were approved as written.

The reports of the Working Groups and Task Forces were then given.

8.3.1 Task Force on Hottest Spot Temperature Rise Determinations - Don Platts, Chair

The Task Force met on Monday April 23, 1995 at 8:00 AM with 19 members and 25 guests present. 3 new members were added. The minutes of the Sept. 26 meeting in Milwaukee were approved after adding an omitted word.

The chair explained that the copying problem with the mailing of Draft #1 and the preference ballot to members. New copies were made available to all at the meeting. The intention in circulating this ballot was to determine which of the proposed approaches was favored by the members of the Task Force to establish the direction the work should take in finding a uniform method for determining the hot spot temperature rise.

Draft 1A came from the September 1994 meeting where Ed Norton proposed an addition to C57.12.00 to add fiberoptic hot spot detectors in all transformers rated 12 MVA and above. Draft 1B was developed from the four papers that have been presented to the task force.

Ed Norton reviewed his proposal for using fiberoptics to measure the hot spot temperature. He referred to recent test data that showed little difference in the calculated hot spot temperature, using the heat run data as a basis, and the temperatures recorded with the fiberoptic sensors. He also explained that new, more durable, fibers are now available.

Don Platts summarized Draft 1B. It includes an addition to C57.12.00 which would require the manufacturer to use one of three options outlined to show compliance with the hottest spot temperature limit requirement. The options are:

1. Detailed temperature modeling as described in papers prepared by Harold Moore and Bill McNutt.

2. Direct temperature reading sensors as proposed by Ed Norton with calculations per #1 to verify the location for installing the sensors.

3. Establishing design families as proposed by Bob Grubb, where the product line can be grouped into design families based on loss characteristics, and physical size. The highest loss unit in the family would be tested per option 1, or 2 above. All others would then also meet the requirements.

After discussion, the Task Force voted on Draft 1A with 1 affirmative, all others opposed. For Draft 1B, 20 votes affirmative. The Task Force will proceed to work on Draft 1B.

The Task Force briefly discussed the omission of the IEC method of calculating the hottest spot temperature rise. It is included in the work of the Working Group on Thermal Tests in the Overload Temperature Test Guide, and was proposed for use in prior meetings of the Task Force. After discussion, it was determined that the use, or the elimination of it, should be done by formal ballot of the task force. It will be added to Draft 2 as a fourth option.

The question of whether the third option, calculating the temperatures based on families of thermal duplicates, was appropriate for all transformers, or only for the smaller sizes was brought up several times. While it is the most practical approach for distribution, and some small power transformers, it is probably inappropriate for large power transformers. While most industrial customers may consider the hottest spot determination to be an extravagance, most utilities would consider it a requirement.

To resolve the discussions, and get a proposal on paper for consideration, the group determined that somewhere around 10 MVA is the point where the method chosen should be restricted. Don Fallon suggested that the limitation be phrased similar to the following: "Option #3 is appropriate for units rated 10 MVA and below. It may also be used for larger units, when agreed to by the user and the manufacturer."

Don Platts will produce Draft #2 based on Draft #1B and these discussions. It will be balloted within the Task Force before the next meeting. Any additions or corrections from task force members, submitted prior to the end of June will be incorporated into Draft #2.

8.3.2 Working Group on High Temperature Insulation for Liquid-Immersed Power Transformers - Michael A. Franchek, Chair; William J. McNutt, Secretary.

The Working Group met at 9:30 AM on April 25, 1995 with 22 members and 28 guests present. Two new members were added bringing the working group membership to 46. The minutes of the Sept. 25, 1995 meeting were approved.

As the first item of business, the Working Group voted to submit a request for time extension for Project P1276 to the IEEE Standards Board. The extension will be requested to extend the time to complete this document to two years, to end no later than June 1997.

Following the last meeting, Draft 3.0 of the "IEEE Trial Use Guide for the Application of High Temperature Insulation in Liquid-Immersed Power Transformers" had been prepared by the Chair and was circulated and balloted to both the Working Group and the Insulation Life Subcommittee. The Chair expressed his thanks for all of the comments received on this ballot. The Chair then discussed the major changes in Draft 3.0, specifically changes in form and format because of changes in the IEEE Standards Style Manual (1994). The most significant change involved adding an introduction to the beginning of the document. The reason for this addition was because the new style manual required the document to begin with the Overview which includes the Purpose and a Scope. Due to the length and content of the Overview from Draft 2.2, it was modified for use as the Introduction.

The results of the ballot was as follows:

Group	Working Group	Subcommittee
Number Mailed	44	41
Number Returned	35	32
Percent Returned	80	78
Number Approved	32	25
Number Negatives	03	04
Not Voting		03

The Chair then reviewed and the Working Group discussed the seven negative ballots. Changes in the document to resolve most of the negative ballots that were agreed upon at the meeting were:

- Figures 1 and 2, which show examples of increased MVA and reduced weight with a higher average winding rise, will be changed to eliminate specific values and only show relative trends.

- Figure 3, which represents the aging characteristics of cellulose vs. aramid materials, will be changed to format similar to that used in C57.100.

- Section 5.2, which describes typical temperatures seen for high temperature rise systems, will be revised to eliminate the phrase "there is no danger of oil ignitions", to a phrase describing a "reduced risk".

- All references to the cost of transformers with high temperature insulation will be eliminated.

- The symbols used within the document will be reviewed, and changed where necessary, to be consistent with the "New Standardized Thermal Equation Symbols".

- The term "technical life" in the document will be changed to be consistent with the C57.91 draft.

- Section 6, which describes hybrid insulation systems, will be rewritten for improved clarity and consistent use of maximum ambient temperatures for both cellulose and hybrid insulation systems.

- Section 8.2, which details information on high temperature insulation systems, will be modified to discuss in more detail, potential limitations on the temperature capabilities of auxiliary equipment, consistent with existing standards. (C57.92, Section 3.1)

- Annex A, which discusses gas-in-oil information for transformers with high temperature materials will be modified to better describe the single point of data for arcing described in the Annex.

- Change the format of the insulation life equations in the document to be more consistent with existing standards.

- Need to add a comment in Section 12, Gas Analysis, which points out that C57.104 is currently the best guide available to analyze gas data from transformers insulated with high temperature material, until sufficient data from these transformers have been collected.

Some negative ballot issues are still unresolved, primarily around issues which overlap with other working groups or subcommittees areas of responsibility. The Chair will discuss these items with the

Chairs of these groups to help resolve these issues, in a manner consistent with these other standards. These issues are:

- Need to discuss the breakdown of mineral oil at high hot spot conditions with the Insulating Fluids Subcommittee.
- Need to discuss the effects of levels of dissolved oxygen in oil on the aging rate of the insulation system with the Insulating Fluids Subcommittee.
- Need to develop test describing bubbling formation in hybrid insulation systems, based on test data from the ESEERCO report, and wording from C57.92, Section 3.1.
- Need to discuss off-gassing of mineral oil at hot spot temperatures above 150 °C with the Insulating Fluids Subcommittee.
- Need to resolve the method for determining the endpoint of insulation life to be consistent with existing standards. Discuss this with the Chair of the Insulating Life Subcommittee and the appropriate Working group Chairs.

Following completion of the resolution of these items, Draft 4.0 of this document will be compiled by the Chair incorporating the changes required to resolve the negative ballots, as well as many editorial comments. Draft 4.0 will then be circulated to the Working Group and the Insulation Life Subcommittee for ballot.

8.3.3 Task Force on Revision of Temperature Test Code (Section 11 of C57.12.90) - George Henry Chair

The Task Force met at 1:20 P.M., April 24, 1995 with seven members and 15 guests present. Bob Grubb, Jim McIver, Steve Smith, and Dick Sullivan requested membership on the Task Force. This brings the total Task Force membership to 13.

The minutes of the September in Milwaukee were approved as submitted.

A new Draft 1 of Section 11 of C57.12.90 was reviewed in detail. It contains the following changes:

1. References to temperature using the symbol T were changed to Q or DQ with appropriate subscripts. Draft 1 was reviewed for accuracy and completeness of these changes.
2. The language of Sections 11.3.1 and 11.3.1.1 was rewritten for improved clarity.
3. Considerable time and discussions were given to Section 11.2.1.2 on the method for extrapolation of hot resistance to time of shutdown. The Task Force considers the present method archaic and in need of updating. In Draft 1 a new method was proposed based on a least squared error fit of a linear or exponential equation to resistance-time data collected after shutdown of the temperature rise tests. The choice of linear or exponential fit would be based on best fit to the data. The Chair reviewed an example of the proposed method using resistance/time data taken from a heat run on a small distribution transformer. For this example there was no significant difference between the linear equation or exponential equation fit to

the data. However, it was the opinion of the Task Force membership that the underlying phenomenon is exponential, and that an exponential decay of resistance versus time can be expected to occur. For this reason, and in the interest of keeping the standard as simple as possible, it was agreed that the provision for fit of a linear equation would be dropped, and only an exponential equation fit to the data allowed. This change will be incorporated into Draft 2.

Toward the end of the meeting the Task Force membership again recognized the need for reordering the sequence of materials to benefit the clarity of the document and also to fix outright preclusion of useful procedure. In the present document the use of equation 27 and 28 is dictated by the choice of short-circuit or loading-back test method. In fact both equations 27 and 28 are suitable for use in either test method. Reordering sequence of materials was not given priority during creation of Draft 1, but will be given priority during Draft 2.

Draft 2 will be completed within 60 days and mailed to the Task Force membership for review and comments. It is expected that the Chair will then prepare Draft 3 for review at the next meeting in early November in Boston.

8.3.4 Working Group on Thermal Tests - R. L. Grubb, Chair, D. L Fallon Secretary

The Working Group met at 4:00 PM on Monday, Sept. 27, 1994 with 16 members, and 18 guests in attendance. Five of the guests requested membership, and were welcomed to the Working group. These new members are:

Michael F. Barnes, Qualitrol
John J. Hinkson, Western Resources
Vkirendra C. Jhonsa, Atlantic Electric Co.
Ronald W. Stoner, Cinergy
Robert J. Whearty, DuPont

After normal introductions, the minutes of the 9/27/1994 meeting in Milwaukee were approved as mailed.

The first agenda item was a status report on P838/IEEE PC57.119, "Recommended Procedures for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Rating"

The Chair provided some history on the status of this document. The last previous ballot of the Transformers Committee was in 1992. The ballot was successful, but there were some 57 changes recommended in the balloting. The next two or three meetings were spent in review of these modifications. By that time the document was effectively in use on a trial basis as utilities and manufacturers worked to gain some experience with it, even though it had not been published. The resulting experience pointed out some difficulties with the procedure, and work has been proceeding to iron these out. There are still a few final issues to be resolved, and this meeting was spent in discussion of these issues.

Bob Whearty raised a concern at the last meeting, that the 70 % test level appeared to be too low, in that it was skewing the value of the exponents such that calculated oil rises for the 125 % run were

lower that these values. Several members commented that there was greater interest in performance at overload values, and that exponents calculated using the two higher tests should therefore be used when such a problem existed. The Chair pointed out an even more basic problem perhaps existed, since the loading guide equations assumed consistent exponents - and that if these errors were due to other than measurement accuracy then the equations themselves should be reviewed. Lin Pierce indicated that the equations in the present loading guides go back at least to the 1940's. They were based on available data, but not based on rigorous understanding and scientific application of the thermal relationships. Continuing discussion of this issue led to the conclusion that there is not enough presently available data using this procedure to indicate that a change should be made to the three test levels (70%, 100%, and 125 %). The suggestion was made to leave the document as is in this area, to gain some experience when it is published, and to re-visit this question after several years experience. The consensus of the group, by a vote of 17-0 was to adopt this suggestion.

Felipe Weffer raised another issue based on his experience with one manufacturer. A transformer failed rated load temperature rise test, and the manufacturer suggested that the failure was due to the test being done with current held constant (as the document recommends) as opposed to watts being held constant. Mr. Weffer did not agree, but asked for some discussion in the group as to whether ultimate temperatures would be considered more accurate based on whether the test was done using constant current or constant watts. Discussion pointed out that both methods are acceptable in the test code, and will give the same ultimate test results, within the degree of accuracy of the temperature and loss measurements. Constant losses are not recommended in this document since constant current will result in a more accurate calculation of time constants. That recommendations will remain in this document.

Jim Long raised an additional point of discussion, based on consensus from meetings earlier today on hot spot temperature rise determination. In Clause 8.3.3 of the document, the alternative of simply adding 15 °C to the average winding rise to get the hottest spot rise is considered. The validity of this method was questioned, specifically because the guaranteed maximum rise values for average winding rise and hot spot rise are 65°C and 80 °C respectively, but there is no guarantee that the hot spot rise will be no more than 15 °C above average winding rise. After discussion, the consensus of the group was to remove this section from the next draft.

Effort will be made to assemble and proof read the next Draft, including all the changes proposed over the past two years, by early summer, and to submit it to ballot in the Working Group and Subcommittee.

8.3.4.1 New Business - Request for Interpretation

A request for Interpretation was received by the IEEE Standards Board from Mr. K. R. M. Nair of Vijai Electricals Limited, India. Mr. Nair's request was as follows:

"We wish to get the following clarification's on Clause-11 Temperature Rise of IEEE Standard C.57.12.90-1993 "IEEE Standard Test Code for Liquid Immersed Distribution, Power and Regulating Transformers".

1. CLAUSE 11, PAGE 50: On the first line under this clause, it is stated "See IEEE Standard C.57.12.00-1993, 7.2 for conditions under which temperature limits apply. Clause 7.2 of C.57.12.00-1963 is not relevant clause. The relevant clause is 5.11.2, which please clarify.

2. AVERAGE WINDING TEMPERATURE RISE MEASUREMENT: The average temperature of the winding is determined by the resistance method. During resistance measurement of HV winding, the resistance of the tank body together with the tank grounding provisions will be in series with the high voltage winding on single-phase transformers having one high voltage bushing (H1) where the H2 end of the winding is connected to the tank internally. We have observed during resistance measurement that the hot resistance (i.e., resistance measured after shut down) of the high voltage winding of some transformers are giving erratic readings. We have verified it by conducting the hot resistance measurement by directly taking-out the H2 lead of winding outside.

   We wish to know whether measurement of hot resistance of HV as above is a standard practice or not. Also inform us whether the tank body and grounding provision on the H2 end is likely to create any difference in hot resistance measurement.

   We suggest that a suitable remark in this regard may be introduced in Clause-11 of the above IEEE Standard.

We request you to inform your views on the above and advise us regarding the recommended procedure."

The Performance Characteristics Subcommittee had been asked to review this request, and H. Jin Sim had prepared a suggested response and submitted it to the Working Group for our review. The interpretation response by Jin Sim was discussed and approved unanimously by a 14-0 vote of the Thermal Test Working Group of the Insulation Life Subcommittee. The interpretation was as follows: -

"1. Clause 11, Page 50 of C57.12.90-1993.

   We agree with Mr. Nair that 7.2 is an error and should be changed to 5.11.2.

2. Average Winding Temperature Rise Measurement.

   We agree that one should realize the average winding temperature rise by resistance method for the case described (part of the circuit includes tank and internal and external connections in series) is not exactly measuring the "winding" temperature rise. Obviously, temperatures and thermal coefficient of resistivities of those "extra" parts in series would be different compared to those of the winding being tested. This is true for all transformers considering that leads, bushings, tap changers, switches, etc. are also in series with the winding for most transformers. However, since the error caused by these components are relatively small for most transformers and for convenience, we leave these components in the circuit while we measure "winding" resistance's. Although we can not say "conducting the hot resistance measurement by directly taking-out the H2 lead of winding outside" is a standard practice, we may suggest following:

   Clause 11.3 states "Where the use of resistance method is impossible (for example, with extremely low-resistance windings) other methods may be used", which can justify extra steps to take out the H2 lead in an effort to minimize the error. Basically, if the error due to these "other" series connected components is significant, one can take them out of the circuit as long

as intents of the test code are met including general requirements under Clause 11 and both cold and hot resistances are measured the same way.

We have a Task Force within the IEEE/PES Transformers Committee under the Insulation Life Subcommittee that is currently revising the entire Clause 11. We will forward this request to the Task Force for inclusion of suitable remarks."

8.3.5 Task Force on Definition of Thermal Duplicate - Barry Beaster Chair

This Task Force did not meet. Barry Beaster could not attend the meeting.

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

This Working Group did not meet due to the accident suffered by Larry Lowdermilk on Sunday, April 23 and his return to Hickory, NC on Monday April 24.

8.3.7 Old Business

8.3.7.1 Combined Effects of Thermal and Dielectric Stresses on Insulation Life.

No papers on this subject were submitted by the membership since the last meeting. There was no other old business.

8.3.8 New Business

8.3.8.1 Request for Interpretation

A request for interpretation was received by the IEEE Standards Board from Mr. William Kemp of Northern Transformer Incorporated, Ontario, Canada. Mr. Kemp's request was as follows:

"Reference: ANSI/IEEE STANDARD C57.92-1981

The copies of the reference standard we hold include, on page 65a, a figure 8(a) which has no figures on the left ordinate for the vertical divisions. We expect that this oversight has been adjusted by now, and would like to receive a copy of the corrected page. The figure 8 (a) cannot be used without the missing numbers. If you don't have the information we require, will you please forward our request to the appropriate person on the C57 committee for a reply to us."

A response was prepared by Linden W. Pierce, discussed, and approved unanimously by the 32 members of the Insulation Life Subcommittee. The balloted group included a balance of users, producers, and other interests. The response was as follows:

"Figure 8 (a) of C57.92-1981 has not been revised to include the missing numbers. A revision of C57.92-1981 is in progress and the subject figure will be eliminated. Current practice in the industry is to use the equations for calculating transient heating of oil-immersed transformers listed in Section 6.7. The revised document will be issued as C57.91."

The Insulation Life Subcommittee meeting was then adjourned.

Respectfully Submitted by,
Linden W. Pierce, Insulation Life Subcommittee Chair

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

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
C57.12.00	DEFINITION OF THERMAL DUPLICATE			EM	IAS I&CPS	PESC		PAR HAS EXPIRED
PC57.12.001	THERMAL TESTS	GRUBB R. L.	BARRY BEASTER	/ /	05/31/90	1997	(414)547-0121	ACTION NEEDED ON PAR
C57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS							WILL START REVISING SECT. 11
NEW	REVISION OF SECTION 11	HENRY G.		/ /	/ /	1998	(501)534-5332	
C57.91	GUIDE FOR LOADING MINERAL OIL-IMMERSED TRANSFORMERS			SUB T&D	PSE			PAR MORE THAN 4 YEAR OLD
PC57.91	GUIDES FOR LOADING	PIERCE L.		03/21/91	06/13/85	1996	(706)291-3166	ACTION NEEDED ON PAR
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			PAR SHOULD BE CLOSED
PC57.92	GUIDES FOR LOADING	PIERCE L.		03/21/91	06/28/85	1996	(706)291-3166	TO BE COMBINED INTO C57.91
C57.95	GUIDE FOR LOADING LIQUID-IMMERSED STEP-VOLTAGE AND INDUCTION-VOLTAGE REGULATORS							NO WORK IN PROGRESS
NONE	GUIDES FOR LOADING			03/21/91	/ /	1996	(314)554-3097	BALLOT FOR REAF. REQUESTED
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)							COMPLETED COMMITTEE BALLOT
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
P838	THERMAL TESTS	GRUBB R. L.		/ /	09/17/92	0	(414)547-0121	REVISED PAR (TITLE & SCOPE)
IEEE1276	TRIAL-USE GENERAL REQUIREMENTS FOR LIQUID-FILLED DISTRIBUTION AND POWER TR UTILIZING HIGH TEMP SOLID INSULATING MATERIAL			T&D				
P1276	HIGH TEMPERATURE INSULATION	FRANCHEK M. A.		/ /	09/25/91	0	(802)748-3936	STUDYING HI-T MATERIALS

COORDINATION ACTIVITY OF INSULATION LIFE SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE / PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD. PHONE
P420	STANDARD FOR THE DESIGN AND QUALIFICATION OF CLASS 1E CONTROL BOARDS, PANELS, AND RACKS USED IN NUCLEAR GENERATING STN				INFORMATION COPY
11/05/94	NPE	M. S. ZAR	312-269-2222	L. W. PIERCE	706-291-3166

8.4 Performance Characteristics - B. K. Patel

Kansas City, MO - April 25, 1995

8.4.1 Introduction/Attendance

The Performance Characteristics Subcommittee (PCS) met at 9:30 a.m. on Tuesday April 25, 1995 with 52 members and 36 guests attending. The members included eight new members who signed up at the meeting.

8.4.2 Approval of Meeting Minutes

The minutes of the September 27, 1994 PCS Meeting in Milwaukee, WI were approved as written with one editorial correction. The correction was to change "hote" to "vote" in Section 7.10.5.4 LTC Performance Requirements on page 5 in the last sentence.

8.4.3 Chair's Remarks

8.4.3.1 Administrative Subcommittee Notes

Several items of the discussions held at the April 24,1995 Administrative Subcommittee meeting were highlighted. The following are a few of those items:

1. The next Transformers Committee meeting will be held in Boston, MA on November 5-8,1995. Ken Skinger of Stone & Webster will host the meeting.

2. Spring 1997 meeting will be hosted by Elin Transformers in Graz, Austria on July 15-18, 1997, Tuesday through Friday. The meeting will be held in summer to line up with the PES Summer meeting which will be held the week of July 21, 1997 in Berlin, Germany.

3. A two page, new PAR form is available now. The WG Chairs are encouraged to use this new form even though the current PAR form does not expire until September of this year.

4. The Organization, Policies and Procedures Manual for the IEEE Transformer Committee is being revised. The revision will include a procedure on how to handle and document interpretation requests received by the Committee.

5. The attached memo of January 31, 1995 from the Standards Coordinating Committee to the PES Technical Council was highlighted at the PCS meeting.

8.4.3.2 Membership

New Members, Mark Christini (New York State Electric & Gas) , David Rolling (Cooper Power Systems), Fred Elliott (Bonneville Power Administration), Jean-Christophe Riboud (GEC Alsthom T & D), Virendra Jhonsa (Atlantic Electric Co.), Stephen Antosz (Black & Veatch), Ron Fox (ABB), and William Bartley (Hartford Steam Boiler) were added to the roster. Dave Douglas has resigned from the subcommittee. Membership now stands at 100.

8.4.4 Agenda Changes

Added report on ANSI C57.21, Requirements and Test Code for Shunt Reactors rated over 500 kVA.

8.4.5 Working Group Reports

8.4.5.1 Semi-Conductor Rectifier Transformers C57.18.10 - S. P. (Sheldon) Kennedy

The Working Group met on Monday, April 24, 1995 at 8:00 a.m. and 9:30 a.m. There were 16 members and 13 guests attending.

Minutes on the September 26, 1994 meeting in Milwaukee, WI were approved.

It was announced that the PAR has been extended until June, 1997.

The ballot to adopt the proposed IEC method of rating a rectifier transformer based on fundamental kVA versus the traditional ANSI/IEEE method of RMS kVA was reviewed. The ballot received 50% approval with 50% negative ballots. The motion did not pass. Discussion followed.

It was discussed whether an 'In Some Countries..." restriction clause should be recommended to the Technical Advisor of the United States National Committee to IEC. It was decided not to follow forward with this option as the IEEE Standard may change in the near future.

The IAS C34.2 Rectifier Standard Group has been authorized, but is not fully active yet. This Working Group needs to consider these changes in kVA definition.

The possibility of making C57.18.10 Standard a 'Trial Use Standard" until the issue is resolved was discussed. Anne O'Neill of IEEE noted to the Working Group that a 'Trail Use Standard" would need to be revised sooner than a regularly approved Standard. Anne also noted that many do not give "Trial Use Standards" as much credibility as normally approved Standards. Anne also confirmed that a new PAR would be required in order to revise the kVA definition in the future.

A motion was made that we use both ratings on nameplates. This would harmonize with IEC, as well as still using the more familiar RMS kVA rating which present users are familiar with. Fundamental kVA will be used for commercial loss guarantees as is done with the IEC draft. The current and losses associated with rectifier operation, service losses which are enhanced by harmonics, will be used for thermal tests.

Members will review draft 8 for recommended changes. The IEC loss calculation examples will be reviewed. Recommendations and examples will be forwarded to the Chair within 30 days. Draft 9 will be prepared and submitted to the Working Group for ballot prior to the next meeting.

In new business it was noted that some additional guidance regarding expected transformer life should be considered. Many rectifier transformers are fully loaded 24 hours a day for process rectifier applications. Many users still wish to have 25 or more years of service life under these conditions. More emphasis should be placed on the loading guides. Recommendations for

auxiliary cooling or lower temperature rise specifications may be in order. Members will review this issue and make recommendations before the new draft is submitted.

There was no further new business.

The meeting adjourned at 10:45 a.m.

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

- The LTC Performance Requirements Working Group did not meet.
- Successful ballot on C57.131 (Standard Requirements for Load Top Changers). There were 141 ballots with 112 (79%) returned, 100 affirmative, 12 abstentions and no negatives.
- Submitted to REVCOM on January 3, 1995.
- Approval by Standards Board on March 16, 1995.
- IEC Harmonization

  Two Options
  IEC adopt C57.131 (not likely)
  IEEE revise IEC-214 and adopt as our Standard (more likely)

  Two areas to reconcile (not technical in nature)
  1) References to other Standards
     IEC-214 refers only to other IEC Standards
     C57.12.10 refers only to other IEEE Standards
     C57.131 covers only performance requirements
     C57.12.10 covers certain construction requirements
  2) IEC-214 covers performance and construction requirements

  Further work needs to be done in order to reconcile these two areas.

8.4.5.3 Revisions to C57.12.00 - P. E. (Peter) Krause

The working group met at 1:20 p.m. on Monday April 24, 1995 with 38 present, 22 of whom are members.

Old Business

The Chair reported on ballot results of three nameplate issues which were balloted of the PCS in February, 1995. 66 of 89 ballots were returned for each proposal:

1. Proposal to add Month and Year of manufacture to nameplate. This proposal passed balloting of the PCS. One negative ballot was received.

2. Proposal to add statement to the nameplate: "This transformer contained no detectable levels of PCB (less than 2 PPM) at the time of manufacture". Four negative ballots were received. Mr. John Borst recommended shortening the statement by removing the words "This transformer". Mr. Chuck Murray had resolved all but one negative ballot by the time of the meeting and feels this last negative will be resolved. The proposal will probably be referred to the main committee for ballot.

3. Proposal to exclude 150 kV BIL transformers from requirement to list several masses on the nameplate. Many persons had serious reservations about the wording of the proposal. 15 negative ballots were received and the issue will be returned to the WG for further consideration.

It was also reported that balloting was done of the WG on the issue of changing to the IEC method of designating transformer cooling class. (Section 5.1). Mr. Don Platts reported that the balloting was successful and the issue may now be balloted of the PCS.

New Business

A proposal by Mr. Subhash Tuli and Mr. Devki Sharma to include testing of control wiring, secondary wiring for pumps and fans, and electrically and manually testing LTC equipment was discussed. Specific wording will be developed and the proposal balloted the WG.

Reordering the items for Table 17 for clarity was discussed. It is thought some utilities feel the order of the table implies an order for testing. This will be further discussed.

Mechanical Design Tests mentioned in Table 17 were discussed. It has been suggested that a section describing the requirements be added to the standard. This issue will be balloted upon developing specific wording,

The question of whether Induced Voltage Tests of Table 5 should be listed as phase-to-ground or phase-to-phase was asked and discussed briefly. The WG does not feel strongly that a change to "phase-to-phase" from "phase-to-ground" should be made.

A number of typographical errors in C57.12.00 were mentioned and these will be corrected in the next edition.

The meeting adjourned 2:30 p.m.

8.4.5.4 Revisions to C57.12.90 - H. J. Sim/Nigel P. McQuin

The WG met on Monday, April 24, 1995, at 9:30 a.m. with 8 members and 7 guests attending.

After introductions, the Chair passed out the progress report for the Part II of the Standard which was prepared by Chair, Nigel McQuin. Nigel intends to have a draft text revisions of the Part II available for discussion before our fall 1995 meeting.
There was a brief discussion of the procedure that our WG will follow. We will work on PCS related subjects within the C57.12.90 and ballot the PCS. Upon successful ballot, we will forward the

document to WG chair (Steve Smith) of the Standards Subcommittee for Continuous Revision of C57.12.90 who will consolidate all revisions for the Main Committee ballot.

We then reviewed the ballot results on the proposed clause 15, Certified Test Data. Total of 91 ballots were mailed out in January to the members of the PCS and as of April 21, 1995, 73 (80%) of them were returned. There were 56 affirmative ballots, 8 affirmative with comments, 8 negatives, and I abstention. (89% affirmative)

All of the comments and reasons for negative ballots were reviewed. Some of the more significant issues discussed are as follows:

- Many of the data in the current draft are too demanding for distribution transformers and should be separated
- Add exciting current in %.
- Listing non-Standard Harmonic Factor and use of C57.110 for reporting losses of transformers designed for non-sinusoidal loading is inappropriate. Any reference to these should be deleted until C57.110 and C57.18 Standards are revised.
- Number of corrections on temperature rise test data.
- Circular or rectangular winding. This should be considered for possible addition to the nameplate information since it is not a test data or rating data.
- Need to add a note to include other significant information such as tap position during induced potential tests, test connection used and any particular method used when alternatives are allowed in the test code. This is for providing significant information for users.

David Rolling discussed the other activity within the Distribution Transformers Subcommittee WG, Electronic Data Transmittal, and expressed his concerns on possibly conflicting requirements being added in the Certified Test Data. He will forward a draft copy of his document to the Chair for coordination.

The Chair will try to incorporate all comments and re-ballot the new draft within the PCS by June 1995.

The meeting adjourned at 12:05 p.m.

8.4.5.5 Revision of C57.110 - R. P. (Rick) Marek

The meeting was held on Monday April 24, 1995, at 2:50 p.m. in Kansas City, MO. with 23 members and 16 guests attending.

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

A report on the eddy loss survey was given by Mike Bukievicz. A total of 8 responses was received. Mike questioned some of the data. The chair suggested that he consult with the person that provided the data to determine validity. A request was made by the chair for more data from the members and guests to provide a large data set for statistical analysis. Bill Mutchler and Tony Siebert will assist in analyzing the second round of data obtained.

It was again requested that any bibliographies for ANSI C57.110 should be submitted to the chair for addition to the next draft.

Two papers where presented; The first was "K-Factor: A Manufacturer's Perspective" that was presented to the Working Group on Power System Harmonics at the 1995 Winter Meeting of the IEEE Power Engineering Society by Bryce Hesterman. The second paper was "Proposed Derating Method for Small kVA Liquid Filled Distribution Transformers" by Dudley L. Galloway. Both papers were provided to the members for additional information. The authors also requested comments.

The concept of "loss density" is used in ANSI C57.110, and has been questioned by several members. It has been suggested that "loss" be substituted for the term "loss density". This change should be reviewed by members for the next draft. If members have comments they should be submitted in writing to the chair.

The members were requested to provide comments to Draft 3 quickly since it is desirable to issue a ballot along with the next Draft (Draft 4).

The chair then held a review of the written comments to Draft 2. Jerry Frank had submitted and discussed 4 concerns:

1) He is a new member and he objected to the use of the symbol "F_{HL}" instead of "K". It was countered that the symbol "K" can be confusing since it also appears in C57.12.00 and C57.12.01 to describe the ratio of asymmetric to symmetric fault current. The symbol "F" corresponds to the IEC Standards and was therefor selected to begin harmonization of the two Standards. Two opposing responses, by Max Cambre and Chuck Johnson, were also distributed.

2) He also objected to the absence of specific examples with high 3rd harmonics. It was noted that he will submit examples of high 3rd harmonics to be added to the next draft.

3) Jerry commented that derating an existing UL transformer is not allowed without changing the nameplate. He also questioned the advisability of the derating practice. It was noted that the kVA rating is derated for many qualifiers (temperature, altitude, etc.). The derating for nonsinusoidal loads should be treated as one of these qualifiers.

4) He objected to including rectifier transformers and transformers with a HV above 600 volts in this draft which was a change to the original scope. Don Kline also agreed on this topic. As a compromise Don Kline and Jerry Frank offered to submit additional wording that would qualify the type of transformers covered in the scope of the document. Specifically it would clarify the inclusion of only the most basic rectifier transformers.

Linden Pierce noted that small liquid type transformers are derated too conservatively by using the formulas in ANSI C57. 110, since the bus and steel losses add to the liquid temperature rise. Don Kline will submit wording and revised formulas (also being used in ANSI C57.18.10) for addition to the next draft.

The chair reviewed comments by Mike Shacker of UL and Max Cambre. Both comments are incorporated in the latest draft. These additions refer to alternate methods of temperature rise measurement. The chair requested that these additions be closely analyzed by the membership and comments are requested.

The chair informed the members and guests that they could have access to electronic files of ANSI C57. A general interest was shown and the information (SPA) will be sent to those that requested it.

The meeting adjourned at 4:10 p.m.

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

The WG on Loss Tolerances and Measurement met on Monday, April 24, 1995, at 2:50 p.m. in Kansas City, MO. with 15 members and 21 guests attending. After introduction and approval of the minutes, there was a report on the meeting of the Task Force on a Guide for Transformer Loss Measurements. Work on the Guide is nearly complete. Some examples of high power factor cases and discussion of losses in shorting connections and how to correct for them will be added to the guide. The complete document will they be balloted within the Working Group and Task Force before the next meeting.

The second Task Force report was given by Eddy So on Low Power Factor Power Measurement. This guide covers power measurement of devices with power factor of 5% and lower. The latest draft of this guide was reviewed at the meeting.

Oscars Peterson informed the Working Group about his study on Testing Requirements for Distribution Transformers within Provisions of the National Energy Policy, October of 1992. Our Working Group is impacted by the concern that adequate testing Standards are in place, such as C57.12.90.

From this point until 4:05 p.m. the discussion subject was a proposal revising Table 19 of C57.12.00, Tolerance for Transformer Losses. A draft proposal, based on the discussion, will be prepared and a Working Group ballot will be conducted.

The meeting adjourned at 4:05 p.m.

8.4.6 Project Reports

8.4.6.1 Survey of GSU Transformer Failures - D. J. Cash/H. F. Light

Task force met Monday, April 24, 1995 at 11:00 a.m. at the Hyatt Regency Crown Center Hotel in Kansas City, MO. with ten members and eight guests attending.

Survey replies have been received from 95 of 122 companies contacted. A request was made of any attendees that had not responded to do so to the Task Force Chair, Hal Light, as soon as possible.

Volume I & II should be completed before the next Transformer Committee Meeting in the fall. The final documents will be submitted to the Technical Council for approval as a PES special publications as outlined in Luigi Napoli's letter of June 1994.

The meeting adjourned at 11:20 a.m.

8.4.6.2 C37.91 Guide for Relay Application - R. L. (Ron) Barker

Progress Report on Revision of C37.91-199?/Draft 3 Guide for Protective Relay Applications to Power Transformers

The Power System Relay Committee asked us to review this application guide for its accuracy in wording and intent as it pertains to power transformers. Draft 3 consisted of several unassembled sections and figures which were difficult to review as a single document. It was sent out to 33 transformers committee members for comments, and only seven were returned.

Draft 4 will be balloted after the next Working Group meeting in May 1995. The relay committee had hoped to complete the document by the end of 1995, but now expects it to take longer.

8.4.6.3 C57.21 Requirements and Test Code for Shunt Reactors rated over 500 kVA - B. K. Patel/J. McGill

The Standard was balloted successfully in the Transformers Main Committee after the Milwaukee, WI meeting and has been reaffirmed by the Standards Board.

8.4.7 Old Business - None

8.4.8 New Business

Subbash Tuli will propose a paragraph related to procedures/methods of measurement of control/auxiliary losses on transformers for the inclusion in ANSI C57.12.00 and C57.12.90. Presently, there is nothing provided on this subject in standards.

8.4.9 Next Meeting

The next meeting will be held on Tuesday, November 7, 1995 in Boston, MA.

The meeting adjourned at 10:40 a.m.

Respectfully submitted,
B. K. Patel, PCS Chair

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

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	GENERAL REQUIREMENTS FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS							PAR HAS EXPIRED
PC57.12.00m	PCS REVISION OF C57.12.00	KRAUSE P.		/ /	/ /	0	(303)275-27301	COORDINATE WITH J. BORST
C57.12.90	GUIDE FOR SHORT-CIRCUIT TESTING OF DISTRIBUTION AND POWER TRANSFORMERS							NEW PAR NESCOM 03/15/95
PC57.12.90h	PCS REVISION OF C57.12.90 P2	McQUIN N.		/ /	/ /	0	(412)829-1205	TO SPLIT FROM TEST CODE
C57.18.10	REQUIREMENTS FOR SEMICONDUCTOR RECTIFIER TRANSFORMERS			NONE				PAR EXT. TO 06/97 REQUESTED
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			PAR MORE THAN 4 YEAR OLD
PC57.21	TEST CODE FOR SHUNT REACTORS	McGILL J. W.		04/02/91	06/09/88	2000	(414)475-3422	R1995
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.		03/16/93	06/27/91	1998	(205)877-7740	COMPLETE
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 DIRECTLY CONNECTED TO GENERATORS							REAF. APPROVED BY SB 09/21/94
NONE	TR DIRECTLY CONNECTED TO GEN	REITTER G.		01/03/89	06/28/79	1999	(415)508-2864	ACTION ON PAR NEEDED
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

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

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
C57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT							PAR TOO OLD
P1098	LOSS TOLERANCE AND MEASUREMENT	HENNING W. R.	RAMSIS GIRGIS	/ /	06/13/85	0	(414)547-0121	PAR EXT. TO 06/97 APPROVED
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
C57.131	REQUIREMENTS FOR LOAD TAP CHANGERS			EM	T&D			APPROVED BY REVCOM 03/15/95
PC57.131	LTC PERFORMANCE REQUIREMENTS	TRAUB T. P.		/ /	08/17/89	0	(312)394-2704	APPROVED BY REVCOM
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
C57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS							NEW PAR NESCOM 03/15/95
PC57.12.90	PCS REVISION TO C57.12.90 P1	SIM JIN		/ /	/ /	0	(919)734-8900	REVISING TEST DATA
C57.133	GUIDE FOR SHORT-CIRCUIT TESTING OF DISTRIBUTION AND POWER TRANSFORMERS			T&D	PSR SW	SUBS		PAR SUBMITTAL
PC57.133	SHORT-CIRCUIT GUIDE	McQUIN N.		/ /	/ /	0		PART II OF C57.12.90

COORDINATION ACTIVITY OF PERFORMANCE CHARACTERISTICS SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
NEW	MEASUREMENT OF POWER AT LOW POWER FACTOR					
02/15/94		PSIM	EDDY SO	613-993-2660	W. R. HENNING	414-547-0121
PC37.109	GUIDE FOR THE PROTECTION OF SHUNT REACTORS					REAFFIRMED 1993
03/28/85		PSR	LAVERN L. DVORAK	303-231-1636	MIKE ALTMAN	407-694-4975
PC37.91	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER TRANSFORMERS					
03/19/92		PSR	MIRIAM SANDERS	919-856-2457	RON BARKER	804-257-4671
PC37.10	GUIDE FOR DIAGNOSTICS AND FAILURE INVESTIGATION OF POWER CIRCUIT BREAKERS					DRAFT IN REVISION IN WG
05/01/91		SWGR	L. ROLANDO SAAVEDRA	504-363-8765	WALLACE B. BINDER JR.	216-384-5625

8.5 Underground Transformers & Network Protectors - P. E. Orehek

8.5.1 Introduction/Attendance

The Underground Transformers and Network Protectors Subcommittee met at 9:30 A.M. on April 25, 1995 with 13 members and two guests present.

8.5.2 Approval of Minutes

The minutes of the September 27, 1994 Milwaukee meeting were approved as written.

8.5.3 Membership

Membership has decreased to 17 with the resignation of Mr. William C. Kracht of General Electric. Mr. Kracht has informed the Chair that General Electric announced its intent to exit the network protector business and that he was planning to retire.

Application for membership in the Transformers Committee by A. L. "Butch" Robinson of Central Power and Light Company has been approved. Congratulations Butch.

8.5.4 Chair's Remarks

Administrative Subcommittee Notes:

A. Anne O'Neill of IEEE staff reported on IEC transformer activities. Some of the areas pertaining to the Subcommittee were as follows:

1. 1995 Goals for Standards to implement the Vision for the Future

   a. Each newly authorized PAR for a new or revised standard, shall initiate a literature search that includes related IEC standards.

   b. Each PES standard going into ballot (whether newly developed standards or revised) shall include a forward that indicates the standard's relationship to IEC standards.

2. The schedule for implementing metric units in IEEE standards was reviewed. See attachment for the IEEE plan.

B. It was announced that the Transformer Committee would meet in Graz, Austria in July, 1997. This would be considered the 1997 Spring meeting. It was announced that the meeting would be from Tuesday, July 15 to Friday, July 18 so that anyone interested may go to the IEEE PES Summer Power Meeting starting on Sunday, July 20 in Berlin, Germany. The Transformers Committee is presently trying to develop a travel package to Austria and will provide more information about this at the next meeting.

C. Other future meetings of the Transformer Committee were discussed. The November, 1995 meeting is to be held in Boston and will be at the Long Wharf Hotel. The dates for the 1996

meetings were previously published incorrectly and will be held on April 14 -17 in San Francisco and October 27-30 in Burlington, Vermont.

D. The Chair discussed his report to the Administrative Subcommittee the previous evening. He indicated that Standards C57.12.24, C57.12.40 and C57.12.44 have been approved by the IEEE Standards Board for more than a year and all have received ANSI recognition. C57.12.44 has been published by IEEE in December, 1994.

The other two standards are to be published by NEMA and their exact status is unknown at this time. ANSI and NEMA have an understanding that NEMA will publish all ASC standards for which NEMA serves as administrative secretariat. At the September, 1994 meeting in Milwaukee, it was indicated that the standards would probably be published in January, 1995.

A number of discussions with the NEMA secretary have been held and on March 27, 1995 NEMA authorized ANSI to publish C57.12.24 as an exception to their understanding. In a telephone discussion with ANSI on April 21, 1995 all that could be determined was that the standard was in the publications department and no information was available as to when it would be published. It was later learned that NEMA now wants to publish the standard.

In regard to C57.12.40, the Chair was informed that the delay is due to difficulties with the unavailability of the revised document in data disk format. Promises were again made that action would be taken soon to get both standards published but no schedule as to when this would be done could be given.

The Memorandum of Understanding (MOU) between NEMA and IEEE does not seem to resolve any of the administrative problems the Subcommittee has had in the past. The Chair asked that the Transformers Committee and/or IEEE staff provide assistance in resolving this problem.

8.5.5 Working Group Reports

8.5.5.1 Three-Phase Underground-Type Transformers (C57.12.24) (C. G. Niemann - Chair)

The Working Group met at 1:20 p. m. on April 24, 1995 with eight members and two guests present.

The minutes of the September 26, 1994 Milwaukee meeting were approved as written.

Members were informed of the status of the publication of the Standard. The Chair read a letter dated March 27, 1995 from the ASC Secretary to ANSI authorizing ANSI to publish the standard as an exception to the understanding between ANSI and NEMA. The members expressed their concerns about the Memorandum of Understanding (MOU) between IEEE and NEMA which was supposed to resolve these administrative problems. The members decided that no new revisions would be discussed until publication issues are resolved.

The meeting adjourned at 1:40 p. m.

8.5.5.2 Secondary Network Transformers (Liquid-Filled) (E. A. Bertolini - Chair)

The Working Group met at 2:53 p. m. on April 24, 1995 with 12 members and three guests present.

The minutes of the September 26, 1995 Milwaukee meeting were approved for technical content. Mr. Moffat's company name was changed from Westinghouse to Cutler-Hammer.

The status of the publication of the 1993 revision was discussed. The document has been with NEMA for one and one half years without any signs of progress nor any status being provided.

Mr. Plaster presented the two options he prepared concerning the 55/65 degree ratings. After a long discussion, the Working Group decided that Part I of the standard will conform to C57.12.00 (65 degree rise) and Part II will maintain the 55 degree rating and eliminate the reference to C57.12.00.

The discussion on the "O" ring seal for the ground switch shaft continued. With the permission of General Electric, their generic drawing was distributed. After a lengthy discussion, the Working Group decided not to make any changes in the standard concerning this item.

A previous concern on the maximum design operating pressure of the transformer was discussed. The Working Group felt that the 7 psig that is indicated in the standard will not be exceeded during operation of the transformer, based upon its design parameters. The Chair will discuss this issue with John Matthews to determine if it answers his previous question. The discussion will continue at the next Working group meeting if necessary.

Mr. Brian Klaponski of Carte International, Inc., requested membership in the Working Group.

The meeting adjourned at 4:10 p. m.

8.5.5.3 Secondary Network Protectors (C57.12.44) D. H. Mulkey - Chair)

The Working Group met at 8:00 a. m. for three sessions on September 24, 1995 with 11 members and two guests present.

The minutes of the September 24, 1995 Milwaukee meeting were approved as written except for a few editorial corrections of company names.

Mr. W. Kracht submitted his resignation from the Working Group due to his retirement and General Electric's decision to exit the network protector business.

The standard was approved by the IEEE Standards Board in November, 1993 and published by IEEE on December 28, 1994. Congratulations to the Working Group for the development of this much needed document.

A. L. "Butch" Robinson provided curves for silver sand fuses which will be part of the next revision. The Working Group is reviewing all comments received from the recent ballot.

The Chair has submitted a PAR for the next revision of the standard which is due for revision in 1999.

B. Nutt will review definitions with the new publication of the IEEE dictionary. The Chairman will review references to other documents and make up a list for checking revisions.

Several typographical errors were discovered in the new document and were corrected for the next publication.

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

8.5.5.4 Three-Phase Dry-Type Network Transformers (C57.12.57 (B. Nutt - Chair)

The Working Group met at 4:15 p. m. on April 24, 1995 with five members and one guest present.

The minutes of the September 24, 1994 Milwaukee meeting were approved as written.

Draft 6 of the standard was approved by the Subcommittee and submitted to IEEE for balloting in the main committee and the ASC C57 Transformers Committee concurrently.

Since this document has a NEMA copyright, it will be published by NEMA after all approvals are obtained. The Working Group expressed their concerns about not taking as much time to publish after approval as other documents of the Subcommittee have.

The meeting adjourned at 4:30 p. m.

8.5.6 Other Business

This Subcommittee sponsored a panel session at the last IEEE Transmission and Distribution Exposition and Conference and is planning on doing another panel session at the September 1996 Conference. Members were asked to provide topics and speakers for this session at the Boston meeting.

Members also expressed their concern with the cost of hotel rooms proposed for the Boston meeting. The general feeling is that the rate is excessive and many of the members will have to stay elsewhere.

The members also expressed their concern about the July, 1997 meeting scheduled for Graz, Austria. They would like to see IEEE staff or the main committee develop a package plan as soon as practicable or to provide an estimate of what the costs would be otherwise. It was also recommended that IEEE inform Senior Management personnel of participating companies the importance of this meeting and its effect on international standardization.

8.5.7 Future Meetings

The location and dates for future meetings are as follows:

November 5-9, 1995	Boston, Massachusetts
April 14-17, 1996	San Francisco, California
October 27-30, 1996	Burlington, Vermont
July 15-18, 1997	Graz, Austria
November 16-1997	St. Louis, Missouri

The Subcommittee meeting adjourned at 10:15 a .m.

Respectfully submitted,
Paul E. Orehek, Chair

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

SUBCOMMITTEE: UG TR & NETWORK PROTECTORS / CHAIRPERSON: PAUL OREHEK / PHONE: (201)430-7743 / FAX: (201)242-8740

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 DISTRIBUTION TRANSFORMERS,2500kVA AND SMALLER: HV,34500GrdY..& BELOW,LV,480 V AND BELOW			T&D	IC	IAS/REP	IAC/PSE	WILL BE PUBLISHED BY NEMA
PC57.12.24	3-PHASE UG-TYPE TRANSFORMERS	NIEMANN C.		05/10/88	06/27/91	1993	(708)450-5307	ANSI APPROVED 05/23/94
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 ANSI APPROVAL
C57.12.44	STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS			T&D	SWGR	IAS/REP	IAS/PSE EEI	PUBLISHED DEC 94
PC57.12.44	SECONDARY NETWORK PROTECTORS	MULKEY D. H.		12/20/94	06/17/92	1999	(415)973-4699	SUBMITTING NEW PAR
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			TO BALLOT D6 IN TC
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: 06/12/95

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
PC37.108	GUIDE FOR THE PROTECTION OF NETWORK TRANSFORMERS					REAFFIRMED 1994
09/28/84		PSR	THOMAS E. WIEDMAN	312-394-2593	D. H. MULKEY	415-973-4699
PC62.2.01	APPLICATION GUIDE FOR SURGE PROTECTION OF ELECTRIC GENERATING PLANTS					
06/01/84		SPD	G. L. GAIBROIS	313-237-9332	D. H. MULKEY	415-973-4699

8.6 West Coast - D. S. Brucker

IEEE WEST COAST TRANSFORMER SUBCOMMITTEE MEETING MINUTES

The West Coast Subcommittee conducted two technical sessions in conjunction with the Main Transformer Committee meeting in Kansas City. The first of these was a meeting of the Working Group formed to write a guide for the application, specification, factory and field testing of phase shifting transformers. The second technical session was a progress report on the activities of the Substations Committee sponsored Working Group for the revision of IEEE 693, Guide for Seismic Design of Substations.

8.6.1 Working Group, Guide for Phase Shifting Transformers

The Working Group for the Phase Shifting Transformer Guide met to review the present status of the project. After a few introductory remarks a short tutorial on uses of phase shifting transformers was presented by Edgar Trummer. 15 persons from the Main Committee and the West Coast Subcommittee were present.

Dave Brucker acted on behalf of Gary McCulla. A job reassignment and increased responsibilities resulted in Gary McCulla's withdrawing as Co-Chair of the Working Group. Edgar Trummer assumed the duties of Chair. Donald Chew is the new secretary.

After some discussion it was decided that the title of this publication should be "A Guide for the Application, Specification, and Testing of Phase Shifting Transformers." The PAR will be submitted to reflect this. It was also decided that Chair Trummer will prepare an outline of the proposed Guide and distribute this to all Working Group members prior to the Boston meeting. The outline is to serve as the starting point for detailed discussions within the Working Group.

Working Group members were asked to forward copies of all significant technical papers that they might have in their files that deal with phase shifting transformers to Donald Chew prior to the next meeting. Mr. Chew will use this material to prepare a bibliography for inclusion in the Guide. It was further decided that this Working Group will meet in conjunction with the Main Committee meetings in Boston and San Francisco.

8.6.2 Report on the Guide for the Seismic Design of Substations

Dave Brucker, the Main Committee's representative on he 693 Working Group, gave a short report on the activities of that group. This was followed by a presentation by Ed Matsuda, resident structural engineer from PG&E's Geotechnical Services Department.

Ed provided the major briefing for members of the Earthquake Research Institute on the recent San Fernando quake's effect on major utility structures and equipment. His report was complemented by extensive slides of the damage sustained at several major bulk power substations in the LA area as a result of this quake.

26 persons attended the session. Those in attendance will receive the next revision of the Seismic Guide for comment. Others who wish to receive copies should contact Dave Brucker. The next

meeting of this writing group in conjunction with the Main Committee will take place during the San Francisco meeting, April 1996.

The next full meeting of the West Coast Subcommittee will take place May 18th and 19th near San Diego, CA. Anyone interested in attending should contact Dave Brucker for details.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE

DATE: 06/12/95

ATTACHMENT 4

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
C57.12.11	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				PAR EXTENDED TO JUNE 1997
PC57.93	CONSOLIDATION OF INST. GUIDES	GILLIES D. A.		/ /	06/01/89	0	(503)622-4847	WITHDRAW 12.11/12.12 WHEN APP.
C57.114	SEISMIC GUIDE FOR POWER TRANSFORMERS AND REACTORS			NPE	SUBS.			TO BE WITHDRAWN (OBSOLETE)
P513	SIESMIC GUIDE	OKLU S.		02/15/90	09/06/73	1995	(213)481-4823	CLOSE PAR
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			PAR TOO OLD
PC57.128	FIRE PROTECTION	HAGER R.	NORBERG J.	/ /	06/01/89		0		ASK FOR PAR EXTENSION
NEW	GUIDE FOR APPLICATION, TESTING, INSTALLATION AND OPERATION OF PHASE ANGLE SHIFTING TRANSFORMERS								NEW PROJECT
NEW	PHASE ANGLE SHIFTING TRANSFO.	TRUMUER E.	DON CHU (WG SEC)	/ /	/ /	0	(602)236-8621		PAR TO BE SUBMITTED

COORDINATION ACTIVITY OF WEST COAST SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE / PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
P1248	GUIDE FOR THE COMMISSIONING OF ELECTRICAL SYSTEMS IN HYDROELECTRIC POWER PLANTS				
12/06/90	ED&PG	LOUIS A. TAUBER	503-326-2323	D. A. GILLIES	503-622-4847
P 693	RECOMMENDED PRACTICE FOR SEISMIC DESIGN OF SUBSTATIONS				NEW PAR 12/93
09/18/90	SUBS	RULON PRONK	213-481-3327	DAVID BRUCKER	415-692-4431
P 979	GUIDE FOR SUBSTATION FIRE PROTECTION				MUST COMPLETE IN 1994
06/18/92	SUBS	A. J. BOLGER	604-663-2879	D. W. SUNDIN	414-524-3221
P1268	GUIDE FOR INSTALLING TEMPORARY SUBSTATIONS				D1 READY FOR WG COMMENTS
03/30/91	SUBS	SHASHI G. PATEL	404-362-5386	D. A. GILLIES	503-622-4847

8.7 Audible Sound and Vibration - J. Puri

The Subcommittee met on Tuesday, April 24 at 2:00 pm in two sessions. Eleven Members and seven guests were present.

After the introduction of guests and members, the minutes of our previous meeting were approved.

Three main items were discussed.

8.7.1 Transformer Siting Guide

Mr. Jack McGill (WG Chair) gave an overview of the second draft of the Transformer Siting Guide.

After some discussion, it was decided to that this document will be called Guide for Sound Level Abatement and Determination for Liquid Immersed Power Transformers and Shunt Reactors Rated over 500kVA.

The scope of this guide will include provide guidelines for selecting suitable internal methods for noise control, describe various noise abatement methods available for various levels of noise reduction and provide background information on noise sources in oil filled transformers and shunt reactors.

A PAR for this project will be requested accordingly. This WG will now begin meeting independently starting from our next meeting in Boston.

8.7.2 Noise Intensity Measurement

Messrs. Ramsis Girgis and Ernst Hanique accepted the responsibility for proposing a test procedure for measuring noise intensity in transformers. This procedure will be developed for eventual inclusion in transformer test standards.

8.7.3 Transformer Noise Level Standards

Mr. George Reitter (could not attend this meeting) submitted noise level information from Canadian standards on transformers. Mr. Jack McGill also presented information on typical noise levels in transformers up to 1000 MVA manufactured in his company. I requested Dr. Degeneff to review this information and jointly with Mr. Reitter, propose a noise level standard for oil filled transformers up to 1000 MVA rating. This table will then be sent to manufacturers for their comments.

This table will propose noise levels as a function of transformer kVA rating.

There being no new business, our meeting adjourned at 4:30 pm.

Jeewan Puri
Chair

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

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
C57.12.90	STANDARD ON SOUND INTENSITY MEASUREMENT							NEW TASK FORCE TO DRAFT STD
PC57.12.90x			TULI S.	/ /	/ /	0		APPLY FOR PAR, NEW NO. NEEDED
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	PAR TOO OLD, NEW ONE NEEDED
NEW	GUIDE FOR SOUND LEVEL ABATEMENT AND DETERMINATION IN OIL-FILLED TRANSFORMERS							OUTLINE DRAFTED
NEW		McGILL J.		/ /	/ /	0	(414)475-3422	PAR NEEDED TO SUBMIT

COORDINATION ACTIVITY OF AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
P 656	STANDARD FOR THE MEASUREMENT OF AUDIBLE NOISE FROM OVERHEAD TRANSMISSION LINES					PUBLISHED 12/92
03/08/91		T&D	JAMES R. STEWART	518-395-5025	ALAN M. TEPLITSKY	212-460-4859

8.8 Bushings - F. E. Elliott

Kansas City, MO
April 25, 1995

8.8.1 Introduction and Membership

Chair Fred Elliott opened the meeting at 2:00 PM and welcomed the members and guests. The meeting was attended by 16 members and 19 guests. Two guests requested membership on the Subcommittee. An attendance list was circulated among the attendees with a request to add their E Mail address.

8.8.2 Chair's Remarks

- Mr. Elliott thanked the outgoing chair Mr. Loren Wagenaar for his 12 years of hard work and wished him well in his new responsibility as Chair of Dielectric Test Subcommittee.

- The chair also acknowledged the years of service and assistance provided by Mr. Stan Osborn who passed away in January of this year.

- He then reviewed the information presented at the Administrative Subcommittee regarding the conversion of IEEE standards to metric system and harmonization with IEC and other International Standards(See Attachments 2 & 3 for details). IEEE has set January 1, 2000 as the goal for using metric system exclusively.

8.8.3 Minutes of September 27, Meeting held in Milwaukee, WI

The minutes were approved as written.

8.8.4 Working Group / Task Force Reports

8.8.4.1 Working Group Report on Bushing Application Guide (PC57.19.100)

The IEEE Standards Board approved C57.19.100 "Guide for Application of Power Apparatus Bushings" as a new standard on March 16, 1995.

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

Chair P. Singh reported that his WG met on Monday, April 24, 1995 with 13 members and 19 guests present. Seven guests requested membership to the WG. He reported on the following:

1. Tables 1 & 2 (Electrical Insulation Characteristics)

The members agreed to the following:

- Combine Tables 1 & 2 into one table

- Add another set of creep values based on 25 mm/kV L - L or 43.25 mm/kV L - G. This will be equivalent to heavily polluted atmosphere as per IEC 137 bushing standard.

- As decided in the earlier WG meetings the revised table will have the following voltage classes:

kV Class	34.5	69	138	230	345	500	765
BIL	200	350	650	900	1175	1675	2050

  All other ratings will be listed in an Appendix for replacement purposes.

- The two microsecond chopped wave requirement will be eliminated if this is not a requirement for transformers.

- Information on tolerance on 3 microsecond chopped wave time will be reviewed by F. Richens and P. Singh.

2. Table 5 (Dimensions for Outdoor Type Transformer Bushings)

   The members agreed to the revised table as per changes discussed at the last meeting. These changes include the following:

   - 21 inch CT pocket
   - Uniform mounting bolt hole size of 0.875
   - Fewer current ratings
   - More uniform bottom end lengths
   - NEMA bladed terminals for bottom end for bushings 2000 Amps and above.

3. Table 7 (Dimensions for Bushings 138 kV and above)

   The members agreed to the revised table as per changes discussed at the last meeting. These changes include the following:

   - 23 inch CT pocket
   - Uniform mounting bolt hole size of 1.25 inch
   - Fewer current ratings
   - More uniform bottom end lengths

4. Table 8 (Cantilever Design Test Requirements)

The members agreed to the following test requirements for top and bottom ends.

System Voltage kV	34.5 - 69	138	230 & above
Test Force lb.	300	700	900

Bushing Manufacturers will check for the possibility of using these numbers.

5. Table 9 (Partial Discharge Limits)

   The members agreed to remove the requirement of microvolt and only have picocoulombs in the table.

It was agreed that P. Singh will finalize all the tables and send draft 1 for balloting within the WG.

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

Chair Olof Heyman reported that his WG meeting was held at 1:20 PM on April 24, 1995. It was attended by 10 members and 11 guests. Three guests requested membership to the WG. He reported the following:

1. WG Ballot on Impulse Testing

   The outcome was a majority for having full wave lightning impulse test as a routine test with chopped wave impulse lightning test as an optional routine test. Switching impulse test will be routine test only for wall bushings. Besides having switching impulse as a routine test for wall bushings, the draft is the same as the new version of IEC 137.

2. Results of the Ballot on Draft 11

Sent	Returned	Approved	Approved w/c	Not Approved	Abstain
50	39	18	11	3	7

   All negative comments were resolved . It was agreed that a few clauses need to be rewritten. They are as follows:

   - Clause 5.4.3 Thermal basis of Rating. Proper insulation clauses will be chosen. Draft 11 specifies temperature index 105 and 130 even though RIP material is supposed to have a maximum temperature of 120 C. P. Singh will review the existing information and come up with a proposal.

   - Clause 5.4.4 The thermal rating of drawlead is a matter of concern. A task force been created to review the situation and address this concern. In the mean time this standard will include some guide lines. Keith Ellis will write a proposal.

   - Clause 7.1.4 Correction factors shall be rewritten so they are consistent with ANSI Std 4 and IEC 60. Frank Richens and Fred Elliott will write a proposal.

- o Clause 7.2.8 The thermal test procedure will be rearranged to make it more clear and easy to read. This will be done by Olof Heyman.

- o Clause 7.3.5 Impulse Test. The use of term "Chopped Wave Withstand Test..." will be reviewed by Fred Elliott.

- o Clause 7.2.5.3 DC Polarity Reversal Test with Partial Discharge Measurement. A new CIGRE report requires the two initial voltage periods during the polarity reversal test to be 90 minutes instead of 60 minutes and the last one to be 45 instead of 30 minutes. It was agreed to accept this if this is accepted in the transformer standard, if not, this will be discussed further in the WG.

- o It was agreed to make reference only to picocoulombs.

- o Loren Wagenaar will be requested to write a forward for this standard.

- o The WG has obtained the permission of the bushing subcommittee to ballot the next draft in the Transformer Committee.

- o A request for PAR extension will be submitted to the IEEE by Olof Heyman.

The meeting was adjourned at 4:06 PM

8.8.4.4 Task Force on Draw Lead Bushings

Chair Russ Nordman reported that his meeting was held at 4:15 PM on April 24, 1995 with 8 members and 10 guests present. He reported the following:

1. Fred Elliott read the letter of action submitted by the Bushing Subcommittee forming the task force.

2. A brain storming session was conducted to develop a list of concerns, problems and general topics to be considered by the TF.

3. A suggestion was made to develop a questionnaire to send to the Transformer Committee to determine if there are any additional concerns.

4. The bushing manufacturers are to assemble information and test data for review at the next meeting.

5. A copy of the letter of action and the brain storming list will sent to all the attendees before the next meeting.

The Bushing Subcommittee during their meeting approved sending the questionnaire to the Transformer Committee.

8.8.5 Liaison to IEC 137

Technical Advisor Bill Saxon reported on the following activities:

1. Working Group 1, Bushings for Alternating Voltages Above 1000V, Revision of IEC137, Project 36A.9.2

   This standard has been approved and is expected to be published in July.
2. Working Group 2, Guide for Seismic Qualification of Bushings, Project 36A9.4

   This document will probably be issued as a technical report Type 2

3. Working Group 3 Interpretation of Dissolved Gas Analysis in Bushings where Oil is the Impregnating Medium, Project 36A.34.1

   The WG has collected data on 600 samples with special attention being focused on the more critical gases such as acetylene. This document will probably be issued as technical report.

The next meeting is scheduled for October, 1995 in Durban South Africa.

8.8.6 Provision For Bushing Current Transformers

Following the last meeting Loren Wagenaar sent a revised ballot to the Bushing Subcommittee. It consisted of two parts.

Part A included definitions for inclusion in the C57.19.00.

- Current transformer pocket length
- Inboard end ground layer length
- Inboard end metal sleeve length
- Inboard end

Part B contained modified bushing CT requirements for Clause 6.3 of C57.12.00

Part A received 86 % affirmative with 7 % negative. The negative comments appear to be resolvable by rewording the definitions for clear expression of their intent.

Part B received 79 % affirmative with 14 % negatives. The negative comments are rooted in philosophical differences regarding shielding of bushing CT's and could not be resolved even after a prolonged discussion. This possible outcome was discussed in the Administrative Subcommittee meeting on Monday night and they suggested that the issue be referred to the Instrument Transformer Subcommittee for their input. The Bushing Subcommittee voted 12-0 to do this.

8.8.7 New Business

The Subcommittee discussed the following topics under new business.

8.8.7.1 Short Time (Short Circuit) Thermal rating

This subject was raised during the balloting of Bushing Application Guide. The commentator pointed out that IEC 137 included a short circuit rating for bushings and the present bushing standard does not.

Loren Wagenaar presented a 3 point summary of this issue (See Attachment 4):

- His request for comments during his report to the Transformer Committee did not produce any response.
- He presented the pertinent pages from the IEC.
- He calculated the limiting current for some typical bushing conductor sizes and concluded that IEC criteria is not a problem for most ANSI/IEEE standard bushings.

After a discussion, the Subcommittee felt that this deserves further consideration. The Chair appointed Keith Ellis, P. Singh, Dr. Jens Frost, and Bob Thompson to review the IEC information and recommend a course of action to the Bushing Subcommittee.

8.8.7.2 Indoor Bushings

Indoor bushings are not a part of the C57.19.00 & .01 Scope and the Bushing Subcommittee is not aware of any place where they are covered in the IEEE/ANSI Standards.

IEC covers both indoor and outdoor bushings. Olof Heyman reported that the only difference in the way they are treated is that wet tests are not required for indoor bushings.

Loren Wagenaar volunteered to look for other standards which cover indoor bushings and report at the next meeting.

8.8.7.3 Thermal Basis of Rating

Based on the discussions held at the last meeting, P. Singh handed out the background information along with a proposal (See attachment: 5) to address the discrepancy between the present thermal basis of rating(55 C oil rise) and the application of the bushings to 65 C oil rise transformer. He proposed that we use EEMAC Bushing Std. method of allowing hot spot rise of 75 C in a bushing immersed in 65 C rise oil. This could not be discussed at the meeting due to lack of time but the members were asked to bring any comments for discussions at the next meeting.

8.8.7.3 Steep Fronts Caused by SF6 Switching

Keith Ellis submitted a letter (See Attachment: 6) earlier in April with a concern about steep fronts and a proposal to include this test in the standard. This will be discussed at the next meeting.

8.8.8 Adjournment

The meeting was adjourned at 4:45 PM

Minutes by:

Pritpal Singh, Secretary
Bushing Subcommittee

S'ATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE DATE: 06/12/95

ATTACHMENT 4

SUBCOMMITTEE: BUSHING / CHAIR'ERSON: FRED ELLIOTT / PHONE: (503)230-3900 / FAX: (503)230-3212

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 1991
PC57.19.00	SUBCOMMITTEE	WAGENAAR L. B.		07/23/91	04/01/79	1996	(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 1991
PC57.19.01	REVISION TO C57.19.01	SINGH PRITPAL		08/05/91	11/01/89	1996	(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		PAR MORE THAN 4 YEAR OLS
PC57.19.03	BUSHINGS FOR DC APPLICATION	HEYMAN LOF		/ /	11/09/89	0		ACTION NEEDED ON PAR
C57.19.100	GUIDE FOR APPLICATION OF APPARATUS BUSHINGS.			SWGR	SUB	PSR		APPROVED BY REVCOM ON 03/15/95
P800	BUSHING APPLICATION GUIDE	ELLIOTT F. E.		/ /	09/27/79	1999	(503)230-3900	REPLACES C57.19.101
C57.19.101	GUIDE FOR LOADING POWER APPARATUS BUSHINGS							BALLOT TO WITHDRAW
P757	BUSHING APPLICATION GUIDE	ELLIOTT F. E.		10/20/88	/ /	1997	(503)230-3900	REPLACED BY C57.19.100
NEW	TASK FORCE TO STUDY APPLICATON AND PROBLEMS OF DRAW-LEADS FOR BUSHINGS							NEW TASK FORCE
NEW	DRAW-LEADS FOR BUSHINGS	NORDMAN RUSS	R. NORDMAN	/ /	/ /	0	(414)547-0121	

COORDINATION ACTIVITY OF BUSHINGS SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
PC37.04h	MECHANICAL LOADING REQUIREMENTS OF CIRCUIT BREAKER TERMINALS					SUPPLEMENT APPROVED 1991
09/28/90		SWGR	GEORGE R. HANKS	615-751-4020	LOREN B. WAGENAAR	614-223-2259
P 957	GUIDE FOR CLEANING INSULATORS					OLD GUIDE EXTENDED TO 12/94
09/17/92		T&D	WILLIAM L. GIBSON	415-973-3747	L. B. WAGENAAR	614-223-2259

8.9 Dielectric Tests - L. B. Wagenaar

April 25, 1995 - Kansas City, MO

The Subcommittee met at 11:00 a.m. with 44 members and 45 guests present.

8.9.1 Chair's Remarks

The Chair acknowledged the work and leadership exhibited by past Chair Jim Templeton. Prior to becoming chair of the subcommittee for the past two years, Jim participated in subcommittee activities as chair of a working group.

Several items of interest were brought up at last night's meeting of the Administrative Subcommittee. Some of the highlights of the meeting were:

1. The next meeting of the working group will be held in Boston, MA on November 5-9, 1995.

2. Stan Osborn and John Dutton, both of whom were members of this committee, passed away early this year.

3. IEEE is putting emphasis on coordination with the IEC, and four main goals for accomplishing this were listed. A symposium will be held in Boston on this subject.

4. IEEE is pursuing the policy of metrification and has established the following timetable for implementation into standards:

   Stage I - After Jan. 1, 1996 - Soft conversion to metric

   Stage II - After Jan. 1, 1998 - Hard conversion to metric

   Stage III - After Jan. 1, 2000 - Metric units only with exceptions.

5. Ballots to the Working Groups on C57.12.00 and C57.12.90 should be to John Borst and Steve Smith, respectively, by June 1.

8.9.2 Approval of Minutes

The minutes from the September 27, 1994 meeting in Milwaukee were approved as submitted.

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

The Working Group met at 4:15 p.m. on April 24, 1995 with 18 members and 32 guests present. The task force reports were as follow:

8.9.3.1 Task Force on the Revision of Induced Tests - Mark Perkins, Chair

The task force met on April 24 at 8:00 a.m. with 19 members and 29 guests present. Minutes of the Milwaukee meeting were approved as written.
Results of a survey of the members on test equipment and methods were reviewed. The purpose of the survey was to determine if apparent charge could become the standard partial discharge test. A total of eight manufacturers responded, seven of which reported the ability to make apparent charge measurements. The majority routinely measure both RIV and pC, some reporting pC on a routine basis while others do so only when it is specified by the customer specification. Six use a digital average detector which measures peak continuous discharge level.

The Chair then reviewed results of the sub-group meeting held on Sunday, April 23 from 1:00 to 3:00 p.m. The sub-group, consisting of Mark Perkins, Ed Adolphson, Bertrand Poulin, Subhash Tuli, and Georges Vaillancourt, recommended changing both C57.113, Guide for Partial Discharge Measurements in Liquid-Filled Power Transformers and Shunt Reactors, and C57.12.90. It was not considered necessary to change C57.12.00.

Changes necessary to C57.113 are:

1. Defining a means for measuring the average peak discharge level

2. Defining a special calibration function which tests the averaging method used in order to ensure similar characteristics between different types of test equipment

3. Remove the section on the first procedure from C57.113 and replace it with information in C57.12.90. Work on this area is being planned by Georges Vaillancourt, Barry Ward, and possibly others.

A proposed draft of changes to C57.12.90 was distributed to the task force. This draft basically contained text from the present C57.12.90 with the measurement procedure from C57.113 and acceptance levels of 500 pC maximum and 150 pC increase. Considerable discussion took place on the methodology of the test, especially as it concerns the 150 pC increase limit and criteria for extending the test. It was proposed to limit the extension of the test to one additional hour in order to try to meet acceptance requirements.

The sub group, with possible additions for test equipment manufacturers, will be asked to meet again at the next transformer committee meeting to review progress and to further implement recommended changes in C57.113. The task force members will be asked to submit written comments with suggested changes to the C57.12.90 changes distributed at the meeting. Comments and proposed changes will be discussed at the next meeting.

8.9.3.2 Task Force on Metal Oxide Surge Arrester Coordination with Power Transformer Insulation - Robert Degeneff, Chair

The meeting was called to order at 1:20 p.m. on April 24 with 11 members and 20 guests present. The Milwaukee meeting minutes were approved as written, and the following discussion was heard:

Chair Degeneff presented a proposed curve to represent the oil filled insulation characteristic to be used in arrester insulation coordination. This proposal used the same four points as the present coordination curve, but it is proposed to connect the curve with a smooth line rather than with the discontinuous curve presently used. The new curve introduces two major changes. First, a smooth connection from the BIL to BSL points. Second, the transformer insulation characteristic beyond 300 ms is no longer a flat line but now slopes downward reflecting the decreased insulation capability at longer times.

Bob Degeneff agreed to write this proposal in a form that could be balloted the task force for its comments. When it is approved, it will be submitted to the Surge Protective Devices Committee.

Discussion followed in regard to the next assignment of the task force, if any. Suggested areas of concern are the effect of system voltages, aging, oscillatory wave forms, phase to phase insulation coordination, etc. Several short presentations will be made addressing each of these areas at the next meeting.

8.9.3.3 EHV Transformer Dielectric Specification Improvements

The results of a simultaneous ballot of the working group and subcommittee were then presented. The object of this ballot was to add a note at the bottom of Table 17 of C57.12.00 to make the switching impulse test a routine test for transformers with the high voltage winding operating at 345 kV and above. The results were as the following:

Ballots Sent Out	83	
Affirmative	65	
Affirmative with Comment	4	2 editorial
Negative	1	1 on basis of the wording of HV windings operating at 345 kV and above
Abstention	2	
Total Return	72	87 % Return Rate

The ballot will now be referred to John Borst's working group to update C57.12.00.

8.9.3.4 Waveshape Correction Factors for Lightning Impulse Test

Two documents were presented at the meeting. The initial one, by Loren Wagenaar, presents AEP's proposal on the subject. Loren first explained their position and how they selected the proposed correction factors. The present specification calls for a maximum front time of 2.0 ms and a minimum time to half value of 40 ms. He then asked for better numbers and/or methods.

The second document, by Dr. Preininger, explains some of the impacts of the use of such correction factors on transformer insulation. Dr. Preininger shows that in transformers, some parts of the insulation are more sensitive to high frequency phenomena, and thus, the steepness of the front of an impulse. Others are more stressed by the duration of the wave. Therefore, applying a blind correction factor to the crest value of a full wave to compensate for incorrect waveshape could cause severe overstress to the internal insulation of a transformer.

Mr. Wagenaar agreed that Dr. Preininger's approach was indeed interesting, and hopefully, a new proposal could be prepared before the next meeting. It was also suggested that a limit to the correction applied to the crest value of the wave be established.

8.9.3.5 New Business

An error has been discovered and reported in Table 5 of C57.12.00. In the 230 kV class section, the applied voltage level for the 825 kV BIL is incorrectly listed as 275 kV. A correction will be formulated before the next meeting. It was agreed that this was probably a typing error, and there is not need to ballot the proposed correction within the working group. The correction will be presented at the next meeting before being sent to the working group for the revision of C57.12.00.

An apparent conflict between Table 3 and Table 5 of C57.12.00 regarding the suggested BIL levels for 69 kV class were reported. Table 3 shows two BILs for this class: 250 kV and 350 kV; whereas Table 5 shows only 250 kV BIL. A written proposal to clarify the matter will be presented at the next meeting.

8.9.4 Working Group on Revision of Dielectric Tests for Distribution Transformers - John Rossetti, Chair

The working group convened at 11:00 a.m. with five members and ten guests present. The minutes of the Milwaukee meeting were approved. Task force meetings were reported as follow:

8.9.4.1 Results of Ballot on C57.12.90

Preliminary results of the working group and subcommittee ballots on the revision of Section 10.4 of C57.12.90 were presented, as follows:

	WG	SC
Total Ballots	26	106
Affirmative	17	49
Affirmative with Comment	1	
Abstention	3	
Negative		
Not Voting	9 (35 %)	53 (50 %)

The ballot so far has failed in getting sufficient support from either the working group or the subcommittee. Members who have not voted yet will be contacted and addresses will be checked in order to get the correct number of ballots.

8.9.4.2 Task Force on Revision of Distribution Transformer Impulse Guide - Don Ballard, Chair

The task force met at 8:00 a.m. on April 24 with five members and 14 guests present. Don Ballard was not present, so John Rossetti chaired the meeting. The first order of business was a discussion of the routine impulse draft. Don Ballard, Tony Thornton and Steve Smith will be

working on a finished draft to be sent out for comments prior to the fall meeting. The draft will be discussed in the task force and any comments will then be edited into the first draft. Simultaneous balloting of the task force and working group may be done to get comments back on the guide.

The next item of business was the discussion of the comments received from the ballots of the Dielectric Subcommittee on Sections 10.4.1, 10.4.2 and 10.4.3 of C57.12.90. Jeffrey Fleeman had two comments, the first concerning the definition of a low impedance shunt (10.4.2). This comment was addressed as follows: As the impedance varies with the transformer and measurement system, the impedance of the shunt is adjusted to produce a peak voltage of between 700 and 1000 volts. The other comment, concerning windings isolated from ground (10.4.3) such as a three-phase delta winding, the task force referenced Section 5.3.3, Three-Phase Transformer Connections, of the guide, PC57.98a. There are five sections in the guide which discuss the different transformer connections.

8.9.4.3 Other Working Group Business

The working group will interpret and answer the letter for interpretation when it is sent from the subcommittee.

8.9.5 Working Group on Acoustic Location of Partial Discharge - Edgar Howells, Chair

Edgar Howells was not present at the meeting, so that the meeting was not held.

8.9.6 Old Business

8.9.6.1 Low Voltage Wiring & CT Test Requirements

Subhash Tuli's proposal will be balloted in the subcommittee.

8.9.6.2 Guide for Detection of Acoustic Emissions from PD in Oil-Immersed Power Transformers, C57.129

This project was approved by the Transformers Committee several years ago, but the paperwork apparently lost by the IEEE Standards Board. Consequently, it was never approved by the Standards Board. This will be reballoted with the Transformers Committee.

8.9.7 New Business

8.9.7.1 Guide for Diagnostic Field Testing of Electric Power Apparatus - Part I, IEEE 62

Historically, this guide was developed by the Power System Instrumentation and Measurement Committee. The Transformers Committee got into the process through the coordination, and a working group chaired by Bob Veitch, was set up within the Standards Subcommittee and made several constructive comments. The document has been approved by the IEEE Standards Board, but the task force thinks that further information is necessary regarding monitoring, field maintenance for partial discharge, etc.

This item was discussed at the Administrative Subcommittee last evening. The Standards Subcommittee can not accommodate a long-term committee such as this, and it was decided that it belongs in the Dielectric Test Subcommittee. At the working group meeting today, at least 22 people have volunteered to become members of the new committee. However, Bob Veitch no longer wishes to be the chair of the group. A new chair will be selected and the first meeting of the new group will be held in Boston.

8.9.7.2 Routine, Design and Other Tests in Liquid-Immersed Transformers Table 17 of C57.12.00

A comment on the switching impulse ballot stated that Table 17 should be rearranged so that tests are listed in the sequence that they are made. Some customers are insisting on this sequence. It was pointed out that this was never the intent of Table 17. The general guidelines are specified in Section 10.1.5.1 of C57.12.90, and the committee should not specify the same thing in two different places. Affected manufacturers were asked to refer customers to this section and determine if this would suffice.

Respectfully submitted,
Loren B. Wagenaar

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

SUBCOMMITTEE: DIELECTRIC TESTS / CHAIRPERSON: L. B. WAGENAAR / PHONE: (614)223-2259 / FAX: (614)223-2214

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
C57.12.90	REVISION OF THE INDUCED TEST							PAR MORE THAN 4 YEAR OLD
PC57.12.90d	REVISION OF DIELECTRIC TESTS	POULIN B.	M. PERKINS	/ /	09/28/90	0	(408)957-8326	ACTION REQUIRED ON PAR
C57.21	REQUIREMENTS,TERMINOLOGY AND TEST CODE FOR SH. REACTORS OVER 500kVA			NONE				PAR MORE THAN 4 YEAR OLD
PC57.21a	DIELC TESTS OF SHUNT REACTORS	KENNEDY W. N.		04/02/91	12/11/86	1995	(317)286-9387	ACTION NEEDED ON PAR
C57.98	IEEE GUIDE FOR TRANSFORMER IMPULSE TESTS			NONE				PUBLISHED JAN 95
PC57.98	REVISION OF DIELECTRIC TESTS	POULIN B.	R. E. MINKWITZ, SR.	06/01/86	02/01/86	1992	(408)957-8326	DISCUSS PAR BUSINESS
C57.98	GUIDE FOR PERFORMING ROUTINE LIGHTNING IMPULSE TESTS ON DIST.TRANSFO			T&D PSIM PSC		ASC 62	EM	TO PUBLISH AS SUP. TO C57.98
PC57.98a	REV. DIELECTIC TESTS DIST TR	ROSSETTI J.	D. E. BALLARD	/ /	04/30/91	0	(901)528-4743	PAR EXTENSIN TO 06/97 APPR.
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	ACTION ON PAR NEEDED
C57.127	GUIDE FOR THE DETECTION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS			T&D ED&PG CIGRE IEC				REBALLOT TC, PAR TOO OLD
PC57.127	P. D. TESTS FOR TRANSFORMERS	HOWELLS E.		/ /	03/10/88	0	(414)835-1500	WAITING FOR BALLOT, EXTEND PAR
IEEE1350	GUIDE FOR PROTECTION OF DISTRIBUTION TRANSFORMERS WITH EMPHASIS ON SECONDARY (LOW VOLTAGE SIDE) SURGES			SPD T&D IC				CONTINUE WORK IN SPD
P1350	REV. DIELECTRIC TESTS DIST TR	ROSSETTI J.	W. A. MAGUIRE	/ /	03/17/93	0	(901)528-4743	WITHDRAW PAR
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
IEEE 62.1	GUIDE FOR DIAGNOSTIC FIELD TESTING OF POWER APPARATUS, PART I: OIL-FILLED POWER TRANSFORMERS, REGULATORS AND REACTORS							APPROVED BY REVCOM 03/15/95
P 62	DIAGNOSTIC FIELD TESTS OF TR.	VEITCH R. A.		/ /	03/17/94	0	(905) 731-9178	WAITING PUBLICATION

COORDINATION ACTIVITY OF DIELECTRIC TESTS SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
P 4 02/02/89	STANDARD TECHNIQUES FOR HIGH-VOLTAGE TESTING	PSIM	TERRY McCOMB	613-990-5826	G. VAILLANCOURT	BALLOTING IN PSIM 514-652-8515
P1122 12/03/92	DIGITAL RECORDERS FOR MEASUREMENTS IN HIGH VOLTAGE IMPULSE TESTS	PSIM	T. R. McCOMB	613-990-5826	BERTRAND POULIN	APPROVED BY SB 03/17/94 408-957-8326
P1223 08/17/89	POWER SYSTEM DIGITAL TESTING TECHNIQUES	PSIM	T. R. McCOMB	613-990-5826	R. MINKWITZ, SR.	 617-828-3241
C62.62 03/21/91	PERFORMANCE CHARACTERISTICS FOR SURGE PROTECTIVE DEVICES CONNECTED TO LOW VOLTAGE AC POWER CIRCUITS	SPD	LEWIS DOUGLAS SWEENEY	602-834-9372	MAHESH P. SAMPAT	REPLACE P1038 704-462-3226
PC62.11 06/14/94	STANDARD FOR METAL-OXIDE SURGE ARRESTERS FOR AC POWER CIRCUITS	SPD	R. M. SIMPSON	919-836-7059	W. A. MAGUIRE	NEW PAR 501-377-4273
PC62.22 12/02/93	GUIDE FOR APPLICATION OF METAL OXIDE SURGE ARRESTERS FOR AC SYSTEMS	SPD	J. WOODWORTH	716-375-7270	ROBERT DEGENEFF	WILL INCLUDE DIST. TRANSFORMER 518-276-6367
PC62.42 07/18/94	GUIDE FOR THE APPLICATION OF LOW-VOLTAGE SURGE PROTECTIVE DEVICES	SPD	R. DAVIDSON JR.		MAHESH P. SAMPAT	REVISED PAR 704-462-3226

8.10 Distribution Transformers - K. S. Hanus

Hyatt-Regency Crown Center, Kansas City
Tuesday, April 25, 1995

8.10.1 Chair's Remarks & Announcements

The meeting convened at 3:30 PM in the Empire A room with the introduction of the members and guests and signing of the attendance roster.

Minutes of the last meeting in Milwaukee were approved with no changes.

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

Next meeting dates:

Fall 95 - Boston, NOV. 5-8, MARRIOTT $140
Spring 96 - San Francisco, APRIL 14-17
Fall 96 - Vermont, October 27-30
Summer 97 - Austria, July
Fall 97 - St. Louis, November 16-19

Metrification - After January 1996, use metrics as secondary dimension, after January 1998 use metrics as primary dimension and after 2000 use metrics only.

Harmonization with IEC standards is being encouraged. Each new PAR requester must do a literature search for similar IEC standards. Anne O'Neill at IEEE can help with this. Standards submitted in the future to IEEE Standards board should indicate similar IEC standards.

A PAR extension form is available for a 2 year extension on expiring PAR's.

Bob Grunert and Jerry Smith were added as new members to the Main Committee.

8.10.2 A report from each of the working group Chairs was given.

8.10.2.1 C57.15 Step-Voltage and Induction-Voltage Regulators

The survey was completed and reviewed in the WG meeting. A PAR will be requested before the next meeting. A task force will be formed to review the key issues in the existing standard.

8.10.2.2 C57.12..20 Pole Mount Transformers

Results of the Main Committee ballot was reviewed and negative ballots were reviewed. The main issue was the note concerning the allowance of 125 kV BIL on 19.9 kV units. Other comments were discussed with editorial changes to be made and other changes deferred to the next issue of the document. Draft I of the next revision was discussed. Ali Ghafourian presented

a revised tables for grounding provisions. Hanger bracket strength was also discussed. A new draft will be issued to the WG before the next meeting.

8.10.2.3 C57.12.25 Single Phase Deadfront Padmount Transformers

The WG discussed the type II unit dimensions including the sill opening (14" dimension) and the distance between H1b and X3 bushings (8"). Dimension "B" was also discussed and will be researched with a survey. A new draft document will be issued.

8.10.2.4 Combination of .22 & .26 Three Phase Padmount Transformers

The WG discussed the impedance range for units 500 kVA and less. Tom Pekarek presented the results of a survey on impedance's. His task force will continue to establish a proposed impedance range for these units.

8.10.2.5 P1265 Bar Coding

The Draft 5 was successfully balloted at the subcommittee and EEI T&D level. The draft is now being submitted for balloting at the transformers committee level and has been sent to NEMA for review at the C57 Main level.

8.10.2.6 P1388 Electronic Data Transmittal

The WG has decided two data set options, two formats and two transmittal options will be offered. Only liquid immersed units will be covered. The data set options will include a standard set and an extended set. The formats will be ASCII and ? (yet to be determined). Transmittal methods will include electronic and mailing of a disk media.

Follow up work will continue to investigate EDI issues relating to the document.

8.10.2.7 Coating Integrity Documents (.28, .29, .30 & .31)

.29 The coastal environment enclosure integrity standards has been published.

.28 The padmount enclosure document is currently being balloted in the WG and should receive approval and after which it will be sent to the ANSI C57 Main committee for balloting.

.31 The polemount document is in the final review stages in the WG and should be following the WG and C57 Main balloting like .28.

.32 The submersible document has been submitted for publication.

8.10.2.8 Loss Evaluation Guide

An update was given on related activities by other groups.

1. NEMA - Guidelines for industrial users was presented.

2. DOE (Oakridge National Labs) They are preparing a draft report for review by others review, including NEMA, EEI, REA, and others.

3. Energy Star Program (EPA) The manufacturers have supplied loss data and the EPA is developing an efficiency guideline.

Draft II was discussed and the WG is requested to review the draft and provide comments back in 60 days.

8.10.3 New Business

Concern was expressed about inconsistency in size ranges covered by the various distribution transformer standards. Large distribution and small power transformers are in a gray area. There is no definite standard which covers units typically in the 3750-5000 kVA range. These are mainly an issue for industrial customers. SC Chair will discuss with the administrative subcommittee the changing the scope of the distribution transformer documents to include these ranges. Dave Rolling will get more information from the industrial users.

The SC discussed the re-occurring issue of 125 kV BIL on 34.5/19.9 kV transformers. The issue continues to arise on how this will be recognized in the transformer documents. The 3 phase padmount WG has been requested to develop a proposed method for handling this issue. The results would be a model for the other standards.

8.10.4 Working group assignments

The current assignments are as follows:

.20 Glenn Andersen / Allen Wilks
.21 Ali Ghafourian
.22 Ken Hanus
.23 Bob Scheu
.25 John Lazar / Norvin Mohesky
.26 Gerry Paiva
EDT David Rollins/Angie McCain
Bar Coding Ron Jordan / Ed Smith
Loss Evaluation Guide Tom Pekarek/Don Duckett
Combination .22&.26 Clyde Pearson/Ron Stahara
57.15 Tom Diamantis/Craig Colopy

The meeting adjourned at 4:30 PM.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

SUBCOMMITTEE: DISTRIBUTION TRANSFORMERS / CHAIRPERSON: KEN HANUS / PHONE: (817)882-6020 / FAX: (817)882-6038

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 IS EXPIRING
PC57.12.20	POLE MOUNTED DISTRIBUTION TR	ANDERSON G. W.			01/11/88	12/05/91	1993	(913)339-2931	ACTION REQUIRED ON PAR
C57.12.21	STANDARD REQUIREMENTS FOR PAD-MOUNTED, COMPARTMENTAL-TYPE, SELF-COOLED, SINGLE-PHASE DIST TRANSFORMERS WITH HV BUSHINGS			T&D IAS/REP					TO BE PUBLISHED BY ANSI
PC57.12.21	3-PHASE PADMOUNT TR LIVE FRONT	GHAFOURIAN A.			10/22/79	06/27/91	1985	(601)796-4255	
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 PUB. BY NEMA
PC57.12.22	3 PHASE PADMOUNT TR LIVE FRONT	HANUS K.			01/09/95	06/27/91	1999	(817)882-6025	APPROVED BY STD B 12/12/94
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					ANSI APPROVED 02/18/94
PC57.12.23	1-PHASE SUBMERSIBLE TR	SCHEU R. W.			09/19/85	06/27/91	1996	(704) 462-3164	TO BE PUBLISHED BY ANSI
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					PAR IS EXPIRING
PC57.12.25	1-PHASE PADMOUNT TR DEADFRONT	MOHESKY N.			05/11/90	06/27/91	1995	(314)239-6783	ACTION REQUIRED ON PAR
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					WILL HAVE NEW NUMBER
PC57.12.26	3-PHASE PADMOUNT TR DEADFRONT	PEARSON L. C.			06/17/92	12/05/91	1997	(817)882-6025	APPROVED BY ANSI
C57.12.28	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY								EXTENSION TO BE REQUESTED
ANSI	JOINT WG ON CABINET INTEGRITY	MARTIN J.			06/24/87	/ /	1994		BEING BALLOTED IN WG
C57.12.29	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY IN COASTAL ENVIRONMENTS								PUBLISHED IN 1992
ANSI	JOINT WG ON CABINET INTEGRITY	MARTIN J.			/ /	/ /	1996		NOT TRANSFORMERS COMM.
C57.12.30	SUBMERSIBLE EQUIPMENT - ENCLOSURE INTEGRITY								TO BE BALLOTED
ANSI	JOINT WG ON CABINET INTEGRITY	MARTIN J.			/ /	/ /	1994		NUMBER TO BE CHANGED

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

SUBCOMMITTEE: DISTRIBUTION TRANSFORMERS / CHAIRPERSON: KEN HANUS / PHONE: (817)882-6020 / FAX: (817)882-6038

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
ANSI	JOINT WG ON CABINET INTEGRITY	MARTIN J.		/ /	/ /	1994		EXPECT TO COMPLETE BY 12/94
C57.12.32	ENCLOSURE INTEGRITY OF SUBMERSIBLE EQUIPMENT							
ANSI				/ /	/ /	0		
C57.15	REQUIREMENTS, TERMINOLOGY, & TEST CODE FOR STEP-VOLTAGE AND INDUCTION VOLTAGE REGULATORS							WG REVISING SCOPE
NONE	VOLTAGE REGULATORS C57.15	DIAMANTIS T.		03/18/87	06/19/86	1997	(315)428-5741	APPROVED BY ANSI 12/02/92
IEEE1265	STANDARD FOR BAR CODING FOR DISTRIBUTION TRANSFORMERS (POLE-MOUNTED, PAD-MOUNTED AND UNDERGROUND)			AIM/TSC	IAS/REP TD	EEI	NEMA	PAR APPROVED 06/27/91
P1265	BAR CODE STANDARD	JORDAN RON		/ /	06/27/91	1994	(619)482-3239	PAR EXTENSION REQUESTED
IEEE1388	STANDARD FOR THE ELECTRONIC REPORTING OF TRANSFORMER TEST DATA			EEI	NEMA	ASC X12 PSR	CS SAB	PREPARING D1
P1388	ELECTRONIC TEST DATA	McCAIN A.		/ /	09/15/93	0	(410)291-3231	NO. CHANGED FROM C57.132
C57.12.27	STANDARD FOR TRANSFORMERS - LIQUID FILLED DISTRIBUTION TRANSFORMERS USED IN PAD-MOUNTED INSTALLATIONS, INCLUD. UNIT SUBS							PAR IS EXPIRING
PC57.12.27		MILLER J. R.		/ /	06/27/91	0	(314) 634-2111	ACTION REQUIRED ON PAR
C57.12.33	GUIDE FOR EVALUATION OF LOSSES IN DISTRIBUTION TRANSFORMERS							
NEW	LOSS EVALUATION IN DIST. TR.	PEKAREK T.		/ /	/ /	0	(216) 479-3400	APPLY FOR PAR

8.11 Dry-Type Transformers - W. F. Patterson

IEEE/PES TRANSFORMERS COMMITTEE
DRY TYPE TRANSFORMER SUBCOMMITTEE MEETING MINUTES
KANSAS CITY, MO - April 25, 1995

8.11.1 Chair Remarks and Announcements

Introductions were made and the attendance roster was circulated.

First order of business was approval of the minutes from September 27, 1994. Motion was made to approve them as written; seconded and passed.

8.11.2 Working Group Reports

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

8.11.2.1	Dry Type Reactors - HVDC Smoothing	R. Dudley
8.11.2.2	Dry Type Reactors - Current Limiting	R. Dudley
8.11.2.3	Hot Spot Differentials	P. Payne
8.11.2.4	Specialty Transformers	R. Simpson
8.11.2.5	General Requirements Revision	A. Jonnatti
8.11.2.6	Cast Coil Loading Guide	M. Haas
8.11.2.7	Thermal Evaluation & Flammability	R. Provost

NOTE: no meeting of the WG Dry Type Test Code was held during this session of the IEEE Transformer Committee meetings.

During Mr. Dudley's presentation the issue of poor response to ballots was raised again. The Chair reviewed the portions of the IEEE Operations and Procedures Manual regarding this issue. WG Chairs were advised to remove any members from their roster who fail to return two (2) consecutive ballots.

Following Mr. Dudley's presentations, the Chairs opened a discussion on the possibility of combining the Dry Type and Liquid Filled Test Codes (C.57.12.90 and C.12.91). Following the subcommittee discussion, the Chair agreed to pursue this topic with the Administrative Subcommittee.

Mr. Simpson's WG (Specialty Transformers) is involved with IEC/TC98 in establishing an IEC standard on Insulation Systems. Following his report, the Chair noted the following IEEE position on IEC harmonization of units of measure (UOM):

- JAN 96: all IEEE documents to have English UOM followed by Metric UOM in brackets
- JAN 98: all IEEE documents to have Metric UOM followed by the English UOM in brackets
- JAN 2000: the English UOM is to be dropped

In addition, effective immediately, each new PAR must have an IEC literature search. Anne O'Neill of IEEE will assist WG Chairs in this area.

The following members of the Dry Type Subcommittee are involved with IEC Technical Committee activities:

P.Hopkinson TC14, TC98
R.W.Simpson Jr. TC15, TC98
R.Provost TC15, TC98
R.Dudley TC57

The Chair noted that the revisions to C12.12.01 must be forward to RevCom before Nov. 1, 1996 or they will recommend the standard be withdrawn. Mr. Jonnatti agreed to ballot the changes to C57.12.01 at the Transformers Committee no later than Spring, 1996 meeting.

The Chair noted that Mr. Linden Pierce would no longer be able to serve as Chair of the WG: Cast Coil Loading Guide. His efforts in leading this group will be greatly missed. Mr. Mike Haas has replaced him as the Chair.

The Chair noted a Request for Extension needs to be filed on C57.96 as it's life is drawing to an end. Mr. Haas agreed to process this request.

The meeting was adjourned at 4:30 p.m.

8.11.2.1 Working Group on Dry Type Reactors - TF Smoothing Reactors

Chair: Mr. Richard Dudley

Ref: Dry Type Air Core HVDC Smoothing Reactors - IEEE 1277

The Dry-Type Air Core HVDC Smoothing Reactor Task Force met on April 24, 1995 at 800 a.m. in the Benton A Meeting Room of the Hyatt Regency Crown Center Hotel in Kansas City, Missouri. There were 3 members and 3 guests present. The following are the highlights of the meeting.

The attendance list was circulated and is attached.

The minutes of the previous meeting were approved.

Prior to the meeting Bill Kennedy handed the Chair a partially completed Draft #4. The Chair informed task force members that his objective would be to supply Bill Kennedy copies of all documentation previously discussed plus that covered at this meeting so that Bill Kennedy could produce a complete Draft #4 of "General Requirements and Test Code for Dry-Type and Oil-Immersed Smoothing Reactors for DC Power Transmission" prior to the Boston meeting.

Consultants were discussed. Some are developing specifications and test codes for smoothing reactors and are not a part of this WG. The Chair will establish a contact with them to see if they wish to participate in the WG.

A discussion of the test code for smoothing reactors took place and the following is a summary:

(I) Should a test such as the DC Power Test be used to detect a broken conductor or is this a manufacturing quality issue and as such be addressed by in process manufacturing tests? Consensus was that it is a manufacturing quality issue and as such should not be addressed by a standard.

(ii) It was agreed that a power test or tests should be done after the dielectric tests (Impulse Test and Modified Turn to Turn Test). Should it be the AC Power Test or DC Power test or both? Francine Rochon of Hydro Quebec said she would discuss the issue at Hydro Quebec and communicate their position to the Chair within the period of one month.

(iii) For dry-type smoothing reactors the Modified Turn-To-Turn test was added after the Impulse Test because of its improved sensitivity and ability to detect a dielectric problem resulting from the Impulse Test. Is this test of use for oil smoothing reactors?

(iv) Is an AC Power Test after the dielectric test valid for both oil and dry type smoothing reactors?

(v) In Draft #3 the short circuit test is a design test for oil-immersed smoothing reactors and an "other" test for dry type smoothing reactors. One reason for making it an "other" test for dry type smoothing reactors is that the test is expensive and beyond the capabilities of most if not all test labs. What is the point of doing the test at reduced current level? Is a short circuit stress calculation more meaningful? Francine Rochon and Klaus Papp will contact IREQ and KEMA respectively and determine their capabilities. A capacitor discharge test at 300 Hz to 600 Hz is another possible alternative to the short circuit test but will it mechanically stress the windings to the same extent as the short circuit test at 50 or 60 Hz? What are IREQ's and KEMA's capabilities?

(vi) Because of possible test lab limitations, is a winding stress capability calculation the best way (technically and feasibly) to demonstrate short circuit strength capability for both oil-immersed and dry-type smoothing reactors?

(vii) Lars Erik Juhlin of ABB supplied written comments to Draft #3. Copies were given to Task Force members who were present. Copies will be mailed to other task force members with the minutes. The Chair will pass them on to Bill Kennedy. The editorial comments can be directly included in Draft #4. Most of the non-editorial comments were discussed above.

(viii) The application guide to be included in an annex will include a section on transportation and installation handling precautions.

(ix) The test code for oil immersed dry type smoothing reactors will be different to reflect the differences in the basics of the engineering design.

The meeting adjourned at 9:15 a.m. The Chair stated he will supply Bill Kennedy with all relevant information produced by the TF for inclusion in Draft #4 prior to the Boston meeting.

8.11.2.2 Working Group on Dry Type Reactors - C57.16

Chair: Mr. Richard Dudley

The Dry-Type Reactor Working Group met on April 24, 1995 at 2:30 p.m. in the Benton A Meeting Room of the Hyatt Regency Crown Center Hotel in Kansas City, Missouri. There were 6 members and 7 guests present. The following are the highlights of the meeting.

The minutes of the Milwaukee meeting were approved.

Working Group members were informed of Bill Kennedy's intention to produce Draft #4 of the smoothing reactor standards prior to the Boston Meeting.

Draft #9 of the revision of C57.16 was discussed. Draft #9 contained all changes resulting from the balloting of the Dry Type Transformer subcommittee and W.G. members. One major disappointment is that only 29 out of 50 ballots were returned. A discussion of the issue took place. What should be balloting protocol? This lack of response has a negative impact on standards work and can slow down the standards process especially if non-voters choose to vote, especially negatively, on future ballots. Should non-voters get a vote on future ballots? The Chair promised to bring this subject up at the meeting of the Dry Type Transformers Subcommittee. The following are the highlights of the discussion of Draft #9:

(i) The statement of scope will be modified to wit: "With some restrictions this standard is applicable to filter reactors, shunt capacitors reactors and discharge current limiting reactors. Annex's B, C and D are included to provide guidance."

Section 1.2 will be modified accordingly.

(ii) Section 5.5 will be modified to describe the mechanical stresses or dry type air core series reactor is subjected to during short circuit. A section will be added to Annex A to address wheel loading, transport considerations and installation precautions.

(iii) A SubSection will be added to section 12.1 stating that the mounting position of the nameplate on the reactor should be such that it be "readable" from ground level with the use of an optical aid.

(iv) Working Group members felt that the tutorial in Section 2.4 on insulation systems was good background information.

(v) Modify Section 11.6.4; "in case of doubt, up to three...

(vi) Modify Section 6.2.4: (6)Seismic verification per IEEE 344.

(vii) Add a statement to 9.3.5 that the RIV test is only required for system voltages 230 kV and higher.

(viii) Re-title Section 10.2; "The maximum crest value of the short circuit current is 2.55 times the RMS symmetrical short circuit current unless otherwise specified by the purchaser."

(ix) The references to Table 6 in Section 10.2.2 should be to Table 7.

(x) Section 11.5.10 should be eliminated as it is redundant and is covered in Section 11.5.4; Hot Spot Measurement.

(xi) Table 3 has an incomplete description. "Temperature Rise Test: This test is performed on one unit out of a number of the same design."

(xii) The definitions in Section 6.2.5 should be included in Sections 6.2.2, 6.2.3 and 6.2.4 to provide better clarity.

(xiii) Switching Impulse Test should be added to the list of "Other" tests in Section 6.2.4.

(xiv) "11.2.3.4" Bridge Methods. Bridge methods are generally preferred because of their accuracy and convenience.

(xv) Modify Section B5.4.4;

"For tapped filter reactors the impulse or turn to turn test shall be performed, unless otherwise specified, at the maximum tap position on a routine test bases and at the maximum and minimum tap positions for the design test."

NOTE: If the location of the filter reactor on the filter circuit is such that it may be subjected to transient voltages from either end, then it should be impulsed from both ends. Tapped filter reactors should be impulsed from both ends at the maximum tap position on a routine test basis and from both ends and at maximum and minimum tap positions for a design test."

(xvi) After some discussion it was agreed that the short circuit test should be a Design test and not an Other test. The concern was that short circuit testing is expensive and that the short circuit rating is not always significant. However it should be noted that the main function of a current limiting reactor is to limit short circuit current. It was also felt that the statement if 6.2.3 "Design tests may be made on selected specimens during production at the request of the purchaser, when specified and agreed upon" addresses the cost benefit issue. A calculation can also be used to verify short circuit performance if a unit of similar design that has been short circuit tested is used as a comparator.

The meeting adjourned.

8.11.2.3 Working Group on Hot Spot Differentials

Chair: 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.

The Working Group on Hot Spot Differentials met April 24, 1995 at 8:00 a.m. in the Benton Room of the Hyatt Regency in Kansas City, MO. There were 15 members and 23 guests present. Following introduction of attendees, the minutes of the September 27, 1994 meeting in Milwaukee, WI were approved as written.

The Chair stated that there was only a 65% return of the ballot on Draft 2 of the proposal for Table 4A of C57.12.01. The dissenting voters comments mainly focused on establishment of a uniform methodology of determination of the hot spot and removal of the default hot spot ratio of 1.5, applicable in the absence of test data or calculations.

Linden Pierce made a new proposal which removed objectionable statements from the text of 5.11.3.1 which Table 4A accompanies; discussion ensued. Jeewan Puri stated the need for a methodology to measure/calculate hot spot be included. Linden Pierce noted that manufacturer's design calculations are proprietary. Bill Mutschler stated that the manufacturer should perform empirical calculations verified by test data. Tim Holdway noted that the C57.12.01 1989 issue provides average winding temperature rises, where as the 1979 issue provides both average winding and hot test spot temperature rises; the proposed table is based upon the 1979 issue.

The Chair stated the necessity for compromise so that recommendations could be included in the revision of C57.12.01. The need for a uniform methodology of determination of hot spot temperature has been recognized; Working Group activity is to initiate upon completion of this current assignment, with Ms. Payne as Chair. Once the methodology is published, the data obtained can be utilized in review of Table 4A for future revision of C57.12.01.

A motion was made and seconded on the proposal presented by Lin Pierce. There were 12 votes affirmative, 0 negative; the motion carried. The Chair stated she would ballot the proposal to the Working Group and Dry Type Subcommittee, simultaneously.

Tim Holdway gave a follow-up presentation on testing of a customer's transformer. The transformer was tested at 50%, 75%, 100% and 115% of rating. The hot spot ratio for the primary of disc wound construction correlated with data presented previously by Chuck Johnson. The hot spot ratio for the secondary which was of strip winding construction, correlated with Lin Pierce's data. Tim's secondary winding was of 2 parallel sheets, Chuck's winding was of a single sheet.

The PAR for Methodology of Determination of Hot Test Spot Temperature was discussed. The document developed will be a guide. Editorial comments were provided for the Project Title and Scope and the USTAG for IEC 14 was added for coordination. Wes Patterson stated that existing IEC Standards that cover the topic must be cross referenced.

Under new business, Wes Patterson, Dry Type Subcommittee Chair, discussed the low response on ballot returns and urged the members to fulfill the obligations of their membership in order to ensure continuation of member status.

Being no other business, the meeting was adjourned at 8:50 a.m.

8.11.2.4 Working Group on Specialty Transformers - P259

Chair: 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 rewriting of IEEE 259. This standard relates to evaluating the thermal and environmental degradation of small, low voltage, dry type transformers.

Working Group P259 met at 1:20 p.m. on Monday, April 24, 1995 with 4 members and 6 guests present; one guest requested membership.

Introductions were made and the minutes of the 9/26/94 meeting were approved as written.

IEEE Std 259-1994 (Revision of IEEE Std. 259-1974) was printed December 1, 1994 and is currently available.

The W.G. addressed several items initiated at the last meeting.

Chair Simpson presented a new PAR with revised title, scope and purpose for review by the Working Group. After discussion and minor corrections, the proposed PAR was approved by the Working Group and will be submitted to NESCOM through the Sub Committee chair.

It was generally agreed that oven-aging is primarily used to achieve thermal aging as opposed to energizing units when using this test procedure.

Chair Simpson distributed a list of IEC documents related to thermal aging and Electrical Insulation Systems (EIS)for consideration as additions to the bibliography in the next revision.

Chair Simpson has received a copy of IEEE Std. 259-1994 on computer disc from IEEE and will use it to prepare a revised draft prior to the next meeting.

Chair Simpson presented a liaison report on the first official meeting of IEC Technical Committee 98: Electrical Insulation Systems. Three working groups were formed to address the four new work proposals that were approved. IEC/TC98 WG3 was assigned the specific task of developing standard test procedures for the thermal evaluation and qualification of EIS. It is intended that portions of IEEE Std. 259-1994 be used as one of the models to develop this IEC Standard.

As there was no new business, the meeting was adjourned at 2:15 p.m.

8.11.2.5 Working Group on Dry Type General Requirements

Chair: Mr. A. Jonnatti
Secretary: T. Holdway

This working group is preparing revisions for General Requirements for Dry Type Distribution, Power, and Regulating Transformers Standard C57.12.01.

The meeting was called to order at 10:55 a.m. in the Benton A Room. Sixteen members and 19 guests attended. After the introductions, the minutes of the Milwaukee meeting were approved and seconded.

The first discussion was on the noise level. The Chair stated he received a fax from Ray Bancroft who rejected the ballot due to there being no columns for 26 kV and 34 kV transformers.

After much discussion, the Chair stated he would handle, individually, the negative ballots and we would leave the charts as proposed.

The next proposal for discussion was the "Accuracy's Required for Measuring Losses". Discussion was on whether this was appropriate. Follow further discussion, it was agreed that it was and the ballot was approved.

The next proposal for discussion was the "Partial Discharge". The comment was made: is this for a complete unit or just the coil? Most decided, the intent was for a complete core and coil. Bill Mutschler, who wrote the proposal stated his intent was for the complete core and coil. It was decided we want this to be intended for the complete core and coil. It was stated this proposal does not state this 10% value is not a pass/fail value. There is no pass/fail criteria. Lin Pierce asked the questions whether we needed to delete the comments on P.D. from the existing standard. A proposal was made to eliminate one sentence in the existing standard. The proposal was carried and an addendum will be made and sent to the working members.

The next proposal was concerning short circuit characteristics. Chuck Johnson stated that in his ballot he re-wrote certain parts of this proposal to try to harmonize with C57.12.00. Guy Pregent stated in section 7.6.0, a couple of the equations needed to be changed. We agreed to make the changes and put them into the standard.

Another ballot will be sent out to the working members with the above changes.

A decision was made for Paulette Payne to ballot this working group as well as her group.

Lin Pierce will send to the Chair a change to reference to hot spot in the forward.

Again a discussion on sound level was undertaken. Discussion on the chart from TR-1. Wes Patterson stated much discussion had been made in previous meeting and this group had decided the values can be used as a general guide. This is to be used without concern of BIL, %IZ, etc., due to the complexity of the charts with the thought of these extra factors.

Table 3e on single phase will be for 100 Watt volts and below.

A discussion was made on reasons why a transformer would be excessively noisy. Reasons, such as loose laminations, over tightened cores, etc.

The meeting was adjourned at 11:55 a.m.

8.11.2.6 Working Group on Cast Coil Resin Transformers Loading Guide

Chair: Mr. Mike Haas

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

The Working Group met on April 25 at 9:30 a.m. with 12 members and 12 guests present.

The minutes of the September 27, 1994 meeting were approved as written.

Lin Pierce stated that due to his other commitments, he was unable to give the needed attention to this group and because of this he resigned as Chair. Mike Haas will become the chair of the group. The working group acknowledged Lin's work in developing Part II of the loading guide and thanked him for his contribution to the group.

The next discussion was a proposal by Lin Pierce to expand the scope of the working group to include revising C57.96-1989. Lin's proposal was to change the loading guide to use hot spot temperature rise instead of the average temperature rise currently used in the guide. This proposal was approved by the working group members. It was decided that the Chair would revise the PAR and request a 2 year extension in order to get this work done. Chuck Johnson and Bill Mutschler agreed to review sections of the current loading guide and make suggested changes based on Lin's proposal.

The meeting was adjourned at 9:55 a.m.

8.11.2.7 Working Group on Thermal Evaluation C57.12.56/60

Working Group on Flammability Issues

Chair: Mr. R. Provost

The working group met at 8:00 a.m. on Monday, April 24, 1995 at the Hyatt Regency. It was held in lieu of the W.G. on Dry Type Test Code (C57.12.91) since Dave Barnard was not present, and it helped resolve a conflict for this working group on Tuesday morning. There were 7 members and 12 guests present. After the introductions, the minutes of the meeting in Milwaukee were approved as written.

A review of the task force meeting on revision of C57.12.60 was given by the Chair. The task force met on Sunday, April 23, 1995 in the Executive Board Room with nine persons attending. Minor modifications to the minutes of the last task force meeting were made. A discussion of the three key areas of revision followed.

Test Models - Jeewan Puri and Mike Haas submitted a proposal to modify the document regarding small test models. A very comprehensive and detailed description of the geometry, dimensions, winding configuration, and model aging plan was provided. It suggests a minimum of 12 coils per temperature be tested along with a reference or control coil for monitoring.

General agreement was reached on the proposal and it will now be sent to the working group members for comments and discussion as it is written immediately. It will then be incorporated in a revision of the standard.

Criteria of Failure - Tony Jonnatti submitted a basic proposal to utilize partial discharge detection of test coils as an alternate method to establish failure or end point during aging. The method would basically establish coils which begin aging as PD free, and would suggest a failure criteria of 50 picocoulombs.

After some discussion, Mangesh Rajadhyaksha volunteered to work with Tony to expand on the details of the procedure. This will be completed within the next month and also sent to the working group for comments as soon as possible.

Methods of Test - A proposal for revision of this section regarding the testing of full size coils was submitted by Jim Thies, on behalf of Mike Schacker, who was not present. Later, Mike Haas agreed to discuss the proposal with Mike Schacker and expand on the proposal, which would then be incorporated in the next revision.

Finally, a discussion of the differences in construction, aging, and testing of full size coils versus small models resulted in the plan to make two separate sections to the document, since there are more differences than similarities. This also will be incorporated into the revision.

If all comments can be obtained on the various changes by mid summer, then the revised document will be sent to the working group before the next Transformers Committee meeting.

At approximately 4:45 p.m. the task force adjourned.

The Chair noted that the present document must be reaffirmed while work on the revision proceeds. The Transformers Committee will be balloted on reaffirmation as soon as possible.

8.11.2.8 New Business

The Chair requested Mr. Wes Patterson to permanently move this working groups meeting to the 10:55 a.m. time slot on Monday morning of the Transformer Committee meeting. This will resolve the conflict with Tony Jonnatti's meeting on Tuesday. Mr. Patterson agreed to handle this for the next meeting.

With no other new business, the working group adjourned at 8:20 a.m.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

SUBCOMMITTEE: DRY-TYPE TRANSFORMERS / CHAIRPERSON: W. PATTERSON / PHONE: (919)856-2420 / FAX: (919)856-2418

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
C57.12.01	GENERAL REQUIREMENTS FOR DRY-TYPE DIST. AND POWER TR INCL THOSE WITH SOLID CAST &/or RESIN-ENCAPSULATED WINDINGS								EXTENDED 12/96
NONE	NOT SPECIFIED	JONATTI A.			02/02/89	09/28/82	1996		PAR EXTENSION REQUIRED
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		BALLOT REAFFIRMATION
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		BALLOT REAFFIRMATION
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		BALLOT REAFFIRMATION
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								TO BE PUBLISHED
PC57.12.56	THERMAL EVALUATION OF DRY-TYPE	PROVOST R. L.			08/27/84	/ /	1995	(302)999-2225	ANSI APPROVED 01/04/94
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								EXTENDED 12/1996
NONE	DRY-TYPE THRU FAULT DUR GUIDE	NONE			01/01/89	09/13/84	1996		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	THERMAL EVALUATION OF DRY-TYPE	PROVOST R. L.			10/25/92	08/17/89	1994	(302)999-2225	BEING BALLOTTED IN C57

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE

DATE: 06/12/95

ATTACHMENT 4

SUBCOMMITTEE: DRY-TYPE TRANSFORMERS / CHAIRPERSON: W. PATTERSON / PHONE: (919)856-2420 / FAX: (919)856-2418

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
C57.12.91	TEST CODE FOR DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			SPD	EM			PAR HAS EXPIRED
PC57.12.91	TEST CODE FOR DRY TYPE TR	BARNARD D.		11/29/78	06/01/89	1984	(919)738-4251	ACTION NEEDED ON PAR
C57.16	REQUIREMENTS FOR CURRENT LIMITING REACTORS			NEMA	IAS	T&D		WITHDRAWN BY ANSI
PC57.16	DRY TYPE REACTORS	DUDLEY R.		09/19/58	03/21/91	1976	(416)298-8108	PAR EXT. TO 06/97
C57.21	REQUIREMENTS TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA							PAR MORE THAN 4 YEAR OLD
PC57.21	DRY TYPE REACTORS	DUDLEY R.		04/02/91	/ /	1995	(416)298-8108	ACTION NEEDED ON PAR
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	/ /	1992		BALLOTTING REAFFIRMATION
C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			SCC14				PAR MORE THAN 4 YEAR OLD
NONE	GUIDE FOR LOADING DRY-TYPE TR	PIERCE L.		04/26/89	04/26/89	1994	(706)291-3166	ACTIN NEEDED ON PAR
C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			T&D	SCC14	SCC10		EXTENDED 12/96
PC57.96	CAST COIL LOADING GUIDE	PIERCE L.		04/26/89	05/06/91	1996	(706)291-3166	ACTION NEEDED ON PAR
C57.99	GUIDE FOR LOADING DRY-TYPE AND OIL-IMMERSED CURRENT-LIMITING REACTORS							NEEDS REVISION (PAR TOO OLD)
P731	DRY TYPE REACTORS	DUDLEY R.		/ /	03/28/78	1990	(416) 298-8108	LISTED AS IEEE STANDARD
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
IEEE 259	TEST PROCEDURE FOR EVALUATION OF SYSTEMS OF INSULATION FOR SPECIALTY TRANSFORMERS							PUBLISHED
P259	SPECIALTY TRANSFORMERS	SIMPSON R. W. JR.		06/22/72	09/26/91	1979	(603)284-4362	PAR EXTENSION NEEDED
C57.134	GUIDE FOR THE DETERMINATION OF HOTTEST SPOT TEMPERATURE IN DRY TYPE TRANSFORMERS							
PC57.134	DRY TYPE HOT SPOT DETERMINATIO	PAYNE P.		/ /	/ /	0	(202)388-2138	

COORDINATION ACTIVITY OF DRY TYPE SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE / PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
P1303	GUIDE FOR STATIC VAR COMPENSATOR FIELD TESTS				APPROVED BY SB 06/94
09/17/92	SUBS	PHILIP R. NANNERY	914-577-2591	R. F. DUDLEY	416-298-8108

8.12 HVDC Converter Transformers & Reactors - W. N. Kennedy

Meeting Minutes - Kansas City, MO - April 25, 1995

The meeting was called to order at 3:30 with eight members and five guests present. Mr. L. E. Juhlin from ABB in Ludvika, Sweden requested membership, raising the total number of members to eighteen.

Copies of three final drafts that were prepared by the CIGRE HVDC Working Group JWG 12/14.10 were distributed at the meeting. The papers described their positions on load loss calculations, noise considerations, and impedance and tolerances for hvdc converter transformers. The loss calculation paper was discussed in particular at our meeting, as the CIGRE JWG has proposed a technique requiring loss measurements at only two frequencies. In most cases these would be the fundamental (50 or 60 Hz) and the frequency used for the induced test (typically 250 - 300 Hz). This method is simpler than the one proposed in our draft trial-use standard PC57.129/D9, but may make assumptions regarding the exponents used to calculate eddy losses in the winding and stray losses in the clamps and support structure at harmonic frequencies. We agreed that additional study is needed comparing the two methods on actual transformers.

We next examined the length of time for application of the polarity reversal voltage prior to the reversals, as our document specifies 60 minutes at each polarity while the CIGRE JWG has increased the period to 90 minutes. After considerable discussion the members that were present at our meeting recommended unanimously that the sixty minutes is adequate.

Joe Foldi brought up the subject of rated current and MVA for converter transformers. Specifications are presently written defining the rated current as the equivalent rms current of the primary and the harmonics, which is the approach used in our document. It was noted that the IEC rectifier transformer document defines rated power based on only the fundamental component of current, which results in a slightly smaller MVA rating for an equivalent transformer. We agreed to retain our present definition for the present time.

It was mentioned that draft 9 of PC57.129 "Trial-Use General Requirements and Test Code for Oil-Immersed Converter Transformers" is completed and will be mailed out for a recirculation ballot very shortly. It is expected that it will be approved prior to our next meeting.

Note that IEC is starting a working group to develop its own HVDC converter transformer standard, which should be complete or nearly so at the time our standard will come up for renewal. This will provide an excellent opportunity to reconcile any differences between the IEEE and IEC documents at that time.

With the converter transformer standard (hopefully) completed, it is expected that a new draft of the smoothing reactor standard can be prepared for discussion at our next meeting that will include relevant subjects from PC57.129 as well as input of work performed in Richard Dudley's Dry-Type Smoothing Reactor task force in the Dry-Type Subcommittee.

Respectfully Submitted,

William Kennedy, Subcommittee Chair

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95

ATTACHMENT 4

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				PAR EXTENSION REQUESTED
PC57.129	SUBCOMMITTEE	KENNEDY W. N.		/ /	09/26/91	0	(317)286-9387	TO BALLOT D9
IEEE1277	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED AND DRY-TYPE HVDC SMOOTHING REACTORS			SUB				NEW DRAFT BEING PREPARED
P1277	SUBCOMMITTEE			/ /	09/25/91	0		PAR EXTENSION REQUESTED

COORDINATION ACTIVITY OF HVDC CONV. TR & SMOOTHING REAC SUBCOMMITTEE AS PER: 06/12/95

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD.PHONE
P1030.3	GUIDE FOR SPECIFICATION OF HVDC PERFORMANCE - PART III, DYNAMIC PERFORMANCE					DISCUSSING DRAFT IN WG
12/05/91		T&D	LEWIS VAUGHAN	514-652-8457	WILLIAM N. KENNEDY	317-286-9387

EPRI

9.1 EPRI - S. R. Lingren

Electric Power
Research Institute

Leadership in Science and Technology

MEMORANDUM

April 19, 1995

TO: Mr. Wallace B. Binder, Jr.
Secretary, IEEE Transformers Committee
Transmission & Distribution Engrg. Dept.
Ohio Edison Company
76 South Main Street
Akron, Ohio 44308

FROM: Stan Lindgren, Project Manager

SUBJECT: **EPRI LIAISON REPORT**

The following report is for inclusion in your minutes for the April 25, 1995 meeting.

1. EHV Converter Transformer:

   - Test results confirmed 25% or greater major insulation size reduction can be attained with some further work.
   - Final report will be published pending patent filing actions.

2. Advanced Power Transformer:

   - Reduced total owning cost has been demonstrated.
   - A 47 MVA three phase core form prototype was built and successfully short circuit tested March, 1991 delivered to HL&P and is in service. An IEEE paper, 94 SM 414-3 PRD was presented at the IEEE/PES 1994 Summer Meeting in San Francisco.
   - Development of shell form insulation, winding and physical models continues. 1425 BIL dielectric models have been tested successfully. A 25 MVA single phase, 161 kV model testing program including short circuit is in process.

3. Static Electrification in Power Transformers:

   - This is the suspected failure mechanism in over 24 core form and shell form FOA transformers worldwide. Recent failures involve 20 year old transformers.
   - Work has focused on the effects of temperature and moisture transients. Tests on representative transformer cooling components have been completed (Final Report TR-102112). A project continues to monitor a large FOA transformer in the field. Data is being collected and monitored at a remote location that shows increased static electrification activity at low oil temperatures with pumps running. A comprehensive test program is in process for a 333 MVA single phase 500kV autotransformer that is fully instrumented to monitor static electrification effects during a series of experiments.

- Progress is being made in understanding the effects of BTA oil additive on static electrification through flow model experiments. An final report is being published, TR-104973.

A fourth EPRI sponsored workshop was held in Milwaukee September, 1994., which reported on progress in monitoring and tests on full-scale transformers plus field incidents involving both shell-form and core-form transformers. Proceedings are being published, TR-105019.

4. Bubble Evolution in Overloaded Transformers:

- Very rapid load changes can cause bubble formulation under some conditions and reduce 60 Hz and impulse dielectric strength. This has been demonstrated in models with rapid/high O.L.

- A computer program covering bubble evolution plus the ANSI Loading Guide formulas has been developed as an EPRIGEMS, AP-102649, available as of July, 1993. Some software problems were found by users. Corrections have been made, and a new version (PTLOAD 4.1) is now available.

- Additional work is underway to experimentally study moisture dynamics associated with rapid overloads and cool-down cycles plus detect inception of partial discharges caused by bubble evolution.

5. 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 was completed to study fast disconnect switching transient effects on HVCTs. Mathematical modeling was checked experimentally through laboratory tests and switching tests in a 500 kV substation with very high speed instrumentation. Effects of switching resistors during disconnect switching has been studied and found to reduce bus transients and stresses by up to 80%. A final report is published, TR-104961.

6. 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. A final report is being published, TR-104994.

7. Geomagnetic Induced Currents (GIC)

EPRI has three projects.

- A feasibility demonstration has been completed for detection of transformer core saturation at twenty-five locations reporting to a central location. Useful data was collected from several GIC events. A dozen or so locations will continue on a routine monitoring basis.

- 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.

- A project to evaluate the response of protective relaying systems to GIC has been completed. A final report is in process.

8. 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 has been completed. A final report is in process. An IEEE paper, 94 SM 473-9 PWRD, was presented at the IEEE/PES 1994 Summer Meeting in San Francisco.

9. 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. A field demonstration program is underway with 12 prototypes in service during 1994 and additional units during 1995 for a total of 40. Individual ppm for hydrogen, acetylene, ethylene and carbon monoxide is monitored.

10. Power Transformer Remaining Life Prediction & Extension

This project involves two areas of work:

- Furaldehyde in Transformer Oil
  A project is in process to develop a correlation between furaldehydes in oil samples with degree of polymerization found in paper insulation samples taken from a significant number of transformers in service.

- Vibration & Frequency Response Analysis (FRA)

  A project is being initiated to develop a correlation between existing winding conditions and vibration & FRA tests before and after internal inspection and reclamping of the same transformers

11. Transformer Expert System
A new project is being initiated to capture the knowledge of transformer experts and making it usable as a tool for evaluation of transformer design questions, existing condition assessment, problem diagnosis, and identification of maintenance needs.

12. Guidelines for Life Extension of Substations

- These guidelines, now published in Final Report TR-105070, include a large section on transformer inspection, condition assessment, testing, and maintenance practices.

cc: Jim Harlow, Beckwith
Mark Wilhelm

9.2 SCC4 - P. A. Payne

STANDARDS COORDINATING COMMITTEE NO. 4 - ELECTRICAL INSULATION LIAISON REPORT TO IEEE TRANSFORMERS COMMITTEE - APRIL 26, 1995

STANDARDS COORDINATING COMMITTEE NO. 4

Reaffirmation of IEEE 97, Specifying Service Conditions in Electrical Standards, has been tabled by the Standards Board until March 1995 pending resolution of REVCOM's comment concerning the correction factor for insulation withstand capability for altitudes exceeding usual service conditions. SCC4 will ballot to withdraw IEEE 96 as lack of interest was noted during the 1992 reaffirmation. The revision of IEEE 943, Guide for Aging Mechanisms and Diagnostic Procedures, will be postponed one year to review the direction of IEC TC98 in the revision of it's comparable standard, IEC 610. In preparation for revision of IEEE 1, General Principles for Temperature Limits in Rating Electrical Equipment, a comparison will be made to IEC 85, Thermal Evaluation and Classification.

NEMA is the Secretariat for the US Technical Advisory Group to IEC TC98 - Electrical Insulation Systems. Working Groups will be established under SCC4, as required, to provide standards coordination with IEC previously performed by SCC4.1 as US Technical Advisor to the disbanded IEC TC63.

US TECHNICAL ADVISORY GROUP FOR IEC TC98

The US Technical Advisory Group for IEC TC98 met following the SCC4 meeting. Discussion ensued for development of a US position on two proposed work items: (1) WG3 - Thermal Evaluation of Combinations of Insulating Materials and Related Conductor and Core Materials as an Insulating System, and (2) WG4 - Thermal Evaluation of Electrical Insulating System Modifications and Component Substitutions. The Working Group Chairs are Bill Simpson (WG3) and Harold Miller (WG4). Al Iverson is the WG1 Chair for IEC505-1, Evaluation and Qualification of Electrical Insulation Systems, Part 1; a working draft has been prepared. A chair is needed for WG2, IEC505-2. The structure of TC98 and coordination with other Technical Committees was discussed for development of a US position. The first meeting of IEC TC98 will be in Krista, Sweden, April 4-6, 1995.

An open invitation is extended for membership in SCC4 and US TAG/IEC TC98 for assistance in standards development. In addition to leadership for WG2, there is a need for a new Deputy Technical Director for the US TAG. Interested persons should contact:

Dr. Richard F. Weddleton, TA USNC/IEC/TC98
Advisory Engineer
Generator Materials Engineering
Westinghouse Electric Corporation
The Quadrangle MC 303
Orlando, FL 32826-2399
phone (407) 281-2420
fax (407) 281-2334

Respectfully submitted,
Paulette A. Payne

9.3 CIGRE SC12 - W. N. Kennedy

CIGRE STUDY COMMITTEE 12 (TRANSFORMERS)
LIAISON REPORT TO IEEE TRANSFORMERS COMMITTEE

April 26, 1995

There haven't been any meetings of CIGRE SC12 (Transformers) since the general meeting in August 1994 that was reported on at the last Transformer Committee meeting in Milwaukee.

The next meeting will be a colloquium for SC12 (Transformers) to be held in June, 1995. Individuals scheduled to attend from the United States include Stan Lindgren, Jack Harley, T. V. Oommen, Leo Savio, and myself. Topics to be discussed are:

a) Workshops on bushings, LTC and other accessories
b) HVDC converter transformers
c) Short-circuit stresses
d) Life management of transformers
e) Review of PCB problems
f) Optimum design of transformers

A detailed report of the colloquium will be presented at our November 9th meeting in Boston.

Respectfully submitted,

William Kennedy
US Representative to SC12 (Transformers)

10.0 New Business

No new business was brought forward.

The meeting was adjourned at 12:02 pm.

Respectfully submitted,

John W. Matthews
Secretary

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

DATE: 06/12/95
PAGE NO: 1 OF 12

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			T&D	PSRC	SWG	SUBS	IAS IEC-TC1 NEW PAR NESCOM 06/15/95
VARIOUS	STANDARDS	G. VAILLANCOURT	BORST J. D.	06/16/93	/ /		1998	(514)652-8515 WG COLLECTING CHANGES
C57.12.00	DEFINITION OF THERMAL DUPLICATE			EM	IAS	I&CPS	PESC	PAR HAS EXPIRED
PC57.12.001	INSULATION LIFE	L. W. PIERCE	GRUBB R. L.	/ /	05/31/90		1997	(706)291-3166 ACTION NEEDED ON PAR
C57.12.00	GENERAL REQUIREMENTS FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS							PAR HAS EXPIRED
PC57.12.00m	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	KRAUSE P.	/ /	/ /		0	(205)877-7740 COORDINATE WITH J. BORST
C57.12.01	GENERAL REQUIREMENTS FOR DRY-TYPE DIST. AND POWER TR INCL THOSE WITH SOLID CAST &/or RESIN-ENCAPSULATED WINDINGS							EXTENDED 12/96
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON	JONATTI A.	02/02/89	09/28/82		1996	(919)856-2420 PAR EXTENSION REQUIRED
C57.12.10	TRANSFORMERS 230kV AND BELOW -8333/10417kVA 1 PH, -100000 kVA 3 PH w/o LTC, -100000kVA w/ LTC - SAFETY REQUIREMENTS							ANSI STANDARD
ANSI	STANDARDS	G. VAILLANCOURT		06/04/87	/ /		1993	(514)652-8515 NEEDS A HOME, DUE FOR REAF.
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
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
ANSI	STANDARDS	G. VAILLANCOURT		09/02/81	/ /		1987	(514)652-8515 NEMA STANDARD
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 IS EXPIRING
PC57.12.20	DISTRIBUTION TRANSFORMERS	KEN HANUS	ANDERSON G. W.	01/11/88	12/05/91		1993	(817)882-6020 ACTION REQUIRED ON PAR

STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/12/95
ATTACHMENT 1 — PAGE NO: 2 OF 12

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
C57.12.21	STANDARD REQUIREMENTS FOR PAD-MOUNTED, COMPARTMENTAL-TYPE, SELF-COOLED, SINGLE-PHASE DIST TRANSFORMERS WITH HV BUSHINGS			T&D	IAS/REP			TO BE PUBLISHED BY ANSI
PC57.12.21	DISTRIBUTION TRANSFORMERS	KEN HANUS	GHAFOURIAN A.	10/22/79	06/27/91	1985	(817)882-6020	
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 PUB. BY NEMA
PC57.12.22	DISTRIBUTION TRANSFORMERS	KEN HANUS	HANUS K.	01/09/95	06/27/91	1999	(817)882-6020	APPROVED BY STD B 12/12/94
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	ANSI APPROVED 02/18/94
PC57.12.23	DISTRIBUTION TRANSFORMERS	KEN HANUS	SCHEU R. W.	09/19/85	06/27/91	1996	(817)882-6020	TO BE PUBLISHED BY ANSI
C57.12.24	UNDERGROUND-TYPE 3-PHASE DISTRIBUTION TRANSFORMERS,2500kVA AND SMALLER: HV,34500GrdY..& BELOW,LV,480 V AND BELOW			T&D	IC	IAS/REP	IAC/PSE	WILL BE PUBLISHED BY NEMA
PC57.12.24	UG TR & NETWORK PROTECTORS	PAUL CREHER	NIEMANN C.	05/10/88	06/27/91	1993	(201)430-7743	ANSI APPROVED 05/23/94
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	PAR IS EXPIRING
PC57.12.25	DISTRIBUTION TRANSFORMERS	KEN HANUS	MOHESKY N.	05/11/90	06/27/91	1995	(817)882-6020	ACTION REQUIRED ON PAR
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	WILL HAVE NEW NUMBER
PC57.12.26	DISTRIBUTION TRANSFORMERS	KEN HANUS	PEARSON L. C.	06/17/92	12/05/91	1997	(817)882-6020	APPROVED BY ANSI
C57.12.27	STANDARD FOR TRANSFORMERS - LIQUID FILLED DISTRIBUTION TRANSFORMERS USED IN PAD-MOUNTED INSTALLATIONS, INCLUD. UNIT SUBS							PAR IS EXPIRING
PC57.12.27	DISTRIBUTION TRANSFORMERS	KEN HANUS	MILLER J. R.	/ /	06/27/91	0	(817)882-6020	ACTION REQUIRED ON PAR
C57.12.28	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY							EXTENSION TO BE REQUESTED
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS	MARTIN J.	06/24/87	/ /	1994	(817)882-6020	BEING BALLOTED IN WG
C57.12.29	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY IN COASTAL ENVIRONMENTS							PUBLISHED IN 1992
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS	MARTIN J.	/ /	/ /	1996	(817)882-6020	NOT TRANSFORMERS COMM.
C57.12.30	SUBMERSIBLE EQUIPMENT - ENCLOSURE INTEGRITY							TO BE BALLOTED
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS	MARTIN J.	/ /	/ /	1994	(817)882-6020	NUMBER TO BE CHANGED

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C57.12.31	COATING STANDARD FOR POLE MOUNTED TRANSFORMERS							PAR TO BE SUBMITTED
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS	MARTIN J.	/ /	/ /	1994	(817)882-6020	EXPECT TO COMPLETE BY 12/94
C57.12.32	ENCLOSURE INTEGRITY OF SUBMERSIBLE EQUIPMENT							
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS		/ /	/ /	0	(817)882-6020	
C57.12.33	GUIDE FOR EVALUATION OF LOSSES IN DISTRIBUTION TRANSFORMERS							
NEW	DISTRIBUTION TRANSFORMERS	KEN HANUS	PEKAREK T.	/ /	/ /	0	(817) 882-6020	APPLY FOR PAR
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 ANSI APPROVAL
C57.12.44	STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS			T&D	SWGR	IAS/REP IAS/PSE EEI		PUBLISHED DEC 94
PC57.12.44	UG TR & NETWORK PROTECTORS	PAUL OREHEK	MULKEY D. H.	12/20/94	06/17/92	1999	(201)430-7743	SUBMITTING NEW PAR
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	(919)856-2420	BALLOT REAFFIRMATION
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	(919)856-2420	BALLOT REAFFIRMATION
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	(919)856-2420	BALLOT REAFFIRMATION
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 (NO PAR)
ANSI	STANDARDS	G. VAILLANCOURT		/ /	/ /	0	(514)652-8515	NOBODY IS WORKING ON IT
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
ANSI	STANDARDS	G. VAILLANCOURT		/ /	/ /	0	(514)652-8515	NOT IEEE STANDARD

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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	(919)856-2420	BALLOT REAFFIRMATION
C57.12.56	TEST PROCEDURE FOR THERMAL EVALUATION OF INSULATION SYST FOR VENTILATED DRY-TYPE POWER & DISTRIBUTION TRANSFORMERS							TO BE PUBLISHED
PC57.12.56	DRY-TYPE TRANSFORMERS	W. PATTERSON	PROVOST R. L.	08/27/84	/ /	1995	(919)856-2420	ANSI APPROVED 01/04/94
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					TO BALLOT D6 IN TC
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	(919)856-2420	ANSI APPROVED 10/11/91
C57.12.59	GUIDE FOR DRY-TYPE TRANSFORMER THROUGH-FAULT CURRENT DURATION							EXTENDED 12/1996
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON	NONE	01/01/89	09/13/84	1996	(919)856-2420	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	(919)856-2420	BEING BALLOTTED IN C57
C57.12.70	TERMINAL MARKINGS AND CONNECTIONS FOR DIST. & POWER TRANSFORMERS							ANSI APPROVED 07/09/93
NONE	STANDARDS	G. VAILLANCOURT	TRAUB T. P.	06/18/92	/ /	1997	(514)652-8515	TO REVISE TERMINOLOGY
C57.12.80	TERMINOLOGY FOR POWER & DISTRIBUTION TRANSFORMERS							WILL START REVISION
NONE	STANDARDS	G. VAILLANCOURT	TRAUB T. P.	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							NEW PAR NESCOM 03/15/95
VARIOUS	STANDARDS	G. VAILLANCOURT	SMITH S. D.	03/16/93	/ /	1998	(514)652-8515	WG COLLECTING CHANGES
C57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS							WILL START REVISING SECT. 11
NEW	INSULATION LIFE	L. W. PIERCE	HENRY G.	/ /	/ /	1998	(706)291-3166	

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C57.12.90	REVISION OF THE INDUCED TEST							PAR MORE THAN 4 YEAR OLD
PC57.12.90d	DIELECTRIC TESTS	L. B. WAGENAAR	POULIN B.	/ /	09/28/90	0	(614)223-2259	ACTION REQUIRED ON PAR
C57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS							NEW PAR NESCOM 03/15/95
PC57.12.90	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	SIM JIN	/ /	/ /	0	(205)877-7740	REVISING TEST DATA
C57.12.90	GUIDE FOR SHORT-CIRCUIT TESTING OF DISTRIBUTION AND POWER TRANSFORMERS							NEW PAR NESCOM 03/15/95
PC57.12.90h	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	McQUIN N.	/ /	/ /	0	(205)877-7740	TO SPLIT FROM TEST CODE
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	APPLY FOR PAR, NEW NO. NEEDED
C57.12.91	TEST CODE FOR DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			SPD	EM			PAR HAS EXPIRED
PC57.12.91	DRY-TYPE TRANSFORMERS	W. PATTERSON	BARNARD D.	11/29/78	06/01/89	1984	(919)856-2420	ACTION NEEDED ON PAR
C57.13	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS			PSIM	PSR	SPD		
P546	INSTRUMENT TRANSFORMERS	J. E. SMITH		03/30/94	06/14/94	1999	(919)827-2121	REV. PAR APPROVED 06/14/94
C57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS							R1992
PSRC	INSTRUMENT TRANSFORMERS	J. E. SMITH		08/25/87	/ /	1997	(919)827-2121	RELAY COMM. DOCUMENT
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	/ /	1995	(919)827-2121	R1990
C57.13.4	DETECTION OF PARTIAL DISCHARGE AND MEASUREMENT OF APPARENT CHARGE WITHIN INSTRUMENT TRANSFORMERS			T&D				PAR IS EXPIRING
P832	INSTRUMENT TRANSFORMERS	J. E. SMITH	JONNATTI A. J.	/ /	05/28/80	0	(919)827-2121	DOCUMENT NEVER SUBMITTED TO SB
C57.13.5	GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN INSTRUMENT TRANSFORMERS 69 kV AND ABOVE			SWGR	EM			TITLE CHANGE NEEDED IN PAR
PC57.13.5	INSTRUMENT TRANSFORMERS	J. E. SMITH	MA J.	/ /	06/14/94	0	(919)827-2121	SUBMIT NEW PAR WITH CHANGES

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C57.13.6	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS FOR USE WITH ELECTRONIC REVENUE METERS AND RELAYS			PSIM	PSR	TD	PSC	PAR DISSAPROVED **ACTION**
PC57.13.6	INSTRUMENT TRANSFORMERS	J. E. SMITH	TEN-HAAGEN C. W.	/ /	/ /	0	(919)827-2121	MAKE CHANGES AND RESUBMIT PAR
C57.15	REQUIREMENTS, TERMINOLOGY, & TEST CODE FOR STEP-VOLTAGE AND INDUCTION VOLTAGE REGULATORS							WG REVISING SCOPE
NONE	DISTRIBUTION TRANSFORMERS	KEN HANUS	DIAMANTIS T.	03/18/87	06/19/86	1997	(817)882-6020	APPROVED BY ANSI 12/02/92
C57.16	REQUIREMENTS FOR CURRENT LIMITING REACTORS			NEMA	IAS	T&D		WITHDRAWN BY ANSI
PC57.16	DRY-TYPE TRANSFORMERS	W. PATTERSON	DUDLEY R.	09/19/58	03/21/91	1976	(919)856-2420	PAR EXT. TO 06/97
C57.17	REQUIREMENTS FOR ARC FURNACE TRANSFORMERS							LAST REVISED IN 1986
ANSI	STANDARDS	G. VAILLANCOURT		/ /	/ /	1986	(514)652-8515	ANSI DOCUMENT
C57.18.10	REQUIREMENTS FOR SEMICONDUCTOR RECTIFIER TRANSFORMERS			NONE				PAR EXT. TO 06/97 REQUESTED
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 1991
PC57.19.00	BUSHING	FRED ELLIOTT	WAGENAAR L. B.	07/23/91	04/01/79	1996	(503)230-3900	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 1991
PC57.19.01	BUSHING	FRED ELLIOTT	SINGH PRITPAL	08/05/91	11/01/89	1996	(503)230-3900	APPROVED BY ANSI 03/20/92
C57.19.03	STANDARD REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR BUSHINGS FOR DC APPLICATIONS			SPD	IC	SWGR		PAR MORE THAN 4 YEAR OLS
PC57.19.03	BUSHING	FRED ELLIOTT	HEYMAN OLOF	/ /	11/09/89	0	(503)230-3900	ACTION NEEDED ON PAR
C57.19.100	GUIDE FOR APPLICATION OF APPARATUS BUSHINGS.			SWGR	SUB	PSR		APPROVED BY REVCOM ON 03/15/95
P800	BUSHING	FRED ELLIOTT	ELLIOTT F. E.	/ /	09/27/79	1999	(503)230-3900	REPLACES C57.19.101
C57.19.101	GUIDE FOR LOADING POWER APPARATUS BUSHINGS							BALLOT TO WITHDRAW
P757	BUSHING	FRED ELLIOTT	ELLIOTT F. E.	10/20/88	/ /	1997	(503)230-3900	REPLACED BY C57.19.100

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NEW	TASK FORCE TO STUDY APPLICATON AND PROBLEMS OF DRAW-LEADS FOR BUSHINGS							NEW TASK FORCE
NEW	BUSHING	FRED ELLIOTT	NORDMAN RUSS	/ /	/ /	0	(503)230-3900	
C57.21	REQUIREMENTS,TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA			EM	T&D	PSR		PAR MORE THAN 4 YEAR OLD
PC57.21	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	McGILL J. W.	04/02/91	06/09/88	2000	(205)877-7740	R1995
C57.21	REQUIREMENTS TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA							PAR MORE THAN 4 YEAR OLD
PC57.21	DRY-TYPE TRANSFORMERS	W. PATTERSON	DUDLEY R.	04/02/91	/ /	1995	(919)856-2420	ACTION NEEDED ON PAR
C57.21	REQUIREMENTS,TERMINOLOGY AND TEST CODE FOR SH. REACTORS OVER 500kVA			NONE				PAR MORE THAN 4 YEAR OLD
PC57.21a	DIELECTRIC TESTS	L. B. WAGENAAR	KENNEDY W. N.	04/02/91	12/11/86	1995	(614)223-2259	ACTION NEEDED ON PAR
C57.91	GUIDE FOR LOADING MINERAL OIL-IMMERSED TRANSFORMERS			SUB	T&D	PSE		PAR MORE THAN 4 YEAR OLD
PC57.91	INSULATION LIFE	L. W. PIERCE	PIERCE L.	03/21/91	06/13/85	1996	(706)291-3166	ACTION NEEDED ON PAR
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		PAR SHOULD BE CLOSED
PC57.92	INSULATION LIFE	L. W. PIERCE	PIERCE L.	03/21/91	06/28/85	1996	(706)291-3166	TO BE COMBINED INTO C57.91
C57.93	GUIDE FOR INSTALLATION OF LIQUID-IMMERSED POWER TRANSFORMERS.			NONE				PAR EXTENDED TO JUNE 1997
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	/ /	1992	(919)856-2420	BALLOTTING REAFFIRMATION
C57.95	GUIDE FOR LOADING LIQUID-IMMERSED STEP-VOLTAGE AND INDUCTION-VOLTAGE REGULATORS							NO WORK IN PROGRESS
NONE	INSULATION LIFE	L. W. PIERCE		03/21/91	/ /	1996	(706)291-3166	BALLOT FOR REAF. REQUESTED
C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			SCC14				PAR MORE THAN 4 YEAR OLD
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON	PIERCE L.	04/26/89	04/26/89	1994	(919)856-2420	ACTIN NEEDED ON PAR

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C57.96	GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			T&D SCC14 SCC10				EXTENDED 12/96
PC57.96	DRY-TYPE TRANSFORMERS	W. PATTERSON	PIERCE L.	04/26/89	05/06/91	1996	(919)856-2420	ACTION NEEDED ON PAR
C57.98	IEEE GUIDE FOR TRANSFORMER IMPULSE TESTS			NONE				PUBLISHED JAN 95
PC57.98	DIELECTRIC TESTS	L. B. WAGENAAR	POULIN B.	06/01/86	02/01/86	1992	(614)223-2259	DISCUSS PAR BUSINESS
C57.98	GUIDE FOR PERFORMING ROUTINE LIGHTNING IMPULSE TESTS ON DIST.TRANSFO			T&D PSIM PSC		ASC 62	EM	TO PUBLISH AS SUP. TO C57.98
PC57.98a	DIELECTRIC TESTS	L. B. WAGENAAR	ROSSETTI J.	/ /	04/30/91	0	(614)223-2259	PAR EXTENSIN TO 06/97 APPR.
C57.99	GUIDE FOR LOADING DRY-TYPE AND OIL-IMMERSED CURRENT-LIMITING REACTORS							NEEDS REVISION (PAR TOO OLD)
P731	DRY-TYPE TRANSFORMERS	W. PATTERSON	DUDLEY R.	/ /	03/28/78	1990	(919) 856-2420	LISTED AS IEEE STANDARD
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				NO WORK IN PROGRESS
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.	03/16/93	06/27/91	1998	(205)877-7740	COMPLETE
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		REAFFIRMED 03/15/1995
NONE	INSULATING FLUIDS	F. GRYSZKIEWICZ		02/02/89	12/10/87	2000	(617)926-4900	REAF. ON REVCOM AGENDA 03/95

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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	PAR TOO OLD, NEW ONE NEEDED
C57.113	GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN LIQUID-FILLED POWER TRANSFORMERS AND SHUNT REACTOR							PUBLISHED AS FULL-USE 1992
P545	DIELECTRIC TESTS	L. B. WAGENAAR	HOWELLS E.	12/05/91	09/25/91	1996	(614)223-2259	ACTION ON PAR NEEDED
C57.114	SEISMIC GUIDE FOR POWER TRANSFORMERS AND REACTORS			NPE SUBS.				TO BE WITHDRAWN (OBSOLETE)
P513	WEST COAST	DAVID BRUCKER	OKLU S.	02/15/90	09/06/73	1995	(415)692-4431	CLOSE PAR
C57.115	GUIDE FOR LOADING MINERAL-OIL-IMMERSED POWER TRANSFORMERS RATED IN EXCESS OF 100MVA (65 C WINDING RISE)							COMPLETED COMMITTEE BALLOT
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							REAF. APPROVED BY SB 09/21/94
NONE	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	REITTER G.	01/03/89	06/28/79	1999	(205)877-7740	ACTION ON PAR NEEDED
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
P838	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		EXT.TO 12/96 ,ACTION ON PAR
P954	INSULATING FLUIDS	F. GRYSZKIEWICZ		02/22/88	04/12/82	1996	(617)926-4900	REAF DISAPPROVED 03/15/95
C57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT							PAR TOO OLD
P1098	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	HENNING W. R.	/ /	06/13/85	0	(205)877-7740	PAR EXT. TO 06/97 APPROVED

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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	(919)856-2420	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 TC, PAR TOO OLD
PC57.127	DIELECTRIC TESTS	L. B. WAGENAAR	HOWELLS E.	/ /	03/10/88	0	(614)223-2259	WAITING FOR BALLOT, EXTEND PAR
C57.128	FIRE PROTECTION OF OUTDOOR LIQUID-IMMERSED POWER TRANSFORMERS			NPE	SUB	PSR		PAR TOO OLD
PC57.128	WEST COAST	DAVID BRUCKER	HAGER R.	/ /	06/01/89	0	(415)692-4431	ASK FOR PAR EXTENSION
C57.129	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED HVDC CONVERTER TRANSFORMERS AND SMOOTHING REACTORS FOR DC POWER TRANSM			EM	T&D	PSIM	SUB	PAR EXTENSION REQUESTED
PC57.129	HVDC CONVERTER TR & REACTOR	W. N. KENNEDY	KENNEDY W. N.	/ /	09/26/91	0	(317)286-9387	TO BALLOT D9
C57.130	GUIDE FOR USE OF DISSOLVED GAZ ANALYSIS DURING FACTORY THERMAL TESTSFOR THE EVALUATION OF OIL-IMMERSED TRANS. AND REACT.			NONE				D8 BEING REVIEWED (TRIAL-USE)
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			APPROVED BY REVCOM 03/15/95
PC57.131	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	TRAUB T. P.	/ /	08/17/89	0	(205)877-7740	APPROVED BY REVCOM
C57.133	GUIDE FOR SHORT-CIRCUIT TESTING OF DISTRIBUTION AND POWER TRANSFORMERS			T&D	PSR	SM	SUBS	PAR SUBMITTAL
PC57.133	PERFORMANCE CHARACTERISTICS	BIPIN PATEL	McQUIN N.	/ /	/ /	0		PART II OF C57.12.90
C57.134	GUIDE FOR THE DETERMINATION OF HOTTEST SPOT TEMPERATURE IN DRY TYPE TRANSFORMERS							
PC57.134	DRY-TYPE TRANSFORMERS	W. PATTERSON	PAYNE P.	/ /	/ /	0	(919) 856-2420	
IEEE 62.1	GUIDE FOR DIAGNOSTIC FIELD TESTING OF POWER APPARATUS, PART I: OIL-FILLED POWER TRANSFORMERS, REGULATORS AND REACTORS							APPROVED BY REVCOM 03/15/95
P 62	DIELECTRIC TESTS	L. B. WAGENAAR	VEITCH R. A.	/ /	03/17/94	0	(614)223-2259	WAITING PUBLICATION

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IEEE 259	TEST PROCEDURE FOR EVALUATION OF SYSTEMS OF INSULATION FOR SPECIALTY TRANSFORMERS							PUBLISHED
P259	DRY-TYPE TRANSFORMERS	W. PATTERSON	SIMPSON R. W. JR.	06/22/72	09/26/91	1979	(919)856-2420	PAR EXTENSION NEEDED
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 GENERATED IN SILICONE-IMMERSED 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 D07
IEEE1265	STANDARD FOR BAR CODING FOR DISTRIBUTION TRANSFORMERS (POLE-MOUNTED, PAD-MOUNTED AND UNDERGROUND)			AIM/TSC	IAS/REP TD	EEI	NEMA	PAR APPROVED 06/27/91
P1265	DISTRIBUTION TRANSFORMERS	KEN HANUS	JORDAN RON	/ /	06/27/91	1994	(817)882-6020	PAR EXTENSION REQUESTED
IEEE1276	TRIAL-USE GENERAL REQUIREMENTS FOR LIQUID-FILLED DISTRIBUTION AND POWER TR UTILIZING HIGH TEMP SOLID INSULATING MATERIAL			T&D				
P1276	INSULATION LIFE	L. W. PIERCE	FRANCHEK M. A.	/ /	09/25/91	0	(706)291-3166	STUDYING HI-T MATERIALS
IEEE1277	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED AND DRY-TYPE HVDC SMOOTHING REACTORS			SUB				NEW DRAFT BEING PREPARED
P1277	HVDC CONVERTER TR & REACTOR	W. N. KENNEDY		/ /	09/25/91	0	(317)286-9387	PAR EXTENSION REQUESTED
IEEE1350	GUIDE FOR PROTECTION OF DISTRIBUTION TRANSFORMERS WITH EMPHASIS ON SECONDARY (LOW VOLTAGE SIDE) SURGES			SPD	T&D IC			CONTINUE WORK IN SPD
P1350	DIELECTRIC TESTS	L. B. WAGENAAR	ROSSETTI J.	/ /	03/17/93	0	(614)223-2259	WITHDRAW PAR
IEEE1388	STANDARD FOR THE ELECTRONIC REPORTING OF TRANSFORMER TEST DATA			EEI	NEMA ASC X12 PSR		CS SAB	PREPARING D1
P1388	DISTRIBUTION TRANSFORMERS	KEN HANUS	McCAIN A.	/ /	09/15/93	0	(817)882-6020	NO. CHANGED FROM C57.132

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NEW	GUIDE FOR THE LOCATION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS							BALLOTTING WORKING GROUP
NO PAR YET	DIELECTRIC TESTS	L. B. WAGENAAR	HOWELLS E.	/ /	/ /	0	(614)223-2259	SUBMIT PAR AS SOON AS POSSIBLE
NEW	GUIDE FOR SOUND LEVEL ABATEMENT AND DETERMINATION IN OIL-FILLED TRANSFORMERS							OUTLINE DRAFTED
NEW	AUDIBLE SOUND & VIBRATION	JEEWAN PURI	McGILL J.	/ /	/ /	0	(704)282-7413	PAR NEEDED TO SUBMIT
NEW	GUIDE FOR APPLICATION, TESTING, INSTALLATION AND OPERATION OF PHASE ANGLE SHIFTING TRANSFORMERS							NEW PROJECT
NEW	WEST COAST	DAVID BRUCKER	TRUMUER E.	/ /	/ /	0	(415)692-4431	PAR TO BE SUBMITTED

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P1248	GUIDE FOR THE COMMISSIONING OF ELECTRICAL SYSTEMS IN HYDROELECTRIC POWER PLANTS						
12/06/90		ED&PG	LOUIS A. TAUBER	503-326-2323	D. A. GILLIES	WEST COAST	503-622-4847
P420	STANDARD FOR THE DESIGN AND QUALIFICATION OF CLASS 1E CONTROL BOARDS, PANELS, AND RACKS USED IN NUCLEAR GENERATING STN					INFORMATION COPY	
11/05/94		NPE	M. S. ZAR	312-269-2222	L. W. PIERCE	INSULATION LIFE	706-291-3166
NEW	MEASUREMENT OF POWER AT LOW POWER FACTOR						
02/15/94		PSIM	EDDY SO	613-993-2660	W. R. HENNING	PERFORMANCE CHARACTERISTICS	414-547-0121
NEW	GUIDE FOR VOLTAGE AND PHASING DETECTORS FOR USE IN HV SYSTEMS IN ELECTRIC POWER UTILITIES						
03/04/94		PSIM	PETER H. REYNOLDS	215-646-9200	G. H. VAILLANCOURT	STANDARDS	514-652-8515
P 4	STANDARD TECHNIQUES FOR HIGH-VOLTAGE TESTING					BALLOTING IN PSIM	
02/02/89		PSIM	TERRY McCOMB	613-990-5826	G. VAILLANCOURT	DIELECTRIC TESTS	514-652-8515
P 62	GUIDE FOR DIAGNOSTIC OF POWER APPARATUS					COMMITTEE BALLOT OF D7	
03/17/94		PSIM	DAVID TRAIN	617-926-4900	R. A. VEITCH	STANDARDS	905-731-9178
P 454	PARTIAL DISCHARGE MEASUREMENTS					WILL ADOPT IEC-270	
03/31/94		PSIM	BARRY WARD	215-646-9200	G. H. VAILLANCOURT	STANDARDS	514-652-8515
P1122	DIGITAL RECORDERS FOR MEASUREMENTS IN HIGH VOLTAGE IMPULSE TESTS					APPROVED BY SB 03/17/94	
12/03/92		PSIM	T. R. McCOMB	613-990-5826	BERTRAND POULIN	DIELECTRIC TESTS	408-957-8326
P1223	POWER SYSTEM DIGITAL TESTING TECHNIQUES						
08/17/89		PSIM	T. R. McCOMB	613-990-5826	R. MINKWITZ, SR.	DIELECTRIC TESTS	617-828-3241
P1304	CURRENT MEASURING SYSTEMS WHICH USE OPTICAL TECHNIQUES						
06/18/92		PSIM	T. R. McCOMB	613-990-5826	J. N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
PC37.107	STANDARD FOR DIGITAL PROTECTIVE RELAY INTERFACES					EVALUATING BALLOT RESULTS	
12/28/85		PSR	STIG L. NILSSON	408-335-9061	G. H. VAILLANCOURT	STANDARDS	514-652-8515

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PC37.108	GUIDE FOR THE PROTECTION OF NETWORK TRANSFORMERS					REAFFIRMED 1994	
09/28/84		PSR	THOMAS E. WIEDMAN	312-394-2593	D. H. MULKEY	UG TR & NETWORK PROTECTORS	415-973-4699
PC37.109	GUIDE FOR THE PROTECTION OF SHUNT REACTORS					REAFFIRMED 1993	
03/28/85		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					REVISION (D21) BALOTTED IN PSR	
05/31/90		PSR	GRAHAM CLOUGH	206-737-6912	J. E. SMITH	INSTRUMENT TRANSFORMERS	919-827-4286
PC37.91	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER TRANSFORMERS						
03/19/92		PSR	MIRIAM SANDERS	919-856-2457	RON BARKER	PERFORMANCE CHARACTERISTICS	804-257-4671
PC37.97	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER SYSTEM BUSES					ANSI APPROVED 05/20/91	
12/10/87		PSR	STEVE CONRAD	505-848-2642	JOHN N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
PC57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS					REAFFIRMED 1992	
12/31/80		PSR	ARUN G. PHADKE	703-231-7029	JOHN N. DAVIS	INSTRUMENT TRANSFORMERS	404-393-9831
C62.62	PERFORMANCE CHARACTERISTICS FOR SURGE PROTECTIVE DEVICES CONNECTED TO LOW VOLTAGE AC POWER CIRCUITS					REPLACE P1038	
03/21/91		SPD	LEWIS DOUGLAS SWEENEY	602-834-9372	MAHESH P. SAMPAT	DIELECTRIC TESTS	704-462-3226
PC62.11	STANDARD FOR METAL-OXIDE SURGE ARRESTERS FOR AC POWER CIRCUITS					NEW PAR	
06/14/94		SPD	R. M. SIMPSON	919-836-7059	W. A. MAGUIRE	DIELECTRIC TESTS	501-377-4273
PC62.2.01	APPLICATION GUIDE FOR SURGE PROTECTION OF ELECTRIC GENERATING PLANTS						
06/01/84		SPD	G. L. GAIBROIS	313-237-9332	D. H. MULKEY	UG TR & NETWORK PROTECTORS	415-973-4699
PC62.22	GUIDE FOR APPLICATION OF METAL OXIDE SURGE ARRESTERS FOR AC SYSTEMS					WILL INCLUDE DIST. TRANSFORMER	
12/02/93		SPD	J. WOODWORTH	716-375-7270	ROBERT DEGENEFF	DIELECTRIC TESTS	518-276-6367
PC62.42	GUIDE FOR THE APPLICATION OF LOW-VOLTAGE SURGE PROTECTIVE DEVICES					REVISED PAR	
07/18/94		SPD	R. DAVIDSON JR.		MAHESH P. SAMPAT	DIELECTRIC TESTS	704-462-3226

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NEW	GUIDE FOR RECOMMENDED ELECTRICAL CLEARANCES AND INSULATION LEVELS IN AIR INSULATED SUBSTATIONS				APPLYING FOR PAR	
02/20/95	SUBS	RICHARD COTTRELL	517-788-0817	G. VAILLANCOURT	STANDARDS	514-652-8515
P 693	RECOMMENDED PRACTICE FOR SEISMIC DESIGN OF SUBSTATIONS				NEW PAR 12/93	
09/18/90	SUBS	RULON FRONK	213-481-3327	DAVID BRUCKER	WEST COAST	415-692-4431
P 979	GUIDE FOR SUBSTATION FIRE PROTECTION				MUST COMPLETE IN 1994	
06/18/92	SUBS	A. J. BOLGER	604-663-2879	D. W. SUNDIN	WEST COAST	414-524-3221
P 980	GUIDE FOR THE CONTAINMENT AND CONTROL OF OIL-SPILLS IN SUBSTATIONS				GUIDE EXTENDED TO 12/94	
09/17/92	SUBS	RICHARD G. COTTRELL	517-788-0817	F. GRYSZKIEWICZ	INSULATING FLUIDS	617-926-4900
P1268	GUIDE FOR INSTALLING TEMPORARY SUBSTATIONS				D1 READY FOR WG COMMENTS	
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				APPROVED BY SB 06/94	
09/17/92	SUBS	PHILIP R. NANNERY	914-577-2591	R. F. DUDLEY	DRY TYPE	416-298-8108
P1291	GUIDE FOR PARTIAL DISCHARGE MEASUREMENTS IN POWER SWITCHGEAR				ANSI APPROVED 08/30/93	
10/22/91	SWGR	E. F. VEVERKA	414-835-1544	G. H. VAILLANCOURT	STANDARDS	514-652-8515
P1325	RECOMMENDED PRACTICE FOR REPORTING FIELD TROUBLE DATA FOR POWER CIRCUIT BREAKERS				INFORMATION COPY REQUESTED	
03/17/92	SWGR	D. M. LARSON	203-634-5739	G. H. VAILLANCOURT	STANDARDS	514-652-8515
PC37.04h	MECHANICAL LOADING REQUIREMENTS OF CIRCUIT BREAKER TERMINALS				SUPPLEMENT APPROVED 1991	
09/28/90	SWGR	GEORGE R. HANKS	615-751-4020	LOREN B. WAGENAAR	BUSHINGS	614-223-2259
PC37.10	GUIDE FOR DIAGNOSTICS AND FAILURE INVESTIGATION OF POWER CIRCUIT BREAKERS				DRAFT IN REVISION IN WG	
05/01/91	SWGR	L. ROLANDO SAAVEDRA	504-363-8765	WALLACE B. BINDER JR.	PERFORMANCE CHARACTERISTICS	216-384-5625
P 656	STANDARD FOR THE MEASUREMENT OF AUDIBLE NOISE FROM OVERHEAD TRANSMISSION LINES				PUBLISHED 12/92	
03/08/91	T&D	JAMES R. STEWART	518-395-5025	ALAN M. TEPLITSKY	AUDIBLE SOUND AND VIBRATION	212-460-4859

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P 957	GUIDE FOR CLEANING INSULATORS				OLD GUIDE EXTENDED TO 12/94	
09/17/92	T&D	WILLIAM L. GIBSON	415-973-3747	L. B. WAGENAAR	BUSHINGS	614-223-2259
P1030.3	GUIDE FOR SPECIFICATION OF HVDC PERFORMANCE - PART III, DYNAMIC PERFORMANCE				DISCUSSING DRAFT IN WG	
12/05/91	T&D	LEWIS VAUGHAN	514-652-8457	WILLIAM N. KENNEDY	HVDC CONV. TR & SMOOTHING REAC	317-286-9387

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LIST OF LIAISON REPRESENTATIVES

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ACRONYM	SOCIETY/COMMITTEE	LIAISON REPRESENTATIVE	PHONE NUMBER
AIM/TSC	AUTOMATIC IDENTIFICATION MANUFACTURERS (TSC COMM.)		
CS	COMPUTER SOCIETY	G. S. ROBINSON	(508) 442-0248
ED&PG	ENERGY DEVELOPMENT AND POWER GENERATION COMMITTEE	C. A. LENNON JR.	(702) 293-8817
ED&PG	ENERGY DEVELOPMENT AND POWER GENERATION	R. E. HOWELL	
EEI	EDISON ELECTRIC INSTITUTE (T&D COMM.)	M. C. MINGOIA	(202) 508-5177
EI	ELECTRICAL INSULATIONS	E. A. BOULTER	(508) 546-3009
EM	ELECTRIC MACHINERY COMMITTEE	B. GUPTA	(416)231-4111
IAS	INDUSTRY APPLICATION SOCIETY	B. C. JOHNSON	(512) 396-5880
IAS/PSE	IAS/POWER SYSTEM ENGINEERING COMMITTEE	R. W. INGHAM	(313) 236-0130
IAS/REP	IAS/RURAL ELECTRIC POWER COMMITTEE	L. E. STETSON	(402) 472-2945
IC	INSULATED CONDUCTORS COMMITTEE	F. E. KIMSEY	(704) 373-6562
IEC/SC36A	IEC INSULATED BUSHINGS SUBCOMMITTEE 36A	BILL SAXON	(704) 382-6534
IEC/TC42	IEC HIGH VOLTAGE TESTING TECHNIQUES COMMITTEE 42	G. H. VAILLANCOURT	(514) 652-8515
IEC/USTAG	INTERNATIONAL ELECTROTECHNICAL COMMISSION	R. S. GIRGIS	(317) 286-9532
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION	J. GAUTHIER	(202) 457-8400
NPE	NUCLEAR POWER ENGINEERING COMMITTEE	J. D. LAMONT	(803) 725-1649
PSC	POWER SYSTEM COMMUNICATIONS COMMITTEE	G. Y. ALLEN	(416) 259-7986
PSE	POWER SYSTEM ENGINEERING COMMITTEE	R. BEDNARIK	(212) 460-2943
PSIM	POWER SYSTEM INSTRUMENTATION MEASUREMENT COMMITTEE	T. R. MC COMB	(613) 990-5826
PSRC	POWER SYSTEM RELAYING COMMITTEE	R. W. HAAS	(513) 231-2584
SCC14	COORD. COM. ON QUANTITIES UNITS AND LETTER SYMBOLS	B. BARROW	(703) 285-5444
SCC4	COORDINATING COMMITTEE ON THERMAL RATING	P. E. ALEXANDER	(219) 458-4576
SPD	SURGE PROTECTIVE DEVICES COMMITTEE	J. B. POSEY	(216) 887-5129
SUBS	SUBSTATIONS COMMITTEE	GARY ENGMANN	(407) 419-3521
SWGR	SWITCHGEAR COMMITTEE	D. F. PEELO	(604) 528-3034
T&D	TRANSMISSION AND DISTRIBUTION COMMITTEE	VACANT	
TC	TRANSFORMERS COMMITTEE	G. H. VAILLANCOURT	(514) 652-8515
TSC	TECHNICAL SYMBOLOGY COMMITTEE (PART OF AIM)		

IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUPS	Birmingham Apr. 1992	Cleveland Oct. 1992	Portland Mar. 1993	St. Pete Nov. 1993	Dallas Mar. 1994	Milwaukee Sep. 1994	Kansas City Apr. 1995		MAX	AVG
Committee Registration: Members and Guests	285	245	213	283	247	275	286		286	262
Spouses	45	40	48	97	43	55	45		97	53
Luncheon	138	120	112		125	149	158		158	134
SC ADMINISTRATIVE	18	18	16	21	20	22	22		22	20
SC AUDIBLE NOISE AND VIBRATION	36	0	26		29	32	18		36	24
SC BUSHINGS	31	22	17	18	39	36	35		39	28
WG Bushing Application Guide	21	27	21	19	22	23			27	22
TF Draw Lead Bushings							18		18	18
WG DC Applications of Bushings	15	12	17	13	17	19	21		21	16
WG Revision C57.19.01	15	13	12	13	22	23	32		32	19
SC DIELECTRIC TESTS	93	104	88	98	79	84	99		104	92
WG Revision of Dielectric Tests	56	58	40	60	53	56	40		60	52
TF on Revision of the Induced Test			25	33	38	30	48		48	35
TF Metal Oxide Surge Arrester Coordination		27	27	35	25	35	31		35	30
WG Rev. Dielectric Tests on Distr. Transf.	29	19	17			16	15		29	16
TF Rev. Distr. Impulse Guide						17	19		19	18
WG Partial Discharge Tests	46	40	66	28	23	27			66	38
SC DISTRIBUTION TRANSFORMERS	28	35	35	52	47	49	48		52	42
WG Overhead Type Distr. Transfs. C57.12.20	23	23	23	35	34	34	30	*	35	29
WG Single-Phase Submersible C57.12.23						15	30	*	30	23
WG Single-Phase Deadfront Padmount C57.12.25	28	28	28	28	30	28	30	*	30	29
WG Bar Coding					22	30	35	*	35	29
WG Loss Evaluation					44	57	40	*	57	47
WG Electronic Data Transmittal					27	36	35	*	36	33
WG Combination of C57.12.22 and .26					27	28	30	*	30	28
WG Step-Voltage and Induction Regs C57.15						25	40	*	40	33
SC DRY-TYPE TRANSFORMERS	42	26	39	38	33	41	45		45	38
WG Test Code C57.91	31	25	31	27	24	28			31	28
WG Dry-Type Reactors	15	9	12	7	7	12	13		15	11
WG Dry-Type Reactors - HVDC Smoothing				8	5	10	6		10	7
WG Dry-Type Thermal Eval. and Flammability	27	16	26	20			20		27	22
WG Dry-Type General Requirements C57.12.01				31	21	21	36		36	27
WG Insulation Req. for Specialty Transf.	20	11	6	11	8	10	10		20	11
WG Cast Coil Loading Guide	25	19	30	17	17	16	24		30	21
WG Hot Spot Diferentials				27	16	31	38		38	28
SC HVDC CONVERTER TRANSFORMERS AND REACTORS	11	13	19	17		15	13		19	15

NOTE: Data maintained for four years only.

* = estimated

IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUPS	Birmingham Apr. 1992	Cleveland Oct. 1992	Portland Mar. 1993	St. Pete Nov. 1993	Dallas Mar. 1994	Milwaukee Sept. 1994	Kansas City Apr. 1995		MAX	AVG
SC INSTRUMENT TRANSFORMERS	23	26	21	28	21	13	13		28	21
WG Test Req Instr Transf > 115 kVA						22	30		30	26
WG Revision of C57.13						11	13		13	12
SC INSULATING FLUIDS	68	61	57	62	50	44	61		68	58
WG Gas Analysis During Factory Tests			57	62		44	61		62	56
WG Gas Analysis Silicone Transformers						44	61		61	53
SC INSULATION LIFE	71	138	83	60	63	45	49		138	73
WG Guides for Loading	74	70	69	73	61				74	69
WG Thermal Eval. of Distr. and Power Transf.	40	32	38	35	11				40	31
WG Thermal Tests	48	32	34	39	30	58	34		58	39
TF Revision of Temperature Test Code						20	22		22	21
TF Thermal Duplicate					27	31			31	29
TF Hottest Spot Temp. Rise					31	36	44		44	37
WG High Temperature Insulation	59	60	55	58	52	48	50		60	55
SC PERFORMANCE CHARACTERISTICS	86	69	60	97	83	93	88		97	82
WG Loss Tolerance and Measurement	26	38	39	32	35	45	36		45	36
TF Loss Measurement Guide						16			16	16
TF Low Power Factor Measurements						33			33	33
WG LTC Performance Requirements	25	37	38	37	37	41			41	36
WG PCS Rev. C57.12.00					20	21	38		38	26
WG PCS Rev. C57.12.90					15	19	15		19	16
WG Revision C57.110			38	32	35	30	39		39	35
WG Semi-Conductor Rectifier Transformers	30	23	31	23	23	22	29		31	26
TF Survey GSU Transf Failures						16	18		18	17
SC STANDARDS					13	12	17		17	14
WG Continuous Revision C57.12.00							15	*	15	15
WG Continuous Revision C57.12.90							15	*	15	15
WG Diagnostic Field Testing of Transf						21	37		37	29
SC UNDERGROUND TRANSFORMERS AND NETWORK PROTECTORS	21	17	17	19	20	19	15		21	18
WG Three-Phase Underground Transfs.	16	14	9	16	16	16	10		16	14
WG Liquid-Filled Sec. Network Transfs.	21	17	16	15	16	15	15		21	16
WG Secondary Network Protectors	16	19	13	20	17	13	13		20	16
WG Dry-Type Network Transfs.	29	15	18	12	10	12	6		29	15
SC WEST COAST	10	14					26		26	17
WG Consolidation of Installation Guides									0	0
WG Phase Shifting Transformers							15		15	15
WG Seismic Guide									0	0
WG Loss Evaluation Guide									0	0
WG Fire Protection									0	0

filename=/TCATTEND.xls

NOTE: Data maintained for four years only.

* = estimated

ATTACHMENT NO. 5

PLEASE RETURN THIS FORM TO:

RONA KERSHNER
IEEE STANDARDS OFFICE
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
FAX (908) 562-1571

The Working Group requests that NESCOM take the following action with regard to PAR # _____.

[ ] The Working Group wishes to withdraw the PAR (Note: This requires confirmation by the Sponsor).

[ ] The Working Group wishes to revise the PAR (Note: This requires submission by Sponsor) as follows:

  [ ] A revised PAR is attached
  [ ] A revised PAR will be provided by _____ (date)

[ ] The Working Group requests that NESCOM extend the lifteime of the PAR to June, 1997 with the expectation that the Working Group will submit the work to REVCOM prior to that date.

[ ] The Working Group requests exemption of the PAR from the four-year rule for the following reason: (Reason provided by the Working Group or Sponsor).

Comments:

Signed: _____
Working Group Chair or Sponsor Chair as appropriate

Phone: _____

Attachment 6

IEEE

IEEE STANDARDS BOARD

PROJECT AUTHORIZATION REQUEST (PAR) FORM

1. Sponsor Date of Request: _____	2. Assigned Project Number: _____ *Confer with staff*	3. PAR Approval Date: _____ *Leave blank*

4. PROJECT TITLE, COPYRIGHT AGREEMENT, AND WORKING GROUP FOR THIS PROJECT

I will write/revise a Standards Publication with the following TITLE *(Check only one, Spell out all acronyms)*

- ❑ STANDARD FOR (Document stressing the verb "SHALL.")
- ❑ RECOMMENDED PRACTICE FOR (Document stressing the verb "SHOULD.")
- ❑ GUIDE FOR (Document stressing the verb "MAY.")

TITLE: _____

_____

_____

I hereby acknowledge my appointment as Official Reporter/W.G. Chair to the _____
(Name of Working Group)

In consideration of my appointment and the publication of the Standards Publication identifying me, at my option, as an Official Reporter, I agree to avoid knowingly incorporating in the Standards Publication any copyrighted or proprietary material of another without such other's consent and acknowledge that the Standards Publication shall constitute a "work made for hire" as defined by the Copyright Act, and, that as to any work not so defined, I agree to and do hereby transfer any right or interest I may have in the copyright to said Standards Publication to IEEE.

NAME: _____ DATE: _____
(Signature of Official Reporter/W.G. Chair)

Type or print name of Working Group Chair: _____

Title: _____ IEEE Member No: _____

Company: _____ Telephone: _____

Address: _____ Fax: _____

City: _____ State: _____ ZIP: _____ E-mail: _____

5. Describe This Project: *(Choose ONE from each group below.)*

(a) MODIFICATION of an existing PAR. ❑ YES ❑ NO
(Indicate PAR number/approval date.) _____

(b)
- ❑ NEW STANDARD
- ❑ REVISION of an existing standard. (Indicate standard number and year.) _____
- ❑ SUPPLEMENT to an existing standard. (Indicate standard number and year.) _____

(c)
- ❑ FULL USE *(5-year life cycle)*
- ❑ TRIAL USE (2-year life cycle)

6. Scope of Proposed Project: *(What is being done, including the technical boundaries of the project.)*

REV. 1/95

Attachment 6

PROJECT AUTHORIZATION REQUEST (PAR)

(CONTINUED)

7. Purpose of Proposed Project: *(Why is it being done, including the intended user(s) and benefits to the user(s).)*

8. Sponsor: *(Give full name; spell out all acronyms.)*

Society/Committee: _____

9

(a) Are you aware of any patents, copyrights, or trademarks relevant to this project?
❑ YES *(Attach an explanation.)* ❑ NO ❑ DO NOT KNOW

(b) Are you aware of any other standards or projects with a similar scope?
❑ YES *(Attach an explanation.)* ❑ NO ❑ DO NOT KNOW

(c) Is this standard intended to form the basis of an international standard?
❑ YES *(Attach an explanation.)* ❑ NO ❑ DO NOT KNOW

(d) Is this project intended to focus on health, safety, or environmental issues?
❑ YES *(Attach an explanation.)* ❑ NO ❑ DO NOT KNOW

10. Proposed Coordination/Recommended Method of Coordination

(Coordination is accomplished by the following: Circulation of Drafts or Liaison Membership or Common Membership.)

(a) **Mandatory Coordination:**
SCC 10 (IEEE Dictionary) and IEEE Staff Editorial Review — Circulation of Drafts
SCC 14 (Quantities, Units, and Letter Symbols) — Circulation of Drafts

(b) **IEEE Coordination Requested by Sponsor:** *(Use additional page if necessary.)*
If you believe your project will require a Registration Authority, please list IEEE RAC *(refer to Working Guide.)*
(If no coordination is required, please attach an explanation.)

COORDINATION	METHOD OF COORDINATION		
	❑ circ./drafts	❑ liaison memb.	❑ common memb.
	❑ circ./drafts	❑ liaison memb.	❑ common memb.
	❑ circ./drafts	❑ liaison memb.	❑ common memb.
	❑ circ./drafts	❑ liaison memb.	❑ common memb.
	❑ circ./drafts	❑ liaison memb.	❑ common memb.

(c) **Additional Coordination Requested by Others:** *(Leave blank — To be completed by the Standards Staff.)*

11. Submitted By: *(This must be the Sponsor Chair or the Sponsor's Liaison Representative to the IEEE Standards Board.)*

Signature of Submitter: _____ Date: _____ IEEE Member No. _____

Name: _____ Title: _____

Company: _____ Telephone: _____

Address: _____ Fax: _____

City: _____ State: _____ ZIP: _____ E-mail: _____

DO NOT WRITE BELOW THIS LINE

Signature IEEE Officer: _____ Date _____

Title: _____