1. Insulation Life Subcommittee

April 15, 2015

San Antonio, TX

**Chair: Bruce Forsyth
Vice-Chair: Barry Beaster
Secretary: Eric Davis**

The Insulation Life Subcommittee met in San Antonio, TX on April 15, 2015 at 8:00 AM.

A hand count of the members at the beginning of the meeting revealed that 59 of 99 members were present. A quorum was present.

The Chair added an item of New Business, finding a new Secretary, to the Agenda. T. Prevost made a motion to approve the Agenda as modified. S. McNelly seconded the motion. There was no discussion on the agenda. It was unanimously approved.

K. Miller made a motion to approve the Washington, DC Meeting minutes as written. G. Hoffman seconded the motion. There was no discussion on the minutes. It was unanimously approved.

The attendance rosters show that the meeting was attended by 212 people, 73 of 99 members and 139 guests. 12 guests requested membership. 6 of these guests meet the membership requirements. The complete attendance is recorded in AMS.

# Chair’s Report

The Chair, Bruce Forsyth, welcomed everyone to the meeting.

The Chair reminded everyone that this is a volunteer organization and thanked the members and activity leaders for their participation and efforts.

The Fall 2015 IEEE Transformers Committee Meeting will be held November 1, 2015 through November 5, 2015 in Memphis, TN. The location of the Spring 2016 Meeting has not been finalized. It will be held March 13-17, 2016 or March 20-24, 2016. The location of the Fall 2016 Meeting has not been finalized. It will be held October 16-20, 2016 or October 23-27, 2016.

Due to the size of the group, general introductions will not be made. Please state your name and affiliation when you address the subcommittee.

The Chair reviewed the Subcommittee Role and encouraged all WG and TF Chairs to do the same in their meetings.

The minutes for Activity Groups should record:

* The attendance including the number of members, the number of guests, and if a quorum was present
* Include a statement that the full attendance record is available in AMS.
* The Chair or Acting Chair
* The Secretary or Acting Secretary
* The name of the member who makes a motion, the name of the Member who seconds the motion, a restatement of the motion and if the motion carried or was defeated.
* A summary of the discussion and comments.
* Minutes should be submitted by May 15, 2015.

The Chair reviewed the process to submit documents for Sponsor ballot. Working Groups must have a 2/3 majority to submit the document for Sponsor ballot. The Subcommittee must achieve a simple majority to submit a document for Sponsor ballot.

The Chair welcomed the following new members of the Insulation Life Subcommittee:

Soloman Chiang Charles Patrick McShane Oscar Pinon

Oleg Roizman Amitabh Sarkar Andre Shor

Charles Simmons Ajith Varghese

## Project Status Reports

### C57.91 IEEE Guide for Loading Mineral-Oil-Immersed Transformers

C57.91 is valid until 2021.

### C57.100 IEEE Standard Test Procedure for Thermal Evaluation of Liquid-Immersed Distribution Transformers

This standard is valid until 2021.

### C57.119 IEEE Recommended Practice for Performing Temperature Rise Tests on Oil-Immersed Power Transformers at Loads Beyond Nameplate Ratings

C57.119 is valid until 2018.

### C57.154 Design, Testing and Application of Liquid-Immersed Transformers with High-Temperature Insulation

C57.154 is valid until 2022.

### C57.162 - Guide for the Interpretation of Moisture Related Parameters in Dry, Gas Insulated and Liquid Immersed Transformers and Reactors

The C57.162 PAR expires December 31, 2017. The standard is valid until 2018.

### 1276 Guide for the Application of High Temperature Insulation Materials in Liquid-Immersed Power Transformers

The 1276 PAR expires December 31, 2016. The standard is valid until 2018.

### 1538 IEEE Guide for Determination of Maximum Winding Temperature Rise in Liquid-Filled Transformer

1538 is valid until 2021.

## Working Group and Task Force Reports

### Task Force on Winding Temperature Indicators - Phil McClure

Monday, 4/13/2015

Chair: Phil McClure

Vice Chair: Robert Thompson

The meeting was called to order at 9:30am.

The meeting began with the members and guests introducing themselves. There were 8 members and 24 guests in attendance. There are 11 members in the Task Force and a quorum was achieved.

The agenda was circulated to the members prior to the meeting and was projected onto the screen. A motion to accept the agenda as written was requested by the Chair. Dave Wallach made the motion and Josh Herz seconded the motion. The agenda was approved unanimously.

The minutes of the Fall 2014 meeting in Washington were sent to the members prior to the meeting and after asking if there were any questions or discussion, a motion to approve the minutes was requested by the Chair. A motion to approve the minutes was made by Dave Wallach, seconded by Josh Herz and was unanimously approved.

**Old Business:**

The Chair submitted the Task Force on Winding Temperature Indicators Experimental Investigation of the Response of Heated-Sensor Simulated Winding Temperature Measurement Devices to Large Step Changes in Signal Current, to the Insulation Life Subcommittee for posting on the website. It is expected to be posted soon.

The editors who volunteered to incorporate the items of the discussion into Draft 14 completed their work and Draft 14, with the incorporated discussion items, was circulated to the members on March 17, 2015. A second version of Draft 14 was circulated to members on April 1, 2015 with further comments.

The members were requested to review the changes and submit comments before the 15-01 meeting or bring them to the meeting for discussion. No further comments were received after April 1st. The objective of this meeting was to discuss the changes and vote on their status in the document.

The changes to the sections identified in the agenda were discussed and only one additional change was made, in section 5.1.

The Chair asked for a motion to approve the paper as written, with changes presented in Draft 14 and made at this meeting. Jean-Noel Berube made the motion and Dave Wallach seconded. The motion was unanimously carried.

Mike Barnes then asked to revisit section 5.2, where the correct word “thermowell” was erroneously marked for change to “thermal well”. The error was acknowledged and marked properly. The chair again asked for a motion to accept this additional change. Jean-Noel Berube made the motion and Dave Wallach seconded. The motion was again unanimously carried.

The approved changes to the paper will be made by the end of the month and will be submitted to the Transformers Committee Secretary for posting on the Insulation Life Subcommittee webpage.

Having completed the Task Force’s mission, the Chair raised an issue that was brought up to the IL SC at the Spring 2005 meeting in Costa Mesa, CA. At that meeting, after the WTI TF Chair had given the meeting report, a member asked if the Task Force was planning on producing a guide with the work that was being done. The member gave an impassioned request to produce the guide, given that there was none available. The WTI Chair asked the IL SC Chair to call for a vote of the subcommittee on the issue of producing a guide. The subcommittee voted overwhelmingly in favor of the guide, but the IL SC Chair reminded the group that the current mission of the task force must be completed first. Now that the mission has been completed, the issue needs to be opened again.

Much of the work to produce a guide had been done before, but was removed from the technical paper that was just approved, in order to streamline progress in completing the TF on WTI’s original mission.

At 10:15am, having completed the agenda items, a motion to adjourn was made by Josh Herz and was seconded by Jean-Noel Berube . The motion to adjourn carried unanimously.

Respectfully,

Phil McClure, Chair

### Working Group on 1538 - IEEE Guide for Determination of Maximum Winding Temperature Rise in Liquid-Filled Transformers – Rick Marek

San Antonio, TX, USA

Hyatt Regency San Antonio Riverwalk

Tuesday April 14, 2015

The working group did not meet since the document ballot had just completed. Instead, a ballot resolution meeting was held Tuesday, in the Chula Vista Boardroom from 1:45 pm to 3:00 pm. 19 of the 33 comments were resolved. The remaining comments will be resolved by email and/or phone conference. The following details the results of the ballot:

Ballot Open Date: 02-Mar-2015

Ballot Close Date: 05-Apr-2015

Type: New

Draft #: 3

Comments: 33

Must Be Satisfied Comments: 7

**RESPONSE RATE**

This ballot has met the 75% returned ballot requirement.

137 eligible people in this ballot group.

92 affirmative votes

4 total negative votes with comments

4 negative votes with new comments

0 negative votes without comments

7 abstention votes: (Lack of expertise: 7

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103 votes received = 75% returned

 6% abstention

**APPROVAL RATE**

The 75% affirmation requirement is being met.

92 affirmative votes

4 negative votes with comments

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96 votes = 95% affirmative

Respectively submitted
Richard P. Marek, WG Chair

### Working Group on PC57.162 - Guide for the Interpretation of Moisture Related Parameters in Dry, Gas Insulated and Liquid Immersed Transformers and Reactors – Tom Prevost

Attendance Members 47 out of 80

 Guests 64

 Guests Requesting Membership 3

Meeting Minutes

Chair, Tom Prevost skipped introductions in order to save time and established a quorum.

A quorum of the working group members were present 47 out of 80.

Minor correction in number of Task Force numbers in the minutes.

Tom Prevost briefing described the agenda plans then asked for the approval of the agenda with

Don Cherry making a motion and Don Platts seconding the motion. Approved.

Tom Prevost asked for approval of minutes from the October meeting then two minor corrections to the minutes of the October meetings were corrected. Rich Simonelli made a motion to accept with Bruce Forsyth seconding the motion. Approved.

The meeting started with the purpose and scope of the WG. The Par is 4 years and the group is half way through. The chair mentioned the importance of staying on task.

Valery Davydov then proposed a draft table of contents for the document.

He then proposed a new subsection 6.1 to address a section not covered 6.1 in the table of contents pertaining to moisture migration and moisture distribution and/or annex A. It was decided to be addressed as new business.

The task force leaders then updated the WG on the progress of their respective task forces.

**Task Force 1 Terminology and Definitions
Task Force Leaders - Jeff Golarz** **jgolarz@lumasenseinc.com**

This section will list and define the terminology for moisture related phenomena in solid, liquid and gaseous insulating materials used in transformers and reactors. This is the list of members so far;

1. Alex Macias
2. Shawn Luo
3. Oleg Roizman
4. Valery Davydov

Update on progress

A document was sent out with 25 to 30 terms and received no feedback He will resend to task force leaders for feedback.

Need to send to other task force leaders for feedback

**Task Force 2 Measurement and evaluation of moisture-in-gas insulation parameters**

**Task Force Leaders - Tom Melle replaced Rich Simonellni**

* Tom Prevost
* Gary Hoffman
* Bob Kinner
* Deanna Woods

Tom will work on next steps to contact team and looking for manufacturing along with field experience to help with this task force.

**Task Force 3 Measurement and evaluation of moisture-in-liquid insulation parameters**

**Task Force Leaders- Claude Beauchemin** **beauchemin@tjh2b.com**

Claude discussed Karl Fisher, dew point or sensors along with saturation curve. (moisture in oil)

**Task Force 4 Measurement of moisture in solid insulation
Task Force Leader - Paul Griffin** **pgriffin@doble.com/** **Ronald Hernandez** Ron stands in as leader

This section describes the methods of measurement of moisture in solid insulation using sample of insulations, for un-oiled insulation and a Karl Fisher method using solvent extraction or vapor extraction for oiled insulation.

The Task Force has met twice and has 8 members. They have productive meeting and completed 80% of their sections.

Valéry suggested working with CIGRE as they doing very similar process as IEEE task force.

**Task Force 5 Evaluation of moisture in solid insulation using dielectric response methods**

**Task Force Leader - George Frimpong** **george.k.frimpong@us.abb.com**

Nine subsection and has 3 people to cover the task so far.

Valery suggested changing the title of the section due to not measuring DFR with moisture due to balance can be used for oil impregnated paper.

**Task Force 6 Inferring of moisture in solid insulation from measurements conducted in liquid or gaseous medium**

**Task Force Leader - Valery Davydov** **valery.davydov@ieee.org**

Minutes can be found in separate document supplied by Valery Davydov

The process of a separate annex was bought to attention of the WG.

Tom Prevost then brought forward a separate task force for the moisture. Then he proposed new subsection 6.1 to address a section not covered 6.1 in the table of contents pertaining to moisture migration and moisture distribution and/or annex A. It was decided to be addressed as new business.

**Task Force 7 Evaluation of aging and end of life of solid insulation parameters**

**Task Force Leader- Roger Wicks** roger.c.wicks@usa.dupont.com

The task force now has 9 members and it major discussion revolves around end of life aging of a transformer.

Task force is looking at a CIGRE document that very similar but there is a lot of referenced documentation that might be accessible to everyone. There should be a limit on references due to access.

**Task Force 8 Factory/workshop application of knowledge on moisture; establishing baselines
Task Force Leader - Poorvi Patel** **poorvi.patel@us.abb.com**

The task force has had two meetings since the last meeting and have progressed and should have the section ready soon.

1. Dew Point- Especially prior to shipping
2. Sample Block Method+ KF- which is not described in any of the IEEE documents as we know
3. Water Extraction Rate- method
4. Relative Saturation in Oil-method

Power Factor during the acceptance test – refer to stand IEEE standard for this test.

**Task Force 9 Field application of knowledge on moisture
\* Note: *This section lists the risks associated with moisture*Task Force Leader - Jim Thompson** serve1@svtv.com

He is still looking for data for the task force. The working group suggested/requested that the query be sent to the entire group and maybe have more response to the request and Jim agreed.

**New business**

**There was two items for new business.**

1. Addition of a new task force covering the subject of moisture equilibrium and migration. Oleg Roizman made a motion to start a new task force covering these subjects with Don Cherry seconding. The motion passed.
2. Where bibliography content should be located in the document. Valery Davydov made a motion to place all bibliography content in Annex A rather than have a bibliography section for each chapter. Bruce Forsyth seconded the motion and it passed.

### Working Group for Application of High-Temperature Materials IEEE P-1276 – Mike Franchek

Hyatt Regency San Antonio Riverwalk – San Antonio, Texas USA

Room – Live Oak

April 14, 2015, 3:15pm – 4:30pm

1. Welcome & Chairman's Remarks R. Wicks

Roger opened the meeting at 3:16pm explaining the purpose and scope of the WG, encouraging participation from members. He also indicated that Michael Franchek has resigned to the position of chair of WG and that he is assuming now this position. For now Mike will continue to have the position of vice-chair.

1. Circulation of Attendance Rosters J. Arteaga

Circulated

1. Attendance for Quorum J. Arteaga

16 members were in attendance meeting the quorum required. From the rosters at the end of the meeting there were 18 members in attendance and 43 guests. Of these 43 guests, 4 requested membership. The attendance will be reviewed and new members will be added if they meet current attendance requirements.

1. Approval of Fall 2015 Meeting Minutes – Washington, DC J. Arteaga

Marion Jaroszewski made the motion to approve the minutes as written. Thomas Golner second it, and all members unanimously approved them.

1. Approval of Meeting Agenda R. Wicks

The agenda was approved unanimously without changes.

1. Review of IEEE 1276 D1 Table of Contents/Changes All

Chairman clarified the scope of the guide explained the difference of this with standard C57.154, where IEEE 1276 can expand in the information provided as tutorial.

Patrick McShane indicated that section 6 (Insulating Materials) is a duplicate of standard C57.154 and that the table of content currently does not include additional material like gaskets or accessories that need to be addressed. Also he indicated that the scope of both documents is almost the same, questioning the need for the guide, unless additional materials and components are included, which would lead to change the PAR with a new scope.

The chair indicated that this could be feasible once the different sections are completed and, with the members review, it may be identified to change the scope. At this time of development is too early to define and it will be looked at once the document completion is more advanced.

Richard Marek mentioned that the scope for C57.154, as well as of IEEE 1276 is broad enough that can include other materials that were not part of the standard, focusing more on identifying the types of insulation to use and the temperature limits of this.

The chair of the WG mentioned that previous revisions of IEC 60076-14 had good informative references that were omitted once it became a standard, and that this material can be reviewed by group members for its incorporation in present guide. Chair will request copies of this document for distribution between group members.

It was also identified that the use of enamel covered conductor that are mechanically modified (flattened) have a different thermal properties than the round conductor and that this need to be included in the guide.

An additional section will be added to guide to cover accessories and components in the transformer. Patrick McShane and Thomas Golner will draft a request to transformers manufacturers to identified the different accessories and components required for high temperature applications. This request will be requested to be circulated among members of the Insulation Life, Distribution Transformers and Insulating Fluids subcommittees.

Kurt Kainedes requested to have an updated content list, and the chair will issue this, via e-mail to members, by May 15, 2015.

The chair made an emphasis that the PAR expires at the end of 2016 and that the guide needs to be balloted the fall of next year, so he encouraged the members to provide their feedback at the earliest possible.

1. Assignment of tasks for the revision of the different sections of guide:

Introduction – it is very complete and it was requested to have additional comments by members of WG.

Section 4 - Merits of operating at high temperatures. Volunteers – Kurt Kaineder, Marion Jaroszewski, John Luksich, and Tom Golner.

Section 5 – Insulation-system temperature ratings, test procedures, and material aging qualification. Volunteers – Mike Franchek, Roger Wicks, Ken McNeish, Tom Golner, Dave Stankes, Solomon Chiang and Joshua Verdell.

Section 6 – Insulating Materials. Volunteers – Claire Claiborne, Javier Arteaga, Julio Calderia, Patrick McShane.

Section 7 – Description of high-temperature transformers. Volunteers – Kurt Kaineder, Mike Franchek and Arup Chakraborty.

Section 8 – Loading guidelines for high-temperature transformers. Volunteers - John Luksich, Arup Chakraborty

Section 9 – Nameplate. To be removed.

Section 10 – Heat run test and average winding temperature. Volunteers – Juan Castallanos, and Mike Franchek.

New section – Accessories. Volunteers – Tom Golner, Patrick McShane, Joshua Verdell

1. Old Business

No old business.

1. New Business

No new business.

1. Adjournment

No further discussion, so with this, Kurt Kaineder moved to adjourn, seconded by Marion Jaroszewski. Meeting adjourned at 4:20 PM.

### Working Group on C57-119 IEEE Recommended Practice for Performing Temperature Rise Tests on Oil-Immersed Power Transformers at Loads Beyond Nameplate Ratings – Gael Kennedy

The individuals attending this Monday 13:45 to 15:00 off-schedule meeting in the Chulu Vista Board Room were there for the purpose of resolving the comments associated with the First Ballot of C57.119 in January/February of 2015.

Eligible Balloters 112

Affirmative Votes 78

Negative votes 9

Abstained 4

**Total Returned Votes 91**

81 % Return Ballot Votes

89% Affirmative Votes

Number of Comments to resolve: 140

Ballot Resolution Core Committee:

 Gael Kennedy

 Tom Prevost

 Bruce Forsyth

 Marian Jarwowski

Submitted by: Gael R Kennedy

# Old Business

No old business.

# New Business

During the Task Force Report on the Winding Temperature Indicator, Bob Thompson, the Vice-Chair, raised the issue of producing a Guide on WTI. Some key points of the discussion were:

* The process of devolving a new document should be followed. This requires developing the Scope of a PAR.
* The purpose of a WTI is self-explanatory. How much of a guide is needed?
* Many young engineers do not realize that the winding temperature is simulated.
* The WG of C57.12.10, Clause 5 is looking at this topic and should resolve this question.

Dave Wallach made the following motion:

Form a Task Force to either create a Scope for a Guide for WTI or recommend placement for information in an existing document with recommendations due at the next subcommittee meeting.

This motion was seconded by Bob Thompson. After discussion of the motion, the vote was 46 For and 5 Against. The motion passed.

The Chair identified that the current Secretary would be stepping down at the end of this meeting and asked for a volunteer for a new Secretary. Sam Sharpless volunteered.

# Adjournment

S. Som made a motion to adjourn. C. Beauchemin seconded this motion. The meeting adjourned at 9:15 AM.

Respectfully submitted,

Eric Davis

Secretary, Insulation Life Subcommittee