9.9 Dielectric Test Subcommittee – Loren Wagenaar, Chair; Thang Hochanh, Vice-Chair; Dennis Marlow, Secretary

The Dielectric Test Subcommittee (DISC) met on Wednesday, March 10, 2010 at 11:00 am in Houston Texas, with 149 persons in attendance. There were 66 of 111 members, and 83 guests present. 14 of the 60 returning guests who requested membership will have their participation status reviewed prior to acceptance

9.9.1 Chair's Remarks

1) Loren Wagenaar was again unable to attend for personal reasons. Thang Hochanh. Chaired the meeting

2) The Chair briefly reviewed highlights of the Administrative Subcommittee meeting held on Sunday:

   a) The next meetings:
      1) Fall October 24-28, 2010 , (Hilton $159 CAD) – Toronto, Ontario- hosted by Trench
      2) Spring 2011 , April 10-14– Hotel Mission Bay hosted by San Diego Gas & Electric
3) After introductions a count showed 66 members were in attendance. The new quorum requirements were met. The membership participation will be again reviewed prior to the next meeting to include only active members. All WG and TF should update their rosters prior to the next meeting.

4) The minutes of the fall 2009 meeting in Lombard were approved as written, and are available on the IEEE Transformers Committee Web Site.

9.9.2 Working Group Reports

9.9.2.1 Task Force on External Dielectric Clearances
Eric Davis, Chair; Dennis Marlow, Secretary

The TF met on Mar 8, 2010 at 9:30 am at the Omni. 50 people attended this fifth meeting, 6 members and 44 guests (13 repeat guests) were present with 4 accepted as new members, bringing the total membership to 23. We did not have a quorum.

The minutes from the fall 2009 meeting in Lombard, IL were approved as submitted.

The IEEE patent disclosure requirement policy was discussed. Reference to the package posted on the IEEE Transformers Committee Web site was made. None of the members and guests present during the meeting was aware of any patents related to the work of this TF.

Clearances < 230-kV

- Discussion of how IEEE 1427 determines recommended minimum clearances in air insulated substations
- Review of last meeting's discussion regarding 230-kV clearance table organized by BIL, kV or both
- A survey will also be sent out to the members and interested guests for review so that comments can be obtained about the proposed clearance table.

Clearances > 230-kV

- Discussion of IEEE 1427 determines recommended minimum clearances in air insulated substations based on switching surge.
- Discussion of the configuration of the unit during test. (i.e. which terminals get grounded)
- A quick straw vote in favor of 9 to 3 was taken to revise the clearances for voltages above 230-kV.
- Discussion of bushing clearances and the area of influence.

Meeting adjourned 10:45 am respectfully submitted, Dennis Marlow

9.9.2.2 Task Force on Special Dielectric Test Issues – Bruce Forsyth, Chair

The Task Force on Special Dielectric Test Issues met in Houston, TX on March 8, 2010 at 1:45 PM. There were 52 people in attendance, 22 members and 30 guests, with 4 guests requesting membership. At the commencement of this meeting the TF membership count stood at 31 so a quorum was present.

After introductions of attendees it was noted that the minutes of the fall 2009 meeting in Lombard, IL had been posted in the Transformers Committee website. There were no negative comments related to the Lombard minutes, but at that time it was unclear as to whether a quorum existed because several attendees could not recall whether they were members. The Chair asked participants to confirm their status by checking the attendance rosters that were circulating and tabled further review or approval of the minutes until later in the meeting. Although it was later established that a quorum existed, the minutes were not reviewed again prior to the end of the meeting. As such the minutes of the Lombard meeting were not approved.

The purpose of the TF, which is to make recommendations to the Chairman of the Dielectric Test Subcommittee regarding how to proceed with certain dielectric test issues, was reviewed before moving on to unfinished or new business.

The first item of unfinished business was to review the results of a recent survey of the Dielectric Test Subcommittee regarding neutral impulse tests. Specifically, the survey asked, "When impulse tests are required on the line end terminals, should impulse tests be performed on the corresponding neutral terminals regardless of the BIL rating of the neutral terminal?" Of the 90 responses from the subcommittee, 64 were "yes", 23 were "no", and 3 were "abstain." After some discussion, the TF focused its attention on clause 5.10.7.1 (Lightning impulse tests) in PC571200_D4Finalrev3-2-2101, which states:

> "When required, lightning impulse tests shall be performed on line and neutral terminals for at the specified levels per Columns 1 and 2 of Table 6, as selected from either Table 4 or Table 5."

Several members expressed concern that this wording does not adequately clarify whether impulse tests on neutral terminals is mandatory. A motion was made (Matthews/Melanson) as follows:

> In the next revision of C57.12.00, the first sentence of clause 5.10.7.1 (Lightning impulse tests) should be revised to read "When lightning impulse tests are required

they shall be performed on both line and neutral terminals at the specified levels per Columns 1 and 2 of Table 6, as selected from either Table 4 or Table 5."

The motion was adopted after debate and by inclusion in these minutes shall be forwarded to the SC Chair as the recommendation of the TF. This concludes the TF review of this issue pending further direction from the SC Chair.

Under New Business the Chair opened discussion on the issue of test levels on Class I and Class II transformers. Specifically the Chair commented that during past discussions on whether 69 kV transformers should be considered Class I or Class II it appeared there was greater concern over the tests to be performed than what specific label was given to the transformer. The Chair asked whether there was any merit in considering classifying the test levels rather than the transformer and allowing the user to designate the transformer as distribution or power, and then select the from a two or three test groups based in the specific application of the transformer. A member expressed concern about this approach specifically in cases where the purchaser may not have sufficient technical knowledge to make the best decision. After a short discussion the Chair asked for a hand vote of the TF members on the question of whether there was any desire for the TF to pursue this issue further. No such interest was expressed and the issue will not be discussed further.
The final item of discussion was regarding the future of the TF. The major issues that were assigned to the TF initially have been addressed during the past several meetings and at this time there are no new action items before the TF. The Chair asked the TF members if there were any pressing issues that they believe the TF should add as new items of business. It was noted that one new item had recently been brought to the SC Chair's attention that may be appropriate for the TF. The Chair will discuss this with the SC Chair and seek guidance regarding future activity.

The meeting adjourned at approximately 2:50 PM.

Respectfully submitted,

Bruce Forsyth

9.9.2.3 Working Group for Revision of the Impulse Test Guides C57.98 and C57.138
Art Molden, Chair; Joe Melanson, Co-Chair

The meeting started at 9:30 AM on Tuesday March 10th, 2010. The total number of attendees was 50. The numbers of members and guests are not yet known since membership rules are in a state of flux.
Based to our present membership role we did not have a quorum.

In keeping with the IEEE patent policy the members were asked if they were aware of any patent or copyright infringement issues in the present draft of the Impulse Guide. No issues were identified and the meeting proceeded with group introductions.

A revised version of our guide, Draft 6 included the changes agreed upon at the last meeting in the fall, had been placed on the Transformers Committee website and on the grouper website. Those changes were presented to the attendees and comments were solicited. The general consensus was that this embodiment of our guide was complete and ready for ballot.

Invitations to ballot have already been initiated and all that remains is to present this draft to the IEEE for editorial review.

The working group members were reminded that C57.138, the Guide for Routine Impulse Tests of Distribution Transformers is also included in our scope and that we need to begin a review of that document.

There being no further business the meeting was adjourned at 10:40 AM.

Art Molden & Joe Melanson. 3/10/10

9.9.2.4 Working Group on Revision of Low Frequency Tests – Bertrand Poulin, Chair; Bill Griesacker, Secretary

1. The WG met on March 9, 2010 at 1:45.There were 59 attendees, 17 members and 42 guests. There are 55 official members of the working group; therefore there a quorum was not present to permit voting.

2. The minutes from the October 2009 meeting in Lombard, IL were brought to the table; there were no objections although the minutes were not approved since a quorum was not present.

3. There was a request for any patent issues to be made known, none were voiced.

4. Dr. Lemke reported on the Task Force for the Revision of C57.113. The document was sent for ballot and passed successfully. The document was submitted to Rev-Com in February 2010 and the outcome of this review is expected. Some issues of the document PC 57.113 will be incorporated in the Field Test Guide (PC 57.152) as well as in the Guide for PD measurements in Bushings, PT´s and CT´s. Dr. Lemke is congratulated on his accomplishments over the last 4 years.

5. Thang Hochanh presented the minutes for the Task force for PD in other devices such as CTs and Bushings. Reviewed sections of Draft, including Annex A and B. Discussed the digitization of signals and changes in instrumentation technology in the industry. A survey will be sent out to collect information regarding the size of corona shields used according to voltage class. Vladimir Khalin offered to prepare a draft for the next meeting regarding test configurations for CTs and PTs.

6. Loren Wagenaar sent out a survey with two questions: 1) should the neutral terminals of transformers be impulse tested and 2) should 69 kV transformers be tested per Class II requirements. About 70 % were interested in including these tests. It is expected that if this vote is taken to the Transformers Committee for vote we would get about the same percentage response. The working group will recommend that 69 kV transformers are Class II transformers and the 1 hour PD/RIV test will be a routine test. Discussion took place over this topic but was not conclusive. We are trying to provide the information for those who ask the question of “how should I specify my transformer?”

7. Tutorial on PD was requested. This will be a future topic but there is a long waiting list of subjects identified for the tutorial sessions held at the Transformers Committee meetings Monday and Tuesday afternoon.

8. New Business: It was requested to require that induced testing for reactance LTC transformers with a preventive autotransformer (PA) shall be tested in a bridging position so that the PA has induced volts/turn. Series transformers will be brought into the discussion, i.e. “the series transformer may conflict with attaining the desired line terminal voltage in the transformer during the test”.

9. The meeting adjourned at 2:35 p.m.

9.9.2.5 Working Group on Revision of Impulse Tests – Pierre Riffon, Chair; Peter Heinzig, Vice-Chair

The WG met on March 9, 2010, from 3:15 pm to 4:35 pm. Twenty (20) members and forty-three (43) guests attended the meeting. Five (5) guests requested membership. The meeting was chaired by Peter Heinzig, vice-chair of the WG.

The agenda has been reviewed and no changes were requested.

The minutes of the Lombard meeting could not be approved because only 20 out of 45 members attended the meeting.

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

The first technical item of business was to discuss the comments received on the 3rd survey made within the WG and within the Dielectric Tests SC on a revised proposal concerning the tap changer position during lightning impulse tests. The proposal was motivated by two principal reasons: testing three different tap positions for reflecting service conditions and for a possible harmonization with IEC testing practices. The changes agreed during the Lombard meeting were implemented in the new proposal.

The number of returns was low as usual on surveys but higher as last time. The return rates were 42.0% from the SC membership and 27.4% from the WG membership. Approval rate were respectively 89.0% and 87.0%.

All affirmative comments received could be discussed during the meeting. The results are listed below and will be included as discussed in a revised version of the proposal.

Only two (2) out of totally four (4) negative comments could be discussed during the meeting. Both cannot be resolved because there are in general against the idea to perform impulse test on different tap positions. They have proposed either to keep the actual procedure e.g. testing at the minimum effective turns or to perform the impulse tests at a single tap position which give the “highest stress”.

Based on the high affirmation rate of 89.0% and 87.0% and elaborately discussion of the negative comments during the meeting and the Lombard meeting the vice chair informed that this negative votes remain unresolved and the new proposal will be included in the new draft for C57.12.90.

At the end of the discussion a proposal was made to add a hint that the tap position can be agreed between the manufacturer and the buyer to achieve the best possible test conditions for a certain transformer.

Due to lack of time, this proposal and the comments received were not fully discussed and the remaining subjects on the agenda were not discussed and will be postponed to the upcoming meeting in Houston.

The meeting adjourned at 4:35 pm on March 9th, 2010.

Outcome of the discussion during the meeting regarding the comments received on 3rd survey made within the WG:

- comment from Barry Beaster requesting new wording - rejected by the group.
- comment from J. Britton - accepted
- comment from Bill Chui - accepted.
- comment from J. Crotty - no change proposed.
- comment from R. Dudley - accepted
- Comments from J. Graham - accepted`
- comments from Laszlo Kadar - No change required
- comment from S. McGovern - accepted
- comment from Susan McNelly - accepted
- comment from Bipin Patel - editorial accepted. rated tap instead of middle tap rejected, already discussed. Note for reactor type TC - we keep the note
- last comment from Patel - add word "ohmic impedance"
- comment from Dan Perco - no change in wording
- comments from Don Platts - editorial, will be considered
- comments from Hossein Rezai - no change
- comments from Steve Snyder – editorial no change in wording
- comment from S. Tuli - already covered
- comment from Peter Werelius - already covered.
- comment from Jim Zhang - not accepted
- negative vote from Yang Baitun - cannot be resolved
- negative vote from Joe Foldi - cannot be resolved

Peter Heinzig, WG Vice-Chair March 9, 2010

9.9.2.6 Task Force on Electrical Partial Discharge Measurements Guide C57.113 - E. Lemke Chair

The task force met on Monday March 8 at 8:00 am. No minutes were presented. The latest corrections were discussed and the chairman will revise the document in preparation for a ballot. Other relevant comments are included with the minutes of **Working Group on Revision of Low Frequency Tests – Bertrand Poulin, Chair**

9.9.2.7 Task Force on Partial Discharge in Bushings and Voltage/Current Transformers- T. Hochanh Chair

The task force met on Monday March 8 at 3:15 pm. No minutes were presented. The TF has now made their recommendation to proceed with the new Guide on PD measurement on Bushing and Instrument transformers. Other relevant comments are included with the minutes of **Working Group on Revision of Low Frequency Tests – Bertrand Poulin, Chair**

9.9.3 Liaison Reports

9.9.3.1 High Voltage Test Techniques (HVTT), IEEE Standard 4 - Arthur Molden

Editorial work continues. This revision of Standard 4 has been extensively rewritten and rearranged into a more informative and more tightly integrated standard. Additional information concerning testing and measuring techniques, measuring system performance, calibration methods, atmospheric correction and statistical treatment of uncertainties, has been added. The latest draft document is currently in circulation for review by the active members of the working group.

A Molden. 3/10/2010

9.9.4 Old Business

None

9.9.5 New Business :

1. Guide for Dielectric Frequency Response Testing. Special appreciation was given to Mark Perkins and other participants for the tutorial on this interesting subject. Discussion about this new technique was not conclusive. It appeared that a guide is not needed at this time but since it can also detect moisture in insulation that it may have some merit in the future. A motion to NOT prepare a guide at this time was made by Don Platts and seconded by Bill Chui was carried by a vote of 50 to 3.

2. Tutorial for Electrical Partial Discharge Measurements should be considered for future meetings.

3. Test Levels for 69 kV class transformers as Class I or II was discussed.

   - B. Poulin fielded some questions from the membership. Topics included, “there is no evidence from the field that the present induce test connections need to be changed.
   - Re 69 kV impulse tests. Many manufacturers are not necessarily setup to perform this as a routine test. Time (notice) may be needed (i.e. 5 years) for manufacturers to accommodate this request if it is implemented.
   - The TF for special dielectric test issues chaired by B. Forsyth has already recommended to the SC that 69 kV class transformers be tested as class II transformers.
   - It should be noted that C57.12.36 covers 69 kV class distribution transformers but only up to 10 MVA size.
   - NO MOTION was received from the membership with regard to these issues.

9.9.6 Meeting adjourned 12.06 PM respectfully submitted: Dennis Marlow