

MINUTES OF THE IEEE/PES

TRANSFORMERS COMMITTEE

APRIL 9, 1986

LITTLE ROCK, ARKANSAS.

MEMBERS OR REPRESENTATIVES PRESENT (69)

R. Allustiarti  
J. J. Bergeron  
J. V. Bonucchi  
J. D. Borst  
G. H. Bowers  
D. J. Cash  
O. R. Compton  
F. W. Cook, Sr.  
    J. Corkran  
D. H. Douglas  
J. D. Douglass  
J. C. Dutton  
J. A. Ebert  
E. C. Edwards  
R. L. Ensign  
C. G. Evans  
P. P. Falkowski  
H. G. Fischer  
    M. Frydman  
H. E. Gabel, Jr.  
    G. Gunnels  
J. H. Harlow  
W. R. Henning  
K. R. Highton  
P. J. Hoefler  
R. H. Hollister  
C. C. Honey  
    F. Huber, Jr.  
R. G. Jacobsen  
A. J. Jonnatti  
C. P. Kappeler  
J. J. Kelly  
W. N. Kennedy  
    E. Koenig  
J. G. Lackey  
    W. Lampe  
H. F. Light  
M. L. Manning  
J. W. Mathews  
S. P. Mehta  
C. K. Miller  
    C. Millian  
R. E. Minkwitz, Sr.  
W. H. Mutschler

L. S. McCormick  
J. W. McGill  
C. J. McMillen  
B. K. Patel  
H. A. Pearce  
C. A. Robbins (represented by  
                    M. A. Franchek)  
L. J. Savio  
    V. Shenoy  
L. R. Smith  
W. W. Stein  
L. R. Stensland  
R. B. Stetson  
    V. Thenappan  
F. W. Thomason  
J. A. Thompson  
T. P. Traub  
D. E. Traux  
R. E. Uptegraff, Jr.  
    G. Vaillancourt  
R. A. Veitch  
L. B. Wagenaar  
R. J. Whearty  
W. E. Wrenn  
A. C. Wurdack  
D. A. Yannucci

MEMBERS ABSENT (40)

D. J. Allan  
B. F. Allen  
R. J. Alton  
S. J. Antalis  
E. H. Arjeski  
J. C. Arnold  
    R. Bancroft  
P. L. Bellaschi  
    E. Chitwood  
D. W. Crofts  
M. G. Daniels  
J. K. Easley  
S. L. Foster  
D. A. Gillies  
A. W. Goldman  
R. L. Grubb  
    C. Hall  
T. K. Hawkins  
F. W. Heinrichs  
    C. Hurty  
G. W. Iliff  
    O. Keller  
A. D. Kline

T. G. Lipscomb  
    R. Little  
R. I. Lowe  
H. B. Margolis  
H. R. Moore  
R. J. Musil  
G. C. McCrae  
W. J. McNutt  
E. T. Norton  
D. D. Perco  
B. E. Smith  
E. G. Strangas  
A. L. Tanton  
R. C. Thomas  
J. W. Walton  
    A. Wilks  
E. J. Yasuda

GUESTS (40)

J. Hupp  
G. J. Reitter  
    P. Iijima  
    C. Hoesel  
R. P. Miller, Sr.  
    R. Maugs  
C. V. Brown  
C. L. Moore  
D. A. Whiteley  
T. L. Walters  
    E. Howells  
W. E. Boettger  
L. D. Miller  
J. M. Pollitt

T. L. Provost  
L. A. Swenson  
    B. Damsky  
    J. Rossetti  
H. J. Windisch  
S. K. Oklu  
    G. Zguris  
    R. Jasek  
    R. Hauptert  
    J. Gerth  
    G. Bryant  
R. E. Lee  
D. J. Fallon

F. N. Young  
    G. Schaufler  
F. E. Willett  
    D. Sundin  
    D. Barnard  
    J. Antweiler  
    R. Grunert  
    M. Mitelman  
W. E. Saxon  
W. B. Binder, Jr.  
    P. Singh  
L. M. Nicholas  
W. J. Carter

1. CHAIRMAN'S REMARKS AND ANNOUNCEMENTS

Chairman Dean Yannucci convened the meeting at 8:00 a.m. with 69 members and 40 guests present. Appreciation was expressed to Cal Kappeler for the fine arrangements for the meeting noting particularly the distinguished luncheon guest, Governor Bill Clinton. This will be a hard act to follow at future meetings. Total registration for the Little Rock meeting was 160 members and guests plus 26 women.

Dean Yannucci noted the passing of one of our active members, Bill Farber, who was chairman of the Working Group on Revision of Dielectric Tests on Distribution Transformers. Bill had given long and distinguished service to the Transformers Committee. Dean also noted that retired member Art Lockie, who had done much pioneering work in the transformer industry, had also passed on.

2. APPROVAL OF THE MINUTES OF THE TORONTO MEETING HELD OCTOBER 30, 1985

The minutes were approved as issued.

3. REPORT OF THE SUBCOMMITTEES

3.0 Administrative - D. Yannucci

For the complete report and details on the following points, highlighted by Chairman Yannucci, see Appendix "A".

- Refunds of Prepayments

Refunds will now be made if the bank balance is \$1500 or greater.

- EEl Representation on the Transformers Committee

Roger Ensign of Southern California Edison will be EEI's representative on the Transformers Committee. He will have one vote.

- Update on Liability Insurance

A policy to indemnify named committee members has been approved and is under way. However, no amount of insurance has been established at this time.

- PES Standards Co-ordinating Committee

Ray Smith has taken on the position of "Standards Co-ordinating Committee Liaison", formerly held by Olin Compton.

- Highlights of Technical Council Meeting

Each technical committee has been asked to develop goals for 1986/87 and to provide progress reports at the next Winter Power Meeting. If any members have suggestions for such goals, they should be forwarded to Dean Yannucci for consideration. It was also noted that seminars will be re-established in the 1986 budget.

- Future Meetings

Dave Truax made a pitch for the next meeting to be held in Pittsburgh PA, October 12-15, 1986, at the William Penn Hotel.

The following future meetings have been scheduled:

Fort Lauderdale, FL.	May 10-13/87	Yankee Trader Hotel Host: C. Honey
New Orleans, LA.	Nov. 1-4/87	Monteleone Hotel Host: J. Bergeron
Washington, DC.	Apr.10-13/88	Host: Jim Arnold
Long Beach, CA.	Fall 1988	Ramada Renaissance Hotel Host: O. Keller

The following new members were approved by the Adsubcom and welcomed to the Transformers Committee by Chairman Yannucci.

R. H. Hollister - Westinghouse Electric Corp.

G. Vaillancourt - Hydro Quebec (IREQ)

It was noted that Chuck McMillen had resigned as chairman of the Insulation Life Subcommittee after many years of service. Chuck stated that he will still be active in the Committee but felt that someone else should be given a chance to chair the Insulation Life Subcommittee. The new chairman will be Dave Douglass.

Finally, Dean noted that the Adsubcom will begin their meetings at 5:00 p.m. instead of the traditional 7:00 p.m.

3.1 Audible Sound and Vibration - A. M. Teplitzky - See Appendix "B"

The subcommittee report was given by Len Swenson. It was noted that a seminar on sound will be presented at the Spring 1987 meeting in Fort Lauderdale.

- 3.2 Bushings - L. B. Wagenaar - See Appendix "C"
- 3.3 Dielectric Tests - L. S. McCormick - See Appendix "D"
- 3.4 Dry Type Transformers - R. E. Uptegraff - See Appendix "E"
- 3.5 Instrument Transformers - R. B. Stetson - See Appendix "F"
- 3.6 Insulation Life - C. J. McMillen - See Appendix "G"

After his report was presented, Chuck McMillen announced his resignation and thanked all those who had worked on the Subcommittee and Working Groups for their efforts over the years. Also announced was the name of the new chairman - Dave Douglass.

- 3.7 Insulating Fluids - H. A. Pearce - See Appendix "H"

Henry Pearce announced that Leo Savio's Working Group, which is preparing the "Interpretation Section" of the Gas Analysis Guide, (C57.104), would be presenting a seminar on their work at the next Transformers Committee meeting in Pittsburgh (October 14).

We have just been informed that the seminar planned will not be ready for the Pittsburgh meeting. In its place Frank Heinrichs will review his paper, "The Impact of Fault Detection Methods on the Transformer Operating Decision". This paper will be given at the T&D Conference at Arnaheim on September 19, 1986.

Jim Douglass asked a question concerning the timing for the revision of C57.104. Henry answered that it may be ready at Pittsburgh but more likely it will be another year.

- 3.8 Performance Characteristics - J. D. Borst - See Appendix "I"

A motion was made by John Dutton that C57.105-1978, Guide for Application of Transformer Connections in Three Phase Distribution Systems, be reaffirmed. This motion was passed unanimously by the Transformers Committee.

- 3.9 Recognition and Awards - W. J. McNutt

The report was presented by Dean Yannucci.

The Awards Subcommittee has made the following nominations for awards:

- Donald G. Fink Prize Award - Most outstanding survey, review or tutorial paper published in 1985.  
Our nomination - Distribution Transformer No Load Loss - D. S. Takach et al.
- W. R. G. Baker Prize Award - Most outstanding paper reporting original work published in 1985.  
Our nomination - Mathematical Modelling of Bubble Evolution in Transformers - W. J. McNutt et al.
- An outstanding Service Award will be presented to Ray Thomas at the next Transformers Committee meeting in Pittsburgh.

- 3.10 Transformer Standards - L. R. Smith  
For the complete report, see Appendix "A", Enclosure 5.

An observation was made by John Dutton that requests for re-affirmation of standards is very important. New documents refer to old documents and if an old document, referenced by a new document has not been re-affirmed, the new document will not be approved.

- 3.11 West Coast - H. Johnson - See Appendix "J"

The report was given by Roger Jacobsen.

4. REPORT OF LIAISON REPRESENTATIVES

4.1 EPRI

A verbal report was given by Ben Damsky.

A written report has not been received for inclusion in these minutes.

4.2 IEC Transformer Activities - See Appendix "K"

4.3 Other Liaison Reports

Appendix "A", Enclosure 9, contains the following other liaison reports:

- CIGRE Study Committee 12 - W. J. McNutt.
- C57.15 - Step Voltage and Induction Voltage Regulators - A. Wurdack.
- C57.17.2 - Subcommittee on Distribution Transformers - C. P. Kappeler.
- C89.1 - Dry Type Machine Tool and Control Transformers)
- C89.2 - Dry Type Transformers for General Applications) - S. J. Antolis
- Standards Coordinating Committee - O. R. Compton.
- Technical Publications - O. R. Compton.
- National Public Affairs Council - O. R. Compton.
- Technical Paper Coordination - O. R. Compton.
- Surge Protective Device Committee - E. Yasuda.
- Social Implications of Power Technology Committee - D. A. Yannucci.

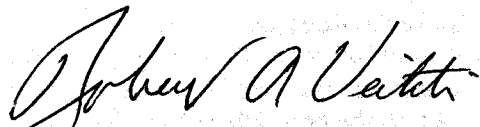
5. TECHNICAL PAPERS FOR FUTURE IEEE/PES MEETINGS - O. R. COMPTON

See Appendix "A", Enclosure 10.

6. NEW BUSINESS

As there was no new business raised at the meeting, it was adjourned.

Respectfully submitted,



Robert A. Veitch,  
Secretary.

RAV:pm

APPENDIX "A"

MINUTES OF MEETING

ADMINISTRATIVE SUBCOMMITTEE

IEEE TRANSFORMERS COMMITTEE

LITTLE ROCK, ARKANSAS

MONDAY, APRIL 7, 1986

ATTENDANCE

D. Yannucci - Chairman  
O. Compton - Vice Chairman  
R. Veitch - Secretary

MEMBERS

J. Borst  
J. Dutton  
L. McCormick  
H. Johnson (represented by R. Jacobsen)  
R. Stetson  
W. McNutt  
L. Wagenaar  
C. McMillen  
R. Uptegraff  
A. Teplinsky  
R. Smith

GUESTS

F. Huber  
C. Kappeler  
D. Truax  
W. Kennedy  
R. Ensign



## Administrative Subcommittee

The Adsubcom met at 7:00 p.m. on Monday, April 7, 1986 with 14 members and five guests present.

1. Introductions were made.
2. Minutes of the Toronto meeting were approved as written.
3. Committee Finance and Meeting Arrangements.

Cal Kappeler brought up the subject that a \$30 registration fee will not cover the expenses of the meeting even if there is no charge for meeting rooms. This is currently the maximum that can be charged. Cal would also like to refund prepayments to individuals who could not attend the meeting. The current rule states that refunds will only be made if the meeting is "in the black". This rule was changed so that refunds will now be made if the bank balance is \$1,500 or greater.

Dave Truax provided an update on the next meeting in Pittsburgh. Single rooms will be \$100 and doubles \$120. Meeting rooms will be free provided the "bedroom-night" requirements are met. To-date, a speaker has not been obtained for the luncheon. It was recommended that blackboards or flip charts be provided when requested.

#### 4. EEI Representation

Early this year Mr. R. J. Butryn, Chairman, EEI Standards Coordination and Technical Liaison Subcommittee, issued a proposed "Procedure for Management and Co-ordination of Electric Utility Participation in IEEE Committee Activities". Roger Ensign of Socaled was invited to review this proposal with Adsubcom. Roger has been appointed EEI's representative on the Transformers Committee.

Fred Huber of IEEE stated that organizations such as EEI can request representation on technical committees. The request must be approved by the IEEE Standards Board and the representative will have one vote.

It was noted by John Dutton that EEI does not fund travel outside the U.S. and therefore he is having a difficult time in building a balanced team for the upcoming IEC TC14 meeting in Holland. Mr. Ensign was asked to inform EEI that their support is necessary to have the best U.S. representation at this meeting.

#### 5. Update on Liability Insurance

As reported in the minutes of the October 30/85 Transformers Committee meeting, the IEEE Board of Directors has approved in principle a policy to indemnify named committee members involved in IEEE standards activities. Step 1 was to identify individuals and this was done. Step 2 is now underway. Members involved in this work will be sent a letter from John E. May, Standards Director and "IEEE Standards Activities Acknowledgement Form". These forms should be completed and returned to IEEE. The letter and form are shown as Enclosure 1A and 1B.

Fred Huber will review this topic at the Transformers Committee meeting.

6. Review of PES Standards Co-ordinating Committee Activity.  
Report submitted by Olin Compton - See Enclosure 2.

Ray Smith has agreed, with the consent of his employer, to take over the position of "Standards Co-ordinating Committee Liaison" from Olin Compton. Ray is already chairman of the Standards Subcommittee so his new position fits in well with his present position.

Chairman Yannucci asked for a volunteer to write a short article on Transformer Standards.

Fred Huber submitted "Standards Project Authorization" (PAR) form dated 11/13/85.

Also submitted was, "Standards Project Authorization (PAR) Submitter's Working Guide", dated 11/13/85. (See Enclosure 3A and 3B).

John Borst had submitted a PAR for Failure Investigation and Analysis for Power Transformers some time ago but had never received authorization. Chuck McMillen had similarly submitted a PAR for Thermal Evaluation of Power Transformers. Both were asked to prepare new PAR's and submit them to Ray Smith for processing.

7. Review of Technical Council Activities - D. Yannucci

A report of the PES Technical Council Meeting of February 3/86 was presented. (See Enclosure 4).

Chairman Yannucci highlighted the following:

- Deadline dates for manuscripts of technical papers remain unchanged at February 1 for the Summer Meeting and September 1 for the Winter Meeting.
- The booklet, "Corona and Field Effects of AC Overhead Transmission Lines - Information for Decision Makers" is available from IEEE headquarters. Contact Nancy Heitmann for copies. There is no charge.
- President Hissey has asked each technical committee to develop goals for 1986/87 and provide progress reports for presentation at the next Winter Power Meeting. Chairman Yannucci proposed that the officers will correspond and prepare these goals, which will then be sent to all Adsubcom members for review and comment.

8. Review of Standards Projects Status - L. R. Smith

Ray Smith presented a written report. (See Enclosure 5).

9. Review of ANSI Standards - J. C. Dutton.

Report submitted by John Dutton. (See Enclosure 6)

It was noted that the latest issues of C57.12.00 and 12.90 have been held up due to various problems. All but one of these have been resolved. The outstanding problem is a conflict between C57.12.00 8.1.1 Footnote 6 and Table 14. This conflict will be sent back to the Performance Characteristics Subcommittee for resolution.

The Standards Review Committee has returned P786 - "Guide for Reporting Failure Data for Power Transformers and Shunt Reactors on Electric Utility Power Systems", to Harold Light. Reasons for this are given in E. P. Lange's letter dated March 25/86. The requirements of this letter are new and will have to be investigated further. (See Enclosure 7). Fred Huber will review these new requirements and reply to John Borst and Harold Light.

10. Standards Requiring Revision or Reaffirmation - J. C. Dutton.

Fred Huber has written to ANSI requesting a two year extension of the five year rule for a number of ANSI standards. (See Enclosure 8).

The following is the current status of these standards:

- C57.12.01 - In committee.  
and 12.91
- C57.12.80 - Being balloted.
- C57.13 - In process of reaffirmation.
- C57.104 - Now being revised.
- C57.105 - Inactive - Reaffirmation will be requested at the Transformer Committee meeting.
- C57.106 - This is not an IEEE standard.

11. Subcommittee Activities Discussion

(a) Dry Type - R. Uptegraff

- The subcommittee will keep watch on the flammability of dry type materials. There are a number of groups investigating this subject.

(b) West Coast - H. Johnson (Reported by R. Jacobsen)

- The subcommittee will meet April 28, 29, 30/86 in Phoenix, Arizona. This will be a joint meeting with the West Coast Substation Committee.

- Present work consists of:
  - P842 Loss Evaluation Guide.
  - P513 Seismic Guide. The Standards Review Committee returned this on the basis that the information contained in it was old. The subcommittee will review it and it will have to be reballotted in the Transformers Committee.
  - C57.93 was rescinded. It will be worked on by the subcommittee. C57.12.11 and 12.12 will be incorporated into it.
  - A PAR will be prepared for a fire prevention guide.

(c) Audible Noise - A. Teplitsky

- A draft for a proposed sound measurement standard was submitted to the subcommittee for review. Two comments were received and these will be discussed at the subcommittee meeting.

(d) Dielectric Test - L. S. McCormick

- Due to Bill Farber's untimely death, there is a need for a new chairman for the Working Group on Dielectric Tests for Distribution Transformers. L. S. recommends an award for Bill's excellent work in the Transformers Committee over many years.
- The new chairman will be C. V. Brown of Florida Power and Light.

(e) Performance Characteristics - John Borst.

- The Ad Hoc group to investigate tap changer position numbers has not been able to agree on a standard method. There was some discussion that this problem be turned over to C57.12.30 however, the scope of the problem is much larger than covered by C57.12.30, therefore the Ad Hoc group will be asked to review its findings.
- Test Code for Current Limiting Reactors should be referred to the Dry Type Subcommittee as these devices are almost universally built as dry type units.

(f) Instrument Transformers - R. Stetson

- It was proposed that a revision of C57.13 be balloted by the Transformers Committee using a marked up version of the existing C57.13. This was agreed to by Adsubcom.

(g) Bushings - L. Wagenaar

- P852, Bushings to Operate in Gas Insulated Substations has been rescinded.
- P757, Bushing Loading Guide, could be published as a separate document or could be integrated into P800, Application Guide. It was agreed that it would be better to incorporate P757 into P800.
- The Bushing Subcommittee of C57 is looking for new members representing bushing manufacturers, bushing users and general interest individuals.

(h) Insulation Life - C. J. McMillen

- P. Bellaschi has written to the Transformers Committee requesting a "task force" to develop recommendations on loadability of power transformers and shunt reactors for operation at sub-zero temperatures (down to  $-50^{\circ}\text{C}$ ).
- The Working Group on Guides for Loading will look into extending these guides to  $-20^{\circ}\text{C}$ .
- Chuck McMillen, after many years service as chairman of the Insulation Life Subcommittee has asked to step down. His resignation was accepted. A motion was made and passed that Dave Douglas become the new subcommittee chairman.

(i) Standards - Ray Smith

- Report submitted by Ray (See Item 8 above).
- P801, ANSI C57.15 Requirements, Terminology and Test Code for Step-Voltage and Induction Voltage Regulators, is now complete and has been submitted to the Standards Board. Ray wanted to acknowledge the excellent work of Jim Harlow in getting this work done in a timely manner.

12. D. C. Converter Transformers - W. Kennedy

- As reported in the Minutes of the Toronto meeting, (See Appendix E), the Working Group on Dielectric Tests for HV DC Stressed Transformers and Reactors, is investigating future work for the Group. There are various dielectric, thermal and core considerations that should be addressed.
- The main discussion concerned the fact that these subjects fall under different subcommittee responsibilities. The question of the formation of a D. C. Converter Subcommittee was discussed. There was not a consensus on this point and Bill was asked to review this subject with his Working Group members and report back to the Transformers Committee chairman.

13. Liaison Activities

A report was submitted by Dean Yannucci. (See Enclosure 9).

14. Papers for Power Group Meetings

Report submitted by Olin Compton (See Enclosure 10)  
Also submitted is the Transformers Committee's Technical  
Papers List for the 1986 T&D Conference. (See Enclosure 11).

15. Future Transformers Committee Meetings

- The 1988 Spring Meeting will be held in Washington D.C.  
April 10 - 13. The host will be Jim Arnold.
- The 1988 Fall Meeting will be held in Long Beach, California  
at the Ramada Renaissance Hotel. Otto Keller will be our host.  
The date has not been set at this time.

16. Committee Membership Review and Nominations

The following new members were accepted by the Adsubcom:

- R. H. Hollister - Westinghouse Electric Corp.
- G. Vaillancourt - Hydro Quebec (IREQ)

The following individuals are no longer members of the Transformers  
Committee:

- W. R. Farber
- N. J. Melton
- D. A. Roach

17. Status of Operational Manual

This is presently under review and is being updated by Leo Savio.

18. PES Awards - W. J. McNutt

The Awards Subcommittee has made the following nominations for awards:

- Donald G. Fink Prize Award - Most outstanding survey, review or  
tutorial paper published in 1985.

Our nomination - Distribution Transformer No Load Loss - D. S. Takach et al.

- W. R. G. Baker Prize Award - Most outstanding paper reporting original  
work published in 1985.

Our nomination - Mathematical Modelling of Bubble Evolution in  
Transformers - W. J. McNutt et al.

19. Fellow Committee Status Report - W. J. McNutt

Two names were brought up for a recommendation by the Transformers Committee. However, since neither of these individuals had been actively involved in Transformers Committee work, they could not be endorsed.

A policy was established that the Transformers Committee cannot endorse a "Fellow" nomination unless the individual has been actively involved in T. C. work.

20. Request for Preferred Topics for the 1987 Winter Power Meeting.

Chairman Yannucci asked the subcommittee chairmen to raise this subject at their meetings. Recommendations should be forwarded to Dean.

21. Request for Meeting Rooms

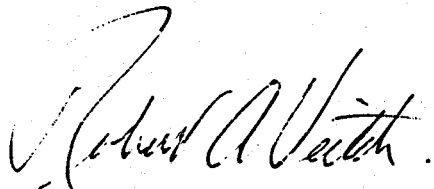
Chairman Yannucci asked that subcommittee chairmen follow up on requests for meeting rooms at PES Winter and Summer meetings and at the T&D conference. It is important that individuals requesting meeting rooms use them, as these rooms are paid for by IEEE.

22. Technical Council Ballot on Scope Changes of Other Technical Committees

When such ballots arise, Chairman Yannucci will forward these to the subcommittee chairmen most affected by the proposed change. The subcommittee chairmen will return their comments and recommendations to Dean.

23. Other Business

- John Dutton has asked to be relieved as chairman of the IEEE delegation to ANSI C57. His place will be taken by Olin Compton.
- The timing of the Adsubcom meeting was reviewed. After much deliberation it was agreed that the next Adsubcom meeting will begin at 5:00 p.m. with food and refreshments to be brought in. It is hoped that the amount of work will not expand to fill the additional two hour earlier start time.



Robert A. Veitch,  
Secretary.

April 4, 1986

{INIT}{LASTNAME}  
{ADD(1)}  
{ADD(2)}  
{ADD(3)}  
{ADD(4)}

Dear {INIT}{LASTNAME}:

Subject: IEEE Standards Activities Acknowledgement

The IEEE Board of Directors has requested each participant in standards activities to review the Standards Manual and sign the enclosed statement so as to assure that standards activities are carried out in accord with accepted procedures.

Please sign the attached statement and return as quickly as possible, preferably not later than December 30, 1985, to:

Administrator  
IEEE Standards Office  
345 East 47 Street  
New York, NY 10017

Cordially yours,

John E. May  
Standards Director

Jem/ss

*Enclosure 1A*



IEEE STANDARDS ACTIVITIES ACKNOWLEDGEMENT FORM

Name: \_\_\_\_\_ Member #: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

I am working in the following capacity in IEEE Standards Activities:

Member of the following committees, subcommittees, working groups, or project groups:

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

IEEE Standards representative to outside organizations:

_____	_____	_____	_____
_____	_____	_____	_____

This will acknowledge that I have received a copy of the most recent version of the IEEE Standards Manual, that I have carefully reviewed and believe I understand the policies and procedures contained in the Manual, and that I will use my best efforts to participate in IEEE Standards activities in the public interest and for the purposes set forth in the Manual, and that I will not participate in a particular activity if I believe that I may not be able to do so objectively because of any financial or other conflict of interest.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

*Enclosure 1B.*

REPORT OF STANDARDS COORDINATING COMMITTEE  
LIAISON FOR TRANSFORMERS COMMITTEE

OLIN COMPTON

The following Project Authorization Requests were received from other Technical Committees with liaison requests handled as shown.

Committee	Title	TX COMM Liaison
Substa.	Guide for Customer and Interactive Power Systems	Borst
SPD	Guide on Electrostatic Discharge: Characterization and Testing for Withstand Capability.	None
RM	Revision of IEEE Guide for Operation and Maintenance of Turbogenerators.	None
PG	IEEE Guide for Installation of Vertical Hydraulic Driven Generators and Generator/Motors.	None
PG	IEEE Standard for Vertical Hydraulic Turbine-Generator Shafts.	None
Substa.	Guide for Application and Design of D.C. Converters for Storage Systems and Alternate Power Sources.	None
T&D	Foundation Design Guide for Transmission Structures	None
NPE	Guide for Application of Risk Criteria to Light Water Moderated Nuclear Power Plants	None
RM	Sealed Insulation Systems for Random Wound Machines	None
PG	Recommended Practice for Testing and Startup Procedures for Electric Heat Tracing Systems	None
NPE	Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems	None
PG	Recommended Practice for Design and Installation for Electric Heat Tracing Systems	None
NPE	Criteria for Safety Systems for Nuclear Generating Systems	None
Substa.	Guide for the Design, Construction, and Operation of Safe and Reliable Substations for Environmental Acceptance	None
SPD	Neutral Grounding Devices: Requirements, Terminology, Testing Procedures	Compton
Substa.	Revise and Update IEEE 80 (Grounding Guide)	None
SPD	Guide for the Application of Metal Oxide Surge Arresters	L.R. Smith
SPD	Guide for the Application of Gapped Silicon Carbide Surge Arresters.	Compton
PG	Recommended Practice for Installation and Design of Lead Storage Batteries for Generating Stations and Substations	None
PG	Recommended Practice for Sizing Nickel-Cadmium Storage Batteries for Generating Stations and Substations	None
Substa.	Guide for Fence Safety Clearances in Electric Supply Stations.	None
PSR	Digital Protective Relay System Interface Standard	Compton
RM	Test Procedures for DC Machines Controlled by Choppers	None
IC	Guide for the Design & Installation of Submarine Power and Communication Cable	None
NPE	Criteria for Independence of Class 1E Equipment & Circuits	Compton

SPD Recommended Practice for Surge Voltages in Low Voltage  
AC Circuits

None

The status of Project Authorizations for the Transformers Committee will be in The Standards Subcommittee report.

Routine business was discussed at the Standards Coordinating Committee meeting. We need a volunteer to write a short article on Transformer Standards status for the Review. There was some spirited discussion concerning the plan of the EEI to designate a Committee Member as the EEI Liaison representative. The conclusion was to pass our concern to the Technical Council which later bucked it to the Administrative Council.

Olin Compton 3/20/86

LIAISON REPORT  
AD HOC COMMITTEE ON TECHNICAL PUBLICATIONS  
OLIN COMPTON

This Committee held it's final meeting at the February, 1986 Winter Power Meeting. We have completed the implementation of the three new Transactions, revision of the Author's Guide, and the revision of the Peer Review Rating Sheet. The new Transactions are in publication already. It is expected that the new Author's Guide and Rating sheets will be available in late 1986.

LIASION REPORT  
NATIONAL PUBLIC AFFAIRS COUNCIL  
OLIN COMPTON

I was unable to attend the last meeting of the National Public Affairs Council due to a conflict with the Ad Hoc Committee on Technical Publications . The public affairs group continues to work to seek better liasion between the chapters, sections, and technical xommittees.

STANDARDS PROJECT AUTHORIZATION (PAR)

When completing this PAR refer to instructions in the PAR Submitter's Guide

Revised PAR <input type="checkbox"/> Yes <input type="checkbox"/> No Date of Request _____	12. Standards Board Assigned Project No. _____ Approved: _____ (For Standards Office Use Only)
---	--

2.  Standard  Recommended Practice  Guide  Revision of \_\_\_\_\_

New

3. Project Title: \_\_\_\_\_

4. Scope of Proposed Standard (use attachment sheet if necessary):

5. Purpose of Proposed Standard (use attachment sheet if necessary):

6. Sponsor \_\_\_\_\_  
 Technical Committee: \_\_\_\_\_  
 Society: \_\_\_\_\_

Proposed Coordination: \_\_\_\_\_  
 Method of Coordination: \_\_\_\_\_

8. Name of Group that will write the Standard: \_\_\_\_\_

9. Are you aware of any patent issues?  Yes  No (If yes, attach a sheet with a complete description.)

Are you aware of any standards or projects with a similar scope?  Yes  No (If yes, attach a sheet with a complete description.)

10. Person Delegated to Receive Communications and Conduct Liaison with Interested Bodies:

Name \_\_\_\_\_  
 Company \_\_\_\_\_  
 Street Address \_\_\_\_\_  
 Telex No. \_\_\_\_\_  
 Telephone No. \_\_\_\_\_  
 State \_\_\_\_\_ Zip Code \_\_\_\_\_

11. Submitted by:

Name \_\_\_\_\_  
 Company \_\_\_\_\_  
 Street Address \_\_\_\_\_  
 Telex No. \_\_\_\_\_  
 Telephone No. \_\_\_\_\_  
 State \_\_\_\_\_ Zip Code \_\_\_\_\_

Note: Copies of PAR Submitter's Guide and the IEEE Standards Manual are available from the IEEE Standards Office

Enclosure 3A

IEEE STANDARDS SUBMITTAL

STANDARDS PROJECT AUTHORIZATION (PAR)  
SUBMITTER'S WORKING GUIDE

FACE

To assist in the submittal of the PAR for consideration by the New Standards Review Committee (NesCom), and approval by the IEEE Standards Board (StB) as an IEEE Standards Project, the following notes have been prepared. (Numbers at the end of a paragraph refer to the applicable section of the IEEE Standards Manual, dated December 1982.)

The items that follow refer to the item number on the form.

1. Enter the date that the PAR was completed on. Enter whether or not this is a revised PAR by checking the yes or no box.
2. Indicate whether this is a new document or a revision of an existing document (indicate standard number and date). The type of document, i.e., standard, recommended practice or guide should be indicated. For the submitter's reference, standards are documents with mandatory requirements and are generally categorized by the verb "shall". Recommended Practices are documents in which procedures and positions preferred by IEEE are presented and are generally categorized by the verb "should". Guides are documents in which alternative approaches to good practice are suggested but no clear-cut recommendations are made (1.2).
3. Fill in project title which should include the type document specified in Item 2 (1.2). For example:
  - A. Standard Test Method .....
  - B. Recommended Practice for ...
4. The submittal should clearly and concisely define the scope of the document (use attachment sheets if necessary).

For example:

"Scope: Communications equipment that is to operate in electric power generating stations and in generation, transmission, and distribution substations."

"Scope: Interface systems used to interconnect both programmable and nonprogrammable electronic measuring apparatus with other apparatus and accessories necessary to assemble instrumentation systems."
5. The submittal should clearly and concisely define the purpose of the document (use attachment sheets if necessary). The purpose of the document should be consistent with the type of document specified in Item 2 and the title specified in Item 3 (1.2).

For example if the title of the document is "Guide for ...," it is inconsistent if the purpose states "This document will describe standard criteria ..."

It is important that the submittal be as clear as possible so that NesCom can properly evaluate the PAR.

6. Enter the name of the Technical Committee responsible for the development and coordination of the standard project (the sponsor is also responsible for the maintenance of the standard after approval of the standard by the Standards Board). The name entered here should not be confused with the name of the group writing the standard (see Item 8). If the standards project is being developed by two or more committees, enter all committee names and indicate that it is a jointly sponsored standards project. Enter the name of the society to which the technical committee belongs.

In instances where a Standards Coordinating Committee (SCC) is developing the document, enter the SCC number as the Technical Committee and leave the Society blank (3.1 to 3.4).

7. Enter the organizations outside the sponsor organization that will coordinate on the document. For each organization, a method of coordination should be specified. Generally approved methods of coordination include circulation of drafts, joint memberships and liaison membership (3.5).

When specifying an organization be as specific as possible. For example: don't indicate ANSI when ASC X3 is meant or don't indicate Power Engineering Society when the Rotating Machinery Committee of the Power Engineering Society is meant.

It is not necessary to indicate coordination with a group that is in the sponsor committee. (For example, a document being developed by the Power Generation Committee need not indicate coordination with the Nuclear Power Subcommittee of the Power Generation Committee.)

8. Enter the name of the group that will physically write the standard. For example, the "Battery Working Group of the Station Design Subcommittee".
9. Answer the questions related to patent issues and standards with a similar scope (this includes international standards as well as US standards). If the answer to either question is yes attach a separate sheet explaining the answer.
10. Enter the name, address and telephone number of the person delegated to receive communications on the standard. This is normally the chairperson of the group identified in Item 8.
11. Enter the name, address and telephone number of the person submitting the PAR. This is normally the sponsor committee's liaison to the IEEE Standards Board.
12. Make no entry for this item. Once completed and approved by the Standards Board, the approved PAR will be transmitted by the IEEE Standards Office to the persons named in Items 10 and 11.

Enclosure 3B

Exhibit A2

The submitter should recognize that NesCom may make changes to the PAR (for example, additional coordination may be added) before approving the PAR. These changes will be noted on the approved PAR as well as included in the transmittal letter.

Once the PAR is completed (normally by the working group chairperson), it shall be forwarded to the person designated by the Sponsor responsible for submitting it to the Standards Board (normally the sponsor committee's liaison to the IEEE Standards Board). If the Sponsor does not designate a specific person to submit the PAR, it shall be sent to the Secretary, NesCom at the address below. Be certain to include all attachment sheets and supporting correspondence.

The persons named in Items 10 and 11 will be notified, in writing by the IEEE Standards Office once the PAR is received. If it is a new standard a project number will be assigned. The letter will also indicate when the PAR will be considered for approval by NesCom.

If you have any questions or require clarification of any items contact:

Louise Germani, Secretary  
NesCom  
IEEE Standards Office  
345 E 47th Street  
New York, NY 10017  
(212) 705-7091

11/13/85

PES Technical Council Meeting  
February 3, 1986  
New York Penta Hotel

1. PES Executive Board Meeting

o Paper Review Time

Our action of Monday evening, February 3, 1986, of recommending a change in the deadline date for manuscripts received by headquarters from September 1 to August 1 was reviewed and rejected by the Executive Board. IEEE Headquarters staff personnel present agreed that the same time provided for the Summer Meeting for paper review would be made available for the Winter Meeting paper review. The two weeks lost in October for paper review will be restored in order to provide the same review time for both Summer and Winter Meetings. The deadline dates now remain at February 1 for the Summer Meeting and September 1 for the Winter Meeting, and the same review period for both meetings will be made available by IEEE headquarters.

- o The PES Executive Board agreed with our moving of the Technical Council Meeting from the traditional Monday evening to Tuesday evening. Several of the old-time Technical Council Members commented on the many long Monday evening sessions they have attended over the years. It was agreed that Tuesday evening would provide for the various Technical Committees, Task Forces, and Subcommittees to have their meetings prior to the Technical Council meeting.
- o President Hissey requested that the Technical Council Members provide more public affairs-type technical documents, such as the Corona and Field Effects of AC Overhead Transmission Lines - Information for Decision Makers. This booklet has been a roaring success and is an excellent public relations-type document for PES.
- o Nancy Heitmann has several thousand copies of the Corona and Field Effects booklet available for dispersing to the public. Contact Nancy directly for copies to distribute in areas that you think would be effective for PES.
- o This is a reminder that President Hissey has asked that each Technical Council Committee develop goals for 1986/87. Each Committee Chairman was requested to develop these goals and provide progress reports for presentation at the next Winter Meeting showing how progress is being made in achieving established goals.
- o President Hissey requested increased activity toward new and unique developments in each Technical Committee's area. Specifically, a brief statement or report on new and unique developments; along with slides or exhibits that could be useful to the Chapters Council and also the public Affairs Council, was requested.

*Enclosure 4*



PES Technical Council Meeting  
February 3, 1986  
New York Penta Hotel

1. PES Executive Board Meeting (Continued)

- o At the Winter General Meeting, there were two Technical Sessions at which there was no Session Chairman. (Transformers was not one of them.) The Meetings Committee tried to find a representative to take on the responsibility, but it was reported that no one would accept the role. Specific information will be provided by President Hissey on both cases. Each Technical Committee should develop a process to assure that the person selected to chair a Technical Session at a Winter, Summer, or other special PES meeting shows up to assume his or her responsibilities. It is a shame to have authors develop and write papers and then have a "snafu" develop in which no one is present to chair and coordinate a Technical Session at one of our meetings.

2. Standards Seminars

Seminars will be re-established in the 1986 budget. A seminar on "Computer Use in Power" will soon be announced.

- 3. An international symposium on Electric and Magnetic Fields will be held in Toronto, Canada September 17-19, 1986. Unfortunately, it will conflict with the T&D Conference.
- 4. Peter Bellaschi requested the PES to consider design/operation of transmission facilities at Low Temperatures. Frank Denbrock will respond on a course of action.
- 5. Membership to CIRED, which is Europe's Distribution CIGRE, was approved. The Technical Council will appoint an IEEE Committee through the T&D Committee.

6. EI Representative to IEEE Committees

O. Compton made a motion that was accepted to have the Technical Council set up a Committee representing the Technical Committee, Standards Committee, and EI people to meet and resolve this issue. Frank Denbrock will discuss at the Technical Committee's Administration Meeting. The following is the result of the Technical Committee Adcom Meeting.

- o A review of the discussions and concerns on the philosophy, process, and status of appointments of EI representatives to PES Technical Committees was presented to the PES Executive Board. It was agreed that the TC request to the IEEE Standards Board for better overall communications on the subject was appropriate. This request for better communications to the Technical Committees from the Standard Board on the EI participation in Standards development will be documented by headquarters staff.

PES Technical Council Meeting

February 3, 1986

New York Penta Hotel

7. Plans are underway to obtain funds to place the Technical Committee's personnel mailing addresses in zip code order and send it to local chapters and sections to get them more active on the local level.
8. The Transformer Committee Report is attached.



## POWER ENGINEERING SOCIETY

PLEASE REPLY TO:

### REPORT TO PES TECHNICAL COUNCIL TRANSFORMER COMMITTEE

#### Meetings

The Transformer Committee, Subcommittees, and Working Groups met in Toronto, Ontario, Canada, October 28-30, 1985 with 181 members and guests. Future meetings scheduled are:

Little Rock, Arkansas	April 6-9, 1986
Pittsburgh, Pennsylvania	October 12-15, 1986
Ft. Lauderdale, Florida	May 10-13, 1987
New Orleans, Louisiana	November 1-4, 1987

#### Organization - Personnel

Mr. A. Teplitzky of Consolidated Edison of New York was appointed the new Chairman of the Audible Sound and Vibration Subcommittee.

#### Organization - Scope Changes

The following subcommittee scope changes were approved:

1. The Standards Subcommittee scope has been changed to delete reactors.
2. The Insulation Life Subcommittee scope has been changed to include loading of liquid filled current limiting reactors.
3. The Dielectric Test Subcommittee scope has been changed to include liquid filled reactors.
4. The Dry-Type Subcommittee scope has been changed to include all dry-type reactors.



IEEE

POWER ENGINEERING SOCIETY

PLEASE REPLY TO:

REPORT TO PES TECHNICAL COUNCIL  
TRANSFORMER COMMITTEE

Page 2

Standards Activity

Attached is a copy of the Transformer Committee Projects' status. In addition, the following standards were reaffirmed by the Transformer Committee:

C57.12.80  
C57.13.1978

Technical Sessions

Two five-paper sessions were sponsored by the Committee at the Winter Power Meeting. A total of 20 papers were reviewed.

Dean A. Yannucci, Chairman  
IEEE Transformer Committee

DAY/bvs

REPORT  
OF  
THE STANDARDS SUBCOMMITTEE  
IEEE TRANSFORMER COMMITTEE MEETING  
LITTLE ROCK, ARKANSAS  
APRIL 6-9, 1986

My records have the subcommittee chairmen as listed below:

R. E. Uptegraff, Jr.	Dry-Type Transformers
J. D. Borst	Performance Characteristics
R. E. Liebich	Audible Sound and Vibration
Herb Johnson	West Coast
L. S. McCormick	Dielectric Tests
C. J. McMillen	Insulation Life
H. A. Pearce	Insulating Fluids
L. R. Smith	Standards
Ralph Stetson	Instrument Transformers
Loren Waggenar	Bushing

It is understood that D. H. Douglas will replace C. J. McMillen as Chairman of the Insulation Life Subcommittee after this meeting in Little Rock.

The following is a summary of the activities and status of the various subcommittee projects as reported through April 4, 1986.

Project Status

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

PC57.12.00 Table 6B - Revision of Dielectric Test Requirements for Distribution Transformers. Being balloted in ANSI C57.

C57.12.00, Section 5, and C57.12.90, Section 10 - Dielectric Tests for Transformers. Being balloted in ANSI C57.

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

Draft #1 sent to Working Group about March 5, 1986.

PC57.12.91 - Test Code for Dry-Type Distribution and Power Transformers

No change from October 1984.

PC57.18.10 - Semi-Conductor Rectifier Transformer

Draft #3 is under development.

*Enclosure 5*

- PC57.21 - American National Standard Requirements, Terminology and Test Code for Shunt Reactors
- Being discussed at Task Force level. Still in early stages.
- PC57.91 - ANSI/IEEE Std. C57.91 - 1981, Guide for Loading Mineral-Oil-Immersed Transformers (Revision)
- O. R. Compton resigned. W. Wrenn has assumed chairmanship.
- PC57.93 - Guide for Installation of Liquid Immersed Power Transformers
- Progress at meeting February 14, 1985, toward writing sections yet to be done.
- PC57.95 - Loading Guide for Regulators
- Will be printed by IEEE in Spring a guide, per Angela of IEEE office.
- PC57.96 - Guide for Loading Dry-Type Distribution and Power Transformers
- Draft #8 is being balloted in the Working Group and Dry-Type Transformer Subcommittee. Ballots due March 24, 1986.
- PC57.104 - Guide for the Detection and Determination of Generated Gases in Oil-Immersed Transformers and their Relation to the Serviceability of the Equipment
- The revision is in progress.
- PC57.110 - Harmonic Load Current Heating of Transformers
- Draft #8 was approved in main committee and was submitted to Standards Board on February 24, 1986, by W. J. McNutt, Working Group Chairman.
- PC57.111 - Guide for Acceptance and Maintenance of Silicone Liquid in Equipment
- Draft #9 is being balloted.
- P21 - Revision of ANSI C76.1
- Draft #7 being balloted in Transformer Committee and Subcommittee. Ballot due back May 20, 1986.

- P65 - Thermal Evaluation of Ventilated Dry-Type Power and Distribution Transformers, ANSI C57.100
- ANSI approved August, 1984. Ready for printing. Will appear first in new composite book of C57 transformer standards expected to be published in Spring of 1986.
- P93 - Transformer Impulse Tests (C57.98)
- Ready for printing. Will appear in new composite book of Transformer Standards. Task Force formed to begin new revision.
- P262E - Revision of C57.12.90 Loss Tolerance and Measurement
- P262E/D8 - Proposed addition to C57.12.90, Section 9.2.4.2. Corrections to Load Loss Measurements. Draft #8 was approved and has been issued as a circulation of editorial change. It will then go to Standards Board.
- P262E.1/D4 - Proposed revision of C57.12.90, Sections 8.1 and 8.2.2 (new). No load loss temperature correction. Proposal under development.
- P262E.2/D8 - Proposed addition to C57.12.90, Section 8.3.2.1 and deletion of Section 8.3.3. Voltmeter connection for no-load loss measurement. Draft #8 was approved and issued as a circulation of editorial changes. It will be forwarded to the Standards Board.
- C57.12.90; 8.2.1 - Assumed to be still waiting additional data. Need information as to status.
- P345 - Review of IEEE Std. 345-1972 Test Procedures for Thermal Evaluation of Oil-Immersed Distribution Transformers (C57.100-1974)
- Approved by ANSI C57. Will be dated August 1985.
- P462C - Revision of C57.12.00, Section 5.9, Loss Tolerance and Measurements
- Temperature correction survey completed; proposal under development.
- P462D - Revision of C57.12.00, Section 9.1. Wording of Ratio Tolerance.
- Transformer Committee ballot of Draft #6 received only one negative vote. Resolution will be attempted prior to forwarding to Standards Board.
- P513 - Seismic Guide for Power Transformers and Reactors
- Project was considered for approval by Standards Board at March 13, 1986, meeting. Returned to subcommittee for further review because of age of work and coordination with NPEC/PE.

- P545 - Recommended Practice for Partial Discharge (Corona) Tests for Transformers
- Draft #6 of a trial use document is being balloted in the Dielectric Tests Subcommittee.
- P546 - Revision of ANSI Requirements for Instrument Transformers C57.13-1978.
- Subcommittee ballot complete. Draft being prepared for presentation to Transformer Committee.
- P637 - Proposed Guide for the Reclamation of Insulating Oil and the Criteria for Its Use
- Complete. Issued!
- P638 - Standard for Type Tests on Class 1E Transformers for Nuclear Power Generating Stations
- Draft #14 has been prepared and sent to NPEC-2 members for balloting.
- P670 - Switchgear and Transformers Working Group on Instrument Transformers for High-Voltage Circuit Breakers
- Draft #6 completed March 27, 1986, and circulated to the Working Group before next meeting in Little Rock.
- P731 - Revision of Guide for Loading Current Limiting Reactors, ANSI C57.99
- No report.
- P732 - Revision of Current Limiting Reactor Standards, ANSI C57.16
- No report.
- P745 - Guide for Conducting a Transient Analysis for Dry-Type Transformers (C57.XX)
- Returned by Standard Board for coordination review by other standard groups, particularly IEC. Work underway to accomplish this.
- P757 - IEEE Guide for Loading Power Apparatus Bushings
- Work underway in IEEE to have published as a Trial Use Guide.



- P784 - Transformer Through Fault Current Duration Guide  
Printed - Published as C57.109-1985
- P785 - Transformers Connected to Generators  
Draft #7 of the guide is under development by the Working Group.
- P786 - Transformer Failure Reporting and Reliability Analysis  
Considered by Standards Board Review Committee at March 13, 1986, meeting. Returned to subcommittee for verification of coordination with EEI, NRC and that all balloting members had been advised of legal questions.
- P799 - Guide for Handling and Disposing of Askarels  
Approved by Standards Board subject to documentation of coordination with IAS and PE/T&D.
- P800 - Bushing Application Guide  
Work still being done in ANSI C76 to incorporate a bushing application guide to include forward and already approved sections on purpose, scope, cantilever loading and loading of bushings applied to transformers above nameplate ratings.
- P801 - Recommendations for Revisions to ANSI C57.15 Requirements, Terminology, and Test Code for Step-Voltage and Induction-Voltage Regulators  
Sent to Standards Board, January 21, 1986.  
No report.
- P832 - Detection and Measurement of Partial Discharge (Corona) In Instrument Transformers  
Draft to be reviewed in Little Rock. A C57 type Project Number has been requested by F. Huber.
- P838 - Guide for Performing Overload Heat Runs  
Draft #9 ballot returns being accumulated. Six "Not Approved" among subcommittee and Working Group members. Will be reviewed at Little Rock.
- P842 - Loss Evaluation Guide  
Draft #12 is complete and will be circulated to the Subcommittee for review and comment. Informational copy will be sent to the Transformer Committee for review.

- P852 - Bushings to Operate in Gas-Insulated Substation  
Transformer Committee voted to rescind this project at Fall 1985 meeting in Toronto. Project will be dropped.
- P954 - Guide for High Temperature Hydrocarbon  
Draft #6 presently being balloted by Subcommittee.
- P1052 - Dry-Type Transformer Through Fault Current Duration Guide  
Guide at Standards Review committee awaiting completion of revision of C57.96 on which it depends for approval by Standards Board.
- P1098 - Guide for Transformer Loss Measurement  
Initial draft under development.

In the Insulation Life Subcommittee:

- a. Under the Working Group on Guides for Loading, a new Project Authorization has been requested for revision and/or combination of all three guides C57.91, C57.92, and IEEE Std. 756.
- b. Under the Working Group on Thermal Evaluation of Power and Distribution Transformers a project number has been requested for Standard Test Procedure for Thermal Evaluation of Oil-Immersed Power Transformers -- Development of documentation of procedure similar to C57.100.
- c. C57.99 - Guide for Loading Current-Limiting Reactors:  
Dry-type will be assumed by Dry-type Subcommittee. Liquid filled will be incorporated in C57.91-92 revision.
- d. Standard Test Procedure for Thermal Evaluation of Oil-Immersed Power Transformers:  
Development of documentation of procedure similar to C57.100. PK # requested.

In the Dry-Type Transformer Subcommittee:

- a. Project Authorization Request applied for on "Proposed Standard Test for Thermal Evaluation of Insulation Systems for Solid Cast and Resin Encapsulated Power and Distribution Transformers." Draft #3 was sent to ballot by Working Group on April 11, 1985. Task Force organized to consider insulation flammability - To meet in October 1985.

- b. Project Authorization Request applied for on January 10, 1986, for "A Guide for Conducting Partial Discharge Tests on Dry-Type Transformers." This activity by the Working Group on Dielectric Problems coordinates with PC57.12.01 and PC57.12.91 will be considered at NESCOM meeting, March 11, 1986.
- c. Working Group on Test Procedures for Evaluation of Systems of Insulation for Specialty Transformers (IEEE Std. 259-1974) has been reorganized to meet October 29, 1985, to consider reaffirmation. Last reaffirmation was December 1980.
- d. PC57.12.60 - Standard Test Procedure for Thermal Evaluation of Insulation Systems for Solid Cast and Encapsulated Power and Distribution Transformers:

This standard is being balloted in Transformer Committee.

- e. PC57.12.XX - Guide for Conducting Partial Discharge Tests on Dry Type Transformers:

The original PAR of November 30, 1984, has been lost and the new PAR was submitted January 10, 1986. Draft #1 is currently being reviewed by the Working Group and Draft #2 will be sent to ballot shortly after the Little Rock meeting in April 1986.

In the West Coast Subcommittee:

- o Guide for Fire Protection of Outdoor Liquid Immersed Power Transformer:
- o A group headed by Herb Johnson has been formed to gather information to write a guide. They will meet next on April 29, 1986.

In the Performance Characteristics Subcommittee:

- o A PAR was submitted for Failure Analysis Guide. Draft #2 under development.


In the Instrument Transformer Subcommittee:

- o P356 HVACC, C57.13.2 - Ron Hansen reports that the C57 ballot has been favorably concluded and that the BSR9 has been submitted.
- o P860 ANSI C57.13.3 - Letter ballot under way in Subcommittee. (This material has been approved by IEEE Standards Board and submitted to C57 ballot, so sequences are a bit unusual.

In the Dielectric Tests Subcommittee:

- o PR Request by John Burgeron for Authorization of "Development of Requirements for External Phase-to-Phase Clearances for Power Transformers."
- o PR Request by William Kennedy for Authorization of "Revision of Shunt Reactor Dielectric Tests, Sections 8.2 and 12.2 of C57.21."
- o PR Request by John Burgeron for authorization of "Revision of Guide for Transformer Impulse Tests."

Your help in updating the status of any project covered or omitted in this report would be greatly appreciated. Please include project number, title and relation to IEEE or ANSI standards.

  
Ray Smith, Chairman  
Standards Subcommittee

ASC C57  
BALLOT NO.  
OR

PROJ. NO.	BRIEF DESCRIPTION	IEEE STD BD SUBM.	ASC C57 BLTG.	ANSI BSR-8 SUBM.	STDS ACTIN PUB. REV.	ANSI BSR-9 APPR	EDIT, TYPESET	INT
P353	ANSI/IEEE, C57.12.55 Dry Type	N/A	C	C	C	IP Exp 4/7		
P356	ANSI/IEEE, C57.13.2 Inst Tr		C	C	C	IP Exp 4/16		
P65	ANSI/IEEE C57.12.56 Dry-Type Ins Test	C	C	C	C	C	C	*C
P93	ANSI/IEEE C57.98 Impulse Test Guide	C	C	C	C	C	C	*C
P784	ANSI/IEEE C57.109 Short-Cir Dur	C	C	C	C	C	C	Print
	ANSI C57.12.23 Under 1 Ø Dist Tr.	N/A	C	C	C	C	C	Exp. 4/86
	ANSI C57.12.26 Padmt 3 Ø Dist Tr	N/A	C	C	C	IP Exp 4/16		
	ANSI/IEEE C57.95 Load Gd Stp & Ind Reg		C	C	C	C	C	*C
	ANSI/IEEE C57.100 DT Therm Eval	C	C	C	C	C	C	*C
	ANSI/IEEE C57.12.00 Requirements	C	Bltg					} Problems involved discussed in JC Dutton 3/31/86 Ltr to Sherr, Yannucci, Ensign and Hansen
	ANSI/IEEE C57.12.90 Test Code	C	Bltg					
	ANSI C57.12.20 Pole Dist Tr	N/A	Re- Bltg					
	ANSI C57.12.57 Dry Type NTW Tr	N/A	IP					

Subm. = Submitted Bltg. = Balloting IP = In Process C = Complete N/A = Not Applicable  
 \* = Ready for printing, will appear first in new composite book of C57 transformer stds,  
 expected to be published in Spring '86. (Individual copies of Stds expected later.)

*John C. Dutton*  
 John C. Dutton, Chairman - IEEE Delegation to ASC C57

IEEE-TR.C.	IEEE-NY	ASC C57		OTHER
DA Yannucci	SI Sherr	R Uptegraff	LS McCormick	M Piscioti
OR Compton	J Gorman	R Ensign	WJ Neiswender	D Kelly
R Veatch	F Huber	R Hansen	H Tucker	V Morgan
LR Smith	P Lange	JV Bonucchi	HD Smith	CH White

Enclosure 6



IEEE

STANDARDS OFFICE

1430 AVENUE OF THE AMERICANS, NEW YORK, N.Y. 10017-2400  
345 EAST 47TH STREET, NEW YORK, N.Y. 10017 U.S.A. TELEX 236411

March 25, 1986

Mr. Harold F. Light  
Niagara Mohawk Power Corporation  
300 Erie Blvd. West (D:G)  
Syracuse, N.Y. 13203

Re: P786 - Reporting Failure Data for Power Transformers and  
Shunt ~~Protectors~~ *Reactors* on Electric Utility Power Systems, Guide  
for *Reactors*

Dear Mr. Light:

The P786/D8 dated June 1, 1985, was considered by the IEEE Standards Board Review Committee. Following considerable discussion, they recommended this project be returned to the Sponsoring Subcommittee for action as noted below. The Standards Board approved this recommendation on March 13, 1986.

- A) To verify by copy of letter that coordination has been completed with all specified organizations (with particular emphasis on a reply from Edison Electric Institute).
- B) The Review Committee considers it essential that coordination also be established with the National Regulatory Commission. (This Commission represents all State Regulatory bodies which could be affected by the recommendations of this proposed Guide).
- C) To indicate that all balloting members had been advised of the legal questions raised by a manufacturer, and that this advice did not create further negative ballots.

We will hold all present documentation on P786 in our files, pending clarification of the above questions.

Sincerely,

E. Paul Lange  
Secretary  
Standards Review Committee

cc: L.R. Smith  
O.R. Compton  
Judith Gorman

*Enclosure 7*



### Standards Project Authorization

1. <u>February 6, 1979</u> Date of Request	Project No <u>786</u> Approved: <u>6/7/79</u> <u>SR</u> Date For Standards Committee Use Only
2. <input type="checkbox"/> New Guide <input type="checkbox"/> Revision of _____ Standard No _____	<input type="checkbox"/> Reaffirmation of _____ <input type="checkbox"/> Withdrawal of _____ Standard No _____
3. Project Title: <u>Transformer Failure Reporting and Reliability Analysis</u>	
4. Scope and Purpose of Proposed Standard: <u>Preparation of a Guide for Transformer Failure Reporting and Reliability Analysis.</u>  <u>The intent is to develop a standardized method for accumulating statistical data on transformer reliability which can gain wide industry acceptance.</u>	
5. Sponsor: <u>Transformers Committee</u> Technical Committee	<u>Power Engineering Society</u> Society
5a. Proposed ANSI Committee: <u>C57</u>	ANSI Project #: _____ Date Approved: _____
6. Proposed Coordination: <u>EEI</u> <u>IAS</u>  <u>T&amp;D, NPEC, PGC/PES, ETC IEC TC-56, NERC</u>	Method of Coordination: <u>Liaison Representative</u> <u>Liaison Representative and circulation of drafts.</u> <u>Circulation of drafts.</u>
7. Name of Group that will Write the Standard: <u>Performance Characteristics</u> Subcommittee	<u>WG on Transformer Reliability</u> Working Group
8. Estimated Final Ballot Date: <u>March 1982</u> To Technical Committee	<u>October 1982</u> To Standards Board
9. Person Delegated to Receive Communications and Conduct Liaison with Interested Bodies: <u>Harold F. Light</u> Name <u>Niagara Mohawk Power Corporation</u> Company <u>300 Erie Boulevard West</u> Street address <u>Syracus, NY 13202</u> City State Zip Code <u>315-474-1511</u> Telephone	
10. Submitted by: <u>Leonard W. Long</u> Name <u>Duke Power Company</u> Company <u>P.O. Box 31189</u> Street address <u>Charlotte NC 28242</u> City State Zip Code <u>704-373-4291</u> Telephone	



**IEEE**

**STANDARDS OFFICE**

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.  
345 EAST 47TH STREET, NEW YORK, N.Y. 10017-2394, U.S.A. TELEX 236411

DIRECT NUMBER  
(212) 705-7960

January 16, 1986

Charles T. Zegers  
Senior Program Administrator  
American National Standards Institute, Inc.  
1430 Broadway  
New York, NY 10018

Subject: C57 Standards Beyond the 5-Year Review

Dear Charles:

IEEE requests a 2-year extension of the 5-year rule for the following ANSI/IEEE Standards:

C57.12.01-1979  
C57.12.80-1978  
C57.12.91-1979  
C57.13-1978  
C57.104-1978  
C57.105-1978  
C57.106-1977

Work is in process on these standards within the IEEE Transformers Committee and some action is expected at the April 1986 meeting, at least reaffirmation.

However, the standards would then have to go through the IEEE Standards Board and the C57 Committee.

Thank you for your patience in this matter.

Sincerely,

Fred Huber, Jr.

FH:sp

cc: R. G. Hansen - NEMA

*Enclosure 8*



IEEE Transformer Committee

Liaison Reports  
Little Rock, Arkansas  
April 7-9, 1986

I. ANSI C89 and ANSI C89.1 - S. J. Antalis

1. No ANSI meeting has been held since the last report.
2. ANSI C89.2 ---- Dry Type Transformers for General Applications

The NEMA section letter ballot including revisions to remove high voltage (>1.2 kV) references, but retain sound level limits for above 1.2 kV Class, has been approved and is now at the Codes and Standards board for approval.

3. ANSI C89.1 ---- Dry Type Machine Tool and Control Transformers

A ballot for reaffirmation was held up for documentation format changes. These have been completed and the ballot is back in process.

II. ANSI C57.17.2 Subcommittee on Distribution Transformers - C. P. Kappeler

This subcommittee has not met since the last meeting of the IEEE Transformer Committee in Toronto, but will meet on April 10th and 11th in Little Rock.

Since that time, however, revised C57.12.21 ballots have been mailed to the membership, to be returned before the end of April, 1986.

Draft 1 of a proposed standard for Padmounted Enclosure Integrity for Coastal Environments has been prepared and will be reported on April 10.

Your liaison representative has contacted Mr. Frank Stepniak, Chairman of the Working Group on Separable Connectors, to request help in resolving the apparent difference between acceptable ambient temperatures for transformers and the separable connectors used with them. Mr. Stepniak will address this at the next meeting in Anaheim in September.

III. IEEE Joint Committee on Nuclear Power Stations - L. R. Stensland

1. The Working Group for Qualification of Class 1E Transformers for Nuclear Power Generating Stations issued Draft 14 (dated November 20, 1985) of P638 to the IEEE/NPEC/SC-2 for ballot. The majority of the ballots have been returned and the Working Group will discuss those ballots with comments at our forthcoming meeting in Little Rock, Arkansas in April.
2. The IEEE/NPEC/SC-2 Committee meeting is being held on March 18 and 19, 1986 in Phoenix, Arizona.

Enclosure 9

IEEE Transformer Committee

Liaison Reports  
Little Rock, Arkansas  
April 7-9, 1986

IV. CIGRE Study Committee 12 (Transformers) - W. J. McNutt

Study Committee 12 (Transformers) held a Study Committee meeting and Colloquium in Helsinki, Finland from June 24-28, 1985. Discussion subjects at the colloquium included:

Application of New Materials in Transformers  
Experience with New Dielectric Tests  
Diagnostic Methods for Transformers in Service

Discussion highlights can be summarized as follows:

Materials

1. Most work on amorphous core steel centers in U.S., but some use in distribution transformers in Italy. Little enthusiasm for application in stacked (plate) cores.
2. Aramid fiber insulation (Nomex) is finding some use in specialized, high temperature, low weight transformers around the world. This use may grow in response to a desire for transformers with greater loading flexibility.
3. Insulating fluids other than oil (silicone fluids, chlorinated fluids, synthetic esters) are finding use only in applications where there is need for limited flammability.
4. Efforts have been made in a few countries to develop gas insulated power transformers, but it does not appear that they will be economically viable.

Dielectric Tests

1. Dielectric tests for high voltage transformers are developing a greater degree of uniformity around the world, with growing acceptance of:
  - (a) Full and chopped wave impulse tests
  - (b) One hour induced voltage test at 1.3 to 1.5 p.u. voltage
  - (c) Partial discharge measurements during the induced voltage test
2. There was a general feeling that partial discharge measurements have provided a positive influence on transformer service reliability.
3. Some method of demonstrating resonant overvoltage capability is desirable, but particular tests which can serve that function have not yet been identified.

IEEE Transformers Committee

Liaison Reports  
Little Rock, Arkansas  
April 7-9, 1986

IV. CIGRE Study Committee 12 (Transformers) - W. J. McNutt  
(Continued)

Diagnostic Methods

1. A general need is felt for a comprehensive diagnostic system which would permit monitoring of vital signs and identification of abnormal performance.
2. Gas-in-oil analysis is the most widely applied and most useful diagnostic technique presently employed.
3. Equipments for direct measurement of conductor temperature are presently available in many countries, but they are not widely applied (probably because of cost and some concern for reliability).
4. Acoustic partial discharge detectors are generally available, but are usually employed for diagnostics rather than for detection of an abnormality.

Working Group activity is still sparse in Study Committee 12. Most active Working Groups have completed their assignments and only two new ones have formed or are forming. There is a Joint Working Group for SC-12 and SC-14 on Converter Transformers for HVDC Transmission which is active. They are pursuing three main subjects:

1. Testing
2. System effects on the converter transformer
3. Converter transformer effects on the system

A Working Group 12-09, Heating and Cooling of Transformers, has membership identified, but no convenor.

Preferential subjects for the 1986 General Session in Paris are:

Transformers for Special Purposes, including HVDC Converter Transformers  
Diagnostic Methods for Transformers in Service  
Applications of New Materials in Transformers

V. C57.15 Step Voltage and Induction Voltage Regulators - A. Wurdack

This Committee has not held a meeting within the last year and no meeting is planned.

IEEE Transformers Committee

Liaison Reports  
 Little Rock, Arkansas  
 April 7-9, 1986

VI. Standards Coordinating Committee - O. R. Compton

The following Project Authorization Requests were received from other Technical Committees with liaison requests handled as shown.

Committee	Title	TX COMM Liaison
Substa.	Guide for Customer and Interactive Power Systems	Borst
SPD	Guide on Electrostatic Discharge: Characterization and Testing for Withstand Capability	None
RM	Revision of IEEE Guide for Operation and Maintenance of Turbogenerators	None
PG	IEEE Guide for Installation of Vertical Hydraulic Driven Generators and Generator/Motors	None
PG	IEEE Standard for Vertical Hydraulic Turbine-Generator Shafts.	None
Substa.	Guide for Application and Design of D.C. Converters for Storage Systems and Alternate Power Sources	None
T&D	Foundation Design Guide for Transmission Structures	None
NPE	Guide for Application of Risk Criteria to Light Water Moderated Nuclear Power Plants	None
RM	Sealed Insulation Systems for Random Wound Machines	None
PG	Recommended Practice for Testing and Startup Procedures for Electric Heating Tracing Systems	None
NPE	Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems	None
PG	Recommended Practice for Design and Installation for Electric Heat Tracing Systems	None
NPE	Criteria for Safety Systems for Nuclear Generating Systems	None

IEEE Transformers Committee

Liaison Reports  
 Little Rock, Arkansas  
 April 7-9, 1986

VI. Standards Coordinating Committee - O. R. Compton  
 (Continued)

Committee	Title	TX COMM Liaison
Substa.	Guide for the Design, Construction, and Operation of Safe and Reliable Substations for Environmental Acceptance	None
SPD	Neutral Grounding Devices: Requirements, Terminology, Testing Procedures	Compton
Substa.	Revise and Update IEEE 80 (Grounding Guide)	None
SPD	Guide for the Application of Metal Oxide Surge Arresters	L. R. Smith
SPD	Guide for the Application of Gapped Silicon Carbide Surge Arresters	Compton
PG	Recommended Practice for Installation and Design of Lead Storage Batteries for Generating Stations and Substations	None
PG	Recommended Practice for Sizing Nickel-Cadmium Storage Batteries for Generating Stations and Substations	None
Substa.	Guide for Fence Safety Clearances in Electric Supply Stations	None
PSR	Digital Protective Relay System Interface Standard.	Compton
RM	Test Procedures for DC Machines Controlled by Choppers	None
IC	Guide for the Design and Installation of Submarine Power and Communication Cable	None
NPE	Criteria for Independence of Class 1E Equipment and Circuits	Compton
SPD	Recommended Practice for Surge Voltages in Low Voltage AC Circuits	None

The status of Project Authorizations for the Transformers Committee will be in the Standards Subcommittee report.

IEEE Transformers Committee

Liaison Reports  
Little Rock, Arkansas  
April 7-9, 1986

VI. Standards Coordinating Committee - O. R. Compton  
(Continued)

Routine business was discussed at the Standards Coordinating Committee meeting. We need a volunteer to write a short article on Transformer Standards status for the Review. There was some spirited discussion concerning the plan of the EEI to designate a Committee Member as the EEI Liaison representative. The conclusion was to pass our concern to the Technical Council, which later bucked it to the Administrative Council.

VII. Technical Publications - O. R. Compton

This Committee held its final meeting at the February, 1986 Winter Power Meeting. We have completed the implementation of the three new Transactions, revision of the Author's Guide, and the revision of the Peer Review Rating Sheet. The new Transactions are in publication already. It is expected that the new Author's Guide and Rating sheets will be available in late 1986.

VIII. National Public Affairs Council - O. R. Compton

I was unable to attend the last meeting of the National Public Affairs Council, due to a conflict with the Ad Hoc Committee on Technical Publications. The public affairs group continues to work to seek better liaison between the chapters, sections, and technical committees.

IX. Technical Paper Coordination - O. R. Compton

1986 Winter Power Meeting

Twenty-one (21) papers were submitted. One was referred to another Society. Based on the 50% quota rule from the Technical Council, only ten (10) papers could be presented. There were two (2) five (5) paper sessions. One was chaired by Bob Veitch. The second was chaired by me.

There were two noteworthy events. First I had a paper by two U.S. authors and a Chinese Masters student. The student did not appear for the author's breakfast, so I had no way to gauge his presentation ability. Unfortunately, his English was such that his presentation was very poor and the paper was poorly received. The second event involved a PSIM session chairman who, after being told that a proposed announcement of his afternoon PSIM session (which conflicted with the afternoon Transformers session) was inappropriate, proceeded to use the discussion period to make his announcement. One result was a reduced attendance at the afternoon Transformer's session. In fairness, the PSIM session was billed as being jointly sponsored by PSIM and Transformers.

IEEE Transformers Committee

Liaison Reports  
Little Rock, Arkansas  
April 7-9, 1986

IX. Technical Paper Coordination - O. R. Compton  
(Continued)

1986 Summer Power Meeting

It is obvious that many IEEE members are passing up the SPM for the T&D Conference. I already have Declaration of Intent for twenty (20) papers with the expectation that there will be additional transformer papers offered which were initially assigned to other committees. I would like to ask that those of you who are asked to review papers do it promptly to assure that we get to make our time slot requests early.

General

I want to express the appreciation of the Transformers Committee, the Society, and the Institute to all of you who have so faithfully taken time from your busy schedules to peer review the many technical papers we receive. I really try to assign reviews to those members who, in my judgment, have the expertise to best evaluate each paper. Due to the declining technical expertise base in the U.S., coupled with the recent influx of highly technical papers, I have been caused to probably overburden some of our experts. To your credit, you have not complained; for this I am grateful. If there are members who would like to review papers in specific technical areas, please let me know. I will be glad to increase my knowledge of our expertise base and forward future papers to you.

I also want to solicit advice from all members on how we can improve our technical paper sessions. We have outlawed overhead projectors because the quality of the slides has deteriorated to hand drawn sketches, some made only hours before the presentation. If you have specific suggestions, please let me know so I can pass them on to the Technical Council's Committee on Session Improvement.

There has been some concern voiced because the 1986 WPM Transformer sessions were scheduled on Thursday; instead of the more traditional Tuesday. Is this a concern among many members who attend the Power Meetings? Please share your opinion with me.

X. Surge Protective Device Committee - E. Yasuda

The SPDC met prior to the October 1985 Transformer Committee meeting in Toronto and will not be holding the Spring meeting until after the Transformer Committee meeting in Little Rock. The liaison report submitted at the October 1985 meeting is, therefore, still applicable.

IEEE Transformers Committee

Liaison Reports  
Little Rock, Arkansas  
April 7-9, 1986

XI. Social Implications of Power Technology Committee - D. A. Yannucci

Report to the Power Engineering Administrative Committee at the Winter Power Meeting in New York City, February 2-7, 1986

During 1985, Social Implications of Power Technology Committee (SIPTCOM) met only once during the 1985 Winter Meeting. At that meeting the primary discussion concerned establishing goals and objectives for SIPTCOM. Following the meeting, the chairman wrote to the membership requesting their input and suggestions for SIPTCOM activities of interest to the members of their various PES committees, councils or departments.

The Chairman relocated to Florida in May 1985, upon retirement from the Long Island Lighting Company. For this reason, SIPTCOM has been inactive and did not meet at the 1985 Summer or 1986 Winter meetings.

Liaison with the Social Implications of Technology Society (SSIT) has also been limited. Communication as Division VII PES Representative to SSIT Adcom is primarily through meeting minutes.

SSIT membership appears to have stabilized at about 3500 with minor growth. New chapters are being formed including a Metro New York Chapter.

The publication of Technology and Society magazine continues to be delayed, but progress is being made to meet a reasonable quarterly publishing schedule.

SSIT continues to address many varied areas of interest including censorship of technical papers by Government Agencies and procedures to be followed by experts in reacting to technical misinformation in media presentations, such as a recent article in the Washington Post on exposure to radiation.

The Computer Society has expressed an interest to SSIT in interfacing with the Society on R&D, U.S. Information Policy and Education.

SIPTCOM will continue to participate in SSIT activities.



TECHNICAL PAPER COORDINATION  
OLIN COMPTON

1986 WINTER POWER MEETING

Twenty one (21) papers were submitted. One was referred to another Society. Based on the 50 % quota rule from the Technical Council, only ten (10) papers could be presented. There were two (2) five(5) paper sessions. One was chaired by Bob Veitch. The second was chaired by me.

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1986 SUMMER POWER MEETING

Currently, twelve (12) papers are being reviewed for the Mexico Meeting, Assuming the usual 50 % quota, I expect two (2) three paper sessions. However, based on the low number of papers offered and the fact that I have authorized two late submissions, these may be four (4) paper sessions.

1986 T&D CONFERENCE

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GENERAL

I want to express the appreciation of the Transformers Committee, the Society, and the Institute to all of you who have so faithfully taken time from your busy schedules to peer review the many technical papers we receive. I really try to assign reviews to those members who, in my judgment, have the expertise to best evaluate each paper. Due to declining technical expertise base in the U.S., coupled with the recent influx of highly technical papers, as probably caused me to over-burden some of our experts. To your credit, you have not complained; for this I am grateful. If there are members who would like to review papers in specific technical areas, please let me know. I will be glad to increase

my knowledge of our expertise base and forward future papers to you.

I also want to solicit advice from all members on how we can improve our technical paper sessions. We have outlawed overhead projectors because the quality of the slides had deteriorated to hand drawn sketches, some made only hours before the presentation. If you have specific suggestions, please let me know so I can pass them on the the Technical Council's Committee on Session Improvement.

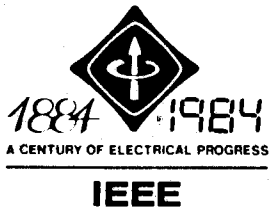
There has been some concern voiced because the 1986 WPM Transformer sessions were scheduled on Thursday; instead of the more traditional Tuesday. Is this a concern among many members who attend the Power Meetings? Please share your opinion with me.

1986 TRANSMISSION AND DISTRIBUTION CONFERENCE

TRANSFORMERS COMMITTEE TECHNICAL PAPERS LIST

REF#	AUTHOR	TITLE
r TX1	Uhl, W.B.	Saving Bid Time the Floppy Disk Way
TX2	Sundlin, et als	Low Temperature Dielectric Performance of Transformers Filled with High Molecular Weight Hydrocarbon Fluid.
TX3	Sundlin, et als	Application of High Molecular Weight Hydrocarbon Fluid in High Voltage Regulators
r TX4	Sundlin, et als	Retrofilling Conventional Mineral Oil Filled Distribution Transformers with High Molecular Weight Hydrocarbons for Increased Safety.
r TX5	Faltermeier, et als	SF6 Gas Insulated Instrument Transformers with Composite Isolator
TX6	Orbeck, et als	Service and Safety Experience with Silicone Liquid-Filled Small Power Transformers
TX7	Grubb, R.L.	Results of Dissolved Gas Analysis During Temperature Rise Test
TX8	Grubb, R.L.	Automated Temperature Rise Test Laboratory
TX9	Nathasingh, et als	Transformer Applications of Amorphous Alloys in Power Distribution Systems
TX10	Lanoue, et als	Resonant Frequency Analysis of Power Transformers
TX11	Girgis, R.	Components of Transformer Iron Losses and Effect of Core Temperature
r TX12	Whitley, D.W.	Type Testing of Amorphous Transformers
TX13	Burrage, et als	Steep Front Short Duration Impulses and Electric Power Apparatus
r TX14	Muench, F.J.	Protection of Category II Transformers Using Recent Revisions of the ANSI Standard Loading and Through Fault Duration guides as a Reference
r TX15	Heinrichs, F.W.	Gas Detection Methods and Their Impact on the Operating Decision
TX16	Struemph, et als	Correlation of Two Accelerated Corrosion Test Methods to the Actual Exposure of Finished Panels
r TX17	Faris, et als	Round Robin Testing of 3- Phase Padmount Transformer
TX18	Bzdak, et als	Secondary Surge Arrester Protection for Distribution Transformers
r TX19	Kischefsky, J.A.	Primary Protection of Network Transformers
r TX20	Lian, et als	An Equivalent Magnetization Surface Current Approach of Calculation 3-Dimensional Leakage Fields of a Transformer
r TX21	Norton, et als	Improved Fiber Optic Temperature Measurement System for Monitoring Winding Temperature in Medium and Large Transformers
r TX22	McMillen, et als	Scaled Low-Voltage Side Surge Current Tests of a Model Distribution System

Enclosure 11



APPENDIX "B"

**POWER ENGINEERING SOCIETY**

TRANSFORMERS COMMITTEE  
Dean Yannucci, Chairman

AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE  
Allan M. Teplitzky, Chairman

MINUTES OF THE MEETING OF THE AUDIBLE SOUND AND VIBRATION SUBCOMMITTEE

at Little Rock, Arkansas, April 8, 1986

The Subcommittee was convened by Allan Teplitzky at 10:05 a.m., April 8, 1986.

The following were present:

MEMBERS

J.C. Dutton  
R.S. Girgis  
R.G. Jacobsen  
W.D. Lampe  
J.W. McGill  
W.J. McNutt  
C.H. Millian  
L.M. Nicholas  
J.M. Pollitt  
L.A. Swenson  
A.M. Teplitzky

GUESTS

J.D. Douglass  
J. Gerth  
R.R. Hayes  
C.C. Honey  
P. Iijima  
J.G. Lackey  
C. Moore  
D.A. Yannucci

Minutes of the last meeting in Toronto, October 29, 1985, were reviewed and approved.

The first draft of revisions to ANSI C57.12.90 was commented on by many of those present.

Chairman Allan Teplitzky summarized the revision as containing three basic elements:

1. Transformer sound level is reported as sound power output rather than sound pressure level.
2. Narrow band analysis is used to compute the sound power output.
3. A standard method of reporting all data is established.

Ramsis Girgis commented on experiencing some confusion over the reorganizations of the subcommittee in the past few years and the change in direction from a transformer sound measurement guide to a revision of a standard. Mr. Girgis had commented extensively on the earlier work and was concerned about utilization of his efforts.

L. A. Swenson  
Bonneville Power  
Administration  
P.O. Box 3621  
Portland, OR 97208  
PLEASE REPLY TO: (above)

Allan Teplitzky and Len Swenson both commented that Mr. Girgis work was being used in the present proposed revision.

Bill McNutt recommended that sound pressure level measurements be retained and sound power level determination be added as an optional requirement.

Wolfgang Lampe observed that we will always have sound pressure level measurement and that sound power is a universal tool which will eventually be universal.

Additional comments were received supporting the above comments together with some concern about the need to explain the differences and uses of sound pressure and sound power. The use of an appendix to the standard and a seminar at a later Transformers Committee meeting were suggested.

It was decided to conduct a seminar at the Spring 1987 meeting in Fort Lauderdale, Florida. The seminar will consist of four parts with the persons listed tentatively assigned:

NEMA TR1 history and application--Bill McNutt  
Sound Pressure vs. Sound Power--Allan Teplitzky  
European Experience--Wolfgang Lampe and J. Gerth  
Frequency Analysis--Ramsis Girgis

The standards revision will be modified to reflect above comments and issued as Draft No. 2.

The meeting was adjourned at 11:15.



Lennart A. Swenson  
Secretary, Audible Sound &  
Vibration Subcommittee

BUSHING SUBCOMMITTEE

Report to the Transformers Committee

The Bushing Subcommittee met on Tuesday, April 8, 1986 with nine (9) members and seven (7) guests present.

Ballot P21/d7 has been sent to members of the Transformers Committee and the Bushing Subcommittee. The ballot is due on May 20. Preliminary results and comments were reviewed at the meeting. One of the comments brought forth at the meeting concerned the level of RIV limits during the dielectric tests on bushings. After a lengthy discussion on this topic, it was decided to ballot the subcommittee on a new test sequence wherein RIV would be measured at 1.5 or 1.7 times maximum line to ground voltages, at the one-minute test level and then again at 1.5 or 1.7 times line to ground voltage. The RIV limits at these test voltage levels would be 10 $\mu$ V for the initial voltage level, 20 $\mu$ V for the second voltage level and the RIV during the last voltage level could not exceed the level measured at the original test level.

It was reported at the last meeting that IEEE Headquarters had been requested to publish P757, Guide for Loading Power Apparatus Bushings, as a Trial Use Guide. Since that time, IEEE Headquarters has advised that the P757 document could be published along with P800, Bushing Application Guide, provided, first, that the original negative vote of the C76 ballot be resolved and second, that the Bushing Subcommittee agree with this resolution. The negative C76 ballot has been resolved and pending written responses from Bushing Subcommittee members who were not at the meeting, the Bushing Subcommittee agrees with the resolution. IEEE Headquarters shall be so advised.

Four people have volunteered to become members of the Working Group on the Bushing Application Guide. They are Dennis Bowman, Bill Saxon, Prit Singh and Ed Yasuda. This working group will address items not yet covered in P800. Two of these items are thermal loading for bushings used with isolated phase bus and use of bushings in contaminated atmospheres. The work of John Easley's Working Group on the Guide for Loading Power Apparatus Bushings will also be transferred to the new working group. Anyone wishing to join this group should contact me.

A Bushing Subcommittee is also being formed within the ANSI C57 Committee. Volunteers are solicited for that subcommittee. In order for the subcommittee to be well balanced, members are needed from the following categories: bushing manufacturers, transformer manufacturers who apply bushings and utilities.

L.B. Wagenaar

APPENDIX "D"

MEETING MINUTES  
Dielectric Test Subcommittee  
Little Rock, AR  
April 8, 1986

L. S. McCormick, Chairman

<u>Membership of Record</u>	<u>Attendance Status</u>	
	<u>Present</u>	<u>Absent</u>
Allan, D. J.		X
Allustiarti, R.	X	
Alton, R. J.		X
Arjeski, E. H.		X
Arnold, S. W.		X
Barnard, D. A.		X
Bellaschi, P. L.		X
Bergeron, J. J.	X	
Bonnucchi, J. V.	X	
Brown, C. V.		X
Chitwood, E.		X
Cook, F. W., Sr.		X
Corkran, J. L.		X
Douglas, D. H.	X	
Douglass, J. D.	X	
Duckett, D. A.		X
Dutton, J. C.	X	
Fallon, D. J.	X	
Fischer, H. G.	X	
Frydman, M.		X
Hoesel, C.	X	
Honey, C. C.	X	
Hurty, C.		X
Iijima, Y. P.		X
Iliff, G. W.		X
Keller, O.		X
Kennedy, W. N.	X	
Lee, R. E.		X
Light, H. F.		X
Matthews, J. W.	X	
McAlpin, J. T.		X
McCormick, L. S.	X	
McCrae, G. C.		X
McMillen, C. J.	X	
Mehta, S. P.	X	
Miller, C. K.	X	
Minkwitz, R. E.		X
Moore, H. R.		X
Moser, H. P.	X	
Musil, R. J.		X
Osborn, S. H.		X
Perco, D. D.		X
Puri, J.	X	

0534J/1

<u>Membership of Record</u>	<u>Attendance Status</u>	
	<u>Present</u>	<u>Absent</u>
Roach, D. A.		X
Robbins, C. A.		X
Saxon, W. E.	X	
Shenoy, V.	X	
Stein, W. W.	X	
Stensland, L. R.	X	
Traub, T. P.		X
Vaillancourt, G.	X	
Veitch, R. A.		X
Wagenaar, L. B.	X	
Whearty, R. J.	X	
Wurdak, A. C.	X	
Yannucci, D. A.	X	

GUESTS

Antweiler, J.	Lampe, W.
Binder, W. B.	Lowdermilk, L.
Boggavarapu, R. L.	
Borst, J. D.	McGill, J.
Carter, W. J.	McNutt, W. J.
Damsky, B.	Miller, L. D.
Dripps, W. F.	Mitelman, M.I.
Evans, C. G.	Moore, C. L.
	Nicholas, L. M.
Franchek, M. A.	Norton, E.
(Rep.H.P.Moser)	
Gerth, J.	Pollitt, J. M.
Highton, K. R.	Schauffler, G.
Henning, W.	Singh, P.
Jasek, R.	Subramanian, R.
	Truax, D. E.
	Willett, F. E.
	Young, F. N.



## Meeting Minutes

### DIELECTRIC TEST SUBCOMMITTEE

Little Rock, Arkansas

April 8, 1986

The subcommittee met at 1:50 p.m. with 27 members and 28 guests in attendance.

The minutes of the previous meeting held in Toronto were approved without change.

After the attendees introduced themselves and the chairman's comments concerning the previous night's ADCOM meeting, the Working Group chairman reported as follows:

#### Working Group on Revision of Dielectric Tests - John Bergeron

This group met on Monday at 3:00 p.m. with 23 members and 23 guests present.

Bill Kennedy, chairman of the Task Force for Revision of Dielectric Tests of Shunt Reactors reported that draft 2 of their revision was distributed and considerable discussion was devoted to the one hour low frequency overvoltage testing of three phase reactors. The decision was reached to propose three single phase tests instead of one three phase test with the addition of the following proviso: "It is therefore recommended that the manufacturer shall demonstrate to the users satisfaction, the adequacy of the phase to phase insulation structure." with the added wording "such as achieving 1.5 times the rated phase to ground test voltage between phases during the one hour test." They also decided to move the test voltage column labeled "Applied Voltage on 7200 cy. Test Level" back to Table 4 and to delete values for BILs above 450 KV. At voltages 115 KV and above, they will recommend the 1.5 times operating voltage for one hour instead of the 7200 cycle test.

Jim Douglass, Chairman of the Task Force on External Clearances reported that draft 2 of a proposed "Minimum External Clearances Between Live Parts of Different Phases of the Same Voltage" was discussed in their meeting. A third draft will be balloted within the Task Force. This group, with the concurrence of the Working Group, agreed to recommend that phase to phase switching impulse testing remain an optional test. The task force also agreed to look at phase to phase clearances for 230 KV and are asking manufacturers to provide input on the impact of the present NEMA requirement of 84 inches.

Harold Light reported that the galley proofs of the revised Impulse Test Guide C.57.98 have been reviewed and that this document is moving again.

Working Group on Revision of Dielectric Tests for Distribution Transformers - C. J. McMillen

Due to the untimely death of Bill Farber last January, Chuck McMillen served as temporary chairman pending the appointment of a replacement. Charlie Brown of FP&L has now been confirmed as the new chairman. A moment of silence was observed in memory of Bill who was well liked and whose leadership will be missed.

Bill Henning, chairman of the Task Force working on adoption of a routine impulse test for distribution transformers, reported on results of a recent ballot of the subcommittee and working group.

41 approved  
8 approved with comments  
1 not approved  
2 not voting

The "no" ballot concerned the confusion of the dividing line between KVA ratings of distribution and power transformers. The group would like to add a note to Table A of C57.1200 clarifying this division. Also, since this proposal requires revision of both C57.1200 and C57.12.90, they are going to submit a new PAR to cover these changes.

Due to Bill Farber's death, the meeting that was to be held in March to discuss the subject of low side surge withstand requirements was not held. The new chairman intends to set up such a meeting in the near future. A request was made in the Subcommittee to have this open to all of the subcommittees. Two papers on this subject will be presented at the EEI-T&D meeting on May 15th in Pittsburgh.

Working Group for Dielectric Tests of HVDC Stressed Transformers - Bill Kennedy

This group produced a paper - B5 SM375-1 "Recommended Dielectric Tests and Test Procedures for Converter Transformers and Smoothing Reactors" which was presented at the 1985 summer power meeting. They are presently expanding the paper with the objective of completing a guide for dielectric testing of this equipment. The new draft includes information on resistivity and partial discharge behavior under DC conditions.

This group intends to expand into other areas concerning DC transformers and reactors, such as heat runs, loss calculations, and core noise. Since these subjects would be outside the scope of the Dielectric Tests Subcommittee, several alternate plans are being studied. The group may become a separate subcommittee or it may study one subject at a time and report to the appropriate existing subcommittee.

Working Group on Partial Discharge Tests - H. R. Moore

The sixth draft of the trial use Guide P545 has been balloted in the subcommittee and the results were:


43 approved  
7 approved with comments  
1 not approved  
4 not returned

The negative ballot concerned the definition of acceptable terminal partial discharge level and was resolved. The comments were all editorial and were considered by the task force. Draft 7 will be prepared, with the addition of a foreword and bibliography and balloted in the main committee before the fall meeting.

The fifth draft of the proposed Guide for the Detection of Acoustic Emissions from Partial Discharges in Oil Immersed Power Transformers was reviewed in detail at the task force meeting. Appendices on the calibration of the instrumentation, including the transducer and pre-amplifier have been added. A sixth draft will be prepared and balloted in the working group before the next meeting.

At the close of the subcommittee meeting, it was announced that W. Lampe of ASEA will make a short presentation at the next subcommittee meeting in Pittsburgh. He will discuss 76-3, the Dielectric Test Section of IEC standards, how it is being used and its effect in Europe.

There being no other business brought before the meeting, it was adjourned at 2:40 p.m.



L. S. McCormick  
Chairman  
Dielectric Test Subcommittee

APPENDIX "E"

IEEE DRY-TYPE

TRANSFORMERS SUBCOMMITTEE

MINUTES OF APRIL 8, 1986 MEETING

LITTLE ROCK, ARKANSAS

MEMBERS PRESENT

A. Bimbris  
G. H. Bowers  
E. C. Edwards  
H. E. Gabel  
A. D. Kline

E. Koenig  
M. L. Manning  
W. H. Mutschler, Jr.  
R. E. Uptegraff

MEMBERS ABSENT

B. F. Allen  
S. J. Antalis  
R. A. Bancroft  
F. Brutt  
J. C. Dutton  
G. L. Gaibrois  
(Liaison Member)  
A. Jonatti

N. J. Melton  
J. J. Nay  
J. Rodden  
B. E. Smith  
S. A. Wiencek  
C. R. Willmore  
(Liaison Member)

GUESTS PRESENT

<u>Name</u>	<u>Affiliation</u>	<u>Address</u>
R. W. Simpson, Jr.	Spaulding Fibre Co.	Spaulding Avenue N. Rochester, N. H. 03867
Henry Windisch	Black & Veatch	P. O. Box 8405 Kansas City, MO 64114
Bob Grunert	Square D. Co.	P. O. Box 5002 Monroe, N. C. 28110
Rick Marek	National Industri	2520 58th St. Hampton, VA 23661
Fred Huber	IEEE Stds. Office	345 E. 47th St. New York, NY 10017
Richard Dudley	Trench Electric	71 Maybrook Drive Scarborough, Ont. MIV2LS
D. A. Barnard	Square D Company	P. O. Box 5002 Monroe, NC 28110
A. M. Iversen	General Electric Co.	P. O. Box 1701 Fort Wayne, IN 46804
T. J. Lanoue	National Industri	2520 58th St. Hampton, VA 23661
Mike Sharp	Trench Electric	71 Maybrook Dr. Scarborough Ont. MIV2LS
Richard L. Provost	DuPont Company	Chestnut Run Location (701) Wilmington, DEL 19898
George C. Zguris	Quinn-T-Corporation	P.O. Box 309 Tilton, NH 03276-0309
J. G. Lackey	Ontario Hydro	700 University Ave. Toronto, ONT. M5G1X6
R. H. Hollister	Westinghouse Electric	P.O. Box 920 So. Boston, VA 24592
R. R. Hayes	Ferranti Packard	Dieppe Rd. St. Catherines Ontario, CA LZR6W9
Joe Hupp	ACME Electric Corp.	RT. 4, Box 54 Lumberton, NC 28358

The Dry Type Subcommittee met at 1:00 p.m. on April 8, 1986 in the Excelsior Hotel, Little Rock, Arkansas with 9 members and 16 guests present. Following introduction of members and guests and opening remarks by the Chairman a motion for approval of the October 29, 1985 (Toronto) meeting was made, seconded, and approved by voice vote.

#### Working Group Reports

1.0 Dielectric Problems Working Group - Don Kline, Chairman.

This Working Group met on April 7, 1986 with 7 members and 9 guests present.

1.1 Draft #1 of "Guide for Conducting Partial Discharge Tests on Dry Type Transformers" was reviewed in detail by the Working Group. Several suggested changes made during the review will be incorporated into the guide.

1.2 The revised guide will be submitted to the liquid transformer partial discharge Working Group for comments. The guide will then be balloted in the W.G. prior to the next meeting in Pittsburgh.

2.0 W.G. on Insulation Requirements for Specialty Transformers (IEEE Std. 259), Alan M. Iversen - Chairman.

This W.G. met on April 8, 1986 with 3 members and 6 guests present.

George Zguris of Quinn-T-Corp. was added to the W.G. membership bringing the total membership to 11.

2.1 The process of re-affirming or revising IEEE Std. 259 will be started by balloting a draft of the standard in the W.G.

2.2 A proposal for a transformerette-type test specimen model was distributed by Bill Simpson, Jr. The Chairman will consider incorporating this proposal in the initial draft of the standard.

2.3 The W.G. will attempt to coordinate the revised standard with CSA and IEC. These standard groups will be contacted and their input requested.

3.0 W.G. on Standards for Dry-Type Transformers Incorporating Solid Cast and Resin - Encapsulated Coils - Egon Koenig, Chairman.

This W.G. met on April 7, 1986 with 17 members and 8 guests present. A. M. Iversen, G.E. Company and R. Hollister, W.E. Company were added to the W.G. membership.

3.1 Results of the W.G. and Subcommittee ballot on C-57.12.01 Revision #1 were as follows:

Approved	- 11
Approved with comments	- 4
Not approved	- 1

The negative ballot was concerned with different temperature systems used by U.L. and ANSI/IEEE relating to the general use of 150°C and 180°C system ratings used by ANSI/IEEE instead of 155°C and 185°C system ratings used by U.L.

A thorough discussion of the issues involved resulted in withdrawal of the negative ballot.

Each of the comments were discussed and resolved. The results of the comments and discussion will be incorporated in Rev. #2 of C-57.12.01. This revision will be balloted in the full Transformer Committee.

3.2 There was a question of consistency in on-load tap changer position designations between ANSI C-57.12.01, Table 5 and C-57.12.10. Dave Barnard volunteered to investigate the above standards and determine if in fact there is a substantive discrepancy.

4.0 W.G. on Revision of C-57.96 "Guide for Loading Dry Type Transformers" - Bill Mutschler, Chairman.

This W.G. met on April 7, 1986 with 12 members and 10 guests present.

4.1 Results of W.G. and Dry Type Subcommittee ballot of Draft #8 were reported by the Chairman.

Ballots sent out	- 26
Affirmative	- 20
Negative	- 3

In addition to the negative ballots, a number of comments were received. These comments were accepted and will be incorporated in Draft #9. Acceptance of two of the comments reconciled two of the negative ballots.

4.2 A revised foreword was reviewed by the W.G. which was intended to reconcile the third negative ballot. The Chairman will contact the negative ballot voter and attempt to reconcile the negative vote.

4.3 The W.G. agreed that Draft #9 should be prepared incorporating all the changes and then ballot the main Transformers Committee.

- 5.0 W.G. on Thermal Evaluation Test Procedures, George Bowers, Chairman.

W.G. on Standard Test Procedures for Thermal Evaluation of Insulation Systems for Solid Cast and Resin Encapsulated Power and Distribution Transformers", PC57.12.60 met on April 8, 1986 with 6 members and 7 guests present.

- 5.1 Chairman announced that C-57.12.56 "Thermal Evaluation of Insulation Systems for Ventilated Dry Type Power and Distribution Transformers" is in final proof stage prior to printing.
- 5.2 PC57.12.60 was balloted in the W.G. and Subcommittee with 18 affirmative votes and no negatives. A total of 18 votes out of 24 ballots were returned.
- 5.3 A new draft of PC57.12.60 will be balloted in the Transformers Committee in the near future.
- 5.4 Jerry Corkran of RTE resigned from the Working Group.
- 6.0 Task Force on Dry Type Transformer Flammability - George Bowers, Chairman.

This Task Force met on April 7, 1986 with 23 persons in attendance.

- 6.1 The Chairman reviewed discussions on the subject from various meetings held around the country.
- 6.2 A meeting was held in Chicago in January, 1986 with representatives of NEMA, U.L., Factory Mutual, IEC and IEEE, as well as interested individuals in attendance. The meeting centered on two approaches to fire prevention advanced by U.L., and Factory Mutual. The U.L. approach is prevention of a fire and the Factory Mutual approach is on containment after a fire has started. There was no common agreement on the basic approach but negotiations are continuing.
- 6.3 Flammability expertise is external to this task and is in a fluid state at present. The Task Force, therefore, agreed that its immediate task should be educational and will consist of reporting known progress in the field so that the background needed to develop transformer flammability criteria will be available when or if needed.
- 7.0 Dry Type Reactor Task Force, Temporary Chairman, Roy Uptegraff.

This Task Force met on April 8, 1986 with 3 members and 7 guests present. Since this was the first meeting, discussion centered on the following issues:



### 7.1 Chairmanship

Richard Dudley of Trench Electric has consented to be the new permanent Chairman.

### 7.2 Membership

Task force agreed that an effort should be made to get a balanced membership of users as well as manufacturers in the work of the Task Force. Where appropriate, members from other working groups involving reactors should be encouraged to participate, providing cross linkage with work in other related areas.

### 7.3 Priorities

Three reactor standards are in various stages of being revised or reaffirmed. These are as follows:

- C-57.16 Current Limiting Reactors
- C-57.21 Shunt Reactors
- C-57.99 Guide for Loading Dry Type and Oil Immersed Current Limiting Reactors

Reactor activity in the Dry Type Transformer Subcommittee was started because of a request to contribute to the Loading Guide -C57.99. The Task Force agreed that the reactor updating process would be best served by working on the dry type parts of the standards in the following order:

- C57.21 Shunt Reactors
- C57.16 Current Limiting Reactors
- C57.99 Reactor Loading Guide

### 7.4 Scheduling

The Task Force will serve as an adjunct service to other working groups that have prime responsibility for reactor projects.

The Task Force will draw on the experience of present working groups in the Dry Type Transformer Subcommittee as appropriate.

Because of the potential conflicts every effort will be made to avoid scheduling conflicting meetings with other reactor activities during the semi-annual Transformer Committee meetings.

### 8.0 Through-Fault Current Duration Guide.

The Chairman announced that this guide C-57.12.59 is in the Standards Review Committee pending Standards Board approval. No further action will be taken on the above guide until the Dry Type Loading Guide is also submitted to the Standards Board for approval.

9.0 New Business

The Chairman suggested that the Subcommittee consider the formation of a working group on thermal problems similar to the present working group on dielectric problems. After discussion of areas where input from such a working group is needed, the Subcommittee indicated nearly unanimous support for the formation of a thermal problems working group.

Meeting Adjourned

E. C. Edwards, Secretary  
Dry Type Transformer Subcommittee

ECE/ck  
0046/2E

APPENDIX "F"

INSTRUMENT TRANSFORMERS SUB-COMMITTEE REPORT

4/9/86

The Instrument Transformers Sub-Committee met April 8, 1986 with 11 members and 6 guests present.

The Sub-Committee completed <sup>negative ballots being reserved - to be rebalotted.</sup> work on the proposed revision of C57.13. This revision will now be submitted to concurrent letter ballot of the Transformers Committee and the Sub-Committee. The Sub-Committee has completed a letter ballot on this revision, except for one change made without dissent on 4/8/86.

The Sub-Committee has completed a letter ballot approving P860 (9/82) C57.13.3 Guide for the Grounding of Instrument Transformer Secondary Circuits and Cases. This document was prepared by a Working Group of the Relay Input Sources Sub-Committee of the Power System Relaying Committee. This draft has been approved by the IEEE Standards Board and is now being balloted in C57. *ready for publication*

C57.13.2 Conformance Test Procedures for Instrument Transformers has been approved by C57 ballot, and the BSR9 form has been submitted.

ANSI C12 Sub-Committee 7, covering instrument transformers, will meet in Clearwater, Florida, on April 14, 1986. One subject will be revision of C12.11-1978. The revision will cover dimensions and minimum electrical characteristics of 10kv through 350kv BIL instrument transformers for revenue metering. Another subject will be revision of the instrument transformer material in ANSI C12.1. Both subjects will feature elimination of material which is covered in C57.13.

John Reckleff, Chairman of the Joint Switchgear and Transformer Working Group, has sent D670/D6 3/27/86 to the Working Group for comments. This draft covers current transformers for use with high voltage AC circuit breakers. The Sub-Committee reviewed this draft on 4/8/86 and comments will be forwarded to Mr. Reckleff. *revised another meeting of WG*

The Sub-Committee reviewed a substantial portion of draft #4 of the proposed Standard for the Detection of Partial Discharge and the Measurement of Apparent Charge Within Instrument Transformers. The Chairman will obtain a new project authorization number, and will prepare a revised draft.

  
Ralph B. Stetson - Chairman  
Instrument Transformers Sub-Committee

APPENDIX "G"

REPORT OF THE INSULATION LIFE SUBCOMMITTEE  
TO THE IEEE TRANSFORMER COMMITTEE  
APRIL 9, 1986, EXCELSIOR HOTEL, LITTLE ROCK, ARKANSAS

The Insulation Life Subcommittee met yesterday with an attendance of 63, composed of 20 members and 43 guests.

The first working group reporting was that on Thermal Evaluation of Oil-Immersed Power and Distribution Transformers. Chairman Al Wurdack reported they had eight members and 18 guests at their meeting yesterday, April 8. The entire meeting was spent reviewing a proposed foreword, scope and purpose for the proposed Thermal Evaluation Procedure for Power Transformers. It was agreed to use the revised C57.100 Procedure for Distribution Transformers as the basis of a paste-up draft of the power transformer procedure, adding needed parts for power transformers. They will also accumulate a listing of appropriate references to help members that aren't familiar with past work sponsored by EPRI. They have five volunteers who said they will help in the paste-up.

The next working group reporting was that on Thermal Tests chaired by Bob Gubb. Bob had to leave before the Subcommittee meeting so Don Fallon presented their report. The Working Group met on Monday, April 7 with ten members and nine guests present. The only business before the Working Group is project P838, the proposed Procedure for Performing Temperature Rise Tests on Oil-Immersed Power Transformers at Loads Beyond Nameplate Rating. Since the last meeting draft 9 has been balloted jointly by the Working Group and the Insulation Life Subcommittee. The results were:

26.... Approvals  
6.... Approved with comment  
6.... Negative  
11.... Not voting  
49.... Total ballots distributed

Don Fallon and Bob reviewed the negative ballots, and the meeting was devoted to discussing and resolving the issues raised by the comments. As a result, the more important revisions to be included in the next draft are:

- o Extend the scope to cover ratings larger than 100 MVA.
- o Determine the oil exponent "n" by plotting the quantity  $[(k^2R + 1)/(R + 1)]$  versus oil rise temperature, rather than tested losses versus temperature.
- o Modifications to specifying when oil samples for dissolved gas analysis be taken.
- o Addition of the recommendation that hottest spot temperatures be measured during the tests.

Draft 10 will be prepared and ballots mailed within the next six weeks to assure returns prior to the Fall meeting.

Under new business, Bill McNutt suggested a Working Group paper be written to present the rationale used to develop the procedure. Dave Douglas and Dr. Lampe volunteered to help the chairman in this effort.

Our third working group, the Guides for Loading, reported by Chairman Bill Wrenn, also met Monday, April 7. There were 26 members and 24 guests present. B. K. Patel of Southern Services requested and was approved for membership status.

Jacques Aubin reported on the status of the IEC Loading Guide revision. A meeting to resolve certain questions was held this past winter in London, with a general membership meeting scheduled for Holland in May.

Reports of the various project groups working on the revision of C57.91 and C57.92 were presented to the group.

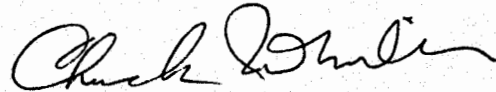
Bob Vietch's report on stray flux and eddy loss elicited discussion as to the best location, whether as general text, or as one of the appendices. It was felt that some could be placed in both locations. Dave Douglas presented copies of his efforts in regard to equations and symbols. In spite of the desirability of having equation variables directly entered into computers in English acronyms, the traditional Greek and modern symbols will be retained to conform to ANSI/IEEE standard 280-1985. The numeric value of exponents m and n were discussed as were other topics such as ANSI vs. IEC "average oil" temperature, "hottest spot gradient" and stray flux heating adder.

The operation of transformers below 0°C was discussed and it was agreed that the tables guide should cover operation down to -20°C. Jacques Aubin agreed to head a task force to investigate other facets of cold weather operation such as cold load pick-up and increased oil viscosity with cold energization. Tom Traub presented the results of a survey he conducted for the Working Group of load tap changer manufacturers. The consensus of Ed Yasuda's report on Bushing Loading was that the guide should reference Bushing Subcommittee documents. The Chairman will do more investigation of the overload capabilities of bushing CT's, especially in the hot oil environment.

Bill McNutt distributed copies of a proposed table of contents for the guide revision. Members were requested to review it and forward comments and questions to either Bill McNutt or the chairman.

Under "old business", John Matthews presented an early report on balloting a request we made to the Performance Characteristics Subcommittee to provide nameplate identification of directed flow forced oil cooled transformers which produced some interesting responses. Bob Veitch was requested to assist John if rewording for a second ballot is required.

After the conclusion of the Working Group reports, I announced my resignation as the Subcommittee's Chairman, feeling that it was time for new leadership, namely, Dave Douglas who has ably served the Subcommittee in many tasks. I wish to thank the Subcommittee's members and Working Group members for their cooperation in the many projects we have carried through to successful adoption by the industry. It couldn't have been done without your hard work and cooperation.



Chuck McMillen  
(Past) Chairman of  
Insulated Life Subcommittee  
4/9/86

mcm/0519-3



**Westinghouse  
Electric Corporation**

**Transmission and Distribution**

**Materials & Manufacturing  
Technology**

469 Sharpsville Avenue  
Sharon Pennsylvania 16146 USA  
(412) 983-4335  
Telex: 81-2349

May 6, 1986

TO: IEEE TRANSFORMER COMMITTEE  
Insulating Fluids Subcommittee

FROM: Henry A. Pearce, Chairman

Enclosed is a copy of the minutes of the Subcommittee meeting held April 7 and 8, 1986 in Little Rock, Arkansas. Also inclosed is a copy of a letter to Mr. Tor Orbeck concerning the next draft of the Silicone Guide.

MEMBERS PRESENT

G. Bryant	R. Musil
J. Corkran	E. Norton
M. Frydman	T. Orbeck
H. Hauptert	H. Pearce
P. Hoeffler	T. Rouse
C. Hoesel	L. Savio
B. Hunter	D. Sundin
J. Kelly	J. Thompson
T. Lipscomb	L. Wagenaar
R. Lowe	R. Young
C. Miller	

GUESTS PRESENT

J. Antweiler	Square D Co.	R. Hames	Feranti Packard
J. Lackey	Ontario Hydro	R. Jasek	Texas Pwr. & Lt.
H. Light	Niagara Mowhawk	D. Bowman	Westinghouse
A. Mud	Federal Pioneer	V. Raff	Westinghouse
L. Beauchemin	Syprotec	C. Moore	Consultant
M. Vazquez	Prolec	E. Edwards	Commonwealth Edison
T. Walters	Kuhlman	J. Guertin	Spaulding Fiber

H.A. Pearce, Chairman  
Insulating Fluids Subcommittee

/slr  
Encl.

## INSULATING FLUIDS

The Insulating Fluids Subcommittee met on Monday and Tuesday, April 7 and 8, 1986 with 20 members and 15 guests present.

1. The minutes of the October meeting in St. Louis were approved as presented.
2. Mr. James Kinney of General Electric has been added to the list of members of the subcommittee.
3. The Chairman reported that the Guide for Reclamation of Transformer Oil has been issued and is available as Std. 637-1985.
4. The Guide for Handling and Disposal of Transformer Grade Insulating Liquids containing PCB's, Project P799 has been approved by the IEEE Standards Board, pending two coordination approvals.
5. The Subcommittee voted to request a project to revise C57.106, Guide for Acceptance and Maintenance of Insulating Oil in Equipment. All members are requested to submit comments as to areas needing revised.
6. Project C57.104, Gas Guide is presently under revision. Brian Hunter has prepared Scope, Introduction, Calibration and Use of Field Instruments. These sections were discussed and will now be revised. The Sections on Sampling and Testing are being prepared. Bibliography has been amended. The most difficult section, covering Interpretation is being prepared by a Working Group headed by Leo Savio which will have a draft prepared for presentation to the Subcommittee before the Fall meeting. The Subcommittee has elected to present a Symposium to the Main Transformers Committee membership on Tuesday after-noon of the October 1986 meeting in Pittsburgh.
7. Project P954, Guide for Acceptance and Maintenance of Less Flammable Hydrocarbon Fluid and Its Maintenance in Equipment was balloted by the Subcommittee as Draft 6. One negative and several comments were received. These were discussed extensively and the Working Group will now prepare Draft 7 for Subcommittee ballot prior to the next meeting.  
*- Also balloted in the TX Comm.*
8. Project C57.111, Guide for Silicone Fluid Draft 9 was presented by the Working Group Chairman, Tor Orbeck, and discussed. There were 4 negatives and several comments. These were discussed in detail and Draft 10 will be prepared for Subcommittee prior to the next meeting.  
*- Also balloted in the TX Comm.*
9. There being no additional business, the Subcommittee adjourned until the Fall meeting in Pittsburgh, PA.
10. The next meeting is 1986 at the William Penn Hotel in Pittsburgh, PA.



H.A. Pearce, Chairman  
Insulating Fluids Committee





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May 8, 1986

Mr. Tor Orbeck  
Dow Corning  
Mail #C41 C02 P.O. Box 994  
Midland, MI 48640-0994

Dear Tor:

It has been brought to my attention that perhaps we did not adequately discuss Tom Rouse's negative on the Silicone Guide at Little Rock. Please be appraised of the fact that he felt the need to insert a paragraph discussing the combustion products of PDMS. This apparently came from concerns in the market place. I am sure there are those who would feel this should not be included in the guide. Your task force should address this for the preparation of the next draft and it should probably be discussed at the next meeting.

Dave Sundin has interest in this and by copy to him should give the same consideration to the Guide for High Molecular Weight Hydrocarbons.

Sincerely,

H.A. Pearce, Chairman  
Insulating Fluids Subcommittee

/slr

cc: Dave Sundin - RTE Corp.  
Tom Rouse - General Electric Co.

Encl.

RTE CORPORATION  
1900 EAST NORTH STREET  
WAUKESHA WISCONSIN 53186  
(414)549-5000 (800)558-2262  
TELEX: 26762

## **RTE FLUIDS**

April 24, 1986

Mr. Henry Pierce  
Westinghouse Electric Corp.  
469 Sharpville Avenue  
Sharon, PA 16146

Dear Henry:

As I stated in our phone conversation of April 23, I would like to see that the minutes of the Little Rock meeting of the Insulating Fluids Subcommittee include the following exchange that occurred between Dr. Tom Rouse and myself.

When Tom voted negative on the proposed Acceptance and Maintenance Guide for Silicone Fluid, he did so in order to insert a paragraph discussing the combustion products of PDMS fluid. I asked him then what his motivation for the inclusion of this statement was, as this was not addressed in the HMWH or oil guides; and since this is the ninth revision of the silicone guide, why was it being brought up at this time. Dr. Rouse's reply to me was "Concerns have been made in the marketplace" (To the best of my note-taking ability, this is a verbatim quote). I then replied that "If concerns have been raised in the marketplace, then that would be the place to address them, not in an IEEE guide for acceptance and maintenance".

I believe that it is important that the minutes of the meeting include these remarks.

If you have any questions or comments, please feel free to contact me. Thank you very much.

Sincerely,

  
D. Sundin

DS/jdg

APPENDIX "I"

PERFORMANCE CHARACTERISTICS SUBCOMMITTEE

Little Rock, Arkansas - April 8, 1986

MEETING MINUTES

I. INTRODUCTION/ATTENDANCE

The Performance Characteristics Subcommittee (PCS) met at 11:15 A.M. on Tuesday, April 8 with 34 members and 36 guests registering their attendance.

II. APPROVAL OF MINUTES

The minutes of the October 29, 1985 PCS Meeting were approved as submitted.

III. CHAIRMAN'S REMARKS

Project Authorization Requests (PAR):

1. The original PAR for the Failure Analysis Guide submitted 11/83 apparently has become lost. By direction of the Administrative Subcommittee, Chairman Cash will prepare and submit a new PAR.
2. A PAR has been submitted to address the inclusion of information on the nameplate which designates directed liquid flow.
3. A PAR will be submitted to address standardization of LTC position indication.
4. A PAR will be submitted to address routine resistance testing for distribution transformers rated 501 through 2500 kVA.

There was no liaison report from Dave Smith concerning the Guide for Protection of Network Transformers.

There was no liaison report from Chuck McMillen concerning the development of metal oxide arrester standards.

Twenty-two papers have been submitted to the Transformers Committee for presentation at the IEEE T&D Conference in September. PCS member review support is acknowledged and appreciated.

III. CHAIRMAN'S REMARKS (Cont'd)

PCS membership changes include:

1. Resignation of Don Roach - Memphis Light
2. Death of Bill Farber - Westinghouse
3. Addition of Len Swenson - Bonneville Power Adm.

PCS membership now stands at 52.

IV. AGENDA CHANGES

It was noted that item VII 2 would not be covered and that there would be two items of new business.

V. WORKING GROUP (WG) REPORTS

The WG reported as follows:

1. Failure Analysis - D. J. Cash, Chairman

The Working Group on Transformer Failure Analysis met at 1:00 P.M. on Monday, April 7, 1986, with 25 members and 13 guests present. After introduction of members and guests, the minutes of the previous Working Group meeting in Toronto, Ontario were accepted without comment.

Between the Toronto meeting and this meeting, a Task Force meeting was held in Detroit, MI on January 15, and 16, 1986, with 7 members present. Draft #2 was reviewed and revised according to the comments received on the balloting of Draft #1. Additional comments received at the Toronto meeting were also incorporated. Draft #2 was then sent to the Working Group for the second ballot.

The results of this second ballot are:

- 37 ballots sent out
- 17 ballots returned
- 16 ballots approved
- 1 ballot not approved

*37 Ballots  
25 Returned  
15 A.  
8 AC  
1 N - can be resolved*

V. WORKING GROUP (WG) REPORTS (Cont'd)

The comments received with the ballots were distributed to the Working Group yesterday and the entire document was reviewed. The Task Force will meet again on August 4, and 5, 1986, in Detroit to prepare Draft #3 based on these comments.

Some of the comments received at the Working Group meeting were:

- Draft #3 should still be balloted at the Working Group level.
- Tutorial material was felt to be needed but it should be kept in the Appendix.
- Tabular listings and charts should be developed to aid the users of the guide.
- Illustrations and diagrams should be added for clarity.

Following the August Task Force meeting, Draft #3 will be submitted to the Working Group for balloting. These results will then be reviewed by the Working Group on October 13, 1986, in Pittsburgh, PA.

At the PCS meeting it was noted that a PAR would be resubmitted.

2. Loss Tolerance and Measurement - W. R. Henning, Chairman

The Working Group on Loss Tolerance and Measurement met on Monday, April 7, at 10:05 A.M. with 15 members and 28 guests present. The first item for discussion was the status of changes to the test code C57.12.90 (Project #P262E) which includes:

- 9.4 - Calculation of Loss Date
- 9.4.1 - Correction for Phase Errors
- 9.4.2 - Temperature Correction
- 9.4.3 - Correction of Impedance Voltage

8.3.3 - Voltmeter Connections

V. WORKING GROUP (WG) REPORTS (Cont'd)

The above changes were approved by the Transformer Committee but will not be included in the 1985 revision of C57.12.90. They will appear with other changes in Sections 8 and 9 being developed by this Working Group.

The next subject was temperature correction for no-load losses. The WG reviewed a change to Section 5.9 of C57.12.00, which would define a reference temperature for no-load losses as 20°C.

The working group next reviewed a change in Section 8.1 of the test code C57.12.90, which would specify the temperature correction formula and would establish the per unit change in no-load losses per °C. The Working Group:

- A. Made a correction in the placement of parenthesis in the formula.
- B. Changed the wording in places.
- C. Considered the advantages and disadvantages of including "a little" tutorial information in the test code.

The Working Group will ballot the PCS on these changes, along with other changes in Section 8 and 9 of the Test Code being developed by the Working Group and the Task Force for writing a loss measurement guide.

The task force has reviewed Section 8 (which covers no-load losses) of C57.12.90. The Task Force will hold an interim meeting to rewrite Section 8 of the test code, to be presented to the working groups at their next meeting. Some key points proposed were:

- A. Removal of the 2-Wattmeter method.
- B. Removal of the bridge method.

V. WORKING GROUP (WG) REPORTS (Cont'd)

- C. For exciting current, removal of all methods except the average-voltage voltmeter and rms ammeter method.

When all of Section 8 and all of Section 9 have been rewritten and approved by the Working Group a ballot of the PCS will be conducted, with all changes to Section 8 and Section 9 as a package.

The WG next reviewed Section 9.2 of C57.12.00 (Tolerances for Impedance) to determine if this section needs to be rewritten. It was decided not to modify this section.

The last topic discussed was a proposal by Sam Mehta to establish a requirement for the accuracy of measured losses. Table 16 of C57.12.00 now specifies a tolerance that applies to the difference between reported losses and specified (or guaranteed) losses. Mr. Mehta's proposal would not change this but would specify the accuracy of the tests used to arrive at the reported losses. For example, alternative #3 was:

<u>Accuracy Requirements</u>	
Losses	± 3%
Voltage	± 0.5%
Current	± 0.5%
Resistance	± 0.5%
Temperature	± 1°C

Points of discussion were:

- A. Whether an NBS Technical Note could simply be referenced or whether the information would have to be brought into the standard (and therefore go through the approval processes).
- B. Established that this proposed requirement would apply only to transformers and not to shunt reactors.

V. WORKING GROUP (WG) REPORTS (Cont'd)

The Working Group will continue to consider this proposal and will bring it up again at the next meeting.

3. Haramonic Load Current Heating of Semi-Conductor Rectifier Transformers - G. C. Bryant, Chairman

The meeting was held on April 7, 1986, in Little Rock, Arkansas, at 8: A.M. There were five members and two guests present.

So far, five ballots of 18 mailed on Draft 3 have been received. One of the five was a negative ballot. The meeting time was used to resolve the items in the negative ballot.

The first point made by Roger Hayes in the negative ballot was on Table 5: "Limits of Transformer Winding Temperatures for Defined Load Cycles." (This table will hereafter be called Table 10). The "dry type" temperature limits are missing from this table. The "liquid filled" values are present and accepted by voice vote as submitted along with the notes. A. D. Kline has agreed to submit "dry type" values for Table 10 with the help of Roger Hayes and others, by September 5, 1986.

The second point was about "load losses" (Section 8.6). It was agreed to accept load losses determined by Section 8.6 as the losses reported on the certified test report, after adding the following statement: "Unless otherwise specified or specifically defined by Equations 1, 2, and 3 in Section 8.6.1, the load losses on a rectifier transformer with unequal primary and secondary kVA will be determined by using the line current of the highest kVA winding calculated from Table 9 for the specific circuit."

The third point was on temperature rise tests. We agreed that Section 8.10 will be changed to read: "Unless specified, the temperature rise tests shall be made and/or calculated by the method described in C57.12.90 and C57.12.91 using the line current determined in Section 8.6."



V. WORKING GROUP (WG) REPORTS (Cont'd)

Ed Kalkstein suggested eliminating Section 5.1.2 which calls for a system kVA of 10 times the rectifier load as usual service conditions and add "high source impedance" as unusual service conditions. This will be done.

John Armstrong reminded us that we agreed, in Toronto, to leave out references to Circuit 29 which have showed up again in Draft 3. This will be done.

Plans are to prepare Draft 4 beginning September 5, for ballot before the fall meeting in Pittsburgh. Within the month of April, 1986, every effort will be made to obtain 100% return on the Draft 3 ballots.

The meeting adjourned at 10:05 A.M. after some lively discussion.

4. Transformer Reliability - H. F. Light, Chairman

The WG met on Monday, April 7, 1986, at 3:00 P.M. with 10 members and 10 guests. After introduction of members and guests, the previous meeting minutes were approved without comment. The chairman then discussed the correspondence (Attachment A) received March 25, 1986, regarding the review of the Reliability Guide of the IEEE Standards Board Review Committee. The standards board recommended this project be returned to the Sponsoring Subcommittee for action as indicated in the correspondence items. The Chairman will respond to items A and C and had requested the main Committee to respond to item B.

257.117  
Approved by  
IEEE Standards  
Board

With no new or old business the WG was adjourned.

Subsequent to the WG meeting, the Chairman has learned that at the Administrative Subcommittee Meeting Fred Huber of IEEE was asked to address Item B with Paul Lange, also of IEEE.

V. WORKING GROUP (WG) REPORTS (Cont'd)

5. Qualification of Transformers for Class 1E Application in Nuclear Power Stations - L. B. Stensland, Chairman

The Working Group met on Monday, April 7, 1986, with 3 members and 1 guest representing a member unable to attend. Draft 14 of P638 was issued on November 20, 1985, to members of NPEC/SC-2 for ballot. 38 ballots were distributed with 34 returned.

15 affirmative  
13 conditional affirmative  
4 negative  
2 no vote

The meeting was devoted to reviewing the conditional affirmative and negative ballots. There has been a change in some of the SC-2 members, therefore, some comments do not reflect previous resolutions. It appears the only way to resolve comments is to have a meeting directly with the SC-2 members enmasse.

6. Transformers Directly Connected to Generators -  
B. K. Patel, Chairman

The WG met at LP on Monday, with 8 members and 8 guests attending. The minutes of the Toronto meeting were approved.

Section 6 (Selection of Parameters of Unit Auxiliary Transformers) was reviewed in detail. It was pointed out that the Power Generation Committee Project P-666 includes a Chapter 9 on Station Auxiliaries. Numerous comments were presented for revision of Section 6; the Chairman will attempt to harmonize Section 6 with the rest of Draft 7.

Sections 1, 3 and 7 were also discussed. The Chairman will prepare a Draft 8 by July 1 for WG ballot.

*to be balloted in  
SC and TC*

V. WORKING GROUP (WG) REPORTS (Cont'd)

7. Test Code for Shunt Reactors - J. W. McGill, Chairman

The Working Group met at 3:00 P.M. on April 7, 1986, with 10 attendees, 5 members and 5 guests. One of the guests, Mr. Ramon Garcia of Prolec, Mexico requested membership, thus making a total of sixteen members.

The minutes of the last meeting in Toronto were approved.

This meeting centered around the discussion of Draft #2 of the Revisions to the Test Code for Shunt Reactors (C57.21). The highlights of these discussions are summarized below.

- A. Reduced Voltage Testing of Shunt Reactors:  
Testing for losses, impedances, temperature rise, sound level and vibration should be made at 100% of rated voltage. When available power is insufficient for testing at full voltage (100%), then the manufacturer must demonstrate to the user's satisfaction that reduced voltage testing produces sufficiently accurate results when extrapolated to the 100% voltage level. The manufacturer must notify the user of reduced voltage testing during the proposal stages.
- B. Single Phase Testing on Three Phase Shunt Reactors:  
Testings of shunt reactors for impedances, losses and temperature rises should be conducted using 30 power. When available 30 power is insufficient, 10 testing can be performed providing the manufacturer can demonstrate to the user that 10 testing can produce sufficiently accurate results for 30 conditions. The manufacturer must notify the user during the proposal stages of this condition.
- C. There was considerable discussion concerning the 105% of rated voltage rating in that maybe the maximum system voltage could replace the 105% limit now in the standard. It was finally agreed that the 105% voltage limit should remain in the standard.

V. WORKING GROUP (WG) REPORTS (Cont'd)

- D. Numerous editorial comments and paragraph deletions, relative to 100% voltage 30 testing, were made.
- E. Temperature of metallic parts on shunt reactors should be correlated with the similar paragraphs in the transformer standard.
- F. It was suggested that this standard should include a section pertaining to the linearity of the saturation curve, including the method of determining the 'knee' of the curve.
- G. There should also be a tolerance stated for losses, which should be similar, if not the same, as stated in the transformer standard.
- H. The method for determining the zero sequence impedances of shunt reactors should also be addressed in this revised standard.
- I. Mr. R. Dudley of Trench Electric volunteered to separate the required testing of dry type shunt reactors from the testing of oil-immersed shunt reactors as the present standard is confusing in this respect.

The Chairman requested that any additional comments or suggestions on Draft #2 be directed to him. Draft #3 will be available for the next meeting and will contain all the above comments as well as any additional ones received after this meeting.

VI. PROJECTS

- 1. Ratio Tolerance (P462D) - M. Mitelman

The ratio tolerance change is complete and is in the process of being submitted to the Standards Board.

VII. OLD BUSINESS

1. LTC Position Indication - C. G. Evans

After review by an Ad Hoc Force, Mr. Evans recommends that the standardization of LTC position indication be addressed in the nameplate section (5.12) of C57.12.00. A PAR will be submitted and Mr. Evans will begin to develop an appropriate resolution to the issue.

2. Interpretation of C57.12.90, Section 5.3.2.3 -  
R. H. Frazer *- developed interpretation*

No report.

3. Nameplate Information Change Request - J. W. Matthews

The Loading Guides WG had requested that additional nameplate information be required to identify transformers having directed liquid flow. A proposed change was balloted in the PCS; the results (Attachment B) indicated a need both to better define "directed flow" and to clarify the intent for which the information is needed. Mr. Matthews will resolve these issues with the Loading Guides WG prior to re-ballotting the PCS.

*red part  
classification  
from loads  
Guide WG*

VIII. NEW BUSINESS

1. C57.105-1978, The Guide for Application of Transformer Connections in Three-Phase Distribution Systems is overdue for re-affirmation, revision or withdrawal. The guide is still thought to be an accurate, valuable document. The PCS voted unanimously that it be reaffirmed.

2. In 1978, the Transformer Committee approved a change which made the Resistance Test a Design Test rather than Routine Test for Distribution Transformers rated 501 through 2500 kVA (Attachment C). Unfortunately, this change never got implemented in C57.12.00 as intended. By direction of the Administrative Subcommittee, this item will be reconsidered. A PAR will be submitted and a simultaneous ballot of the PCS and Main Committee undertaken. Chuck McMillen, who guided the original effort, has graciously agreed to try again.

PAGE 12  
PERFORMANCE CHARACTERISTICS SUBCOMMITTEE  
MEETING MINUTES  
Borst

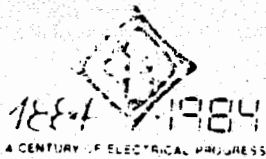
IX. NEXT MEETING

The next meeting will be held on Tuesday, October 14, in Pittsburgh. The meeting was adjourned at 12:15 P.M.

Subsequent to the PCS meeting, the Main Committee also voted unanimously to reaffirm C57.105. This will be reported to the IEEE Standards Board via Ray Smith.

John D. Borst  
Chairman

8807A:jfi



IEEE STANDARDS OFFICE

March 25, 1986

Mr. Harold F. Light  
Niagara Mohawk Power Corporation  
300 Erie Blvd. West (D:G)  
Syracuse, N.Y. 13203

Re: P786 - Reporting Failure Data for Power Transformers and  
Shunt Protectors on Electric Utility Power Systems, Guide  
for

Dear Mr. Light:

The P786/D8 dated June 1, 1985, was considered by the IEEE Standards Board Review Committee. Following considerable discussion, they recommended this project be returned to the Sponsoring Subcommittee for action as noted below. The Standards Board approved this recommendation on March 13, 1986.

- A) To verify by copy of letter that coordination has been completed with all specified organizations (with particular emphasis on a reply from Edison Electric Institute).
- B) The Review Committee considers it essential that coordination also be established with the National Regulatory Commission. (This Commission represents all State Regulatory bodies which could be affected by the recommendations of this proposed Guide).
- C) To indicate that all balloting members had been advised of of the legal questions raised by a manufacturer, and that this advice did not create further negative ballots.

We will hold all present documentation on P786 in our files, pending clarification of the above questions.

Sincerely,

E. Paul Lange  
Secretary  
Standards Review Committee

cc: L.R. Smith  
O.R. Compton  
Judith Gorman

PERFORMANCE CHARACTERISTICS SUBCOMMITTEE  
SUMMARY OF BALLOTS  
-----

Document: Draft 1 - Proposed Revision to ANSI/IEEE C57.12.00,  
Table 7 - Nameplate Information, Note(2)  
-----

I. Tally  
-----

Date of Ballot 2/4/86  
Closing Date 3/26/86  
Number Mailed 53

Affirmative Ballots		44
Without Comments	41	-
With Comments	3	- (see Part III)
Negative Ballots		2 (see Part II)
Not Voting Ballots		0
Ballots Not Returned		7

Tally ----- 53 Ballots

% of Ballots Returned 87 % Returned

II. Negative Ballots  
-----

A. Alternate Proposal:  
-----

The nameplate on forced-oil cooled transformers where the oil is directed through one or more windings shall include " Directed Flow."

Reason:  
-----

Simpler proposal: Keep the nameplate as it is, except for the directed oil flow, where this information should be added.

Resolution:  
-----



B. Alternate Proposal:  
-----

Perhaps the cooling designation could have a " D " added for directed flow, as OAD, FOAD, etc.

Reason:  
-----

DOF is used for convection cooled as well as forced cooled windings.

Resolution:  
-----

III. Comments With Affirmative Ballots  
-----

A. Comment 1)  
-----

To be consistent with the remainder of the standard, the term " forced oil " in the proposed addition should be replaced with " forced liquid."

Resolution:  
-----

Comment 2)  
-----

The proposed addition uses the term " directed " to define " directed flow " and implies that " non-directed flow " doesn't pass through the winding. A more precise definition of the term " directed flow " should be included either in the note or elsewhere in the standard.

Resolution:  
-----

B. Comment:  
-----

You might want to add " ... by design " after  
" directed."

Resolution:  
-----

C. Comment:  
-----

Not all windings may have directed flow. In this case,  
it is necessary to specify which windings have directed  
flow.

Resolution:  
-----

Draft 1 - Proposed Revision to ANSI/IEEE C57.12.00,  
Table 7 - Nameplate Information, Note (2)

Present Wording:

(2) Where the class of transformer involves more than one kVA (or MVA) rating, all ratings shall be shown.

Any winding, such as tertiary, which has a different rating shall have its kVA (or MVA) suitably described.

Where the transformer has more than one temperature rating, the additional rating shall be shown on the nameplate.

Provision for future forced-cooling equipment shall be indicated.

Proposed Addition:

The nameplate on forced-oil cooled transformers shall include the words "Directed Flow" or "Nondirected Flow" to indicate whether or not the oil flow is directed through the windings.

2/3/86 - JWM



THE INSTITUTE OF  
ELECTRICAL AND  
ELECTRONICS  
ENGINEERS, INC.

ATTACHMENT C  
C57.12.00c

345 EAST 47TH STREET, NEW YORK NEW YORK 10017

STANDARDS BOARD

DIRECT NUMBER  
(212) 644-7960

January 17, 1979

Mr. C.J. McMillen  
General Electric Co.  
Distribution & Transformer Business Dept.  
P.O. Box 2188  
Hickory, NC 28601

Subject: Proposed Revision of Routine Test  
Requirements, C57.12.00, 8.1.1, Footnote 6(IEEE 462)

Dear Mr. McMillen:

On December 14, 1978 the subject document was submitted by the IEEE PES Transformer Committee for approval as an IEEE Standard. We are pleased to inform you that the IEEE Standard Board approved this document.

This revision will now be submitted to the American National Standards Committee C57 for ANSI approval. Upon ANSI BSR approval the document will be turned over to our editor who will be in touch with you at that time.

Sincerely,

Ivan Easton,  
Secretary, IEEE Standard Board

IGE:ac

462 file - footnote 6

1973?  
FINAL PROPOSED REVISION OF FOOTNOTE 6, PARAGRAPH 8.1.1  
ANSI C57.12.00-1963, PAGE 18

Resistance test is a design test for three-phase distribution transformers 2500 kVA and smaller. Resistance, impedance, and load loss tests are design tests for single- and three-phase transformers 500 kVA and smaller. These tests shall be omitted as a routine test when a record of such tests made on a duplicate or essentially duplicate unit in accordance with this standard is available. Correction of impedance and load loss to reference temperature when resistance test is omitted shall be calculated by using the design test resistance.

This is the final proposed revision as approved by the IEEE Transformer Committee.

Charles J. McMillen, Member  
IEEE Transformer Committee

APPENDIX "J"

REPORT OF THE WEST COAST TRANSFORMER SUBCOMMITTEE

The West Coast Transformer Subcommittee will meet April 28 and 29, 1986, in Phoenix, Arizona, at the time of the meeting of the Main IEEE Substation Committee.

We are presently working on the following projects:

1. C57.93 Transformer Installation Guide

We are reactivating C57.93, which had been rescinded, and are incorporating into it, C57.12.11 and C57.12.12, which we had previously prepared.

2. P-513 Seismic Guide for Transformers

This has recently been sent back to us from the IEEE Standards Board because of procedural objections and lack of proper documentation. It will be necessary to update it and to ballot it thru the Main Transformers Committee again.

3. P-842 Transformer Loss Evaluation Guide

The latest draft has been sent to the members of both the Subcommittee and the Main Committee, and will be discussed at a Working Group meeting April 28.

4. Fire Protection Guide for Transformers

A scope is being prepared for this proposed guide, with the expectation that we will soon be submitting a Project Authorization Request.

Roger G. Jacobsen for Herb Johnson - Chairman

April 9, 1986

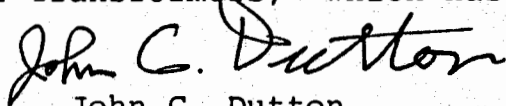
APPENDIX "K"

John C. Dutton Enterprises, Inc.  
Consulting Engineering  
120 Hyliff Road  
Rome, GA 30161  
404-232-7781

3/21/86

NEWS OF IEC TRANSFORMER ACTIVITIES  
(For IEEE Transformers Committee)

1. IEC TC 14 (Power Transformers) will hold a meeting in Arnhem, Holland, May 12, 13, & 14, 1986. It appears that the principal agenda item will be discussion of the proposed revision of Pub 354-1972, "Loading Guide for Liquid-Immersed Transformers."  
  
As US Technical Advisor to USNC/IEC Technical Comm 14, I expect to attend this meeting--possibly with a small delegation.
2. As USTA, I have recently updated (1/30/86) the list of engineers involved in the "USNC/IEC Technical Advisory Group."
3. IEC Document 14(Central Office)66, Feb '86, "Determination of Transformer and Reactor Sound Levels" is being distributed to the TC 14 TAG members by Mr. Hansen of NEMA.
4. C. J. McMillen (as a Member of IEC TC 14, WG 18, Loading Guides) attended a meeting of the Working Group in London in Jan '86. WG 18 is involved in the revision of IEC Pub 354, and is Chaired by J. Aubin.
5. J. C. Dutton (as USNC/IEC TA to IEC TC 14) commented on IEC 14(Secretariat)156, Proposed Amendments to IEC Pub 76-1.
6. 14(Central Office)61, (an amendment to IEC 726, Dry-Type Transformers) was unanimously approved.
7. IEC 14(Central Office)63 reported 6-Months Rule voting on 14(Central Office)60 "Loading Guide for Dry-Type Transformers" (20 Pro, 3 Con). The US voted "NEGATIVE" with comments.
8. IEC 14(Central Office)62 reported 6-Months Rule voting on 14(Central Office)19 "External Clearances in Air for Power Transformers" (19 Pro, 2 Con) the US voted "AFFIRMATIVE."
9. IEC TC 14B (On-Load Tap-Changers) completed deliberations on the Proposed Revision of IEC Pub 214-1976, "On-Load Tap Changers" and will now submit the new proposal for balloting under the "Six-Months Rule."
10. Recently Mr. J. D. Douglass requested information concerning IEC work on the new IEC publication relating to "External Clearances in Air for Power Transformers," which has been furnished.

  
John C. Dutton  
US Technical Advisor to IEC TC 14