

Annex B Dielectric Tests Subcommittee

**October 26th, 2016
Vancouver Canada.**

Dielectric Tests Subcommittee		
Chair: Ajith M. Varghese	Vice-Chair: Thang Hochanh	Secretary: Poorvi Patel
Room : Grand Ballroom	Date : October 26 th , 2016	Time: 11:00 am to 12:15 pm
Members : 118	Present at time of checking : 77	Present per attendance roster & recorded to AM System: 86
Guests present : 139	Membership requested : 19	Membership accepted: 8

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. 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 shared details of upcoming PES sponsored meeting as well as details of next transformer committee. PES T&D Expo will be at Denver Colorado from 2018 April 16th – 19th. The next IEEE PES General Meeting will be in July 16th-20th,2017 in Chicago. The next transformer committee will be from April 2nd – 6th, 2017 at New Orleans, Louisiana.

Current Status of PARs was presented. C57.138 Recommended Practice for Routine Impulse Tests for Distribution Transformers – par expires 2016 however a par extension has been requested. C57.161 Guide for DFR Measurements, par expires December 2017.

Last meeting in Atlanta GA, 24 requested membership and 11 request were accepted. 9 participants status went from member to guest due to lack of attendance.

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. 77 out of 118 members were present at time of checking, so there was a quorum.

All attendance is recorded in AM System. Per verification of roster 86 members and 139 guests attended the SC in Vancouver, Canada.

The agenda was presented by the chair and it was unanimously approved. Motion for approval was made by Daniel Sauer and second by Sanjib Som

The minutes of the Spring 2016 meeting at Atlanta meeting was approved unanimously. Motion for approval of meeting minutes was made by Daniel Sauer and seconded by Vijay Mehrotra.

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 October 24, 2016 at 9:30 AM in the Sheraton Vancouver Wall Centre. There were 53 people in attendance; 14 of 18 members, and 39 guests. Two guests requested membership, but will not be granted membership because the working group activities are coming to an end. A quorum was achieved. The full attendance record is available in the AM System.

Dan Sauer moved that the meeting agenda be approved. David Wallace seconded the motion. The agenda was unanimously approved.

Joshua Verdell moved that the spring 2016 meeting minutes be approved as written. Dan Sauer seconded the motion. There were no revisions or additions to the minutes. The motion passed unanimously.

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

The chair stated that he will be sending the text and table to the Dielectric Test Subcommittee, immediately following the fall 2016 meeting in Vancouver. He then asked for volunteers to help with resolution of the comments from the Dielectric Test Subcommittee. Dan Sauer, Javier Arteaga and Eric Davis volunteered to make up the comment resolution team.

Dan Sauer moved to adjourn the meeting. David Wallace seconded and the meeting was adjourned at 9:40 AM.

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

Ali Naderian, WG Chair; Peter Werelius, Vice Chair, Poorvi Patel, Secretary
Monday, October 24, 2016 – (3:15 -4:30PM)

The meeting was called to order by the WG chair Ali Naderian at 3:15 PM. This is the 7th Working group meeting. There were a total of 97 attendees; 24 members and 73 guests and 8 requested to become members. 6 memberships were granted.

1. With 24 members attending the meeting we had a quorum (out of 37 members)
2. The minutes of meeting from the WG Spring 2016 meeting in Atlanta, GA, was approved- motion for approval from Mark Perkins and Diego Robalino.
3. Ali presented the timeline of this working guide- The WG was established in 2013. 7 TF was created and a first draft of document was produced in 2014. It modified by working group and task force members to create D1.3. This draft document was circulated for review in 2015 and about 125

comments was received. Over several conference calls and meeting in accordance to the fall or spring meeting the comments were addressed and a second revision of the document was produced. The review of the document generated comments from 2 reviewers (thanks reviewers) which was addressed in 2 conference calls between the Atlanta meeting and Vancouver meeting. The latest draft D2.0 was created October 3rd 2016 and uploaded to the website. D2.0 draft was also sent to the Dielectric Test Subcommittee Oct 10th 2016 for review.

4. The Par is expiring on 31st of December 2017.
5. The document is ready for Ballot voting. 2/3 of the members need to approve to take the document to ballot
 - a) Mark Perkins questioned if the document has been reviewed by the subcommittee?
 - b) Chuck Sweetser commented that some review of editorial nature was needed
 - c) Don Plats indicated that the graphs may not be according to the IEEE standard practice
 - d) If we go for review mode- volunteers are needed to review the document that has not been produced by them
 - e) Mario indicated that this is what happens in the ballot process –many many fresh eyes will review the document and come with comments
 - f) Dan Sauer indicated that if we don't move to ballot we will probably need to have a par extension- this can however be decided in the spring meeting and if we have come far we may also go for ballot then.
 - g) Ballot are fresh eyes looking at the document
 - h) Mario Motioned to send the document for ballot- second motion came from Tom Prevost
 - i) If we pass the voting to send the document for ballot- a second approval process needs to be done in the Subcommittee level.
 - j) Dan Sauer and Mark Perkins had a motion to amend the existing motion- to do send the document to the subcommittee for review and go for ballot next meeting.
 - k) Ajit indicated we should go for clearing out the first motion made by Tom and Mario
 - l) The outcome from the subcommittee level could very well be go for a review and not ballot.
 - m) The document was voted for ballot – 16 members voted to go for ballot and 3 opposed- thus 2/3 majority was received. The document will be recommended to the subcommittee to go for ballot
6. Peter Werelius presented a study about DFR measurements on HV-bushings. Very interesting results was presented.
7. This DFR guide produced in this WG does not include DFR on Bushings, this could be a future TF.
8. Ali concluded to thank all the task Force leaders and contributors for their hard work on producing this DFR Guide.
9. Meeting was adjourned 4.15 pm- motion to adjourn by Diego Robalino and Tauhid Ansari.
10. Attendance was recorded in AM system after the meeting.

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

**B.3.2 Working Group for Revision of the Distribution Impulse Test Guide C57.138
Recommended Practice for Routine Impulse Test of Distribution Transformers;
Arthur Molden, Chair; Susmitha Tarlapally, Vice-Chair**

Vancouver, Canada, October 24th, 2016

The ballot and recirculation of a final Draft 4 of the document was successfully completed and that draft has now been accepted for final review by RevCom. The RevCom meeting at which acceptance will be voted on will be in December.

A. Molden

**B.3.4 TF on Revision of Impulse Tests
Pierre Riffon, Chair; Daniel Sauer, Vice-Chair
Vancouver, October 25th – 4.45pm-6.00 pm**

The TF met on October 25, 2016, from 4:45 pm to 6:00 pm. Twenty-one (21) members and fifty-one (51) guests attended the meeting. Seven (7) guests requested membership. The meeting was chaired by Pierre Riffon, chair of the TF. Mr. Daniel Sauer was the vice-chair. Attendance has been recorded in the AM system.

Required quorum was met, presence of at least 19 members was required. Twenty-one members were present. The TF membership and guest roster has been reviewed after the Atlanta meeting and members who did not attend the last two meetings were moved as guests. Guests (114) who did not attend the last five meetings have been deleted from the TF roster.

Revision 1 of the agenda has been approved unanimously. Mr. D. Wallace made the motion and Mr. B. Poulin seconded it.

The Memphis meeting minutes were approved as written by all members present. The motion has been made by Mr. M. Perkins and seconded by Mr. J. McBride.

The Atlanta meeting minutes were also approved unanimously. The motion has been made by Mr. D. Wallace and seconded by Mr. M. Perkins.

The first item of business was related to the 4th survey on the impulse front time test parameters and tolerances. This survey was sent on March 27, 2016 to the TF and Dielectric Tests Subcommittee rosters. Out of 592 individuals who were asked to participate, 88 provided a reply (return rate of 14.9%). Out of these 88, 80 were approved or approved with comments (100% approval rate), none disapproved and 8 abstained. The proposal is making consensus and will be sent to Steve Antosz for inclusion in the next revision of C57.12.90.

The second item of business was related to the 2nd survey on the way that the chopping time during chopped-wave tests is defined and measured. This survey was sent on March 27, 2016 to the TF and Dielectric Tests Subcommittee rosters. Out of 645 individuals who were asked to participate, 87 provided a reply (return rate of 13.5%). Out of these 87, 67 were approved or approved with comments (89.3%

approval rate), 8 disapproved and 12 abstained. The negatives have been discussed and in order to satisfy most of them, a TF Chair counterproposal has been discussed and agreed upon. This counterproposal will be surveyed to the TF and Dielectric Tests Subcommittee rosters prior to next meeting. The motion for making new survey has been made by Mr. A. Varghese and was seconded by Mr. M. Perkins.

The third item of business was related to the 2nd survey on the instantaneous voltage level at instant of chopping. This survey was sent on March 27, 2016 to the TF membership. Out of 303 individuals who were asked to participate, 48 provided a reply (return rate of 15.8%). Out of these 50, 28 were approved or approved with comments (68.2% approval rate), 13 disapproved and 7 abstained. The negatives have been discussed.

In addition to the Chair proposal, a question of principle related to the need of having such additional criteria was also surveyed. 48.8 % replied "yes" and 34.8% did answer that this is not needed.

Since there is no clear and large consensus, this subject will be dropped from the TF agenda unless a member will come with something which may make a better consensus.

On the new business, the Chair received an Email from Phil Hopkinson regarding the need of revising impulse testing procedures and adding new transient tests in order to improve transient test severities for covering resonance related failures during service. The TF Chair considers that this is too early for discussion and needs to be, first, fully discussed and agreed within the C57.142 TF and Dielectric Tests Subcommittee.

The meeting adjourned at 5:40 pm on October 25, 2016. The adjournment motion was made by Mr. J. McBride and was seconded by Mr. A. Bolliger.

The next meeting is planned to be held in New Orleans, LA, on April 4, 2017.

Pierre Riffon P. Eng.

TF Chair

October 25, 2016.

B.3.5 TF on Revision of Low Frequency Tests

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

Vancouver, BC – October 25, 2016, 1:45 p.m..

1. There were 129 attendees, 31 members and 98 guests present at the meeting; 10 guests requested membership, 5 of those will be granted. More than 50 % of the working group members were in attendance at the meeting, therefore a quorum was present.
2. The meeting was called to order at 1:45 PM
3. The agenda for the meeting was presented and unanimously approved.

4. A motion was made to approve the minutes from the Spring 2016 meeting in Atlanta, GA. The minutes were unanimously approved with no objections or comments voiced. One editorial correction was made to the minutes concerning the year referenced for the previous meeting.
5. New business
 - a. A presentation was given by Edgar Trummer concerning PD level criteria during induced voltage tests.
 - I. The presentation triggered a discussion concerning the current PD level criteria covered in IEEE standards. The general consensus of the group was that the guaranteed PD levels in the current standards need to be reduced.
 - II. Edgar Trummer made a motion to “Reduce allowable PD levels to 100 pC, allow no PD up to max operating voltage, call for a maximum PD @ 110% max operating voltage to be 20 pC, require maximum background noise level of 40 pC, and determine PD inception and extinction voltage.” The motion was rejected based on 0 votes in favor, 22 in opposition, and 4 abstentions.
 - III. A second motion was made by Steve Antosz to form a study group, under this Task Force, to investigate standard PD limits during induced voltage testing. The motion passed unanimously and volunteers were asked to approach the Chairperson after the meeting to participate in the study group. Volunteers are still needed and are encouraged to contact Bill Griesacker, Dan Blaydon, or Myron Bell if they would like to participate. A meeting time slot has been requested for Monday of the next Transformers Committee meeting to be held in New Orleans.
 - b. A suggestion was made to explore the idea of a Low Frequency Dielectric Test Guide, similar to the other companion guides that already exist for other sections of 12.90. Bertrand said this would be an issue for the SC to discuss and he would follow up with them.
6. Old business
 - a. Tap changer position during induced test (survey results).

Bertrand Poulan presented the results and comments of the survey conducted after the last meeting. A positive approval rate was observed, however, there is still no agreement. Bertrand offered a few options on how we could proceed and will follow up with an updated text for the survey and report back.
 - b. Applying pressure inside a transformer tank during induced test (survey results)

Bertrand Poulan once again presented results and comments from the survey with an overall good approval rate. There are still too many valid comments opposing the wording and requirements, but has overall made everyone aware of the possibility occurring during factory testing. Bertrand will follow up with new wording of the proposal. Don Platts’ survey response noted that some of the new wording sounded like more like a guide. It was suggested that one option would be to undertake a low

frequency test guide, and maybe for now move the text to an informative annex until a guide is written.

- c. Alternative Applied test method for HV Delta windings.

No further progress, this topic was tabled until the next meeting.

- d. Gassing issue for certain types of transformers with wound cores: proposal for new design test

Carried over from last meeting, this topic was tabled until next meeting.

- e. Dielectric testing in the field.

Carried over from last meeting. Mark Perkins will write the details of a motion to generally require field tests on transformers with new insulation to be tested in accordance with C57.12.00 test voltage levels and transformers with other than new insulation to be tested in accordance with C57.12.90 test voltage levels. Background levels for PD can be a problem in the field and will need to be addressed.

- 7. This Task Force plans to meet next in April of 2017 at the Spring Transformer Committee meeting to be held in New Orleans, Louisiana.
- 8. The meeting adjourned at 3:00 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

Vancouver, October 25th 2016

Room: Port Alberni

1. Meeting Attendance

The working group met at 11:00 AM. 74 persons were in the room and 20 members out of 22 were present. Quorum requirement was met. Complete attendance record is available in the AM System.

2. Discussions

The meeting started with the unanimous approval of the agenda (motion by Gregorio Lobo, second by Mike Franchek. The minutes from the Atlanta meeting were also unanimously approved (motion by Hemchandra Shertukde, second by Mike Franchek).

During call for patents potentially essential to the implementation of the proposed guide, Hemchandra Shertukde, Ph.D., declared his patent number US6178386. Subsequent review of the US Patent Office website indicates that this patent was recorded January 24, 2001 and expired February 18, 2013. Unless there is further information to the contrary, this patent will not be included in the Guide.

A presentation was given to the group about certain acoustic principles that will be added to the guide. Details were given about the way the mechanical energy from the partial discharges disperses in a spherical way. The energy drops with the square of the distance. It was also mentioned that oil

temperature will have an effect on the propagation speed which will affect the precision of the location results if not compensated.

Different examples of wave shapes were presented with characteristics corresponding to the direct path to the sensor (oil only) and to the combined oil-steel propagation path. Internal structure of the transformer will sometimes prevent direct propagation of the waves to the tank wall. In some case, the waves will propagate through channels that will guide the waves to an exit point from where normal propagation can take place. In these cases, localisation results will change when changing the sensors position on the tank. Having the schematics of the transformer is a great advantage for identifying the possible propagation paths.

Raja Kuppaswamy mentioned that there are calculations on the waves that can be used to extract the time of arrival. Although this is usually a process correctly done manually by the users, Arturo Nunez mentioned that it can be of great use when acoustic is used in a monitoring perspective.

Two additions to chapter 6 were shown to the group highlighting differences from factory test to field test regarding power frequency and available sensors to acquire electrical signal.

A call was made to the group to gather examples of documented localisation cases for potential inclusion in the guide. The cases would ideally represent different contexts of localisation and highlight the procedures that led to successful results.

The group will meet again in New Orleans for the spring 2017 meeting.

3. Adjournment

The meeting was adjourned at 12:10 PM.

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 October 24, 2015 at 4:45 – Vancouver, BC Canada

Attendees: 57

Members attending: 20/34

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: Motion approved David Wallace (1st) & Pierre Riffon (2nd)

Items discussed based upon comments received:

A total of 17 comments were received for discussion many were editorial or minor in nature. Details of the discussion points are below.

Comments accepted and which will be in the next draft:

- Introduction – An introduction will be added to the draft.
- IEEE C57.13 was not in the list of references.
- 6.3.1 Figure 3 text is to be updated for consistency of wording which references test taps.
- 6.3.2.1 Pierre Riffon proposed text for the bushing section to match the instrument transformer section regarding the measured PD limits once the calibration is completed.
- 6.4 It was proposed to move the list of abbreviations from 6.4 up in the document to 3.2 as they are used throughout the document.
- 6.4 Shibao Zhang proposed an editorial change from ‘is’ to ‘are’.
- 6.4 Shibao Zhang proposed an editorial change in paragraph 1 to match the indication of bushing tap for consistency.
- 6.5.1 Shibao Zhang proposed to add the following text to the end of the section. "Calibration circuits in Figures 10 and 11 may be slightly adjusted to reflect the point that the ambient noise during the test can be as high as the testing circuits in Figures 5, 6, and 9. However, the calibration injection points should always be the outlet of the capacitance C1 of the test object, points A and B. “
- 6.6.1 Pierre Riffon indicated that a precision need to be mentioned to reflect the point that the verification of a valid calibration is performed at a level not necessarily at 50% of the partial discharge limit for DC bushings.
- Thomas Sizemore indicated that several figures need to be updated to improve consistency of line weights, etc.
- Pierre Riffon: Correction to figure 17 labeled as a balanced circuit (unbalanced circuit).
- Figure 10: For the clarity of the figure, the chair proposes a dotted line box around the capacitor and the square wave signal generator.
- 7.2.1 Vladimir Khalin indicated that no explicit instructions were provided for the testing of line to line VTs.
- The annex 'PD Measuring Circuits' (initially annex A), covers many of the same topics as the guide. It was decided to remove it, due to duplication of definitions and explanations
- Thomas Sizemore propose an introduction to be added to the annex related to PD patterns.

The follow comments were discussed but not accepted.

- 6.5.1 Jitendra Mamtora indicated a potential error in the calibrator circuits used in the guide.
- An additional pattern taken from an online monitoring system was discussed. The PD pattern cannot be positively identified being in the bushing installed on a transformer.

Additional items discussed:

The wording of the PAR was discussed. It currently does not cover DC bushings which are in the draft document. The working group agreed to pursue a change in the PAR to incorporate DC bushings in the guide. Tom Provost indicated that he is willing to assist the Chair in this process.

Motion to adjourn: A motion was presented by David Wallace and was seconded by Detlev Gross.

Spring meeting 2017: The chair plans to wrap-up the draft for the New Orleans meeting and submit the Draft for approval by the WG.

Date: 2016-10-25
 Secretary: Thomas Sizemore
 Chair: Thang Hochanh

B 3.8 Task Force Winding Insulation Power Factor & Winding Insulation Resistance Limits
WG Secretary: Diego Robalino; WG Chair: Susmitha Tarlapally
Tuesday 10/25/16– Vancouver, Canada

Meeting initiated at 08:00 AM at the Jr. Ballroom CD, Sheraton Wall Center, Vancouver, BC, Canada

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

Quorum identified 25 members attending at the beginning of the session. Attendee Session Report from the electronic System shows;

Activity Name: TF Winding Insulation PF/Resistance Limits

Activity ID: 2186

Number of Members in Activity = 46

Number of Members Present = 25

Quorum Present = 54.3%

Number of attendees = 79

- Susmitha requested a motion for Approval of S16 meeting minutes, Ajith Varguese first and David Wallach second to approve the minutes. None oppose. Unanimous approval.
- Diego Robalino presented 7 general examples of different PF and IR tests performed and results were used for general discussion.
 - Mark Lachman pointed out that looking only at PF values may not be important, need to look at C and current, watt loss.
 - It was emphasized that probably using only PF and IR values is not sufficient and best practices together with better diagnostic references should be considered
- A generic survey flyer is distributed among the group to get an idea of the limits in the mind of the attendees to this TF session.
 - Suggested to add if the person completing the survey is a Member or Guest
 - Suggested to go back to factory and get a better and more accurate number
 - Peter Werelius suggested not to use PI for acceptance/commissioning.
 - Requested to submit the survey information via e-mail if no need for confidentiality
 - Aniruddha Narawane, questioned the scope and the validity of the survey. Susmitha explained the need for having some benchmark information from the group.
- Survey flyers collected.
- Any new topic for discussion:
 - Mark Perkins: Temperature correction of parameters is an issue. Major change on Temperature correction procedure. Mentioned the use of DFR as part of the analysis, mentioned geometrical parameters having an influence on the temperature correction. The importance of temperature correction has been highlighted.
 - Susmitha responded that condition might be different for distribution transformers vs power transformers and factory test might be performed at temperatures away from 20C.
 - Mark Lachman: Mentioned the influence of bushings or other components on the overall PF.
- Ajith Varguese: Asking what is next step. How to use this survey? Susmitha explained the use of information for reference and statistical analysis.
- Data Base question: Michael Franchek had no updates and Ajith will ask and provide feedback later to TF leaders.

- Ramsis: discussed the influence of wound core technology, high resistance among the core, would this affect the PF measurement? Suggested to include the core design for PF limits.
- Poorvi Patel also mentioned the differences that may be observed between different capacitances tested.
- Survey table will be submitted to the members and guests covering the topics for survey from the first meeting. Requested motion to proceed.
 - Mario Locarno: Motion to send the survey to members of the TF detailing information to gather and begin the task of collecting general reference for what limits should look like for PF and IR.
 - Dan suggested to submit to members and guests
 - Uannimus approval
- No more topics for discussion
- Motion to adjourn Vijay Tendulkar, Aniruddha Narawane second
- Meeting adjourn 8:55AM

B.4 Liaison Reports

B.4.1 Voltage Test Techniques (HVTT), IEEE Standard 4 - Arthur Molden

HVTT LIAISON REPORT OCTOBER 2016, VANCOUVER BC CANADA

The IEEE High Voltage Test Techniques (HVTT) Subcommittee of the Power Systems Instrumentation and Measurement (PSIM) Committee met in conjunction with the IEEE PES Fall 2016 Switchgear Committee Meeting, in Pittsburgh, PA. The meeting took place at 2PM, Tuesday October 11th, in the hotel and on line via a video web conferencing service. There were 6 members and 3 guests present onsite for the meeting, 1 member and 3 guests attending via web conference, and 1 member attending via teleconference. The membership attendance was sufficient to achieve a quorum, and the Minutes of the last HVTT meeting held in Memphis, TN in January 2016 were approved.

Prior to this meeting, members of the HVTT Subcommittee made a presentation to the Switchgear Committee members and guests on Monday October 10th, which included a brief history of IEEE Standard 4, a presentation on measurement uncertainties, and a presentation on impulse parameter extraction by the k-factor method.

On the morning of Tuesday October 11th, the working groups met who are responsible for the revisions of IEEE 1122 and IEEE 510.

IEEE 1122 is the Standard for Digital Recorders for Measurements in High-Voltage Impulse Tests. The minutes of this meeting will be included in the HVTT minutes when published later this year. There is an active PAR for the revision of this standard, which was last reaffirmed in 2008.

IEEE 510 is the Recommended Practices for Safety in High-Voltage and High-Power Testing. The minutes of this meeting will be included in the HVTT minutes when published later this year. This document was last reaffirmed in 1992, and although it is presently considered as inactive by the IEEE, it is still commonly referenced in other active standards and in work safety procedures utilized by private HV testing organizations. A PAR has been submitted for consideration at the December 2016 IEEE NESCOM meeting to rewrite and reissue this document in the form of an IEEE Guide.

Both working group meetings were conducted from the hotel meeting room and also included web conferencing attendance.

The web conferencing service was a new experience for this working group, and while it enables higher meeting attendance levels and more technical discussion, the service requires a more disciplined coordination of member comments, both in the room and over the web. Audio and video quality can vary during the meeting, and can be compromised by inadvertent interruptions to a comment, the results of which may require repetition of a discussion and some loss in productivity. However the overall result was quite successful.

Actual Standard 4 business discussed at this meeting included:

- Progress of AC voltage measurement Round Robin
- Differences between IEEE Standard 4 and IEC 60060 Step Response testing procedures used in the qualification of impulse measuring systems
- Slightly different definitions for the peak value of an AC voltage in IEEE Standard 4 versus IEC 60060-1
- Corrections required in Table 5 of IEEE 4-2013 to correct the units given for the column specifying the water resistivity values to be used during wet tests of insulators
- The need to provide more information and guidance on the use of Type B (systematic) uncertainties in the estimation of the combined expanded uncertainty, as required in the calibration of HV measuring systems made in accordance with IEEE Standard 4-2013.

Finally, there was interest expressed by the Switchgear Committee in having a general IEEE Guide for Partial Discharge Measurement, as a horizontal (non-apparatus specific) document, as their former PD Guide (IEEE 1291) is expired. The HVTT Subcommittee agrees that such a guide would be beneficial, and we believe that HVTT would be the correct group within IEEE to organize its development. Following some investigation into what level of support may be available to develop such a guide, discussion of this topic will continue at the next HVTT meeting in January 2017.

The High Voltage Testing Techniques Subcommittee is actively soliciting members. Should anyone be interested in joining HVTT or it's working groups, please contact Jim McBride or Jeff Britton for details.

The next HVTT meeting will be at the IEEE Joint Technical Committee Meeting in New Orleans, LA, January 8th to 12th, 2017.

END

Molden / jab 10/26/2016

B.5 Discussions

- The working group chair for DFR Ali Naderian requested a motion to send the current version of DFR guide to ballot. Second motion was made by Diego Robalino. 36 approved to move for ballot, 8 opposed and 9 abstentions. The Current version of the DFR guide was approved to send for ballot.
- Thang Working Group chair for PD in bushings, PTs and CTs – PC57.160- presented a motion to expand the current scope to also include DC Bushings. Second motion was made by Raj Ahuja. Motion was passed unanimously. This motion was also passed in the Bushing Subcommittee meeting.

- Bertrand Poulin proposed a motion to modify the wording on proposed section related to tap changer position during induce test by moving the detailed explanation and examples to annexure of C57.12. 90 until a guide of low frequency testing is developed. Second to this motion was Sanjib Som. 44 approved the motion, 2 opposed and 9 abstentions. There was also a discussion on having a WG for creating the guide on low frequency test but no decision was made.
- Motion to survey the new section on air clearance that was approved by TF on External clearance was passed unanimously.
- Motion to survey for the 3rd time the modified wording related to way that the chopping time during chopped-wave tests is defined and measured was also passed unanimously

B.6 Old Business

Motion Approved during S16 to Request Performance subcommittee to expand scope of Task Force on “ Switching transients induced by transformer-Breaker interaction PC57.142 to “Investigate effect of high frequency transient on transformer and identify mitigation which may including additional factory testing or prevent transients from reaching unit”

Performance Subcommittee Chair agreed to this request.

Phil Hopkinson presented on the subject of transformer failures related to high frequency transient during PC57.142 WG Meeting. This presentation is posted on Dielectric Subcommittee home page - “ Fall Presentation - Impulse Test Concepts “

B.7 New Business

- **Request for PAR “ Guide for Field Measurements and Pattern Recognition of Partial Discharges in Oil-immersed Power Transformers**
 - A PAR request was received by IEEE –SA from SGCC for new guide prior to F16 meeting, but was not discussed in transformer committee earlier.
 - Representative from State Grid Corporation of China made a presentation to support the case.
 - Due to limited time, discussion of the request and presentation could not be taken up. DTSC chair will forward the presentation to members by email before next meeting.
- **Concern with bushing PD affecting transformer induce test.**
 - A concern was raised during F15 Bushing SC meeting regarding need for bushings to be vented to have transformer pass partial discharge limits during induce test. This resulted in lengthy discussion where many transformer manufactures and utilities shared similar views and expressed concerns with warranty and field performance. Bushing manufacturer in general acknowledge the concern but reported there has been no field defects and issue has been there forever with OIP design. Bushing SC requested DTSC to evaluate next steps
 - Due to lack of time, this was not taken up for discussed during this meeting.
- **Review of accuracy requirement for power factor test defined under C57.12.90 – 10.10.2**
 - Due to lack on time, this item was not taken up for discussion during this meeting

B.8 Adjournment

Meeting adjourned 12.05 PM. Motion to adjourn made by Dan Sauer and Sanjib Som

Minutes respectfully submitted by:

Poorvi Patel

Secretary DTSC.