

Annex B Dielectric Tests Subcommittee

April 5th, 2017

New Orleans, Louisiana.

Dielectric Tests Subcommittee		
Chair: Ajith M. Varghese	Vice-Chair: Thang Hochanh	Secretary: Poorvi Patel
Room : Grand Ballroom ABC	Date : April 5 th , 2017	Time: 11:00 am to 12:15 pm
Members : 122	Present at time of checking : 84	Present per attendance roster & recorded to AM System: 85
Guests present : 147	Membership requested : 22	Membership accepted: 20

B.1 Chair's Remarks

The Chair briefly highlighted the requirement that while introducing one need to state their employer/ company and sponsor if difference from company. Chair also reminded that IEEE and transformer committee are non-commercial organizations and standards shall focus only in developing performance and functional requirement and not design and construction details.

The Chair reminded the WG on attendance requirement for new membership and for continuation and the requirement to have attendance updated in AM system i.e. to attend two out of last three meetings or three out of five last meetings. Chair welcomed .the new members during the meeting.

The Chair reminded to start every meeting, conference calls if there are any patents that are known to be applicable for within the area of WG scope. If yes, patent claim type should be noted but not discussed at the working group meetings

The Chair reminded the WG and TF leaders to submit their minutes from the meetings within 30 days to the SC chair and secretary. The SC Secretary then has to submit the SC minutes within 45 days of the SC meeting.

The Chair shared details of upcoming PES sponsored meeting as well as details of next transformer committee. IEEE PES General Meeting will be held in July 16-20,2017 in Chicago and next IEEE PES T&D Expo in April 16-19 of 2018 in Denver, CO, USA The next transformer committee will be from October 29th – 2nd of November, 2017 in Louisville, Kentucky .

The Current Status of PARs was presented by The Chair. C57.161 Guide for DFR Measurements is currently under ballot process the par expires December 2017 and an extension is recommended. Par for C57.12 Guide for the Detection of Acoustic Emissions from Partial Discharges in Oil Immersed Power Transformers expires in 2018 and may require a par extension. All other pars are in good order.

Last meeting in Vancouver, Canada, 18 requested membership and 9 request were accepted. 6 participants status went from member to guest due to lack of attendance.

Sue McNelly informed that from the next meeting in Louisville, the meeting schedule will include a percentage indicating at what stage the WG and TF work is at. WG and TF leaders please review and update this completion percentage in the AM system before the next meeting.

B.2 Quorum, Approval of Minutes and Agenda

The membership list was shown and a show of hands of committee members present showed that a quorum of members were in attendance at the start of the meeting. 84 out of 122 members were present, so there was a quorum.

All attendance is recorded in AM System. Per verification of roster 85 members and 147 guests attended the SC in New Orleans, Louisiana.

The agenda was presented by the chair and it was unanimously approved.

The minutes of the Spring 2016 meeting at Atlanta meeting was approved unanimously.

B.3 Taskforce and Working Group Reports

B.3.1 TF on External Dielectric Clearances

Eric Davis, Chair; Troy Tanaka, Secretary

The Working Group on External Dielectric Clearances met on Monday April 3, 2017 at 9:30 AM in the Astor Crowne Plaza Hotel. There were 47 people in attendance; 10 of 18 members, and 37 guests. A majority of the members were not present at the same time and, therefore, a quorum was not achieved. The full attendance record is available in the AM System.

Since a quorum was not present, no official business could be conducted. The meeting agenda and previous meeting minutes could not be approved. Approval of the previous meeting minutes will be conducted by e-mail.

The chairman asked if there were any known essential patent claims. None were stated.

The chairman reviewed the results of the Dielectric Test Subcommittee Survey. One hundred eight-teen (118) surveys were sent using the AM System. Eight (8) emails were undeliverable leaving a survey size of 110. A 20% response rate was achieved with twenty-four (24) responses received; 2 abstentions, 19 approvals, 2 approvals with comments and 1 disapproval.

The majority of the comments received were editorial in nature. These comments were discussed and responses proposed. Approval of the responses will be conducted by email.

The disapproval stated that “The phase-to-phase distances proposed for the 345 and 500kV voltage systems are significantly too large...”.

The proposed phase-to-ground and phase-to-phase distances were compared with the distances proposed with the disapproval and the IEC distances. The phase-to-ground distances are larger than the IEC

distance but both have a similar trend. The phase-to-phase distances are much larger than the IEC distances.

The following points were made during the discussion:

- Larger clearances will result in larger unit sizes and increased costs.
- The proposed distances are based on a scientific approach using generally accepted formulas and assumptions.
- Problems have not been reported with flashovers using the IEC distances.
- The larger proposed distances may not be justified given the lack of reported problems with the smaller distances.

Given the similar shape of the curves for the proposed and IEC phase-to-ground distances, the chair proposed reducing the probability of withstand to approximate the IEC curve. The phase-to-phase distance will be recalculated using the same value and the results distributed to the Task Force for discussion. Approval of this approach will be conducted by email.

Respectfully submitted,
Eric Davis
Chair

B.3.2 WG on Dielectric Frequency Response Analysis (DFR)

Ali Naderian, WG Chair; Peter Werelius, Vice Chair, Poorvi Patel, Secretary

The working group for Dielectric Frequency Response Analysis did not meet in New Orleans. The guide is under ballot. The ballot repose return rate was 78% with an approval rate of 91%. 167 comments were received and now needs to be addressed

The WG chair will call for approval to start a ballot resolution team and invite anybody that wants to be part of the resolution team. Once all comments have been addressed the document will again be circulated within the members of the WG.

The par is expiring end of December 2017, thus an extension will be needed for this WG.

B.3.4 TF on Revision of Impulse Tests

Pierre Riffon, Chair; Daniel Sauer, Vice-Chair
New Orleans, LA, April 4th – 4.45pm-6.00 pm

- Pierre Riffon (Chair) not able to attend the 4/4/17 meeting
 - Daniel Sauer (Vice Chair) served as Chair for the 4/4/17 meeting.
 - John Foschia served as secretary
- Based on the membership of 43 prior to the 4/4/17 meeting, 22 members were required for a quorum.
 - No members were dropped from the roster prior to this meeting
 - 6 members were added to the membership prior to this meeting
 - 19 members present at start of the meeting; **quorum could not be established.**
 - 21 members were present at the start of new business during a recount; **quorum could not be established.**
 - Final review of the paper roster indicated 76 people in attendance including 23 members which is a quorum and 6 guests requesting membership.
- The spring 2017 agenda and minutes of the fall 2016 meeting could not be approved due to lack of quorum.
- No essential patent claims were brought to attention.

Old Business:

- The third survey pertaining to section 10.3.1.3 of C57.12.90 was discussed.
 - Comments received were brought to attention.
 - “Is chopping-time clear enough?”
 - Are the measurement systems accurate enough to meet the requirements?
 - The chop time limit is specified in C57.12.90-2015.
 - Mr. Bertrand presented the illustration in IEEE Std 4 that defines ‘virtual steepness,’ and recommends that this language is used in C57.12.90 instead of ‘chop-time.’
 - Ajith Varghese highlighted differences in the definitions.
 - David Geibel noted that (dv/dt) measurement is accurately depicted by the word ‘steepness.’
 - No further commentary regarding Pierre’s observations of the comments was offered (refer to Pierre’s 2/25/17 email).

- **A recount of the present members was conducted. At this point, 21 members were present; insufficient to establish a quorum.**
 - No official business could be conducted.

New Business:

- Ajith Varghese asked for discussion regarding:
 - Clear definitions of neutral grounding resistor/reactor (non-)utilization during impulse testing.
 - The current standards have no reference to these scenarios.
 - For transformers with a fully insulated neutral bushing which could be ungrounded in service – what should be the test condition for this bushing?
 - Mark Perkins offered an explanation as to why these devices are not used during impulse testing.
 - Ajith agreed but stated that this should be covered in the standard.
 - When temporary tertiary terminals are established during factory tests, what are the necessary circuits to be established during impulse testing?
 - TV configured similar to operation conditions or are all terminals grounded?
- Meeting was informally adjourned due to lack of quorum.

B.3.5 TF on Revision of Low Frequency Tests

Bill Griesacker, Chairman; Daniel Blaydon, Vice Chairman; Myron Bell, Secretary

New Orleans, LA – April 4, 2017, 1:45 p.m

There were 115 attendees, 35 members and 80 guests present at the meeting; 8 guests requested membership that will be granted. More than 50 % of the working group members were in attendance at the meeting, therefore a quorum was present.

I. The meeting was called to order at 1:45 PM followed by introductions.

Attending members were counted and quorum was verified.

There were no objections to unanimous approval of the agenda.

There were no objections to unanimous approval of the meeting minutes from the 2016 fall meeting in Vancouver.

Old business

Tap changer position during induced test (survey results).

Bertrand Poulan presented the results and comments of the survey conducted after the last meeting. The survey results were as follows: 230 distributed, 106 returned, 7 abstentions, 99 responses, 80 approve as is, 16 approve with comments, and 3 disapprove. Bertrand discussed the disapprovals with the individuals and agreed to make revisions to satisfy the comments. There will be another survey before the next meeting, reflecting the revisions.

Applying pressure inside a transformer tank during induced test (survey results)

Bertrand Poulan agreed to forward the comments from the last survey to Steve

Antosz. Steve will evaluate the comments and introduce revised wording for re-survey.

Alternative Applied test method for HV Delta windings.

No further progress. Based on comments from Don Platts, some believe this information should be placed in a Guide. Ajith Varghese indicated no motion had been passed to establish a PAR for a guide,

but this would be addressed at Thursday's SC meeting. If a motion is made and approved, the application of PAR would follow.

Gassing issue for certain types of transformers with wound cores: proposal for new design test
No progress. There is no indication that the comments from 2 yrs ago have been addressed by Phil Hopkinson, and Phil was not present in our meeting to provide a status.

TF PD Factory Limits report by Vinay Mehrotra

The initial meeting was attended by 171 people; a bigger room was requested for the next meeting. The following two points were covered in the TF for Revision to Low Frequency Dielectric Tests. There was open discussion concerning the scope of the new TF for PD Factory Limits, and agreement that a change to the initial scope had to originate from the TF for Revision to Low Frequency Dielectric Tests. A motion was made by Edgar Trummer to "Amend the scope by adding to TF PD Factory Limits, to provide recommendations for background noise and test acceptance criteria." The second for the motion came from Dan Sauer. The motion passed with 30 members in favor, 0 opposed, and 0 abstentions. There was confusion in the TF PD Factory Limits concerning membership, as the roster for a different TF was circulated. A motion was made by Mark Perkins that "The next meeting should be counted as the initial meeting and all participants should be allowed membership if requested". The second for the motion came from Dan Sauer. The motion passed with 31 members in favor, 0 opposed, and 0 abstentions. The Fall 2017 meeting in Louisville will be considered the initial meeting and all who request membership will be granted.

New business

No new business was discussed.

This Task Force plans to meet next in October of 2017 at the Fall Transformer Committee meeting to be held in Louisville, KY.

Dan Sauer motioned for the meeting to be adjourned. The second for the motion was made by Hemchandra Shertukde. The motion was unanimously passed and the meeting adjourned at 2:54 p.m.

B.3.6 WG - IEEE Guide for the Detection of and Location of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers and Reactors (C57.127)

Chair: Detlev Gross Chairs Vice Chair: Jack Harley Secretary: David Larochelle

New Orleans, LA, April 4th 2017

Room: St. Charles AB (1)

Meeting Attendance

The working group met at 11:00 AM. 84 persons were in the room and 15 members out of 23 were present. Quorum requirement was met. Complete attendance record is available in the AM System. From the 7 membership requests received, 6 have attended the last two meetings and will be included as members for next meeting in Louisville.

Discussions

The meeting started with the unanimous approval of the agenda (Thang Hochanh). The minutes from Vancouver's meeting were also unanimously approved (motion by Thang Hochanh, second by Robert Brusetti).

No new patent was brought to our attention during the call for patent.

It was mentioned that our PAR will expire in December 2019. For meeting this deadline without asking for extension, the work will focus on having a stable document after F17 meeting. Changes will be made to the document and circulated for comments before Louisville.

Robert Brusetti questioned the need to mention a number of sensors in subclause 4.2. The reason why 3 sensors are mentioned is because this section covers the spherical triangulation approach which needs 3 sensors. It is an explanation of the technique and not meant as a recommendation.

Robert Brusetti also mentioned his disagreement with the sentence in clause 11 that states that a correlation can be made between acoustic characteristics and PD levels. It was agreed to correct the sentence. He also suggested cropping certain images to emphasize on the signals only, which will be done.

Detlev Gross volunteered to add details to the clause covering the acoustic localisation during impulse test.

Raja Kuppaswami suggested adding examples for user to better distinguish the direct propagation path and the combined oil-steel path. This could include mathematical approaches that could fall under patent material with ownership outside our WG. Alexander Kraetge volunteered to work on adding this information with concepts from public domain.

Hemchandra Shertukde suggested not removing Annex C covering wavelet transform for being an applicable approach to solving times of arrival of waveforms. He will provide examples where such process was proven useful. Waldemar Ziomek and Detlev Gross suggested adding the time-frequency analysis as a wider topic since wavelet processing is not the only option.

The group will meet again in Louisville for the fall 2017 meeting.

Adjournment

The meeting was adjourned at 11:50 AM.

David Larochelle

B 3.7 Working Group for PD in bushings, PTs and CTs – PC57.160
WG Secretary: Thomas Sizemore; WG Chair: Thang Hochanh
Meeting Minutes April 3rd, 2017 at 4:45 – New Orleans. LA

Attendees: 71

Members attending: 19/42 - Quorum requirements were not met.

Rosters: Circulated for members and guests.

Agenda: An agenda was presented for the meeting.

Essential Patent Claims: Text was displayed and the Chair inquired as to if anyone knew of essential patent claims. None were brought up during the meeting.

Minutes: Minutes could not be approved due to the quorum requirements not being met.

Items discussed based upon comments received:

A total of 23 comments were received for discussion many were editorial or minor in nature. Details of the discussion points are below.

Comments discussed and which will be incorporated into the next draft:

- An abstract was not included in the previous draft. Suggested text was provided.
- Keywords were not included in the previous draft. Suggested text was provided.
- A suggestion was made to change the order of the references.
- Change ‘pico-Coulombs’ to ‘picocoulombs’ in several locations.
- Section 3.1 correct referenced clause number.
- Section 4.2.1 make the last indented statement a separate paragraph.
- Section 4.2.2 add the word ‘capacitance’ for clarity.
- Sections 4.2.2 and 7.1 Discussed wording regarding allowing the measured PD noise to be as high as the limit if no higher values are measured.
- Section 4.2.4.1 Discussed changing to 500 kHz from 1 MHz.
- Sections 4.2.4.2 and Appendix A removed company logo from provided figures.
- Section 4.2.4.3 Added qIEC, Rmax, Rmin and Pulse Train definitions from IEC.
- Section 4.2.4.4 Removed typographical error from the section heading.
- Section 4.2.4.4 Discussed adding stronger language for recommend recording and evaluation of several pieces of data. Chose to leave the current language both because it would be excessively hard to do in higher production environments and also to prevent potentially controversial language from a legal standpoint.
- Section 6.2 Discussed the wording relating to the use of shielding as part of test preparation.
- Annex C updated references which called out ‘B’ instead of ‘C’ figures and text.

Motion to submit the document for ballot: At the next meeting, a motion for ballot will be submit to the WG members.

PAR extension: Due to the termination (2017-12-31) of the original PAR, a PAR extension is necessary.

Motion to adjourn: A motion was presented by Bertrand Poulin and was seconded by Vladimir Khalin.

Fall meeting 2017: This WG plans to continue working at the IEEE Fall meeting in Louisville (KY).

Next version of draft: A new and “final” draft is being prepared to incorporate all of the recent comments. This will be sent out between meetings.

Date: 2017-04-03
 Chairman: Thang Hochanh
 Secretary: Thomas Sizemore

**B 3.8 Task Force Winding Insulation Power Factor & Winding Insulation Resistance Limits
 WG Secretary: Diego Robalino; WG Chair: Susmitha Tarlapally
 Tuesday 4/4/17– New Orleans Canada.**

Meeting initiated at 08:00 AM at the Grand Ballroom AB, Astor Crown Plaza Hotel, New Orleans, LA, USA.

Susmitha Tarlapally (Chair) and Diego Robalino (Secretary) at the meeting

Meeting started with introduction of attendees

At the beginning of the meeting, 22 members were in the room out of 36 total members listed. Quorum was established to continue with the agenda.

- Data received from Cluod-in-hand
 - Activity Name: TF Winding Insulation PF/Resistance Limits
 - Activity ID: 2186

Number of Members in Activity = 36

Number of Members Present = 22

Quorum Present = 61.1%

Number of attendees = 127

- 10 new guests requested membership and 8 guests were granted membership.
- Susmitha presented the Agenda for the S17 meeting. None opposed to unanimous approval of agenda. Agenda for S17 meeting was approved unanimously
- Susmitha requested a motion for Approval of F16 meeting minutes submitted previously to members and guests.
 - Motion by Aniruddha Narawane
 - Second: James Antweiler
 - None opposed to F16 meeting minutes approval
 - F16 meeting minutes were approved unanimously
- The scope of the TF was read again to all attendees
- Susmitha made a review of the documentation gathered so far supporting the activity of this TF
- Diego presented a summary of the information gathered during the F16 meeting on an anonymous survey
 - Charts included acceptance limits for:
 - PF (line frequency) based on rated KVA and kV
 - IR based on rated kVA and kV
 - Results showed a tendency of values for PF line frequency at different MVA and kV ratings
 - Results showed a wide dispersion of limit values for IR
- Open discussion on survey data presented
 - Mark Perkins suggested to reduce variability of IR limits by separating delta and wye configurations with reference to a resistance value per nominal kV.
 - The influence of bushings on the PF measurement was brought up to the attention of the TF. It was suggested to approach the bushing group and get a feedback of the influence of the bushings due to materials.
 - Ali Naderian suggested to review in the literature the formulas correlating kV and KVA to PF
 - It was suggested to establish the factory limits and provide guidance to percentage increase in the field
 - Recommended best practices for testing different types of transformers
 - Ramsis Girgis suggested to include the type of core as variability might be observed between core and shell type, as well as wound type. A section is suggested to include core and cutting.
 - Suggested to differentiate in the survey the type of insulating liquid: mineral oil or ester oil.
 - Baitun Yang suggested factory testing to be benchmark for future analysis and limits should be recommended only.
 - Aniruddha Narawane requested to include the influence of grounded shield
 - Mario Locarno reminded the attendees that the scope of the TF is factory acceptance and/or field commissioning limits. The scope does not include field data.
- There were no new topics for discussion
- Susmitha requested a motion to move into a WG to continue with the activity

- Ajith Varghese clarified the TF cannot be a working group unless it is related to the main standard. We have to continue as a task force and come up with recommended limits. Some suggestion shall come out from the work on this TF before any decision is taken to move forward.
- Mark Perkins suggested to start with Class II Power transformers with oil-paper insulation as those seem to have more consistency of data based on the survey
- The survey needs more detail and become more specific
- It was suggested to ask NETA if data base could be used
- It was suggested to divide the data between manufacturers and end users
- A decision was made to form a smaller group and frame a table to be circulated among members and guests for a formal survey
- Members and guests volunteered to complete this task (total of 12). Meeting will be arranged by Susmitha Tarlapally over skype.

Peter Werelius	Mario Locarno
Saurabh Ghosh	Subhash Tuli
Tauhid Ansari	Matthew Weisensee
James Antweiler	Fernando Leal
Cihangir Sen	David Wallach
Don Dorris	Aniruddha Narawane
Poorvi Patel	Susmitha Tarlapally
Scott Marshall	Diego Robalino

- No more topics for discussion
- Motion to adjourn:
 - Aniruddha Narawane
 - Second: Diego Robalino
- Meeting adjourn 9:01 AM

B.4 Liaison Reports

B.4.1 IEEE High-Voltage Testing Techniques Subcommittee, Liaison Report to Dielectric Tests, Subcommittee of IEEE Transformers Committee, Submitted by Jeff Britton (HVTT Chair) on behalf of Arthur Molden, April 5th, 2017, New Orleans, LA

The High-Voltage Testing Techniques (HVTT) Subcommittee of the IEEE Power System Instrumentation and Measurements Committee met in New Orleans, Louisiana on January 11th, 2017, in conjunction with the 2017 IEEE PES Joint Technical Committee Meeting. There were a total of:

20 Onsite Attendees – Comprised of 7 Members and 13 Guests

31 Web Meeting Attendees – Comprised of 4 Members and 27 Guests

Official HVTT Subcommittee Membership presently stands at 13 persons, so we had a strong quorum present. Of the total of 40 Guests, 30 requested membership. Ray Hill of NEETRAC was accepted as a new member of the Subcommittee.

Following introductions, a presentation was given by representatives of State Grid Corporation, China, regarding a PAR submitted to IEEE SA to develop a Guide titled “Guide for Accurate Measurement and

Classification of Fast-Front and Very Fast-Front Overvoltages in Electric Power Systems”. IEEE SA was looking for possible PES Committees to sponsor the development of this guide, and the Transmission and Distribution and Power System Instrumentation and Measurements Committees were offered the opportunity to participate. At the meeting, PSIM/HVTT agreed to provide input to the PAR, and possibly participate in the document development.

Working Group Updates: HVTT presently has 2 active working groups which also met at the JTCM:

WG P1122 “IEEE Standard for the Digital Recorders for Measurements in High-Voltage Impulse Tests”
Chaired by Jeff Britton (Phenix Technologies), with Secretary Tom Melle (Highvolt).

This group met and reviewed the overall uncertainty requirements on digital recorders as stated in IEEE 1122-1998, and compared these to the requirements stated in the present Committee Draft of IEC Standard 61083-1. There are minor differences between the IEC and IEEE documents, and where possible we will work to harmonize the standards. The other technical topics being addressed in the revision will be:

- To review and update the initial qualification and periodic testing requirements for digital recorders used to measure high-voltage impulses,
- To ensure that a mathematically correct, standard methodology is given for estimation of the overall uncertainty based on the results of the various tests and measurements prescribed in the standard.

WG P510 “Guide for Electrical Safety in High-Voltage Testing”
Chaired by Jeff Hildreth (Bonneville Power Administration) with Secretary Johannes Rickmann (Phenix Technologies)

This WG met for the first time, having received PAR approval in December 2016.

A proposed table of contents was presented by the chair, and comments received on the proposed table of contents were discussed. An older CENELEC document (EN 50191) was also circulated for discussion.

Assignments for the next meeting include a further review of existing safety documents published or “in use” that members can locate and provide to the WG. By the next meeting, individual writing tasks should begin to be assigned.

Following the WG reports, there was discussion on a proposal to develop a general IEEE Guide for Partial Discharge Measurement. A motion was passed to form a task force to develop a scope statement for such a guide. Once reviewed and accepted by the Subcommittee, this scope statement will become the basis for a PAR. The TF is presently being chaired by Nigel McQuin (McQuin Power Consulting), and also includes Detlev Gross (Power Diagnostix) and Jeff Britton (Phenix Technologies) who may give input from the perspective of the Transformers Committee. Membership on this TF is open, and anyone who would like to join may contact Detlev Gross or Jeff Britton.

The HVTT Subcommittee is planning to meet in the Fall of 2017, tentatively during the week of October 2nd, in Clearwater Beach Florida.

Anyone interested in participating in the work of HVTT should contact Arthur Molden, Jim McBride or Jeff Britton.

B.5 Discussions

None.

B.6 Old Business

As a part of Old business the chair talked about the request for an entity PAR for guide for field measurements and Pattern recognition of Partial Discharges in oil-immersed Power Transformers. During Vancouver meeting, a representative from SGCC had a made a presentation to support this.

Chair reported that PAR request was reviewed during administrative subcommittee on Sunday 4/2/2017 and was not approved due to significant overlap with current standards. It was pointed out that there was at least four standards or guides (C57.127, C57.113, C57.152 and C57.124) that have some overlaps. UHF is not included in the current standard but scope of the current documents doesn't exclude the requested topics. PAR Applicant is advised to participate in Transformer Committee WGs towards addressing areas that are not covered in existing documents

B.7 New Business

- **Accuracy requirement for power factor test defined under C57.12.90 – 10.10.2**
 - There is a request to identify the equipment accuracy during power factor testing.
 - Bertrand pointed out that we should not talk about accuracy but rather **uncertainty** is not greater than xx%
 - The Equipment manufacturer all agreed to that the equipment uncertainty of +/- 1% can be met.
 - Suggestion was made to send out a survey to PF- equipment manufacturer
 - Ali suggested to possibly create a new TF
 - Diego suggested to include this topic in the TF for Winding Insulation Power Factor & Winding Insulation Resistance Limits
 - Dan Sauer made a motion to include in the scope of TF on Winding Insulation Power Factor & Winding Insulation Resistance Limits to review and recommend accuracy of PF Test as defined under C57.12.90-10.10.2 – Bertrand made a second.
 - 52 approved this suggestion, 2 Abstained, No negatives
- **Concern with bushing PD affecting transformer induce test.**
 - A concern was raised in Bushing SC meeting regarding need for bushings to be vented to have transformer pass partial discharge limits during induce test.
 - Transformer and bushing manufactures shared their experience and knowledge of this phenomena that seems to appear only at factory testing and has not been seen in the field.
 - Steve Antosz recommended this topic can be added to agenda for the TF on The Revision of Low Frequency TF for additional investigation and recommendation, which Chair agreed.

B.8 Adjournment

Meeting adjourned 12.05 PM. Motion to adjourn made by Dan Sauer and Diego Robalino

Minutes respectfully submitted by:

Poorvi Patel

Secretary DTSC.