

## **Annex D Dry Type Transformers Subcommittee**

**March 23, 2016  
Atlanta Georgia**

**Chair: Charles Johnson  
Secretary: Casey Ballard**

### **D.1 Introductions and Approval of Agenda and Minutes**

The Subcommittee met on March 23, 2016 at 1:32 PM in the Atlanta 4,5 Room of the Sheraton Atlanta Hotel.

There were 18 of 26 members present (therefore we had a quorum of 69%), and 18 guests present, 6 guests requested membership. The attendance roster will be kept in the AMS.

The agenda was approved unanimously after a motion from Sanjib Som and a second from Martin Navarro.

The minutes of the Memphis, Tennessee meeting were approved unanimously after a motion from Roger Wicks and a second from Mike Sharp.

### **D.2 Working Group/Task Force Reports**

The next order of business was the presentation of the reports of the various working groups and task forces. See the following sections for the individual reports:

#### **D.2.1 IEEE PC57.12.01 - Dry Type General Requirements Chair Casey Ballard**

The working group met in the Georgia 4,5 Rooms of the Sheraton Atlanta Hotel

The meeting was called to order at 1:17 PM by Chairman Casey Ballard

The meeting was convened with 19 members (out of 28 – therefore a quorum was reached with 68% attending) and 30 guests present with 5 guests requesting membership. The attendance was reported in the AMS.

Introductions were made by all participants

The agenda was approved unanimously being no negative votes.

The minutes of the Memphis, TN, November 2, 2015 meeting were approved unanimously being no negative votes

#### **Old business**

- The chair talked through a list of suggested topics from TF members and agreed to provide both the presentation and a red lined version of 12.01 before the next meeting.
  - o Definitions Section on no load losses – standard requires no load loss tests to be performed on cores with top yoke temperatures under 40°C but does not give method to correct core losses if above 40°C
    - Does correction belong in 12.01 or 12.91- will be decided by subcommittee
    - Proposal is to use equation from 12.00 using top yoke instead of top oil
    - Concerns were voiced that core may still be hot when tested and how this would impact the stabilization of cold resistance measurements for the windings

- Maximum altitude Sections 4.2.4 and 4.2.5– no comments to the proposal
- Service Conditions Section 4.2.6i– Rick Marek to provide wording for first revision document
- Rated Power Wording Section 5.4.1– no comments to the proposal
- Rated Voltage Wording Section 5.5.2– no comments to the proposal
- Thermal Protection Section 5.11.3 from Phil Hopkinson
  - Suggested we needed a method that would be equivalent to IEC 60076-11 F0/F1 rating
  - Rick Marek pointed out that test was to determine how much energy a transformer would add to a fire – not if the transformer would catch on fire due to an internal fault
  - Phil conceded that they were different and removed the proposal
- Standard BIL Ratings Table 5
  - Discussion focused on moving 15kV from 60 to 95 BIL, but grew to include 8.7kV class, 601V class and eventually the entire table
  - Chuck Johnson proposed to make 95kV BIL the standard for 15kV while still allowing a customer to specify 60 or 75kV BIL. This was proposed to match the standard levels for distribution liquid immersed transformers.
  - Phil Hopkinson added that increasing BIL may help with fast transients but coordination studies are still required
    - Sanjib Som did not support increasing BIL to address transient issues since these should be prevented to reach the transformer by using suitable suppressors.
  - The proposal was tabled and the chair will send out an email ballot as to whether the members would like to address this issue or not
- Extended Sound Measurement – proposal to add sound measurements after 6 hours on no load and for multiple windings stacked vertically
  - Chair commented that this belongs in 12.91 for definition before adding it to 12.01 and Sanjib agreed
- Ambient Temperature Section 4.1.2 – Sasha Levin proposed to use the 30 day average method from IEC instead of the 24 hour average used by IEEE
  - Comments from the group were that a customer can specify a higher temperature ambient and that changing just in 12.01 may cause issues since 12.00 would not change
  - No further discussion was held and issue was tabled
- Minimum Voltage Rating Scope – change to 208 from 601 – no support from the group
- Applications Section 7.5.d – Inclusion of furnace and traction transformers – no support from the group

### **New business**

- The chair asked for a Secretary and Sasha Levin agreed to volunteer. The chair expressed his gratitude.

Next meeting: Fall 2016, Vancouver, British Columbia, Canada, October 23-17, 2016

With no further business, the meeting was adjourned at 2:29 PM by the chair.

Chairman: Casey Ballard  
Secretary: Sasha Levin

## **D.2.2 IEEE PC57.12.60 - Dry Type Thermal Aging Chair Roger Wicks**

The working group met in the Georgia 4-5 Room in Atlanta Georgia Hotel.

The meeting was called to order at 9:30 AM by Chairman Roger Wicks. Roger explained that he would be assuming the Chair roll as former Chair Casey Ballard had stepped down to assume Chair roll of C57.12.01. Introductions were made and attendance sheet was circulated.

The meeting was convened with 27 people in attendance / 17 members present (Quorum reached.) The minutes from Fall 2015 WG meeting in Memphis and agenda were approved unanimously.

### **Old Business / Review of last meeting:**

#### **1. Reference Temperature Explanation**

Roger Wicks presented information on Thermal Endurance and Reference Time that was presented at previous meeting. Explained that there are different reference times associated with different standards, and that 12.60 uses a “reasonable” reference time of 40,000 hours. Using longer reference requires longer extrapolation of data, making results less statistically acceptable.

He reminded the WG that it was agreed to retain the 40,000 hour reference time at the last meeting in Memphis. Roger also explained that in order to achieve completion of test with desired (low) number of hours for high temperature test point, very high temperatures must be used.

#### **2. Full-Size Working Coil discussion**

Roger reviewed the agreed upon definition for Full-Size Working Coil (as discussed at Fall 2015 Memphis meeting), described as:

*Small-scale transformer coils.* Test samples should be actual full size working coils capable of meeting the requirements of IEEE C57.12.01 and passing the testing per IEEE C57.12.91. Coils shall be selected to represent the transformer range for commercial use...

#### **3. PD Measurement as a trending test**

Reviewed previous proposal of adding information related to PD in C57.12.60. Reminded WG that proposal was approved to include into the standard information on PD as part of an informative annex.

#### **4. Major Insulation materials and method for changes (major)**

Reviewed problem of current standard not having clear information on how to modify an established EIS. A proposal had been made at previous meeting to utilize single point test in place of currently used Sealed Tube (CCT) test for materials deemed as Major insulation but was not voted on due to need for more discussion.

### **Continuation of discussion topics from previous meeting:**

#### **1. Accuracy of model types and methods for changes (voltage and other)**

Mark Raymond reviewed that both full size coil and “model” techniques have been used to developed MV EIS’s, but an abundance of data on completed systems was not available. Mark explained that changes are handled on a case by case basis, and that modifications such as changing a varnish that was present in original EIS may require full three point temperature test.

Explained that models that are used in testing may not be suitable or capable of being tested with Impulse test. He also explained that in IEC, the German NC has proposed a new standard for development of MV EIS’s using “model” technique (IEC 61857-41). This standard has not yet been

released. This standard will use requires three models as opposed to the IEEE requirement for thirteen. Casey Ballard asked if there was data on EIS's tested both ways (model and full size coil), but group was not aware of any data.

A discussion regarding possible ways to approve modification/substitutions for materials by using chemical analysis or comparisons of assigned temperature indexes. Solomon Chiang suggested that IR comparison of materials may be useful, but perhaps would not capture all differences between materials. Roger Wicks explained that different temperature indexes may be assigned to the same material depending on the property that is measured.

## **2. Extension of cold shock testing**

A discussion regarding the possible extension of Cold Shock testing to all types of dry-type transformers was held. Currently cold shock is only required for solid-cast and resin-encapsulated transformers only.

Chuck Johnson explained that these types of transformers were subject to (epoxy resin) cracking, although expansion/contraction in other types (including OVDT) may also cause cracking of insulation. Solomon Chiang pointed out that different expansion rates for Cu and Al may also affect potential cracking.

A motion was made by Casey Ballard, seconded by Tim Mai to strike the reference to "solid-cast and resin-encapsulated designs only" in Clause 4.6 so that all transformers were subject to cold shock test, followed by discussion.

Casey Ballard explained that changes to terminology (including resin encapsulated) may affect how future designs may be tested. Casey reminded the WG that if we did nothing, all transformers would need to be cold shock tested based on the changes in terminology.

A discussion of how future modifications (single points) would be tested (with or without cold shock). Dhiru Patel asked that we consider how EIS's that were tested without a varnish would be handled.

*Following the discussion the motion was approved (14-1) to modify Clause 4.6, striking reference "solid-cast and resin-encapsulated designs only" in the working Draft document.*

## **3. Ratioing Up or Down from tested EIS**

Roger asked the WG if it is acceptable to ratio up or down stress of a new design relative to stress levels tested in an approved system. Roger presented the following examples:

- Example 1 – are the stress levels of a 15kV coil tested per 12.60 acceptable to ratioed up for 72kV
- Example 2 – are the stress levels of a 36kV coil tested per 12.60 acceptable to be ratioed down to 5kV

Mark Raymond discussed that using lower voltages and ratioing up may be acceptable to UL, but would like guidance from IEEE regarding what lower voltage levels would be acceptable.

A motion to approve use of ratioing down (Example 2) was put forth by Casey Ballard and seconded by Sanjib Som. After discussion, motion was not passed and it was decided to defer approval and investigate method further.

## **4. Work Assignments for Revision**

Assignments for the work were reviewed and volunteers solicited. The chair requested that the volunteers provide at least an outline of their thoughts for work on these areas by the end of May.

- Review use of Partial Discharge as a trending test. – Tim Mai and Louis Nemec
- Review proposal of using One Point Test as a way to modify or change a Major insulation in and approved EIS. Review use of Sealed Tube CCT test to approve changes to Minor insulation in an approved EIS – Dhiru Patel, Mark Raymond, Roger Wicks, Ashley Reagan, Solomon Chiang

- Review proposal to use “ratio down” method to approve new (lower) voltage class. – Casey Ballard, Chuck Johnson, Dhiru Patel
- Review other changes including Model Definition and Cold Shock sections. – Mark Gromlovits, Sanjib Som

**New Business**

- Ashley Reagan asked question of how the number of test units specified in model test (thirteen) was determined. No one at the meeting was aware of the reason.
- Chuck Johnson reminded WG of 2019 deadline to complete work on this PAR.

The meeting was concluded at this point due to no more time.

It was confirmed that the WG would meet again at the Fall 2016 Transformer Committee Meeting in Vancouver.

Meeting was adjourned at 10:45AM

Chair: Roger Wicks  
Co-Chair: Dave Stankes

**D.2.3 IEEE PC57.12.51 - Dry Type Product Standard “> 500kVA Ventilated”  
Chair Sanjib Som**

Meeting convened at 11:03 AM

Attendance: 26 total (13 members, 13 guests); since total members is 15, quorum was archived.

The chairman brought the meeting to order, circulated the roster and encouraged our guests to request membership if they would like to join the working group.

Mark Gromlovits was introduced as the new secretary.

A few technical projector difficulties delayed the start of the meeting.

The chairman reviewed the agenda with all present.

The chairman reviewed the meeting minutes from the previous meeting and advanced a motion to approve the minutes. Chuck “so moved” John “second”, minutes was unanimously approved.

The chairman explained to the group that he will need to review all of the changes that Casey Ballard and Tim Holdway had discussed and introduced in the red line copy of the standard. We were to concentrate on the “Title” of the document for the first part of our meeting.

The chairman pulled up a copy of the standard for the group to view and initiated the discussion regarding the title.

The chairman pointed out “501 kVA” was part of the title, however in several places in the document <500 kVA was mentioned (see example at 6.6.2). This is most certainly a conflict that needs to be resolved. Further discussion took place for the next 25 minutes.

Chuck Johnson suggested combining 12.51 and 12.50 – his point “does this standard truly represent the standard from 1 – 501 kVA”. The chair clarified that combining of the two standards are still on track.

Casey pointed out that using “General Requirements” in our title present confusion with regards to 12.01. Several members present pointed out that we have “ventilated” in our title which differentiates from 12.51.

Chuck Johnson went on to expound on the intent of several standards with regards to the word “General” in the title.

Dhiru Patel commented that this document covers upto 34.5 KV whereas C57.12.01 covers upto 69kV. There was no further discussion on this topic.

Casey Ballard reminded the group that any changes we make to 12.51 need to correspond or rather not conflict with 12.01. This led to a discussion regarding the “interchangeability” and “mechanical” nature of the document. He said “it’s basically all the stuff that was left out of 12.01”.

Chuck Johnson mentioned that this used to be a NEMA document and the title was simply brought forward when it switched to IEEE.

Casey noted that this document references other standards for almost everything. He stated “we only kept what was different”. Further to this he said “we may not even need kVA in the title”. More discussion took place.

The chairman again made it clear that the title is our responsibility and that we need to focus on it. We reviewed the scope to assist in helping define the title.

Casey mentioned again that “all electrical stuff had been removed from this document, only mechanical and accessories were left in 12.51”.

A discussion regarding 12.55 and how it relates to enclosures took place.

The group expressed concern that 12.51 was kind of caught between all of the other standards.

More discussion took place regarding the “kVA’s” mentioned in the title and simply changing it to a lower kVA like 200 kVA. Casey strongly opposed removing or changing the kVA in the title. He wanted to change it completely and remove kVA entirely.

The first motion was made by Casey Johnson to change the title to – “Ventilated Power Transformers mechanical interchangeability and accessories”. Discussion regarding the motion took place over the next 15 minutes.

Chuck Johnson suggested adding “Basic” to the title. Jerry, Phil and Casey objected to this.

Casey Ballard then said “I think this is more of a guide than a standard”. Casey reminded the chairman that he can change this from a standard to a guide because we are dealing with the title. It was agreed that Chairman needs to contact Jim for clarification on this.

More title discussion took place. Several random suggestions were thrown out and quickly dismissed – adding “for”, remove the word “power” and several others.

After some discussion the original motion was revised to “Guide for Ventilated dry type transformers, for mechanical interchangeability and accessories”. This motion was then further revised by Casey to remove the words “and accessories”. Casey again made the motion and Dhiru seconded the motion.

Before we could all agree on the title, Casey amended his motion again. The title we agreed to was “Guide for mechanical interchangeability of ventilated dry type transformers”. A vote was taken and the new title motion passed 11 yes, 0 no; that is no opposition from any attendee including our guests.

The chairman went back and asked about the blank section in the document at section 5.3. Casey said it was the only way to show a change in a word document that would show up in a .pdf.

The chairman requested that Chuck Johnson help him get a “clean” copy of the standard to work with.

Matt Ceglia from IEEE chimed in and informed the group that if IEEE cannot get a good clean copy of a standard, they will scan it and send a .pdf. Unfortunately that is the only option at times.

Casey asked about the PAR revision and the chairman stated he will work with Standards coordinator.

Casey also asked when we would vote on this standard – the chairman said he hoped to get first ballot of the working group this year.

Next meeting: Fall 2016, Vancouver, BC, Canada October 23-27, 2016.

The chairman asked for a motion to adjourn at 12:17 PM. Phil made the motion and Jerry Murphy seconded the motion.

The meeting adjourned at 12:18 PM.

Respectfully submitted,

Chairman: Sanjib Som

Secretary: Mark Gromlovits

#### **D.2.4 IEEE PC57.12.58 - Dry Type Transient Analysis Chair Roger Wicks**

Roger gave a presentation on the status of P57.12.58 since it had no formal meeting and the text is included below:

- Status – We have circulated the document within small task force developed at last dry-type SC.
- Document has been reviewed and a modified version created.
  
- Need SC direction on next steps

- Submit Edited version of document as is for subcommittee ballot.
- Form a working group to update the document to incorporate current practice:
  - Most of document today involves how to design test equipment to conduct transient voltage analysis – because at the time the document was originally developed the equipment didn't exist
  - Today –commercial equipment (recurrent surge generators) exist – could update document to describe how to use existing equipment and to actually conduct the test using same.

After Roger's presentation Sasha Levin asked if the process for conducting the test was needed before circulating the document to the Sub Committee for their opinions. Klaus Pointner also noted that simulation software was available for this purpose and the group acknowledged his comments.

Sanjib Som made a motion to send the document as-is to the membership of the Dry Type Sub Committee for their vote of approval to move to ballot. If they didn't approve then comments would be required. Martin Navarro seconded the motion and it was approved w/o any objection.

### **D.2.5 IEEE C57.12.91 - Dry Type Test Standard Chair Derek Foster**

The Working Group met in the Georgia 4,5 meeting room

There were 14 members and 18 guests present. A quorum of 81.2% was reached.

The agenda was approved. Motion by Chuck Johnson, second Tim-Felix Mai.

The minutes of the November 3, 2015 meeting in Memphis were approved as written.

### **Old Business**

- The Chairman advised that this is now a Working Group, since the PAR for revision was approved at the March NESCOM meeting. Chuck Johnson commented that people should review the purpose and understand that C57.12.91 is about gathering test information, NOT a pass/fail determination. C57.12.01 has pass/fail information.
- Sanjib Som presented a proposal to measure current during the applied voltage test. After some discussion, a vote was taken with 2 votes for the proposal, 10 against and 1 abstain. Proposal rejected.
- Sanjib Som also presented a proposal to measure acoustic noise during a full load current test, to be a Special Test. After discussion a vote was taken with 12 against, 0 for. Proposal rejected.
- Casey Ballard then explained a proposal to apply a correction factor to no-load losses if the core top yoke temperature is greater than 40 °C. After discussion a vote was taken with 10 against, 0 for. Proposal rejected.

- Tim Holdway had proposed the addition of two clauses in the dielectric test section, one relating to the applied voltage testing of transformers for installation and/or testing at altitudes above 1000 m and the second relating to impulse testing of transformers for installation and/or testing at altitudes above 1000 m. These clauses require the application of a correction factor which can be found in C57.12.01. After discussion a vote was taken with 0 against and 10 for. Clauses as written will be added to the standard. Casey Ballard suggested that a similar clause should be added to the temperature rise section and Carl Bush agreed to provide proposed wording.

#### **New Business**

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- The Chairman stated that in section 3 of the standard (Definitions), there is a single line statement referring readers to C57.12.80, and asked if the Working Group considered that some definitions should be added to the standard. Chuck Johnson suggested that the group may want to consider adding some definitions specific to dry-type transformers. This item will be reviewed at future meetings. Rick Marek added that C57.12.80 is being re-opened and we need to clarify the definitions of various dry-type transformer constructions.
- The Chairman also stated that currently there is no reference to PD testing in C57.12.91. A reference to PD testing in an earlier revision had been removed, but the Chairman asked if the group believes that a reference should be re-instated. A vote produced 6 for and 2 against. A reference to PD testing will be added to the standard. Dhiru Patel and Chuck Johnson then said that other tests would also need to be referenced in C57.12.91. Chuck Johnson moved that all tests mentioned in C57.12.01 be referenced in C57.12.91. A vote showed 10 for and 0 against.

With no further business, the meeting was adjourned at 6:05 pm.

The Working Group will meet again at the Fall 2016 meeting in Vancouver.

Chairman: Derek Foster

Vice Chairman: David Walker

#### **D.2.6 IEEE PC57.16 – Dry Type Reactors Chair Art Del Rio**

The new working group for the revision of C57.16 met for first time in the ‘Atlanta 4’ room of the Sheraton Hotel on Monday March 21,2016, at 4:45 PM.

The meeting was called to order at 4:45 PM by the Chair Art Del Rio.

As this was the first meeting following the PAR approval, it was held off-schedule. There were a total of 10 participants, 10 requesting and granted membership, noting that 6 of these participants were part of the WG for the 2011 revision.

- The meeting was opened with the introduction of participants and the circulation of attendance roster.

**Meeting notes:**

■ **Meeting Agenda (unofficial)**

- Introductions and Attendance Sheets.
- Background.
- Topics for Discussion.
- Membership
- Adjournment.

■ **Minutes from previous meeting**

- No minutes from previous meeting as this was the first meeting.

■ **New Business:**

1. The administrative information related to the PAR approval was presented to the group by the Chair.

Type of Project: Revision to IEEE Standard C57.16-2011

PAR Request Date: 24-Nov-2015

PAR Approval Date: 05-Feb-2016

PAR Expiration Date: 31-Dec-2020

Status: PAR for a Revision to an existing IEEE Standard

Root Project: C57.16-2011

Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 06/2019

Projected Completion Date for Submittal to RevCom: 12/2019

2. The existing Scope and Purpose sections of the C57.16 standard were presented to the group for review and comments. The participants were encouraged to submit suggestions to the Chair as topics for discussion in the next meeting.
3. A reference to the information available in MyProject related to the balloting process for the previous 2011 revision was presented. It was noted that many of the comments requiring resolution during balloting were related to TRV and mitigation methods.
4. Charles Johnson volunteered to compile meeting minutes from old meetings related to the 2011 revision and send them to the Chair as background information and to share the existing recent history on the C57.16 standard with others.
5. A volunteer for the role of Secretary will be requested in the next meeting.

Meeting adjournment:

Meeting was adjourned at 5:30 PM

Next meeting: Fall 2016, October 23-27; Vancouver, BC CANADA.

Respectfully submitted,

Chairman: Art Del Rio (a.delrio@ieee.org)

Secretary: TBA

**D.2.7 IEEE PC57.124 – Dry Type Partial Discharge Guide**

The first meeting of the task force took place at the Capital Center meeting room of the Sheraton Hotel. The meeting was called to order at 8:03AM by Tom Prevost, Chairman with 41 present.

This was the first meeting so Tom stated that this was only a task force meeting. He explained the rules of a PAR and the technical definition of a PAR as reviewed by NESCOM. He explained the indemnification provided by NESCOM approval. The reason for the explanation was that today's meeting will determine the Scope and Purpose of the document. The group needs to review the 1991 document which was reaffirmed in 2000. He then noted that reaffirmation is no longer permitted.

Tom then reviewed C57.113 which is a similar document for liquid-immersed transformers. C57.12.01 is the base document where the PD requirements were revised to match IEC more closely. Tom showed the agenda and asked if it was acceptable. However, since the group was only a task force, it could only be informally approved. All present approved. Tom also noted that assuming this was the last Task force meeting, the next meeting in Vancouver would be a working group meeting and anyone requesting membership at that meeting would become a member automatically.

Tom noted that C57.12.01 was revised in 2015 and it sets limits and specific procedures for performing the test. He reminded all that C57.124 is the procedure with no limits which should be found in the base documents. Chuck Johnson requested the opportunity to speak describing the history of dry-type PD testing going back to Tony Jonetti who changed C57.12.01 where the limits were first set. He noted that there were different limits for "open wound" compared to epoxy vacuum cast and expressed the hope that the procedure will also help to interpret as well.

Detliv Gross described the need for PD evaluation of epoxy cast transformers. Chuck Johnson then clarified the PD test is required for epoxy cast but only considered an "other" test for "open wound" units. C57.12.01 was then reviewed demonstrating that the requirement is mandatory for solid cast.

Dr. Hem Shertukde noted a bubble is a flaw to be located and asked if acoustic or apparent discharge was better. Detliv Gross noted that in some bubble sizes, it may take 15 minutes or so for the PD to initiate so the current procedure in C57.12.01 may be inadequate. Tom questioned where a note explaining this timing would be placed. He felt it should be in the C57.12.01 document and not in the C57.124 document.

The scope and purpose from the last revision were then shown for discussion. Tom noted that the scope is required, but the purpose is optional. His preference was to include a purpose. IEC 454 was a previous reference but is no longer in existence. In fact all of the IEC references were out of date and required updating. The scope and purpose of C57.113-2010 were read and it was noted that they were nearly the same as in C57.124. One solution could be to revise C57.113 to include dry-type units. Tom asked Detliv if this might be feasible. He noted that the physics of discharge and the failure mechanism are completely different. He does not feel combining the two would be feasible. Tom noted that the core of the document is the same for setup and procedure but that interpretation is in an annex.

Chuck Johnson asked that we make sure the document includes procedure and interpretation. Aleksandr Levin noted that there are no bushings on dry-type transformers. It was decided to continue as planned. Tom asked if anyone felt the document was not needed. Detliv noted that acoustic measurement could be used especially for location purposes. No one was against proceeding to request a PAR. Tom noted he prefers the scope from C57.113 as a starting point and felt it could easily be modified. Also, he preferred the wide band apparent charge method.

David Walker asked if reactors would be included. Casey Ballard noted that reactors have their own requirements in separate documents. Chuck Johnson noted that C57.12.01 does not include reactors. C57.16 is the standard for reactors. (Can French) noted there is a difference between transformers and reactors so no need to include them in the scope. Only a corona test is performed since there is no core

and the turn to turn stress is very low. However, this only applies to air core reactors and it could apply to iron core reactors. Casey Ballard noted there was no definition for reactors.

Tom asked David Walker why he asked the question. He said other facilities in his company make iron core reactors and he just wondered if they would be included. He noted that reactors are included in C57.12.00. Chuck Johnson noted that others should be included if the scope is expanded and Tom asked if this should be asked at the dry-type subcommittee meeting. Chuck suggested the group proceed as initially planned and wait to see if the SC generates a request. Roger Wicks suggested keeping iron core reactors with the rest of the reactor documents. Detliv recommended omitting reactors and then bring it up at the SC meeting. By voice request, no one opposed the suggestion.

Tom suggested starting with the C57.113 scope and wording was discussed. Detliv noted that location detection was unnecessary. Casey Ballard preferred to place location information in an annex. Mark Gromlovitz noted that PD location information is appropriate for an annex. Rick Marek noted that there is a distinction between cast and VPI and location for VPI can be useful. Hem and Tom both noted that they preferred to also have purpose. Chuck Johnson said the purpose statement for C57.113 should be reviewed. However, Tom does not like this purpose statement. He felt the purpose conflicts with the scope and requested the group opinion. Chuck Johnson noted the purpose should be the procedure with some equipment notes. Tom questioned why it included the narrow band when wide band is what is required by C57.12.01. He questioned if narrow band were even used. Detliv noted that high repetition rate is frequent and not detectable with narrow band. Chuck expressed his pleasure at having the expertise of Detliv, which the group needed.

It was decided that interpretation should not be in the scope or purpose, since the plan is to put it in an annex. Tom noted that the document is a recommended practice so methods are the core. A guide would have information such as this in the body but not with a recommended practice.

Bill Lazerlee who was on the revision of IEC 60270 noted that some variation was possible with wide band since the frequency range can be selected. Detliv noted that the frequency range was widened with the latest version of 60270. Also, the frequency spectrum can be wider with the latest equipment.

Tom noted that the first meeting should be a tutorial and asked Detliv if he would help and he agreed.

The meeting adjourned at 9:15 AM.

After Tom's presentation he asked for volunteers to fill the Secretary roll and nobody volunteered. Then Tom Prevost made a motion based on the meeting minutes and Jim Antweiler seconded. There was discussion on what standards should be referenced in the PAR submission with IEC 60076-11 and IEEE C57.12.01 specifically suggested. Detlev Gross noted that IEC 60270 High-voltage test techniques – Partial discharge measurements, has no equal in IEEE. The vote resulted in 16 for, 0 against, and 1 abstention.

### **D.3 Old Business**

#### **D.3.1 IEEE PC57.94 - WG Dry Type O&M Guide**

##### **Chair Dave Stankes**

Dave Stankes was unable to attend the meeting, but shared this note with the chair in advance:

*Thanks for reminding me that we should celebrate our accomplishments regarding C57.94!*

*Since our last Fall 2015 meeting,*

- 1) PC57.94 was approved as a revised standard by the IEEE-SA Standards Board on December 5, 2015, and*
- 2) IEEE Std C57.94-2015 officially published on February 26, 2016*

*This project was completed on time.*

*Thanks to all who contributed to this Revision (including Sanjib, Tim, Dhiru, Casey, Jerry Murphy, Rick and Roger among others! Wahoo!!!!*

#### **D.4 New Business**

##### **D.4.1 Chair's Comments**

- The chair addressed some requirements of meeting minutes as other SC's had been missing these according to Sue McNelly.
  - o Title of WG or TF
  - o When and where the meeting occurred
  - o When and if the group plans to meet again
  - o Attendance of members, guests, and those requesting membership. Attendance to be recorded in the AMS.
- Any WG must bring the document to the SC for approval before going to ballot
- The Transformers Committee Chair has asked all TF and WG chairs to capture the 'why' behind the decisions made to help out in future revisions
- The WG chair is responsible for checking all grammar and spelling *\*before\** sending the document out for ballot.
- Next meeting: Spring 16, Atlanta, GA, March 20-24, 2015.

#### **D.5 Adjournment**

With no further business, the meeting was adjourned at 2:43 PM.

Chairman: Charles Johnson

Secretary: Casey Ballard