MINUTES OF MEETING
BUSHING SUBCOMMITTEE
OF THE
IEEE/PES TRANSFORMER COMMITTEE
San Diego, CA
April 13, 2011

10.10 Bushing Subcommittee – Peter Zhao, Chair; Eric Weatherbee, Secretary.

10.10.1 Introduction/Attendance

Chair opened the meeting at 9:30 AM and welcomed the members and guests. A quorum was formed by confirmation of member attendance. There were 82 attendees with 22 members and 60 guests present.

Patent policy was addressed in the meeting and no patent conflict was reported.

10.10.2 Approval of Minutes of Last Meeting

The minutes of last meeting in Toronto, ON Canada were approved as written.

10.10.3 Chairman's Remarks

a) Leadership and contributions of the previous Chairman Fred Elliott
b) Fall 2011 meeting will be held in Boston, Massachusetts on October 30th – November 3rd, sponsored by OMICRON Electronics Corp. USA
c) Archive - IEEE Transformer Committee Meeting Minutes has been established and posted on the Website. If you have any additional information or records, please contact Peter Balma.

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

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

Reaffirmed C57.19.00-2004 – New expiration date is Dec. 31, 2015

10.10.4.2 WG - Revision of C57.19.01 – Arturo Del Rio, Chair

The WG for the revision of C57.19.01 Standard Requirements for Bushings met on Tuesday April 12th, 2011, at 9:30 am with 36 guests. Since this was the first meeting membership is yet to be established.

- The meeting was opened with a request for patent disclosures and introductions.
- Since this was the first meeting for the WG, there were no minutes from previous meetings.
- Regarding the scope of this Standard, a modification will be needed in order to avoid conflict with the work being done on the standardization of GSU bushings for use in bus-enclosures. This item will be included in the agenda for the next meeting.

- The first item in the agenda was the review of the work done during the 2000 revision and 2005 re-affirmation of this Standard in terms of survey and ballot results.
- After the review of this background information, an open discussion took place with the participation of users, transformer manufactures and bushing manufacturers in attendance.
- A request was made by the Chair for participants to e-mail comments and suggestions for changes to the existing Standard to arturod@ieee.org.
- Meeting was adjourned at 10:30 am.
- Any members of the Bushings Subcommittee are welcome to join this new WG and participate in the revision of the Standard.

10.10.4.3 WG - Revision of C57.19.100 – Tommy Spitzer, Chair

No report, ready for ballot

10.10.4.4 TF – GSU Bushings – Catherine Hurley, Chair

April 12, 2011, 1:45pm - Toucan Room at the Catamaran Resort / San Diego, California

1. Attendance: The meeting consisted of 36 attendees: 16 of 22 "members" (quorum was reached) and 20 "guests", 11 of which were NEW "guests". 1 "member" requested change to "guest" status. 2 "guests" who have attended previous meetings requested membership, but neither had an attendance record which justified membership. Their request for membership was denied. 1 NEW "guest" requested membership, but membership was not granted because this was his first meeting.
   The new membership total is 21.

2. Agenda:
   - No known patent related issues were brought to the attention of the TF
   - Meeting minutes from Fall 2010 meeting were presented and approved
   - Status of PAR submittal was discussed. Original submittal rec'd negative votes so the PAR was revised to distinguish this standard from C57.19.01 by limiting our focus to only those bushings rated >5000A and applied in metal enclosed bus, typical of the LV side of GSU transformers. No negative comments have been received to date by the committee and we expect PAR approval and creation of WG by next meeting.
   - Sections 3 and 4 of the standard, prepared by John Graham, were presented to the members for the first time, and those sections were briefly reviewed and discussed openly. These sections will be distributed to the members by C. Hurley for a more detailed evaluation at the next meeting in Boston.
   - Dimensional recommendations by European bushing manufacturer Areva/Alstom/Passoni Villa were presented to the group for discussion. Their recommendations will also be distributed to the members by C. Hurley.

3. Adjournment: The meeting was adjourned at 3:10pm

10.10.4.5 C57.19.03 – DC Bushing Standard – Les Recksiedler (IEEE) and John Graham (IEC), Chair

IEC62199 "Bushings for DC Application"
SC36A MT5 is working with The IEEE Bushing subcommittee with a joint working group to produce a dual logo document.
Three meetings have been held, in Lombard (Fall 2009), Houston (Spring 2010) and Toronto (Fall 2010). Work has proceeded by email to avoid a meeting in Europe. A fifth draft has been circulated for comment and any comments would be welcomed. Draft 5 needs the addition of a second annex concerning an alternative method for the calculation of a harmonic equivalent current; this is being prepared by Italy. No meeting will be held in San Diego pending completion of the Annex and official circulation for comment. It is hoped to be able to go for voting at this stage.

The main items to review are;
- Creepage distance calculation – specification of the appropriate voltage.
- Emission test
- Temperature rise test – agreement on method for calculation of the equivalent current.
- Dry lightning impulse test.

10.10.4.6 IEC Bushing Standards Activity - John Graham

IEC Meetings
The IEC bushing committee SC36A has not met since the IEC General Session in Sao Paulo, Brazil during the week of November 17th 2008. The next meeting is planned for October 2011 in Melbourne, Australia.

IEC60137 "Insulated Bushings for Alternating Voltages above 1000V"
Edition 6 was published in July 2008; the maintenance date for IEC60137 is set at 2011.
The Chairman recently asked for revision work to be started with a short date of May 20th 2011 for a Committee Draft (CD). The main purpose is to include test values for UHV bushings (above 800kV rating) in line with the latest edition of IEC60071-1: Insulation Co-ordination. During the 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. Also changes to the calculation of creepage distance in line with IEC60815 will be included.
It is hoped that the CD can be circulated and comments prepared for the IEC meeting in October.

10.10.4.7 IEEE 693 - Interaction of Bushings and Transformers during Seismic Events – Lonnie Elder

No report

10.10.4.8 Task Force on PD Measurement on Bushings & CTs - Thang Hochanh, Chair

MINUTES OF TASK FORCE MEETING – S11 San Diego, CA.

The task force on Partial Discharge in Bushings and PTs/CTs met on Monday April 11th, 2011, at 3:15pm with 45 attendees. Of those, 10 members and 35 guests with 7 guests requesting membership.

- The meeting was opened with a request for patent disclosures and introductions.
- The minutes for the F10 Toronto meeting were presented.
- The next item in the agenda was a presentation by Alex Kraetge: De-noising and pulse separation approaches based on synchronous multi-terminal frequency measurements.
- A request was made to have all the presentations delivered to date in the TF meetings posted on the Transformer Committee webpage; the request was accepted since the material is considered public domain.
- After the presentation by Mr Kraetge, the TF Chair presented a preliminary scope and a proposed outline for the guide.
- Among the comments to the preliminary scope presented by the Chair were:
  - The scope limits the guide to wide band detection, whereas narrow band could also be suitable considering the simpler propagation patterns found in the equipment under test.
  - Both wide band and narrow band detection are presently being used in laboratory settings by manufacturers.
  - The scope should be limited to laboratory settings for now and consider field PD measurements for future work.
  - The scope needs to be re-worded to address the above comments.
- Regarding the proposed outline, the following comments were made:
  - What instrumentation is appropriate for PD testing needs to be addressed.
  - The proposed outline includes a separate sections for CTs, PTs and bushings. Is it really necessary as CTs and bushings are very similar regarding PD testing?
  - Most of the material that it is currently part of the annexes such as calibration, test procedures and PD pattern recognition should be moved to the main body of the guide and decide later if an annex is needed for additional information.
- TF Chair Thang Hochanh requested volunteers to start drafting the different sections of the guide. Additional volunteers willing to contribute to the guide can contact Mr. Hochang:
  - W. Hauschild offered to work on the section regarding shielding.
  - R. Krump offered to work on the section regarding bushings and single ended method.
  - B. Wimberly offered to work on the instrument transformer section.
- Meeting was adjourned at 4:15 pm.

10.10.5 Old Business

10.10.5.1 Busing Service Conditions - Devki Sharma

The question was raised by Devki if the external bare bushing terminal temperature of 70C should be changed to meet the value of disconnect switches which allow 90C. Having these value different causes misapplication. He also mentioned that he had tried to get the substation committee to address the issue but was rejected.

Many disagreed as standard bushings are not designed to handle that high of a temperature. Damage to the seals may occur due to the higher temperature.

The Chair asked for someone to research the issue and provide an update for the next meeting. Loren Wagner volunteered to head up the research with the assistance of Devki Sharma.

10.10.6 New Business

10.10.6.1 Task Force on PD Measurement on Bushings & CTs - Thang Hochanh, Chair

Tang Hochanh suggested that a specific setup be established for measuring external RIV results. Laboratories could provide their results anonymously for comparison. Ray Bartnikas commented that weighting on circuitry differences likely explains the difference in results and the manufacturers should come to an agreement on circuitry.

10.10.7 Adjournment

The meeting adjourned at 10:45 PM.

Minutes submitted respectively by,

Eric Weatherbee

Secretary
Bushing Subcommittee