

**MINUTES OF MEETING  
BUSHING SUBCOMMITTEE  
OF THE  
IEEE/PES TRANSFORMER COMMITTEE  
Miami, FL  
April 22, 2009**

**8.12 Bushing Subcommittee – Fred Elliott, Chair; Peter Zhao, Secretary.**

**8.12.1 Introduction/Attendance**

Peter Zhao opened the meeting at 9:30 AM since Fred Elliott was unable to attend and welcomed the members and guests. There were 82 attendees with 15 members and 67 guests present. Five (5) guests were added to the membership after the meeting.

Copies of the IEEE patent policy summary were circulated with the meeting agenda. The policy was addressed in the meeting and no patent conflicts were reported.

Les Recksiedler assisted in taking notes for this meeting.

**8.12.2 Approval of Minutes of Last Meeting**

The minutes of last meeting in Porto, Portugal were approved as written.

**8.12.3 Chairman's Remarks**

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

- Next meeting of the transformers committee will be held in Lombard, Illinois, Oct 25-29, 2009.
- It is requested that for future meetings, all the attendees shall clearly state their arriving and departure dates when making their hotel registrations to avoid any possible incorrect room bookings among IEEE Transformers Committee as a whole.
- IEEE PES general meeting will be held at Calgary, Alberta, Canada on July 26-30, 2009. This is the 125<sup>th</sup> anniversary of PES.
- Development of IEEE and IEC dual logo standards shall require the joint efforts from both sides according to Thomas Prevost - Chair of IEEE Transformers Committee. It was also realized that more details should be worked out.

**8.12.4 Working Group (WG) and Task Force (TF) Reports**

**8.12.4.1 WG - Revision of C57.19.00 - Keith Ellis, Chair**

No meeting was scheduled.

This Standard is expiring at end of 2009, and the action is required.

#### **8.12.4.2 TF - Revision of C57.19.100 – Tommy Spitzer, Chair**

The meeting was called to order at 3:15 on April 21, 2009 with 15 members and 13 guests. There were no patent disclosures. The Spring 2008 minutes were approved. There was no meeting in Porto. Jesse Patton replaced Charlie Caruso who has retired.

TF completed review of Draft 2, and a new draft will be created from the comments of Draft 2. The Chair plans to have the draft completed to begin balloting by end of the year. The PAR is active until 12/31/2010.

The meeting was adjourned at 4:30.

#### **8.12.4.3 TF – GSU Bushings – Catherine Hurley**

Minutes: Meeting of the Task Force for Generator Step-Up (GSU) Bushing Standardization

April 21, 2009 1:45 pm

1. Attendance: There were 30 people in attendance, as follows: 15 Members; 1 Requesting Membership, 13 Guests and 1 did not mark any designation. Introductions were made by everyone.
2. Agenda: An Agenda was presented by the Chair of the Task Force.
3. Minutes: The Minutes of the last meeting in Porto, Portugal were presented and approved.
4. Comments on Title and Scope: The Chair sent a copy of the Title and Purpose via email to participants of the Task Force, and she received comments. The TF proceeded to discuss the comments, as follows:

##### Title:

- a. There was considerable discussion of the Title, and whether it should include a reference to Outdoor and Apparatus. It was decided that "Outdoor" would be removed but that there was no agreement on the word Apparatus. Some suggestions were to add Power before this or to replace with Transformers and Reactors. This will be resolved by emails.
- b. The IEEE Administration will have to review and approve the Title.

##### Purpose:

- c. There was considerable discussion about the purpose of the Standard. It was suggested to keep it the same as that in C57.19.00 but a review of that Standard showed there was no clause labeled purpose in that document. Thus it may not be required but is desirable to show the need for this Standard which is not in any other Standard.
5. Table 1 was discussed in general terms to determine if the 110 kV BIL should be kept and after discussion it is still included as there are many 13.8 kV bushings out there.

6. PAR: The Chair's intent is to draft the PAR and send it out for comment before it is formally submitted. The draft version of the PAR will be sent via email to participants of this meeting and will be approved via emails. Comments should be sent back to [cahurley@aep.com](mailto:cahurley@aep.com).
7. Adjournment: The meeting was formally adjourned.

#### **8.12.4.4 C57.19.03 – DC Bushing Standard – Les Recksiedler, Chair**

The WG met on April 21, 2009. Eleven (11) members and twenty-one (21) guests attended the meeting. Four (4) guests requested membership. The meeting was chaired by Mr. Les Recksiedler and the Vice-Chair was Pierre Riffon.

Minutes of Porto meeting were approved as written.

The IEEE patent disclosure requirement policy was discussed. None of the members and guests present during the meeting were aware of any patents related to the work of the WG.

The first subject on the agenda was the possibility to establish a joint IEEE/IEC Working Group / Maintenance Team in order to get a dual-logo standard on DC bushings since the contents of actual IEEE and IEC standards are quite similar. After having discussed several practical operational matters with IEEE officers, the WG voted to go for a joint WG/MT with IEC. None of the WG members did oppose to this proposal. The IEC format and template will be used. A modified PAR needs to be submitted to IEEE. Such joint WG/MT still needs the approval of the Bushings Subcommittee and the approval of a New Work Item Proposal by National Committees participating to the work of IEC SC36A.

The remaining part of the meeting was dedicated to the review of proposals made by Pierre Riffon during Porto meeting. These proposals have been implemented into D1 of the revision of C57.19.03. Most of the proposals were deemed acceptable to the WG membership. One point which needs to be modified is related to the procedure to be used during temperature rise test for simulating high ambient air temperature of HVDC valve halls. Reiner Krump will make a counterproposal prior to next meeting.

A new Annex proposed by Ulf Radbrandt related to DC bushings used in VSC HVDC converters has been reviewed. This Annex is based on similar Annexes used in C57.129 on HVDC Converter Transformers and in the upcoming revision of IEEE Std. 1277 on HVDC smoothing reactors. A revised version will be produced and will give more details related to bushing design in relation with fast switching voltage transients produced by such DC converters.

The meeting adjourned at 10:45 am on April 21, 2009.

#### **8.12.4.5 IEC Bushing Standards Activity - John Graham of Trench Ltd., UK**

### **IEC BUSHINGS STANDARDISATION**

## **IIEC Meetings**

The IEC committees TC36 “Insulators” including SC36A “Bushings” meet during the IEC General Session in Sao Paulo, Brazil during the week of November 17<sup>th</sup> 2008. Fourteen countries were represented with the main discussion being;

### **IEC60137 “Insulated Bushings for Alternating Voltages above 1000V”**

Edition 6 was published in July 2008 following a majority positive vote by National Committees. The Japanese delegate pointed out the lack of technical justification for the recent revision of testing of transformer bushings. Japan requested that work start immediately to gather information on bushing failures in transformer test. While it was agreed to request Cigré A2 – Transformers to investigate failure rates the maintenance date for IEC60137 was set at 2011. During future revision the working group should address inconsistencies in the test method for temperature rise of external connections – this inconsistency also exists in IEEE C57.19.00. This work by SC36A MT5 is now closed.

### **IEC62199 “Bushings for DC Application”**

It was proposed that SC36A MT5 take over the review of this document. This standard is the IEC equivalent of IEEE C57.19.03 currently under review. It was agreed that this document is a suitable candidate for dual numbering by IEC/IEEE. There has been correspondence between the Officers of IEC and IEEE on this subject and it is referred to the IEEE Working Group meeting in Miami.

#### **Other Work –**

It was agreed to liaise with IEC TC10 Insulating Fluids on “Condition assessment of insulating liquids in electrical equipment”. In this would TC10 would be responsible for test techniques and SC36A would be responsible for condition assessment of bushings.

The maintenance result date for IEC61464 “Guide for the interpretation of DGA in bushings” was extended to 2013.

IEEE High Current Bushing TF – it was agreed that IEC had no interest in this work.

UHV Products – A joint IEC / Cigré working group (JICCG) has been set up with the scope of standardisation of ratings for UHV AC and DC equipment. Bushings are a particular focus of this group but to date SC36A has not considered any implications on standards.

The next meeting of SC36A is planned for Seattle in October 2010 in conjunction with the IEC General Meeting.

### **8.12.4.6. IEEE 693- Interaction of Bushings and Transformers During Seismic Events – Lonnie Elder**

No meeting was scheduled.

### **8.12.5. Old Business**

#### **8.12.5.1 Task Force on PD Measurement on Bushings & CTs**

This TF was formed under the Subcommittee of Dielectric Tests. A presentation was contributed from Bushing Subcommittee, which is posted on the Website.

#### **8.12.5.2 Technical Papers**

No activity was reported for this mtg.

#### **8.12.6 New Business**

**8.12.6.1 Bushing Oil Standardization** – Copper Migration Issues: Do we need to add bushing oil requirements to the bushing standards?

A presentation was made during the meeting by Trench introducing the issue, which is available on the Website.

Chair was requesting for others who would like to make presentations related to this issue at the fall meeting. Contact Fred Elliott and Peter Zhao to get on the agenda.

A consensus on the need for any future action will be developed at the Fall Meeting.

#### **8.12.7 Adjournment**

The meeting adjourned at 10:45 PM.

Minutes submitted respectively by,

Peter Zhao

Secretary  
Bushing Subcommittee