IEEE/PES Transformers Committee

Meeting Minutes
April 17, 1996

IEEE/PES TRANSFORMERS COMMITTEE MEETING

APRIL 17, 1996

SAN FRANCISCO, CALIFORNIA

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ATTENDANCE SUMMARY

MEMBERS PRESENT

D. J. Allan
J. Arteaga
J. H. Bishop
D. J. Cash
J. C. Crouse
D. J. Fallon
R. D. Graham
M. E. Haas
J. H. Harlow
E. Howells
C. W. Johnson, Jr.
A. D. Kline
H. F. Light
D. L. Lowe
C. P. McShane
W. E. Morehart
C. G. Niemann
J. M. Patton
D. Perco
B. Poulin
P. G. Risse
V.S.N. Sankar
K. R. Skinger
R. J. Stahara
V. Thenappan
G. H. Vaillancourt
F. N. Wetter

R. A. Allustiarti
J. Aubin
W. E. Boettger
D. Chu
T. Dismantis
F. A. Franchek
R. L. Grubb
E. Hanique
W. R. Henning
J. Hunt
A. J. Jonnatti
J. G. Lackey
S. P. Lindgren
J. W. Matthews
C. K. Miller
D. H. Mulkey
P. E. Orehek
P. A. Payne
M. D. Perkins
J. Purl
C. A. Robbins
W. E. Saxon
J. E. Smith
W. W. Stein
T. P. Traub
R. A. Veitch
R. J. Whearty

M. S. Altman
D. A. Barnard
J. D. Borst
J. L. Corkran
R. F. Dudley
D. L. Galloway
R. L. Grunert
N. W. Hansen
K. R. Highton
P. Iijima
J. J. Kelly
M. Y. Lau
M. C. Loveless
A. D. McCain
M. I. Mitelman
C. R. Murray
K. Papp
L. C. Pearson
L. W. Pierce
C. T. Raymond
A. L. Robinson
D. N. Sharma
J. E. Smith
R. W. Stoner
E. P. Trummer
L. B. Wagenaar
A. L. Wilks

G. Andersen
W. B. Binder, Jr.
M. Cambre, Jr.
D. W. Crofts
F. E. Elliott
A. A. Ghafourian
F. J. Gryszkiewicz
K. S. Hanus
P. J. Hopkinson
V. C. Jhonsa
S. P. Kennedy
T. D. Lewis
L. A. Lowdermilk
J. W. McGill
H. R. Moore
W. H. Mutschler, Jr.
B. K. Patel
T. J. Pekarek
R. L. Plaster
P. Riffon
J. R. Rossetti
H. J. Sim
S. D. Smith
J. C. Sullivan
S. C. Tuli
B. H. Ward

MEMBERS ABSENT

E. J. Adolphson
S. Bennon
D. S. Brucker
J. N. Davis
J. A. Ebert
S. L. Foster
G. H. Hall
J. W. Howard
E. Kallaur
J. P. Lazar
D. S. Lyon
K. T. Massouda
S. P. Mehta
E. T. Norton
V. Q. Pham
R. B. Robertson
R. W. Scheu
L. R. Stensland
R. C. Thomas
C. W. Williams, Jr.
J. C. Arnold, Jr.
E. A. Bertolini
T. F. Clark
R. C. Degeneff
K. D. Edwards
J. M. Frank
F. W. Heinrichs
G. W. Iliff
C. P. Kappeler
F. A. Lewis
J. Ma
C. J. McMillen
M. C. Mingoia
G. A. Paiva
D. W. Platts
G. W. Rowe
V. Shenoy
D. W. Sundin
J. A. Thompson
W. G. Wimmer
R. A. Bancroft
J. V. Bonucchi
O. R. Compton
L. E. Dix
P. T. Feghali
D. A. Gillies
P. J. Hoefler
D. C. Johnson
W. N. Kennedy
L. W. Long
W. A. Maguire
N. P. McQuin
R. E. Minkwitz, Sr.
W. F. Patterson, Jr.
V. Raff
M. P. Sampat
J. W. Smith
L. A. Tauber
R. W. Thompson
W. E. Wrenn
R. L. Barker
C. V. Brown
V. Dahinden
J. K. Easley
J. A. Fleeman
R. S. Girgis
C. C. Honey
R. D. Jordan
E. Koenig
R. I. Lowe
R. P. Marek
R. McTaggart
R. J. Musil
H. A. Pearce
S.M.A. Rizvi
L. J. Savio
L. R. Smith
J. B. Templeton
D. W. Whitley

GUESTS PRESENT

P. Ahrens
S. Antosz
D. E. Ballard
O. M. Bello
C. P. CARUSO
J. M. Christini
D. A. Duckett
B. I. Forsyth
H. GIANAKOUROS
E.G. HAGER, JR
T. L. Holdway
C. J. KALRA
D. N. LAIRD
J. P. Melanson
A. F. O'Neill
G. Payerle
T. A. Provost
G. J. Reitter
R. SAWYER
D. M. Shah
S. L. Snyder
A. Traut
R. WILLIAMS
R. C. Wicks
P. ZHAO
R. K. Ahuja
J. Antweiler
M. F. Barnes
T. E. Blackburn III
A. Cancino
C. A. Colopy
K. P. Ellis
R. Fox
G. Gagne
J. W. Harley
A. F. Hueston
L. KOGA
G. N. MILLER
S. E. Michael
D. E. Orten
D. Payne
R. I. Psyck
J. C. Riboud
S. SEARCY
C. Simmons
R. G. Subramanian
J. Vaschak
J. WOODWARD
D. L. Wood
D. de la Cruz
D. C. Anderegg
M. P. Austin
P. Barry
A. Bolliger
W. J. Carter
G. DENNY
R. H. Fausch
C. G. GARNER
R. Garcia
R. R. Hayes
T. Huff
G. K. KRAUSE
D. Marlow
J. R. Moffat
B. PENNY
G. Pregent
D. R. Purohit
D. J. Rolling
W. SMITH
R. W. Simpson, Jr.
G. TSIER
B. E. WARDELL
R. D. Wakeam
D. J. Woodcock
G. W. Anderson
J. BERUBE
A. Bartek
J. L. Brown
A. C. Chan
D. Dohnal
G. E. Forrest
S. GHOSH
J. L. Goudie
G. E. Henry III
L. E. Juhlin
C. E. Kelly
W. E. McCain
R. C. Nordman
J. L. PROGAR
G. Preininger
M. Rajadhyaksha
P. Russman
W. W. Schwartz
P. Singh
J. TUOHY
J. D. WATSON
E. W. Werner
F. N. Young

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CLAUSE PAGE

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IEEE PES TRANSFORMERS COMMITTEE MEETING
WEDNESDAY, April 17, 1996

Chair: W. B. Binder **Vice Chair: J. W. Matthews**

Secretary: B. K. Patel

1.0 Chairman's Report - W. B. Binder

W. B. Binder called the meeting to order at 8:00 am. Mr. Binder opened the meeting by complimenting Dan de la Cruz for the excellent meeting arrangements. The Committee thanked Dan and the Host Committee with a round of applause.

Dan de la Cruz, Meeting Host, reported on the attendance (see Attachment 4).

Edgar Trummer provided an update on the Graz meeting to be held in July 1997. The details can be found in the Administrative Subcommittee Meeting minutes in Section 4.0.

Mr. Binder highlighted the discussions held during the Administrative Subcommittee on April 15, 1996. See the Administrative Subcommittee Meeting Minutes in Section 4.0 for the details.

1.1 Report on the Technical Council Meeting, January 23, 1996 in Baltimore

The three major issues facing PES Technical Council this meeting were as follows:

1.1.1 Open Standards Preparation and Balloting Process for PES

This new procedure represents one of seven Technical Council goals for 1996. Because of the timing of our Transformers Committee meeting in April, the Committee will be the first to establish a schedule of open ballots for 1996. This will involve requesting an invitation to ballot for standards which are expected to be balloted in the next twelve months. This will require each WG or SC Chair who plans to ballot during this time to submit the roster of WG and SC members who should be sent an invitation. The Standards Coordinator will forward these rosters to IEEE Standards Department for initiation of the invitation to ballot. This process will repeat annually.

The other aspect of this policy is the invitation to participate. This will affect the way working groups are established. A detailed implementation plan has not been finalized. However, the goal is every standards project which starts after the 1996 Winter Power Meeting will incorporate the invitation to participate as well as the invitation to ballot.

1.1.2 Revised PES Paper Presentation Policy

This represents one step of the Technical Council goal for 1996 to establish a new presentation model by the Winter Meeting in 1997. It eliminates the requirement for "presentation before publication" and allows the technical sessions to be structured by the Technical Committees in the best way possible on subjects of current interest. The most direct impact on Transformer Committee members will be the possible continuous flow of papers for review.

1.1.3 1997 Summer Power Meeting in Berlin

A special meeting of Technical Council was held Sunday, January 21, 1996 to review PES plans for the Berlin Summer Meeting. It appears that a number of Technical Committees will be participating in Berlin. The emphasis will be on discussions with IEC counterparts from Europe to help in the harmonization process.

1.2 Transformers Committee Report to Technical Council

I reported the following to Technical Council on behalf of the Committee:

1.2.1 Committee Meeting Activities

We may repeat the panel session on Transnationalization of Standards that was presented to the membership in Boston. Panelists included Anne O'Neill and five Committee members who have been involved in IEC activities.

Since this report, I have received confirmation ,from a number of panelists that they will participate. This panel will now be scheduled.

1.2.2 Future meetings

Fall '96	10/27/96	Burlington, VT
Summer '97	7/15/97	Graz, Austria
Fall '97	11/16/97	St. Louis, MO
Spring '98	4/26/98	Little Rock, AR

Since this was reported, the date for Little Rock has been established and we continue to seek a host for the Fall of 1998.

1.2.3 Organization Changes

John Matthews is Committee Vice Chairman and Paper Coordinator. Bipin K. Patel is the new Committee Secretary, H. J. Sim replaces Patel as Performance Characteristic Subcommittee Chairman.

Ramsis Girgis resigned as TA to USNC of IEC. Phil Hopkinson will replace. Phil is constituting the TAG as all Subcommittee. Chairs within the Transformers Committee plus members the former TAG.

1.3 Transformer Committee Goals

The Committee obligated itself to goals for 1996 and I will report progress toward their completion.

1.3.1 Transnationalization of Standards

It is our goal to continue research on related standards in IEEE and IEC and identify points of disparity between those standards. To date, Anne O'Neill has undertaken most of this work. Additional work needs to be done.

Secondly, meetings of the TC14 TAG will be encouraged in conjunction with the Transformers Committee meetings. Phil Hopkinson has arranged a meeting of the TAG for this meeting in San Francisco.

1.3.2 Support the 1997 Summer Power Meeting

We should move ahead with plans for our panel session and welcome the input of all members. We want to encourage all members and guests to join us in Graz and to arrange their stay to include a side trip to the Summer Power Meeting in Berlin the week following our meeting.

1.3.3 Promote Committee activities in addition to standards

We have proposed pursuit of technical and educational activities beyond the traditional emphasis of the Committee. This is another goal that needs some work.

2.0 Approval of Minutes of November 8, 1995 - W. B. Binder

The minutes of the Boston meeting were approved as written.

3.0 Vice Chair's Report - J. W. Matthews

3.1 PES Technical Council Committees

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 1996 Winter Power Meeting in Baltimore, MD during January 22-25, 1996.

3.1.1 Publications Committee

3.1.1.1 1996 Winter Power Meeting Presentations

A total of 340 papers were to be presented. 36 of these papers were to be presented in three poster sessions. The Transformers Committee sponsored two technical paper sessions in which eight papers were presented. Paulette Payne chaired the first presentation session and I chaired the second session.

3.1.1.2 New Publication Policy

The new policy to publish technical papers without prior presentation will take place after the 1996 T & D Conference. This Committee addressed the paper review, presentation, and publication processes to be followed when the new policy takes effect.

Papers for review will be sent to the paper coordinators on a monthly basis. Each committee can then decide how often to perform paper reviews, i.e. monthly or quarterly. Other details which must be addressed are: limit for resubmittals, process for review of resubmittals, and the deadline for submittals to be considered for presentation at a particular meeting.

An author can request that a paper be presented at a particular meeting. In most cases, a poster session will be made available. The technical committee may also request the author to present the paper at a panel session, symposium, or technical committee meeting. The author is not required to present the paper anytime. Preprints of papers for publication only will be made available at whatever meeting follows acceptance of the paper.

The present six page limit per paper will still be in effect. Authors are charged $110 per page for publication of papers exceeding the six page limit. The 1996 Budget is 5,000 pages. With discussions and closure, the average paper size is 6.7 pages. About 400 papers per meeting can be published. The Publications Committee Chair will set page allocations for each technical committee.

3.1.1.3 Transformers Committee Special Publication

I submitted a request to have the Survey of Generator Step-Up Transformer Failures published as a PES Special Publication. It was determined that the proper procedure would be to have the Technical Committee Chair request approval of the Technical Council Chair.

This procedure was followed after the Winter Power Meeting. The Technical Council Chair, Mr. Don Volzka, is presently reviewing the appropriateness of PES performing this type of survey and reviewing legal concerns with this particular survey.

3.1.2 Organization and Procedures Committee

3.1.2.1 Open Standards Preparation and Balloting Process

The Committee reviewed and edited the proposed process. A motion to recommend immediate adoption by the Technical Council was drafted, discussed, and approved. Details of this process and the proposed implementation plan are attached. Procedures for Working Group Chairs have been presented in the Chair's and Standards Coordinator's reports on Technical Council activities.

3.1.2.2 New Stationary Battery Technical Committee Scope and Organization

The Committee reviewed the formation of this new committee which will address the design, manufacturing, implementation, operation, and maintenance of stationary batteries and agreed to recommend approval by the Technical Council.

3.1.2.3 Revision of the Technical Council Organization and Procedures Manual

The Committee is undertaking the revision of the Technical Council O & P Manual due to the major changes in balloting procedures.

3.1.2.4 Technical Committee Scopes and Operating Manuals

Editorial revisions to the scopes of the Electric Machinery and Transformers Committees were reviewed, discussed, and approved. The revised Transformers Committee O & P Manual was approved in this process. New manuals are presented to the Administrative Subcommittee members here and manuals have been mailed to all the other voting members.

3.1.3 Technical Sessions Improvement Committee

This Committee meeting was devoted entirely to discussion of logistics for implementing the policy change that technical papers may be published without prior presentation after the 1996
T & D Conference.

Following are notes from this discussion:

The requirement that a Transactions Paper be presented at a meeting of the PES has been rescinded.

The author may choose to not present the paper at any meeting.

The usual format for presentations will be the poster session.

Technical Committees may decide to organize panel sessions or other educational programs on particular subjects. Authors of accepted papers may be invited to participate in these activities.

Accepted papers may be presented at the General Power Meetings, T & D Conferences, or during Technical Committee meetings.

The traditional technical paper presentation sessions will end with the 1996 T & D Conference.

There will be no more "Call for Papers". Papers may be submitted at any time.

A cut-off date must be established for papers to be submitted for presentation at a particular meeting.

Technical Committees may build a backlog of accepted papers from which to draw for invited panel sessions or directed educational programs.

All accepted papers will be preprinted (including those not to be presented) and made available to the membership.

Solicitation will be made for discussion to all papers. Closure will continue to be required before the paper is published.

Seven documents were distributed for revisions by April 30, 1996. Wally Binder and I are working on revision of the Publications Guide. Extended meeting times were established for review of these documents at the 1996 Summer Power Meeting.

An article describing this policy and process revision has been published in the April 1996 Power Engineering Review.

3.2 Technical Paper Reviews

3.2.1 1996 IEEE/PES Summer Power Meeting Papers

We received ten papers for review. Requests for reviews were sent out on February 15, 1996 for responses by March 7, 1996. We accepted five of the ten papers for presentation at the Summer Power Meeting. One Technical Paper Presentation Session has been scheduled. I will be the Session Chair for these presentations.

3.2.2 1996 IEEE/PES T & D Conference Papers

We received only five papers for review. Requests for reviews were sent out on March 23, 1996 for responses by April 5, 1996. One of the papers was withdrawn by the author. We accepted two of the remaining four papers for presentation at the T & D Conference. The schedule for this Conference has not been established.

I need to request a volunteer to Chair the presentation session because I will not be able to attend this Conference to be held in Los Angeles, CA in September.

3.3 Future Meeting Schedule

October 27-30, 1996	Vermont	Dave Woodcock
July 15-18, 1997	Graz, Austria	Edgar Trummer
November 16-19, 1997	St. Louis, MO	Jerry Bishop
April 26-29, 1998	Little Rock, AR	Ed Smith

This schedule extends for two more years. Commitments from hosts are needed for meetings Fall, 1998 and beyond. The planning should be starting very soon. Please solicit future hosts and contact me with any possibilities.

Respectfully submitted,

John W. Matthews, Vice Chair

- ATTACHMENT 3.1.2.1-1 -

Open Standards Preparation and Balloting Process for PES

1. Introduction

This procedure defines the process used for assuring that all materially interested and affected parties have an opportunity to participate in the development, reaffirmation, withdrawal, and balloting of PES sponsored standards. The procedure supplements guidance provided in the IEEE Standards Operation Manual and the Standards Board Bylaws and is to be used by all standards preparing bodies within the PES.

The procedure is divided into two parts:

Invitation to Participate: Defines the process for advertising the formation of PES sponsored standards projects and extends an invitation for materially affected persons to participate in the development of the standards.

Invitation to Ballot: Defines the process for advertising upcoming ballots of PES sponsored standards projects and extends an invitation for materially affected IEEE members to participate in the balloting of the standards.

Examples of the Invitation to Participate and the Invitation to Ballot forms are included in the Appendix.

2. Invitation to Participate

2.1 Advertising

To assure that all materially interested parties are invited to participate in a PES standards project, an Invitation to Participate will be extended in the following publications:

The Standards Bearer

The Standards Bearer has a circulation to IEEE members from all societies. Each Standards Bearer lists recently approved Project Authorization Requests (PARs) by title only. Periodically, the name of a staff member in the IEEE Standards Department to contact for further information will be published. If any responders indicate an interest in document development the staff member, Working Group, or Task Force Chairman will mail them an Invitation to Participate form.

ANSI Standards Action

The ANSI Standards Action publication has wide distribution among parties interested in standards development. Upon PAR approval, the IEEE Standards Department submits a PINS (Project Initiation Notification System) form notifying ANSI of the initiation of an

IEEE Standards Project. This published notification includes an IEEE staff contact for further information. If any responders indicate an interest in document development the staff member, Working Group or Task Force Chairman will mail them an Invitation to Participate form.

The IEEE Standards Department staff is responsible for submitting the information for publication in both the Standards Bearer and the ANSI Standards Action.

2.2 Invitation to Participate Form

The Working Group or Task Force chairman is responsible for sending an Invitation to Participate form (modeled after the attached form) both to interested parties who contact him directly and to the listing of interested parties supplied by the IEEE Standards Department staff. A list of upcoming Working Group and Task Force meetings shall be included. Any other pertinent information regarding status of the document, qualifications of Working Group and Task Force members, etc., shall also be sent.

The returned Invitation to Participate forms shall be evaluated by the Working Group or Task Force chairman for inclusion of the responder in its membership. In general, all who respond and who are technically qualified should be invited to participate unless specific reasons exist for excluding them. (Example: Adding them would provide one organization or company an undue influence on the content of the document.)

Paragraph 7.4.1 of this manual provides additional guidance regarding the qualifications for Working Group members.

3. Establishment of Balloting Body

3.1 PES Balloting Pool

Periodically, an invitation to become a part of the PES Balloting Pool will be published in the Standards Bearer, which has a circulation to IEEE members from all technical societies. The purpose of this invitation is to identify those members who have a general interest in standards documents being balloted by the Technical Committees within PES. In addition, a PES Balloting Pool form, similar to the one attached, can be made available at PES meetings. Responses are to be sent to the IEEE Standards Department staff member listed, who will compile the results and send them to the respective Technical Committee Standards Coordinator.

3.2 Formation of Sponsor Balloting Body

From 3 to 6 months in advance of sponsor balloting, the committee's Standards Coordinator (or the designated representative) will send an Invitation to Ballot form, similar to the one attached, to those who have expressed general interest in that

committee's standards projects. Alternatively, the IEEE Standards Department will, upon request, mail the Invitation to Ballot forms.

The Invitation to Ballot form may also be used by the Committee's Standards Coordinator (or the designated representative) to identify persons within PES, including persons within the sponsoring technical committee, who wish to ballot the document. (This can be considered as a supplement to the coordination requests identified on the PAR.)

The sponsor's balloting group will consist of the following:

- The sponsoring Working Group or Task Force members who both wish to vote and are IEEE members.

- Those IEEE members who submit a completed Invitation to Ballot form and are who are judged by the Standards Coordinator (or the designated representative) as technically qualified to ballot on the document.

- Members of the sponsoring Technical Committee and the sponsoring Subcommittee wishing to ballot the document.

Note that the balloting body must be balanced as defined in the IEEE Standards Operations Manual, Section 5.4.1. The conductor of the ballot (which in most cases will be the sponsoring Committee or its Standards Coordinator) retains the responsibility for the balance. Any actions necessary, including refusal of membership, to establish or restore balance must be done prior to the ballot. The sponsoring technical committee Standards Coordinator can seek the advice of the IEEE Standards Department staff in achieving balance.

Also note that the sponsor retains a degree of control over the balloting group, as stated in the IEEE Standards Operations Manual, Section 5.4.

4. Balloting Procedures

4.1 One Ballot

Some committees have used a tiered balloting process to obtain consensus. A Working Group ballot was conducted, followed by a Subcommittee ballot, and then the sponsoring Committee ballot. To expedite the balloting process only one ballot shall be conducted. The balloting body for this one ballot shall be as described in Paragraph 3.2. Follow-up ballots (to the same balloting body) will be necessary when substantive technical changes are made as a result of negatives or by comments received.

4.2 Balloting Procedure

The balloting shall be conducted using the procedure published in the latest revision of the IEEE Standards Operation Manual, Section 5.4.3, which can be obtained by contacting the IEEE Standards Department staff, or by downloading it from the SPA System home page on the World Wide Web.

Invitation to Participate

(sponsor)
of the Power Engineering Society
invites you to participate in the development of

P### **(title)**

Return Deadline: (date)
[no forms will be accepted after the deadline]

SCOPE:

PURPOSE:

Brief statement of why you are interested in this Standards Project:

Please print clearly, or type: New information/new applicant? Yes or No

[Mr./Mrs./Ms./Dr./Capt./Maj./Other_____]

Name: Given: _____ MI:____ Family:_____

Company:_____ Phone:_____

Mailing Address: _____ FAX:_____

_____ EMail:_____

IEEE Membership Number:

(Note: Membership in IEEE is desired, but not required, to participate in standards project development)

Participant's Responsibility

If you elect to become part of the Working Group or Task Force responsible for this document, your active participation is expected. Failure to participate will result in suspension of membership.

Signature:_____ Date _____

If you want confirmation that this form has been received by the IEEE Standards Office, please enclose a *stamped, pre-addressed post card* along with this form.

Please return by (date) to: (Working Group or Task Force Chairman)

The Power Engineering Society

Balloting Pool

I would like to receive invitations to ballot Power Engineering standards when the committees I've marked below form balloting groups.

Electric Machinery (EM)
Energy Dev. and Power Generation (EDPG)
Insulated Conductors (IC)
Nuclear Power Engineering (NP)
Power System Communications (PSC)
Power System Engineering (PSE)
Power System Instrumentation and Measurements (PSIM)
Power Sys. Relaying (PSR)
Substations (SUB)
Surge Protective Devices (SPD)
Switchgear (SWG)
Transformers (TRF)
Transmission & Dist. (TD)

Please print clearly or type:

[Mr./Mrs./Ms./Dr./Capt./Maj./Other_____]

Name: First:_____ MI:___ Last:_____.

Company:_____ Phone:_____

Mailing Address: _____ FAX:_____

_____

_____ EMail:_____

IEEE Membership Number (membership required):

Are you a member of the Power Engineering Society (not required)?:

Please send me an IEEE membership application so that I may vote.

Signature:_____ Date:_____

Return this form to:

Rosemary Tennis, IEEE Standard Office, P.O. Box 1331, Piscataway NJ 08855-1331
Fax: 908 562 1571; email: r.tennis@ieee.org

February 14, 1996

Invitation to Ballot

(sponsor)
of the Power Engineering Society
invites you to ballot on

P### **(title)**

Return Deadline: (date)
[no forms will be accepted after the deadline]

SCOPE:

PURPOSE:

Your Category of Interest in this Standards Ballot (i.e. do you, or did you ever, use or produce the items in this standard?):

User Producer General Interest

(Note: Please choose only ONE of the above. If you have any combination of Interests, check the General Interest Category)

Brief statement of why you are interested in balloting this Standard:

Please print clearly, or type: New information/new applicant? Yes or No

[Mr./Mrs./Ms./Dr./Capt./Maj./Other_____]

Name: Given: _____ MI:____ Family:_____

Company:_____ Phone:_____

Mailing Address: _____ FAX:_____

_____

_____ EMail:_____

IEEE Membership Number: Check here if not a member of IEEE

Please send me an IEEE Membership Application so that I may vote.

Balloter's Responsibility

If you become part of the balloting body, you will have 30 days to review and respond to the draft. In order for the Sponsor Ballot to be valid, *at least 75% of the ballots sent must be returned.*
For this reason: **VOTERS HAVE AN OBLIGATION TO RESPOND**. Only IEEE Members are eligible to vote. Non-members will comment as Parties of Interest. For Membership Application, Call Rosemary Tennis at (908) 562-3811.

Signature:_____ Date _____

If you want confirmation that this form has been received by the IEEE Standards Office, please enclose a *stamped, pre-addressed post card* along with this form.

Please return by (date) to:

Rosemary Tennis
IEEE Standards Office,
PO. Box 1331,445 Hoes Lane, Piscataway, NJ 08855-1331
V: 908 562 3811, F: 908/562-1571, E: r.tennis@ieee.org

- ATTACHMENT 3.1.2.1-2 -

IEEE PES Open Standards Preparation and Balloting Process
Proposed Implementation Plan

As discussed at the 1996 Winter PES Meeting, the implementation of our new Open Standards Preparation and Balloting Process is dependent upon IEEE Standards Department Staff resources. Listed below is the plan that has been suggested by the staff. Please forward any comments or concerns about the plan to Harry Jones no later than **March 15, 1996**. If no comments or concerns are received by that date, the plan is assumed to be approved for implementation.

Here is a proposed implementation plan for the PES balloting process. If any Committee has concerns about meeting the plan, we can discuss and modify to accommodate their schedule. During the implementation we will continue to conduct ballots using the main committee membership and additional membership provided by the sponsor. The invitations for each committee can be conducted on an annual basis beginning with the schedule outlined below. The invitation to ballot for low activity committees (PSIM, Electric Machinery, Power System Comm., and Power System Eng.) will be conducted on a standard by standard basis on request.

April 1996 - An announcement stating that PES would like to expand it's balloting pool will be printed in the April issue of the IEEE Standards Bearer. A small cut-out balloting pool form will be included in the Standards Bearer.

May 1996- Transformers Committee to request invitation to ballot for standards that are expected to be balloted within the next 12 months. The Transformers Committee meets in April. The Subcommittee Chairs should provide reports on the standards projects within the SC and whether any projects are expected to be ready for ballot in the next 12 months. Any SC or WG rosters of members that should be sent an invitation to ballot for those projects should also be provided by the WG or SC Chair. The Standards Coordinator will forward to the IEEE Standards Dept. for initiation of the invitation to ballot.

June 1996 - Insulated Conductors Committee to request invitation to ballot for standards that are expected to be balloted within the next six months. The Committee meets in April. Same process as above.

July 1996 - Switchgear Committee to request invitation to ballot for standards that are expected to be balloted within the next six months. The Switchgear Committee meets in May. Same process as above.

August 1996 - Substations Committee to request invitation to ballot for standards that are expected to be balloted within the next six months. The Committee meets in May. Same process as above.

Sept. 1996 - T&D Committee to request invitation to ballot for standards that are expected to be balloted within the next six months. The Committee meets in July (PES Summer meeting). Same process as above.

Oct. 1996 - Surge Protective Devices Committee to request invitation to ballot for standards that are expected to be balloted within the next six months. The Committee meets in Sept. Same process as above.

Nov. 1996 - Power System Relaying Committee to request invitation to ballot for standards that are expected to be balloted within the next six months. The Committee meets in Sept. Same process as above.

Dec. 1996 - Nuclear Power Eng. Committee to request invitation to ballot for standards that are expected to be balloted within the next six months. The Committee meets in November. Same process as above.

Feb. 1997 - ED&PG Committee to request invitation to ballot for standards that are expected to be balloted within the next six months. The Committee meets in January (PES Winter meeting). Same process as above.

4.0 Administrative Subcommittee - W. B. Binder

ADMINISTRATIVE SUBCOMMITTEE MEETING MINUTES
APRIL 15, 1996
SAN FRANCISCO, CALIFORNIA

4.1 Introduction of Members and Guests

Chair Binder called the meeting to order at 7:20 p.m. in the Cornell Room of the ANA Hotel.

The following members of the Subcommittee were present:

W. B. Binder, Jr.
J. D. Borst
F. E. Elliott
F. J. Gryszkiewicz
C. Johnson (rep. W. F. Patterson)
E. G. Hager
K. S. Hanus
J. H. Harlow
J. W. Matthews
P. E. Orehek
B. K. Patel
L. W. Pierce
J. Puri
H. J. Sim
J. E. Smith
T. P. Traub
G. H. Vaillancourt
L. B. Wagenaar

The following guests were present:

Dan de la Cruz - San Francisco Meeting Host
Anne O'Neill - PES International Program Engineer, IEEE Standards Office
Tom Prevost - Burlington Meeting Host
Rochelle Stern - Project Editor, IEEE Standards Office
E. Trummer - Graz Meeting Host

4.2 Approval of the Boston Meeting Minutes

The minutes of the previous Administrative Subcommittee meeting in Boston were approved as published.

4.3 Additions to and/or Approval of the Agenda

The published agenda was modified as follows:

> Awards Subcommittee and Status of ANSI C57 Committee items were moved up as items 5 and 6, respectively in the item order.

Rochelle Stern will present Role of IEEE Standards Staff in L. Napoli's place.

4.4 Committee Finances and Meeting Arrangements

4.4.1 Finances

No report was made at the meeting.

Revised Para 4.4.2, June 7, 1996

4.4.2 Meeting Arrangements

The San Francisco meeting host, Dan de la Cruz, reported the following preliminary registration statistics:

Members and guests		301
Companions		64
Companions Tours -	Monday	42
	Tuesday	54
Tuesday Luncheon		167
Tuesday Outing		221

Tom Prevost, host for the next Committee meeting in Burlington, announced that the meetings will be held at the Sheraton Burlington Conference Center hotel on October 27-30, 1996. The room rates will be $ 90 per night single or double plus tax. All major airlines fly into Burlington.

E. Trummer, host for the Graz meeting reviewed preliminary plans for the meeting. Two hotels, the Das Weitzer and the Grand Hotel, appeared to be having adequate facilities for the meeting. The room rates are expected to be $ 140 to 150 per night for singles with applicable taxes included. Double rooms may cost up to $30 extra. He is investigating better air fares with the airlines. Having a head count of the participants will be of a great help in negotiating better air fares. This will be discussed at the main committee meeting. A sign-out sheet will be made available at the registration desk to obtain the interest level. The Graz meeting will be held during July 15-18.

The Chair discussed the offer made by Reinhausen to provide hotel accommodations, meals, and ground transportation from Regensburg to Graz to conduct a tour of their facility while the Transformer Committee is in Europe. The offer is for the first one hundred, including companions, to sign up for the tour. It is understood that the offer can be mailed along with the general invitation to attend the committee meeting only if anyone is allowed to accept the offer. The general arrangement communicated is that the tour will be conducted on Monday before the Transformer Committee meeting and Reinhausen will provide transportation to Graz that night. There will be day time activities arranged for companions. Edgar is aware of the arrangements.

4.5 Chair's Report - W. B. Binder

Wally presented his report which will be included in the Committee meeting minutes. He briefly detailed the new balloting procedure which is included in his report.

He mentioned that the Executive Committee met yesterday. The new balloting procedure was briefly discussed at the meeting. As part of their review to night all SC chairmen are asked to
provide status on main committee balloting expected in the next twelve months in their respective subcommittees.

4.6 Standards Subcommittee - G. H. Vaillancourt

4.6.1 Standards and Coordination Activities

George Vaillancourt presented his status report which will be included in the Committee meeting minutes.

He pointed out that a revised PAR form is included in the report and should be used for all new PAR submittals.

Tom Traub will replace George as the Chair.

4.6.2 Documents Submitted to the Standards Board

Two PAR's were submitted to NESCOM and seven documents were submitted to REVCOM for approval. One document was denied approval. See the complete report for details. Also the Standards Board meeting schedule is shown in the complete report.

4.6.3 Standards Subcommittee

None to report at this time.

4.7 Status of IEEE Standards - L. Napoli

Luigi was not present. Rochelle made a presentation on Role of IEEE Standards Staff. She had made the same presentation to a WG meeting and felt it received overwhelming support. She will be glad to make similar presentations at other WG meetings upon request.

4.8 Status of ANSI C57 Committee - J.D. Borst

John Borst noted that IEEE will provide support to C57.12.20 and C57.12.40 series documents. He proposed a motion that IEEE provide similar support to C57.12.50 series of dry-type transformer standards. The motion was passed and will be discussed at the ANSI C57 meeting on April 17,1996.

4.9 Subcommittee Activities - Subcommittee Chairs

4.9.1 West Coast - E.G. Hager

Everett (Red) Hager is replacing Gary McCulla as chairman for the subcommittee.

4.9.2 Performance Characteristics - H. J. Sim

Jin indicated that Revision of C57.12.90 is expected balloting in the next twelve months. He further reported that Don Platts will be the new chairman of this WG replacing Pete Krause who has retired.

A special session on interaction between breakers and transformers was held this morning by Jeewan Puri to discuss unique applications. In some special applications load switching can create voltage transients beyond standard transformer insulation withstand capabilities. A brief discussion ensued indicating that sufficient literature is available in technical papers and IEEE guides on the subject. Jeewan's point is that it needs to be collected and condensed for appropriate guidance. Jin and Jeewan will prepare a proposal on the subject. The Chair will contact IEEE Switchgear Committee for liaison.

4.9.3 Audible Sound and Vibration - Jeewan Puri

Jeewan recommended that WGs similar to C57.12.00 and C57.12.90 be set up to address revisions of C5712.01 and C57.12.91.

He reported that the work is underway on addressing sound level requirements for liquid immersed and dry-type transformers. The IEC requirements are for sound power and the IEEE are for sound pressure. He sees an opportunity to coordinate them for mutual benefits and also to address these requirements for sound intensity.

4.9.4 Dielectric Tests - L. B. Wagenaar

Loren expects Revision of C57.12.00 and C57.12.90, C57.98, and C57.113 for balloting in the next twelve months.

He reported that the TF on Surge Arrester Insulation Coordination has completed its task and this will be forwarded to the PSRC. Bob Degeneff has agreed to document the background information gathered on the subject for future reference. A request for interpretation on Table 11 of C57.12.00 has been discussed and a response has been formulated. The response will be forwarded to the Chair for review.

4.9.5 Bushings - F. E. Elliott

Fred expects to ballot C57.19.00 and C57.19.01 in the next twelve months.

He reported that C57.19.03, DC Application Guide, has been approved by the Committee and will be forwarded to IEEE RevCom, and C57.19.101 has been withdrawn.

A request for interpretation has been reviewed and a response has been formulated which will be forwarded to the Chair for review.

4.9.6 Instrument Transformers - J. E. Smith

Jim reported that a request for interpretation has been received. He will provide the details and report later. He mentioned that at the CIGRE meeting in Paris he recently attended, he was requested to provide them US test requirements for 72KV and above instrument transformers. He is looking for guidance on what to do. Anne will help to prepare the response.

4.9.7 Insulating Fluids - F. J. Gryszkiewicz

Frank reported that C57.130 will be reballoted in the main committee after revising the recent draft. He further reported that James Kinney has advised of his retirement and is resigning from the subcommittee and the main committee. Jerry recommended that James be recognized for his efforts by an award.

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

Paul advised that C57.12.57 is expected balloting the in next twelve months. Also a panel discussion is planned on Reliability and Maintenance Practice at the T & D Show later this year.

He reported that C57.12.40 has been approved by NEMA. This 1994 revision has several errors and will be republished with errors.

4.9.9 Distribution Transformers - K. S. Hanus

Ken expects balloting of C57.15, C57.12.21,.21, and P1388 in the next twelve months. He further reported that C57.12.20 and C57.12.35 have been successfully balloted in the main committee and will be submitted to IEEE RevCom.

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

Bill was not present. Richard Dudley has volunteered to coordinate this WG to completion but does not want to become SC chairman in Bill's absence. The matter was put on hold until the next meeting.

4.9.11 Dry Type Transformers - W. Patterson

Chuck Johnson represented Wes. He reported that C57.12.91 had been published in late 1995 and was now available from IEEE. He recommended that Dave Barnard be given a certificate of appreciation for his work as a chairman of the working group for C57.12.91. He also noted that C57.12.01 will be balloted in the main committee prior to the next meeting.

4.9.12 Insulation Life - L. W. Pierce

Linden expects C57.100 and C57.119 for balloting in the next twelve months.

4.10 Awards Subcommittee - J. H. Harlow

Jim's full report will be shown in the Committee meeting minutes.

4.10.1 Committee Service Awards

Jim announced that Certificates of Appreciation have been prepared for four members. They are:

John Borst	Bipin Patel
Jim Harlow	Jin Sim

The Subcommittee Chairs were requested to identify any others deserving an award at the next meeting.

A motion was passed to nominate Bill McNutt for Tesla Award for his contributions. The Chair will prepare the appropriate paper work for the nomination.

4.11 Vice Chair's Report - J. W. Matthews

John presented his written report which will be included in the Committee meeting minutes. He reviewed the new paper publication policy and summarized technical paper reviews for the 1996 IEEE/PES Summer Power Meeting and 1996 IEEE/PES T&D Conference.

4.11.1 Revisions to Organization and Procedures Manual

A copy of the January 1996 O & P Manual revision was distributed to the Administrative Subcommittee members at the meeting. Also copies of the manual have been mailed to all other voting members.

4.12 Secretary's Report - B.K. Patel

4.12.1 Membership Review

Voting Members - Don Ayers , James Kinney, and Pete Krause resigned since the last meeting. Dan Perco changed his voting status from Producer to General Interest. Charlie Brown and Bill Mutschler, Jr. changed their status from Voting Member to Emeritus Member. J. D. Ramboz was removed from the roster due to poor participation in attending meetings and returning ballots.

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

Voting Members -	165	
Emeritus Members -	17	
Voting Classifications:	Producers -	72
	Users -	54
	General Interest -	39

Poor Attendance Records - Voting Members who have not attended a Committee meeting since Spring 1994 will be contacted to determine their interest in maintaining membership.

4.12.2 New Member Applications

New membership applications were received from the following persons for review at this meeting and all four were accepted.

Applicant-Company-Voting classification-Sponsor

Virendra C. Jhonsa - Atlantic Electric Co - User - Patel
Mark C. Loveless - Oklahoma Gas & Electric Services - User - Hanus
Subhash Tuli - Waukesha Electric System - Producer - Patel
Felipe N. Weffer - ComEd - User - Pierce

Following these additions, membership now stands at 169 voting members, with 73 producers, 57 users, and 39 general interest.

4.12.3 PES Directory Rosters

After submitting the Transformers Committee rosters in October 1995, I was surprised to see that the 1996 PES Directory still contains the old rosters. I have not received an explanation for this omission.

4.12.4 Meeting Minutes

Minutes of the Boston meeting were reproduced at no cost, compliments of Ken Hanus and TU Electric. Postage costs were $ 1175.36 for 344 mailings, which averages $ 3.42 per mailing. The total income from the 272 registrants was $2,720.00. 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.

I request the Subcommittee Chairs to submit their minutes within 30 days of the meeting (by May 17, 1996 for this meeting). Note that Subcommittee minutes must be received by this date to be included in the Committee minutes. 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 WordPerfect 5.1 (or earlier versions).

4.12.5 Additional Items:

Bipin requested SC chairmen to provide update on WG and SC membership listings for next PES Directory publication along with the minutes. Next directory publication is expected this fall.

4.13 Old Business

None was presented for discussion.

4.14 New Business

None was presented for discussion.

4.15 Adjournment

There being no further business, Wally adjourned the meeting at 11:40 p.m.

Respectfully submitted,

B.K. Patel, Secretary

5.0 Transformers Standards - T. P. Traub

G. H. Vaillancourt, Vice Chairman, prepared and presented the following report.

5.1 Transformers Standards and Co-ordination Activities

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

Attachment 1 (14 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, 133 standards or projects listed.

Attachment 2 (4 pages) is a report of coordination 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 coordination on the standards for which we are responsible.

Attachment 4 (26 pages) is sorted by Subcommittee names. It contains a listing of the projects, for which a given Subcommittee is responsible, and coordination 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

NESCOM 12/11/95 (PAR's)

PC57.12.35 (P1265)	Revised PAR approved with dual number
PC57.16	Revised PAR approved

REVCOM 12/11/95 (Standards)

C57.93	Revision approved
C57.19.101	Standard withdrawn

NESCOM 03/21/96 (PAR's)

PC57.12.33	Dissappoved, define low and medium voltages
PC57.121	Approved
PC57.136	Approved
P259	Approved
P1276	Approved

5.3 Standards Due For Reaf., Revision, Or Withdrawal Before Dec. 96

C57.12.01, C57.12.58, C57.12.59, C57.13.2, C57.19.00, C57.19.01, C57.96, C57.104, C57.106, C57.115, C57.120, C57.124, C57.125

5.4 PAR Submittals

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. Please use the PAR form dated 1/96 (Attachment 5) for all new PAR submittals.

5.4.1 Bushing Subcommittee

PC57.19.00	PAR application in progress
PC57.19.01	PAR application in progress
PC57.19.03	Extension to June 1997

5.4.2 Dielectric Tests Subcommittee

PC57.21	Submit new PAR
PC57.98	Request PAR withdrawal, new PAR will be required later
PC57.113	PAR application in progress
PC57.127	Submit new PAR
PD Loc. Guide	Combine with C57.127
P1350	Request PAR withdrawal, work to continue in SPD

5.4.3 Distribution Transformers Subcommittee

PC57.12.20	PAR extended to June 1997
PC57.12.21	PAR extended to June 1997
PC57.12.24	PAR application in progress
PC57.12.25	Submit new PAR

5.4.4 Dry-Type Transformers Subcommittee

PC57.12.58	Request PAR extension
PC57.124	Request PAR to revise
PC57.12.91	Extended to June 1997
PC57.96	Submit new PAR

5.4.5 HVDC Converter Transformers Subcommittee

PC57.129	Extended to June 1997
P 1277	Extended to June 1997

5.4.6 Instrument Transformers Subcommittee

PC57.13.4 (P832)	Apply for new PAR if wanted
PC57.13.5	Submit new PAR for title change

5.4.7 Insulating Fluids Subcommittee

PC57.104	Apply for new PAR
PC57.106	Apply for new PAR
PC57.121 (P954)	PAR withdrawn, apply for new PAR

5.4.8 Insulation Life Subcommittee

PC57.92	Request PAR withdrawal, work included in PC57.91
PC57.115	Request PAR withdrawal, work included in PC57.91
PC57.119	Submit new PAR

5.4.9 UG TR & Network Protectors Subcommittee

PC57.12.57	New PAR may be needed

5.4.10 West Coast Subcommittee

PC57.93	PAR extended to June 1997
PC57.128	Apply for new PAR
PC57.135	PAR application in progress

5.4.11 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	Only title exists
C57.12.54	Only title exists
C57.17	ANSI Std, needs a home in IEEE

5.5 Next Standards Board Meetings And Submittal Deadlines

NEXT STANDARDS BOARD MEETING DATES AND SUBMITTAL DEADLINES

Meeting Date	Deadline for PAR (1)	Deadline for STD (2)
June 18, 1996	March 10, 1996	May 10, 1996
September 19, 1996	June 9, 1996	August 9, 1996
December 10, 1996	September 1, 1996	November 1, 1996

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 16, 1996 at 08:00 A.M. with 15 members and 9 guests present for a total attendance of 24.

After approval of the minutes of the Boston meeting, the new open standard preparation and balloting process for PES was discussed. The goal of this new procedure is to insure that all materially interested and affected parties are given an opportunity to participate in the development of PES sponsored standards. This includes new standards as well as ballots for reaffirmation and withdrawal of standards.

The new procedure is divided into two parts: the invitation to participate part, and the invitation to ballot part. For the invitation to participate part, the IEEE Standards Department staff will advertise any new approved project by title in the Standards Bearer and in the ANSI Standards Action and will extend an invitation to participate giving the name of an IEEE staff contact for further information. If any responders indicate an interest in one of the documents listed then, either the IEEE staff member, or the WG or TF Chair will mail them an Invitation to Participate Form along with the information on future meetings. The returned Invitation to Participate Forms will be evaluated by the WG or TF Chair for inclusion of the responder in the WG or TF membership.

An Invitation to Ballot Form has been designed by the IEEE staff to help forming the balloting group. That form will be sent to all IEEE members that have manifested an interest in the standard to be balloted. Only people who will return the form will be made part of the balloting group. At first the form will be sent to people on the Transformers Committee Invitational List, and to other PES Committees Liaison Representatives. IEEE staff will also send it to other people who will have requested it. To expedite the balloting process, only one ballot shall be conducted. Follow-up ballots will be necessary when substantive technical changes will be made as a result of negative ballots or comments received. In order to keep the number of follow-up ballots to a minimum, the Standards Subcommittee recommends to continue making surveys amongst WG and TF members in order to obtain and resolve comments before going into the final ballot. At the WG and TF levels the 75% return rule needs not apply but will continue to apply for the final ballot through the official balloting group.

The next item on the agenda was presentation of the working groups reports.

John Borst, the Chair of the Working Group on Continuous Revision of C57.12.00 - *Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers*, presented and explained his list of pending changes to the document (Attachment 6). He said that the changes that have been completed, and that will be incorporated into the next revision are relatively few, but the ballot will go ahead as planned as soon as the balloting group will have been formed. He announced that he is transferring responsibility for the Working Group Chairmanship to Subhash Tuli who will take over immediately after the meeting. Subhash will continue to collect and keep track of the changes and finalize the document for ballot.

The second working group report was presented by Steve Smith, the Chair of the Working Group on Continuous Revision of C57.12.90 - *Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers*. He announced that the complete text of draft D1 has been updated with all revision balloted up to now. He presented an updated list of all presently active revisions, and a list of technical subcommittee responsibility by clause (Attachment 7). The current plans for the working group is to add further completed revisions and to submit the document to IEEE for ballot as soon as the balloting group will have been formed. Formation of the balloting group has to be initialized by the Standards Subcommittee Chair.

The last working group report was next presented by Tom Traub, the Chair of Working Group on Terminology, Definitions, Units and Terminal Marking. The Working Group whose purpose is to update standards C57.12.70 - *Terminal Markings and Connections for Distribution and Power Transformers*, and C57.12.80 - *Standard Terminology for Power and Distribution Transformers*, had met on Monday, April 15. A first drafts of the revised standards has been prepared and includes:

- Changes to comply with IEEE Style Manual,
- Marked text recommended to be removed,
- Underlined text to be added.

Copies of the draft had been distributed to all attendees of the Working Group Meeting. Copies will also be sent to each Technical Subcommittee Chair. Comments were requested by August the first. A second draft will then be prepared to be balloted by the Transformers Committee balloting group.

The next item on the agenda was the formation of a new working group to compare IEEE Transformers Standards with IEC Standards. It was remarked that preliminary work along this line has already been done by Ramsis Girgis and Jin Sim. A copy of Ramsis Girgis slides presented at the seminar in Boston, and a handout prepared by Jin Sim are available on request. Formation of the new working group was approved by the members of the Standards Subcommittee. Two names were proposed as possible working group chair. The Standards Subcommittee Chair will try to convince one of them to accept the job.

Under new business, Georges Vaillancourt announced that he his handing over the position of Standards Subcommittee Chair to Tom Traub. Effective immediately after this meeting, all new PAR submittals will have to be sent to Tom. Georges will continue to contribute as Vice-Chair of the Subcommittee. The meeting was then adjourned.

5.7 PES Standards Coordinating Committee Meeting

The Standards Coordinating Committee met on Monday, January 22, 1996 in Baltimore, Maryland. The report below was provided by Gary Engmann, the secretary of the Standards Coordinating Committee.

ATTENDANCE:

Members		
Gary Engmann, Substations	Terry McComb, PSIM	Miriam Sanders, PSR
Robert Howell, EDPG	Gary Polhill, IC	Georges Vaillancourt, TR
Chuck Lennon, SCC Chair	John Posey, SPD	Mark Zar, NPE
Members Not Present		
Bal Gupta, EM	Chandra P. Krishnayya, T&D	Sukhdev Walia, PSC
Walter A. Johnson, PSE	David F. Peelo, SWG	
IEEE Standards Staff		
Karen DeChino	Ann O'Neill	Karen Rupp
Luigi Napoli		
Guests		
John Appleyard	Harry Jones	Terry Stringer
Robert Dempsey	Gerald Lee	T. P. Traub, Transformers
Barry M. Gore	Dan Nordell	Don Volzka
Dennis Holstein		

5.7.1 Members of the IEEE Standards Department Staff that were present announced that

1. Standards "Style" documents are available from Luigi Napoli. The "Style" documents are electronic files in popular word processing software (Word, WordPerfect). A Staff Services request must be completed to obtain a disk.

2. Electronic and hard copies of standards are available to Working Groups who are revising the document. Contact Luigi Napoli.

3. The Standards report is now available on the IEEE Web home page.

5.7.2 The following points were next discussed

1. Summer 1997 SCC Meeting. The Summer 1997 Standards Coordinating Committee Meeting will be held in Berlin in conjunction with the PES Summer Meeting. Plans include meeting in conjunction with IEC standards participants.

2. Goals. Progress was made on the SCC 1995 Goals in the harmonization of IEEE and IEC Standards. There is still work to be done on all four goals. Ann O'Neill will update the goals and distribute to the SCC for comment, and finalized goals will be presented at the 1996 Summer Meeting. John Appleyard will assist Ann on the second goal (identifying the relationships between IEC and IEEE standards), and John Posey will help with the third goal (identifying IEEE membership that is common to IEC and CIGRE). Ann will provide the SCC a list of the IEC USNC and Canadian Committee members. Ann will also provide a list of the chairs for the IEC Technical Committees.

3. Open Standards Balloting. Harry Jones presented a markup revision of the January 3, 1996 draft of the "Open Standards Preparation and Balloting Process for PES". After much discussion, several changes were made. . A motion was made and carried to recommend the new balloting procedure to the Technical Council at the next Council meeting on Wednesday, 24 January 1996. Negative ballots were cast by Terry McComb, Georges Vaillancourt, and Mark Zar.

4. PES Representatives to National Committees. A list of the PES Technical Committee representatives to National Committees (ANSI), as provided by each Standards Coordinator has been prepared by the secretary. The motion was made and carried to recommend that the Technical Council nominate these representatives for approval by the Standards Board.

5. SCC Operating and Procedures Manual. Chuck Lennon reported that Bal Gupta has a draft of the changes to the Procedures Manual, including a draft procedure for the appeal process. Chuck will send the draft to the SCC.

6. Interpretation of standards. A procedure is also needed for interpretations.

7. International Coordination. Ann O'Neill presented a new practice for increasing international coordination.

8. Trademark of SPD. John Posey advised that a manufacturer was attempting to trademark the mnemonic "SPD" that is widely used in IEEE Surge Protective Device standards. Karen DeChino advised that this is not a violation of the IEEE Copyright, but the SPD Committee should oppose the trademark application, if they object. John Posey will document the objection and send it to Karen DeChino.

9. Reports. Copies of Standards Coordinators reports were distributed previous to the meeting and handed out at the meeting. No reports were distributed by the Electric Machinery, Power System Communications, Power System Engineering, and T&D. Copies of the reports from the other Standards Coordinators are available from the Standards Coordinators, or Gary Engmann.

NOTE: All attachments of Section 5.0 are included at the end of the minutes except Attachment 4 which is included with each subcommittee report as appropriate.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/19/96

ATTACHMENT 4

SUBCOMMITTEE: STANDARDS / CHAIRPERSON: TOM TRAUB / PHONE: (312)394-2704 / FAX: (312)394-2717

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	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	FORMING BALOTTING GROUP
VARIOUS	CONTINUOUS REV. OF C57.12.00	TULI S.	06/16/93	06/15/95	1998	(414)547-0121	EDITING REVISION
C57.12.00	TABLE 5 - CORRECTION OF TYPO. ERRORS						CORRECTIONS BEING DONE
PC57.12.00	CONTINUOUS REV. OF C57.12.00	TULI S.	/ /	/ /	0	(414)547-0121	
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	TRAUB T.	06/04/87	/ /	1993	(312)394-2704	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	TRAUB T.	09/02/81	/ /	1987	(312)394-2704	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						ONLY TITLE EXIST (NO PAR)
ANSI		TRAUB T.	/ /	/ /	0	(312)394-2704	IS IT REQUIRED?
C57.12.54	REQUIREMENTS FOR DRY-TYPE, UNDERGROUND 3 PHASE DISTRIBUTION TRANSFORMERS,2500 kVA OR <, HV 24940 grdY/14400 OR <,LV 480V						ONLY TITLE EXISTS
ANSI		TRAUB T.	/ /	/ /	0	(312)394-2704	IS IT REQUIRED?
C57.12.70	TERMINAL MARKINGS AND CONNECTIONS FOR DIST. & POWER TRANSFORMERS		T&D	SUBS ICC			REVISING TERMINOLOGY
NONE	TERMINOLOY, UNITS AND MARKING	TRAUB T. P.	06/18/92	06/14/95	1997	(312)394-2704	REVISE OR REAF. BEFORE 12/97
C57.12.80	TERMINOLOGY FOR POWER & DISTRIBUTION TRANSFORMERS		T&D	SUBS			WILL START REVISION
NONE	TERMINOLOGY, UNITS AND MARKING	TRAUB T. P.	05/01/92	06/14/95	1997	(312)394-2704	PAR APPROVED 06/14/95
C57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS & GUIDE FOR SC TESTING OF		T&D	PSRC SWG	IECTC14 USTAG		MAKING RUNNING CHANGE LIST
VARIOUS	CONTINUOUS REV. OF C57.12.90	SMITH S. D.	03/16/93	06/15/95	1998	(606)879-2757	WG COLLECTING CHANGES

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE

DATE: 06/19/96

ATTACHMENT 4

SUBCOMMITTEE: STANDARDS / CHAIRPERSON: TOM TRAUB / PHONE: (312)394-2704 / FAX: (312)394-2717

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.17	REQUIREMENTS FOR ARC FURNACE TRANSFORMERS						LAST REVISED IN 1986
ANSI	ANSI DOCUMENT	TRAUB T.	/ /	/ /	1986	(312)394-2704	ANSI DOCUMENT

COORDINATION ACTIVITY OF STANDARDS SUBCOMMITTEE AS PER: 06/19/96

PROJECT NO. / DATE	TITLE / PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD. PHONE
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	T. P. TRAUB	312-394-2704
P 62	GUIDE FOR DIAGNOSTIC OF POWER APPARATUS				DRAFT PUBLISHED IN C57 COLL.
03/17/94	PSIM	DAVID TRAIN	617-926-4900	R. A. VEITCH	905-731-9178
P 454	PARTIAL DISCHARGE MEASUREMENTS				WILL ADOPT IEC-270
03/31/94	PSIM	BARRY WARD	215-646-9200	T. P. TRAUB	312-394-2704
PC37.107	STANDARD FOR DIGITAL PROTECTIVE RELAY INTERFACES				EVALUATING BALLOT RESULTS
12/28/85	PSR	STIG L. NILSSON	408-335-9061	T. P. TRAUB	312-394-2704
PC37.108	GUIDE FOR THE PROTECTION OF NETWORK TRANSFORMERS				REAFFIRMED 1994
09/28/84	PSR	THOMAS E. WIEDMAN	312-394-2593	VACANT	
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	T. P. TRAUB	312-394-2704
P1291	GUIDE FOR PARTIAL DISCHARGE MEASUREMENTS IN POWER SWITCHGEAR				ANSI APPROVED 08/30/93
10/22/91	SWGR	E. F. VEVERKA	414-835-1544	T. P. TRAUB	312-394-2704
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	T. P. TRAUB	312-394-2704

6.0 Recognition and Awards - J. H. Harlow

6.1 Certificates of Appreciation

Transformers Committee Certificates of Appreciation will be presented to the following persons at the Transformers Committee meeting, April 17, 1996:

John D. Borst	Chair, Awards Subcommittee
James H. Harlow	Chair, IEEE PES Transformers Committee
Bipin K. Patel	Chair, Performance Characteristics Subcommittee
H. Jin Sim	Chair, Working Group on Standard Test Code for Liquid Immersed Distribution, Power and Regulating Transformers

IEEE Standards Board acknowledgments for the publishing of a document will be presented to:

Fred Elliott - C57.19.100	Guide for Application of Apparatus Bushings
Tom Traub - C57.131	Standard Requirements for Load Tap Changers

These persons are congratulated for their contributions and leadership.

6.2 IEEE PES Awards Committee - J. H. Harlow, Chair

Nominations for the following IEEE awards for authors are requested and must be submitted by July 1, 1996 for a candidate to be considered for a 1997 award. The paper which is the basis of a nomination must have been published in the TRANSACTIONS, JOURNALS, or MAGAZINES of the Societies, or PROCEEDINGS of the IEEE during 1995. Transformers Committee members and participants are invited to recommend the nomination of those they feel are qualified, based upon the criteria shown.

W. R. G. Baker Prize Award - Award to the author or authors of the outstanding paper reporting original work.

Donald G. Fink Prize Award - Award to the author or authors of the most outstanding survey, review or tutorial paper.

Browder J. Thompson Memorial Prize - Award to the author or joint authors, under 30 years of age at date of submission of original manuscript, for the most outstanding paper published in any of the IEEE publications.

7.0 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.

7.1 Distribution Transformers - K. S. Hanus

7.1.1 Chair's Remarks & Announcements

The meeting convened at 2:00 PM in the City room with the introduction of the members and guests and signing of the attendance roster. There were 22 members and 15 guests in attendance.

Minutes of the last meeting in Boston were approved with one change. The one change was in the committee report area where the Bar Coding report was listed with the ".34" number instead of ".35".

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

298 registered, 64 spouses

Future Meetings:

October 27-30, 1996 Burlington, Vermont-Sheraton-$90 sgl/dbl
July 15-18, 1997 Graz, Austria-2 hotels $140/$150 w/tax
November 16-19, 1997 St. Louis, MO
April 26-29, 1998 Little Rock, AR

Concern over travel to Europe (GRAZ, Austria) was discussed among the subcommittee. A show of hands was taken to see how many people would not be able to come at all and a small amount of people indicated they would not be able to come. It was stated the subcommittee and its working groups are intending to have regular attendance and perform a full schedule of work. Work will go on as usual.

Par extensions are needed for the following documents:
12.25 extend to July 1997
12.33 loss evaluation - PAR submittal revised and re-submitted

Send PAR extension forms to Rona Kershner of the Standards Board.

Future Standards Board Meetings:

Meeting Date	New/Rev. Doc.	PAR's
June 18, 1996	March, 10, 1996	May 10, 1996
September 19, 1996	June 9, 1996	August 9, 1996
December 10, 1996	September 1, 1996	November 1, 1996

Discussion ensued concerning the new "Open Standards Preparation and Balloting Process for PES". The process is to be implemented to resolve a "perceived" sense the document development process is a closed process. The process will be implemented in May and will open the participation and balloting process open to all interested and

qualified IEEE members. An "Invitation to Participate" form will be sent to all interested parties who show a desire to participate in WG and SC activities even if only by correspondence. It should be noted that participation by correspondence already exists. Balloting groups will be formed from balloting pools made up of persons showing a direct interest in the document being revised or developed. It should be noted if a person does not show intent to participate i.e. respond to ballots, surveys or task force assignments they are subject to being removed from balloting pools or from rosters. Information available on this new process is attached to these minutes.

The issue of publication of documents under the NEMA copyright was discussed. It seems galley proofs are not being provided to the working group chairs for final review before final publication. NEMA has promised to make sure WG chairs will receive galley proofs before final publication. Documents which fall into this category include C57.12.21, 22, 23, 25 & 26.

Mark Loveless was approved as a new member of Transformer Committee.

Working group chairs have expressed a need for format information for documents so when they are submitted to IEEE they will be in the correct format. Also the question of electronic formats was also in question. IEEE staff has provided templates for use in the development of documents. Also they stated graphics should be provided in separate files with .TIF, .EPS or .PIC formats. Text can be provided in any word processing format.

7.1.2 A Report From Each Of The Working Group Chairs Was Given

7.1.2.1 C57.15 Step-Voltage Regulators

The PAR was approved for the document at the last Standards Board Meeting. Draft V was handed out to the WG and changes that went into draft 5 were discussed. References to induction regulators were removed and verbiage addressing 65 degree C insulation systems was added. The document will show sealed or vented units with 55 degree rises and sealed units only on 65 degree rise units. Ratings will be the same for 55 & 65 degree C rise units.

Routine and design tests were more clearly clarified in draft 5 and necessary parts of C57.12.90 were updated in the document since it stands alone from a testing standpoint.

The document will after the next meeting begin balloting procedures.

7.1.2.2 C57.12.20 Polemount Transformers

It was reported the re-circulation of the Main Committee ballot was successful with the document to be submitted to the next Standards Board meeting. The WG continued to discuss comments received on the re-circulation ballot for inclusion in the next revision. Comments covered BIL shown for various voltage classes and the minimum kVA ratings addressed by the document. The WG also discussed the applied and induced tests relating to three phase transformers with further work needed in the area of these tests to clarify requirements.

7.1.2.3 C57.12.21 Single Phase Livefront Padmount Transformers

The WG has obtained an extension on the PAR until June 1997. The document will begin balloting at the subcommittee level.

7.1.2.4 C57.12.22 Three Phase Livefront Padmount Transformers

The document has been approved and is in the process of being published by NEMA.

7.1.2.5 C57.12.23 Submersible Single Phase Transformers

The C57 12.23 document has been approved by the ANSI Board of Standards Review and is now awaiting publication by NEMA.

7.1.2.6 C57.12.25 Single Phase Deadfront Padmount Transformers

The working group continued to work out details of faceplate and air compartment dimensions. The only major item left to resolve concerns the low voltage stud usable thread lengths. The WG plans to finalize details by the next meeting so the document can begin the balloting process. An extension on the PAR will be submitted to the next Standards Board meeting.

7.1.2.7 C57.12.34 Three Phase Padmount Transformers

The WG discussed the copyright issue of this combination document. It was stated at the last C57 Main meeting it was decided this document would have its copyright remaining with NEMA.

7.1.2.8 C57.12.26 Three Phase Deadfront Padmount Transformers

The C57 12.26 document has been approved by the ANSI Board of Standards Review. It is now awaiting publishing by NEMA.

7.1.2.9 C57.12.35 Bar Coding

The document was successfully re-circulated. The two negative votes were resolved and now the document will be submitted to the Standards Board. The WG next discussed what direction to take next in its efforts. Surveys will be prepared for users and manufacturers to gather information of what the WG needs to work on next.

7.1.2.10 Coating Integrity Documents (.28, .29, .30 & .31)

.29 Coastal Environment for Padmount equipment The working group has two issues relating to tests to work out and then they will be submitting the document for approval.

.28 Padmount integrity document The document has been satisfactorily balloted and is in the process of being published by NEMA.

.31 Polemount The document has been satisfactorily balloted and is in the process of being published by NEMA.

.32 Submersibles The document has been published by NEMA and will be available shortly.

7.1.2.11 C57.12.33 Guide for Evaluation of Losses in Distb. Xfmrs.

The working group heard from the three entities doing similar work to the document being developed by the WG.

Phil Hopkinson (NEMA) updated to group on work being done by NEMA which will typically cover transformers used in the Commercial and Industrial areas. They have an approved transformer cost analysis standard which will probably be available in June from NEMA.

Randy Barnes from Oakridge National Labs discussed the report they are producing for the DOE. Due to 100+ comments received from various review groups there have been many changes to the report. The report will be re-circulated among the reviewers next month. The report indicated conservation standards are technically and economically feasible and would bring about energy savings especially in the dry type areas.

Steve Rosenstock of ICF-Kaiser provided an update on the Energy Star Program. Currently there are 14 utilities and 9 manufacturers participating in the program. Steve also discussed the two software projects being developed which include a transformer sizing and transformer cost evaluation program. Both programs will be issued by the EPA to the Energy Star partners.

Don Duckett discussed the Transformer Economic Variance (TEV) program written to provide a sensitivity study of the terms used to develop the No Load(core) and Load(winding) loss cost factors. Don also discussed various portions of the current draft. A revised draft will be mailed out before the next meeting and also an attempt will be made to set up a copy of the draft on the SPA system.

7.1.2.12 P1388 Electronic Data Transmittal

The WG discussed the final disposition of the standard and extended data sets so the document can now begin going thru the balloting process. Draft 2 will be issued before the next meeting. The WG also discussed the use of EDI to transmit the data specified in the document. It was decided the WG will work with the UIG group to set up EDI transaction sets for use by those which will use EDI to transmit this test data. This work will be done as a follow up to the work accomplished in the first issue of the document.

7.1.3 New Business

The subcommittee chair expressed thanks to the WG chairs for their work in keeping rosters up to date and making sure only persons willing to participate are kept on the roster. It was also mentioned the SC chair needs electronic copies of the WG rosters for the PES directory.

The SC chair discussed what formats IEEE would like to see documents transmitted to them so final publication can be made easier and quicker. The text portion of a document can be provided in electronic form from any word processing package. Tables should also be included in these files even though they do not transfer very well into the publishing package used by IEEE. Graphics figures should be provided is separate files in one of the following electronic formats designed for graphic figures - .TIF, .PIC or .EPS. Also available are "Templates" to be used in word processing packages to ensure document formats are per IEEE requested formats.

7.1.4 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
P1388	David Rollins/Angie McCain
.33	Ron Jordan / Ed Smith
.35	Tom Pekarek/Don Duckett
.34	Clyde Pearson/Ron Stahara
57.15	Tom Diamantis/Craig Colopy

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/19/96

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 OR TF CHAIR	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 EXTENDED TO 06/30/97
PC57.12.20	POLE MOUNTED DISTRIBUTION TR	ANDERSON G. W.		01/11/88	12/05/91	1993	(913)339-2931	REBALLOT REVISION
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	SUBMIT NEW PAR
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	TO INCORPORATE INTO C57.12.34
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 NEMA
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	APPLY FOR NEW 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					TO INCORPORATE INTO C57.12.34
PC57.12.26	3-PHASE PADMOUNT TR DEADFRONT	PEARSON L. C.		06/17/92	12/05/91	1997	(817)882-6025	TO BE PUBLISHED BY NEMA
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
C57.12.28	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY							JOINT C37/C57 PROJECT
ANSI	JOINT WG ON CABINET INTEGRITY	MARTIN J.		06/24/87	/ /	1994		AWAITING PUBLICATION
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.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE

DATE: 06/19/96

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 OR TF CHAIR	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.12.30	SUBMERSIBLE EQUIPMENT - ENCLOSURE INTEGRITY						TO BE BALLOTED
ANSI	JOINT WG ON CABINET INTEGRITY	MARTIN J.	/ /	/ /	1994		NUMBER TO BE CHANGED
C57.12.31	COATING STANDARD FOR POLE MOUNTED TRANSFORMERS						JOINT C37/C57 PROJECT
ANSI	JOINT WG ON CABINET INTEGRITY	MARTIN J.	/ /	/ /	1994		AWAITING PUBLICATION
C57.12.32	ENCLOSURE INTEGRITY OF SUBMERSIBLE EQUIPMENT						
ANSI		HANUS K.	/ /	/ /	0	(817)882-6020	AWAITING PUBLICATION
C57.12.33	GUIDE FOR EVALUATION OF LOSSES IN DISTRIBUTION TRANSFORMERS						PAR DISSAPROVED 03/21/96
PC57.12.33	LOSS EVALUATION IN DIST. TR.	PEKAREK T.	/ /	/ /	0	(216) 479-3400	NESCOM WANTS CLARIFICATION
C57.12.34	REQUIREMENTS FOR THREE PHASE PAD-MOUNTED DISTRIBUTION TRANSFORMERS	ICC					PAR APPROVED
PC57.12.34	THREE PH PAD-MOUNT TRANSFORMER	PEARSON L. C.	/ /	09/21/95	0	(817)882-6025	TO COMBINE C57.12.22 & .26
C57.12.35	STANDARD FOR BAR CODING FOR DISTRIBUTION TRANSFORMERS (POLE-MOUNTED, PAD-MOUNTED AND UNDERGROUND)	AIM/TSC IAS/REP TD			EEI	NEMA	PAR APPROVED 12/15/95
P1265	BAR CODE STANDARD	JORDAN RON	/ /	12/15/95	1994	(619)482-3239	PROJECT NO. CHANGED
C57.15	REQUIREMENTS, TERMINOLOGY, & TEST CODE FOR STEP-VOLTAGE REGULATORS	SUBS	IAS/PSE				SCOPE REVISED
NONE	VOLTAGE REGULATORS C57.15	DIAMANTIS T.	03/18/87	09/21/95	1997	(315)428-5688	TO ISSUE DRAFT 4
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

7.2 Dry-Type Transformers - W. F. Patterson

7.2.1 Chair Remarks

In Mr. Patterson's absence, the meeting was chaired by Mr. Charles Johnson. Introductions were made and the attendance roster was circulated. Minutes from the previous meeting were unavailable for review and approval. Announcements were held until after the working group reports were given.

7.2.2 Working Group Reports

7.2.2.3	**Dry-Type Reactors - HVDC Smoothing**	**Richard Dudley**
7.2.2.4	**Dry-Type Reactors - Current Limiting**	**Richard Dudley**
7.2.2.5	**Dry-Type Test Code**	**Dave Barnard**
7.2.2.6	**Dry-Type Specialty Transformers**	**William Simpson**
7.2.2.7	**Dry-Type Hot Spot Differentials**	**Paulette Payne**
7.2.2.8	**Dry-Type General Requirements**	**Anthony Jonnatti**
7.2.2.9	**Dry-Type Loading Guide**	**Michael Haas**
7.2.2.10	**Dry-Type Thermal Evaluation and Flammability**	**Richard Provost**

7.2.2.1 Working Group on Dry-Type Reactors - TF Smoothing Reactors - Mr. Richard Dudley, Chair

Ref.: Dry-Type Air Core Smoothing Reactors - IEEE 1277

The Dry-Type Air Core Smoothing Reactor Task Force met at 8:00 AM on April 15, 1996 in the Civic meeting room of the ANA Hotel in San Francisco, California. There were four members and one guest 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.

A brief discussion took place on how the smoothing reactor standard should proceed in consideration of the prolonged illness of Bill Kennedy. It was decided to discuss this issue at the meeting of the HVDC Converter Transformer and Smoothing Reactor Subcommittee.

The chair circulated new input from Nigel McQuin and Lars Erik Juhlin regarding the test code for HVDC smoothing reactors. These notes plus previous input and the minutes from the Boston meeting provided the basis for discussion on the test code for oil and dry-type HVDC smoothing reactors.

The following items are the main points of a discussion on the short circuit test:

Laboratory short-circuit power levels are a key issue. It was decided that the main body of the standard should set a minimum short-circuit current level of 80% of the specified value. If this level is not available, calculation method should be employed to demonstrate the short-circuit capability.

An annex will be created to provide information regarding the demonstration of short-circuit capability; included in the annex will be:

- Background information on test lab short-circuit power limits will be included.
- A calculation method will be outlined. Required input data and critical stress comparators for oil and dry-type smoothing reactors will be provided. Calculation methods regarding short-circuit capability of transformers will be consulted for reference.
- Critical stresses that are common for oil and dry-type smoothing reactors winding loop and compression stresses. For oil reactors, how do you demonstrate in calculation that the winding clamping system won't become loose under short-circuit conditions.

If an actual short-circuit test is performed, the test setup guidelines in the revision of IEEE C57.16 will be included

(with some appropriate modification) in the main test code.

The DC power test was discussed. Input from Pierre Riffon and Lars Erik Juhlin provided a basis for discussion. Key points are:

- The test should be performed on both oil and dry-type smoothing reactors and should be done prior to dielectric tests.
- The test demonstrates the ability to withstand in-service steady state conditions and is a quality verification; especially as a check for open circuited conductors.
- It was noted that rated DC current is used in the measurement of incremental inductance of the oil smoothing reactor.
- The magnitude and duration of the DC current should be such that the in-service temperature rise is approximately achieved by the end of the test. It was decided that a DC current of 1.2 times rated for a duration of thirty minutes would achieve this requirement for both oil and dry-type smoothing reactors.
- Test criteria for dry-type smoothing reactors would be Q factor measurement before and after the test and physical observation such as no smoke noise. For oil smoothing reactors, Q factor measurement before and after the test may be applicable, but gas and oil analysis at the end of the test would be the most positive indicator.

The AC power test was discussed as follows:

- The test is applicable to both oil and dry-type smoothing reactors and should be conducted after completion of dielectric tests. It is a quality check.
- The test should be carried out at a current and frequency such that the voltage drop is 2 times the voltage drop based on maximum harmonic content at normal load. The duration should be five minutes.
- For dry-type reactors, visual and audible criteria will be employed for evaluation. For oil reactors, partial discharge measurement will be used for evaluation.

The modified turn to turn test was discussed. It is now felt that this test is not required with the advent of modern digital test techniques. Therefore, the test will be classified as 'other' and is only recommended (or may be obligatory) if a digital impulse test system is not used.

The chair stated that he would produce a new draft of the test code for oil and dry-type smoothing reactors for the next meeting. Bill Kennedy's draft 4 would be the basis. The meeting adjourned at 9:15 AM.

7.2.2.2 C57.16 Working Group on Dry-Type Reactors - Mr. Richard Dudley, Chair

The Dry-Type Air Core Reactor working group mat at 2:50 PM on April 15, 1996 in the Commonwealth meeting room at the ANA Hotel in San Francisco, California. There were nine members and five guests present. The following are the highlights of the meeting.

The attendance list was circulated and is attached.

The minutes of the Boston meeting were approved.

The provisional draft #11 of C57.16 was the basis for discussion. The provisional draft #11 was proposed and distributed to working group members. This provisional draft #11 was prepared by the chair based on the successful ballot of the Transformers Committee in September and October of 1995. The six negative ballots have been resolved and changes (mostly editorial) are enclosed in provisional draft #11. At the chair's discretion, input from the 'approved with comments' ballots are included. Due to the illness of the designated liaison person with the T&D Committee, coordination was not achieved during the ballot. Input has now been received from the T&D Committee's Capacitor Subcommittee. This input is editorial or clarification in nature and has, based on the judgment of the Chair, been included in provisional draft #11. The Chair informed the working group that once the working group approved the provisional draft #11, he would submit it with any consensus changes to IEEE. Luigi Napoli has told the Chair that draft #11 will be subject to 'recirculation ballot'; a process that should take about twenty days plus mailing time. The following discussions then took place.

The working group members approved provisional draft #11. The working group then focused on editorial input.

Most of the editorial issues resulted from the reorganization of the standard requested by the IEEE editor. Some of the more significant editorial clarifications are:

- Section 11.3.6.3 will be modified to state the opposite polarity scale to be 50% in order to be in line with IEEE Std. 4-1995.
- A definition for rated inductance will be included in Section 3.7.2.
- The fourth paragraph in C1.1 will be eliminated as these iron core reactors are no longer employed and C57.16 does not cover iron core reactors as set out in the scope. Capacitors are now supplied with discharge resistors and iron core discharge reactors are not required across groups of capacitors.
- Section 6.2.3 to 6.2.5 of draft #10 was eliminated as redundant to Table 3 at the request of one of the negative balloters. However, information in Section 6.2.5 (1), (2), and (6) should be maintained. Information in (1) and (2) will be included in Section 11.3.1 of the test code and Section 11.9 will be added to included a statement that seismic certification should be per IEEE Std. 344-1987(R1993).
- Section B.3.3 will remain as it essentially was in draft #10.
- Section B.4.4 will remain as it essentially was in draft #10.
- Section C5.4.4 will remain as it essentially was in draft #10 but will be reworded for clarification purposes. A statement will be added that the first mechanical peak of current should be equal to greater than 1.1 times rated discharge current.

The Chair stated that he had already received written or verbal clarification from some working group members. He requested other working group members to supply him with such input as soon as possible as he wished to submit the completed Draft #11 of C57.16 to IEEE by mid May of 1996 for 'recirculation ballot'. The objective is to be able to submit C57.16 to the IEEE Standards Board by midyear.

The Chair thanked the working group members for their contributions to the revision of C57.16. The meeting adjourned at 6:45 PM. Once the editorial changes and clarifications are made to draft #11, work on C57.16 will be complete. Pending a successful 'recirculation ballot', C57.16 draft #11 will be submitted to the IEEE Standards Board in mid 1996.

7.2.2.3 C57.12.91 Working Group on Dry-Type Test Code - Dave Barnard, Chair

The Dry-Type Test Code working group met at 8:00 AM on April 15, 1996 in the Cornell meeting room of the ANA Hotel in San Francisco, California. There were fifteen members and six guests present. The following are the highlights of the meeting

The attendance list was circulated and is attached.

The minutes of the Milwaukee, WI meeting were passed out along with the agenda for this meeting.

After the introductions, the Milwaukee, WI minutes were approved.

The Chair stated that C57.12.91 had been published with a 1995 revision date and that all working group members would receive a complimentary copy of the standard from the IEEE. Since the Chair had the only copy of the new revision of the standard, there was no discussion or review of the standard.

The Chair stated that a new PAR would be submitted so that work on the next revision of the standard could begin and that power factor test and hot spot test methodology would be reviewed for possible addition to the standard.

The meeting adjourned at 8:20A M.

Secretary: Mr. Tim Lewis

7.2.2.4 P259 Working Group on Dry-Type Specialty Transformers - William Simpson, Chair

The Dry-Type Specialty Transformer working group met at 1:20 PM on April 15, 1996 in the Commonwealth meeting room of the ANA Hotel in San Francisco, California. There were six members and five guests present. The following are the highlights of the meeting.

Introductions were made and the minutes of the November 6, 1995 meeting in Boston, MA were approved as read.

The Chair noted that on March 21, 1996, the IEEE Standards Board approved the new PAR for P259: "Standard Test Procedure for Evaluation of Systems of Insulation for Dry-Type Specialty and General-Purpose Transformers".

A corrected draft of IEEE Std. 259-1994 designated as P259/D1(4/15/96) was reviewed by the working group. Three items were discussed:

- The duration of mechanical stress noted in Table 2 (Ref. 4.3) will be changed from "1.5g minimum for 10,000 cycles" to "1.5 g minimum for a period of 1 hour".
- A sentence will be added to the second paragraph of Section 4.2 on thermal aging clarifying that if the test cycle is halved or doubled, that testing is continued on the same set of test specimens.
- After much discussion, it was decided to leave the thermal shock conditioning for outdoor applications at -20° C for 2 hours (Table 2, Section 4.4).

A new draft designated P259/D2 will be circulated to the working group and the Fry-Type Subcommittee for balloting.

It was noted that the first draft of IEC 1858: "Standard Test Procedure for Thermal Evaluation of Electrical Insulation Systems" has been circulated for comments and will be discussed at the TC 98 meeting in Orlando, Florida on April 23, 1996.

It was noted that a new revision of UL 1446 was issued March 12, 1996.

As there was no new business, the meeting adjourned at 2:20 PM.

7.2.2.5 Working Group on Dry-Type Hot Spot Differentials - Paulette Payne, Chair

The meeting began at 8:00 am. There were twelve members and twenty-two guests present. The minutes from the meeting in Boston were approved as written.

Discussion focused on temperature sensor location and methodology for hot spot determination facilitated by information provided by Jewan Puri, Linden Pierce and Tim Holdway.

Temperature sensor location appears to be within 0.5 - 1.0 inch from the top of the coil. It was suggested that a percentage would be more appropriate as the hot spot for larger size coils could be 2.0 inches from the top of the coil. Linden Pierce stated he will verify and provide data which indicates the hot spot to be at 95% of the coil height. Chuck Johnson stated that he found the hot spot to be at 75% of the coil height for disc windings and 1.0 - 2.0 inches from the top of the strip for split strip windings; he will provide supporting information.

Linden Pierce suggested extracting pertinent information from Don Platts' Task Force for Liquid Hot Spot Determination into the Dry Type Hot Spot Determination Guide. The Chair stated she had attended Don Platts' meeting and would incorporate the two options discussed, calculation and testing, into the Guide.

Linden Pierce will provide supporting data for Equations 1 and 2, calculation of hot spot presented in the information he provided for the meeting. The calculations requires iteration. The character of equations 1 and 2 will change with design. Equation 3 allows for extrapolation of the hot spot to different size transformers.

There was discussion on the number of thermocouples required for measurement. Too many thermocouples installed in the prototype will affect winding size; 100 - 300 thermocouples should be installed. Based upon experimental results, verification of hot spot would then require significantly less thermocouples installed as the hot spot location would already have been established.

Discussion ensued on whether the hot spot should be a Design Test or an Other Test. Don Kline cautioned that categorizing as a Design Test would require testing to validate each design, where as an Other Test would allow the option to verify a design within a validated design family.

Don Kline stated he would have hot spot data on a FA transformer, soon. He also inquired if anyone had used infra-red measurement. Chuck Johnson stated that he had performed infra-red measurements on a disc winding. The profile across an inch thick radial disc is not difficult; measurements could probably be taken for 1.5 - 2.0 inch thick radial discs. Calibration must be good as the varnish could affect measurement. The surface temperature of the disc winding must be known.

There was discussion on whether stagnation of air flow in disc coils had been noticed. Linden Pierce will provide data available on windings tested.

It was questioned whether anyone had measured the hot spot in the radial direction. For barrel type windings, the hot spot is dependent upon how the cooling ducts are divided between the layers. The discussion reinforced that the winding construction will have bearing on the methodology employed to determine the hot spot.

The Chair stated she would take the information provided along with information from Don Platts' Task Force and incorporate into the Draft Guide.

Being no other business, the meeting was adjourned at 8:48 am.

7.2.2.6 Working Group on Dry-Type General Requirements - Anthony Jonnatti, Chair

The Dry-Type General Requirements working group met at 9:30 AM on April 15, 1996 in the Cornell meeting room of the ANA Hotel in San Francisco, California. There were twelve members and eight guests present. The following are the highlights of the meeting.

The Chair passed out a copy of the minutes from the Boston, MA meeting.

After the introductions, the Chair passed out a summary of the ballots he had received. All ballots were approved and a discussion of the comments was held.

The Chair stated that this working group had completed its work and that he would send the standard to the IEEE for balloting by the Transformers Committee. Upon approval, the working group would then have five years to revise the standard before reaffirmation.

The Chair distributed a lists of topics for discussion. These topics were suggestions to discuss for when we revise the standard in the next five years.

Gene Morehart brought up the fact that we should add the 600 volt class units to the scope of the standard. There was an extended discussion of this topic and it was decided that the small 600 volt class specialty transformers should not be included. The Chair asked Mr. Morehart to make a written proposal on how we may want to add 600 volt class transformers to the standard.

At this time, the minutes of the Boston, MA were approved.

The remainder of the discussions were on the topics for inclusion in the next revision of the standard. A decision was made to have the working group members review the topics distributed by the Chair and to send any comments on these topics as well as any additional topics or suggestions for revising the standard back to the Chair.

Being no further new business, the meeting adjourned at 10:30 AM.

Secretary: Mr. Timothy Holdway

7.2.2.7 C57.96 Working Group on Dry-Type Loading Guide - Michael Haas, Chair

The meeting was called to order at 9:30 AM on April 16, 1996 in the Olympic room in the ANA Hotel in San Francisco, CA with 11 members and 8 guests present. Six of the guests requested membership in the working group.

It was reported by the Chair that he had submitted Part II of the loading guide, which incorporated winding using epoxy resins in the insulation system, to IEEE for balloting and was informed that IEEE no longer would ballot a part of a standard, they would only ballot a complete document. Lin Pierce suggested that Part I be Xeroxed without any changes and Part II attached to it in order to get the document balloted by the Main Transformers Committee. In doing this, we could release the document as is and continue working on the revision to Part I. The Chair agreed to do this in order to keep the document moving forward.

Tim Holdway gave a presentation to the working group comparing the IEC Loading Guide to the existing IEEE Loading Guide. Tim noted that there were not many differences, however in the IEEE document curves were given for life expectancy whereas the IEC document used formulas to determine "daily life consumption." The other notable difference was that there are 3 insulation systems listed in the IEEE document vs. 6 in the IEC document.

After this presentation was given the issue of harmonization with the IEC document was discussed. It was determined after some discussion that the IEEE document was ahead of the European Loading Guide since the IEC guide was initially issued in 1982 and the last update was in 1985. Because of this, it was decided to continue with our work and submit our completed document to IEC.

The minutes from the previous meeting were approved as written after everyone had time to review them.

In other business, Lin Pierce pointed out that IEC uses 20° C as the average ambient whereas the IEEE guide uses 30° C. Lin suggested that in order to make the guide more universal if it were to be used as an IEC document that the ambient temperature be made a variable and a statement be added about the average ambient temperature being country specific. No action was taken on this suggestion.

Being no further business, the meeting adjourned at 10:10 AM.

7.2.2.8 Working Group on Dry-Type Thermal Evaluation - C57.12.56/60, and Flammability - Richard Provost, Chair

Due to a lack of new issues for discussion and a conflict with the TC 14 technical committee meeting, the Chair decided to cancel the meeting. The Chair was given an opportunity at the Dry-Type Subcommittee meeting to discuss the status of his working group. Mr. Provost's comments are as follows.

A revision of C57.12.60 was sent in August 1995 to working group members for review. This revision had comments incorporated from previous drafts and new test methods. These revisions were discussed at the Boston, MA working group meeting.

Some comments and additional revisions were incorporated into the document after the Boston meeting and the Chair now has received a disk from the IEEE with the changes. This document will be sent out in its present form for balloting by the working group.

A draft proposal for an alternative test method using partial discharge has been prepared by Anthony Jonnatti and Mangesh Rajadhyaksha and will also be circulated to the working group for review.

7.2.3 Announcements and New Business

After the working group reports, the following announcements were made by the Chair:

The C57.12.5 series of standards (C57.12.50, C57.12.51, C57.12.52, and C57.12.55) presently maintained by ANSI will now in the future have the standards support supplied by the IEEE, specifically by the Dry-Type Subcommittee. At the Subcommittee Administration meeting, the Chair has requested that these standards be balloted for reaffirmation.

A new PAR form now exists and should be used for all PAR submittals.

The process of selective revision presently being used to maintain C57.12.00 and C57.12.90 was suggested for application to C57.12.01 and C57.12.91 during the Subcommittee Administration meeting. This suggestion will be brought to the attention of the subcommittee chair for consideration.

The Chair reminded members to review the operations manual with regard to requirements for membership in the Transformers Committee.

Being no further new business, the meeting was adjourned at 11:45 AM.

Respectfully yours,

Charles Johnson

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/19/96

ATTACHMENT 4

SUBCOMMITTEE: DRY-TYPE TRANSFORMERS / CHAIRPERSON: W. PATTERSON / PHONE: (919)848-1860 / FAX: (919)856-2418

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	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						ASK FOR PAR EXTENSION
NONE	NOT SPECIFIED	JONATTI A.	02/02/89	09/28/82	1996	(813)442-0414	EXTENDED TO DEC 96
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	PATTERSON W.	06/12/89	/ /	1994	(919)848-1860	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	PATTERSON W.	06/12/89	/ /	1994	(919)848-1860	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	PATTERSON W.	06/12/89	/ /	1994	(919)848-1860	BALLOT REAFFIRMATION
C57.12.55	CONFORMANCE STANDARD FOR TR- DRY-TYPE TRANSFORMERS USED IN UNIT INSTALLATIONS, INCL. UNIT SUBSTATIONS						COPYRIGHT NOT RELEASED
NONE		PATTERSON W.	04/07/86	/ /	1992	(919)848-1860	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			REVISE OR REAFF. BY DEC 96
P745	DRY TYPE DIELECTRIC PROBLEMS	KLINE A. D.	06/27/91	06/28/78	1996	(404)762-1642	REQUEST PAR EXT. TO JUNE 97
C57.12.59	GUIDE FOR DRY-TYPE TRANSFORMER THROUGH-FAULT CURRENT DURATION						EXTENDED 12/1996
NONE	DRY-TYPE THRU FAULT DUR GUIDE	PATTERSON W.	01/01/89	09/13/84	1996	(919)848-1860	ASK FOR PAR EXTENSION
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: 06/19/96

ATTACHMENT 4

SUBCOMMITTEE: DRY-TYPE TRANSFORMERS / CHAIRPERSON: W. PATTERSON / PHONE: (919)848-1860 / FAX: (919)856-2418

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	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			REVISION APPROVED 06/15/95
PC57.12.91	TEST CODE FOR DRY TYPE TR	BARNARD D.	11/29/78	06/01/89	1984	(919)738-4251	REVISION OF PAR NEEDED
C57.16	STANDARD REQUIREMENTS, TERMINOLOGY, AND TEST CODE FOR DRY-TYPE AIR-CORE SERIES CONNECTED REACTORS		NEMA	IAS	T&D		TITLE CHANGE
PC57.16	DRY TYPE REACTORS	DUDLEY R.	09/19/58	12/11/95	1976	(416)298-8108	PAR APPROVED 12/11/95
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	PATTERSON W.	12/09/87	/ /	1992	(919)848-1860	BALLOTTING REAFFIRMATION
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	APPLY FOR PAR EXTENSION
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	PAR WITHDRAWN
C57.124	RECOMMENDED PRACTICE FOR THE DETECTION OF PD AND THE MEASUREMENT OF APPARENT CHARGE IN DRY-TYPE TRANSFORMERS		NONE				REVISE OR REAFF. BY DEC 96
PC57.124	DRY TYPE DIELECTRIC PROBLEMS	KLINE A. D.	06/29/91	06/27/91	1996	(404)762-1642	REQUEST PAR EXTENSION
C57.134	GUIDE FOR THE DETERMINATION OF HOTTEST SPOT TEMPERATURE IN DRY TYPE TRANSFORMERS						PAR APPROVED
PC57.134	DRY TYPE HOT SPOT DETERMINATIO	PAYNE P.	/ /	09/21/95	0	(202)388-2138	
IEEE 259	TEST PROCEDURE FOR EVALUATION OF SYSTEMS OF INSULATION FOR SPECIALTY TRANSFORMERS						PUBLISHED
P259	SPECIALTY TRANSFORMERS	SIMPSON R. W. JR.	06/22/72	03/21/96	1979	(603)284-4362	PAR APPROVED 03/21/96

COORDINATION ACTIVITY OF DRY TYPE SUBCOMMITTEE AS PER: 06/19/96

PROJECT NO.	TITLE				COMMENT OR STATUS OF DOCUMENT
DATE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	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

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

7.3.1 Dry-Type Reactor Working Group - Bill Kennedy, Chair

In the absence of Bill Kennedy, Richard Dudley acted as Chairman. The Dry-Type Air Core Reactor WG met on April 15, 1996 at 2:50 p.m. in the Commonwealth Meeting Room of the ANA Hotel in San Francisco, California. There were 9 members and 5 guests present. The following are the highlights of the meeting.

1. The attendance list was circulated and is attached.

2. The minutes of the Boston meeting were approved.

3. The provisional Draft #11 of C57.16 was the basis for discussions. This provisional Draft #11 was prepared and distributed to WG members. This provisional Draft #1 I was prepared by the Chairman based on the successful ballot of the Transformers Committee in Sept. - Oct. '95. The 6 negative ballots have been resolved and changes (mostly editorial) are included in provisional Draft #11. At the Chairman's discretion input from "approved with comments" ballots are included. Due to the illness of the designated liaison person, coordination with the T&D Committee was not achieved during the ballot. Input has now been received from the T&D Committee's Capacitor Subcommittee. Input is editorial or clarification in nature and has, based on the judgment of the Chairman been included in provisional Draft #11. The Chairman informed the WG that once the WG approved the provisional Draft #11 he would submit it, with any consensus changes, to IEEE. Luigi Napoli has told the Chairman that Draft #11 will be subject to "recirculation ballot"; a process that should take about 20 days plus mailing time. The following discussions then took place.

   (i) The WG members approved provisional Draft #11. The WG then focused on editorial input. Most of the editorial issues resulted from the reorganization of the standard requested by the IEEE editor. Some of the more significant editorials or clarifications are:

   - Section 11.3.6.3 will be modified to state the opposite polarity peak to be 50% in order to be in line with IEEE Std. 4-1995.

   - A definition for rated inductance will be included in 3.7.2.

   - The 4th paragraph in C.1.1 will be eliminated as these iron core reactors are no longer employed and C57.16 does not cover iron core reactors as set out in the Scope. Capacitors are now supplied with discharge resistors and iron core discharge reactors are not required across groups of capacitors.

   - Section 6.2.3 to 6.2.5 of D.10 were eliminated as, redundant to Table 3 at the request of one of the negative balloters. However, information in 6.2.5. (1) (2) and (6) should be maintained. Information in (1) and (2) will be included in Section 11.3.1 of the test code and Section 11.9 will be added to include a statement that seismic verification should be per IEEE Std. 344-1987 (R1993).

   - Section B.3.3 will remain as it essentially was in D.10.

   - Section B.4.4 will remain as it essentially was in D.10.

   - Section C.5.5.4 will remain as it essentially was in D.10 but will be reworded for clarification purposes. A statement will be added that the first mechanical peak of current should be equal to or greater than 1.1 x ("rated discharge current").

   (ii) The Chairman stated that he had already received written or verbal clarification or editorial input from some WG members. He requested other WG members to supply him with such input as

soon as possible as he wished to submit the completed D.11 of C57.16 to IEEE by mid May '96 for "recirculation ballot". The objective is to be able to submit C57.16 to the IEEE Standards Board by mid year.

The Chairman thanked WG members for their contributions to the revision of C57.16. The meeting adjourned at 6:45 p.m. Once the editorial and clarifications are made to D.11 work on C57.16 revision will be complete. Pending a successful "recirculation ballot" C57.16 D.11 will be submitted to the IEEE Standards Board in mid 1996.

7.3.2 The Dry-Type Air Core HVDC Smoothing Reactor TF

In the absence of Bill Kennedy, Richard Dudley acted as Chairman. The Dry-Type Air Core HVDC Smoothing Reactor TF met April 15, 1996 at 8:00 a.m. in the Civic Meeting Room of the ANA Hotel in San Francisco, California. There were 4 members and one guest present. The following are the highlights of the meeting.

1. The attendance list was circulated and is attached.

2. The minutes of the previous meeting were approved.

3. A brief discussion took place on how work on the smoothing reactor standard should proceed in consideration of the prolonged illness of Bill Kennedy. It was decided to discuss this issue at the scheduled meeting of the HVDC Converter Transformer and Smoothing Reactor SC.

4. The Chairman circulated new input from Nigel McQuin and Lars Erik Juhlin re the test code for HVDC smoothing reactors. These notes plus previous input and the minutes from the Boston meeting provided the basis for discussions on test code for oil and dry type HVDC smoothing reactors.

5. The following are the main points of a discussion of the short circuit test.

   (i) Laboratory SC power limits are a key issue. It was decided that the main body of the standard should set a minimum SC current limit of 80% of specified, which if not achievable then a calculation method should be employed to demonstrate SC capability.

   (ii) An ANNEX will be created to provide information re the demonstration of SC capability. Included will be:

   - Background information will be included re test lab SC power limits.

   - A calculation method will be outlined. Required input data and critical stress comparators for oil and dry type SMRs will be provided. Calculation methods re SC capability of transformers will be consulted for reference.

   - Critical stresses that are common for oil and dry type SMRs are winding hoop and compression stresses. For oil reactors how do you demonstrate by calculation that the winding clamping system won't become loose under SC?

   (iii) If an actual SC test is performed, the test set-up guidelines contained in the revision of C57.16 will be included (with some appropriate modification) in the main test code for dry type SMRs.

6. The DC power test was discussed. Input from PR and LEJ provided a basis. Key points are:

   (i) It should be performed for both oil and dry type SMRs and should be done prior to dielectric tests.

   (ii) The test demonstrates the ability to withstand in-service steady state operating conditions and is a quality verification; especially as a check for open circuited conductors.

   (iii) It was noted that rated DC current is used in the measurement of incremental inductance for oil SMRs.

(iv) The magnitude of DC current and duration should be such that the in-service operating temperature rise is approximately achieved by the end of the test. It was decided that a test DC current of 1.2 times rated for a duration of 30 minutes should achieve this for both dry type and oil SMRs.

(v) Test acceptance criteria for dry type SMRs should be Q factor measurement before and after and physical observations such as no smoke or noise. For oil SMRs Q factor measurement before and after may be applicable but gas in oil analysis at the end of the test should be the most positive indicator.

7. The AC power test was discussed as follows.

(i) The test is applicable to both oil and dry type SMRs and should be carried out after the completion of dielectric tests. It is a quality check.

(ii) The test should be carried out at a current and frequency such that the voltage drop is 2 times the voltage drop based on maximum harmonic content at normal load. The duration should be 5 minutes.

(iii) For dry type reactors visual and audible criteria will be employed for evaluation. For oil reactors p.d. measurement will be used for evaluation.

8. The modified turn to turn test was discussed. It is now felt that this test is not required with the advent of modern digital test technologies. Therefore this test will be classified as "OTHER" and only recommended (or may be obligatory) if a digital impulse test system is not used.

The Chairman stated that he would produce a new draft of the test code for oil and dry type SMRs for the next meeting. Bill Kennedy's Draft 4 would be the basis. The meeting adjourned at 9:15 a.m.

7.3.3 HVDC Converter Transformer And Smoothing Reactor SC - Bill Kennedy, Chair

In the absence of Bill Kennedy, Richard Dudley acted as Chairman. The SC met at 10:55 a.m. in the Harvard Meeting Room of the ANA Hotel in San Francisco, California. There were 6 members and 5 guests present. One of the guests, Joe Watson, requested membership. The following actions and discussions took place.

1. The attendance list was circulated and is attached.

2. Richard Dudley informed the SC about the work of the Dry Type SMR TF in developing the test code for HVDC smoothing reactors.

3. Discussion took place on how to proceed with work on the HVDC smoothing reactor standard in view of Bill Kennedy's illness. It was pointed out that work on the test code for both oil and dry type was progressing quite well within the Dry Type HVDC SMR TF Richard Dudley agreed that he would discuss the situation with Wally Binder and look for guidance on how to proceed.

4. During discussions it was discerned that Draft #4 of the HVDC SMR standard that Richard Dudley had received from Bill Kennedy prior to his illness had not been distributed to SC members. Richard Dudley stated that he would send a copy to all SC members prior to the Vermont meeting. In addition he stated that he would produce a Draft #5 which would include all recent work completed on the test code by the Dry Type HVDC SMR TF This would also be sent to all SC members prior to the Vermont meeting. These two documents will be the basis for discussions at the Vermont meeting of the TF and SC.

5. One option for carrying out the work on the SMR standard would be to combine the Dry Type HVDC SMR TF and the SC into a single WG. As there were no other volunteers Richard Dudley stated that he would be willing to chair such a WG although he had no detailed expertise in the area of oil immersed SMRs.

The meeting adjourned at 11:45 a.m.
Richard F. Dudley

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE DATE: 06/19/96

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 OR TF CHAIR	COMMITTEES REQUESTING COORDINATION				LATEST STATUS / COMMENTS
			PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	
C57.129	GENERAL REQUIREMENTS & TEST CODE FOR OIL-IMMERSED HVDC CONVERTER	EM	T&D	PSIM	SUB		PAR EXTENDED TO JUNE 97
PC57.129	TRANSFORMERS AND SMOOTHING REACTORS FOR DC POWER TRANSM 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	(317)286-9387	PAR EXTENDED TO JUNE 1997

COORDINATION ACTIVITY OF HVDC CONV. TR & SMOOTHING REAC SUBCOMMITTEE AS PER: 06/19/96

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

7.4 C57.13 Instrument Transformers - J. E. Smith

7.4.1 Chair's Remarks & Announcements

The subcommittee met on April 16, 1996. The minutes of the November 7, 1995 meeting were approved with a correction to the ratio correction factor in column one changing from .9958 to .9985.

The following WG's reported on their activities at the San Francisco meeting. The Working Group on Test Requirements for High Voltage Instrument Transformers 115 kV and above by Joe Ma, Chairman, Working Group on Instrument Transformers Used with Electronic Meters and Relays by Chris Ten Haagen, Chairman and Working Group on C57.13 Revision by Tom Nelson, Chairman.

7.4.2 C57.13.5 - Working Group On Test Requirements for Instrument Transformers for Nominal System Voltage 115 kV and above - Joe Ma, Chair

Attendees	*Affiliation*
Pierre Riffon	Hydro Quebec
Gregoire Gagne	Hydro Quebec
Jim Flessner	Knopp Inc.
Pat Barry	GEC Alsthom
Rick Sawyer	GEC Alsthom
Vladimir Khalin	Kuhlman Electric Co
Arthur Molden	AMEESCO
Brent Hayman	ABB, Bloomington, IN
Loren Wagenaar	American Electric Power
Anthony Jonnatti	Instrument Transformers Inc.
Donald Ballard	Consultant
Peter D. Zhao	Haefely Trench
Joseph Nelanson	Southwest Electric Co.
R H Hartgrove	Carolina Power & Light
Vadim Raff	Square D Co
Jose R Marotta	Square D Co
Wayne Hansen	Doble Engineering Co.

- The WG (PC 57.13.5) meeting was opened at 8:00 AM on April 16, 1996 by Joe Ma. Sixteen members and guests attended.
- The minutes of the meeting at Boston, Mass, were reviewed and no change was made from the members.
- The importance of a good sealing system and effective sealing test were discussed
- As a special test, Pierre Riffon of Hydro Quebec presented the sealing test set-up and procedure for the SF_6 equipment.
- The frame work of the trial-use guide for the test requirements was submitted

7.4.3 C57.13.6 Working Group Use of Instrument Transformers with Electronic Meters and Relays - C.T. Haagen, Chair

Members & Guests Present	*Affiliation*
Vis Thenappan	SESCO
Brent Hayman	ABB
Jim Smith	ABB
J H Harlow	Beckwith Electric
Chris Ten Haagen	GE
Pat Barry	GEC Alsthom T & D Balteau (guest)
Rick Sawyer	GEC Alsthom
Anthony Jonnatti	ITI
Anne O'Neil	IEEE PES
Jim Flessner	Knopp Inc.
Vladimir M. Khalin	Kuhlman Electric Corp.
Tom Nelson	NIST
Joseph Ma	Ritz Instrument Transformers
V. Raff	Square D Co.

Meeting began on April 16, 1996 at 11:00 AM.

Old Business

Approval of Minutes, Boston, MA

New Business

Comments on 0.15 proposal from last meeting circulated by the chairperson were that it should stand alone as in a guide (PAR PC 57.13.6 is being circulated for review and comment, with final action set for 19 September) rather than an addition to C57.13, so that it would not delay the 5 year cycle for updating. There was no further discussion or suggestion regarding other limits, however.

There was some discussion regarding the need for improved definition of burden tolerance in C57.13. Tom Nelson indicated that section 8.1.1 provides maximum uncertainties of 0.1% for test and calculations. Members are asked to review this section for adequacy in light of 0.15 accuracy limits, especially when testing CT's at 5% of rated load. Test equipment manufacturers may have a strong interest in this area.

The meeting was closed at 12:00 PM

7.4.4 Minutes for the working group on revision C57.13 - Tom Nelson, Chair

The working group met on April 16, 1996. There were 10 members and 10 guests present. Several proposed changes to the standard were discussed in the meeting. There was a general consensus to define tolerances for burdens on instrument transformers. Changes to some tables that would make them more readily understood were agreed upon. It was decided that at this time it would be too time consuming to specify transient performance for CT's; this subject will have to be dealt with in the future by a working group formed for just that purpose. Several other items on the agenda did not get discussed due to lack of time. The chairman of the working group will send out proposed changes and topics to working group members before the next meeting in order for consensus to be reached on the proposed changes. The changes will have to be voted on in 1997 for the PAR deadline to be met.

7.4.5 Old Business

1. C57.13.2 Standard titled Performance Testing Procedures for Instrument Transformers did not receive enough return ballots for the reaffirmation or canceling of this standard.

2. C57.13.3 Standard titled Guide for Grounding of Instrument Transformers Secondary Circuits and Cases did not receive enough return ballots to reaffirm or cancel this standard.

3. Ballot for Partial Discharge Testing of Instrument Transformers by either using IEC Publication 270 or Proposed Guide P832/65 was discussed. Since only one response was received concerning this proposal, the members of the subcommittee were asked to submit their written opinions and the chairman would circulate to the committee members.

4. The Chairman reported on his attendance to a CIGRE Working Group 12.16. The CIGRE Working Group requested that the Chairman furnish them the US Test Requirements with the reason why we specify different tests than the IEC Standards. Joe Ma, Vadim Raff, and Pierre Riffon have volunteered to develop this information.

5. The request for interpretation of the K Class was discussed. The comments back from the members were that they were not clear as to exactly what the K Class was supposed to mean. We will respond back that this K Class is not applicable because there is not a definition of it available.

7.4.6 New Business

1. C57.13.1 titled Field Testing of Current Transformers expires in 1997. A ballot will be sent out to determine whether we should reaffirm or cancel this standard.

2. The subcommittee received a request from C57.12.00 to comment upon the requirement for shielding of current transformers in the bushing pocket. The subcommittee members will submit in writing to the Chairman, their response to this request.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE DATE: 06/19/96

ATTACHMENT 4

SUBCOMMITTEE: INSTRUMENT TRANSFORMERS / CHAIRPERSON: J. E. SMITH / PHONE: (919)827-3220 / FAX: (919)827-4286

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS COMMENTS
C57.13	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS		PSIM	PSR SPD			WORKING ON CHANGES
P546	SUBCOMMITTEE	NELSON T.	03/30/94	06/14/94	1999	(301)975-2956	REV. PAR APPROVED 06/14/94
C57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS						R1992
PSRC	SUBCOMMITTEE	SMITH J. E.	08/25/87	/ /	1997	(919-827-2121	RELAY COMM. DOCUMENT
C57.13.2	CONFORMANCE TEST PROCEDURES FOR INSTRUMENT TRANSFORMERS						REVISE OR REAFF. BY DEC 96
NONE	SUBCOMMITTEE	SMITH J. E.	04/16/86	09/26/91	1996	(919-827-2121	REQUEST PAR EXT. TO JUNE 97
C57.13.3	GUIDE FOR THE GROUNDING OF INSTRUMENT TR SECONDARY CICUITS AND CASES						REVISE OR REAF. BY 12/96
NONE	SUBCOMMITTEE	SMITH J. E.	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 WITHDRAWN
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: 06/19/96

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. E. SMITH	919-827-3220
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	919-827-3220
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	J. E. SMITH	919-827-3220
PC57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS					REAFFIRMED 1992
12/31/80		PSR	ARUN G. PHADKE	703-231-7029	J. E. SMITH	919-827-3220

7.5 Insulating Fluids - F. J. Gryszkiewicz

The Insulating Fluids Subcommittee met in San Francisco, California on Monday and Tuesday, April 15 and 16 with 33 members and 35 guests in attendance. Of the 35 guests in attendance, one requested membership on the Subcommittee. This brings the total membership of the Insulating Fluids Subcommittee to 74.

The minutes of the meeting held in Boston, Massachusetts (November 6 and 7, 1995) were approved as submitted.

7.5.1 Current Subcommittee Projects

7.5.1.1 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 Insulating Fluids Subcommittee on Monday, April 15 to discuss this item of business. Since the last meeting in Boston, Draft 10 of the document was balloted at the Main Committee level. The results of the ballot were as follows:

Affirmative	98
Abstentions	13
Negative	12

The ballots for Draft 10 were reviewed at the meeting and the negative ballots resolved. The Subcommittee will submit Draft 11 for recirculation to Main Committee prior to the next meeting in Burlington, Vermont.

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

Since the last meeting in Boston, Draft 8 of this document was balloted at the Main Committee level. Since tile ballot was due to close on May 3, 1996, no action was taken on this item at our meeting as it was before the closing of the ballot.

The Subcommittee will address this item at our next meeting in Burlington, Vermont.

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

The Working Group met on Monday, April 15 to discuss Draft I of the revision to this Guide. Additional changes were recommended and Draft 2 will be balloted at the Subcommittee level prior to the next meeting in Burlington, Vermont.

7.5.1.4 C57.104 - IEEE Guide for the Interpretation of Gases Generated in Oil-immersed Transformers

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

The Working Group Chairs were unable to attend the San Francisco meetings due to other business commitments; however, they were in communication with the Subcommittee Chair prior to the meetings. These two guides were extensively revised in 1991 and only minor revisions are expected to be incorporated this time around. Draft I for each document is expected to be sent to Working Group members prior to the next meeting in Burlington, Vermont.

7.5.2 Other Business

There was discussion on the need to develop a guide for the interpretation of gases generated in load tap changers (LTC). A Working Group was established to begin work on this project. Members of this Working Group include:

Fred Jacob
George Forrest
Bob Turcotte
Jim Dukarm

This Working Group Still needs a Chair. When a Chair is appointed, a PAR will be issued. The Working Group hopes to have Draft I prepared prior to the meeting in Burlington, Vermont.

This concluded the business for the Insulating Fluids Subcommittee at this session. The Subcommittee will next meet in Burlington, Vermont on Monday and Tuesday, October 28 and 29, 1996.

Frank J. Gryszkiewicz, Chair
Eugene Kallaur, Secretary

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE DATE: 06/19/96

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 OR TF CHAIR	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				REVISE OR REAFF. BY DEC 96
PC57.104		HEINRICHS F. W.	06/07/92	05/31/90	1996	(412)941-6924	REQUEST PAR EXT. TO JUNE 97
C57.106	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF INSULATING OIL IN EQUIPMENT		NONE				REVISE OR REAFF. BY DEC 96
PC57.106	SUBCOMMITTEE		11/20/91	06/19/86	1996	(617)926-4900	REQUEST PAR EXT. TO JUNE 97
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	(617)926-4900	ASK FOR FOR PAR EXTENSION
C57.121	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS		PSRC T&D IAS IEC				PAR APPROVED 03/21/96
P954	HYDROCARBON FLUIDS	McSHANE C. P.	02/22/88	03/21/96	1996	(617)926-4900	REAF DISAPPROVED 03/15/95
C57.130	T-U GUIDE FOR USE OF DISS. GAZ ANALYSIS DURING FACTORY THERMAL TESTSFOR THE EVALUATION OF OIL-IMMERSED TRANS. AND REACT.		NONE				PREPARING D10
PC57.130	GAS ANALYSIS DURING FACT.TESTS	HEINRICHS F. W.	/ /	03/17/93	0	(412)941-6924	CHANGE IN TITLE AND SCOPE
C57.137							
PC57.137			/ /	/ /	0	(617)926-4900	
IEEE 637	GUIDE FOR THE RECLAMATION OF INSULATING OIL AND CRITERIA FOR ITS USE						REAFFIRMED 03/18/92
P637	SUBCOMMITTEE		06/04/84	/ /	1997	(617)926-4900	
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	(617)926-4900	
IEEE1258	TRIAL-USE GUIDE FOR INTERPRETATION OF GASES GENERATED IN SILICONE-IMMERSED TRANSFORMERS		T&D ICC				PAR REVISION APPROVED
P1258	GUIDE FOR GAS ANALYSIS-SILICON	GRYSZKIEWICZ f.	/ /	06/15/95	0	(617)926-4900	D08 TO BALLOT

COORDINATION ACTIVITY OF INSULATING FLUIDS SUBCOMMITTEE AS PER: 06/19/96

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

7.6 Insulation Life - L. W. Pierce

The Insulation Life Subcommittee met on Tuesday, April 16, 1995, with 33 members and 32 guests in attendance. The minutes of the Nov. 7, 1995 meeting in Boston, Mass. were approved as written. The reports of the Working Groups and Task Forces were then given.

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

The Task Force met on Monday April 15, 1996 at 8:00 AM with 18 members, 2 new members, and 31 guests present. The minutes of the Nov. 6, 1995 meeting in Boston were approved as written.

Draft #3 was sent to the task force, but was not balloted. At the meeting comments from those present and comments sent in by Lin Pierce were reviewed. The comment from Lin Pierce was that a section to elaborate on the calculation of oil temperature be added. There was general agreement that it is required. Lin Pierce, Bob DelVecchio and Pierre Feghali will provide suggested wording for the next draft.

Another comment from Lin Pierce was whether Option #3 is needed. Any manufacturer who follows this option will also comply with Option #1. Bob Grubb commented that Option #3 was originally put in to take care of small transformers which are made in large volumes, where there is no time for individual calculations. Therefore, this option gives leeway for testing those large volumes. After discussion, it was concluded that none of the manufacturers represented utilize that method but all do some customization of individual transformers. A motion was made to remove Option #3 and it passed with only 1 dissenting vote.

Don Platts asked if Option #2 is a similar case? Since the manufacturer must perform the calculation of Option #1 before placing sensors, hasn't he complied with the requirement? Dan Perco commented that Option #1 has a proven model. Option #2 could be used when there isn't a verified model, so sensors are then used for the verification, and feedback into model improvements. Lin Pierce commented that there are factors included in Option #2 which are not addressed anywhere else. There was no general support for removing Option #2.

Ed Norton suggested that a section on verification of the calculations more detailed than lines 88-90 be added. He volunteered to draft something, although most opinions expressed were that the present wording is sufficient. Don Fallon proposed to retain lines 88-90 as is and the Task Force concurred 17-3.

The Task Force concurred that the deadline for submitting proposed wording changes to Don Platts would be mid-May. The Task Force, Working Group on Thermal Test, and Insulation Life SubCommittee would be balloted in the summer.

7.6.2 Working Group on High Temperature Insulation for Liquid-Immersed Power Transformers - Michael A. Franchek, Chair

The Working Group met at 9:30 AM on April 15, 1996 with 25 members and 23 guests present. Three guests requested membership, bringing the membership to 49 members. After introductions, the minutes of the November 6, 1995 meeting were approved as written.

As the first order of business, The Chairman discussed the status of the PAR revision and read a copy of the letter dated 3/21/96 granting a revision and extension. There was a question in the letter regarding the scope of the PAR by NESCOM. The Chairman noted that the Working Group had already agreed to limit the scope to power transformers.

The Chairman then reviewed the ballot of Draft 5.0 of this document which included changes to resolve three negative ballots on Draft 4.0. The results of the ballot was as follows:

Group	Working Group	Subcommittee
Number Mailed	44	62
Number Returned	36	46
Percent Returned	82	74
Number Negatives	1	0

The Chairman then reviewed the negative ballot and changes which were made to resolve this ballot as part of Draft 5, Revision 1, which was handed out at the meeting. The first changes involved the additions or modifications of several definitions, including those for average winding temperature rise, average winding rise, high temperature insulation system, hybrid high temperature insulation system and transformer. During the discussion of these definitions, it was agreed to modify the definition for the hybrid high temperature insulation system to have the maximum temperature limit for cellulose be consistent with Table I in the document. A second change would be to eliminate the reference to 65 °C rise in the definition for average winding temperature rise.

Other items changed to address the negative ballot involved clarifying the difference between high temperature insulation systems and hybrid high temperature insulation systems in the document. The Chairman will further review the document to make sure all such references have been clarified.

Other comments from the Working Group involved markings of the normal insulation life curves (these will be made as part of the next draft). The phrase MCR will be modified to MKR to differentiate between kraft-cellulose and conductor rise.

One other comment discussed involved the continued need to include a reference to 55 °C rise systems. The consensus of the Working Group was to continue to include a this reference, with a modification of Section 5.1 to use the words "insulation systems" instead of "insulating materials". The Chairman noted that 55 °C rise systems are mentioned within this document as a result of a negative ballot a number of years ago. The Chairman also agreed to modify the introduction to describe the historical basis for including this reference.

The Chairman then commented as to his plans to incorporate these final changes and a final typographical edit into Draft 5.2 and circulate it to both the Working Group and the IEEE Standards Editor for review. He will request a quick turn around of the draft, asking the Working Group to comment only if the changes to resolve the negative would cause them to change their affirmative vote to a negative. The Chairman will then develop a Draft 6.0 from the comments of both groups, and then ballot the Transformers Committee prior to the next meeting. A motion was voted on and approved to go forward with these plans.

OLD BUSINESS

A thank you letter was sent to Bill McNutt for his efforts on the Working Group.

The Chairman is still looking to the members of the Working Group to submit any DGA information they have on transformers with high temperature insulation, to expand upon the data presented in Annex A. This data could be from either factory tests or from sampling units in service. Information on the transformer loading would also be helpful.

7.6.3 Task Force on Definition of Thermal Duplicate - Barry Beaster, Chair

The Task Force met on Monday, April 15, 1996 with 8 members and 12 guests attending. Chairman Barry Beaster could not attend and Bob Grubb, Chairman of the Working Group on Thermal Tests presided. The minutes of the November 6, 1995 meeting in Boston were approved as read.

In response to a request for further discussion of issues to be incorporated into a revised draft 4.0 of the document, Lin Pierce suggested that sample calculations be prepared to test the equations being proposed. These example calculations may be included as an Informative Annex. Bob Grubb, Lin Pierce, and Pierre Feghali agreed to provide sample calculations which will be circulated to the Task Force for review prior to the next meeting.

There was a lengthy discussion of an objection raised by Mark Perkins. He believed that the direction the document was heading was wrong. He expressed concern that the factors being considered for the definition of thermal duplicate would not assure the thermal performance of a transformer sold as a thermal duplicate. Discussion which followed acknowledged that the definitions and equations as presented would not guarantee the thermal performance of a specific transformer designated as a thermal duplicate. However, at the present time it increased the probability of complying with thermal guarantees over the present situation where there is no definition of what constitutes a thermal duplicate. The present draft represents the best efforts of the Task Force to:

- define a list of thermal factors which must be considered, without requiring manufacturers to publish or reveal proprietary information.
- establish acceptable ranges of values for these factors, over which it was believed the calculated results would be reasonably accurate.

No alternate to the present direction of the work was suggested or presented, other than to return to the present situation where a "thermal duplicate" is not defined. The majority of the members present agreed to continue the process with the preparation of Draft 4.0 to be balloted before the Task Force and Working Group on Thermal Test prior to the next meeting.

Another lengthy discussion followed regarding the problems this definition may impose on transformers being repaired, where the repaired transformer was redesigned. Bob Grubb explained that he thought much of the concern was due to a misunderstanding of the term "Design Test". Those expressing concern were interpreting the term more narrowly then the definition in C57.12.80. The term is much more broadly defined than the interpretation apparently being made and it was believed that the broader interpretation would not impose any more restrictions on the redesign of repaired units than presently exist.

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

The Task Force met at 2:50 P.M., April 15, 1996 with 6 members and 31 guests present. Gordon Denny with Ferranti-Packard Mexico requested membership on the Task Force bringing the total membership to 16. Following introduction of members and guests, the minutes of the November 6, 1995 meeting in Boston were approved as submitted.

Draft 3 of proposed changes to the Section 11 of the Test Code were reviewed. Discussion centered on the changes between the Draft 2 and Draft 3. During discussion of Draft 3 the following changes were identified for inclusion into Draft 4:

1. In 11.3.1 and 11.3.2 , the IEC cooling class designation will be included in parenthesis next to their equivalent IEEE designation.

2. In 11.2.2 c, which discusses the preferred methods for measurement of bottom liquid temperature, Bob Grubb agreed to provide revised language to replace a statement cautioning against the placement of thermocouples in the direct blast of fans on fan-cooled transformers. Bob believed that it may not always be possible to place surface thermocouples isolated from the effects of fans, unless shielding methods are employed. Bob's substitute language will describe the shielding methods to mitigate the effects of moving air from fans.

3. Considerable discussion was given to clause 11.2.3.1, correction of winding temperature to instant of shut down. For the cooling curve method, it was agreed to change the minimum number of resistance readings from 4 readings to 10 readings, with the maximum time interval between readings not to exceed three times (3x) the minimum time interval between readings. The Task Force believes more than 4 resistance readings are needed for accurate extrapolation of average winding temperature to instant of shut down. In Draft 3 two methods are described for fitting an exponential equation to resistance-time data. Method 1, the preferred method, is based on fitting an equation to average winding temperature rises above the liquid temperature measured at shut down. Method 2, an alternate method, is based on fitting an equation to average winding resistance rises above the average winding resistance referenced to the liquid temperature at shutdown. The Task Force believes that example calculations, illustrating the two curve fitting methods, should be developed for inclusion into an informative annex.

4. Additional discussion was held about the accuracy of the empirical method for correction of winding temperatures to instant of shut down. Concern was raised about this method because it requires only one reading of hot resistance for each winding. During the Boston meeting, the Task Force was hesitant about removing the empirical method from the document, choosing instead to make the cooling curve method the preferred method for temperature correction, and placing it ahead of the empirical method. However, during this meeting, the Task Force was more bold. By a show of hands, 10 in favor and 1 against, the Task Force voted to remove the empirical method from the document. In a second show of hands, 7 in favor and 1 against, the Task Force voted to move the empirical method to an informative annex.

5. Subhash Tuli raised an issue about the subscripts used on the $\Delta\Theta$ symbols in clauses 11.3.1 and 11.3.2. These subscripts will be reviewed to insure consistency with symbols used in other documents.

The Chairman will incorporate the above changes into Draft 4 of the document. It is the intention of the Chairman to ballot Draft 4 simultaneously in the Task Force, the Working Group on Thermal Tests, and the Insulation Life Subcommittee. We will review the results of our ballot at the next meeting in Burlington, Vermont.

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

The Working Group met at 1:20 P.M. on April 15, 1995 with 8 members and 24 guests present. After introduction of members and guests, the minutes of the last meeting were read and approved.

The primary topic of discussion was Draft 4 of the Standard Test Procedure for Thermal Evaluation of Liquid Immersed Distribution and Power Transformers. This most recent draft has incorporated all the modifications resulting from negative ballots and other comments received during the balloting of Draft 3 at the Insulation Life Subcommittee level. It was agreed by the Working Group that with some minor editorial changes Draft 4 is now ready for balloting at the Transformer Committee level.

One question was raised concerning the need to obtain EPRI approval to use text and pictures in Annex B which were the result of an EPRI project. This Annex proposes a suggested method for thermal evaluation of model power transformers. It was recommended that Stan Lindgren be contacted to request this approval. Also, Mike Franchek agreed to contact Dean Yanuchi in an attempt to locate the original photographs of the power transformer model core and coil, which are used in this annex. The original pictures will be needed when the standard is approved and ready for publishing. Lin Pierce also noted that the PAR for this project has expired and that a new project authorization request should be completed and forwarded to George Vaillancourt.

A Target schedule was established to complete the suggested minor editorial changes to draft 4, and submit it to the Transformers Committee for ballot by May 31.

7.6.6 Working Group on Thermal Tests - R. L. Grubb, Chair

The Working Group on Thermal Test met at 4:15 P.M. on Monday, April 15, 1996 with 20 members and 13 guests in attendance. Three of the guests requested membership and are welcomed to the Working Group. These new members are:

Gordon Denny, Ferranti-Packard de Mexico
Dennis Marlow, Farranti-Packard de Mexico
Steve Snyder, Kuhlman Electric Corp.

After the introductions, the minutes of the November 6, 1995 meeting in Boston were approved as mailed. The rest of the meeting was taken up with review and discussion of PC57.119 **"Recommended Practice for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Ratings".**

Chairman Bob Grubb had distributed Draft 13 at the last meeting. Draft 13 consisted of a major re-write to comply with the requirements of the 1994 IEEE Style Manual. Subsequent to the last meeting, Draft 13 was mailed out for ballot to the Working Group. The Chairman was appreciative of the time and effort spent by those individuals who had responded, but expressed dismay that only about 16 of the 51 members had done so. This created a serious burden for the Chairman in repeated contacts to Working group members delinquent in responding. All were reminded of their duty to respond, and note was made that the membership roster will be reviewed again to purge from the listing those who have not attended any of the recent meetings and have not responded to the ballot.

There were three negative ballots received, as well as very many editorial comments. Chairman Grubb incorporated the editorial comments, and many of the comments from the negative ballots, into a Draft 13.1, which was distributed at this meeting together with a three page listing of the unresolved items. The remainder of the meeting involved working review and discussion to resolve these issues. two of the negative ballots were from Mark Perkins and Barry Beaster, and

unfortunately these gentlemen were not able to attend this Working Group session to participate in these discussions. Resolution of these items proceeded as follows:

(NOTE - all references to clauses here are as found in Draft 13.1)

Item 1 (Page 12, and clauses 9.6 and 9.7) - Request to change the definition of P_1, P_2, P_3 to allow these losses to be calculated per the measurements done according to C57.12.90, rather than be measured as recommended in this procedure. There was also concern as to how these loss values could be used to determine the current to be circulated in the test (equations 2 and 3) when the actual values of losses could not be determined until measured during the test. While acknowledging there was some merit to these concerns, the Working Group consensus was that the wording of Draft 13.1 could not be improved at present.

Item 2 (Clause 6.2) - Delete "one or more" referring to the number of thermocouples to be used, as C57.12.90 only calls for "a" thermocouple. The consensus of the Working Group was that this did not represent a conflict with C57.12.90, and it was left as is. Request was also made to delete reference to inches (for placement of thermocouple below the top oil surface) in favor of the metric equivalent, but the Chairman pointed out the present guidelines are to include both references. Change was made in Draft 13.1 to include both English and metric values.

Item 3 (Clause 6.3) - request to delete this section on recording measurements of fiber optic temperature sensors, when so equipped. The consensus of the Working Group was that recording the readings of these devices was appropriate, and this section will be left in.

Item 4 (Clause 6.4) - Question on tolerance requirement of ± 0.5 % for input current. In response to this comment, a change was made in Draft 13.1 suggesting measurement accuracy tolerance of ± 0.5 % and the requirement to hold current constant within ± 1 %.

Item 5 (Clause 9.2 h) - Request to delete measurement of oil level change. After discussion, the consensus of the Working group was that this measurement was appropriate, and no change will be made to the wording of Draft 13.1.

Item 6 (Clause 9.4) - Request to change wording from "shall" to "may" in reference to stopping the test due to discontinuities. The wording was changed to "should" in Draft 13.1, and the consensus of the Working Group was to leave 'should' in place. In response to a comment that allowing oil to cool down to initial value before re-starting the test was impractical, the wording was changed in draft 13.1 to allow cooldown to within 5 degrees Centigrade of initial value.

Item 7 (Clause 10.5.a) - Request to delete the reference "at rated frequency', for description of the current to be circulated during test. This was accepted and the change was made for Draft 13.1.

Item 8 (Clause 9.8.3) - Request to delete the entire section on Winding Hottest Spot Temperature Rise, in favor of having this type of information in C57.12..90. It was pointed out in discussion that this section was included to address negative ballots requiring reference how such rises could be determined. While the concern as to the proper location of such discussion is understood, there is no method presently in C57.12.90. The consensus of the Working Group remained that this clause should stay in this document.

Item 9 (Clause 9.8.4) - Concern again (as in item 1) on the impact of "tested" versus "calculated" losses in the equations for determining the exponent "n". In discussion, it was agreed that the modifications made in Draft 13.1 could not be improved upon at this time.

Item 10 (Clause 9.9) - objection to this section on dissolved gas analysis because it was felt it required a pass-fail criteria be established. The consensus of the Working Group was to leave this section in, as it did not require a pass-fail criteria, but only suggested one 'may' be established by mutual agreement of user and manufacturer.

Item 11 (Clause 10.5) - Request to change interval for data recording for load cycle test from 15 minute intervals to allow a 30 minute interval was more appropriate due to the allowable load variations in the load cycle test. In addition, after further discussion, it was decided that a more understandable wording for the intervals discussed in this clause and in clause 6.0 would be to substitute wording like "intervals of 15 minutes or less" in place of "minimum intervals of 15 minutes."

7.0 Reports of Technical Subcommittees (cont'd)

Item 12 (Clause 10.6.a) - Concern for stabilization of top liquid temperature rise defined by measurements being within ±1 °C over 2 hours. After discussion it was decided to make a modification on the next Draft to be in accordance with C57.12.90 in allowing stabilization to be reached when measurements were within 2.5 % or ±1 °C, whichever is greater.

Item 13 (Clause 10.7) - Objection to the statement that the load cycle test "must" be started over due to shutdown or data recording discontinuities. The consensus of the Working Group discussion was that verification of load cycle performance (per Clause 1.2.b) could not be demonstrated if significant discontinuities did not result in re-starting the test. It was felt, however, that a change to the word "should" was more appropriate than "must", and this change will be made.

Item 14 (Clause 10.8) - Objection that this section implied a pass-fail criteria for assessment of transformer performance, and request that the wording be modified to indicate that useful information may be provided by the testing. This concern is understood, but the Working Group consensus again was that one of the purposes of this document is to provide a procedure to verify load cycle performance and that Clause 10.8 as written is appropriate for that purpose.

This concluded the discussion of unresolved items. As the meeting had gone beyond allotted time in covering the above items, the meeting was adjourned at 5:45 PM. Prior to adjournment, the Working Group expressed appreciation for the work of Chairman Grubb in the massive modifications to the document to meet the IEEE style requirement. Changes to Draft 13.1 will be incorporated into the next draft which will be balloted shortly. Working Group members were reminded to respond promptly to the coming ballot.

D. L Fallon Secretary

7.6.7 Old Business-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.

7.6.8 Announcements and New Business

1. The Chairman reported that Rochelle Stern, IEEE Project Editor, has completed editing the Loading Guide submitted last year. It is scheduled to be printed April 25,1995. It will carry the designation C57.91-1995. C57.92-1981 and C57.115-1991 have been withdrawn since they were incorporated into the new C57.91.

2. The Chairman announced a Subcommittee goal to complete all documents under development by the end of 1997. After completion then new activities for the Subcommittee may begin.

3. A question was received from the Task Force on Cooling Class Designations of the Performance Characteristics Subcommittee on whether use of the IEC designation OD for forced oil cooling implied a permissible average winding rise of 70 °C per IEC. After a brief discussion it was concluded that it did not since the average winding rise was given in C57.12.00, appeared in the one line rating on the nameplate, and also appeared in customer specifications.

4. A request for liaison was received from a Working Group of the Relay Committee for preparation of a tutorial on transformer loading and the effect on transformer protection. Ron Barker has been assigned from the Performance Characteristics Subcommittee. The Chairman of the Insulation Life Subcommittee will answer this request.

Respectfully Submitted by:

Linden W. Pierce
Insulation Life Subcommittee Chair

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE DATE: 06/19/96

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 OR TF CHAIR	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 WITHDRAWN
PC57.12.001	THERMAL TESTS	GRUBB R. L.	/ /	05/31/90		1997 (414)547-0121	WORK INCLUDED IN C57.12.00
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	
C57.12.90	REVISION OF TEMPERATURE RISE TESTS						TO BALLOT D3 IN TF, WG, SC
PC57.12.90	THERMAL TESTS TF	HENRY G.	/ /	/ /		0 (501)543-6546	
C57.91	GUIDE FOR LOADING MINERAL OIL-IMMERSED TRANSFORMERS		SUB	T&D	PSE		REVISION APPROVED 06/15/95
PC57.91	GUIDES FOR LOADING	PIERCE L.	03/21/91	06/13/85		1996 (706)291-3166	REVISION OF PAR NEEDED
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	PAR WITHDRAWN
C57.115	GUIDE FOR LOADING MINERAL-OIL-IMMERSED POWER TRANSFORMERS RATED IN EXCESS OF 100MVA (65 C WINDING RISE)						REVISE OR REAFF. BY DEC 96
P756	GUIDES FOR LOADING	PIERCE L. W.	03/21/91	06/15/91		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	APPLY FOR NEW PAR

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE

DATE: 06/19/96

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 OR TF CHAIR	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS COMMENTS
IEEE1276	TRIAL-USE GENERAL REQUIREMENTS FOR LIQUID-FILLED DISTRIBUTION AND POWER TR UTILIZING HIGH TEMP SOLID INSULATING MATERIAL	T&D					PAR APPROVED 03/21/96
P1276	HIGH TEMPERATURE INSULATION	FRANCHEK M. A.	/ /	03/21/96	0	(802)748-3936	

COORDINATION ACTIVITY OF INSULATION LIFE SUBCOMMITTEE AS PER: 06/19/96

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

7.7 Performance Characteristics - H. Jin Sim

7.7.1 Introduction/Attendance

The Performance Characteristics Subcommittee (PCS) met at 9:30 a.m. on Tuesday April 16, 1996, at San Francisco, CA with 61 members and 45 guests attending. This is a new record. Previous record was 99 attendance in Boston meeting.

7.7.2 Approval of Meeting Minutes

The minutes of the November 7, 1995, PCS Meeting in Boston, MA were approved as written.

7.7.3 Chairman's Remarks

7.7.3.1 Administrative Subcommittee Notes

Several items of the discussions held at the April 15,1996 Administrative Subcommittee meeting were highlighted as follows:

1. Pete Krause has resigned as a WG Chair for PCS Revision to C57.12.00 and Don Platts will assume the chairmanship of the WG. Pete is retiring later this year and would not be able to continue the committee work. Pete was recommended for Certificate of Appreciation from the Transformers Committee.

2. The next Transformers Committee meeting will be held in Burlington, VT, hosted by Tom Prevost. Spring 97 meeting will be held in Graz, Austria the week before IEEE/PES Summer Power Meeting in Berlin, Germany. The host Ed Trummer is trying to negotiate the best deal for the flight tickets and looking for some idea on how many of us are planning to attend. The main committee meeting on Wednesday will have an extra roster circulated to indicate your plan.

3. There will be a discussion of the new PES balloting process during the Wednesday main committee meeting and all TF and WG chairs are requested to attend.

4. A special PCS presentation by Jeewan Puri on Interaction between breakers and transformers was held on Monday (5:00 p.m. to 6:10 p.m.) to determine the interest level within the PCS. The brief discussion took place Monday night and the committee chair Wally Binder will communicate this to the Switchgear Committee (C37) and give us a direction as to our next step with the issue.

5. TF and WG chairs are requested to update their roster and submit them to SC chair with the meeting minutes. These rosters will be used for PES directory.

7.7.3.2 Membership

New Members, Rajendra Ahuja (North American Transformer) and Felipe Weffer (ComEd Company) were added to the roster. Membership now stands at 95.

7.7.4 Agenda Changes

Added new business items as described later.

7.7.5 Working Group Reports

7.7.5.1 Revisions to C57.12.90 - H. J. Sim

Guide for Short Circuit Testing - Nigel McQuin

The WG on Performance Characteristics Subcommittee Revision of C57.12.90 and WG for Guide for Short Circuit Testing met on Monday, April 15, 1995, at 9:30 a.m. with 34 members and guests attending.

The chair reported that the Proposed Change on Certified Test Data has been forwarded to Steve Smith, Standards Subcommittee WG Chair for C57.12.90 for inclusion in the next complete Test Code.

The chair reported the results of PCS ballot for the Measurement of control circuitry and system/auxiliary losses on class I and class II power transformers. Subhash Tuli of Waukesha Electric Systems conducted the ballot and has received only 67 % return. Subhash will continue to work on getting more ballots returned and resolving 12 % negative ballots. John Matthews, Vice Chair of the Transformers Committee, commented that Subcommittee ballots do not require 75 % return and 75 % affirmative that applies to the main committee ballots.

Dave Barnard, chair of Dry type test code, announced that their standard C57.12.91 has been published and now available.

The chair stated that he is looking for someone to chair the WG for PCS revision to C57.12.90 as he has too many conflicts in our meeting schedules.

Next WG, Guide for Short Circuit Testing did not have any progress to report since the chair Nigel McQuin could not attend the meeting. Jin Sim stressed the need for experts in LVI part of the test code and there were two names mentioned to have extensive experience on the subject. They are Jerry Corkran of Cooper Power Systems and John Vandermaar of Power Engineering Labs. Jin Sim will encourage the WG chair Nigel McQuin to contact these individuals. After the WG meeting, Bipin Patel suggested that we should break-up the Part II of the C57.12.90 so that we have a working draft of the separate Short Circuit Test guide and Jin Sim will recommend this to Nigel McQuin.

The meeting adjourned at 9:45 am.

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

The meeting was held on Monday, April 15, 1996, at 2:50 p.m. in San Francisco, CA. with 23 members and 11 guests present. One guest requested membership. The meeting was conducted by a WG member, Tony Siebert, for the chair who could not attend the meeting.

The first order of business was approval of the Boston, MA. Minutes. They were approved without comment.

A proposal was distributed by Jerry Frank to use the term "K" instead of the term "F HL." Jerry read the motion to the group and offered further explanation. The discussion was then opened to the group. Don Kline offered support for the term "K" factor when using commercial applications. Linden Pierce referenced a previous proposal that discussed the technical difference between "K" and "F HL.", this information will be distributed for comment and possibly added to the Appendix in the next draft. It was noted that the existing C57.110-1986 does not refer to the term "K" factor. A handout was distributed that used the term "K" factor as "the ratio of copper area to window area", this handout showed the confusion that can exist since the term "K" is used often. Other examples of "K" being used were noted. Upon completion of the discussion a motion was made.

Jerry Frank made a motion " that the term "K" replace the term "F HL." as currently used in C57.110". The motion was seconded by Don Kline. A vote was then taken, the results were 4 in favor of and 19 opposed to the motion. The motion did not pass.

Another request for information on the eddy loss survey was made, the data set collected is too small to be of technical assistance.

A report from the Task Force was distributed and presented by Dudley Galloway. The report noted changes to Draft 3 and an example calculation for liquid filled transformers. The task force resolved that an accurate "cookbook" approach is not practical. The example showed that derating can vary greatly depending upon technique. The task force will continue developing methods for liquid filled transformers.

Comments to updated sections by Nigel McQuin were distributed for review and will be incorporated into Draft 4.

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

The WG on Loss Tolerances and Measurement met on Monday, April 15, 1996, at 2:50 p.m. with 20 members and 17 guests attending. Minutes of the previous meeting in Boston, MA were approved as written.

The first Task Force project report was given by Ramsis Girgis for the TF on a Guide for Transformer Loss Measurements. The results of a WG ballot on the guide were discussed, with most of the time being spent on the subject of a correction for shorting lead losses. The two negative votes on this subject were resolved. The guide is ready for the Performance Characteristics Subcommittee.

The second TF report was given by Eddy So on the TF on Low Power Factor Power Measurement. The main result of the discussion was a proposal that uncertainty limits be placed on individual instruments rather than on the entire system.

The final subject of discussion in the WG meeting was a proposed revision of Table 19 of C57.12.00-1993, Tolerance for losses. A ballot of the Performance Characteristics Subcommittee will be made on the proposal.

The meeting was adjourned at 3:45 p.m.

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

The Working Group met on Monday, April 15, 1996, at 8:00 a.m. and 9:30 a.m. There were 22 members and 6 guests present.

Minutes of the November 6, 1995, meeting in Boston, MA were approved.

Discussion of changes made in the new Draft 10 which was mailed before the meeting were discussed. This draft was to be balloted with the Performance Characteristics Subcommittee. However, several working group negative ballots on draft 9 were received after the meeting in Boston. The chair felt that these should be resolved before balloting the Subcommittee.

At the last meeting, it was decided to modify several areas of the document. These changes appear in draft 10 and were discussed and mostly approved. Changes in clause 5.1.2 regarding voltage and frequency, "usual service conditions" were discussed. The previous language in the draft was dropped in favor of wording similar to C57.12.00 and C57.12.01. The chair noted that this only allowed for load power factors of 80 % or higher, which is not appropriate for rectifier loads. It was decided to remove that condition.

The chair also noted that there were errors in example 3 of Annex B. These will be corrected.

John Grace, who was not present, submitted a negative ballot. Most of the items of his negative ballot have been incorporated into draft 10. However, John also asked that marine duty be included on the nameplate as is done with other specific duty classifications, such as: electro chemical, industrial, light traction, mining, heavy traction or extra heavy traction. This was discussed with the working group. It was noted that each of these specific duties refers to Table 10, which gives the rated overload conditions and temperature limits. Marine duty has not been defined this way in this standard or in C34.2. It was decided to not add marine duty unless a standard overload

cycle could be given for Table 10 and referenced to C34.2 or other similar existing standard. John Grace will be notified of this.

Allan Ludbrook had also cast a negative ballot. Most of Allan's comments were incorporated into draft 10. However, Allan desired that Clause 8.6.2 "Test and calculations required for Load Loss test" be revised. He asked that either specific limitations be defined or that subclause 6 and 7 be removed. These clauses have their roots in C57.110 and were desired by some users. When no design data is available, subclause 6 specifies that a division of 60 % Eddy Loss and 40 % Other Stray loss be used. Subclause 7 gives similar information when no design data is available, regarding the distribution of Eddy current losses within the windings. The WG felt that these clauses gave guidance and limits when design data was not available. The WG also felt that limitations of its use were not required. Allan also was not present to discuss his negative ballot. Allan will be notified of the WG's vote.

Roger Hayes also had cast a negative ballot, indicating that he felt more precise thermal test methods should be developed. The chair added a paragraph in the forward indicating that more development work is desired for thermal test procedures as this standard comes into greater use. Roger will submit some clarification and the WG approved for the next draft. This satisfied Roger's negative. Time is not available for substantial work due to the need to get this standard approved.

Don Kline submitted a paragraph he would like to include in the Forward. A reference to low loss power factor test problems in the Forward will be modified.

John Armstrong noted that the examples in Annex B refer to a converter rating giving Edo and Id. He pointed out that Ed is usually associated with a converter and Edo is usually associated with a transformer. Both ratings will be given in the examples.

Ken Skinger noted that the term "and/or" is used several places on pages 30 and 31 of draft 10. This is in reference to when corrections are needed during thermal tests for deviations from desired test watts loss or rated current. The required corrections refer to C57.12.90 and C57.12.91. The term "as necessary" will be added.

All reference of specific cooling classes such as "OA" or "AA" will be removed. Since there is ongoing work which may alter these designations, we will reference C57.12.00 and C57.12.01.

Jeewan Puri suggested that a previous Table from prior drafts which showed theoretical harmonics through the 25th harmonic be reinstated. He would like this to be used when a user does not include a harmonic spectrum. Jeewan will form a Task Force which will respond to the WG by June 30, 1996.

After the ballot of draft 10 is completed June 30, 1996, and Jeewan's task force finishes their work, draft 11 will be completed. The WG and PCS will be balloted simultaneously.

The meeting adjourned at 10:45 a.m.

7.7.5.5 Revisions to C57.12.00 - Donald W. Platts

TF - Revision of Cooling Class Designation in C57.12.00

TF met on Sunday, April 14, 1996, at 4:45 p.m. We had 2 members and 3 guests present. The minutes of the Kansas City meeting in April 1995 were approved.

The chair reviewed the balloting of draft 5, which had been sent to members of the TF, and also to members of the PCS for re-circulation.

Subcommittee ballot summary (Prepared before the meeting)

Ballots sent	91
Approved	51
Approved with comment	3

Negative	0
Percent Returned	59 %

We reviewed the comments that were submitted. One was to define how to include the future rating, when one is specified. C57.12.00 now states "Provision for future forced cooling equipment shall be indicated". Since we could not agree on any simple method, we decided not to address that comment at this time.

Another comment was that the cross reference table should not include an asterisk to refer to any existing ANSI FOA transformers as having directed flow, because there is no definition to support that labeling. Since the 1993 revision of C57.12.00 requires the words "directed flow" to appear on the nameplate, when appropriate, we concluded that the definition does not exist, but the asterisk explanation will be expanded.

A comment was made that many manufacturers now use the term directed flow for cases with zigzag flow through the winding, but not necessarily with pumped oil flow as presently defined. For now, we have only noted that the use, as described, does not comply with the published definition, and therefore is inappropriate.

Steve Antosz also raised the question of creating differences with IEC standards, while trying to harmonize with them. In IEC 76-2, when they use OD to designate directed flow, the temperature rise portion of that document states that the allowable average winding temperature rise shall be 70 °C. The question raised is when we adapt the OD designation, are we implying that transformer can be built with a 70 °C rise? After discussion we concluded to ask the PCS and the Insulation Life Subcommittees for guidance on this topic.

The meeting adjourned at 5:45 p.m.

The WG met on Monday, April 15, 1996, at 1:20 p.m. We had 21 members and 17 guests present.

The minutes of the Boston meeting in November 1995 were approved.

Don Platts explained that Pete Krause has resigned from the Committee, and that he had agreed to become the new chair. We expressed our appreciation for the work Pete has done to organize this new WG.

We discussed the ballot sent out by Pete in September 1995. It included three items. The first was to add to the references in C57.12.00, the second was for testing of CT's, control wiring, and secondary power supply circuits per C37 standard and the third was to test LTC's for correct sequencing. This ballot was not successful due to poor return, and confusion over a similar ballot sent to the Dielectric Tests Subcommittee (DiT). After discussion, we agreed that Subhash Tuli would continue to pursue the first two items through the balloting done in the DiT, and our WG would drop those issues from consideration. The dielectric testing of the LTC controls is covered in that document along with all other controls. The LTC testing for operation and proper sequencing will become a separate issue, we will reference only the C57 standards, and we will reballot this item in the WG.

Don Platts, chair of the TF for Revision of Cooling Class reported on the TF meeting held Sunday. The meeting minutes are as written above. The WG briefly addressed the question of whether the OD designation would imply that a higher winding rise would be allowed. The conclusion was that the question should be raised at both the PCS and Insulation Life Subcommittee meetings on Tuesday. However, we could likely adopt a cooling class designation convention, independent of the temperature limits as defined in C57.12.00 and IEC 76-2. If the Subcommittees agree, this document will be passed on to the Standards Subcommittee for inclusion with the other changes to be balloted in the main committee. (Both PCS and DiT subcommittees agreed and gave Don the direction to proceed as requested)

Leon Plaster presented a discussion of options to address the need to define Design Tests for Mechanical Lifting and Moving Devices, as required in Table 17 of C57.12.00. He reviewed the present references to design of the devices, throughout the C57 series, MIL specification, and other Government documents. Then he explained the process used by his company to design lifting devices. They calculate using basic strength of materials methods, the stresses seen by the various members, and their strengths. They performed mechanical testing of samples of the materials used. Then by performing calculations, done with a factor of safety of five, they can demonstrate the adequacy of their designs. Leon presented four options for methods that could be used to satisfy the intended requirement, that the strength of the members is adequate. After discussion, a proposal was formulated to revise

Table 17 to designate testing of Lifting and Moving Devices as an "Other" test. A note will be added to indicate that testing of the design may not be practical, but that calculation of adequate strength would comply with this requirement. Leon will draft that change for balloting in the WG.

Two nameplate changes have been approved by the PCS, and are ready to send to the Standards Subcommittee. Don Platts will forward the wording of those changes to add a statement on PCB content, and date of manufacture. We expect them to be balloted in the main committee later this year.

The meeting adjourned at 2:40 p.m.

7.7.6 Project Reports

7.7.6.1 Survey of GSU Transformer Failures - H. F. Light

Task force did not meet at this meeting, its work being completed at the last meeting in Boston.

The document, consisting of two volumes was submitted to the PES Special Publications Committee on 1/22/96 by John W. Matthews, Vice Chair of the Transformers Committee. At that time, he was informed that the procedure for requesting publication of a document as a special publication was for the Technical Committee Chair to request approval of the Technical Council Chair. After that approval, it will be forwarded for publication. John submitted that request on 2/9/96. Afterwards a question has arisen as to its commercial value and as to the actual information contained in the document. After these questions have been investigated at IEEE, the document should be published as a PES special publication.

Harold is now conducting an independent survey of substation class transformers, so his association with transformer surveys continues.

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

Ron had an operation recently and could not attend this meeting.

7.7.6.3 Reaffirmation of C57.125, Failure Analysis Guide - Don Cash

C57.125, Failure Analysis Guide" is up for reaffirmation, revision, or withdrawal. It must be balloted by the end of 1996. (PCS approved the action as we did not find any compelling reasons for revision and this will be completed prior to the Fall meeting in Burlington.)

7.7.7 Old Business - None

7.7.8 New Business

V.S.N. Sankar presented an operational problem associated with differences in response time of Winding Temperature Indicator (WTI) and the winding temperature associated with "step" changes in leading. When load on a transformer suddenly changes, for example, from approximately 10% of ONAN rating to approximately 90% of ODAF rating, cooling could be delayed as much as 30 minutes in the case of a 75°C (mainly pump) cooling setting. During this delay the winding temperature could exceed design limit as the oil velocity in the winding will be very low (ONAN rating). This is more serious for overloads when load changes from about 0.1 PU to 2 PU. Mr. Sankar also said that presently IEEE Standards neither specify a response time nor a test for Winding Temperature Indicator (WTI); his opinion is that IEEE Standards should at least specify a response characteristic for WTI (may be based on I2t). After some discussion, we concluded that this concern is real and should be investigated. However, the only ANSI document deals with WTI is C57.12.10 and this document has been identified as one of several "Orphan Standards" lacking a designated committee to ensure their currency. The chair will bring this subject up during the C57 meeting to determine the direction as to which committee should address this issue. (PCS Chair's note: This subject was discussed in C57 Main Committee meeting on Wednesday afternoon. C57 Main Committee decided to form a Working Group to investigate the C57.12.10 before our next

meeting in Burlington and report on which committee is responsible for maintaining this standard and initiate the revision. Jin Sim and David Rolling were assigned for this.)

Subhash Tuli suggested that we should delete the note under the clause 4.4 of the test code C57.12.90-1993. This deals with test sequence to minimize potential damage to the transformer during testing. Since this subject involves several subcommittees, at least PCS, IL, and DiT, the chair will discuss this issue with the Standards Subcommittee chair to decide which subcommittee should address this issue. (PCS Chair's note: After the Transformers Committee meeting in San Francisco, Chairs of the PCS, DiT, IL, and STD met to discuss the issue. We decided that this note is not a mandatory requirement since it uses the term "should" and provides a good suggestion. We decided that it is not necessary to take any action at this time.)

7.7.9 Next Meeting

The next meeting will be held on Tuesday, October 29, 1996, in Burlington, VT.

The meeting adjourned at 10:40 a.m.

Respectfully submitted,
H. Jin Sim
PCS Chairman

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/19/96

ATTACHMENT 4

SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS / CHAIRPERSON: JIN H. SIM / PHONE: (919)580-3234 / FAX: (919)580-3236

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	COMMITTEES REQUESTING COORDINATION: PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
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	SIM JIN	/ /	/ /	0	(919)580-3234	COORDINATE WITH S. SMITH
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				APPLY FOR PAR EXTENSION
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				APPLY FOR PAR TO REVISE
PC57.109	SHORT-CIRCUIT DURATION	PATEL B.	03/16/93	06/27/91	1998	(205)877-7740	
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	REAFFIRMED 1992
C57.116	GUIDE FOR TRANSFORMERS DIRECTLTY CONNECTED TO GENERATORS						REAFFIRMED
NONE	TR DIRECTLY CONNECTED TO GEN	REITTER G.	01/03/89	06/28/79	1999	(415)508-2864	IS REVISION 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
C57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT						PAR TOO OLD
P1098	LOSS TOLERANCE AND MEASUREMENT	HENNING W. R.	/ /	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		BALLOTING REAFFIRMATION

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE

DATE: 06/19/96

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STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	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						INCLUDE IN NEXT REVISION
PC57.12.00m	PCS REVISION OF C57.12.00	PLATTS D.	/ /	/ /	0	(610)774-4686	COORDINATE WITH S. TULI
C57.12.00	TABLE 9 - DATE OF MANUFACTURE ON NAMEPLATE						APPROVED BY SUBCOMMITTEE
PC57.12.00	PC WG ON REV. C57.12.00	PLATTS D.	/ /	/ /	0	(610)774-4686	
C57.12.00	TABLE 9 - PCB STATEMENT ON NAMEPLATE						APPROVED BY SUBCOMMITTEE
PC57.12.00	PC WG ON REV. C57.12.00	PLATTS D.	/ /	/ /	0	(610)774-4686	
C57.12.00	9.3 TABLE 19 - TOLERANCE FOR LOSSES						TO BE BALLOTED
PC57.12.00	LOSS TOLERANCE AND MEAS.	HENNING W.	/ /	/ /	0	(414)547-0121	
C57.12.00	SECTION 5.1 - COOLING CLASS REVISION TO CONFORM TO IEC						BALLOTING
PC57.12.00	COOLING CLASS REVISION TF	PLATTS D. W.	/ /	/ /	0	(610) 774-4686	
C57.12.00	SECTION 8 - DIELECTRIC TESTING OF SECONDARY CONTROL WIRING						BALLOTING
PC57.12.00		TULI S.	/ /	/ /	0	(414)547-0121	
C57.12.00	SECTION 8 - TESTING OF LTC CONNECTIONS						BALLOTING
PC57.12.00	PCS WG ON REV. OF C57.12.00	PLATS D.	/ /	/ /	0	(610)774-4686	
C57.12.00	SECTION 5.9 - AUXILIARY LOSSES ON CLAS I AND CLASS II POWER TRANSFORMERS						BALLOTING
PC57.12.00		TULI S.	/ /	/ /	0	(414)547-0121	
C57.12.00	TABLE 17 - MECHANICAL LIFTING REQUIREMENTS CLARIFICATION						UNDER DEVELOPMENT
PC57.12.00	PC WG ON REV. OF C57.12.00	PLATTS D.	/ /	/ /	0	(610)774-4686	
C57.12.90	CLAUSE 15 - NEW CLAUSE FOR CERTIFICATION TEST DATA						APPROVED BY PCS
PC57.12.90		JIN S.	/ /	/ /	0	(919)580-3234	
C57.12.90	CLAUSE 9 - ADD MEASUREMENT OF AUXILARY LOSSES						D1 BALLOTED IN PCS
PC57.12.90		TULI S.	/ /	/ /	0	(414)547-0121	

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE DATE: 06/19/96

ATTACHMENT 4

SUBCOMMITTEE: PERFORMANCE CHARACTERISTICS / CHAIRPERSON: JIN H. SIM / PHONE: (919)580-3234 / FAX: (919)580-3236

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS COMMENTS
PC57.125	FAILURE ANALYSIS	ALTMAN M.	06/27/91	06/28/87	1996	(407)694-4975	REQUEST PAR EXTENSION
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
C57.133	GUIDE FOR SHORT-CIRCUIT TESTING OF DISTRIBUTION AND POWER TRANSFORMERS		T&D,SWG PSR	IECTC14 SUBS	IAS/PSE IAS/REP		PAR APPROVED
PC57.133	SHORT-CIRCUIT GUIDE	McQUIN N.	/ /	09/21/95	0	(412) 829-1205	PART II OF C57.12.90
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.	03/19/92	10/29/90	1997	(706)291-3166	NEW PAR APPROVED 12/04/90

COORDINATION ACTIVITY OF PERFORMANCE CHARACTERISTICS SUBCOMMITTEE AS PER: 06/19/96

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD. PHONE
NEW 02/15/94	MEASUREMENT OF POWER AT LOW POWER FACTOR	PSIM	EDDY SO	613-993-2660	W. R. HENNING	414-547-0121
PC37.109 03/28/85	GUIDE FOR THE PROTECTION OF SHUNT REACTORS	PSR	LAVERN L. DVORAK	303-231-1636	MIKE ALTMAN	REAFFIRMED 1993 407-694-4975
PC37.91 03/19/92	GUIDE FOR PROTECTIVE RELAY APPLICATION TO POWER TRANSFORMERS	PSR	MIRIAM SANDERS	919-856-2457	RON BARKER	804-257-4671
PC37.10 05/01/91	GUIDE FOR DIAGNOSTICS AND FAILURE INVESTIGATION OF POWER CIRCUIT BREAKERS	SWGR	L. ROLANDO SAAVEDRA	504-363-8765	WALLACE B. BINDER JR.	DRAFT IN REVISION IN WG 216-384-5625
P1459 / /	STD DEF. FOR THE MEAS. OF ELECTRIC POWER QUANTITIES UNDER SINUSOIDAL, NON-SIN., BALANCED OR UNBALANCED CONDITIONS	PSIM	A. E. EMMANUEL	508-831-5239	EDDIE SO	APPLYING FOR PAR 613-993-2660

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

Meeting Minutes - San Francisco, California

7.8.1 Introduction/Attendance

The Underground Transformers and Network Protectors Subcommittee met at 9:30 a.m. on April 16, 1996. with 11 members and one guest present.

7.8.2 Approval of Minutes

The minutes of the November 7, 1995 meeting in Boston, Massachusetts were approved as submitted.

7.8.3 Membership

Mr. Matthew C. Mingoia retired at the end of last year from EEI and resigned as a member of the Subcommittee. Mr. Gary N. Miller of EEI has joined the Subcommittee as an Alternate Member. Our membership remains at 17.

7.8.4 Chairman's Remarks

Administrative Subcommittee Notes

1. Attendance at this meeting included 298 registrants and 64 spouses. Also, 167 people have signed up for the Tuesday luncheon and 221 for the dinner cruise.

2. The Fall 1996 meeting will be held in Burlington, Vermont at the Sheraton-Burlington Hotel and Conference Center. Rooms will be $90/night and should be reserved by September 26. Hosts for the Fall 1998 meeting are needed.

3. At the ASC C57 Transformers Committee meeting in Boston, it was recommended that the IEEE Transformers Committee provide the same standards support to the C57.12.50-series of dry-type transformer standards as provided for the C57.12.20 and C57.12.40 series documents. The Administrative Subcommittee agreed to provide this support and these activities would be transferred to the Dry-Type Transformers Subcommittee.

4. The new open standards preparation and balloting process for PES was discussed at length. This will involve requesting an invitation to ballot for standards which are expected to be balloted in the next 12 months. Our Subcommittee expects to ballot C57.12.57 in 1996.

5. The Project Authorization Request (PAR) Form has been revised in January, 1996 and was sent to all Working Group Chairman.

6. The chair informed the Subcommittee that ANSI C57.12.40 was published in January, 1996 after being approved by the IEEE Standards Board in December, 1994. The document has many errors and after some discussion with the NEMA Secretariat it was decided all corrections will be made to the document, the Working group Chairman would be given a final galley proof for approval and the document would be republished.

7.8.5 Working Group Reports

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

Meeting was called to order at 1:20 p.m. with nine members and one guest in attendance.

The minutes of the meeting on November 6, 1995 in Boston, Massachusetts were approved as submitted.

The PAR application for the revision of the standard has been submitted and is in progress and will be submitted to the IEEE Standards Board in May, 1996.

The discussion about tank pressure testing was postponed to the next meeting since the people who were to provide the data were absent. The intent of the Working Group is to include in the Standard required values of 15 psig for design pressure tests and 7 psig for tank withstand without deformation tests. The Working Groups on Secondary Network Transformers (Liquid-Filled) and Secondary Network Protectors are planning to include the same requirements so all standards will be consistent.

There being no additional new or old business, the meeting was adjourned at 1:30 p.m.

7.8.5.2 Liquid Filled Secondary Network Transformers (C57.12.40) - E.A. Bertolini, Chair

A. L. Robinson acted as Chairman since Mr. Bertolini was absent.

The working group met on Monday, April 15, 1996 at 10:55 a.m. with 12 members in attendance.

The minutes of the November 6, 1995 meeting in Boston, Massachusetts were approved as submitted.

The discussion of maximum tank pressures continued from the previous meeting. Mr. Klaponski reported that he attended the three-phase padmounted transformer working group meeting and obtained a copy of that standard's language on maximum tank pressures. This language will be considered for inclusion in the .40 standard.

The proposed survey on usage of stainless steel tanks was discussed; however, no action was taken.

The poor quality of the recently published standard was discussed. It was subsequently learned that all corrections would be made, the Working Group Chairman would approve the final galley proof and NEMA would republish the standard.

The Working Group Chairman is to submit a new PAR for approval to start work on the next revision.

There being no additional business the meeting was adjourned at 11:40 a.m.

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

The Working Group met at 8:00 a.m. on Monday, April 15, 1996 for two sessions with nine members and two guests present.

The minutes of the November 6, 1995 meeting in Boston, Massachusetts were approved as submitted.

The referenced standards were reviewed and do not require any changes. The spade and stud terminations were also reviewed and corrections were made to Figures 6 and 7. Some changes were made to the fuse curve tables.

Cabinet design pressure requirements were changed to 15 psig from 7 psig and now conforms with the transformer standard.

All dimensions are presently being reviewed for conversion to metric units when the document is revised. The standard is due for revision in 1999 and is on schedule. The first seven sections have been completely reviewed and revised accordingly.

Working Group requested only one session for the next meeting in San Francisco.

There being no additional business, the meeting was adjourned at 10:55 a.m.

7.8.5.4 Ventilated Dry-Type Network Transformers (C57.12.57) - B. Nutt, Chair

Since the Chairman was absent, no meeting was held.

7.8.6 Other Business

The Subcommittee is going to sponsor a Panel Session at the IEEE Transmission and Distribution Conference and Exposition in September, 1996 in Los Angeles. The subject matter will be related to Reliability, Design and Operating Practices of Underground Distribution Systems. Presently, there are four panelists **with room for two more.**

7.8.7 Future Meetings

The location and dates for future meetings are as follows:

October 27-30,1996	Burlington, Vermont
July 15-18,1997	Graz, Austria
November 1997	St. Louis, Missouri
Spring 1998	Little Rock, Arkansas

The Subcommittee meeting adjourned at 10:45 a.m.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/19/96

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 OR TF CHAIR	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				PUBLISHED BY ANSI 06/94
PC57.12.24	3-PHASE UG-TYPE TRANSFORMERS	NIEMANN C.	05/10/88	06/27/91	1993	(708)410-5307	PAR SUBMITTAL IN PROGRESS
C57.12.40	REQUIREMENTS FOR SECONDARY NETWORK TRANSFORMERS, SUBWAY & VAULT TYPES (LIQUID IMMERSED)		SCC14				ANSI APPROVED 02/28/94
PC57.12.40	LIQUID-FILLED NETWORK TRANSFMR	BERTOLINI E. A.	03/19/92	12/05/91	1997	(212)460-4913	PUBLISHED JAN 1996
C57.12.44	STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS		T&D SWGR IAS/REP IAS/PSE EEI NEMA				PUBLISHED DEC 94
PC57.12.44	SECONDARY NETWORK PROTECTORS	MULKEY D. H.	12/20/94	09/21/95	1999	(415)973-4699	PAR APPROVED 09/21/95
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	APPLY FOR NEW PAR

7.9 West Coast - E. G. Hager, Jr.

IEEE WEST COAST TRANSFORMER SUBCOMMITTEE MEETING MINUTES
Monday, April 15,1996
San Francisco, CA

The meeting was called to order by Chairperson, Dave Brucker, at 9:30 AM. members and guests were introduced. Those in attendance were:

		Phone Numbers	
Bill Boettger	US Transformer	208-238-0720	G
Dave Brucker	Cooper Power Systems	415-692-4431	M
Donald Cash	Nevada Power Company	702-227-2316	G
Everett Hager	Smit Transformers	619-789-3022	M
Peter Iijima	Bonneville Power Administration	503-230-3639	G
Arthur Molden	AMEESCO	914-225-0993	G
Anne O'Neill	IEEE PES	908-562-3852	G
Edgar Trummer	Elin Transformers	43-3172-606-404	M
Joe Watson	ZTR	803-849-7487	M

As copies of the prior meeting minutes were sent to all subcommittee members and in the absence of Secretary & Vice Chairperson Gary McCulla, the Chairperson asked for corrections and amendments to the prior meeting minutes. The minutes were approved subject to correction of typographical errors.

The Chair noted that the following were present at the Working Groups meeting that was held the prior Friday, April 12th, at Tacoma City Light, Tacoma, WA:

Dave Brucker	Cooper Power Systems	415-692-4431	M
Bob Clark	Montana Power Company	406-723-5421	M
Jim Gillies	Consultant	503-622-4847	M
Mostafa Jafarnia	North American Transformer	408-957-8373	M
Jerry Mundon	Joslyn Hi-Voltage	503-524-1182	M
John Nordberg	Seattle City Light	206-684-3038	M
Bill Revel	Nevada Power Corporation	702-367-5302	M
Bob Stewart	BC Hydro	604-528-2930	M
Chuck Todd	Tacoma City Light	206-502-8297	M

Activities of the Working Groups is reported below.

7.9.1 Old Business

The following are summaries of the Working Groups' activities at the Tacoma meeting. A separate report is enclosed for the activities of the Phase Shifting Transformers Working Group.

7.9.1.1 Transformer Installation Guide (Tacoma)

Jim Gillies reported that the Main Transformers Committee had approved the Installation Guide. The Guide will become effective after ANSI approval. This is expected to occur in either July or August of this year.

7.9.1.2 Loss Evaluation Guide (San Francisco)

As noted in the November 1995 minutes, Everett Hager will lead this effort. Joe Watson will collaborate in this effort. Everett is expecting comments from each member prior to the next meeting.

7.9.1.3 Phase Shifting Transformers Guide (Tacoma and San Francisco)

Edgar Trummer, WG Chair, reviewed the progress of this group. The report of this Group's activities at the Boston and San Francisco meetings plus two additional handouts is enclosed.

7.9.1.4 Grounding Transformer Application Guide (Tacoma)

Burhan Becer was not present at the Tacoma meeting so no working group report was received.

7.9.1.5 Life Extension of Generator Step-up Transformers Working Group (Tacoma)

Bob Stewart provided an outline of the paper which this Group proposes to write. Discussion followed. Individual writing assignments are noted in paper outline. A copy of the outline (with annotations) is enclosed.

There was a short discussion on responsibility for up-dating of the Standards Committee's Activities List. It was decided that the new Chairperson will have to deal with that by obtaining direction directly from Georges Vaillancourt, Standards Subcommittee Chair.

7.9.2 New Business

Everett Hager was selected as the new Chairperson to replace Dave Brucker. Selection was unanimous from those present and from the eight absentee ballots received. Dave Brucker volunteered to produce the minutes for this meeting pending recruitment of a permanent Secretary.

There was a short discussion of the possible use of the IEEE World Wide Web Site and Bulletin Board as an interchange site for Subcommittee activities. Dave Brucker offered to investigate and report to the Subcommittee at/before the next meeting.

7.9.3 Next Meeting

Although there was some thought given to holding the next meeting in conjunction with the PES exhibit to be held in Los Angeles September 16th -19th, it was generally agreed that there was insufficient time available during that week to do so. After an extended discussion it was decided to poll all Subcommittee members to determine their preferences as to date and location of the next meeting given a choice between five western and southwestern locations. The ballot is to be enclosed with these minutes when they are sent to Subcommittee members.

The meeting was adjourned at 9:50 AM.

Respectfully Submitted:

S/S David S. Brucker
Secretary pro tem
West Coast Transformer Subcommittee

7.9.4 West Coast Subcommittee Guide For The Application, Specification And Testing Of Phase Shifting Transformers

The Working group met on Monday, April 15, 1996 at 2:50 pm. There were 23 members and 13 guests present, with 4 guests requesting membership.

After introductions, the minutes of the Boston, MA meeting in November 1995 were approved as written. Discussions were held upon the following areas:

I. The scope and purpose of the guide and whether the document should be a guide or standard. The consensus of the attendees was that the document should be written as a guide. The guide will be a compilation of the industry's knowledge on the application, theory, specification and testing of phase

shifting transformers. The intent of the guide will be to provide an understanding of the terminology types, construction and testing as related to phase-shifting transformers.

II. Contents and clauses to be included in the guide.

III. The Guide will reference applicable standards wherever possible. The document will not be a self-contained document where sections of existing standards are extracted.

IV. The types of phase-shifting transformers to be covered are single-core, dual-core and quadrature booster designs.

V. New clauses were added for the following:

A. Load tap changer application

B. Application as related to series, parallel and by-passing of phase-shifting transformers

C. Impedance differences between single and dual core designs

D. Two tank design construction considerations

E. Single core design short circuit considerations

VI. The Chairman requested volunteers for writing of the guide. The following assignments were agreed upon:

Harold Moore	Theory of Phase-Shifting Transformers
Fred Elliott, Vic Shenoy & Joe Watson	Application of Phase-Shifting Transformers
Jim Fyvie	Discussion of Quadrature Booster Design
Dieter Dohnal	Load Tap Changer Application

The meeting continued for a second session. The Working Group's business was completed and the meeting adjourned at 5:40 pm.

Donald Chu, Working Group Secretary April 15, 1996

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/19/96

ATTACHMENT 4

SUBCOMMITTEE: WEST COAST / CHAIRPERSON: RED HAGER / PHONE: (619)789-3022 / FAX: (619)788 1753

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	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				REVISION APPROVED 12/11/95
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.			STD WITHDRAWN (OBSELETE)
P513	SIESMIC GUIDE	OKLU S.	02/15/90	09/06/73	1995	(213)481-4823	BALLOT WITHDRAWAL
C57.120	LOSS EVALUATION GUIDE FOR POWER TRANSFORMERS AND REACTORS		SUB	EM	ED&PG	IAS	IEC	REVISE OR REAFF. BY DEC 96
P842	LOSS EVALUATION GUIDE	JACOBSEN R.	12/03/91	05/01/80	1996			PAR EXTENSION NEEDED
C57.128	FIRE PROTECTION OF OUTDOOR LIQUID-IMMERSED POWER TRANSFORMERS		NPE	SUB	PSR			PAR TOO OLD
PC57.128	FIRE PROTECTION	HAGER R.	/ /	06/01/89	0			PAR WITHDRAWN
C57.135	GUIDE FOR APPLICATION, TESTING, INSTALLATION AND OPERATION OF PHASE ANGLE SHIFTING TRANSFORMERS							NEW PROJECT
PC57.135	PHASE ANGLE SHIFTING TRANSFO.	TRUMUER E.	/ /	/ /	0	(602)236-8621		PAR SUBMITTAL IN PROGRESS

COORDINATION ACTIVITY OF WEST COAST SUBCOMMITTEE AS PER: 06/19/96

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 FRONK	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

7.10 Audible Sound and Vibration - J. Puri

The Subcommittee met on Tuesday, April 16 at 2:00 PM. Eleven members and twenty three guests were present.

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

The following items were discussed:

7.10.1 WG Report - Transformer Siting Guide C57.136 - Jack McGill, Chair

This WG met for the first time and reviewed Draft #3 of the Siting Guide.

This documents has been organized to describe :

1. External Noise abatement procedures (e.g. enclosures and active noise cancellation devices) that can be applied existing as well as new transformers.

2. Internal Noise abatement procedures depending upon design techniques (e.g. induction levels and improved core materials) describing the achievable noise levels in new transformers.

Dr. Girgis proposed an analytical method for far field noise level calculations. Dr. Keren Wiesman will of Quiet Power will evaluate this expression based on her noise level measurement data generated through field measurements.

7.10.2 Noise Intensity Measurements

It was agreed that noise intensity is indeed a superior and advantageous method for determining noise levels in transformers. Dr. Girgis will make a proposal on standard noise intensity levels in transformers.

A procedure for making noise intensity measurements has been drafted and will be balloted in the subcommittee before it is proposed for inclusion in C57.12.90.

7.10.3 NEMA TR1 Table for Standard Noise Levels in transformers

Dr. Degeneff has located the basis of the present data in this table. Dr. Girgis presented data in support of making no changes to the present standard noise levels listed in NEMA TR1 Table. Messrs. Degeneff and Girgis will evaluate this table can be used to set noise power level standards for transformers.

There being no new business, our meeting adjourned at 3:30 PM.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE DATE: 06/19/96

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 OR TF CHAIR	COMMITTEES REQUESTING COORDINATION PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.12.00	AUDIBLE SOUND LEVEL REQUIREMENTS						UNDER DEVELOPMENT
PC57.12.00		PURI J.	/ /	/ /	0	(704)282-7413	
C57.12.90	CLAUSE 13 - ADD TEST PROCEDURE FOR MEASURING SOUND INTENSITY						D1 BEING PREPARED
PC57.12.90x		GIRGIS R.	/ /	/ /	0	(317)286-9532	COORDINATE WITH STEVE SMITH
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 WITHDRAWN
C57.136	GUIDE FOR SOUND LEVEL ABATEMENT AND DETERMINATION IN OIL-FILLED TRANSFORMERS						DRAFT 1 PRODUCED
PC57.136		McGILL J.	/ /	03/21/96	0	(414)475-3422	PAR APPROVED 03/21/96

COORDINATION ACTIVITY OF AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE AS PER: 06/19/96

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

7.11 Bushings - F. E. Elliott

7.11.1 Introduction and Membership

MINUTES OF MEETING BUSHING SUBCOMMITTEE IEEE/PES TRANSFORMER COMMITTEE
SAN FRANCISCO, CA
APRIL 16, 1996

Chairman Fred Elliott opened the meeting on Tuesday, April 16, 1996 at 10:55 AM and welcomed the members and guests. The meeting was attended by 15 members and 14 guests. Two of the guests requested membership on the Subcommittee.

MEMBERS PRESENT

Florian Costa	J. Frost	Mangesh Rajadhyaksha	Devki Sharma
Fred Elliott(Chmn.)	Olof Heyman	Mark Rivers	Pritpal Singh(Secy.)
Keith Ellis	Russ Nordman	W.E. Saxon	P. Zhao
Ron Fox	J. Patton	D.M. Shah	

GUESTS PRESENT

Charles P. Caruso *	Donald N. Laird	Jim Reed	Roger Wicks
Frank David	Mike Lau	Henk Ruevekomp	Randy Williams
Charlie Garner	Donald L. Lowe	John Vandermaar	
Wayne Hansen *	Andre Lux	Brian E. Wardell	

* Membership requested

7.11.2 Chair's Remarks

Mr. Elliott, after attending the Administrative Subcommittee meeting reported the following:

- Meeting attendance was beyond expectation with 300 members and 64 spouses.
- Next meeting in Vermont
- Balloting procedures are being changed. Details to follow.

7.11.3 Minutes of November 7, 1995 Meeting Held in Boston, MA

The minutes were approved as written.

7.11.4 Working Group / Task Force Reports

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

Fred Elliott reported that IEEE has approved the withdrawal of C57.19.101 which was replaced by C57.19.100, Guide for Application of Power Apparatus Bushings. The work in this WG is now complete.

7.11.4.2 WG on Performance Characteristics and Dimensions for Outdoor Apparatus Bushings (PC57.19.01)

Chairman P. Singh reported that his WG met on April 15, 1996 with 20 members and 12 guests present. Two of the guests requested membership to the WG. He reported on the following:

a. Minutes of the Previous Meeting

These were approved as written

b. Discussions on Draft 2

The WG discussed Draft 2 which was prepared to include Draft 1 changes discussed in Boston. The following were discussed in Draft 2

c. Table 1, Electrical Insulation Characteristics

No changes were made in Table 1

d. Table 2, Dimensions for 34.5 kV and 69 kV Bushings

In column 5 change the heading as follows:
"Current transformer pocket length and distance from the gasket surface to minimum oil level"

In column 8, remove the mm dimensions for inside tube diameter for drawlead ratings.

e. Table 3 Dimensions for 138 kV and above bushings

In column 4, make the "L" dimensions for drawlead bushings same as bottom end connected bushings. Add the following note at the bottom of the table:
"For drawlead bushings the, addition of bottom end shield may increase the "L" dimension"

In column 5 change the heading as follows:
"Current transformer pocket length and distance from the gasket surface to minimum oil level"

In column 7, remove the mm dimensions for inside tube diameter for drawlead ratings.

f. Table 4, Cantilever Design Test

In column 2 remove the word "Apparatus"

In column 3 change the test force for 34.5 & 69 kV bushings as follows:

Up to 2000 Amps	200
3000 Amps	300
5000 Amps	500

g. Tables 5, 6, and Appendix A

No changes were made to these tables.

h. Metric Conversion

It was agreed to check the metric conversion as per the IEEE practice.

i. Next Step

The WG decided to ballot the revised draft in the Bushing Subcommittee

The meeting was adjourned at 12:05

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

Chairman Olof Heyman reported that his WG meeting was held at 1:20 PM on April 15, 1996 with 9 members and 8 guests in attendance. He reported the following:

a. Results from Reballoting of Major Draft 12 changes in The Transformer Committee

Sent	Returned	Affirmative	Negative	Abstain
164	147	115	—	32
89 %	100 %			

With the above results the Draft is approved by the Transformer Committee.

b. Next Step

The Draft 13 including the editorial changes as well as the approved major changes will be sent to the IEEE Standards Board before May 5 for their approval. If the Standard is approved then the work in this WG will then be complete.

c. Coordination with IEC

Bill Saxon TA/IEC36A agreed to check for the procedure for proposing this standard for adoption by IEC.

7.11.4.4 Task Force on Draw Lead Bushings

Chairman Russ Nordman reported that his TF meeting was held at 4:15 PM on April 15, 1996 with 16 members and 13 guests present. Four of the guests requested membership to the TF. He reported the following:

a. Minutes from previous meeting

These were approved as written.

b. Questionnaire

The questionnaire to the Transformer Committee asking for additional concerns regarding drawlead and bushings was sent to 170 PES members in March. See Attachment # 2.

The questionnaire for bushings manufacturers was revised and several ideas from the group were added.

It was suggested that the questionnaire be modified and also sent to transformer manufacturers and rebuilders. This will be completed before the next meeting.

Mark Rivers agreed to help by distributing the questionnaire to members of the Doble Committee.

It was mentioned that a TF, " Hottest Spot Determination" headed by Don Platts has been created within the Insulation Life Subcommittee. See letter from Don Platts in Attachment # 3. The activities between the two groups will be coordinated.

The meeting was adjourned at 5:30 PM

7.11.5 Technical Advisor to IEC/SC36

Bill Saxon Reported the following:

a. Working Group WG01

Document 36A/45/DIS, "Bushings for Alternating Voltages above 1000V" was published as IEC 137 1995 - 12, Fourth Edition.

b. Working Group WG02

Document 36A/48/CDV, "Bushings Seismic Qualification" has been approved and will be issued as a Technical Report, Type 2. The report will be sent for publication to the central office by the end of April 1995. The WG will continue their work on improvement of the report.

c. Working Group WG03

Document 36A/50/CD, "Guide for The Interpretation of Dissolved Gas analysis(DGA) in Bushings Where Oil is The Impregnating Medium of The Main Insulation(generally Paper)". Even though there is some conflict of interest with Technical Committee 10, the WG03 will continue the work on this project. The document will be issued in July as a Committee Draft for Vote(CDV). The WG is planning to issue this document as a Technical Report-Type 2 and then it will be included as an Annex in the next revision of Publication 599.

7.11.6 Old Business

7.11.6.1 Reaffirmation of C57.19.00 - 1991 & C57.19.01 - 1991

As per the IEEE Standard's requirements, these existing bushing standards are due for reaffirmation before the end of 1996. The subcommittee members passed separate motions to reaffirm these standards. Chairman Fred Elliott will get the process started so they are reaffirmed before their expiration date.

Revision of C57.19.00 - 1991

Mr. Elliott informed that a PAR has been submitted for the revision of C57.19.00. He also indicated that he will try to obtain an electronic copy of the existing standard to help the revisions.

Several Comments/Proposals have been received from members for revision of C57.19.00. These are as follows:

- Indoor Bushings
- Gas Bushings
- Short Time (Short Circuit) Rating of Bushings
- Bushing Thermal Basis of Rating
- Service Conditions
- Drawlead Applications
- Correction Factors
- Cantilever Testing
- Thermal Calculations
- Others

See Attachment # 4 and previous meeting minutes for detailed comments/proposals

Mr. Elliott asked members and guests to send their comments on the above proposals and others if any to help revise the C57.19.00 Standard.

7.11.6.2 Provision For Bushing Current Transformers

As per the decision in the Administrative Subcommittee, Fred Elliott has sent to Jim Smith, Chairman, Instrument Transformer Committee, the results of the Bushing Subcommittee Ballot and the associated information for their input. See Attachment # 5 for covering letter.

7.11.7 New Business

A letter was received from Keith Ellis (See Attachment #5) raising a question whether the standard should include Bushing Arcing Distance. The following comments were made during the discussions.

The arcing distance of a bushing depends upon the design of a bushing. Factors like condenser versus non-condenser type and type of shielding/terminal will affect the arcing distance.

The bushing standard specifies 60 Hz, Impulse, and SWS test levels and as long as the bushing meets these criterion, specifying an arcing distance would be contradicting and not very meaningful.

7.11.8 Adjournment

The meeting was adjourned at 12.05 PM.

Minutes By
Pritpal Singh, Secretary
Bushing Subcommittee

Attachment 1 is intentionally left out.

GS WAUKESHA ELECTRIC SYSTEMS

LETTER OF REQUEST
FROM
TASK FORCE ON BUSHING DRAW LEADS
BUSHING SUBCOMMITTEE

Subject: Concerns regarding drawlead loading of transformer bushings

Dear Committee member:

This Task Force was formed per request of the Bushing Subcommittee because current standards give little guidance on the loadability of bushing drawleads. Design testing for bushings require temperature testing only at the maximum current rating with connection at bottom terminal of bushing, the drawlead connection is not addressed. Therefore, this Task Force is charged with the task of better defining problems that exist and to recommend solutions. Recommendations could be a revision to bushing standards C57.19.00, C57.19.01 or a complete new document.

In our initial Task Force on Bushing Drawleads meeting, we had discussed corresponding with the Transformer Committee regarding additional concerns. I have drafted this letter in response.

I am asking Transformer Committee members to be very specific in their concerns for bushings and drawleads and add any other related topics or questions. These may include suggestions for manufactures and users of transformer bushings. Our Task Force can then address all areas needing attention in future meetings. With the above, we can make a more informed recommendation to the Bushing Committee.

Please send any written comments by FAX or mail before April 12, 1996 or bring to the Task Force meeting in San Francisco on April 15, 1996 Room "Franciscan IT' at 4:15 pm.

Thank you,

Russ Nordman
Chair, Task Force on Bushing Drawleads

FAX: 414-521-0198

400 S. PRAIRIE AVENUE • WAUKESHA, WI 53186-5937
(414) 547-0121 • FAX (414) 521-0196 [-0190 (PURCHASING) -0198 (TRANSFORMERS)]

Russ Nordman
Chair, Task Force on Bushing Drawleads

FAX (414) 521-0198 **Waukesha Electric Systems**

April 10, 1996

The Task Force on Hottest Spot Determination within the Insulation Life Subcommittee is also looking at loading of leads and the resulting temperatures. Perhaps we may have some input for your bushing draw lead work.

Our task force has concluded that the 80°C hottest spot limit specified in C57.12.00 clause 5.11.1.1 applies to leads, as well as, to windings.

So far we have not distinguished between a draw lead and any other lead. The approach we are taking requires the calculation of conductor temperatures throughout the transformer, Perhaps a specific statement to include the draw lead and it's termination, would be sufficient to address your needs, at nameplate rated load.

(Of course, we rarely do anything that could turn out to be so simple.) At a minimum, we need to coordinate our efforts. I invite you to attend our meeting on Monday morning at 8 AM. You may raise any questions about determining the temperatures in draw leads.

Several people in Waukesha have copies of our draft. (Messrs. Mehta, Grubb, Rizvi, Tuli.)

Don Platts
Chair, Task Force On Hottest Spot Temperature Rise Determination

D. W. Platts N-4
Pennsylvania Power & Light Co.
2 North Ninth Street
Allentown, PA. 18101-1179

Phone (610) 774-4686
FAX (610) 774-5177
email: dwplatts@papl.com

BUSHLEAD.DOC

IEEE C57.19.00-1991 CHANGE PROPOSALS
BUSHING SUBCOMMITTEE
IEEE-PES TRANSFORMER COMMITTEE

5 April, 1996

IEEE Standard General Requirements and Test Procedure for Outdoor Power Apparatus Bushings

Summary

Change proposals are listed in order of their occurrence in the present edition of the standard. Each proposal is identified with the name of the proposer.

General

- Remove the word "outdoor" from the title of the standard as well as throughout the standard wherever it appears. (1.1, 1.2, 2.8, 6) (D. Sharma)
- Reformat to fit the current IEEE Style Manual (F. Elliott)

Foreword

- Revise. (D. Sharma)

1. Scope and Purpose

1.1 Scope

- Should transformer to gas bushings be included? (J. Frost)

3. Definitions

- Add definitions of indoor and outdoor bushings (D. Sharma)
- Oil: Synthetic insulation fluids should be included (J. Frost)

- Resin-impregnated paper(-insulated) bushing: ... and subsequently impregnated under vacuum with a curable resin. (To make clear the major difference between resin bonded and resin impregnated) (J. Frost)
- Add definitions of CT pocket (Attached) (BSC Ballot)

4. Service Conditions

4.1 Usual Service Conditions

- (6) not exceeding 30° (=IEC) (J. Frost)

4.2.2 Other Conditions That May Affect Design, Testing, and Application

- ".... they should be brought to the attention..." is too weak. It's a must. (J. Frost)
- (2) 30°

5. Rating

- Add a statement that wet tests are not required for indoor bushings (D. Sharma)

5.4.1 Thermal Basis of Rating

- A proposed revision discussed in past meetings is attached. (P. Singh)
- The difference between current carrying and noncurrent carrying parts I deem neglectable. (J. Frost)

5.4.2 Draw-Lead Applications

- The internal diameter of the central tube determines the maximum cross section of the draw lead. Thus there is an association between the rating of the bushing and that of the draw lead. (J. Frost)

7. Test Procedure

7.1.4 Correction Factors

- Is the rod-gap configuration referred to in this paragraph rod-rod or rod-plane? We should make this clear in the text. (F. Elliott)

7.2.1 Dielectric Withstand Voltage Tests

- Add a statement that wet tests are not required for indoor bushings (D. Sharma)

7.2.1.1 Low Frequency Wet Withstand Voltage

-300 kV instead of 242 kV (=IEC) (J. Frost)

7.2.1.4 Wet Switching-Impulse Withstand Voltage

-"..... at a maximum system voltage of 300 kV and above" (=IEC) A remark should be added that this test is only applicable for outdoor bushings. (J. Frost)

7.2.2.2 Cantilever Strength Test

- It should be sufficient to apply the test load to the most critical part of the bushing in normal operation (e.g. outdoor part of transformer bushings). (J. Frost)
- The ambient air temperature listed in the second paragraph appears to be more restrictive than the condition set in 7.1.3? Do we need to keep it or can we remove it and rely on 7.1.3? (F. Elliott)

7.2.3 Thermal Tests

-I suggest to rename the clause into Temperature Rise Test because the Thermal Stability Test is also a kind of thermal test. (J. Frost)

-It should be permitted to prove the temperature rise by calculation like in the new issue of IEC 137. (J. Frost)

-(2) Other frequencies should be permitted for the test provided that the current is adjusted to the same heat generation (see IEC 137). (J. Frost)

7.3.1 Thermal Stability Tests

- Alternatively it should be permitted to prove the thermal stability by calculation (see IEC 137) (J. Frost)
- (2) Heating by resistors and lower current should be permitted if the installation will be adjusted to the same losses (see IEC 137). (J. Frost)

7.4.3 Low Frequency Dry Withstand Test with Partial Discharge Measurements

- Last Section: Partial discharge test should be applied to each bushing with oil impregnated paper and resin impregnated paper insulation because it is the most sensitive and advanced method to check healthiness of the insulation. It doesn't make sense for resin bonded paper because is has always PD. (J. Frost)

New Section: Short-time current and thermal ratings of bushings

- A proposal for this new topic is attached. (K. Ellis/J. Frost)

DEFINITIONS RELATED TO CT POCKET

Current Transformer Pocket Length. The maximum length, as specified by the manufacturers drawing, suitable for the mounting of current transformers on the inboard end, as measured from the mounting flange gasket surface, This area may have a visible metal or conductive surface, or may be provided by an internal shield.

Inboard-end Ground Layer Length. The inboard-end portion of the ground layer measured axially along the bushing from the gasket surface of the mounting flange to the inboard-end of the ground layer.

Inboard-end Metal Sleeve Length. The inboard-end portion of the mounting flange measured axially along the flange from the gasket surface to the end of the flange.

Inboard-End (Oil-side End). End of bushing which is inserted into apparatus.

SHORT-TIME CURRENT AND THERMAL RATINGS OF BUSHINGS

1. Standard values of rated thermal short-time current I_{th})

The standard value of I_{th} shall be 25 times I_r, t_{th} being 2 s. For bushings with I_r equal to or greater than 4000 A, I_{th} shall always be 100 kA.

2. Standard value of rated dynamic current (I_d)

The standard value of I_d shall have an amplitude of the first peak of 2.5 times the value Of I_{th} according to section 1

NOTE: In some cases, values greater then 2.5 times the value of I_{th} may be necessary with respect to the transformer characteristics. The transformer manufacturer shall stipulate such requirements when ordering the bushing.

3. Thermal short-time current withstand test

The ability of the bushing to withstand the standard value of I_{th} shall be demonstrated by the following calculation:

$$\theta_f = \theta_o + a \quad I_{th}^2 / S_t S_e X t_{th}$$

where:

θ_f = the final temperature of the conductor, in degrees Celsius

θ_f = temperature of the conductor in degrees Celsius, under continuous operation with I_r at an ambient temperature of 40°C

a = 0.8 (K/s) / $(kA/cm^2)^2$ for copper, 1.8 (K/s) / $(kA/cm^2)^2$ for aluminum

I_{th} = standard value as specified above, in kiloamperes

S_t = total cross-section in square centimeters corresponding to I_r

S_e = equivalent cross-section taking account of skin effect

t_{th} = rated duration as specified above, in seconds

The bushing shall be considered to be able to withstand the standard value of I_{th} if θ_f does not exceed 180°C.

If the calculated temperature exceed this limit, the ability of the bushing to withstand the standard value of I_{th} shall be demonstrated by a test, the test shall be carried out as follows:

(a) The bushing can be installed in. any position.

(b) A current of at least the standard value of I_{th} and of duration t_{th} in accordance with section 1 shall be passed through the conductor, the cross-section of which shall conform with the rated current I_r.

Before the test, the bushing shall carry a current which produces the same stable conductor temperature as the rated current at maximum ambient temperature.

The bushing shall be considered to have passed the test if there is no visual evidence of damage and if it has withstood a repetition of all routine tests without significant change from the previous results.

4. Dynamic current withstand test

At the present time there is insufficient experience to allow the formulation of a test which will simulate the stresses encountered by a bushing during a transformer short-circuit test.

IEEE/PES TRANSFORMER COMMITTEE
BUSHING SUBCOMMITTEE
MINUTES OF MEETING APR. 25, 1995

G3: Thermal Basis of Rating

I agree with the proposal from Mr. Pritpal Singh distributed during the Kansas City meeting of the SC Bushings.

I am convinced that normally most bushings are able to operate even long times at a temperature above the specified and tested value for the insulating material (105°C for OIP). However, I think such an operating condition should not be specified in a standard because contradictions between applicable standards are to be avoided and the amount of life time consumption is unknown under such circumstances.

In cases where transformers with 65°C top oil rise have to be operated in an environment with 40°C average ambient temperature, bushings insulated with materials with higher temperature class (RIP with class E = 120°C) should be used. This offers the necessary safety for a regular life time consumption in applications where the transformer really works a significant amount of it's operating time with full load at ambient temperatures that result in daily means above 30°C.

Jens Frost
Oct. 15, 1995

Bushing Thermal Basis of Rating

Before discussing the subject of Thermal Basis of Rating let us look at the comparison of the operating and test conditions between different standards a shown below.

Standard	GSA GL1-2	ANSI/IEEE C57.19.00	IEC IEC 137-1984
Operating Conditions			
Max. Amb. C	40	40	40
Average (24 Hrs.) Amb. C	30	--	30
Min. Amb. C	-50	-30	-(25, 40, 60)
Immersion Medium			
Average (24 Hrs.) C	95	95	90
Max. (24 Hrs) Normal Load C	--	--	100
Oil Rise C	--	55	--
External Terminal Temp. Rise. C	30	30	75*
Test Conditions and Limits			
Hottest Spot Temp. C	--	--	105
Hottest Spot Temp. Rise C	75	65	75
Oil Rise C	65	55	60
Oil Level - During Testing	50 mm	MIN.	Specified
Test Ambient C	10 - 40	10 - 40	10 - 40
External Terminal Temp. Rise C	--	--	--
External Terminal Temp. C	70	--	--

For at least the last 30 years the bushing standards (IEEE 21 and now C57.19.00) have required the bushings to be temperature rise tested as per the above ANSI/IEEE requirements. The transformer bushings as per the above standards are required to limit the hottest spot temperature rise to 65°C above the test ambient which could vary between 10 and 40°C. The hottest spot temperature under these conditions was limited to 105°C. The maximum test ambient temperature of 40°C coincides with the maximum ambient of 40°C under operating conditions. The immersion oil temperature during the test is limited to 55°C above the actual test ambient. The oil temperature during this test therefore could go up to 95°C.

In service for a 65°C oil rise transformer, the average top oil temperature for a 30°C average ambient would be 95°C. (A 95°C top oil temperature is equivalent to 55°C oil spot rise would have an average hottest spot temperature of 105°C which is same as the current operating condition. On an average, the bushing insulation can be expected to have an normal life expectancy.

Bushings tested wit 55°C rise immersion oil have since 60's been successfully used on 65°C rise oil filled transformers with average top oil temperature of 95°C over a 24 hour period.

From time to time a question has been asked about the possibility of the bushing to be temperature rise tested with an immersion oil temperature rise of 65°C. (same as transformers). If this was done and still assuming 40°C maximum ambient, then the hottest spot temperature would be 115°C which exceeds the present 105°C limit. If however the average ambient of 30°C is used then the hottest spot temperature remains at the present

limit of 105°C on an average. If the average ambient is 30°C then a 75°C hottest spot temperature rise still meets the 105°C temperature limit.

A review of the CSA and IEC standards indicates that both these standards specify a hottest spot temperature rise of 75°C. Also these standards specify an average daily ambient of 30°C. The Immersion oil temperature specified by CSA is 65C and that by IEC is 60°C. Bushings tested as per CSA standard would have an average hottest spot temperature of 105°C when applied on a 65°C oil rise transformer and an average ambient temperature of 30°C. On the other hand an IEC bushing meeting the above requirements would have an average hottest spot temperature of 105°C when applied on a 65°C oil rise transformer and an above requirements would have an average hottest spot temperature slightly in excess of 105°C when applied on a 65°C oil rise transformer and a 30°C average ambient.

In view of the above and to have some consistency with the transformer standard it is proposed that wee change our standard requirements as follows:

Hottest Spot Temperature Rise = 75°C
Immersion Oil temperature Rise = 65°C
Average Ambient over 24 hour period = 30°C
The above proposal is another way to present the limits and does not require a change in the present operating conditions. IF the above proposal is acceptable then Sections 4.1 (1) and 5.4.1 can be rewritten as follows:

Section 4.1 (1) Usual Service Conditions

(1) The temperature of the ambient air is not above 40°C or below -30°C. The average ambient air temperature for any 24 hour period shall not exceed 30°C.

5.4.1 Thermal Basis of Rating

The hottest spot temperature rise of the current carrying parts in contact with temperature index 105 insulation and the non current carrying parts shall not exceed 75°C over ambient air when bushings are operated with the lower end is immersed to the minimum oil level in oil having a rise of 65°C over the ambient air and the bushing is carrying the rated current.

Bushings that pass the above thermal basis of rating test are suitable for use in 65°C rise oil filled transformers. The oil temperature in these transformers is limited to 95°C averaged over a 24 hour period with equivalent to the conditions used in the bushing thermal test.

Pritpal Singh
4.21.95

HAEFELY TRENCH
HIGH VOLTAGE TECHNOLOGY

To: Bonneville Power Admin.
Portland, OR

Fax No. 503-230-3212

Attn. Fred E. Elliott, P.E.
Dept. Electrical Engineering
Your ref.
please copy to:

From: Keith P. Ellis
Dept. Bushings

Pages (incl. cover)

Our ref.
Phone: direct (416) 751-8570
Fax direct (416) 751-6952
Date February 19, 1996

Subject: Bushing Arcing Distances

Dear Fred:

It is my understanding that the bushing's arcing distance, at a given voltage class, will determine the altitude rating for that bushings and that creepage distance has no bearing on the altitude rating. Reviewing C57.19.00, C57.19.01 and C57.19.100 I can find no references to minimum arcing distances, by voltage class, for the minimum altitude of 1000 meters.

The bushing standards give great detail on how to correct the bushing rating for increases in altitude above 1000 meters, but no values as a starting point is there such an IEEE/ANSI standard covering this requirement? If not, should there be?

I raise this question because I have noticed different outline drawings of the same class bushing with the same arcing distance (or nearly the same) yet one indicates an altitude rating, of 1000 meters and the other 3000 meters. They both cannot be right!

Please let me know if there are current standards covering minimum arcing distances. If you have any questions on this request, please let me know.

Best regards,

Keith

Haefely Trench. 390 Midwest Road, Scarborough, Ontario M1P 3B5 Canada
Phone (416) 751-8570, Fax (416) 751-6952

IEEE

POWER ENGINEERING SOCIETY
TRANSFORMERS COMMITTEE

9 April, 1996

Mr. James E. Smith, Chair IEEE Instrument Transformers Subcommittee
ABB Power T&D Company, Inc.
P.O. Box 687
Highway 43 North
Pinetops, NC 27864

Subject: Provisions for Bushing Current Transformers

On 22 May, 1992, Mr. J. Clinton Scott of Kuhlman Power Transformer Group sent a letter (copy attached) to Mr. Loren Wagenaar, Chairman of the Bushing Subcommittee of the IEEE PES Transformers Committee, requesting that the Bushing Subcommittee "...introduce a formal definition of "Current Transformer Pocket' and definitive requirements of the metal sleeve length in regard to the CT Pocket length." He based this request on his concern about a potential safety hazard.

The Bushing Subcommittee has discussed this request over several meetings since then and balloted two proposals related to this request. Each proposal has been developed in two separate parts. Part A adds several new definitions to Clause 3, Definitions, of ANSI/IEEE C57.19.00. Part B adds new requirements to Clause 6.3, Construction, of ANSI/IEEE C57.12.00.

The definitions in Part A have been successfully balloted in the Bushing Subcommittee and have general acceptance. It will be considered in the upcoming revision of C57.19.00.

The information in Part B regarding CT installation requirements is very controversial -with some support and strong vocal opposition even though the last subcommittee ballot was positive. As you know, the previous Bushing Subcommittee Chair, Loren Wagenaar, and I have discussed this in the Administrative Subcommittee at the Kansas City Meeting. ADCOM's advice to us was to refer this part to the Instrument Transformers Subcommittee for their consideration and action. The Bushing Subcommittee voted to do this during their meeting at Kansas City.

As a result, I am submitting the following information for the Instrument Transformer Subcommittee's information and consideration:

- Letter from J. Clinton Scott of Kuhlman - Dated 22 May, 1992

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

- Comments on Kuhlman's Letter by Pritpal Singh of ABB - 12 October, 1992
- The First Bushing Subcommittee Ballot - 21 February, 1994
- Ballot Results of First Bushing Subcommittee Ballot - 27 September, 1994
- The Second Bushing Subcommittee Ballots on Provisions of Bushing Current Transformers - 7 March, 1995 (Second Subcommittee Ballot)
- Final Results of the Second Bushing Subcommittee Ballots - Provisions for Bushing Current Transformers (Second Subcommittee Ballot)

Please consider Part B in the instrument Transformers Subcommittee and make a recommendation on presenting it or a modification of it for inclusion in proposed revisions for C57.12.00.

Please contact me if you need further information or 'assistance.

Sincerely,

Fred E. Elliott, Chair
Bushing Subcommittee
IEEE PES Transformers Committee

Bonneville Power Administration
NW Stop: TEOH/4
PO Box 3621
Portland, Oregon 97208-3621
Phone: (503) 230-3807
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E Mail: feelliott@bpa.gov

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/19/96

ATTACHMENT 4

SUBCOMMITTEE: BUSHING / CHAIRPERSON: FRED ELLIOTT / PHONE: (503)230-3807 / FAX: (503)230-4325

STANDARD NO. / PROJECT NO.	TITLE OF DOCUMENT / WORKING GROUP	WG OR TF CHAIR	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	REVISE OR REAFF. BY DEC 96
PC57.19.00	SUBCOMMITTEE	ELLIOTT F. E.	07/23/91	04/01/79	1996	(614)223-2259	PAR APPLICATION IN PROGRESS
C57.19.01	STANDARD PERFORMANCE CHARACTERISTICS AND DIMENSIONS FOR OUTDOOR APPARATUS BUSHINGS (IEEE 24)		SPD	IAS	IC	SWGR	REVISE OR REAFF. BY DEC 96
PC57.19.01	REVISION TO C57.19.01	SINGH PRITPAL	08/05/91	11/01/89	1996	(901)696-5228	PAR SUBMITTAL IN PROGRESS
C57.19.03	STANDARD REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR BUSHINGS FOR DC APPLICATIONS		SPD	IC	SWGR		PAR EXTENDED TO JUNE 1997
PC57.19.03	BUSHINGS FOR DC APPLICATION	HEYMAN OLOF	/ /	11/09/89	0	(503)230-3807	
C57.19.100	GUIDE FOR APPLICATION OF APPARATUS BUSHINGS.		SWGR	SUB	PSR		PUBLISHED 08/24/95
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						WITHDRAWN BY REVCOM 12/11/95
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	/ /	/ /	0	(414)547-0121	

COORDINATION ACTIVITY OF BUSHINGS SUBCOMMITTEE AS PER: 06/19/96

PROJECT NO. / DATE	TITLE	PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD. PHONE
P 957	GUIDE FOR CLEANING INSULATORS					
09/17/92		T&D	WILLIAM L. GIBSON	415-973-3747	L. B. WAGENAAR	OLD GUIDE EXTENDED TO 12/94 614 223-2259

7.12 Dielectric Tests - L. B. Wagenaar

The Subcommittee met in San Francisco, CA on April 16, 1996 with 50 members and 38 guests present. Since the room was only set up for 60 people, extra chairs had to be brought in, and people were standing in the aisles. The following business was covered during the meeting:

7.12.1 Chairman's Remarks

The IEEE will use a new balloting process. Working Group chairmen are asked to submit the new/revised documents which will be balloted within the next year. So far, the chairman has indicated that C57.98 and C57.113 will have ballots.

The next meeting of the Transformers Committee will be in Burlington, VT from Oct. 27-30, 1996. The following meeting will be in Graz, Austria from July 15-17, 1997. A separate roster will be circulated during the Wednesday meeting of the Transformers Committee for people to indicate their interest to attend the Graz meeting.

The chairman also asked for a volunteer to become secretary of the subcommittee.

7.12.2 Approval of Minutes of Boston Meeting

One misprint has been called to the attention of the chairman. This was in Section 7.12.3.4 where the 325 kV BIL should have been 825 kV BIL. The amended minutes were approved as corrected.

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

The Working Group met at 4:15 p.m. on April 15, 1996. Not all the people who attended the meeting signed the attendance sheet so an accurate count of those present was not possible. It is estimated that 50 people attended the meeting. Minutes of the Boston meeting were approved as written.

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

The task force met on Monday, April 15. Chairman Perkins announced the results of the ballot of draft 1 of the changes to ANSI C57.113 and C57.12.90:

Sent out	33	
Returned	20	61 %
Approved:	15	75 %
Not approved:	5	25 %

The negative votes were then reviewed, and all four concerning C57.12.90 were resolved. Following is a summary of the resolutions:

Section 10.8.2 will be changed to clarify that partial discharge acceptance criteria will be based on each line terminal 115 kV and above.

Section 10.8.5, c) will be deleted because it is vague and the variability of apparent charge measurements would make it too difficult to apply a pass/fail criterion.

Section 10.9.2 will be amended to include the use of a suitable external coupling capacitor for measurement of partial discharge.

Regarding C57.113, the negative balloter submitted two new paragraphs to specify a procedure to demonstrate the discharge meter characteristics. This addition was accepted. During this discussion, it became apparent that the most commonly used detector used in North America would not meet the requirements of C57.113. This item will

be discussed and hopefully resolved so that another ballot can be circulated within the task force before the next meeting.

Bertrand Poulin reported that a PAR for the revision of C57.113 had been submitted. The title was changed from a Guide to a Recommended Practice because this method will become a standard test procedure.

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

The task force met on April 15. Chairman Degeneff presented a review of activity since the last meeting: The updated insulation characteristic was forwarded to Bertrand Poulin in written form. Mr. Poulin forwarded it to Yasin Musa, who originally submitted the request for information. Mr. Musa sent it on to Bob Hileman, the current chairman of WG 3.4.8, Transformer Protection, who reviewed the curve and found that it would cause no problems in the insulation coordination effort. Mr. Hileman passed his comments to the new chair of the working group, Eva Tarasiewiez.

Bob Degeneff will write to Ms. Tarasiewiez, asking for the working group's acceptance of the curve. Furthermore, he will ask for clarification of several questions which Mr. Hileman asked concerning several additional aspects of insulation coordination.

Several members of the task force will prepare a technical paper for recording the history and rationale leading to the curve. They will attempt to have this paper ready in time for the next call for papers.

7.12.3.3 Waveshape Correction Factor

Loren Wagenaar agreed to study this problem further at the last meeting and pointed out that the suggested approach would not work, primarily because of the hump in the center of the frequency plot. Dr. Degeneff volunteered to participate in a study with Mr. Wagenaar to try a somewhat different approach.

7.12.3.4 Old Business

Table 5 of C57.12.00 is presently out for ballot on two separate aspects. The first aspect covers test levels for 735 and 735 kV transformers and addresses the induced test levels raised by Jeff Fleeman at the previous meeting. It also incorporates a 1950 kV BIL and appropriate test levels for chopped wave and switching impulse tests. The second aspect of the ballot concerns an omission of a line for 350 kV for 69 kV transformers from the last revision of C57.12.00. It was agreed at the meeting that this line would be reinserted without regard to results of this aspect of the ballot.

7.12.3.5 New Business

As indicated by Attachment I, the issue of test levels for transformers repaired in repair facilities has been referred to the working group. Discussion at the meeting indicate that it will be difficult to formulate wording for the numerous situations which will can arise. Mark Perkins volunteered to submit wording for the minimum requirements for these tests.

It was also proposed that a paragraph be inserted in the induced test section of C57.12.90 addressing the test connections for multiple connections. A proposal will be balloted with the working group before the next meeting.

7.12.4 Working Group on Revision of Dielectric Tests for Distribution Transformers - John Rossitti, Chair

The combined Task Force on the Guide for Routine Impulse Testing and the Working Group met on April 15. Don Ballard passed out a list of 24 substantive and editorial changes to the document which were discussed at the meeting. Following are two substantive items which were discussed:

Clause 10.4 of C57.12.90 lists two acceptable methods of fault detection; however, Clause 4 of the document only describes the use of a neutral impedance. Both methods should be discussed.

Clause 4.9 states that power class transformers need to limit induced voltages by loading non-induced windings with externally resistance, whereas C57.12.90 states that these terminals should be grounded. This discrepancy should be corrected or clarified.

Numerous members will work on these changes, which will be incorporated into Draft 4. Draft 4 will be sent to Rochelle Stern at IEEE for editorial review prior to being balloted within the working group and subcommittee.

There was also discussion at the subcommittee meeting concerning whether the new document should be made part of the present impulse guide, C57.98, or if it should be made into a separate document. Unless there are over-riding reasons to do it otherwise, the subcommittee would prefer that it be made into a separate document.

7.12.5 Working Group on Partial Discharge Tests in Transformers - Edgar Howells, Chair

The working group met on April 15. The main topic of discussion was the Trial Use Guide for the Location of Acoustic Emissions from Partial Discharges in Oil-immersed Power Transformers and Reactors. The outstanding negative vote from the previous ballot had been resolved with a suggested rewording. The document now describes the signal sampling rates such that it indicates that 1 MHz value stated has been found to be acceptable from experience and avoids any suggestion that this sampling rate was mandatory. The working group accepted the changes, and once a valid PAR is received from IEEE, the revised document will be balloted at the subcommittee and main committee levels.

The working group has been informed that the C57.127, Trial Use Guide for the Detection of Acoustic Emissions, has been canceled because the paperwork was lost in the IEEE Standards Office. This means that a new PAR must be obtained, the main committee must be reballoted and the document must be resubmitted to the Standards Board.

7.12.6 Working Group on Diagnostic Field Testing and Monitoring of Liquid Filled Power Transformers, Regulators and Reactors - Rick Young, Chair

The working group met on April 16. The chairman distributed copies of several EPRI Substation Equipment Diagnostics Conference papers for general information on the topic of on-line monitoring of transformers. Attendees were also reminded of the panel session covering on-line monitoring, sponsored by the working group, to be held later in the afternoon. This panel session was well attended and contained several items of good information.

It was reported that David Train, chairman of the PSIM working group revising IEEE Standard 62, had resigned. Andre Lux of ABB has volunteered to monitor the progress of PSIM on IEEE 62 and will report to the working group.

John Tengdin, representative of the IEEE Substations Committee, spoke to the working group on the issue of communication and protocol between intelligent electronic devices within the substations. John discussed the Substation Committee work on Standard P1379 for RTU to IED protocol within a substation, EPRI project RP3599 for substation Integrated protection, control and data acquisition, and work within IEC TC57 covering communication within substations. Mr. Tengdin strongly urged that liaison representation be established between the Transformers and Substations Committees to help coordinate the development of standards for communication with transformer on-line monitoring devices.

7.12.7 Liaison Activities

John Crouse reported that the IEEE Working Group on Insulation Coordination began its review of Part 2: Application Guide at the November 16-17 meeting. The working group will continue its review at the next meeting, to be held in Orlando, FL on May 9-10.

There was no liaison report from the Surge Protective Devices Committee.

7.12.8 Old Business

Subhash Tuli reported the following results of subcommittee balloting for the dielectric withstand test for low voltage control wiring and associated auxiliary circuits on Class I and II power transformers:

	C57.12.00		C57.12.90	
Ballots sent out	94		94	
Total returned	52	55 %	60	64 %
Affirmative	44	85 %	44	73 %
Affirmative with comment	4	8 %	8	13 %
Negative	3	7 %	6	10 %
Abstention	1	2 %	2	3 %

Mr. Tuli will check with members who cast the negative ballots and report back to the subcommittee chairman before the changes are sent on to the respective working groups for these documents.

7.12.9 New Business

A probable typographical error was found in Table 4 of C57.12.90. This is the table on Methods I and II insulation power factor tests. Previous editions of the standard will be checked, and if it is indeed an error, it will be sent to the Working Group on the Revision of C57.12.90.

Mark Perkins also mentioned that Table 5, Temperature Correction Factor for Insulation Power Factor, in C57.12.90 is out of date. The correction factors given in the table are for transformers with higher moisture contents and power factors than modern transformers, which have power factors in the order of 0.5 % or less, and correction factors will reduce for these power factors. Mark suggested that the Doble correction factors for higher voltage transformers be used. This item will be included as an agenda item for future meetings.

7.12.10 Attendance at Working Group and Task Force Meetings

Committee	Members	Guests
TF Revision of Induced Tests	16	20
TF Metal Oxide Surge Arrester Coordination with Power Transformer Insulation	8	14
TF Revision of Distribution Transformer Impulse Guide/WG Revision of Impulse Tests for Distribution Transformers	5	11
WG Partial Discharge Tests	9	26
WG Revision to Dielectric Tests	50 total (See Text)	
WG Diagnostic Field Testing and Monitoring of Transformers	89 total	

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE

DATE: 06/19/96

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 OR TF CHAIR	COMMITTEES REQUESTING COORDINATION: PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	LATEST STATUS / COMMENTS
C57.12.00	SECTION 5.10.7.1 - LIGHTNING IMPULSE TESTS						APPROVED BY MAIN COMMITTEE
PC57.12.00		MINKWITZ R. E. TF	/ /	/ /	0	(617)828-3241	
C57.12.00	TABLE 17 - SWITCHING IMPULSE TESTS - NOTE 8 ADDED						APPROVED BY SUBCOMMITTEE
PC57.12.00	REVISION OF DIELECTRIC TESTS	POULIN B.	/ /	/ /	0	(408)957-8326	
C57.12.00	TABLE 3 AND 5 - HARMONIZE VALUES						UNDER DEVELOPMENT
PC57.12.00	REVISION OF DIELECTRIC TESTS	POULIN B.	/ /	/ /	0	(408)957-8326	
C57.12.90	REVISION OF THE INDUCED TEST						INCLUDE IN C57.12.90
PC57.12.90d	REVISION OF DIELECTRIC TESTS	POULIN B.	/ /	09/28/90	0	(408)957-8326	COORDINATE WITH STEVE SMITH
C57.12.90	CLAUSE 10.4 - IMPULSE TESTS FOR DISTRIBUTION TRANSFORMERS						APPROVED BY SUBCOM
PC57.12.90	REV. OF IMPULSE TEST I/T	ROSSETTI J.	/ /	/ /	0	(901)528-4743	
C57.12.90	CLAUSE 10 - ADD HI-POT TEST FOR CONTROL WIRING						D1 BALOTTED IN SUBCOM
PC57.12.90		TULI S.	/ /	/ /	0	(414)547-0121	
C57.12.90	REVISE INDUCED TESTS FOR CLASS II POWER TRANSFORMERS						D1 BALOTTED IN TF
PC57.12.90	REVISION OF INDUCED TESTS TF	PERKINS M.	/ /	/ /	0	(317)286-9334	
C57.138	RECOMMENDED PRACTICE FOR ROUTINE IMPULSE TEST FOR DISTRIBUTION TRANSFORMERS						PAR APPLICATION IN PROGRESS
NEW	REV. DIEL. TESTS DIST. TRANSFO	ROSSETTI J.	/ /	/ /	0	(901)528-4743	
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	PAR WITHDRAWN
C57.98	IEEE GUIDE FOR TRANSFORMER IMPULSE TESTS		NONE				PUBLISHED JAN 95
PC57.98	REVISION OF DIELECTRIC TESTS	POULIN B.	06/01/86	02/01/86	1999	(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.	/ /	04/30/91	0	(901)528-4743	PAR EXTENSION TO 06/97 APPR.

STATUS REPORT OF STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/19/96

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 OR TF CHAIR	COMMITTEES REQUESTING COORDINATION				LATEST STATUS / COMMENTS
			PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_PHONE	
C57.113	GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN LIQUID-FILLED POWER TRANSFORMERS AND SHUNT REACTOR						REVISE OR REAFF. BY DEC 96
P545	P. D. TESTS FOR TRANSFORMERS	HOWELLS E.	12/05/91	09/25/91	1996	(414)835-1500	PAR SUBMITTAL IN PROGRESS
C57.127	GUIDE FOR THE DETECTION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS	T&D ED&PG CIGRE IEC					PAR WITHDRAWN BY SB
PC57.127	P. D. TESTS FOR TRANSFORMERS	HOWELLS E.	/ /	03/10/88	0	(414)835-1500	APPLY FOR PAR TO REBALLOT
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.	YOUNG F. N.	/ /	03/17/94	0	(216)447-2649	PUBLISHED
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.	/ /	03/17/93	0	(901)528-4743	ASK FOR PAR WITHDRAWAL
NEW	GUIDE FOR THE LOCATION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS						BALLOTTING WORKING GROUP
NO PAR YET	P. D. TESTS FOR TRANSFORMERS	HOWELLS E.	/ /	/ /	0	(414)835-1500	SUBMIT PAR AS SOON AS POSSIBLE

COORDINATION ACTIVITY OF DIELECTRIC TESTS SUBCOMMITTEE AS PER: 06/19/96

PROJECT NO. / DATE	TITLE / PES COM.	CONTACT IN PES COM.	CONTACT PHONE	COORDINATOR TRANS. COM.	COMMENT OR STATUS OF DOCUMENT / COORD. PHONE
P 4	STANDARD TECHNIQUES FOR HIGH-VOLTAGE TESTING				JUST PUBLISHED
02/02/89	PSIM	TERRY McCOMB	613-990-5826	G. VAILLANCOURT	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	408-957-8326
P1223	POWER SYSTEM DIGITAL TESTING TECHNIQUES				
08/17/89	PSIM	T. R. McCOMB	613-990-5826	R. MINKWITZ, SR.	617-828-3241
C62.62	PERFORMANCE CHARACTERISTICS FOR SURGE PROTECTIVE DEVICES CONNECTED TO LOW VOLTAGE AC POWER CIRCUITS				RESOLVING NEGATIVE BALLOTS
03/21/91	SPD	E. GALLO		MAHESH P. SAMPAT	704-462-3226
PC62.11	STANDARD FOR METAL-OXIDE SURGE ARRESTERS FOR AC POWER CIRCUITS				NEW PAR 6/14/94
06/14/94	SPD	R. M. SIMPSON	919-836-7059	W. A. MAGUIRE	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	VACANT	
PC62.22	GUIDE FOR APPLICATION OF METAL OXIDE SURGE ARRESTERS FOR AC SYSTEMS				INCLUDE DIST. TRANSFORMER
12/02/93	SPD	J. WOODWORTH	716-375-7270	ROBERT DEGENEFF	518-276-6367
PC62.42	GUIDE FOR THE APPLICATION OF LOW-VOLTAGE SURGE PROTECTIVE DEVICES				REVISED PAR 9/22/94
07/18/94	SPD	R. DAVIDSON JR.		MAHESH P. SAMPAT	704-462-3226

8.0 Reports of Liaison Representatives

8.1 EPRI - S. R. Lindgren

EPRI

Electric Power
Research Institute

Powering Progress through Innovative Solutions

MEMORANDUM

April 11, 1996

TO: Mr. John W. Matthews
Secretary, IEEE Transformers Committee
Baltimore Gas & Electric Co.
Windsor Office Building
7152 Windsor Boulevard
Baltimore, MD 21244-2779

FROM: Stan Lindgren, Project Manager

SUBJECT: EPRI LIAISON REPORT

The following report is for inclusion in your minutes for the April 17,1996 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. Core-form winding development and transformer demonstrations have been completed.

   - 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 or older transformers that had just been reprocessed following maintenance work. Failure typically occurs during the first startup or light loading period.

   - Work has focused on the effects of temperature and moisture transients. 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. Phase I of a comprehensive test program was completed on a 333 MVA single phase 500 kV autotransformer that is

fully instrumented to monitor static electrification effects during a series of experiments. A broad range of partial discharge activity was produced. A Phase II second round of tests is being planned for May-June 1996 to confirm and expand on the results.

- Results of the field tests are being reflected in a large-scale flow-model experiment starting in 1996 that will simulate the 500 kV transformer under laboratory conditions and controls.

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 by 40%. This has been demonstrated in models with rapid/high overload.

- Additional work is in process to experimentally study moisture dynamics associated with rapid overloads and cool-down cycles plus detect inception of partial discharges caused by bubble evolution. Moisture moves away from the hot conductor fast and returns very slowly after cool-down.

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.

A new project is underway to monitor HVCTs, bushings and potheads in laboratories and in service, including on-line tan delta, partial discharge and other available monitoring methods. Units will be tested to failure to evaluate failure modes, sensitivity of monitoring and to develop "end-of-life" criteria for interpretation of field monitoring data.

6. 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 near publication, TR-105421. An IEEE paper, 94 SM 473-9 PWRD, was presented at the IEEE/PES 1994 Summer Meeting in San Francisco. A second paper, "Field Application of a Dynamic Thermal Circuit Rating Method", was presented at the IEEE/PES 1996 Winter Meeting in Baltimore.

7. 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 metal-insulated-semiconductor sensors to monitor multiple gases. A field demonstration program is completed involving over 30 prototypes starting with the first in October 1993. Individual ppm for hydrogen, acetylene, ethylene and carbon monoxide is monitored.

8. Power Transformer Remaining Life Prediction & Extension

This project involves two areas of work:

- Furaldehydes in Transformer Oil

  A project is in process to develop a correlation between furaldehydes in oil samples with degree of polymerization (DP) found in paper insulation samples taken from a significant number of transformers in service. Additional laboratory experimental work is being added to search for trace chemicals that are an early indication of insulation degradation that can be sensed with on-line monitoring.

- Vibration & Frequency Response Analysis (FRA)

  A project is in process to develop a correlation between existing winding conditions and vibration & FRA tests before and after internal inspection and reclamping of the same transformers.

  The objective is to develop noninvasive field test methods that can be used to predict winding condition in the broad variety of existing power transformers without entering the transformer.

9. Transformer Expert System

A project is in process to capture the knowledge of transformer experts and make it usable in an off-line software tool for evaluation of transformer design questions, condition assessment, problem diagnosis, and identification of maintenance needs.

10. Guidelines for Life Extension of Substations

These guidelines, now published in Final Report TR-105070, include a large section an transformer inspection, condition assessment, testing, and maintenance practices. These guidelines will be updated on an ongoing basis.

11. Maintenance-Free LTC

A new project has been initiated to identify and categorize specific LTC problems, causes and populations involved; evaluate existing mitigation measures; and identify R&D needed to achieve substantial reduction in LTC maintenance requirements. A workshop is being planned for November 1996.

cc: Jim Harlow, Consultant
Mark Wilhelm, EPRI

SRL9862.M.BinderRev..3

8.2 SCC4 - P. A. Payne

SCC4-STANDARDS COORDINATING COMMITTEE NO. 4
INSULATION SYSTEMS

LIAISON REPORT TO IEEE TRANSFORMER COMMITTEE

The committee convened at the PES Winter Power Meeting on January 22, 1996 in Baltimore, Maryland. Action is required on IEEE 1, 98 and 99 which were last reaffirmed in 1992. One Working Group will revise the three standards harmonizing with IEC standards. IEEE 96 will be balloted for withdrawal as there seems to be no interest in the standard. IEEE 97 has several issues to be resolved resultant of the Standards Board review, resolutions will be circulated for reballot. One of the issues concerns the accuracy of the curve for the calculation of the correction factor. IEEE 943 requires action by 1997 for revision and harmonization with IEC 310.

US Technical Advisory Group for IEC TC98 will convene April 22-26, 1996 in Orlando, Fl, working groups are in preparation for the meeting. Working Group 1 is preparing a US portion on the Committee Draft. Working Group 2 has prepared a flow chart on intrinsic and extrinsic factors. Working Group 3 has its second Draft out for comments with basic test procedure identified without specifying test objects. Collaboration is required with specific equipment Standards Technical Committees to specify conditions in annexes. Additionally, the terminology in working Group 3 Draft needs to be revised to synchronize with terminology in Working Group 4 Draft.

The US will sponsor the IEC Annual Meeting in Fall 1998; two hundred Subcommittees and Committees will convene in Texas.

Respectfully submitted,

Paulette A. Payne
Loren B. Wagenaar

8.3 CIGRE SC12 - W. N. Kennedy

Mr. Kennedy was absent due to illness and no report was given.

9.0 Old Business

There was no old business discussed.

10.0 New Business

Wally Binder reported that Phil Hopkins has been appointed as the technical advisor to the US National Committee IEC TC 14. Phil has appointed the membership of the Administrative Subcommittee of the IEEE Transformer Committee, in addition to outside experts, to his group of technical advisors for the TC 14 Committee. Wally further added that this is an excellent opportunity for us to continue the organization of standards and to provide input to and learn from IEC standards.

Don Laird, the treasurer of the T & D Conference to be held in September this year in Los Angeles, California, invited everyone to attend this conference. He is expecting large attendance at the conference.

11.0 Adjournment

The meeting was adjourned at 11:02 AM.

Respectfully submitted,

Bipin K. Patel, Secretary

STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/19/96

ATTACHMENT 1 — PAGE NO: 2 OF 14

STANDARD NO / PROJECT NO	TITLE OF DOCUMENT / SUBCOMMITTEE	SC CHAIRPERSON	WG OR TF CHAIR	COMMITTEES REQUESTING COORDINATION: PUB DATE	PAR DATE	REV DUE YEAR	WG CH PHONE	LATEST STATUS / COMMENTS
C57.12.00	SECTION 5.1 - COOLING CLASS REVISION TO CONFORM TO IEC							BALLOTING
PC57.12.00	PERFORMANCE CHARACTERISTICS	JIN H. SIM	PLATTS D. W.	/ /	/ /	0	(610) 774-4686	
C57.12.00	SECTION 8 - DIELECTRIC TESTING OF SECONDARY CONTROL WIRING							BALLOTING
PC57.12.00	PERFORMANCE CHARACTERISTICS	JIN H. SIM	TULI S.	/ /	/ /	0	(414)547-0121	
C57.12.00	SECTION 8 - TESTING OF LTC CONNECTIONS							BALLOTING
PC57.12.00	PERFORMANCE CHARACTERISTICS	JIN H. SIM	PLATS D.	/ /	/ /	0	(610)774-4686	
C57.12.00	SECTION 5.9 - AUXILIARY LOSSES ON CLAS I AND CLASS II POWER TRANSFORMERS							BALLOTING
PC57.12.00	PERFORMANCE CHARACTERISTICS	JIN H. SIM	TULI S.	/ /	/ /	0	(414)547-0121	
C57.12.00	TABLE 17 - MECHANICAL LIFTING REQUIREMENTS CLARIFICATION							UNDER DEVELOPMENT
PC57.12.00	PERFORMANCE CHARACTERISTICS	JIN H. SIM	PLATTS D.	/ /	/ /	0	(610)774-4686	
C57.12.00	AUDIBLE SOUND LEVEL REQUIREMENTS							UNDER DEVELOPMENT
PC57.12.00	AUDIBLE SOUND & VIBRATION	JEEWAN PURI	PURI J.	/ /	/ /	0	(704)282-7413	
C57.12.01	GENERAL REQUIREMENTS FOR DRY-TYPE DIST. AND POWER TR INCL THOSE WITH SOLID CAST &/or RESIN-ENCAPSULATED WINDINGS							ASK FOR PAR EXTENSION
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON	JONATTI A.	02/02/89	09/28/82	1996	(813)442-0414	EXTENDED TO DEC 96
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	TOM TRAUB	TRAUB T.	06/04/87	/ /	1993	(312)394-2704	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	RED HAGER	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	WEST COAST	RED HAGER	GILLIES D. A.	05/09/80	/ /	1992	(503)622-4847	LIFE EXTENSION TO 12/92

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C57.12.13	CONFORMANCE REQUIREMENTS FOR LIQUID-FILLED TRANSFORMERS USED IN UNIT INSTALLATIONS INCL. UNIT SUBSTATIONS							ASSIGN TO SUBCOMMITTEE
ANSI	STANDARDS	TOM TRAUB	TRAUB T.	09/02/81	/ /	1987	(312)394-2704	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 EXTENDED TO 06/30/97
PC57.12.20	DISTRIBUTION TRANSFORMERS	KEN HANUS	ANDERSON G. W.	01/11/88	12/05/91	1993	(913)339-2931	REBALLOT REVISION
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	(601)796-4255	SUBMIT NEW PAR
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)882-6025	TO INCORPORATE INTO C57.12.34
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	(704) 462-3164	TO BE PUBLISHED BY NEMA
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						PUBLISHED BY ANSI 06/94
PC57.12.24	UG TR & NETWORK PROTECTORS	PAUL OREHEK	NIEMANN C.	05/10/88	06/27/91	1993	(708)410-5307	PAR SUBMITTAL IN PROGRESS
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	(314)239-6783	APPLY FOR NEW 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						TO INCORPORATE INTO C57.12.34
PC57.12.26	DISTRIBUTION TRANSFORMERS	KEN HANUS	PEARSON L. C.	06/17/92	12/05/91	1997	(817)882-6025	TO BE PUBLISHED BY NEMA
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	(314) 634-2111	ACTION REQUIRED ON PAR

STATUS REPORT ON STANDARDS OF IEEE/PES TRANSFORMERS COMMITTEE
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C57.12.28	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY							JOINT C37/C57 PROJECT
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS	MARTIN J.	06/24/87	/ /	1994		AWAITING PUBLICATION
C57.12.29	PAD-MOUNTED EQUIPMENT - ENCLOSURE INTEGRITY IN COASTAL ENVIRONMENTS							PUBLISHED IN 1992
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS	MARTIN J.	/ /	/ /	1996		NOT TRANSFORMERS COMM.
C57.12.30	SUBMERSIBLE EQUIPMENT - ENCLOSURE INTEGRITY							TO BE BALLOTED
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS	MARTIN J.	/ /	/ /	1994		NUMBER TO BE CHANGED
C57.12.31	COATING STANDARD FOR POLE MOUNTED TRANSFORMERS							JOINT C37/C57 PROJECT
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS	MARTIN J.	/ /	/ /	1994		AWAITING PUBLICATION
C57.12.32	ENCLOSURE INTEGRITY OF SUBMERSIBLE EQUIPMENT							
ANSI	DISTRIBUTION TRANSFORMERS	KEN HANUS	HANUS K.	/ /	/ /	0	(817)882-6020	AWAITING PUBLICATION
C57.12.33	GUIDE FOR EVALUATION OF LOSSES IN DISTRIBUTION TRANSFORMERS							PAR DISSAPROVED 03/21/96
PC57.12.33	DISTRIBUTION TRANSFORMERS	KEN HANUS	PEKAREK T.	/ /	/ /	0	(216) 479-3400	NESCOM WANTS CLARIFICATION
C57.12.34	REQUIREMENTS FOR THREE PHASE PAD-MOUNTED DISTRIBUTION TRANSFORMERS			ICC				PAR APPROVED
PC57.12.34	DISTRIBUTION TRANSFORMERS	KEN HANUS	PEARSON L. C.	/ /	09/21/95	0	(817)882-6025	TO COMBINE C57.12.22 & .26
C57.12.35	STANDARD FOR BAR CODING FOR DISTRIBUTION TRANSFORMERS (POLE-MOUNTED, PAD-MOUNTED AND UNDERGROUND)			AIM/TSC	IAS/REP TD	EEI	NEMA	PAR APPROVED 12/15/95
P1265	DISTRIBUTION TRANSFORMERS	KEN HANUS	JORDAN RON	/ /	12/15/95	1994	(619)482-3239	PROJECT NO. CHANGED
C57.12.40	REQUIREMENTS FOR SECONDARY NETWORK TRANSFORMERS, SUBWAY & VAULT TYPES (LIQUID IMMERSED)			SCC14				ANSI APPROVED 02/28/94
PC57.12.40	UG TR & NETWORK PROTECTORS	PAUL OREHEK	BERTOLINI E. A.	03/19/92	12/05/91	1997	(212)460-4913	PUBLISHED JAN 1996
C57.12.44	STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS			T&D	SWGR	IAS/REP	IAS/PSE EEI NEMA	PUBLISHED DEC 94
PC57.12.44	UG TR & NETWORK PROTECTORS	PAUL OREHEK	MULKEY D. H.	12/20/94	09/21/95	1999	(415)973-4699	PAR APPROVED 09/21/95

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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	PATTERSON W.	06/12/89	/ /	1994	(919)848-1860	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	PATTERSON W.	06/12/89	/ /	1994	(919)848-1860	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	PATTERSON W.	06/12/89	/ /	1994	(919)848-1860	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							ONLY TITLE EXIST (NO PAR)
ANSI	STANDARDS	TOM TRAUB	TRAUB T.	/ /	/ /	0	(312)394-2704	IS IT REQUIRED?
C57.12.54	REQUIREMENTS FOR DRY-TYPE, UNDERGROUND 3 PHASE DISTRIBUTION TRANSFORMERS,2500 kVA OR <, HV 24940 grdY/14400 OR <,LV 480V							ONLY TITLE EXISTS
ANSI	STANDARDS	TOM TRAUB	TRAUB T.	/ /	/ /	0	(312)394-2704	IS IT REQUIRED?
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	PATTERSON W.	04/07/86	/ /	1992	(919)848-1860	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	(302)999-2225	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					BALLOT D6 IN TC
PC57.12.57	UG TR & NETWORK PROTECTORS	PAUL OREHEK	NUTT B.	03/18/92	12/05/91	1997	(214)698-7447	APPL...
C57.12.58	GUIDE FOR CONDUCTING TRANSIENT VOLTAGE ANALYSIS OF A DRY-TYPE TRANSFORMER COIL	IEC	IAS					REVISE OR REAFF. BY DEC 96
P745	DRY-TYPE TRANSFORMERS	W. PATTERSON	KLINE A. D.	06/27/91	06/28/78	1996	(404)762-1642	REQUEST PAR EXT. TO JUNE 97

STANDARD NO / PROJECT NO	TITLE OF DOCUMENT / SUBCOMMITTEE	SC CHAIRPERSON	WG OR TF CHAIR	COMMITTEES REQUESTING COORDINATION / PUB_DATE	PAR_DATE	REV_DUE_YEAR	WG_CH_PHONE	LATEST STATUS / COMMENTS
C57.12.59	GUIDE FOR DRY-TYPE TRANSFORMER THROUGH-FAULT CURRENT DURATION							EXTENDED 12/1996
NONE	DRY-TYPE TRANSFORMERS	W. PATTERSON	PATTERSON W.	01/01/89	09/13/84	1996	(919)848-1860	ASK FOR PAR EXTENSION
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	(302)999-2225	BEING BALLOTTED IN C57
C57.12.70	TERMINAL MARKINGS AND CONNECTIONS FOR DIST. & POWER TRANSFORMERS			T&D	SUBS	ICC		REVISING TERMINOLOGY
NONE	STANDARDS	TOM TRAUB	TRAUB T. P.	06/18/92	06/14/95	1997	(312)394-2704	REVISE OR REAF. BEFORE 12/97
C57.12.80	TERMINOLOGY FOR POWER & DISTRIBUTION TRANSFORMERS			T&D	SUBS			WILL START REVISION
NONE	STANDARDS	TOM TRAUB	TRAUB T. P.	05/01/92	06/14/95	1997	(312)394-2704	PAR APPROVED 06/14/95
C57.12.90	STANDARD TEST CODE FOR LIQUID-IMMERSED DISTRIBUTION, POWER, AND REGULATING TRANSFORMERS & GUIDE FOR SC TESTING OF			T&D	PSRC	SWG	IECTC14 USTAG	MAKING RUNNING CHANGE LIST
VARIOUS	STANDARDS	TOM TRAUB	SMITH S. D.	03/16/93	06/15/95	1998	(606)879-2757	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	(501)534-5332	
C57.12.90	REVISION OF THE INDUCED TEST							INCLUDE IN C57.12.90
PC57.12.90d	DIELECTRIC TESTS	L. B. WAGENAAR	POULIN B.	/ /	09/28/90	0	(408)957-8326	COORDINATE WITH STEVE SMITH
C57.12.90	CLAUSE 13 - ADD TEST PROCEDURE FOR MEASURING SOUND INTENSITY							D1 BEING PREPARED
PC57.12.90x	AUDIBLE SOUND & VIBRATION	JEEWAN PURI	GIRGIS R.	/ /	/ /	0	(317)286-9532	COORDINATE WITH STEVE SMITH
C57.12.90	CLAUSE 10.4 - IMPULSE TESTS FOR DISTRIBUTION TRANSFORMERS							APPROVED BY SUBCOM
PC57.12.90	DIELECTRIC TESTS	L. B. WAGENAAR	ROSSETTI J.	/ /	/ /	0	(901)528-4743	
C57.12.90	CLAUSE 15 - NEW CLAUSE FOR CERTIFICATION TEST DATA							APPROVED BY PCS
PC57.12.90	PERFORMANCE CHARACTERISTICS	JIN H. SIM	JIN S.	/ /	/ /	0	(919)580-3234	

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C57.12.90	CLAUSE 9 - ADD MEASUREMENT OF AUXILARY LOSSES							D1 BALLOTED IN PCS
PC57.12.90	PERFORMANCE CHARACTERISTICS	JIN H. SIM	TULI S.	/ /	/ /	0	(414)547-0121	
C57.12.90	CLAUSE 10 - ADD HI-POT TEST FOR CONTROL WIRING							D1 BALOTTED IN SUBCOM
PC57.12.90	DIELECTRIC TESTS	L. B. WAGENAAR	TULI S.	/ /	/ /	0	(414)547-0121	
C57.12.90	REVISION OF TEMPERATURE RISE TESTS							TO BALLOT D3 IN TF, WG, SC
PC57.12.90	INSULATION LIFE	L. W. PIERCE	HENRY G.	/ /	/ /	0	(501)543 6546	
C57.12.90	REVISE INDUCED TESTS FOR CLASS II POWER TRANSFORMERS							D1 BALOTTED IN TF
PC57.12.90	DIELECTRIC TESTS	L. B. WAGENAAR	PERKINS M.	/ /	/ /	0	(317)286-9334	
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	JIN H. SIM	SIM JIN	/ /	/ /	0	(919)580-3234	COORDINATE WITH S. SMITH
C57.138	RECOMMENDED PRACTICE FOR ROUTINE IMPULSE TEST FOR DISTRIBUTION TRANSFORMERS							PAR APPLICATION IN PROGRESS
NEW	DIELECTRIC TESTS	L. B. WAGENAAR	ROSSETTI J.	/ /	/ /	0	(901)528-4743	
C57.12.91	TEST CODE FOR DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS			SPD	EM			REVISION APPROVED 06/15/95
PC57.12.91	DRY-TYPE TRANSFORMERS	W. PATTERSON	BARNARD D.	11/29/78	06/01/89	1984	(919)738-4251	REVISION OF PAR NEEDED
C57.13	REQUIREMENTS FOR INSTRUMENT TRANSFORMERS			PSIM	PSR	SPD		WORKING ON CHANGES
P546	INSTRUMENT TRANSFORMERS	J. E. SMITH	NELSON T.	03/30/94	06/14/94	1999	(301)975-2956	REV. PAR APPROVED 06/14/94
C57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS							R1992
PSRC	INSTRUMENT TRANSFORMERS	J. E. SMITH	SMITH J. E.	08/25/87	/ /	1997	(919-827-2121	RELAY COMM. DOCUMENT
C57.13.2	CONFORMANCE TEST PROCEDURES FOR INSTRUMENT TRANSFORMERS							REVISE [illegible] EFF. BY DEC 96
NONE	INSTRUMENT TRANSFORMERS	J. E. SMITH	SMITH J. E.	04/16/86	09/26/91	1996	(919-827-2121	REQUEST [illegible] EXT. TO JUNE 97
C57.13.3	GUIDE FOR THE GROUNDING OF INSTRUMENT TR SECONDARY CICUITS AND CASES							REVISE OR REAF. BY 12/96
NONE	INSTRUMENT TRANSFORMERS	J. E. SMITH	SMITH J. E.	01/23/87	/ /	1995	(919-827-2121	R1990

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C57.13.4	DETECTION OF PARTIAL DISCHARGE AND MEASUREMENT OF APPARENT CHARGE WITHIN INSTRUMENT TRANSFORMERS			T&D				PAR WITHDRAWN
P832	INSTRUMENT TRANSFORMERS	J. E. SMITH	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	INSTRUMENT TRANSFORMERS	J. E. SMITH	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	INSTRUMENT TRANSFORMERS	J. E. SMITH	TEN-HAAGEN C. W.	/ /	/ /	0	(603)749-8433	MAKE CHANGES AND RESUBMIT PAR
C57.15	REQUIREMENTS, TERMINOLOGY, & TEST CODE FOR STEP-VOLTAGE REGULATORS			SUBS	IAS/PSE			SCOPE REVISED
NONE	DISTRIBUTION TRANSFORMERS	KEN HANUS	DIAMANTIS T.	03/18/87	09/21/95	1997	(315)428-5688	TO ISSUE DRAFT 4
C57.16	STANDARD REQUIREMENTS, TERMINOLOGY, AND TEST CODE FOR DRY-TYPE AIR-CORE SERIES CONNECTED REACTORS			NEMA	IAS	T&D		TITLE CHANGE
PC57.16	DRY-TYPE TRANSFORMERS	W. PATTERSON	DUDLEY R.	09/19/58	12/11/95	1976	(416)298-8108	PAR APPROVED 12/11/95
C57.17	REQUIREMENTS FOR ARC FURNACE TRANSFORMERS							LAST REVISED IN 1986
ANSI	STANDARDS	TOM TRAUB	TRAUB T.	/ /	/ /	1986	(312)394-2704	ANSI DOCUMENT
C57.18.10	REQUIREMENTS FOR SEMICONDUCTOR RECTIFIER TRANSFORMERS			NONE				PAR EXT. TO 06/97 REQUESTED
PC57.18.10	PERFORMANCE CHARACTERISTICS	JIN H. SIM	KENNEDY S. P.	/ /	12/28/81	0	(716)896-6500	PAR HAS BEEN FOUND
C57.19.00	GENERAL REQUIREMENTS AND TEST PROCEDURES FOR OUTDOOR APPARATUS BUSHINGS (IEEE 21)			T&D	PSR	IC	SWGR	REVISE OR REAFF. BY DEC 96
PC57.19.00	BUSHING	FRED ELLIOTT	ELLIOTT F. E.	07/23/91	04/01/79	1996	(614)223-2259	PAR APPLICATION IN PROGRESS
C57.19.01	STANDARD PERFORMANCE CHARACTERISTICS AND DIMENSIONS FOR OUTDOOR APPARATUS BUSHINGS (IEEE 24)			SPD	IAS	IC	SWGR	REVISE OR REAFF. BY DEC 96
PC57.19.01	BUSHING	FRED ELLIOTT	SINGH PRITPAL	08/05/91	11/01/89	1996	(901)696-5228	PAR SUBMITTAL IN PROGRESS

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C57.19.03	STANDARD REQUIREMENTS, TERMINOLOGY AND TEST CODE FOR BUSHINGS FOR DC APPLICATIONS			SPD	IC	SWGR		PAR EXTENDED TO JUNE 1997
PC57.19.03	BUSHING	FRED ELLIOTT	HEYMAN OLOF	/ /	11/09/89	0	(503)230-3807	
C57.19.100	GUIDE FOR APPLICATION OF APPARATUS BUSHINGS.			SWGR	SUB	PSR		PUBLISHED 08/24/95
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							WITHDRAWN BY REVCOM 12/11/95
P757	BUSHING	FRED ELLIOTT	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	BUSHING	FRED ELLIOTT	NORDMAN RUSS	/ /	/ /	0	(414)547-0121	
C57.21	REQUIREMENTS,TERMINOLOGY, AND TEST CODE FOR SHUNT REACTORS RATED OVER 500kVA			EM	T&D	PSR		APPLY FOR PAR EXTENSION
PC57.21	PERFORMANCE CHARACTERISTICS	JIN H. SIM	McGILL J. W.	04/02/91	06/09/88	2000	(414)475-3422	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	(416)298-8108	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	(317)286-9387	PAR WITHDRAWN
C57.91	GUIDE FOR LOADING MINERAL OIL-IMMERSED TRANSFORMERS			SUB	T&D	PSE		REVISION APPROVED 06/15/95
PC57.91	INSULATION LIFE	L. W. PIERCE	PIERCE L.	03/21/91	06/13/85	1996	(706)291-3166	REVISION OF PAR NEEDED
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				REVISION APPROVED 12/11/95
PC57.93	WEST COAST	RED HAGER	GILLIES D. A.	/ /	06/01/89	0	(503)622-4847	WITHDRAW 12.11/12.12 WHEN APP.

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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	PATTERSON W.	12/09/87	/ /	1992	(919)848-1860	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	(314)554-3097	BALLOT FOR REAF. REQUESTED
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	(706)291-3166	APPLY FOR PAR EXTENSION
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	1999	(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	DIELECTRIC TESTS	L. B. WAGENAAR	ROSSETTI J.	/ /	04/30/91	0	(901)528-4743	PAR EXTENSION 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	(416) 298-8108	PAR WITHDRAWN
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	(704)462-3113	PAR WITHDRAWN
C57.104	GUIDE FOR THE DETECTION AND DETERMINATION OF GENERATED GAS IN OIL-IMMERSED TRANSFORMERS & THEIR RELATION TO SERVICEABIL.			PSR T&D				REVISE OR REAFF. BY DEC 96
PC57.104	INSULATING FLUIDS	F. GRYSZKIEWICZ	HEINRICHS F. W.	06/07/92	05/31/90	1996	(412)941-6924	REQUEST PAR EXT. TO JUNE 97
C57.105	GUIDE FOR APPLICATION OF TRANSFORMER CONNECTIONS IN THREE-PHASE DISTRIBUTION SYSTEMS							REAFFIRMED BY SB 06/17/92
PC57.105	PERFORMANCE CHARACTERISTICS	JIN H. SIM	REITTER G.	06/17/92	/ /	1997	(415)591-4463	BEING BALLOTED IN C57
C57.106	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF INSULATING OIL IN EQUIPMENT			NONE				REVISE OR REAFF. BY DEC 96
PC57.106	INSULATING FLUIDS	F. GRYSZKIEWICZ		11/20/91	06/19/86	1996	(617)926-4900	REQUEST PAR EXT. TO JUNE 97

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C57.109	GUIDE FOR THROUGH-FAULT CURRENT DURATION			PSR				APPLY FOR PAR TO REVISE
PC57.109	PERFORMANCE CHARACTERISTICS	JIN H. SIM	PATEL B.	03/16/93	06/27/91	1998	(205)877-7740	
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	JIN H. SIM	MAREK R. P.	12/03/92	09/15/93	1997	(804)838-8080	REAFFIRMED 1992
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	ASK FOR FOR PAR EXTENSION
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 WITHDRAWN
C57.113	GUIDE FOR PARTIAL DISCHARGE MEASUREMENT IN LIQUID-FILLED POWER TRANSFORMERS AND SHUNT REACTOR							REVISE OR REAFF. BY DEC 96
P545	DIELECTRIC TESTS	L. B. WAGENAAR	HOWELLS E.	12/05/91	09/25/91	1996	(414)835-1500	PAR SUBMITTAL IN PROGRESS
C57.114	SEISMIC GUIDE FOR POWER TRANSFORMERS AND REACTORS			NPE SUBS.				STD WITHDRAWN (OBSELETE)
P513	WEST COAST	RED HAGER	OKLU S.	02/15/90	09/06/73	1995	(213)481-4823	BALLOT WITHDRAWAL
C57.115	GUIDE FOR LOADING MINERAL-OIL-IMMERSED POWER TRANSFORMERS RATED IN EXCESS OF 100MVA (65 C WINDING RISE)							REVISE & REAFF. BY DEC 96
P756	INSULATION LIFE	L. W. PIERCE	PIERCE L. W.	03/21/91	06/15/91	1996	(706)291-3166	ANSI APPROVED 01/13/92
C57.116	GUIDE FOR TRANSFORMERS DIRECTLTY CONNECTED TO GENERATORS							REAFFIRMED
NONE	PERFORMANCE CHARACTERISTICS	JIN H. SIM	REITTER G.	01/03/89	06/28/79	1999	(415)508-2864	IS REVISION NEEDED?
C57.117	GUIDE FOR REPORTING FAILURE DATA FOR POWER TRANSFORMERS AND SHUNT REACTORS							REAFFIRMED BY SB 06/17/92
P786	PERFORMANCE CHARACTERISTICS	JIN H. SIM	ALTMAN M.	06/17/92	/ /	1997	(407)694-4975	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	(414)547-0121	APPLY FOR NEW PAR

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C57.120	LOSS EVALUATION GUIDE FOR POWER TRANSFORMERS AND REACTORS			SUB EM ED&PG IAS IEC				REVISE OR REAFF. BY DEC 96
P842	WEST COAST	RED HAGER	JACOBSEN R.	12/03/91	05/01/80	1996		PAR EXTENSION NEEDED
C57.121	GUIDE FOR ACCEPTANCE AND MAINTENANCE OF LESS FLAMMABLE HYDROCARBON FLUID IN TRANSFORMERS			PSRC T&D IAS IEC				PAR APPROVED 03/21/96
P954	INSULATING FLUIDS	F. GRYSZKIEWICZ	McSHANE C. P.	02/22/88	03/21/96	1996	(617)926-4900	REAF DISAPPROVED 03/15/95
C57.123	GUIDE FOR TRANSFORMER LOSS MEASUREMENT							PAR TOO OLD
P1098	PERFORMANCE CHARACTERISTICS	JIN H. SIM	HENNING W. R.	/ /	06/13/85	0	(414)547-0121	PAR EXT. TO 06/97 APPROVED
C57.124	RECOMMENDED PRACTICE FOR THE DETECTION OF PD AND THE MEASUREMENT OF APPARENT CHARGE IN DRY-TYPE TRANSFORMERS			NONE				REVISE OR REAFF. BY DEC 96
PC57.124	DRY-TYPE TRANSFORMERS	W. PATTERSON	KLINE A. D.	06/29/91	06/27/91	1996	(404)762-1642	REQUEST PAR EXTENSION
C57.125	GUIDE FOR FAILURE INVESTIGATION, DOCUMENTATION AND ANALYSIS FOR POWER TRANSFORMERS AND SHUNT REACTORS			T&D ED&PG PSE SWGR				BALLOTING REAFFIRMATION
PC57.125	PERFORMANCE CHARACTERISTICS	JIN H. SIM	ALTMAN M.	06/27/91	06/28/87	1996	(407)694-4975	REQUEST PAR EXTENSION
C57.127	GUIDE FOR THE DETECTION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS			T&D ED&PG CIGRE IEC				PAR WITHDRAWN BY SB
PC57.127	DIELECTRIC TESTS	L. B. WAGENAAR	HOWELLS E.	/ /	03/10/88	0	(414)835-1500	APPLY FOR PAR TO REBALLOT
C57.128	FIRE PROTECTION OF OUTDOOR LIQUID-IMMERSED POWER TRANSFORMERS			NPE SUB PSR				PAR TOO OLD
PC57.128	WEST COAST	RED HAGER	HAGER R.	/ /	06/01/89	0		PAR WITHDRAWN
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 EXTENDED TO JUNE 97
PC57.129	HVDC CONVERTER TR & REACTOR	W. N. KENNEDY	KENNEDY W. N.	/ /	09/26/91	0	(317)286-9387	TO BALLOT D9
C57.130	T-U GUIDE FOR USE OF DISS. GAZ ANALYSIS DURING FACTORY THERMAL TESTSFOR THE EVALUATION OF OIL-IMMERSED TRANS. AND REACT.			NONE				PREPARING D10
PC57.130	INSULATING FLUIDS	F. GRYSZKIEWICZ	HEINRICHS F. W.	/ /	03/17/93	0	(412)941-6924	CHANGE IN TITLE AND SCOPE

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C57.131	REQUIREMENTS FOR LOAD TAP CHANGERS			EM	T&D			APPROVED BY REVCOM 03/15/95
PC57.131	PERFORMANCE CHARACTERISTICS	JIN H. SIM	TRAUB T. P.	/ /	08/17/89	0	(312)394-2704	APPROVED BY REVCOM
C57.133	GUIDE FOR SHORT-CIRCUIT TESTING OF DISTRIBUTION AND POWER TRANSFORMERS			T&D,SWG PSR	IECTC14 SUBS		IAS/PSE IAS/REP	PAR APPROVED
PC57.133	PERFORMANCE CHARACTERISTICS	JIN H. SIM	McQUIN N.	/ /	09/21/95	0	(412) 829-1205	PART II OF C57.12.90
C57.134	GUIDE FOR THE DETERMINATION OF HOTTEST SPOT TEMPERATURE IN DRY TYPE TRANSFORMERS							PAR APPROVED
PC57.134	DRY-TYPE TRANSFORMERS	W. PATTERSON	PAYNE P.	/ /	09/21/95	0	(202)388-2138	
C57.135	GUIDE FOR APPLICATION, TESTING, INSTALLATION AND OPERATION OF PHASE ANGLE SHIFTING TRANSFORMERS							NEW PROJECT
PC57.135	WEST COAST	RED HAGER	TRUMUER E.	/ /	/ /	0	(602)236-8621	PAR SUBMITTAL IN PROGRESS
C57.136	GUIDE FOR SOUND LEVEL ABATEMENT AND DETERMINATION IN OIL-FILLED TRANSFORMERS							DRAFT 1 PRODUCED
PC57.136	AUDIBLE SOUND & VIBRATION	JEEWAN PURI	McGILL J.	/ /	03/21/96	0	(414)475-3422	PAR APPROVED 03/21/96
C57.137								
PC57.137	INSULATING FLUIDS	F. GRYSZKIEWICZ		/ /	/ /	0	(617)926-4900	
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	YOUNG F. N.	/ /	03/17/94	0	(216)447-2649	PUBLISHED
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	03/21/96	1979	(603)284-4362	PAR [illegible]
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	

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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	JIN H. SIM	PIERCE L. W.	03/19/92	10/29/90	1997	(706)291-3166	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	TRIAL-USE GUIDE FOR INTERPRETATION OF GASES GENERATED IN SILICONE-IMMERSED TRANSFORMERS			T&D	ICC			PAR REVISION APPROVED
P1258	INSULATING FLUIDS	F. GRYSZKIEWICZ	GRYSZKIEWICZ f.	/ /	06/15/95	0	(617)926-4900	D08 TO BALLOT
IEEE1276	TRIAL-USE GENERAL REQUIREMENTS FOR LIQUID-FILLED DISTRIBUTION AND POWER TR UTILIZING HIGH TEMP SOLID INSULATING MATERIAL			T&D				PAR APPROVED 03/21/96
P1276	INSULATION LIFE	L. W. PIERCE	FRANCHEK M. A.	/ /	03/21/96	0	(802)748-3936	
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 EXTENDED TO JUNE 1997
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	(901)528-4743	ASK FOR PAR WITHDRAWAL
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	(410)291-3231	NO. CHANGED FROM C57.132
NEW	GUIDE FOR THE LOCATION OF ACOUSTIC EMISSIONS FROM PARTIAL DISCHARGES IN OIL-IMMERSED POWER TRANSFORMERS							BALLOTTING WORKING GROUP
NO PAR YET	DIELECTRIC TESTS	L. B. WAGENAAR	HOWELLS E.	/ /	/ /	0	(414)835-1500	SUBMIT PAR AS SOON AS POSSIBLE

COORDINATION ACTIVITIES OF THE IEEE/PES TRANSFORMERS COMMITTEE — DATE: 06/20/96
ATTACHMENT 2 — PAGE NO: 1 OF 3

PROJECT NO. / DATE	TITLE / PES COM.	CONTACT IN PES COMMITTEE.	CONTACT PHONE NO.	TRANSFORMERS COMMITTEE COORDINATOR	STATUS OF DOCUMENT / SUBCOMMITTEE TR. COM.	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	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	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	T. P. TRAUB	STANDARDS	312-394-2704
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
P 4	STANDARD TECHNIQUES FOR HIGH-VOLTAGE TESTING				JUST PUBLISHED	
02/02/89	PSIM	TERRY McCOMB	613-990-5826	G. VAILLANCOURT	DIELECTRIC TESTS	514-652 8515
P 62	GUIDE FOR DIAGNOSTIC OF POWER APPARATUS				DRAFT PUBLISHED IN C57 COLL.	
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	T. P. TRAUB	STANDARDS	312-394-2704
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. E. SMITH	INSTRUMENT TRANSFORMERS	919-827-3220
P1459	STD DEF. FOR THE MEAS. OF ELECTRIC POWER QUANTITIES UNDER SINUSOIDAL, NON-SIN., BALANCED OR UNBALANCED CONDITIONS				APPLYING FOR PAR	
/ /	PSIM	A. E. EMMANUEL	508-831-5239	EDDIE SO	PERFORMANCE CHARACTERISTICS	613-993-2660

PROJECT NO. / DATE	TITLE / PES COM.	CONTACT IN PES COMMITTEE.	CONTACT PHONE NO.	TRANSFORMERS COMMITTEE COORDINATOR	STATUS OF DOCUMENT / SUBCOMMITTEE TR. COM.	COORD. PHONE
PC37.107	STANDARD FOR DIGITAL PROTECTIVE RELAY INTERFACES				EVALUATING BALLOT RESULTS	
12/28/85	PSR	STIG L. NILSSON	408-335-9061	T. P. TRAUB	STANDARDS	312-394-2704
PC37.108	GUIDE FOR THE PROTECTION OF NETWORK TRANSFORMERS				REAFFIRMED 1994	
09/28/84	PSR	THOMAS E. WIEDMAN	312-394-2593	VACANT	STANDARDS	
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	919-827-3220
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	J. E. SMITH	INSTRUMENT TRANSFORMERS	919-827-3220
PC57.13.1	GUIDE FOR FIELD TESTING OF RELAYING CURRENT TRANSFORMERS				REAFFIRMED 1992	
12/31/80	PSR	ARUN G. PHADKE	703-231-7029	J. E. SMITH	INSTRUMENT TRANSFORMERS	919-827-3220
C62.62	PERFORMANCE CHARACTERISTICS FOR SURGE PROTECTIVE DEVICES CONNECTED TO LOW VOLTAGE AC POWER CIRCUITS				RESOLVING NEGATIVE BALLOTS	
03/21/91	SPD	E. GALLO		MAHESH P. SAMPAT	DIELECTRIC TESTS	704-462-3226
PC62.11	STANDARD FOR METAL-OXIDE SURGE ARRESTERS FOR AC POWER CIRCUITS				NEW PAR 6/14/94	
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	VACANT	DIELECTRIC TESTS	
PC62.22	GUIDE FOR APPLICATION OF METAL OXIDE SURGE ARRESTERS FOR AC SYSTEMS				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 9/22/94	
07/18/94	SPD	R. DAVIDSON JR.		MAHESH P. SAMPAT	DIELECTRIC TESTS	704-462-3226

COORDINATION ACTIVITIES OF THE IEEE/PES TRANSFORMERS COMMITTEE
ATTACHMENT 2

DATE: 06/20/96
PAGE NO: 3 OF 3

PROJECT NO. / DATE	TITLE / PES COM.	CONTACT IN PES COMMITTEE.	CONTACT PHONE NO.	TRANSFORMERS COMMITTEE COORDINATOR	STATUS OF DOCUMENT / SUBCOMMITTEE TR. COM.	COORD. PHONE
NEW 02/20/95	GUIDE FOR RECOMMENDED ELECTRICAL CLEARANCES AND INSULATION LEVELS IN AIR INSULATED SUBSTATIONS SUBS	RICHARD COTTRELL	517-788-0817	T. P. TRAUB	APPLYING FOR PAR STANDARDS	312-394-2704
P 693 09/18/90	RECOMMENDED PRACTICE FOR SEISMIC DESIGN OF SUBSTATIONS SUBS	RULON FRONK	213-481-3327	DAVID BRUCKER	NEW PAR 12/93 WEST COAST	415-692-4431
P 979 06/18/92	GUIDE FOR SUBSTATION FIRE PROTECTION SUBS	A. J. BOLGER	604-663-2879	D. W. SUNDIN	MUST COMPLETE IN 1994 WEST COAST	414-524-3221
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 INSULATING FLUIDS	617-926-4900
P1268 03/30/91	GUIDE FOR INSTALLING TEMPORARY SUBSTATIONS SUBS	SHASHI G. PATEL	404-362-5386	D. A. GILLIES	D1 READY FOR WG COMMENTS WEST COAST	503-622-4847
P1303 09/17/92	GUIDE FOR STATIC VAR COMPENSATOR FIELD TESTS SUBS	PHILIP R. NANNERY	914-577-2591	R. F. DUDLEY	APPROVED BY SB 06/94 DRY TYPE	416-298-8108
P1291 10/22/91	GUIDE FOR PARTIAL DISCHARGE MEASUREMENTS IN POWER SWITCHGEAR SWGR	E. F. VEVERKA	414-835-1544	T. P. TRAUB	ANSI APPROVED 08/30/93 STANDARDS	312 394 2704
P1325 03/17/92	RECOMMENDED PRACTICE FOR REPORTING FIELD TROUBLE DATA FOR POWER CIRCUIT BREAKERS SWGR	D. M. LARSON	203-634-5739	T. P. TRAUB	INFORMATION COPY REQUESTED STANDARDS	312-394-2704
PC37.10 05/01/91	GUIDE FOR DIAGNOSTICS AND FAILURE INVESTIGATION OF POWER CIRCUIT BREAKERS SWGR	L. ROLANDO SAAVEDRA	504-363-8765	WALLACE B. BINDER JR.	DRAFT IN REVISION IN WG PERFORMANCE CHARACTERISTICS	216-384-5625
P 656 03/08/91	STANDARD FOR THE MEASUREMENT OF AUDIBLE NOISE FROM OVERHEAD TRANSMISSION LINES T&D	JAMES R. STEWART	518-395-5025	ALAN M. TEPLITSKY	PUBLISHED 12/92 AUDIBLE SOUND AND VIBRATION	212-460-4859
P 957 09/17/92	GUIDE FOR CLEANING INSULATORS T&D	WILLIAM L. GIBSON	415-973-3747	L. B. WAGENAAR	OLD GUIDE EXTENDED TO 12/94 BUSHINGS	614-223-2259
P1030.3 12/05/91	GUIDE FOR SPECIFICATION OF HVDC PERFORMANCE - PART III, DYNAMIC PERFORMANCE T&D	LEWIS VAUGHAN	514-652-8457	WILLIAM N. KENNEDY	DISCUSSING DRAFT IN WG HVDC CONV. TR & SMOOTHING REAC	317-286-9387

COORDINATION ACTIVITY OF IEEE/PES TRANSFORMERS COMMITTEE

LIST OF LIAISON REPRESENTATIVES

ATTACHMENT 3

DATE: 06/19/96

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	VACANT	
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	GARY POLHILL	(312) 394-7734
IEC/SC36A	IEC INSULATED BUSHINGS SUBCOMMITTEE 36A	BILL SAXON	(704) 382-6534
IEC/TAG	US TECHNICAL ADVISOR TO IEC TC 14	P. J. HOPKINSON	(704) 282-7469
IEC/TC42	IEC HIGH VOLTAGE TESTING TECHNIQUES COMMITTEE 42	G. H. VAILLANCOURT	(514) 652-8515
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION	J. GAUTHIER	(202) 457-8400
NPE	NUCLEAR POWER ENGINEERING COMMITTEE	M. S. ZAR	(312) 269-2222
PSC	POWER SYSTEM COMMUNICATIONS COMMITTEE	SUKHDEV WALIA	(908) 422-2104
PSE	POWER SYSTEM ENGINEERING COMMITTEE	W. A. JOHNSON	(301) 469-5252
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	C. KRISHNAYA	(514) 652-8342
TC	TRANSFORMERS COMMITTEE	T. P. TRAUB	(312) 394-2704
TSC	TECHNICAL SYMBOLOGY COMMITTEE (PART OF AIM)		

IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUPS	Cleveland Oct. 1992	Portland Mar. 1993	St. Pete Nov. 1993	Dallas Mar. 1994	Milwaukee Sep. 1994	Kansas City Apr. 1995	Boston Nov. 1995	Sanf Apr. 1996	MAX	AVG
Committee Registration: Members and Guests	245	213	283	247	275	286	272	301	301	265
Spouses	40	48	97	43	55	45	51	64	97	55
Luncheon	120	112		125	149	158	165	167	167	142
SC ADMINISTRATIVE	18	16	21	20	22	22	20	21	22	20
SC AUDIBLE NOISE AND VIBRATION	0	26		29	32	18	26	34	34	24
SC BUSHINGS	22	17	18	39	36	35	32	32	39	29
WG Bushing Application Guide	27	21	19	22	23				27	22
TF Draw Lead Bushings						18	25		25	22
WG DC Applications of Bushings	12	17	13	17	19	21	19	19	21	17
WG Revision C57.19.01	13	12	13	22	23	32	30	30	32	22
SC DIELECTRIC TESTS	104	88	98	79	84	99	71	88	104	89
WG Revision of Dielectric Tests	58	40	60	53	56	40	39	50	60	50
TF on Revision of the Induced Test		25	33	38	30	48	28	32	48	33
TF Metal Oxide Surge Arrester Coordination	27	27	35	25	35	31	14	22	35	27
WG Rev. Dielectric Tests on Distr. Transf.	19	17			16	15	14	16	19	14
TF Rev. Distr. Impulse Guide					17	19	18	16	19	18
WG Diagnostic Field Testing & Monitoring							64	89	89	77
WG Partial Discharge Tests	40	66	28	23	27		27	35	66	35
SC DISTRIBUTION TRANSFORMERS	35	35	52	47	49	48	44	37	52	43
WG Overhead Type Distr. Transfs. C57.12.20	23	23	35	34	34	30	30		35	30
WG Single-Phase Submersible C57.12.23					15	30	23		30	23
WG Single-Phase Deadfront Padmount C57.12.25	28	28	28	30	28	30	29		30	29
WG Bar Coding				22	30	35	29		35	29
WG Loss Evaluation				44	57	40	47		57	47
WG Electronic Data Transmittal				27	36	35	33		36	33
WG Combination of C57.12.22 and .26				27	28	30	28		30	28
WG Step-Voltage and Induction Regs C57.15					25	40	33		40	33
SC DRY-TYPE TRANSFORMERS	26	39	38	33	41	45	37		45	37
WG Test Code C57.91	25	31	27	24	28		27		31	27
WG Dry-Type Reactors	9	12	7	7	12	13	10	14	14	11
WG Dry-Type Reactors - HVDC Smoothing			8	5	10	6	7	5	10	7
WG Dry-Type Thermal Eval. and Flammability	16	26	20			20	21		26	21
WG Dry-Type General Requirements C57.12.01			31	21	21	36	27	20	36	26
WG Insulation Req. for Specialty Transf.	11	6	11	8	10	10	9	11	11	10
WG Cast Coil Loading Guide	19	30	17	17	16	24	21	19	30	20
WG Hot Spot Diferentials			27	16	31	38	28	34	38	29
SC HVDC CONVERTER TRANF. & REACTORS	13	19	17		15	13		11	19	15

NOTE: Data maintained for four years only.

Attachment 4

IEEE/PES TRANSFORMERS COMMITTEE ATTENDANCE STATISTICS

GROUPS	Cleveland Oct. 1992	Portland Mar. 1993	St. Pete Nov. 1993	Dallas Mar. 1994	Milwaukee Sep. 1994	Kansas City Apr. 1995	Boston Nov. 1995	Sanf Apr.1996	MAX	AVG
SC INSTRUMENT TRANSFORMERS	26	21	28	21	13	13	18		28	20
WG Test Req Instr Transf >115 kVA					22	30	22	16	30	23
WG Revision of C57.13					11	13	20	20	20	16
SC INSULATING FLUIDS	61	57	62	50	44	61	58	68	68	58
WG Gas Analysis During Factory Tests		57	62		44	61	58		62	56
WG Gas Analysis Silicone Transformers					44	61	58		61	54
SC INSULATION LIFE	138	83	60	63	45	49	57	65	138	70
WG Guides for Loading	70	69	73	61					73	68
WG Thermal Eval. of Distr. and Power Transf.	32	38	35	11				32	38	30
WG Thermal Tests	32	34	39	30	58	34	21	33	58	35
TF Revision of Temperature Test Code					20	22	19	37	37	25
TF Thermal Duplicate				27	31		26	20	31	26
TF Hottest Spot Temp. Rise				31	36	44	52	51	52	43
WG High Temperature Insulation	60	55	58	52	48	50	46	48	60	52
SC PERFORMANCE CHARACTERISTICS	69	60	97	83	93	88	99	106	106	87
WG Loss Tolerance and Measurement	38	39	32	35	45	36	34	37	45	37
TF Loss Measurement Guide					16				16	16
TF Low Power Factor Measurements					33				33	33
WG LTC Performance Requirements	37	38	37	37	41				41	38
WG PCS Rev. C57.12.00				20	21	38	29		38	27
WG PCS Rev. C57.12.90 Part I				15	19	15	23	34	34	21
WG PCS Rev. C57.12.90 Part II							5		5	5
WG Revision C57.110		38	32	35	30	39	40	34	40	35
WG Semi-Conductor Rectifier Transformers	23	31	23	23	22	29	33	28	33	27
TF Survey GSU Transf Failures					16	18	33		33	22
SC STANDARDS				13	12	17	14		17	14
WG Continuous Revision C57.12.00						15	15		15	15
WG Continuous Revision C57.12.90						15	15		15	15
WG Diagnostic Field Testing of Transf.					21	37	29		37	29
SC UNDERGRND. TRANF. & NETWK. PROTCS.	17	17	19	20	19	15	12	12	20	16
WG Three-Phase Underground Transfs.	14	9	16	16	16	10	13	10	16	13
WG Liquid-Filled Sec. Network Transfs.	17	16	15	16	15	15	15	12	17	15
WG Secondary Network Protectors	19	13	20	17	13	13	13	11	20	15
WG Dry-Type Network Transfs.	15	18	12	10	12	6	9		18	12
SC WEST COAST	14					26		9	26	16
WG Consolidation of Installation Guides									0	0
WG Phase Shifting Transformers						15	18	36	36	23
WG Seismic Guide									0	0
WG Loss Evaluation Guide									0	0
WG Fire Protection									0	0

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NOTE: Data maintained for four years only.

Attachment 5

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 (usually the 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)

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) Update an existing PAR. ❑ YES ❑ NO Is this in ballot now? ❑ 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)*

(d) FILL IN TARGET COMPLETION DATE for submittal to IEEE Standards Review Committee (RevCom): _____

6. Scope of Proposed Project: *(What is being done, including the technical boundaries of the project.)*

REV. 1/96

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.1) Are you aware of any patents relevant to this project?
❑ YES *(Attach an explanation.)* ❑ NO

(a.2) Are you aware of any copyrights relevant to this project?
❑ YES *(Attach an explanation.)* ❑ NO

(a.3) Are you aware of any trademarks relevant to this project?
❑ YES *(Attach an explanation.)* ❑ NO

(b) Are you aware of any other standards or projects with a similar scope?
❑ YES *(Attach an explanation.)* ❑ NO

(c) Is this standard intended to form the basis of an international standard?
❑ YES ❑ NO *(Attach an explanation.)* ❑ 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: _____

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Signature IEEE Officer: _____ Date _____
Title: _____

ATTACHMENT 6
IEEE PES TRANSFORMERS COMMITTEE

Summary of C57.12.00 Changes Pending

CLAUSE	CHANGE	GROUP	STATUS
All	Editorial changes per IEEE style requirements	Stds SC	Complete
5.10.7.1	Lightning Impulse Tests	DT SC	Approved in main committee previously
Table 9	Date of manufacture on nameplate	PC SC	Approved by PC SC
Table 9	PCB statement on nameplate	PC SC	Approved by PC SC
Table 9	Masses on nameplate for 150 kv BIL	PC SC	Dropped
Table 17	Switching Impulse Test - Note 8 added	DT SC	Approved by DT SC
Table 5	Column 7 @ Column 1 = 230 and Column 2 = 230, "275" changed to "360"	STD SC	Correction of typographical error
Tables 3 & 5	Harmonize values in Tables 3 & 5	DT SC	Under development
9.3 Table 19	Tolerance for losses	PC SC	To be balloted
5.1	Cooling classes revision to conform with IEC	PC SC	Balloting
8	Dielectric testing of secondary control wiring	PC SC	Balloting
8	Testing of LTC connections	PC SC	Balloting
5.9	Auxiliary losses on Class I & II power transformers	PC SC	Balloting
Table 17	Mechanical lifting requirements clarification	PC SC	Under development
New	Audible Sound Level Requirements	AS&V SC	Under development

ATTACHMENT 7

Revision to C57.12.90-19XX

IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers

1. The Test Code (Part I) has been separated from the Guide for Short Circuit Testing (Part II). Part II will be come a separate Guide for Short Circuit Testing with a new C57 designation.

2. Editorial changes have been made to make the document more closely conform to the IEEE Style Manual, and per recommendations from the IEEE Editorial Staff.

   a. Clauses 1-4 have been rearranged, although virtually all of the original wording remains intact.

   b. When used in text, symbols for delta and wye are now spelled out as words "delta" and "wye."

   c. Periods have been deleted at the end of some of the headings.

   d. Tables 11-14 were retitled as Figures 31-34, since they were illustrative in nature and did not contain data.

3. Corrections have been made to know errors in the text and previous revisions.

   a. Figures 14 and 17 were reversed in the 1993 edition.

   b. In clause 11. the reference to C57.12.00-1993 clause 7.2 has been corrected to read "clause 5.11.2."

4. A previously approved technical revision to clause 10.3.1 will be included. The last sentence of the clause is deleted.

5. A new technical revision to clauses 10.4.1, 10.4.2, and 10.4.3 is proposed. The proposed text for this revision is included.

6. A new clause 15 has been added for Certified Test Data information. The previous Annex is to be deleted.

April 1996

ATTACHMENT 7

Working Group for Continuous Revision of C57.12.90

Test Code for Liquid Immersed Distribution, Power, and Regulating Transformers

Clause	Responsibility
1. Scope	STD
2. References	STD
3. Terminology (Definitions)	STD
4. General	STD
5. Resistance Measurements	PCS
6. Polarity and Phase Relationship	PCS
7. Ratio Tests	PCS
8. No-load Losses and Excitation Current	PCS
9. Load Losses and Impedance Voltage	PCS
10. Delectric Tests	DIT
11. Temperature Rise	IL
12. Short Circuit Tests	PCS
13. Audible Sound Emissions	ASV
14. Calculated Data	PCS
15. Certified Test Data (new)	PCS
16. Bibliography	STD

S. D. Smith, W.G. Chairman April 9, 1996

Working Group for Continuous Revision of C57.12.90

Test Code for Liquid Immersed Distribution, Power, and Regulating Transformers

Active Revisions to C57.12.90

Clause/s	Change	Subcommittee/Group (chairman)	Status
1. Clauses 1-4	to conform to IEEE Style Manual	STD, WG rev of C57.12.90 (Steve Smith)	
2. Clause 10.4	rev. impulse test for dist. trans.	DIT, WG rev of diel. test for dist. trans. (John Rossetti)	approved by DIT
3. New clause 15	add clause for cert. test data	PCS, WG rev of C57.12.90 (Jin Sim)	approved by PCS
4. Clause 9	add measurement of aux losses	PCS, WG rev of C57.12.90 (Subhash Tuli)	D1 balloted in PCS
5. Clause 10	add high-pot test for control wiring	DIT, WG rev of C57.12.90 (Subhash Tuli)	D1 balloted in DIT
6. Clause 11	revise temperature rise tests	IL, TF on thermal tests (George Henry)	D3 to be ballotted in TF, WG, &SC
7. Clauses 10.8 & 10.9	revise induced test for Class II power transformers	DIT, TF for rev. of induced tests (Mark Perkins)	D1 being ballotted in TF
8. Clause 13	add test procedure for measuring noise intensity	ASV (Ramsis Girgis)	D1 being prepared

S. D. Smith, W.G. Chairman March 26, 1996