

MINUTES OF THE IEEE/PES
TRANSFORMERS COMMITTEE
APRIL 13, 1983
ATLANTA, GEORGIA

Members or Representatives Present - 84

L. J. Savio - Chairman
D. A. Yannucci - Vice Chairman
O. R. Compton - Secretary

Allen, D. J.	Keller, O.
Allen, B. F.	Liebich, R. E.
Allustiarti, R.	Light, H. F.
Arnold, J. C.	Lindsay, C.
Bancroft, R.	Little, R.
Bonucchi, J. V.	Long, L. W.
Borst, J. D.	Lowe, R. I.
Brutt, F. J.	Manning, M. L.
Buchanan, D. F.	Matthews, J. W.
Cash, D. J.	McCrae, G. G.
Cook, F. W., Sr.	McCormick, L. S.
Corkran, J.	McMillen, C. J.
Daniels, M. G.	McNutt, W. J.
Douglass, J. D.	Mehta, S. P.
Dutton, J. C.	Melton, N. J.
Edwards, E. C.	Miller, C. K.
Ensign, R. L.	Millian, C.
Evans, C. G.	Minkwitz, R. E., Sr.
Falkowshi, P. P.	Mitchell, C. E.
Farber, W. R.	Musil, R. J.
Fischer, H. G.	Mutschler, W. H.
Foster, S. L.	Norton, E. T.
Frydman, M.	Olsson, R. A.
Gabal, H. E., Jr.	Pearce, H. A.
Gardam, C. M.	Roach, D. A.
Gorub, J. C.	Schmid, R. L.
Griffard, W. F.	by D. R. Smith
Grubb, R. L.	Smith, L. R.
Gunnels, G.	Stein, W. W.; Dr. Ing
Hall, G.	Stensland, L. R.
Harlow, J. H.	Stockum, F. R.
Hawkins, T. K.	Takach, D.
Heinrichs, F. W.	Thomas, R. C.
Highton, K. R.	Thomason, F. W.
Hoefler, P. J.	Traub, T. P.
Honey, C. C.	Troy, E. F.
Huber, E. J.	Truax, D. E.
Huber, F., Jr.	Uptegraff, R. E., Jr.
Illiff, G. W.	Wagenaar, L. B.
Jonnatti, A. J.	Wrenn, W. E.
Kappeler, C. P.	Wurdack, A. C.

Members Absent - 43

Aicher, L. C.
Alacchi, J.
Alton, R. J.
Antalis, S. J.
Arjeski, E. H.
Bell, G. M.
Ballaschi, P. L., Dr.
Bennon, S.
Bergeron, J. J.
Bowers, G. H.
Chartier, E. E.
Chitwood, E.
Degeneff, R. C.
Douglas, D. H.
Duckett, D. A.
Easley, J. K.
Forster, J. A.
Gillies, D. A.
Goldman, A. W.
Herrera, J. J.
Hook, E. L.
Hurty, C.

Jacobsen, R. G.
Jauch, E. T.
Johnson, D. C.
Kelly, J. J.
Kieren, R. C.
Kline, A. D.
Kunes, J. J.
Lauber, T. S.
Lipscomb, T. G.
Margolis, H. B.
ttevangers, J. H.
Smith, B. E.
Stetson, R. B.
Tanton, A. L.
Vargo, S. G.
Veitch, R. A.
Vora, J. P.
Walton, J. W.
Wienczek, S. A.
Whearty, R. J.
Wilks, A.

Guests - 23

Bryant, G. C.
Bull, G. N.
Crichton, C. C.
DeLeon, J. A.
Doughty, K. W.
Hale, C. K.
Hoesel, C.
Hollister, R. H.
Kaufmann, G. M.
Kennedy, W. N.
Koenig, E.
Lampe, W.

Lackey, J. G.
Lee, R. E.
McGill, J.
Morrison, E.
Nicholas, L.
O'Grady, W. T.
Patel, B.
Perco, D. D.
Perkins, W. B.
Yasude, E. J.

MINUTES
IEEE/PES TRANSFORMERS COMMITTEE MEETING
ATLANTA, GEORGIA - APRIL 13, 1985

1.0 Chairman's Remarks and Announcements

Chairman Savio convened the meeting at 8:00 a.m. with 84 members or representatives and 22 guests present. Appreciation was expressed to Gerald Evans for his super hosting job.

Mr. Evans reported 147 registered members and guests.

Don Cash invited everyone to the November 6-9, 1983 meeting in Detroit.

Tom Hawkins extended an invitation to Los Angeles for the Summer Power Meeting.

George Iliff was recognized for his efforts in developing a transformers tutorial.

Sam Foster moved that, "The Transformers Committee send congratulations to Fred Vogal on his 90th birthday." Being duly seconded, the motion passed unanimously. The secretary was directed to correspond with Dr. Vogal. (Appendix 3A)

2.0 Approval of Minutes of Philadelphia Meeting held October 27, 1982.

It was noted that the proposed fall meeting location was deleted. (It will be reported in these minutes.) The October 27, 1982 minutes were approved as corrected.

3.0 Report of the Administrative Subcommittee - L. J. Savio. See Appendix 1A

3.1 Future Meetings

<u>Date</u>	<u>Hotel</u>
Detroit	Dearborn Regency
Vancouver	Holiday Inn Harbourside
Boston	Park Plaza
St. Louis	
Toronto	
Little Rock	
Pittsburgh	

4.0 Review of PES Standards Coordinating Committee - D. A. Yannucci Appendix 1B

5.0 Recognition and Awards - J. V. Bonucchi

- 6.0 Subcommittee Reports
- 6.1 Transformer Standards - L. R. Smith Appendix 2A
- 6.2 West Coast - Ron Little Appendix 2B
- 6.3 Dry Type - B. F. Allen Appendix 2C
- 6.4 Bushings - L. B. Wagenaar Appendix 2D
- 6.5 Insulation Life - C. J. McMillen Appendix 2E
- 6.6 Insulating Fluids - H. A. Pearce Appendix 2F
- 6.7 Instrument Transformers - R. C. Thomas Appendix 2G
- 6.8 Performance Characteristics - O. R. Compton Appendix 2H
- 6.9 Dielectric Tests - L. S. McCormick Appendix 2I
- 6.9a Audible Sound and Vibration - R. E. Liebich
- 7.0 Liaison Reports Appendix 3
- 8.0 Comments on Standards Approach Procedure - Charles Mitchell Appendix 3
- 9.0 Membership
 - D. A. Yannucci reported he had mailed about 20 letters to members who had missed more than two meetings inquiring about their continued interest.
 - Messrs. Harold Moore and J. A. Thompson were appointed to the committee.
- 10.0 New Business - none

3.0 Administrative Subcommittee

The Administrative Subcommittee met at 7:00 PM on Monday, April 11, 1983. The following highlights the activities of that meeting:

A. Technical Council (T.C.) Activity

- The Technical Operating Department is now known as the Technical Council.
- At the January 31, 1983 T.C. meeting, it was proposed to restructure the T.C. into 3 or 4 departments within the Council. The general feeling of the T.C. membership was almost totally negative.
- It was also proposed that each of the departments publish their own technical journal which would replace the current PA&S publication. This proposal was tabled for further study. The status will be reported at the next Transformer Committee meeting.
- A proposal was made for IEEE/PES T.C. to review CIGRE papers. This proposal was voted down.
- Two new Subcommittees have been approved:
 1. Load Management Subcommittee under the Power Systems Engineering Committee,
 2. Fiber Optics Subcommittee under the Power Systems Communications Committee.
- The T.C. sponsored 218 numbered papers at the Winter Power Meeting, which was below the PES Publications Department limit.

B. Reports were submitted by the following members and will be attached to the minutes.

- PES Technical Publications Committee - D. A. Yannucci
- T.C. Activity - L. J. Savio
- ANSI Standard-Status - J. C. Dutton
- IEEE Standards Projects Status - L. R. Smith

3.0 Administrative Subcommittee (Cont'd)

C. Liaison Representation

The following liaison representative vacancies exist and volunteers to fill these are solicited from the membership. Please contact your subcommittee chairman.

- . ANSI C76
- . ANSI C84
- . ANSI C92

D. Future Meetings

November 6-9, 1983

Hyatt Regency Dearborn
Detroit, MI
Host: Don Cash

April 1-4, 1984

Holiday Inn Vancouver
Vancouver, B.C.
Host: George McCrae

October 14-16, 1984

Park Plaza Hotel
Boston, MA
Host: R. Minkwitz

^{14-17,}
April 1985

St. Louis, MO
Host: Charles Mitchell

^{27-30,}
Fall 1985

Toronto, Canada
Host: R. Vietch

Spring 1986*

Little Rock, AR
Host: C. Kappler

Fall 1986*

Pittsburgh, PA
Host: Dave Truax

^{Spring, 1987}
* Not yet confirmed.

Offers from New Orleans & Fla (Ft Lauderdale)

E. Membership

The subcommittee voted to accept the following as members of the Transformer Committee:

- . Harold Moore of Westinghouse
- . J. A. Thompson of T&R Electric

A letter was sent to fourteen members with poor meeting attendance records.

4.0 Review of PES Standards Coordinating Committee - D. A. Yannucci -

A meeting of the Technical Publication Committee was held 2/2/83 at the Winter Power Meeting. Mel Ollken, Chairman, stated the following:

1. The 1983 PES publication budget has a deficit of \$101,000.
2. Publications (transactions) are not presently being purchased by the PES membership. This causes the deficit.
3. The general feedback is that the transactions are too expensive for the information received.
4. With the quota system in place, PA&S is currently publishing 4500 pages.

The members at the meeting made the following comments:

1. The quality of the transaction papers are down as well as attendance. This could be a function of the quality of the papers. It was noted that the quality of the CIGRE papers is also down since only the abstract is reviewed and not the final paper.
2. Concern was expressed that some current work being published does not necessarily need to be a transaction paper that goes into a permanent file.

Suggestions were as follows:

1. Go back to conference/transaction designation for the paper acceptance process. To fulfill the requirement of being able to reference a paper, a conference record could be published.
2. Have pre-prints available prior to the conference, but not at the conference.
3. Consider a one day registration fee.
4. Improve the quality of the review process.

The suggestions will be considered at the next meeting which is being held April 13.

The following acceptance rate history for PES general meetings is as follows:

		<u>Acceptance Rate</u>
	1975 W	.93
	S	.75
	1976 W	.73
	S	.71
	W	.70
Abstracts & Papers	1977 S	.74
	W	.75
	1978 S	.73
	W	.73
	1979 S	.69
	W	.70
	1980 S	.60
	W	.63
Papers	1981 S	.70
	W	.64
	1982 S	.59

(OVER)

Papers for Power Group Meetings - D. A. Yannucci

For the 1983 Summer Power Meeting, a total of 12 papers were submitted for review. Of these 12 papers, 5 were accepted, 5 were rejected outright, one was rejected but a revision would be reconsidered, and one was referred to another society. It appears that there will be only one session for the Summer Meeting.

In general, the reviews were returned in time for the review process to meet its deadline date. Congratulations are in order the reviewers.

REPORT
OF
THE STANDARDS SUBCOMMITTEE
IEEE TRANSFORMER COMMITTEE MEETING
ATLANTA, GEORGIA
APRIL 11-13, 1983

All subcommittees except the Audible Sound and Vibration Subcommittee and the Bushing Subcommittee reported up-to-date status of their projects. The status on the projects under these two subcommittees will be furnished as an addendum to this report when determined.

One new project has been approved.

PC57.93 - ANSI/IEEE Std. C57.93 - Guide for the Installation of Liquid Immersed Power Transformers

My records have the subcommittee chairmen as listed below:

R. E. Liebich	Audible Sound and Vibration
J. K. Easley	Bushing
L. S. McCormick	Dielectric Tests
B. F. Allen	Dry-Type Transformers
O. R. Compton	Performance Characteristics
H. A. Pearce	Insulating Fluids
C. J. McMillen	Insulation Life
R. C. Thomas	Instrument Transformers
Ron Little	West Coast
L. R. Smith	Standards

The following is a summary of the activities and status of the various subcommittee projects.

Project Status

PC57.12.00 - General Requirement for Liquid Immersed Distribution Power and Regulating Transformers

Being balloted in the subcommittee.

PC57.12.01 - General Requirements for Dry-Type Distribution and Power Transformers

Desirable changes related to solid resin-encapsulated coils have been identified. The development of specific proposals is underway.

PC57.18.10 - Semi-Conductor Rectifier Transformer

Work in progress.

- PC57.21 - American National Standard Requirements, Terminology and Test Code for Shunt Reactors
No progress reported.
- PC57.93 - Guide for Installation of Liquid Immersed Power Transformers
New project as of January 5, 1983. Work started at the March 8, 1983 meeting of the West Coast Subcommittee. Decided to include shipping problems in the guide.
- PC57.95 - Loading Guide for Regulators
Draft #3 ballot out to subcommittee.
- PC57.96 - Guide for Loading Dry-Type Distribution and Power Transformers
Still under discussion in working group.
- PC57.104 - Guide for the Detection and Determination of Generated Gases in Oil Immersed Transformers and their Relation to the Serviceability of the Equipment
New project. Will be discussed in Atlanta in April.
- PC57.110 - Harmonic Load Current Heating of Transformers
Revised C57.110/D1 was balloted successfully by working group. However, three negative ballots were received from liaison members. Work is continuing.
- PC57.111 - Guide for Acceptance and Maintenance of Silicone Liquid in Equipment
Second draft will be revised.
- P21 - Revision of ANSI C76.1
No change since March 1982.
- P24 - Revision of ANSI C76.2
No report.
- P65 - Thermal Evaluation of Ventilated Dry-Type Power and Distribution Transformers
Has been submitted to ANSI BSR.

- P76 - IEEE Guide for Acceptance and Maintenance of Transformer Askarel in Equipment
Need information on the status of this project.
- P93 - Transformer Impulse Tests (C57.98)
Being balloted in ANSI C57.
- P262E - Revision of C57.12.90 Loss Tolerances
Two negatives on ballot D3 being resolved. Ballot is on section 9.2.4.2 - Corrections to Load Loss Measurements.
C57.12.90; 8.3.2.1 Voltmeter Connection for No-Load Measurement
Ballot returns from working group due on April 1, 1983.
C57.12.90; 8.1 & 8.2.2 No-Load Loss Temperature Correction
Ballot returns from Performance Characteristics Subcommittee due by March 7, 1983.
C57.12.90; 8.2.1 Awaiting additional data.
- P345 - Review of IEEE Std. 345-1972 Test Procedures for Thermal Evaluation of Oil Immersed Distribution Transformers (C57.100-1974)
Submitted to Standards Board. Awaiting further coordination with underwriters.
- P462C - Revision of C57.12.00 Loss Tolerance and Measurements
Ballot returns from Performance Characteristics Subcommittee due by March 7, 1983.
- P513 - Seismic Guide for Power Transformers and Reactors
Balloting completed. Working group chairman preparing transmittal to IEEE Standards Board.
- P545 - Recommended Practice for Partial Discharge (Corona) Tests for Transformers
Still being discussed in working group.
- P546 - Revision of ANSI Requirements for Instrument Transformers C57.13-1978.
Draft to be finalized in Atlanta in April.

- P637 - Proposed Guide for the Reclamation of Insulating Oil and the Criteria for Its Use
Approved by Standards Board. No report of further progress.
- P638 - Standard for Type Tests on Class 1E Transformers for Nuclear Power Generating Stations
Reviewing working group ballot D11. Ballot also sent to NPEC SC2. There were 29 approvals, 14 approved with comments, 7 negatives, and 3 not returned.
- P670 - Switchgear and Transformers Working Group on Instrument Transformers for High-Voltage Circuit Breakers
No report.
- P731 - Revision of Guide for Loading Current Limiting Reactors, ANSI C57.99
No activity reported.
- P732 - Revision of Current Limiting Reactor Standards, ANSI C57.16
Need information on this working group. Under what subcommittee?
- P740 - Dielectric Test Requirements for Power Transformers for Operating at System Voltage from 69 through 230 kV (C57.XX)
Report approved by Standards Board in March 1982 but still not published.
- P745 - Guide for Conducting a Transient Analysis for Dry-Type Transformers (C57.XX)
Still under discussion in the working group.
- P756 - Guide for Loading Transformers Above 100 MVA
Approved in the Transformers Committee and submitted to the Standards Board. Approved by the Board. Now in the hands of the Standards editor.
- P757 - IEEE Guide for Loading Power Apparatus Bushings
No report of progress beyond Standards Board office.
- P784 - Transformer Through Fault Current Duration Guide
Approved committee ballot is being submitted to the IEEE Standards Board.

- P785 - Transformers Connected to Generators
Ballot is being reviewed for submittal after the Atlanta meeting.
- P786 - Transformer Failure Reporting and Reliability Analysis
Subcommittee is being balloted (D4).
- P799 - Guide for Handling and Disposing of Askarels
Work continuing on second draft.
- P800 - Bushing Application Guide
No progress reported.
- P801 - Recommendations for Revisions to ANSI C57.15 Requirements,
Terminology, and Test Code for Step-Voltage and Induction-Voltage
Regulators
Draft #6 will be discussed in Atlanta.
- P832 - Detection and Measurement of Partial Discharge (Corona) in Instru-
ment Transformers
No change reported since March 1982.
- P838 - Guide for Performing Overload Heat Runs
Now preparing Draft #6 for working group ballot.
- P842 - Loss Evaluation Guide
Draft #7 was presented to West Coast Subcommittee during the
March 8, 1983 meeting. Substantial work remains to resolve
differences in proposed definitions and practices.
- P852 - Bushings to Operate in Gas-Insulated Substation
No progress reported since March 1982.

There are a few projects which are sort of in limbo.

P670 - Instrument Transformers for High-Voltage Circuit Breakers

Last reported action was mailing of ballot P670/D4 dated
September 16, 1980.


P'32 - Current Limiting Reactors

Last report was in March 1980 when D. A. Duckett resigned and a new chairman was being sought.

P832 - Partial Discharge in Instrument Transformers

The committee was to investigate to see if this work should be incorporated into C57.13.

If readers of this report note any projects listed that are no longer active or valid and should be removed, or if any active ones are not listed, please let me know so that I can add or delete as necessary. Please furnish P number, title, and relation to IEEE or ANSI Standard.


Ray Smith, Chairman
Standards Subcommittee

IEEE WEST COAST TRANSFORMERS SUBCOMMITTEE
ACTIVITIES REPORT - 4/13/83

The West Coast Subcommittee presently has three authorized projects:

1. P513 - Seismic Guide for Power Transformers and Reactors
2. P842 - Loss Evaluation Guide for Power Transformers and Reactors
3. C57.93-Guide for Installation of Liquid Immersed Power Transformers

The Seismic Guide Working Group has completed the document, and balloting of committee members and resolution of all negative votes has been concluded. Working Group Chairman, Jess Herrera, is presently preparing "IEEE Standards Board Form for Submittal of Proposed Standards". This should be forthcoming this month.

Draft 7 of the proposed evaluation guide was sent to all those who requested liaison, and was also discussed in detail during the March meeting of the subcommittee. Substantial work remains to resolve differences in proposed definitions and practices. Some general discussion was held regarding whether this document might be a recommended practice rather than a guide. It was decided that it would be more appropriate as a guide. Draft 8 will be reviewed at a working group meeting during the summer PES meeting.

The consolidation of Installation Guides C57.12.11 and C57.12.12 was authorized by the IEEE Standards Board on January 5, 1983 as a revision of C57.93. The new working group under Del Johnson got off to a good start at the March meeting of our subcommittee. Based on a suggestion to review railway shipping practices by Charlie Honey, it was decided to include all shipping practices in this revised guide.

The subcommittee has been discussing a possible fire protection guide for some time now. However, due to changes in personnel and problems with scope definition, nothing has materialized enough to apply for authorization. We may drop the project and ask for liaison with other subcommittees working on fire problems (such as Substation Subcommittee).

Ron Little
Chairman, IEEE West
Coast Transformers Subcommittee

*P989 } out for publication
P982 } towards end
of 1983
oil spills & fire protection
of Transformers*

DRY-TYPE TRANSFORMER SUBCOMMITTEE REPORT
TO THE TRANSFORMERS COMMITTEE

The Dry-Type Transformer Subcommittee met at 1:15 p.m. on April 12, 1983, with 12 members and 9 guests present. The following is a summary of the W.G. activity:

W.G. on Standards for Dry-Type Transformers Incorporating Solid Resin Encapsulated Coils chaired by Mr. Ed Huber met on Monday with 18 members and 11 guests present. The effort to develop suitable revisions to be proposed for C57.12.01 and C57.12.91 has been divided among four task groups. Task Group II reported that a number of conflicting opinions have been offered and must be resolved. Task Group IV is reviewing the material assigned to them. They are discussing what BIL values should be considered standard. The W.G., as a whole, also discussed partial discharge testing, temperature rise testing, and the relation between allowable hottest-spot temperatures and the glass transition points of typical resin systems.

Dielectric Problems W.G. chaired by Mr. Jerry Corkran met on Monday with 9 members and 15 guests. D4 of P745, "Guide for Conducting a Transient Voltage Analysis of a Dry Type Transformer Coil", was balloted in the Subcommittee prior to the meeting. Editorial changes were made to respond to comments on two ballots. Additional ballots must be returned to have a valid ballot. Assuming this is achieved shortly, Draft 5 containing the editorial changes will be circulated in the Subcommittee and Draft 5 balloted in the Transformers Committee in parallel.

W.G. to Revise Loading Guide C57.96 chaired by Mr. Bill Mutschler met on Monday with 13 members and 10 guests present. The W.G. decided to modify the scope to include 185°C insulation systems and non-ventilated units. It was also decided to include information on cast coil type transformers as it becomes available. Revisions of the text material in three of the sections was completed. Other sections are to be reworked prior to the next meeting.

Dry Type Transformer Fault Duration W.G. chaired by Mr. Roy Uptegraff, Jr. met Tuesday morning for an initial discussion of this subject with 18 people present. There is a definite interest in developing a Fault Duration Guide for Dry Type Transformers. A decision has been made to proceed with the formal establishment of the W.G. and submission of a Project Authorization Request.

The Thermal Evaluation W.G. and IEEE 259 Specialty Transformers W.G. did not meet.

Mr. John Nay reported on the present status of product standard C57.12.57 covering dry type network transformers that is being prepared in NEMA for submission to ANSI C57.

Mr. Wiencek asked to be relieved as Subcommittee Secretary; Mr. Ed Edwards has agreed to serve as Subcommittee Secretary. I would like to express my appreciation to Mr. Wiencek for his contributions as Secretary since this Subcommittee was organized.

Thermal Evaluation Guide - George Brown

Bushing Subcommittee - L. B. Wagenaar

The bushing subcommittee met at 8:00 A.M. on Tuesday with 7 members and 3 guests present. One new member, Mr. Paul Falkowski of Square D Company, brings the total membership to 18.

The minutes of the Philadelphia meeting were approved as written.

The Working Group on Bushings to Operate in Gas Insulated Substations met at 3:00 P.M. Monday and chairman, Rick Stockum, made the following report: The group is working on the first draft of a document to cover bushings which interface between transformers and gas insulated bus. The present thought is that it will supplement C76.1 rather than becoming a self-standing standard. Progress to date includes formation of an outline and work has begun on definitions, pressure testing and thermal considerations. An important part of the last two items is getting some practical information from knowledgeable people in the GIS field, and if anyone knows of such sources, please contact Rick Stockum or me.

The subcommittee reviewed the results of the third subcommittee ballot of the revision of C76.1-1976. Results of 18 ballots sent out were: 14 returned with 4 approvals, 9 approvals with comments and 1 disapproval. A large number of good, constructive comments were reviewed and resolved and assignments were made for incorporating changes into the next draft.

The following results of subcommittee ballot of P800.1/d1 - Application of Bushings in Conservative Type Transformers - were also reported: of 18 total ballots, 15 were returned with 10 approvals, 4 approvals with comments and 1 abstaining vote. Comments will be resolved at the next meeting.

The following ballots were reported to have passed in ANSI C76:

1. Revision of C76.2 (IEEE 24) - Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings.
2. New IEEE Std. 757 - Guide for Loading of Power Apparatus Bushings
3. Future C76 Guide for Application of Power Apparatus Bushings including scope, purpose and cantilever loading sections.

Bushing Subcommittee - L. B. Wagenaar
Page 2

One negative vote was received on each of the first two items, but these have been resolved by the Chairman of C76. However, P757 was not included in the Bushing Application Guide, as was the intent of the subcommittee, as well as of this committee. This was discussed in the subcommittee and decided that the Chairman should attempt to get it into the Bushing Application Guide.

REPORT OF THE INSULATION LIFE SUBCOMMITTEE TO THE TRANSFORMER COMMITTEE
APRIL 12, 1983
ATLANTA, GEORGIA
WESTIN PEACHTREE PLAZA HOTEL

C. J. McMILLEN - CHAIRMAN

The Insulation Life Subcommittee met yesterday with an attendance of 23 members and 19 guests for a total of 42.

All 3 Working Groups reported to the Subcommittee. Ron Olsson, chairman of the Working Group on Guides for Loading, reported they met on Monday with an attendance of 23 members and 19 guests. Mr. Daniel Perco, of Westinghouse Canada, was welcomed as a new member. Charles Mitchell reported for David Douglas on the status of the Guide for Power Transformers rated above 100 mVA. The guide has been successfully reviewed by 4 other committees, Power Generation, Power Systems Relaying, Substations and Power Systems Engineering. The IEEE Standards Board has approved the Guide for Trial Use. It is now in process for publication. Charles, after going through the rather involved procedure of coordination with other committees and paper work involved in achieving approval by the Standards Board, has documented the requirements along with good advice for navigating the shoals that threaten successful approval of new or revised standards, procedures, or guides. We will attach a copy of the document to the Insulation Life Subcommittee minutes and have provided copies to the Committee's officers. We thank Charles for the effort he has expended in this effort. I feel it will be a big help to Working Groups and Task Force Chairmen in future standards approvals.

Bill Wrenn reported on the successful balloting of the Working Group and Subcommittee on the proposed revision of the Loading Guide for Oil Immersed Regulators. There was only one 'No' ballot of an 89% return rate and 93% approval of returned ballots. The 'No' ballot has been successfully resolved just before the Working Group meeting. After incorporating the suggested editorial revisions, Bill will be balloting the Transformer Committee along with the Working Group and Subcommittee members before Summer. Hopefully, we will have Committee approval before we meet again

next Fall. We congratulate Bill for the dedication he has shown in guiding this revision so rapidly through the Working Group and Subcommittee.

There was no report from the Chairman of the Task Force for revising the Loading Guide for Current Limiting Reactors.

There was extensive discussion of a report prepared by Orrean Chew of McGraw Edison on a comparison of loading guide equations with the results of loads above nameplate ratings on some power transformers. He compared results obtained using the conventional equations used in preparing the loading guides with modified equations incorporating changes in I^2R and stray-eddy loss with temperature. He concluded that the conventional equations gave a more accurate estimate than the resistance changes and viscosity exponents he used. Jacques Aubin provided the Working Group with the equations proposed for a revision of IEC Loading Guide. The Working Group will compare the IEC equations with Orrean Chew's results and the overload runs reported in the recent EPRI Final Reports on Power Transformers. One change IEC is proposing is an assumption that load losses are proportioned at 80% for I^2R losses and 20% for stray and eddy losses.

Al Wurdack, Chairman of the Working Group on Thermal Evaluation, reported that they met that morning with a total attendance of 18, composed of 8 members and 10 guests. The chairman reported on progress of P345 through the Standards Board. P345 was approved subject to proof of completed coordination. This requires acceptance by the IEEE Electrical Insulation Society and Standards Coordinating Committee No. 4. William Rice and John May of Rev-Con had further questions on whether John Bergeron's note had been negative and whether his concerns were resolved. Dave Douglas could not be present, but he had sent members copies of the conclusions taken from EPRI final reports EL2443 and 2622. Members also received a copy of my letter and the Working Group Chairman to Bruce Bernstein of EPRI tanking him for EPRI's sponsoring these projects. The aim of the Working Group now is to determine if, based on these projects,

we are in a position to initiate a test procedure on thermal evaluation of power transformer insulation systems similar to 345 for distribution transformers.

We also discussed the results of a paper by Gerry Kaufman and myself on a part of the work on EPRI's project on Surge Characteristics and Protection of Distribution Transformers. This paper dealt with the decline of impulse withstand of distribution transformers under severe transient loading. This discussion was intended for the members to consider whether a similar test should be incorporated in IEEE 345 in a future revision to demonstrate lightning withstand during the maximum loading recommended in ANSI C57.91, the Distribution Transformer Loading Guide.

After the meeting, Gerry Kaufmann of GE Pittsfield and Bob Lee of Pennsylvania Power and Light requested membership on the Working Group. We welcome them as members.

Bob Veitch, Chairman of the Thermal Tests Working Group reported he had 11 members and 15 guests attending his meeting Monday. Jim Moon of Kuhlman Electric has joined the group as a member.

Bob Grubb reported that Part A of the proposed Recommended Procedure for Performing Temperature Rise Tests at Loads Beyond Nameplate Rating has been modified in line with suggestions provided at the previous meeting in Philadelphia. The major change was to load on the basis of current instead of watts, as a basis of loading to obtain thermal time constants.

*ballot due
in October.*

At the last meeting of the Working Group there was disagreement over the method of loading for Part B, which is intended as a procedure for demonstrating capability of a power transformer to be successfully loaded over an agreed 24-hour cycle load peaking above nameplate rating. Disagreement was whether the loading should be on the basis of total watts or current. Both methods are subject to inaccuracies. But total loss requires estimation of I^2R , stray and core loss at the end of the peak load if a

rectangular load pattern is used. Loading by current does not take into account the effect of core loss. The Working Group has agreed to investigate if a satisfactory compromise can be achieved by utilizing a modified current approach with an added delta current to compensate for core loss. After the Working Groups reported there was no new business introduced at the Subcommittee meeting.



C.W. McMillen

April 12, 1983

CJMC1/4

The Insulating Fluids Subcommittee met on Monday and Tuesday, April 11 and 12, 1983 with seventeen members and thirteen guests present.

1. The minutes of the October 1982 meeting were approved.

2. Membership changes:

New Member: Steve Northrup, RTE, replaced Mac Thompson of RTE

3. The Chairman reported that IEEE Headquarters had stated that the Guide For Reclamation of Insulating Oil and the Criteria For It's Use will be printed in September 1983.

4. Project P799, PCB's

Considerable time was spent on reviewing the details of the Guide For Handling and Disposal of Transformer Grade Insulating Liquids Containing PCB's. General agreement was reached among those present. George Bull will rewrite the section on Disposal and Transportation after which the Chairman will prepare Draft 3 and submit for Subcommittee ballot.

5. Project C57.111, Silicone

Draft 2 of the Guide for Acceptance and Maintenance of Silicone Liquid in Equipment was reviewed at the meeting. Several changes were discussed and the Task Force will prepare a revised draft. This will be sent to the Subcommittee Chairman and it will be sent out for Subcommittee ballot.

6. Project P954, High Temperature Hydrocarbon

A new Task Force was set-up to handle the Guide for Acceptance and Maintenance of High Temperature Hydrocarbon Liquid in Equipment. Members of this Task Force are:

Steve Northrup, Chairman
Frank Heinrichs
George McCrae
Peter Hoeffler

They will prepare a preliminary draft for the next meeting.

7. Project C57.104, Gas Guide

A discussion of the Gas Guide brought out the following points for consideration:

- a) The Guide is very useful, but some of the recommended values and limits need to be reconsidered.
- b) It may not be necessary to carry the detailed procedure since there is now an ASTM procedure. However, it may be desirable to have this information here as well.

*Survey to be conducted
Review
Preparation
of document
submit to IEEE
for review
approval*

7. Project C57.104, Gas Guide (continued)

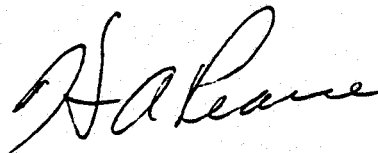
- c) Recommended values might be included for in-plant temp run tests.
- d) The use of the ratios might be re-evaluated.

It was decided that it would be desirable to know what people are actually doing, and therefore a survey would be very helpful. A Task Force was set-up to prepare a questionnaire for use in conducting the survey. The following are the Task Force members:

↑
Earl Morrison, Chairman
Frank Heinrichs
Maurice Frydman
Ted Hauptert
Al Baker

Since the meeting Dan Crofts has volunteered to solicit the help of EEI in conducting the survey.

- 8. Adjournment
- 9. Next meeting, November 6-9, 1983, Hyatt Regency, Dearborn, Michigan.



H. A. Pearce, Chairman
Insulating Fluids Subcommittee

/jaf

IEEE TRANSFORMER COMMITTEE
INSULATING FLUIDS SUBCOMMITTEE

Membership - April, 1983

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GENERAL ELECTRIC

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May 10, 1983

SUBJECT: MINUTES OF IEEE INSTRUMENT TRANSFORMER
SUB-COMMITTEE MEETINGS IN ATLANTA, GA.
4/11 & 4/12/83

4/11/83 Meeting

Members Present

R. C. Thomas
R. B. Stetson
S. C. McCollum
W. E. Morehart
P. Falkowski
E. Basso
C. C. Crichton
L. R. Smith
J. E. Lyles
H. R. Lucas
R. A. Magill

Guests Present

J. N. Davis
M. Daniels
J. Gotal
B. Patel
R. Little

Chairman Thomas opened the meeting at 1:15PM.

The first items discussed were pertinent to Mr. Basso's Task Force on Thermal Capability of Current Transformers, particularly the questionnaire which is proposed. The questionnaire will request inputs from users, to clarify the objectives of the Task Force. The following agreements were reached:

1. Mr. Basso has a listing of investor - owned utilities, and a list of non-investor-owned utilities is desired, so that the questionnaire may have broad circulation.
2. Changes in the questionnaire, as listed:
1) thru 6) in minutes of 10/26/82 meeting, were reviewed and again found desirable. The question in regard to manufacturers providing specific information on loss of life will be deleted, but the question as to general formulas relative to loss of life will be retained.
3. Questions as to loss of accuracy will be clarified to signify "during the overload" (as one condition) and "subsequent to the overload" (as a second condition), and also clarified that no loss of life is associated with the accuracy questions. Suggested limits of allowable change in accuracy will be requested.

Mr. Basso will revise the questionnaire and circulate to the Task Force for comments prior to dissemination. Other members of the Task Force are Messrs. Morehart, Falkowski, Smith, and Stetson

O. R. Compton
METER BUSINESS

DEPARTMENT

APPENDIX 2G

MINUTES OF IEEE I.T. MEETING 4/11/83

The minutes of the last (10/26/82) Sub-Committee meeting were approved as distributed, with the exception of correcting spelling of "tangent" on page 3.

There was no report on liaison with C93. The Secretary offered to summarize status of C93 work as an attachment to these minutes. See Attachment A.

There has apparently been no further activity of the Working Group on Coordination of C57.13 and Switchgear Requirements for Current Transformers used with A.C. High Voltage Circuit Breakers.

Mr. Thomas reported on status of C57.13.2 Conformance Test Procedures for Instrument Transformers stating that the material can be published as C57.13.2 without approval of the IEEE Standards Board, if there is no IEEE number. The document is now with the NEMA Secretary for C57 (Mr. Hansen) and reportedly will go to the C57 Standards Board without further balloting. The document should be the 12/18/1980 draft, as marked up by Mr. Stetson to show 10/20/81 decisions of the Sub-Committee and forwarded to Messers. E. J. Huber and R. C. Thomas on 3/23/83.

The remainder of the meeting was devoted to review of proposed revisions of C57.13, starting with the 4.5 (1978 issue). The following decisions were made, in addition to those changes incorporated in the "4/7/83" revision of 4.5 thru 6.11.

1. Fig 2, stay with 34kV applied voltage test for 95kV and 110kV BIL CT's and VT's
2. Fig. 2, change minimum time to flashover to 1.5 for chopped wave tests for 30 and 45 kV BIL.
3. The Secretary will comment further on minimum creepage distance vs. other standards.
4. Table 3, show only the higher level (900, 1300, 1550) of Wet Switching Surge Tests. Add (mm) to minimum creepage distance.
5. It was noted that NEMA was to furnish a suggested applied voltage test level between primaries of three-wire type current transformers.
6. Table 4, restore with the line for "80°C Rise Type", without the word "Dry". Add the 65°C Rise line as proposed.
7. 4.7.2, correct spelling of "routine".

MINUTES OF IEEE I.T. MEETING 4/11/83

8. 4.7.3, next to last sentence, change to read: "Transformers subjected to type tests shall withstand the applicable routine tests before and after type tests."

9. After considerable discussion, "Radio Influence Voltage Test" was left in the list of type tests. It was noted that there is material on RIV testing for review by the Sub-Committee, and also that a way should be found to permit establishing acceptable communication interference test levels with methods other than conventional RIV equipment.

10. There was considerable discussion in regard to partial discharge testing, now becoming a routine test in CSA standards. The Sub-Committee has been working on a draft for testing procedures; this draft contains no test limits.

Mr. Cord Crichton, Los Angeles Department of Water and Power, became a member of the Sub-Committee.

The meeting closed at 4:45 P.M.

Page 4

4/12/83 Meeting

Members Present

R. C. Thomas
R. B. Stetson
S. C. McCollum
W. E. Morehart
P. Falkowski
E. Basso
C. Crichton
L. R. Smith
J. E. Lyles
H. R. Lucas
R. A. Magill

Guests Present

J. N. Davis
M. Daniels
J. Gotal
F. J. Brutt
C. H. Griffin

Chairman Thomas opened the meeting at 8:15 AM.

Mr. Smith stated that he will provide a list of some non-investor-owned utilities to Mr. Basso (reference discussion of 4/12/83)

The Sub-Committee continued review of the "4/7/83" material, with the following action:

4.7.3.1 clarify (e) to cover verification of thermal burden rating.

4.7.4.2, correct to 4.7.3.2 and list tests without reference to 4.7.3.1

4.7 - establish on "other" category of tests and enumerate some examples, such as the 125% voltage requirement on certain VT's

4.8 - change "lead" to "terminal", one place
Table 5, under ":" delete "winding"
" " , under "x" change to "X" and change "(lower case)" to "(upper case)"

Table 5 under "/" delete "double virgule"

Table 5, under "&" add parenthesis around second sentence under "Current Transformers" and delete one "(C)" at bottom of page. (Editorial comments by Secretary, not discussed in meeting.)

Table 5, under "/", delete "or virgule"; change first "Example:" to end "for additional primary voltage ratings.

It was agreed that the Secretary should propose methods of symbolizing primary voltage ratings of VT's, following C57.12.00 practices as to E/E.Y, etc. with the intent that NP requirements follow these methods. (Reference Attachment B)

MINUTES OF IEEE I.T. MEETING 4/12/83

- 6.3 Delete "Assignment of"
- 6.3.1 Change "classes" to "ratings"
- Table 7, change "13.1" to "14.4", in second column round values over 9.15 to nearest kV
- Table 8, round second column to nearest kV
- 6.4.1 (2), change "class" to rating
- Table 11, change "may" to "shall"
- 6.6.2 start second Par. with: "The limiting temperature shall be _____"
- 6.6.4 add new par. pointing out that short-time thermal and mechanical ratings cannot be rated independently
- 6.7.2, first clause change to read: "(Not required on window or bar type current transformers with 10kV BIL rating and no relay accuracy rating)"
- 6.7.2 next sentence should end "...6.4.1 (2) but not under 200 volts
- 6.7.2 change last sentence to read: "If the voltage cannot be induced at 400 hz without core saturation no test is required.
- 6.8, enlarge scope of "Note".
- 6.9 "... with either aluminum or copper conductors."
- 6.10.1, delete proposed change.
- Fig. 4, use "E_{se}" and "I_e"
- 6.10.2. last paragraph, add "Note: The 45° and 30° tangents were established from experience using conventional low-silicon magnetic steels. The significance of the 45° and 30° knees will be different depending on the magnetic material used."
- 6.11, change "class" to "rating" and add omitted "tangent"

The Sub-Committee then reviewed the "3/15/83" material, with the following action:

Definitions will be provided in C57.13

The Secretary will forward the definitions, as proposed in this meeting, to Mr. Frank Jay, so that these wordings may be used in the current revision of the IEEE Dictionary. The Secretary will check for possible conflict with broader usage of certain terms. (See attachment "C")

Mr. Thomas reported that he has voted in approval of the P860, ANSI C57.13.3 Draft 5, June 1982 Guide for the Grounding of Instrument Transformer Secondary Circuits and Cases. This vote was a liaison vote and conveyed Sub-Committee approval of the draft. (The Secretary suggests that members review the draft and convey any substantive comments to Mr. Thomas)

Page 6

MINUTES OF IEEE I.T. MEETING 4/12/83

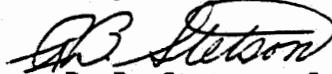
Mr. Morehart distributed copies of proposed draft of C57.3 Section 7. Time did not permit discussion.

Mr. Stetson offered to provide a new draft of material through Section 6.

The next meeting of the Transformer Committee will be at the Hyatt Regency in Dearborn, Michigan, 11/7-11/983. Mr. Thomas may call an intermediate meeting of the Sub-Committee, possibly in June. Mr. L. R. Smith offered to provide meeting facilities and lodging arrangements in Chatanooga, Tenn.

The meeting ajourned at 3:00 P.M., having recessed for lunch from 12:00 to 1:15PM.

Respectfully submitted,



R. B. Stetson, Secretary

CC:

C. F. Burke
E. Conner
D. L. Hillhouse
Singson Lee
J. W. Walton
J. M. Carr
W. R. Ossman
L. S. Carr
W. R. Ossman
L. S. Cores
R. M. Showers
R. L. Smith
O. R. Compton ✓

/fd
0819E

ATTACHMENTS

GENERAL  ELECTRIC

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April 26, 1983

TO: MEMBERS OF IEEE INSTRUMENT TRANSFORMER SUB-COMMITTEE

SUBJECT: Report of Liaison with C93 Committee

During our 4/12/83 meeting, the writer offered to provide a written summary of activities of American National Standards Committee C93 Power Line Carrier Equipment and Coupling Capacitor Voltage Transformers.

The C93 Committee met in Dallas, Texas, on 12/1, 12/2, and 12/3/83. Comments, based on minutes of the meeting, are:

C93-1-1981 Coupling Capacitors - no specific discussion

C93.2-1976 Requirements for Power-Line Coupling Capacitor Voltage Transformers - at next meeting will determine whether to combine C93.1 and C 93.2 or to maintain separate documents

C93.3-1981 Requirements for Power-Line Carrier Line Traps - no specific discussion.

C93.4-198X Requirement for Power Line Carrier Line Tuning Equipment - negative ballots re Draft #4 were discussed extensively. Draft 5 will be prepared and balloted prior to the next meeting.

C93.1-198X Requirements for Power-Line Carrier Transmitter Receiver Equipment - work progressed on definitions; service conditions to be addressed in next meeting.

The meeting will be July 13, 14, and 15, 1983, in Long Beach, California.


R. B. Stetson

/fd
0803E

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April 26, 1983

TO: MEMBERS OF IEEE INSTRUMENT TRANSFORMER SUB-COMMITTEE

SUBJECT: VT Nameplate Markings re: Voltage Ratings

In our 4/12/83 meeting I was asked to revise C57.13 proposals to correlate with C57.12.00-1980 Fig. 2, copy attached. In reviewing Fig. 2 it appears to me that identifications (1) (c), (1) (e), and 1 (f) are not applicable to instrument transformers covered in C57.13, and that our present recommendations (with upper case "X") will conform to (1) (g) if we follow recommendations below.

Identification (1) (a) appears applicable to voltage transformers in Group 2, which have two fully insulated primary terminals, and can be applied line-line at rated voltage and line-ground on systems where the line-line voltage is the same as VT rated voltage. The nameplate marking specified is simply the rated voltage - there is no requirement for such markings as 34 500/34 500 Y.

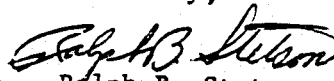
Identification (1) (b) appears applicable to Group 1 voltage transformers, which can be connected line-ground at 100% excitation.

Identification (1) (d) appears generally applicable to Groups 3,4, and 5 voltage transformers.

I will propose changes in line with the comments above.

In coverage of VT Groups, we should consider replacing the left hand column with a column showing the nameplate markings resulting from these changes.

Sincerely,


Ralph B. Stetson

/fd
0804E

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METER BUSINESS

DEPARTMENT

April 19, 1983

Mr. F. Jay
Editor, IEEE Dictionary
IEEE Standards Office
345 East 47th. Street
New York, New York 10017

Dear Mr. Jay:

In early September, 1982 I wrote to Mr. L.B. Wagenaar of American Electric Power, in response to his request for comments on instrument transformer items which could be involved in revision of ANSI/IEEE Std. 100, Standard Dictionary of Electrical and Electronic Terms. Mr. Wagenaar wrote to you on 9/16/82, presumably conveying some of my inputs.

In your 4/7/83 telephone conversation with me, you stated it might be practical to pick up recommended changes from the IEEE Instrument Sub-Committee for use in the current revision of the Dictionary. In the 4/12/83 meeting, the Sub-Committee asked me to forward to you the recommended definitions resulting from that meeting. In September, 1982, I had pretty much held to C57.13-1978 definitions; since the development of revised definitions for C57.13-1983? is essentially complete, usage of the latest recommendations is preferred.

I am attaching a list of instrument transformer definitions representing 4/12/83 decisions of the Sub-Committee. You will find instances where it will be desirable to add "(instrument transformers)" to avoid conflict or confusion. As in my 9/8/82 letter to Mr. Wagenaar, deletion of "rated primary current", "ambient temperature rating at quarter-rated thermal burden", "instrument transformer, low voltage winding", "(3) instrument transformer" on pg. 559, "polarity marks (instrument transformer)", "accuracy burden rating", "accuracy class (instrument transformer)", "accuracy classes for metering (instrument transformer)", "accuracy classes for relaying (instrument transformer)", "accuracy ratings for metering", and accuracy ratings for relaying". Some of these items are obsolete, and others seem to be inadequate explanations rather than definitions.

Mr. F. Jay
Page 2

Retention of the following definitions is probably desirable, although they are not proposed for C57.13-1978:

- (e) accuracy (9) instrument transformer.
- (e) accuracy ratings of instrument transformers.
- (c) percent transformer correction-factor error correction. (instrument transformer). The difference between the transformer correction factor and unity, expressed on percent $[(TCF-1) \times 100]$.

The material on pg. 561 under (7) should be deleted, as short-time ratings of CT's are described elsewhere and there is no short-time rating for VT's.

On page 484, the material under "(2)(current transformer)" and "(3)(potential)(voltage) transformer)" should be deleted.

For each definition I have shown a code, as follows:

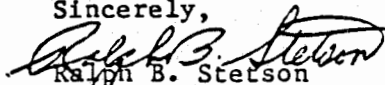
- a) Do not recommend addition to Dictionary.
- b) Recommend addition.
- c) Recommend this changed wording.
- d) May require clarification such as "instrument transformer".
- e) No substantial change in Dictionary.

Under "instrument transformer" there would be some change in the list of applicable definitions.

By copy to the Sub-Committee, the attached list of definitions is offered as input to the next complete draft. The Sub-Committee will note that I have taken the liberty of reinstating "root-mean-square (rms).....rms....." in the definition of true ratio. This is in the present Dictionary definition, and is desirable in my opinion.

NOTE: If any Sub-Committee members have questions or other recommendations, please contact the Secretary immediately, so that the points may be resolved prior to publication of the Dictionary.

Sincerely,



Ralph B. Stetson

Secretary, IEEE Instrument Transformer
Sub-Committee

RBS/di

- (a) true ratio. The ratio of the root-mean square (rms) primary voltage or current to the rms secondary voltage or current under specified conditions.
- (b) bar-type current transformer. One that has a fixed and straight single primary turn passing through the magnetic circuit. The primary and secondary (s) are insulated from each other and from the core (s) and are assembled as an integral structure.
- (c) burden of an instrument transformer. That property of the circuit connected to the secondary that determines the active and reactive power at the secondary terminals.

Note: The burden is expressed either as total ohms impedance together with the effective resistance and reactance components of the impedance or as the total volt-amperes together and power factor of the secondary devices and leads at the specified values of frequency and current or voltage.

- (c) bushing-type current transformer. One that has an annular core with a secondary insulated from and permanently assembled on the core but has no primary and no insulation for a primary. This type of current transformer is for use with a fully insulated conductor as the primary. A bushing-type current transformer usually is used in equipment where the primary conductor is a component part of other apparatus.
- (c) cascade-type voltage transformer. An insulated-neutral terminal type voltage transformer with the primary distributed on two or more cores electro-magnetically coupled by coupling windings. The secondary is on the core at the neutral end of the primary. Each core is insulated from the other cores and is maintained at a fixed percentage of the voltage between the primary terminal and the neutral terminal.
- (c) continuous-thermal-current rating factor (RF). The factor by which the rated primary current of a current transformer is multiplied to obtain the maximum primary current that can be carried continuously without exceeding the limiting temperature rise from 30°C average ambient air temperature. The RF of tapped "-" secondary or multi-ratio current transformers applies to the highest ratio, unless otherwise stated. (When current transformers are incorporated internally as parts of larger transformers or power circuit breakers, they shall meet allowable average winding and hot spot temperature limits under the specific conditions and requirements of the larger apparatus.
- (c) current transformer. An instrument transformer intended to have its primary connected in series with the conductor carrying the current to be measured or controlled.
- (c) double-secondary current transformer. One that has two secondaries, each on a separate magnetic circuit, with both magnetic circuits excited by the same primary.
- (c) double-secondary voltage transformer. One that has two secondaries on the same magnetic circuit, with the secondaries insulated from each other and the primary.

- (c) excitation losses for an instrument transformer. The power (usually expressed in watts) required to excite the transformer at its primary terminals.

Note: Excitation losses include core, dielectric and winding losses due to the excitation current.

- (c) fused-type voltage transformer. One provided with means for mounting one or more fuses as integral parts of the transformer in series with the primary.
- (c) grounded-neutral terminal type voltage transformer. One that has the neutral end of the high-voltage winding connected to the case or mounting base.
- (c) instrument transformer. A transformer that is intended to reproduce in its secondary circuit a definite and known proportion of the current or voltage of its primary circuit, with the phase relations substantially preserved.
- (b) insulated-neutral terminal type voltage transformer. One that has the neutral end of the high-voltage winding insulated from the case or base and connected to a terminal that provides insulation for a lower voltage than required for the line terminal.
- (b) (d) leakage flux (instrument transformer). Any magnetic flux, produced by current in an instrument transformer winding, which does not link all turns of all windings.
- (c) (d) marked ratio. The ratio of the rated primary value to the rated secondary value, as stated on the nameplate.
- (c) multiple-secondary current transformer. One that has three or more secondaries, each on a separate magnetic circuit with all magnetic circuits excited by the same primary.
- (c) multi-ratio current transformer. One with three or more ratios obtained by the use of taps on the secondary.
- (c) nominal ratio. See marked ratio
- (c) percent ratio correction. The difference between the ratio correction factor and unity, expressed in percent. $[(RCF-1) \times 100]$
- (e) (d) phase angle. The phase displacement, in minutes, between the primary and secondary values.
Note: The phase angle of a current transformer is designated by the Greek letter beta (β) and is positive when the current leaving the identified secondary terminal leads the current entering the identified primary terminal. The phase angle of a voltage transformer is designated by the Greek letter gamma (γ) and is positive when the secondary voltage from the identified to the unidentified terminal leads the corresponding primary voltage.

- (c) (d) phase angle correction factor (PACF). The ratio of the true power factor to the measured power factor. It is a function of both the phase angle of the instrument transformer and the power factor of the primary circuit being measured.

Note: The phase angle correction factor corrects for the phase displacement of the secondary current or voltage, or both, due to the instrument transformer phase angle (s).

For a current transformer, the phase angle correction factor = $\frac{\cos(\theta_1 + \beta)}{\cos \theta_2}$

For a voltage transformer, the phase angle correction factor = $\frac{\cos(\theta_1 - \delta)}{\cos \theta_2}$

When both voltage and current transformers are used, the combined phase angle correction factor = $\cos \frac{(\theta_1 + \beta - \delta)}{\cos \theta_2}$

θ_2 is the apparent power factor angle.

- (c) (d) polarity. The designation of the relative instantaneous directions of the currents entering the primary terminals and leaving the secondary terminals during most of each half cycle.

Note: Primary and secondary terminals are said to have the same polarity when, at a given instant during most of each half cycle, the current enters the identified, similarly marked primary terminal and leaves the identified, similarly marked secondary terminal in the same direction as though the two terminals formed a continuous circuit.

- (b) (d) primary. The winding intended for connection to the circuit to be measured or controlled.
- (c) (d) rated current. The primary current on which the performance specifications of a current transformer are based.
- (b) (d) rated secondary current. The rated current divided by the marked ratio.
- (b) (d) rated voltage. The primary voltage on which the performance specifications of a voltage transformer are based.
- (e) (d) ratio correction factor (RCF). The ratio of the true ratio to the marked ratio. The primary current or voltage is equal to the secondary current or voltage multiplied by the marked ratio times the ratio correction factor.
- (c) (d) secondary. The winding intended for connection to the measuring or control devices.
- (b) series-parallel primary current transformer. One that has two insulated primaries, which are intended for connection in series or parallel to provide different rated currents.

- (b) tapped-secondary current or voltage transformer. One with two ratios, obtained by use of a tap on the secondary.
- (c) thermal burden rating of a voltage transformer. The volt-ampere output that the voltage transformer will carry continuously at rated secondary voltage and frequency in 30°C average ambient air temperature without exceeding the specified temperature limits.
- (c) three-wire type current transformer. One which has two insulated primaries and one secondary and is for use on a three-wire, single-phase service.
Note: The primaries and the secondary are permanently assembled on the core as an integral structure. The secondary current is proportional to the phasor sum of the primary currents.
- (c) (d) transformer correction factor (TCF). The ratio of true primary watts or watt-hours to the measured secondary watts or watt-hours, divided by the marked ratio.

Note: The transformer correction factor for a current or voltage transformer is the ratio correction factor multiplied by the phase angle correction factor for a specified primary circuit power factor.

The true primary watts or watt-hours are equal to the watts or watt-hours measured, multiplied by the transformer correction factor and the marked ratio.


The true primary watts or watt-hours, when measured using both current and voltage transformers, are equal to the current transformer ratio correction factor multiplied by the voltage transformer ratio correction factor multiplied by the combined phase angle correction factor multiplied by the marked ratios of the current and voltage transformers multiplied by the observed watts or watt-hours. It is usually sufficiently accurate to calculate true watts or watt-hours as equal to the product of the two transformer correction factors multiplied by the marked ratios multiplied by the observed watts or watt-hours.

- (c) true ratio. The ratio of the root-mean square (rms) primary voltage or current to the rms secondary voltage or current under specified conditions.
- (c) turns ratio of a current transformer. The ratio of the secondary turns to the primary turns.
- (c) turns ratio of a voltage transformer. The ratio of the primary turns to the secondary turns.
- (c) voltage transformer (VT). An instrument transformer intended to have its primary connected in shunt with the voltage to be measured or controlled.

C57.13-2-

(c) window-type current transformer. One that has a secondary insulated from and permanently assembled on the core, but has no primary as an integral part of the structure. Primary insulation is provided in the window through which the line conductor can be passed to provide the primary.

wound-type current transformer. One that has a primary consisting of one or more turns mechanically encircling the core or cores. The primary and secondary (s) are insulated from each other and from the core (s) and are assembled as an integral structure.



Ralph B. Stetson
Secretary, IEEE Instrument Transformer
Sub-Committee

RBS/d1

PERFORMANCE CHARACTERISTICS SUBCOMMITTEE
MINUTES, APRIL 12, 1983
ATLANTA, GEORGIA

The meeting was called to order at 8:00 a.m. Introductions were made by 30 members and 28 guests.

The October 26, 1982 - Philadelphia meeting minutes were approved as mailed.

The Chairman reported on the highlights of the Administrative Subcommittee meeting of April 11, 1983.

The agenda was changed to include two special standards revision reports.

All Working Group Chairmen reported. Their reports are attached.

Briefly,

W. F. Griffard reported that the Short Circuit Duration guide was sent to the IEEE Standards Committee.

D. S. Takach presented the report of the Loss Tolerance and Measurement Working Group. *→ Negative ballots - to be resolved*
P262E/D4 Correction to Load Loss Measurements due to Phase angle error. The results of the Committee ballot on Draft 3 was analyzed. Draft 4 was prepared as an internal W.G. document. Draft 5 will be issued for committee ballot. *→* P262E.2/D4 Voltmeter Connection for No-load Loss Measurement. A W.G. ballot of D4 drew 1 negative ballot and two comment ballots. A proposed revision is circulating in the W.G. Assuming success on this proposal, D5 will be balloted in the subcommittee.

No-load Loss Temperature Correction. *→ do with results by 70*

- a. P262E.1/D3 of C57.12.90-1980 Section 8.1 and addition to Section 8.22.
- b. P462C/D3 Revision of C57.1200 Section 5.9. The subcommittee ballots on these items resulted in 13 negative ballots on (a) and 2 on (b). Based on the comments received, the W.G. will focus on gathering test data to validate the proposed correction method.

L. R. Stensland's report for the W.G. on Qualification of Class IE Transformers for Nuclear Power Generating Stations indicated that their Draft 11 negative ballots have all been discussed. Draft 12 will be issued in May 1983, to the NPEC SC-2 subcommittee. It is felt that unless we can satisfy NPEC it is useless to ballot a broader spectrum.

E. F. Troy presented the report for the Harmonic Load-Current Heating W.G. and its Rectifier Transformer Standard Task Force. E. F. Cham who chaired the Rectifier group has resigned. A new chairman is sought.

The W.G. ballot D1 on Harmonic Load Current was discussed. Draft 2 will be submitted as a subcommittee ballot to both Performance Characteristics and Dry Type Subcommittees.

D. A. Yannucci reported for W.G. on Transformers Connected to Generators. Activity continues in this W.G. to assure that all pertinent concerns are being addressed. *continued to remain 23*

H. F. Light reported for the Transformer Reliability W.G. Draft 4 of their guide document has had a subcommittee ballot with 6 negative ballots. Most of the negative ballot concern is focused on perceptions of the legal ramifications resulting from the use of the guide by others. *9 negative ballots - several committee*

A lively discussion on the legal issue by the subcommittee members followed Mr. Light's presentation. The W.G. plans to obtain legal opinions to try to resolve these concerns. Draft 5 is not being prepared and will be a committee ballot.

C. M. Gardon reported progress in resolving negative ballots on the C57.12.00 statement defining voltage ratio tolerances. *-23 successfully resolved*

John Dutton will report at the committee meeting on his success in resolving ballots on ANS C57.12.80; 4.1.6.1. *continued work on code for committee*

The chairman reported that the ad hoc group to explore the need for a W.G. on Failure Analysis will be named shortly. He also expressed his appreciation to the W.G. chairmen and subcommittee members at this, his last meeting as subcommittee chairman.

Respectfully submitted,



Olin R. Compton, Chairman
Performance Characteristics Subcommittee

MEETING MINUTES
Dielectric Test Subcommittee
Atlanta, Georgia
April 12, 1983

The subcommittee met at 1:15 P.M. with 36 members and 36 guests in attendance. With the addition of one new member, Mr. B. F. Allen, the membership now stands at 61.

The minutes of the previous meeting in Philadelphia were approved as published.

The various working groups reported on their activities as follows:

WORKING GROUP ON
REVISION OF DIELECTRIC TESTING OF DISTRIBUTION TRANSFORMERS
W. R. Farber, Chairman

This working group recently balloted the subcommittee regarding a proposed addition to Table 6B in C57.12.00 which would specify minimum phase-to-phase insulation levels for 3 phase distribution transformers. However, they still have some work to do because they did not receive the necessary 75 percent return and there were 3 negative ballots which must be resolved. In support of this test, Dave Smith reported that under ferro-resonant conditions it is possible to develop up to 3.3 times normal line to neutral voltage between phases of 4 or 5 lagged core units having grounded wye - grounded wye windings when supplied through cable circuits and remotely switched by means of single pole switching.

The group also reviewed a written proposal for routine impulse testing of distribution transformers. Members were asked to study the proposal and to be prepared to discuss it in detail at the next meeting.

A proposal was presented to combine the separate columns for power and distribution transformers in Table 5 of C57.12.00 into one column. The group saw no objection to this and George Iliff will include this in the next ballot of the subcommittee on Section 5.

WORKING GROUP FOR
DIELECTRIC TESTS OF HVDC STRESSED TRANSFORMERS
W. N. Kennedy, Chairman

Bill Kennedy has accepted the Chairmanship of the working group on Dielectric Tests of HVdc Stressed Transformers. Carl Hurty has resigned from this position and the subcommittee wishes to thank him for the many years of hard effort that he put into this working group and for his excellent leadership.

This group has been preparing a working group paper and discussion was held on the March 1982 draft and several proposed changes by Dr. Lampe. The revised document is expected to be mailed to the members for review in May, and if all goes well, to the subcommittee for comments in June.

WORKING GROUP ON RESONANT OVERVOLTAGES

Bob Degeneff will be preparing a section to go into the Transformer Committee's latest tutorial. This report will cover the ten years of effort the Resonant Overvoltages working group put into evaluating the possible causes and effects of resonant overvoltages in transformer windings.

WORKING GROUP ON PARTIAL DISCHARGE TESTS
H. R. Moore, Chairman

The working group on Partial Discharge Tests reported that they had discussed reports from two task forces.

The task force on Acoustic Detection presented a two channel instrument and gave an explanation of how it can be used to detect and locate corona sources internal to transformers while in service.

This task force met later on that same day and assigned members sections to prepare for a guide on detection and location of partial discharge by acoustical methods. As a starting point the final report on EPRI Project RP426 will be used. The sections of this guide will be assembled into a draft document for discussion at the next meeting.

The task force on apparent charge measurement presented proposals on circuitry, instrumentation, and calculations for this type of corona detection and requested that the W.G. members study these and send comments to George Vaillancourt

by July 1, 1983. They are also proposing that manufacturers consider making both apparent charge and RIV measurements and would like their comments before July 1, 1983.

TASK FORCE ON RECOMMENDED DIELECTRIC TEST LEVELS FOR 1200 KV

The last report of the Task Force on Test Levels for 1200 kV was discussed briefly by the Dielectric Test Subcommittee. Subsequent to the meeting the decision was made to include this information in the material published for the next Transformer Tutorial Course.

WORKING GROUP ON REVISION OF DIELECTRIC TESTS
G. W. Iliff, Chairman

The working group on Revision of Dielectric Tests for Power Transformers which is chaired by G. Iliff reported the following:

The task force on Revision of Dielectric Tests of Shunt Reactors is active again and chaired by Bill Kennedy. They intend to begin their task by polling manufacturers to determine test capabilities.

The trial use document C57.12.14 which covers the new test methods for transformers rated 115 and 230 kV has been published and is now available.

The working group heard a report from Sam Mehta which recommended that the next revision of C57.12.90 should include a recommendation that the response time T_2 of impulse measuring circuits should be equal to or less than 100 nanoseconds.

A task force headed by Jim Douglas, was established to investigate the need for phase to phase switching surges greater than 1 p.u. of the phase to ground switching surge.

The ballots on Draft 2 of the revisions to Section 5 of C57.12.00 and Section 10 of C57.12.90 were discussed at length in the working group and in the Subcommittee. In addition, George Iliff presented an excellent seminar on the history and past efforts which lead up to these proposed revisions. George plans to revise the proposals and ballot Draft 3 in the subcommittee before the fall meeting in Detroit.

* * * * *

There being no new business, the meeting was adjourned.

L. S. McCormick
Chairman

SUCCESSFUL APPROVED TRANSFORMERS COMMITTEE BALLOT

WHAT NEXT

The members of each Task Force, Working Group, Subcommittee, and full Committee work long hard hours to complete a new or revised standard and get successful ballots all the way through the Transformers Committee. However, for some members many steps in the standardization process are yet to be traversed. The purpose of the following is to relate part of the standardization process and show the people working on the many Transformers Committee projects and the people participating in the balloting that they are a part of this process.

Is Transformers Committee Approval
All That Is Required

Each proposed new standard or revision to an existing standard must be authorized by the IEEE Standards Board (StB) through the IEEE Standards Review Committee (RevCom). The reasons for this authorization are to avoid duplication, provide for effective management of overall efforts, expedite approval of final documents, and assure proper coordination.

When the project request is submitted to the StB, other technical committees and organizations through their StB liaison representative shall determine if they want to participate in the standards project. Those groups wanting to participate notify the sponsoring technical committee's chairman or designee and agree on a method of coordination. Whichever method is chosen, active participation in the balloting is desirable.

Coordination with the IEC may be for information purposes only. If the project includes definitions, the Chairman of the Standards Coordinating Committee (SCC) 10 on Definitions should be included in the coordination.

When To Contact Standards Board

At the conclusion of both coordination and an approved Transformers Committee ballot, the person assigned to submit the document to StB may want to contact the Secretary of the StB to avoid procedural pitfalls. The Secretary can provide you with the most recent revisions of the Submitter's Working Guide, Submitter's Form, Standards Manual, and Ballot Summary form. The Secretary will also verify requirements on the Standards Project authorization Request (PAR) and verify the agreed to coordination requested by SCC. Examples of the above mentioned items are attached as follows:

<u>Title</u>	<u>Attachment</u>
Submitter's Working Guide	I
Submittal Form	II
Standards* Manual (cover)	III
Ballot Summary	IV
PAR	V
Coordination request	VI

What To Submit To StB

In order to get approval by the StB, the following items must be submitted:

1. A completed IEEE Standards Board Form (Submittal Form)
2. Letter copies of coordination approval
3. Ballot information
4. 30 copies of draft document

How Do Transformers Committee Members Fit In The Standardization Process

How do the Transformers Committee Members fit in this standardization process? Both the Submittal Form and the Ballot Summary Form indicates the need for specific information based on membership ballot results.

All abstentions (Not Voting) requires some information as to why the member abstained. A conditional ballot (Not Approved changed to Approved) should have a summary of why the change was made and that the member agree with the change. Were the changes substantive or editorial? Did the person that changed his Not Approved ballot to Approved, see the editorial change in the revised draft or at the meeting when the editorial change was established?

Closing Notes

This brief discourse was prepared for three reasons, 1.) to inform the membership on what takes place after a successful approved Transformers Committee ballot is achieved, 2.) to inform the membership on what data is needed when preparing the required StB forms, and 3.) to provide people, who are assigned the task of taking a document through the standardization process, with some suggested direction and an idea of the materials and forms needed.

C. E. Mitchell
April 5, 1983

LIAISON REPORTSIEEE/PES TRANSFORMERS COMMITTEEANSI C57 - J. C. Dutton

1. New officers were recently elected for ANSC C57 as follows:

R. E. Uptegraff - Chairman
R. L. Ensign - Vice-Chairman
R. G. Hansen - Secretary

2. A meeting of the ANSC C57.12.1 (Power Transformers) was held on September 23, 1982 at NEMA Headquarters in Washington, D.C. The purpose was to discuss a draft of a proposed revision of ANSI C57.12.10-1977 and ANSI C57.12.30-1977. In addition to normal updating it is expected that this proposed revision will combine ANSI C57.12.10 and ANSI C57.12.30 in a single document to be known as C57.12.10. This reorganization will substantially reduce the size of these documents by eliminating much repeated data.

Also discussed at this meeting were comments and proposals of Mr. R. Beckwith relative to LTC Transformer Control Standards.

3. The annual meeting of ANSC C57 will take place Wednesday afternoon, April 13, 1983; following adjournment of the IEEE Transformers Committee Meeting.

A meeting of ANSC C57.12.1 is tentatively scheduled following the above meeting to briefly review Draft 2 of the proposed new revised Power Transformer Standard ANSI C57.12.10.

4. Subsequent to the last meeting Trial Use Document ANSI/IEEE C57.12.14 has been published.
5. A chart showing the status of C57 documents currently being balloted is attached.

ANSI C57.15 - A. C. Wurdack

This subcommittee has not met in the last six months.

ANSI C57.12.2 - C. P. Kappeler

This subcommittee has not met since October 14, 1982, but is scheduled to meet in Atlanta on April 14, 1983.

Standard C57.12.26 is prepared and should be in the ballot process by the spring meeting.

Standard C57.12.21 and C57.12.22 working groups are begun on revision work. Standard C57.12.23 is in process of preparation of Draft IV.

Work is underway on resolution of differences between C37 and C57 Cabinet Security Standards. A proposal is being considered to establish a joint sections committee on utility distribution enclosures.

ANSI C62 - E. J. Yasuda

The Fall IEEE Surge Protective Device Committee Meeting held its fall meeting on September 28-October 1, 1982, in Memphis, Tennessee.

The special activity for the Memphis meeting was an informative panel discussion on the design and protection of the rapidly growing cable television (CATV) industry. The major discussion topics included: the application of low-voltage surge protective devices; codes/specifications applicable to CATV cohabitation on communication/distribution poles; and potential safety hazards in the present grounding and bonding practices of residential coaxial cables as well as electrical contact with distribution lines. Comments expressed by those present indicate the panel discussion was highly educational particularly for engineers not normally exposed to CATV design and protection practices.

For the new term starting January 1, 1983, the SPD Committee will be chaired by P. W. Bogner, Westinghouse Electric Corporation., Athens, Georgia. Other new officers will be:

Mr. E. J. Yasuda, Vice Chairman, BPA

Mr. R. D. Ball, Secretary, Kearney International

Mr. J. C. Osterhout, Overvoltage Protective Devices Subcommittee
Chairman, Joslyn

Mr. J. A. Hetrick Application Surge Protective Devices Subcommittee
Chairman, Ohio Edison

ANSI C62 (Continued)

During the fall meeting, several new working groups were established. Working Group on Separation Effects was established under the Application of Surge Protective Devices Subcommittee. Five new working groups under the Neutral Grounding Devices Subcommittee were also established. The new working groups, previously task forces, were established to develop the five separate sections of the Neutral Grounding Devices Application Guide #143. These separate sections of #143 include: Introduction, Application Guide for Neutral Grounding of Synchronous Generator Systems; Application Guide for Generator Station Auxiliary Systems Grounding; Application Guide for Grounding Distribution Systems; and Application Guide for Grounding Transmission and Subtransmission Systems.

The final review of the new SPD Operational Manual was completed during the Memphis meeting. The new Operational Manual will be available before December 1, 1982.

The statuses of standards recently completed or near completion are:

ANSI/IEEE C62.1	Proposed revisions to establish heavy duty distribution class arresters - Coordination with Switchgear Committee is required before forwarding to the Standard Board.
IEEE Std. #143	Section I - Introduction and Section II - Application Guide for Neutral Grounding of Synchronous Generator Systems balloted within the subcommittee. Section I will be forwarded to the main committee for balloting. Negative ballots on Section II being resolved.
ANSI/IEEE C62.3/01	Proposed revisions for Std. Test Specification for Gas Tube Surge Protective Devices balloted within the W.G. Negative ballots being resolved.
ANSI/IEEE C62.33	Varistor Specification published June 1982.
ANSI/IEEE C 62.42	Application Guide for Gas Tube Arresters succesfully balloted in the subcommittee - forwarded to the main committee for balloting.

The next SPD meeting is scheduled for May 3-6, 1983, at the North Park Inn, Dallas, Texas, followed by the fall meeting on October 4-7, 1983, at The Red Lion, Portland, Oregon. The special activity for the fall meeting will be a visit to BPA's Lyons 1200-kV Test Facility.

ANSI C68 - L. S. McCormick

No activity to report.

ANSI C76 - N. J. Melton

The following documents were recently submitted for a letter of ballot to the C76 Committee on Apparatus Bushing Standardization. All the negative ballots have been resolved and the documents are ready to be forwarded to ANSI.

1. Revision of IEEE Standard 24 (C76.2) Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings
2. New IEEE Standard 757- Guide for Loading Power Apparatus Bushings
3. Proposed Sections of future C76-Guide for Application of Power Apparatus Bushings
 - a. Scope, purpose
 - b. Cantilever loading

ANSI C84 - J. C. Dutton

1. Newly revised ANSI C84.1-1982 is now published and available. It incorporates a number of improvements and changes.
2. D. S. Brereton's article, "The New ANSI C84 Standard on System Voltages," which appears in the December 1982 issue of "Industrial Power Systems," contains an excellent description (and discussion) of this new revision of ANSI C84.1.
3. No meetings of ANSI C84 are presently scheduled.
4. The writer is resigning as the Liaison Member of ANSI C84 effective April 1, 1983 because of retirement.

ANSI C89 - S. J. Antalis

1. No ANSI C89 Meeting was held since the last report.
2. The Technical Committee of NEMA ST-3 Dry Type & Specialty Transformers is preparing a revised NEMA ST-20 (ANSI-C89.2) document for balloting. The revision will delete all references to High Voltage Standard Requirements (above 600V). (These are now covered under ANSI-C57).
3. At the NEMA ST-8 Annual Meeting in November 1982, the Section also approved the rescission of another High Voltage Product Standard Pub. No. TR-27 "Commercial, Institutional, & Industrial Dry Type Transformers." Again, this is due to the issuance of ANSI C57 Standards on High Voltage Dry Type Transformers.
4. At the NEMA ST-8 Annual Meeting, new officers were elected as follows:

P. J. Hopkinson - General Electric Co. - Chairman
R. D. Goodwin - Hevi-Duty Electric - Vice-Chairman
(General Signal Corp.)
C. W. Ludeke - Matra Electric Corp. - Section Director Power
Equipment Board of Directors

ANSI C92 - J. C. Dutton

1. The ANSC C92 met in Atlanta on December 2, 1982, but the writer was not present. The meeting did not have a quorum, but a mail vote is being taken to approve committee actions taken at the meeting.
2. The work to establish BIL's and test levels for 1200 kV systems was noted.
3. ANSI C92.1-1982 "American National Standard for Power Systems - Insulation Coordination" has now been published.
4. The writer will be retiring April 1, 1983 and will resign from ANSC C92 as Liaison Representative for ANSI C57 and the IEEE Transformers Committee.

IEEE/NPEC/SC-2 - L. R. Stensland

The IEEE/NPEC/SC-2 met on February 2 and 3, 1983.

1. The Working Group for P-323, "Standard for Qualifying Class 1E Equipment for Use in Nuclear Power Generating Stations", reviewed Draft 14 at the meeting. Subsequent to the meeting, Draft 15 was issued. I understand that a marked copy of Draft 15 was approved at the NPEC meeting, the week of March 7, 1983.

The new standard has introduced a definition for "mild environment". In essence, a qualified life is not required for equipment located in mild environments and which has no significant aging mechanisms. It still is questionable how this new term may be applied to transformers located in mild environments.

2. At this time, I am not certain when the next NPEC/SC-2 meeting will take place.

IEC - J. C. Dutton

1. It is with regret that we report that Dr. Leon Podolsky, former President of the USNC-IEC, died in late February.
2. Informative data regarding IEC TC 14 and 14B has recently been distributed to members of the TAG (Technical Advisory Group) by the Technical Advisor.
3. IEC will be holding a General Meeting in October 1983 in Tokyo, Japan. At present IEC TC 14 is not scheduled to meet. However, it is understood that TC 14 Chairman Pratt is endeavoring to arrange that TC 14 will meet.
4. IEC Publication 71-2 (1982) "Insulation Coordination, Part 3: Phase-To-Phase Insulation Coordination Principles, Rules, and Application Guide" has been published.
5. As a matter of information, a draft of a proposed revision of IEC Publication 85, "Thermal Evaluation and Classification of Electrical Insulation," 15B (Central Office) 55, is now being considered by IEC under the Six Months Rule.

STATUS OF IEEE AND ANSI C57 BALLOTS, AND PRINTING

3/10/83

ANSI C57

BALLOT NO.

OR

IEEE PROJ.
NO.

BRIEF
DESCRIPTION

IEEE
STD ED
SUBM.

ANSI C57
COMM
SUBM.

ANSI
BSR
SUBM.

EDIT,
TYPESET

PRINTING

353 HVACC, C57.12.55, Dry Type

N/A

Rebltg.

356 HVACC, C57.13.2, Inst. Tr.

*

ANSI/IEEE C57.12.56-198X
Dry-Type Insul. Testing
(Models)
(Formerly known as IEEE 65)

C

C

Subm.

ANSI/IEEE C57.98-1982
Impulse Test Guide

C

Bltg.

ANSI/IEEE C57.109
Short-Circuit Duration

Subm.

P756 ANSI/IEEE C57.XXX
Loading Guide 100+ MVA

Subm.

*Status being investigated.

Subm. = Submitted Bltg. = Balloting IP = In Process C = Complete N/A = Not Applicable

John C. Dutton

John C. Dutton, Chairman - IEEE Delegation to ANSI C57

14

cc: SI Sherr
B Stanleigh
M Goulding
F Huber

WJ McNutt
LJ Savio
DA Yannucci
OR Compton
RL Smith

TL Mayes
BF Allen
CH White
R Hansen

V. Morgan
LW Long
R Uptegraff

GENERAL ELECTRIC

MEDIUM

TRANSFORMER

DEPARTMENT

GENERAL ELECTRIC COMPANY..... REDMOND CIRCLE. ROME. GEORGIA 30161

March 8, 1983

cc: T. L. Mayes
O. R. Compton
W. J. McNutt
L. R. Long

REPORT ON 12/2/82 BALLOT TO REVISE
ANSI/IEEE C57.12.00-1980, PARAGRAPHS 4.1.6.1 AND 4.3.3 (10)

To: Members of the IEEE Transformers Committee

Gentlemen:

The voting statistics on this ballot follow:

Ballots sent out	118
Ballots returned (undeliverable)	<u>3</u>
Ballots reaching IEEE TC Members	115
Needed for "valid ballot" .75 X 115 =	86.25
Ballots returned without comments	74
Ballots returned with comments	6
Ballots not voting	7
*Negative ballots	<u>1</u>
Total	88

*This negative ballot was withdrawn after telephone discussion.

Several of the ballots with comments included suggestions for rewording which are considered as editorial. The proposal is stated once more below with "added" or "rearranged" words underlined, and "deleted" or "replaced" words struck through with a line.

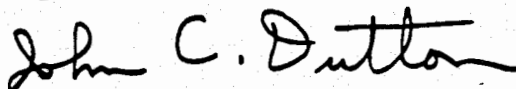
1. Add a note following 4.1.6.1 stating:

"Note: In the case of multi-winding transformers or autotransformers, 4.2.6.1 applies only to the specific loading conditions used as the basis of design. These loading conditions involve simultaneous coordination of kVA input and output, load power factors, and winding voltage combinations (see 4.3.3 (10). Differences in loading and voltage regulation for various output windings may prevent ~~preclude~~ simultaneous achievement of 105% voltage on all output terminals. In no case shall the kVA outputs specified for any loading condition require continuous loading of any input winding in excess of its rating."

2. Modify the statement of 4.3.3 (10) to read:

"Specified loading conditions (kVA outputs, winding load power factors, and winding voltages) associated with multi-winding transformers or autotransformers."

If there are no objections to these changes (which are considered as editorial), this proposal is now considered to be complete and finished.



John C. Dutton
Consulting Engineer - Standards

1/4/82 STATUS REPORT

HVACC Subcommittee I (High Voltage Transformers)

1. Working Group 1A - Chairman A. D. Kline (Southern Transformer Co.)

Document is "Proposed American National Standard Conformance Standard for Dry-Type Transformers Used in Unit Installations, Including Unit Substations." This document, now designated ANSI C57.55-198X, was balloted in C57 and comments received were incorporated into the draft and it is now being reballoted in C57.

2. Working Group 2 - Chairman H. W. Book (Westinghouse)

Document is "American National Standard Conformance Standard for Liquid-Filled Distribution Transformers Used in Pad-Mounted Installations Including Unit Substations" and was published as ANSI C57.12.27-1982.

3. Working Group 2A - Chairman R. E. Uptegraff, Jr. (R. E. Uptegraff Manufacturing Company)

Document is "American National Standard for Liquid-Filled Transformers, Used in Unit Installations Including Unit Substations" and was published as ANSI C57.12.13-1982.

4. Working Group 11 - Chairman W. R. Goldbach

A HVACC document "Proposed Conformance Tests for Separable Insulated Connectors" was approved by HVACC Subcommittee I and forwarded early in 1982 to the Chairman of ANSI C119 with a recommendation for balloting as publication ANSI C119.2(a) - 198X. It is anticipated that when published the document will be issued as a supplement to the latest revision of ANSI/IEEE 386(a)-198S, formerly ANSI/IEEE 386.

5. Working Group 14 - Chairman J. H. Keeler (General Electric)

Document is "Proposed Addendum to American National Standard for Instrument Transformers C57.13." This document was balloted by ANSI C57 and negative ballots are still being resolved within IEEE so that the document may be reballoted.

ANSI/IEEE 386(a)-198X, formerly

6. Working Group 16A - Chairman G. M. Bell (General Electric)

Document is "Proposed American National Standard Conformance Guide for Thermal Evaluation of Dry-Type Ventilated Transformer Insulation Systems." The document has been split into two sections, one covering conformance requirements and the other covering test procedures. The first section is being handled as an appendix to C57.12.55-198X which is covered by Item 1 above and has accompanied that document in its submittal to C57.

The second section, now identified as ANSI C57.12.26-19XX was coordinated with IEEE 65 and has received approval from the IEEE Standards Board. The document has been forwarded to C57 for ballot.

7. Working Group 16B - Chairman R. D. Buckley (Westinghouse)

Document is "Proposed American National Standard Conformance Guide for Insulating Systems and Materials for Liquid-Filled Transformers." The document accompanied Item 2 above as an appendix when sent to HVACC Subcommittee I for balloting as well as when it was sent to ANSI C57 for comments. It is now published as an appendix to ANSI C57.12.13-1982, "Conformance Requirements for Liquid-Filled Transformers used in Unit Installations, Including Unit Substations", and ANSI C57.12.27-1982, "Conformance Requirements for Liquid-Filled Distribution Transformers used in Pad-Mounted Installations, Including Unit Substations".

INSTITUTO DE



**INGENIEROS
EN
ELECTRICIDAD Y EN
ELECTRONICA SECCION MEXICO, A.C.**

Cuernavaca, Mor.; Abril 21, 1983.

L.J. SAVIO
Consolidated Edison Co.
4 Irving Place
New York, NY 10003
U.S.A.

Dear Sir,

On behalf of the Mexican Section of the IEEE, I am pleased to invite you, asking you to extend this invitation to your colleagues within your Organization to participate in the Eleventh International Conference on Research, Development and Applications in Electrical and Electronic Engineering - MEXICON 83, contributing with some papers for their presentation and publication in the Conference Proceedings.

This conference has been held in Mexico every year since 1973, and authors not only from Mexico, but also from the United States, Canada, Europe, and Latin America have always participated enthusiastically contributing with very interesting papers. This year we expect more participants due to the fact that Mexico has become a very inexpensive country to visit.

MEXICON 83 will be held in the city of Cuernavaca, Morelos State, on 23-25th November, 1983.

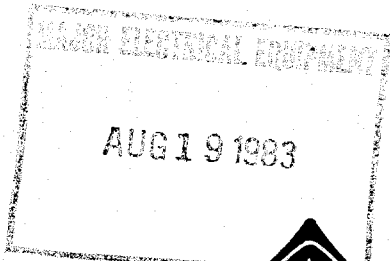
In addition to the presentation of papers on each of the conference subjects by their authors, we have planned an extensive and interesting technical program consisting of tutorials, technical visits, key-note speakers, and student activities. There will also be an attractive social program, consisting of lady's activities and tours. We will be very pleased to send you detailed information regarding these programs in the near future.

Attached to this letter, I am sending you 3 copies of the conference notice for the announcement and call for papers, so that you kindly distribute them, and/or post and circulate as you consider appropriate.

We sincerely hope we shall receive several contributions from your Organization, and to have the opportunity of meeting you next November in Cuernavaca.

Yours sincerely,

JOSE A. TOVAR M., M.Sc.
Chairman, MEXICON 83



IEEE

ELEVENTH INTERNATIONAL CONFERENCE ON RESEARCH, DEVELOPMENT AND APPLICATIONS IN ELECTRICAL AND ELECTRONIC ENGINEERING

CUERNAVACA, MORELOS, MEXICO
NOVEMBER 23-25, 1983

ANNOUNCEMENT AND CALL FOR PAPERS

MEXICON 83

INVITATION

THE MEXICAN SECTION OF THE IEEE IS PLEASED TO INVITE YOU TO PARTICIPATE IN ITS 11TH INTERNATIONAL CONFERENCE MEXICON 83, ON RESEARCH, DEVELOPMENT AND APPLICATIONS IN ELECTRICAL AND ELECTRONIC ENGINEERING. THIS YEAR, THE CONFERENCE WILL BE HELD IN THE CITY OF CUERNAVACA, MORELOS.



CALL FOR PAPERS

IN ADDITION TO INVITED PAPERS, A NUMBER OF CONTRIBUTED PAPERS ARE SOLICITED FOR PRESENTATION AND PUBLICATION IN THE CONFERENCE PROCEEDINGS. SUBMITTED PAPERS SHOULD COVER ORIGINAL UNPUBLISHED WORK ON THE CONFERENCE SUBJECTS. AUTHORS ARE REQUESTED TO SUBMIT BY JUNE 15, 1983, A SUMMARY OF THEIR PROPOSED PAPER, NO LONGER THAN 400 WORDS, EITHER IN ENGLISH OR SPANISH, IN TRIPLICATE, TO THE CONFERENCE CHAIRMAN:

M.C. JOSE A. TOVAR - PRESIDENTE
MEXICON 83 - COMITE DE EVALUACION - IEEE - SECCION MEXICO
CULIACAN 115
06100 MEXICO, D.F.
TELS. (5) 574-2030 AND (5) 564-1105
TELEX INELME 017-3351

AUTHORS OF ACCEPTED PAPERS WILL BE NOTIFIED BY JULY 15, 1983, AND WILL BE REQUESTED TO SUBMIT THE COMPLETE PAPER, IN PRINT-READY FORM, BY SEPTEMBER 30, 1983.

CONFERENCE SUBJECTS

- POWER SYSTEMS
- COMPUTERS
- ELECTRONICS
- INSTRUMENTATION
- ACOUSTICS
- CONTROL ENGINEERING
- COMMUNICATION SYSTEMS
- ELECTRICAL AND ELECTRONIC EQUIPMENT
- OPTICS
- SERVICES
- MANAGEMENT
- INDUSTRIAL APPLICATIONS
- EDUCATION
- BIOENGINEERING

SPECIAL EVENTS

- TUTORIALS
- KEY-NOTE SPEAKERS
- SOCIAL PROGRAM AND TOURS
- TECHNICAL VISITS
- STUDENT ACTIVITIES

THE CITY OF CUERNAVACA

CUERNAVACA IS WORLDWIDE KNOWN AS THE CITY OF ETERNAL SPRING DUE TO ITS EXCEPTIONALLY MILD, WARM WEATHER ALL YEAR ROUND. IT IS ONLY 90 KM. SOUTH OF MEXICO CITY AND OFFERS THE VISITOR A WIDE VARIETY OF SIGHTSEEING PLACES, RANGING FROM IMPRESSIVE ARQUEOLOGICAL SITES, THE SUMMER PALACE OF THE CONQUISTADOR CORTES, COLONIAL ARCHITECTURE AND WONDERFUL LANDSCAPES. CUERNAVACA OFFERS ALSO ALL THE FACILITIES AND SERVICES OF ANY MODERN CITY AND HAS A WIDE NUMBER OF FAMOUS RESTAURANTS AND NIGHT-CLUBS.

- THE OFFICIAL CONFERENCE LANGUAGE WILL BE SPANISH. BUT SIMULTANEOUS ENGLISH-SPANISH TRANSLATION WILL BE PROVIDED.