

Annex K **Power Transformers Subcommittee**

March 27, 2019

Anaheim, CA

Meeting Time: 1:30 p.m.

Chair: Bill Griesacker

Vice Chair: Alwyn VanderWalt

Secretary: Daniel Blaydon

K.1 Meeting Attendance

The Power Transformers Subcommittee met on Wednesday, March 27, 2019 at 1:30 PM. The RFID attendance record indicated that 91 out of 122 members of the subcommittee were in attendance; a quorum at the meeting was achieved. A total of 215 individuals attended the meeting; 7 guests requested membership.

K.2 Approval of Agenda and Meeting Minutes

The Chair requested a motion for approval of the proposed meeting agenda. A motion to approve was made by Dan Sauer and seconded by Marcos Ferreira. The motion was approved by unanimous consent. The approved agenda can be found in Attachment K.2.

The Chair requested a motion for approval of the Fall 2019 meeting minutes. A motion to approve was made by Dan Sauer and seconded by Marcos Ferreira. The motion was approved by unanimous consent.

K.3 Chair's Remarks

The chair provided an overview of the present subcommittee membership statistics, including new members and those members which had been moved to guest status.

An announcement was made that attendance would be tracked by the RFID system. Paper rosters were not used at this meeting; however, a signup sheet was provided to guests who wanted to requested membership.

The chair provided an overview of the Working Group and Task Force requirements for the scheduling of meetings, submission of minutes, and other administrative tasks.

K.4 Working Group and Task Force Reports

K.4.1 Revision of C57.12.10 IEEE Standard Requirements for Liquid-Immersed Power Transformers – Gary Hoffman

This group did not meet.

K.4.2 Revision of C57.93 IEEE Guide for Installation and Maintenance of Liquid-Immersed Power Transformers – Mike Lau

This group did not meet. The work is complete. The document has been submitted to REVCOM for review and will be published pending approval.

K.4.3 Revision of C57.125 Guide for Failure Investigation, Documentation, Analysis and Reporting for Power Transformers and Shunt Reactors – W. Binder

This group did not meet.

K.4.4 WG IEC 60214-2 - Tap Changer Application Guide - Craig Colopy

This group did not meet. The working group is holding a meeting in Paris, France at end of 2019 and will discuss whether work will start next year.

K.4.5 WG 60214-1-C57-131 - Tap Changers - Craig Colopy

This group did not meet. FDIS has been sent to REVCOM. Comments received for recirculation ballot were sent to IEC editorial. This standard is likely to be published in 2nd quarter of 2019.

K.4.6 C57.140 Guide for the Evaluation and Reconditioning of Liquid-Immersed Power Transformers – Paul Boman

This group did not meet.

K.4.7 C57.143 – Guide for Application of Monitoring Equipment to Liquid-Immersed Transformers and Equipment – Mike Spurlock

This working group met on Monday. A quorum was achieved. They announced a new vice chair, Poorvi Patel. They are currently reviewing Chapter 5 which covers various monitoring technologies to allow a user to make an informed decision about what kind of monitoring they want to use. They are also working on Chapters 4, 6, and 7. The goal is to have the guide out for review by the Fall of 2019. The PAR expires in 2021.

The complete meeting minutes can be found in Attachment K.4.7.

K.4.8 Revision of C57.148 Guide for Control Cabinets for Power Transformers - Joe Watson

This working group met on Monday. A quorum was achieved. They issued a 2nd straw ballot just before this meeting. No feedback or comments were received, and the working group decided that revisions to the document are now complete. A vote passed within the working group to recommend that this document be moved this to ballot. Joe Watson made a motion to the Subcommittee for the document to be sent to IEEE SA for balloting which was seconded by Dan Sauer. This motion passed by unanimous consent.

The complete meeting minutes can be found in Attachment K.4.8.

K.4.9 Revision of C57.150 Guide for the Transportation of Transformers and Reactors Rated 10,000 kVA or Larger – Greg Anderson

This working group met on Tuesday. A quorum was achieved. They are currently revising the guide which is due by 2022. A brief presentation was provided on the Panama Canal which will be posted on the website. Work was conducted during the meeting on impact recorders, a checklist for design review issues relating to transportation, and shipping with natural ester fluids. The chair requested individuals with transportation related expertise to get involved in the group and attend the meetings.

The complete meeting minutes can be found in Attachment K.4.9.

K.4.10 Development of PC 57.153 Guide for Paralleling Transformers - Tom Jauch

This group did not meet.

K.4.11 Development of PC57.156 Guide for Transformer Tank Rupture Mitigation of Liquid-Immersed Power Transformers and Reactors - Peter Zhao

This group did not meet.

K.4.12 Development of PC57.157 Guide for Conducting Functional Life Tests for De-Energized Tap Changer Contacts - Phil Hopkinson

This group did not meet.

K.4.13 Task Force on V/Hz Curve – Joe Watson

This task force met on Tuesday. A quorum was achieved. They are currently reviewing the short term heating effects of transformers directly connected to generators. Ramsis Girgis gave a presentation on the origins of the original GE V/Hz curve. The task force will develop new curves which will be a combination of the effects on the transformer and a damage curve based on insulation type. They will require assistance from the Insulation Life Subcommittee. One or two conference call meetings will be held between now and Fall meeting.

The complete meeting minutes can be found in Attachment K.4.13.

K.4.14 Task Force on Condition Assessment Guide – Kumar Mani

This task force met on Tuesday. The final scope for this document has been approved within the Task Force. A motion was made within the Subcommittee to begin work on the PAR by Hemchandra Shertukde which was seconded. The motion passed with 59 voting to approve, 4 voting negative, and 8 abstentions.

The complete meeting minutes can be found in Attachment K.4.14.

K.5 Old Business

No old business.

K.6 New Business

Gary Hoffman mentioned that C57.116 Transformers Directly Connected to Generators is due for revision and expires in 2024. Gary Hoffman made a motion to create a PAR study group to look at the entire document to see if the technology and scope of the document should change and to review title scope and purpose, which was seconded by Joe Watson. This motion passed with 59 voting to approve, 0 voting negative, and 6 abstentions.

There was no further new business.

K.7 Adjournment

The meeting was adjourned at 2:13 pm

K.8 Attachments

Attachment K.2 – S18 PTSC Agenda

Attachment K.4.7 – C57.143 Monitoring Guide

Attachment K.4.8 – PC57.148 Control Cabinets

Attachment K.4.9 – C57.150 Transportation Guide

Attachment K.4.13 – TF V/HZ

Attachment K 4.14 – TF Condition Assessment Guide

Attachment K.2

AGENDA

Power Transformers Subcommittee IEEE PES
Transformers Committee Wednesday, March
27, 2019, 1:30-2:45 PM

Hilton Anaheim Hotel; Anaheim, California, USA

Bill Griesacker – Chair, Alwyn VanderWalt – Vice Chair, Dan Blaydon – Secretary

1. Call to order
2. Determine quorum
3. Approval of previous meeting minutes
4. Chair remarks
5. Working Group and Task Force reports
 - a. WG Revision to C57.93, Installation Guide M. Lau
 - b. WG 60214-1-57-131, Tap Changers (on hold) C. Colopy
 - c. WG Tap Changer Application Guide IEC 60214-2 C. Colopy
 - d. WG Revision of C57.143, Monitoring Guide M. Spurlock
 - e. WG Revision of C57.148, Control Cabinet Standard J. Watson
 - f. WG Revision of C57.150, Transportation Guide G. Anderson
 - g. TF Transformer V/Hz Curves J. Watson
 - h. TF Transformer Condition Assessment Guide B. Sparling
6. Old business
7. New business
8. Adjournment

Attachment K.4.7

C57.143 – IEEE Transformer Monitoring Working Group

Monday, March, 25, 2019

Anaheim, California, USA

Minutes of WG Meeting

The meeting was called to order at 3:15PM AM by Chair Mike Spurlock.

There were 53 of 87 members present and 63 guests for a total of 116 attendees. Eight guests requested membership. A membership quorum was achieved.

Agenda

1. Welcome & Introduction
2. Call for Patent Disclosure
3. Roster Circulation
4. Member Roll Call & Quorum Check
5. Chair Remarks
6. Recognition and thanks to volunteers
7. Approval of the Spring 2018 Meeting Minutes (Pittsburgh, PA)
8. Approval of the Fall 2018 Meeting Minutes (Jacksonville, FL)
9. Working Group Activities
 - a. Chapter 5
 - b. Chapter 6
10. New Business
11. Adjournment

Introductions of the Chair, Vice Chair, and Secretary were made. Attendees were asked to introduce themselves and indicate their affiliations when making comments or asking questions.

Chair Mike Spurlock introduced Poorvi Patel as the new committee vice chair and thanked Brian Sparling for this hard work and contribution to this working group.

Mike Spurlock also reminded the group that the PAR was approved in 2017 and expires December 31, 2021. That means we have 3 more meetings left to get this guide ready for balloting in December of 2020. We will need a year for balloting and commenting and this means the time is getting closer.

Mike Spurlock also recognized the numerous volunteers for all the work they have put into the revision and additions.

A call for disclosure of any essential patent or patent applications claims was made. There were one patent claims identified.

A motion to approve the Spring 2018 Minutes was made by Joe Watson and seconded by Bill Whitehead. There were no objections or additions to the Minutes. There was no opposition to approval of the minutes.

A motion to approve the Fall 2018 Minutes was made by Joe Watson and seconded by Bill Whitehead. There were no objections or additions to the Minutes. There was no opposition to approval of the minutes.

An update on the working group activities around Chapter 5 work.

1. Bill Whitehead on the DGA, moisture, bushings, and GIC sections Bill is asking individuals for more support. The DGA portion is approximately 60% complete needing support in the fuel cell section for a technical and diagram. Volunteers are needed around solid state H2 sensor. The removal of the O2 sensor section was also discussed. Bill is also looking for installation and maintenance volunteers specifically around mounting, new/retrofit situations – Joe Watson offered to volunteer. Moisture looking at the .167 as terms to reference. Bushings need another last review. GIC is 60% complete and referencing the .163 guide instead of adding words to this guide. The question was asked about installation specifics for GIC. Luiz Cheim suggested including the sensors. Mike Spurlock volunteered to assist with the verbiage for the parameters to measure and type of sensors for GIC. AEP correlates GIC with transformer temperatures inside transformer. The use of a GEO-map instead of monitoring and use of calculations was also brought before the group. Luiz Cheim can assist this this. The NERC 007 standard was also brought up in this conversation. It was also noted that this standard assumes the transformer is young and in good working condition without considering the actual condition of the transformer.
2. Poorvi Patel's update was on sections 5.1, 5.2, 5.3. They have had a couple of teleconferences and almost complete with a need for volunteers to help. Section 5.1 (Winding temps) – need information and help with operating conditions, installation of sensor and maintenance requirements. Please reach out to Poorvi Patel to assist with this and it could be just a review of the existing wording from the old guide and simple refreshing only. Section 5.2 is in good shape. The installation section does it need to be here? What is the difference in the installation at the factory and the field? Section 5.3 is in good shape. Luiz Cheim and Poorvi Patel are reviewing it and this section does not need volunteers.
3. Emilo Morales-Cruz's update section 5.4 (LTC) reviewed parameters on whole standard group them into sections. There is a need for volunteers around the motor drive control and several sections need to be reviewed to determine if needed. The .139 LTC gas guide was also brought up. The question of what is the difference between monitoring DGA

online and does it need to be included? Since there are numerous vendors who have this technology it was suggested that this be added to the DGA section. Bill Whitehead noted that this should be as a reference to the values that can be monitored. This discussion was held between Luiz Cheim, Poorvi Patel, and Bill Whitehead and Poorvi Patel will review the LTC guide referenced earlier and give feedback on what to keep or take out of the LTC and DGA sections. Section 5.5 – transformer tank needs to be formatted. The PRD section is in progress with all areas assigned and formatting of words is mostly what is lacking.

Also as a reminder, please make sure if given words from a supplier that permission is given in writing to use the wording and/or diagrams. We should not use any supplier internal material. Refer to standards lunch around this topic.

Mike Spurlock also noted that Chapter 4 is also under review. There is a new chapter #6 around asset selection, infrastructure, data collection and gathering. Also Chapter 7 need to be reviewed to determine if areas need to be removed. The appendix is also under review with updates needed. There was also mentioning of another new chapter for global manufacturing requirements.

The goal is to have a draft of the guide out for review by the Fall 2019 meeting in Columbus Ohio in October.

There was no new business brought before the group.

The meeting was adjourned at 4:27PM

Mike Spurlock
WG Chair

Poorvi Patel
WG Vice-Chair

Elizabeth Bray
WG Secretary

Attachment K.4.8

Minutes from the Working Group for the Revision of C57.148, the Standard for Control Cabinets for Power Transformers

Joe Watson – Chair, Weijun Li, – Vice Chair, Jean-Francois Collin - Secretary

The Working Group met on Monday, March 25, 2019, at 11:00 AM with 38 attendees, including 15 of the 29 members for a quorum. The Agenda and previous minutes were approved. The patent question was asked with no responses.

A second straw ballot had been distributed to the WG about 6 weeks before the meeting and there were no responses. The latest draft was briefly discussed and the group agreed that there were no additional issues that need to be addressed.

The Group unanimously approved to send the latest draft to IEEE SA for balloting. The Chair, Vice-Chair and Secretary will make a final review for typos, numbering and consistent references and start the balloting process.

The group was thanked for its work, and recognized Ryan Musgrove and Shankar Nambi who led the two task forces that contributed the revisions and helped the WG to complete first stage of its work 21 months before the PAR expiration date at the end of 2020.

The group is expected to meet in Columbus to start the ballot resolution process, provided the balloting has been performed by that time.

The meeting adjourned at 11:30.

Attachment K.4.9

C57.150 – IEEE Guide for the Transportation of Transformers and Reactors Rated 10 000 kVA or Higher

Tuesday, March 26, 2019; 11:00 a.m. – 12:15 p.m.

Hilton Anaheim Grand Ballroom B

Anaheim, California, USA

Minutes of WG Meeting

The meeting was called to order at 10:57 a.m. by Chair Greg Anderson. Vice Chair Ewald Schweiger and Secretary Marnie Roussell (writer of Minutes) were also present.

There was a total of 130 people present. This included 28 of the 45 members in the working group, resulting in a quorum. Attendance was taken utilizing RFID tabulation. Paper rosters were not passed around, so any guests desiring membership were asked to contact one of the WG leaders.

Agenda

1. Welcome and Call to Order
2. Questions, Patent Issues
3. Determination of Quorum (determined by RFID system)
4. Approval of the Minutes
5. Old Business
 - a. Timeline of Project
 - b. Review of assigned work
6. New Business
7. Additional discussion, ideas
8. Adjourn

Introductions of the Chair, Vice Chair, and Secretary were made.

There were no objections to the agenda as identified above.

Brief Slideshow: “Greg’s Recent Journey Thru the Panama Canal” focusing on the challenges on OF ocean shipment.

A call for essential patent claims was made. No patent claims were identified.

Minutes of the Fall 2018 Meeting were posted within the minutes of the SC Power Transformers. The minutes were approved with a motion by Roger Verdolin and seconded by Susan McNelly.

List of Meeting Attendees is documented in the AMS system. Scott Reed requested and was granted membership at this meeting.

Revision Topics/Assignments

The Task & Assignments were reviewed and status provided.

The participants were asked to volunteer for additional contribution to the scope and more volunteers are still needed. Furthermore, the group was asked to send updates to all the three WG leaders. Teams of the assigned tasks will be contacted by the WG leaders on a frequent basis to get an update of their progress.

<u>Assignments Chart</u>				
	<u>Task</u>	<u>Brief Scope</u> (see meeting minutes)	<u>Assigned To</u> (team assigned to each task)	<u>Status</u>
1	CIGRE Guide	Compare CIGRE document 673 -WG A2.42-2016 to our Guide. Identify topics to be included.	H. Abdelkamel, M. Locarno, K. Vijayan, S. Nambi, E. Schweiger, B. Webb	Done
1.3		#3 Definitions	Paul Dolloff, Mario Alonso	WIP
1.4		#4 Transport Incidents - case studies	Paul Dolloff, Mario Alonso Need more volunteers	WIP
1.5		#5 Design Considerations for Transportation	Need more volunteers	WIP
1.7		#7 Design review	See item 13 below	
1.8		#8, 12, 13 Transport (process, planning, instructions)	Need more volunteers Shankar Nambi	WIP
1.9		#9 10 Impact recorder application and data interpretation	See item 4 below	WIP
		Annex Flowchart for test/conditions after transport	Need more volunteers	WIP
2		Swimlanes	Helpful "matrix/table" to Guide	D. Wallach
3	Impact Recorders	Enhance section on impact recorders	S. Nambi, K. Nunn, R. Rathi, J. Watson, P. Dolloff, Bruce Webb	WIP
4	Internal Bracing	Add guidance (careful, a design issue!)	R. Verdolin, J. Watson, M. Alonso, Miljenko Hrkac	WIP
5	External Bracing, Lashing, etc.	Provide some guidance	Kris Zibert Pugazhenth Selvaraj	WIP
6	Exceeding Impact Limits	Add: What to do if specified impact limits are exceeded.	R. Verdolin, J. Watson, Samuel Sharpless	WIP
7	Tests	Compare Tests, C57.150 vs. C57.152	W. Binder, J. Watson	WIP
8	Air Pressure	Add: How internal air pressure changes w/ambient temperature.	J. Arteaga, Peter Kleine	WIP

<u>Assignments Chart</u>				
	<u>Task</u>	<u>Brief Scope</u> (see meeting minutes)	<u>Assigned To</u> (team assigned to each task)	<u>Status</u>
9	SFRA	Enhance section on SFRA	G. Anderson, R. Su, K. Sullivan	WIP
10	C57.93, Installation Guide	Review C57.93 for any overlap and conflicts. (Doc submitted to Revcom)	J. Sen, Mike Lau	Done
11	Shipping w/Natural Ester Fluids	Add section of unique issues	R. Simonelli, A. Jhala	WIP
12	Mobile Subs	Add section of unique issues	K. Vijayan Need more volunteers	WIP
13	Design Review Checklist	Checklist of discussion topics during a design review	K. Vijayan, Mario Alonso, A. Jhala, Amitabh Sarkav K. Vijayan, Mario Alonso, A. Jhala; K. Vijayan, Mario	WIP

CIGRE Guide

The following task of the CIGRE Guide were combined with the main task

- Impact recorder #9 & 10
- Design Review#7

Case studies will not be included in the Transportation Guide

Swim Lanes

Dave Wallach completed the Swim Lanes Concept matrix. It is posted to the website.

Impact Recorders

Roger indicated that impact recorders will be discussed at the next meeting.

C57.93 Installation Guide

Mike Lau indicated that the document has been submitted to Revcom.

Greg noted the demarcation point as placement of the transformer on the foundation.

Shipping w/Natural Ester Fluids

Alan Sbravati volunteered to assist with this section.

Design Review Checklist

Dave Wallach suggested that the working group add a Design Review Checklist to the guide. Krishnamurthy Vijayan, Mario Alonso, and Anirudhdhsinh Jhala volunteered to develop this checklist.

New Business – There was no new business

The meeting was adjourned at 11:38 a.m. p.m. with a motion by Roger Verdolin that was seconded by Shankar Nambi.

The Working Group plans to meet at the Fall 2019 Transformers Committee Meeting held October 27-31; Columbus, Ohio USA.

Greg Anderson
WG Chair

Ewald Schweiger
WG Vice Chair

Marnie Roussell
WG Secretary & Technical Editor

Attachment K.4.13

TF on V/Hz Requirements

Kipp Yule - Chair, Ramsis Girgis, - Vice Chair, Joe Watson - Secretary

The Task Force on Volts/Hz Requirements met Tuesday, March 26, 2018, 3:15 – 4:30 PM with 10 of the 14 members present for a quorum and 30 guests. The Agenda was approved and there was no meeting in Jacksonville so no pending minutes to approve.

The Chair was unable to attend and participated remotely through a Skype meeting. Kipp Yule discussed the general purpose of the task force and then Ramsis Girgis gave a presentation on the origins and limitations of the commonly-used V/Hz curves. The presentation is attached to the end of these minutes. Most of the curves in use today are based on the original work done by William McNutt with GE in the 60's. The data were obtained from a core form transformer design using standard cellulose-type insulation between the tie plates and core and is not accurate for other transformer designs such as shell-form types or core form designs using high temperature insulation.

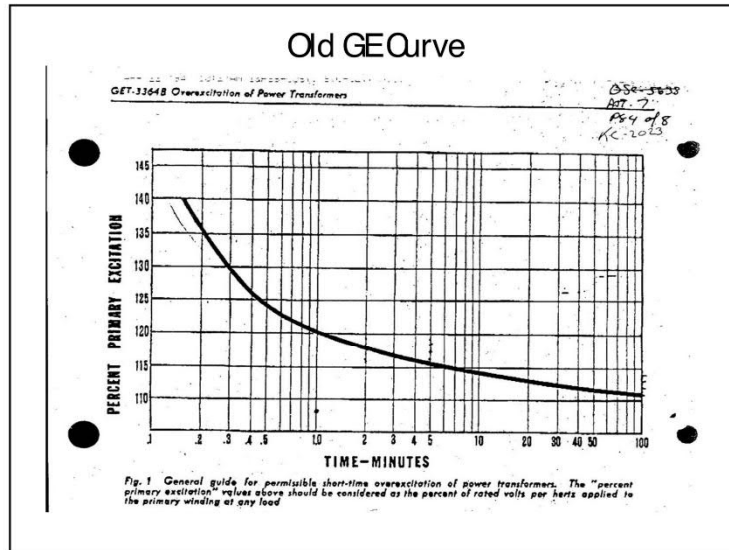
Drew Welton also presented information related to V/Hz relay protection considerations and the challenges that relay engineers face.

The TF intends to develop a general process for manufacturers to use when establishing a V/Hz capability and damage curves that will be included in C57.116, the Guide for Transformers Directly Connected to Generators. The TF discussed the path forward and agreed that we should discuss the time/temperature limits that should be used for any new V/Hz damage curves with the Insulation Life SC and possibly others.

Joe Watson attended the Insulation Life Subcommittee meeting on March 27, 2019 and requested support to establish insulation damage criteria from short-time overheating and Jeff Ray volunteered to act as liason between the TF and the Insulation Life SC in this regard.

The TF will meet again in Columbus and intends to hold at least one web meeting before the Columbus meeting.

3/29/2019



Issues with the Old GE Curve

- Determined based on time for tie-plate to reach 180 C
 - Curve is specific to a specific core-form design with a specific tie-plate material & design
 - Would not apply to other core form designs
 - In Shell form transformers, the tank experiences the overheating
 - Using one temperature limit regardless of duration is not appropriate
 - What, and how much, damage would 180 C, or higher, for a minute, or 10s of seconds, duration, cause.
- Unnecessarily limits design value of rated flux density
 - Resulting in a larger size / more expensive transformer

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3/29/2019

Recommendation

- V/ F Characteristics should be:
 - A function of the transformer Design
 - Core design, Type & design of core clamping structure / tank walls, insulation materials, cooling, etc.
 - Different for Core form vs. shell form
 - Tied to the impact of higher levels of V/ F on the transformer

Recommended actions for the TF

1. Develop / Provide transformer manufacturers with a Standard procedure (Guide) to develop a transformer-specific V/Hz curve
2. Develop / Provide transformer manufacturers with a Standard Temperature – duration criteria that manufacturers need to use in developing V/ F curves for their designs

Above to be added as an additional clause to C57.116 “IEEE Guide for Transformers Directly Connected to Generators”

3/29/2019

Development of Standard Temperature – duration criteria

- How much Structural parts temperature is allowed for how long?
 - For durations of 10s of seconds to a few minutes
 - Which Sub Committee needs to come up with this criteria?
 - Dielectrics/ Insulation fluids/ both?
 - It is a matter of looking at:
 - How much solid insulation life is lost due to the high temperature of structural parts in touch with the solid insulation
 - How much gassing/ Bubbles would be generated
- During such very short times (10s of seconds to a few minutes) and how much would be allowed.



TRANSFORMER COMMITTEE MEETING MINUTES

TF on Condition Assessment of Transformers

March 26, 2019

9:30 PM – 10:45 AM

Hilton Hotel, Anaheim, CA

Meeting Room: California Ballroom A

Chair: Brian Sparling

Vice-Chair: Ismail Guner

Secretary: Kumar Mani

1. **Introductions:** Bill Griesacker sat in as Chair for the meeting since Brian Sparling could not attend the meeting due to prior commitments.

RFID system roll call data- Number of Members in Activity = 84; Number of Members Present = 47 and Number of attendees = 123. A quorum was found using the hand count method.

2. **Anaheim Meeting Agenda Review-** was reviewed and approved

3. **Previous Meeting Minutes Approval Status**

- a. Jacksonville, Fall 2018 – meeting minutes was approved

4. **Call for Patents:** A call for patents was made and there were no disclosures made.

- a) The chair started off with a remark that the tittle had been approved at the Louisville meeting in October 2017 as “A Guide for the Condition Assessment of Liquid Immersed Transformers, Reactors and their components”.

5. **Discussions on proposed Scope:**

Proposed Scope Tabled on Floor:

To review existing condition assessment methodologies and development of indices that will quantify the current technical condition of liquid immersed transformers, reactors and their components.

The objective is to suggest techniques, including aspects of data quality, timeliness, and completeness, that will help asset managers determine the candidates and prioritization of a population of units for possible, repair, refurbishment, replacement, and maintenance activities on these assets.

Discussion:

The following members / guests made notable comments:

Joe Watson; Donald Lamontagne; Jeff Benach; Rich Simonelli; Mario Locarno; Marcus Ferreira; Peter Klein, Scott Reed; Peter Zhao; Jeffrey Wright; Dick Ames; Jim Graham; David Wallach; Bruce Forsyth; Weijun Li, Jim Dukarm; Jamail Khan; Luiz Cheim and Claude Beauchemim.

- Joe Watson emphasized the need for establishing a condition assessment guide.
- Donald L, Mario L suggested the removal of word asset managers from the second paragraph.
- Scott R felt the first paragraph was the scope and the second paragraph read more like the purpose.
- Peter Zhao felt that big items should be excluded from the scope.
- Jim Graham felt that the scope was sufficient to obtain a PAR and the purpose could be added later by amending the PAR.
- Bruce F proposed that second paragraph be removed and first paragraph be adopted as scope. This was seconded by Scott R.
- A vote was taken for retaining second paragraph as proposed by Joe Watson– this was voted down with 11-For and 32-Opposed.
- Joe W moved a motion to withdraw his earlier proposal.
- Then there was a suggestion and discussion to remove the words “development of indices” from the first paragraph.
- Luiz Cheim felt the scope wording should include the word condition.
- A vote on the scope without the second paragraph and deletion of the words “development of indices” from the first paragraph as follows: To present existing condition assessment methodologies that quantify the current condition of liquid immersed transformers, reactors and their components.
- Vote passed with 41-For, 3-opposed and 4-absentees.
- Joe Watson (Donald L seconded) proposed a vote to retain second paragraph as purpose. There were suggestions made to change the wording of the purpose as proposed.
- After much discussion, it was decided to take a vote.

- Vote did not pass with 16-for and 34-opposed.
- Joe W moved a motion to withdraw his proposal to vote on a purpose.

Final Discussion: It was finally resolved that the Condition Assessment TF make the following recommendations to the Power Transformer sub-committee based upon the 41-3-4 vote as detailed above.

- **Final Agreed Title** (adopted at Louisville meeting):

A Guide for the Assessment of Liquid Immersed Transformers, Reactors and their components.

- **Final Agreed Scope:**To present existing condition assessment methodologies that quantify the current condition of liquid immersed transformers, reactors and their components.

6. Next Meeting: Will meet as a Working Group in case the PAR is approved.

7. Adjournment