MINUTES OF MEETING
BUSHING SUBCOMMITTEE
OF THE
IEEE/PES TRANSFORMER COMMITTEE
MONTREAL, QUEBEC
OCT 25, 2006

7.3 Bushing Subcommittee – Fred Elliott, Chair

7.3.1 Introduction/Attendance

Fred Elliott - Chair opened the meeting at 3:00 PM and welcomed the members and guests. There were 46 attendees with 18 members and 28 guests present.

IEEE patent policy was addressed and no patent conflicts were reported.

7.3.2 Approval of Minutes of Last Meeting

The minutes of last meeting in Costa Mesa, CA were approved as written.

7.3.3 Chairman's Remarks

The chair made the following remarks after attending the Administrative Subcommittee.

- Next meeting will be held in Dallas, TX on March 12-15, 2007.
- In future meetings, personal introduction will be re-enforced.
- A technical tour to a local bushing manufacturer facility was scheduled.
- IEEE Patent requirements were available on the Website of Transformer Committee

7.3.4 Working Group (WG) and Task Force (TF) Reports

7.3.4.1 WG - Revision of C57.19.00 - Keith Ellis, Chair

No meeting was scheduled.

7.3.4.2 TF - Revision of C57.19.100 – Tommy Spitzer, Chair

The meeting was called to order at 3:15 on Oct. 24 with 13 members and 13 guests, 2 guests requested memberships.

The 2006 spring minutes were approved as written. There were no Patent issues from anyone in the meeting.

The chair announced that the PAR had been approved until 2010 but felt that most of the work had been done and would like to be ready for ballot after the spring 2007 meeting to be held in

Dallas. Draft 1 is in PDF format and posted on the Transformer Committee website. Some inconsistent nomenclature had been resolved. One of the Manufacturers reported that they were working on making the new document consistent with the latest revision of C57.19.00, and two other manufacturers would provide new wording to clarify the ratings of their draw rod bushings. The chair received permission from IEEE and the authors or various sections to use Word format for future drafts to make revisions easier. Draft 2 should be sent out in December to allow time for input before the next meeting.

The meeting was adjourned at 3:35.

7.3.4.3 TF – Bulk Bushings – Bob Hartgrove, Chair

No meeting was scheduled.

7.3.4.4 C57.19.03 – DC Bushing Standard – Fred Elliott, Chair

No meeting was scheduled.

7.3.4.5 IEC Bushing Standards Activity - John Graham of Trench Ltd., UK

John Graham reported as following;

IEC BUSHING STANDARDISATION WORK

Within IEC, standardisation of bushings is covered by Technical Committee TC36: Insulators, Subcommittee SC36A: Insulated Bushings.

Sub-committee officers are:

Chairman: Lars Johansson, ABB, Sweden.
Secretary: Vacant.

The last meeting of SC36A was held at the IEC General Meeting in Berlin, Germany, on September 27th 2006. The Group Secretary has had to withdraw and the Italian National committee hope to propose a replacement shortly.

SC36A MT5: IEC 60137: Insulated bushings for alternating voltages above 1kV.
Project Leader: John Graham, Trench-UK.

A Committee Draft for Vote (CDV) was distributed for comment by National Committees in October 2005 and National comments were received in July 2006 for discussion in Berlin. The CDV received three negative votes (from Germany, Italy and Japan) but the overall majority acceptance allows it to proceed to the Final Draft International Standard (FDIS) stage.

As reported previously TC14 would prefer that all dielectric tests on to the transformer have been applied to the bushing, with a margin of 10%. The CDV represents compromise agreed with TC14 representatives in the MT. However, TC14 have stated that if the full tests are not included in the bushing standard, they will be included in the next revision of IEC 60076-3.

Discussions in Berlin should allow the Italian and Japanese votes to be changed to positive at the final stage with the new edition being published in 2007. The objections from TC14 will

mean work has to start again immediately and it is proposed to hold a meeting of the Officers of SC36A and TC14 to resolve differences.

The attached tables show typical differences in bushing routine tests between IEEE and IEC standards and the requirements from TC14.

Other Work

SC36A MT4: IEC 62199: Bushings for HVDC application
No work at present but the maintenance cycle will be aligned with IEC 60137 for review in 2008.

SC36A MT6: IEC 61464: Dissolved gas analysis of bushings.
This document will be reconfirmed until 2010 and eventually incorporated into a revision of IEC 60599.

SC36A MT7: IEC 61463: Seismic qualification of bushings.
This document will be reconfirmed until 2012.

EXAMPLE OF DIFFERENCES BETWEEN IEEE AND IEC BUSHING ROUTINE TEST REQUIREMENTS

Rated Voltage 69kV				
Standard	Cap/Tanδ	PD	Withstand	Impulse
IEEE C57.19.00 2000	10	66	160	-
IEC 60137 2003	72.5	63	154	-
IEC 60137 Draft	72.5	63	154	Additional Type Tests
TC14 Proposal	72.5	63	154	360

Rated Voltage 500kV				
Standard	Cap/Tanδ	PD	Withstand	Impulse
IEEE C57.19.00 2000	10	477	750	-
IEC 60137 2003	550	477	748	1550
IEC 60137 Draft	550	477	748	1550
TC14 Proposal	550	477 (1h)	748	1705

7.3.4.6 IEEE 693 Bushing/Transformer Interaction Investigation – Lonnie Elder (presented by Frank Wolfe)

Shake table testing of bushings mounted on simulated transformer tank lids and/or turrets is planned for March 2007 in Buffalo, NY. An update on this activity is posted in the Bushing Subcommittee area of the Transformers committee website. This work was presented to the subcommittee at the Costa Mesa meeting by Dr. Anshel Schiff.

7.3.5 Old Business

- GSU bushings were reviewed and discussed. At present, there are no IEEE Standards or Guides to properly address GSU bushings. Due to their specific natures, it would be meaningful for the Bushing Subcommittee to start looking at the subject. The chair is planning to have a time slot requested during 2007 spring meeting and also asking for an volunteer to chair the meeting. As a start-up, a proposal for GSU bushings was presented by Peter Zhao.

7.3.6 New Business

- The chair requested suggestions from subcommittee members and attendees for technical presentations at future subcommittee meetings. Presentations should be relevant to the development of bushing standards.
- Keith Ellis indicated that IEC bushing standards call for lightning impulse as a routine test on all the bushings, and IEEE bushing standards might need to address this test too if considering the harmonization between IEEE and IEC standards. A recommendation will be prepared and sent to the Subcommittee for review.

7.3.7 Technical Papers

No activity was reported for this mtg.

7.3.8 Adjournment

The meeting adjourned at 4:15 PM.

Minutes submitted respectively by,

Peter D. Zhao

Secretary
Bushing Subcommittee