

Annex K Power Transformers Subcommittee

April 5, 2017

New Orleans, LA

Meeting Time: 1:30 p.m.

Chair: Bill Griesacker

Vice Chair: Kipp Yule

Secretary: Alwyn Vanderwalt

K.1 Meeting Attendance

The Power Transformers Subcommittee met on Wednesday, April 5, 2017, at 1:30 PM. The attendance recorded indicated that 76 out of 110 members of the subcommittee were in attendance; a quorum at the meeting was achieved. A total of 209 individuals attended the meeting; 36 guests requested membership.

K.2 Approval of previous meeting minutes, and meeting agenda

The agenda for the meeting was presented and it was approved; see Attachment K.2.

The Chair requested a motion to approve the Fall 2016 Vancouver meeting minutes. There were no objections to unanimous approval to the meeting minutes and they were therefore approved.

K.3 Chair's Remarks

Alwyn Vanderwalt has agreed to take on the responsibilities of secretary for this subcommittee.

K.4 Working group reports

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

See details of meeting minutes in Attachment K.4.1. The working group did not hold an official meeting but provided an update regarding the status of the balloting process. It was noted that the comment resolution process has just started and was not far enough along to provide specific details of the comments. The WG Vice-Chair indicated that a red-line comment resolution draft would be created and would be transmitted by email to WG members when.

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

See details of meeting minutes in Attachment K.4.2. A new PAR extension was approved through 2018. The latest draft was issued for a straw ballot of the WG membership. The chair reviewed the results of the straw ballot; there were 175 comments submitted that require resolution, a number of attendees volunteered to help with the resolution process. It was also discussed if sections 4 and 5 of the guide should be merged to eliminate overlapping material, a comparison will be made in the next month to move the issue along given the short time left on the PAR.

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

No meeting was held.

K.4.4 TF to Compare C57.131-2012 Standard for Load Tap Changers and IEC 60214-1 ED 2.0 for consideration of recommending adoption of IEC standard (Also WG 60214-2 Tap-Changer Application Guide) - Craig Colopy

See details of meeting minutes in Attachments K.4.4.1. and K.4.4.2.

TF Comparison of IEC 60214-1 and IEEE C57.131: Craig Colopy reported that there are issues with IEC regarding the dual logo document that need to be resolved. The Group may form a joint IEC/IEEE WG to resolve these issues.

WG TC Application Guide IEC 60214-2: The final draft will be sent out to IEC for comments by June 2017 and at the same time the chair will send out the document to IEEE for ballot. The final draft of the document, when available from the convener sometime in June 2017, will be provided to the working group for review and approval to go out for ballot.

K.4.5 C57.140 Guide for the Evaluation and Reconditioning of Liquid-Immersed Power Transformers – Paul Boman

See details of meeting minutes in Attachment K.4.5. Comments were resolved to the first recirculation for ballot comments. A motion was made to accept the resolutions, the motion passed and the document will be sent to IEEE for publishing.

K.4.6 C57.143 – Guide for Application of Monitoring Equipment to Liquid-Immersed Transformers and Equipment – Mike Spurlock

See details of meeting minutes in Attachment K.4.6. Mike Spurlock reported that the WG met for the first time to revise the original document. General discussions were held and a presentation on the existing Guide and other documents was given by Brian Sparling as consideration for the direction for the WG to take with this first revision.

K.4.7 Revision of C57.148 Guide for Control Cabinets for Power Transformers

See details of meeting minutes in Attachment K.4.7. Joe Watson reported that the WG met and discussed comments from a straw ballot of the original document. Two task forces were created to review and resolve these comments.

K.4.8 Revision of C57.150 Guide for the Transportation of Transformers and Reactors Rated 10,000 kVA or Larger – Greg Anderson

The working group held its first meeting under a new PAR. No meeting minutes were submitted.

K.4.9 Development of PC 57.153 Guide for Paralleling Transformers - Tom Jauch

No meeting was held.

K.4.10 Development of PC57.156 Guide for Transformer Tank Rupture Mitigation of Liquid-Immersed Power Transformers and Reactors - Peter Zhao

Working group did not meet.

K.4.11 Development of PC57.157 Guide for Conducting Functional Life Tests for De-Energized Tap Changer Contacts - Phil Hopkinson

Working group did not meet.

K.4.12 Development of Standard Requirements for Phase Shifting Transformers - IEEE/IEC 60076-57-12 - Raj Ahuja

No meeting. Work was completed in February of 2016. IEC approved the document and will now go to publishing.

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

See details of meeting minutes in Attachment K.4.13. A motion in the subcommittee was made for the task force to continue its work; the motion was approved. The TF will continue to meet by conference call or web meeting and will request a small meeting room at the next meeting in Louisville.

K.4.14 Task Force on Condition Assessment Guide – Brian Sparling

See details of meeting minutes in Attachment K.4.14. The task force recommended to proceed with work to develop a guide on transformer condition assessment. The subcommittee approved a motion with this recommendation so a working group will be formed at the next meeting in Louisville.

K.5 Old Business

TF on Condition Assessment: The task force recommended that a guide be developed; the motion was approved. Brian Sparling reported that the TF met on Tuesday and is recommending that a Guide be developed on condition assessment of power transformers and a method of assigning some type of index to each transformer, based on criteria and test processes in several other standards and documents. After some discussion, Daniel Sauer made a motion to accept the TF report and to form a WG to develop the recommended Guide. The motion was seconded by Wallace Binder and approved by the SC with 30 affirmatives, 8 negatives and 9 abstentions.

TF on V/Hz curve: After discussion and several motions, it was agreed that the present task force would continue the work to determine if a guide should be created. Joe Watson reported that the small TF that was assigned to investigate the need for an IEEE document to cover V/Hz issues, had examined the subject and determined that there were no existing IEEE guides or standards that covered the subject in sufficient detail. The TF recommended that the TF be expanded with more transformer experts to re-evaluate the need and, if recommended, develop the groundwork for a new document. A motion was made by Paul Boman and seconded by Wallace Binder to accept the TF recommendations and continue their work. Phil Hopkinson offered a motion, which was seconded by Tauhid Ansari to form a task force to develop a spreadsheet to create a V/Hz curve for individual transformers, based on the design characteristics, but after discussion the consensus was that the motion proposed forming a TF with a similar scope as the original TF and did not pass when voted on by the SC. The original motion passed with 30 affirmatives, 12 negatives and 9 abstentions.

K.6 New Business

No new business.

K.7 Adjournment

The meeting adjourned as scheduled.

K.8 Attachments –Working Group Meeting Minutes and Agenda

Attachment K.2 – S16 PTSC Agenda

Attachment K.4.1 – PC57.12.10 Standard Requirements

Attachment K.4.2 – PC57.93 Installation Guide

Attachment K.4.4.1 – TF IEC 60214-1 / IEEE C57.131 Tap Changer harmonization

Attachment K.4.4.2 – WG 60214-2 IEC Tap Changer Part 2 Application Guide

Attachment K.4.5 – PC57.140 Evaluation and Reconditioning Guide

Attachment K.4.6 – PC57.143 Monitoring Guide

Attachment K.4.7 – PC57.148 Control Cabinets

Attachment K.4.13 – Task Force on V/Hz Curve Guide

Attachment K.4.14 – Task Force on Condition Assessment Guide

Unapproved Draft

AGENDA

Power Transformers Subcommittee
IEEE PES Transformers Committee
Wednesday, April 5, 2017, 1:30-2:45 PM
Astor Crowne Plaza Hotel, Grand Ballroom, New Orleans LA, USA
Bill Griesacker – Chair, Kipp Yule – Vice Chair, TBD – Secretary

1. Call to order
2. Distribution of attendance sheets
3. Determine quorum
4. Approval of previous meeting minutes
5. Chair remarks
6. Working Group and Task Force reports
 - a. WG Revision to C57.12.10, Standard RequirementsG. Hoffman
 - b. WG Revision to C57.93, Installation GuideM. Lau
 - c. WG 60214-1-57-131, Tap ChangersC. Colopy
 - d. WG Tap Changer Application Guide IEC 60214-2C. Colopy
 - e. WG Revision of C57.140, Life Extension GuideP. Boman
 - f. WG Revision of C57.143, Monitoring GuideM. Spurlock
 - g. WG Revision of C57.148, Control Cabinet StandardJ. Watson
 - h. WG Revision of C57.150, Transportation GuideG. Anderson
 - i. TF Transformer V/Hz CurvesJ. Watson
 - j. TF Transformer Condition Assessment GuideB. Sparling
7. New business
8. Old business
9. Adjournment

Attachment K.4.1

*PC57.12.10 - WG for the Revision of
IEEE Standard Requirements for Liquid-Immersed Power Transformers*

8:00 to 9:15 AM, April 4, 2017
Astor Crowne Plaza Hotel, New Orleans

Unofficial Session Summary

WG Chair Gary Hoffman was unable to attend the IEEE Transformers Committee meetings this week so WG Vice-Chair Brian Penny filled in with Gary's absence. WG Vice-Chair Brian Penny called the session to order at 8:00 a.m., Tuesday, April 4, 2017, with WG Secretary Scott Digby also present. The WG Vice-Chair noted that this was not to be considered an official WG meeting, but would just be a short update regarding the status of the balloting process. Introductions were not conducted beyond the WG Vice-Chair and Secretary.

It was reported that the minutes to the previous WG meeting had been approved via an email circulation process, with 41 of the 65 WG members responding (63% of membership responding), with 36 voting to approve the minutes (88% of respondents approving, or 55% of WG membership), 1 voting to disapprove (with no comments regarding disapproval provided), and 4 abstaining. So based on the results the minutes of the Fall-2015 WG meeting in Vancouver are approved. The WG Vice-Chair reported that the balloting of the document had closed on March 15th, reporting the following statistics regarding the ballot:

Ballot Pool	224
Ballot Returns	188 (84% return rate...meeting the 75% required return rate)
Votes to Approve	167 (89% approval rate...meeting the 75% required approval rate)
Votes to Disapprove	19
Abstentions	2
Comments received	271

The WG Vice-Chair noted that the comment resolution process has just started and was not far enough along to comment on specific items or comments. The WG Vice-Chair indicated that a red-line comment resolution draft would be created and would be transmitted by email to WG members when available. D. Giebel posed the question as to whether there were any common threads or themes in the comments, but the WG Vice-Chair reiterated that it was still too soon after the closure of the ballot to discuss any at this time.

The meeting was adjourned at approximately 8:15 a.m.

Respectfully Submitted,
Scott Digby, WG Secretary

Attachment K.4.2

Working Group to Installation of Power Transformers C57.93
Monday, April 3, 2017er 24, 2016
1:45 – 3:15 PM
Capital Central Ballroom
Sheraton Hotel, Vancouver, BC

Chairman Mike Lau
Vice Chairman Alwyn VanderWalt
Secretary Scott Reed

The meeting was called to order at 1:45 am by Chair Mike Lau.

There were 13 of 25 members present. There were 55 guests and 37 visitors. A membership quorum was achieved. Guests attending the WG meeting for the first time who request membership or who have not attended 2 meetings in a row (including the present meeting, will be deferred until the next meeting attended.

Agenda

1. Attendance Roster Sign In / Quorum Check
2. Approval of the Agenda
3. Approval of the Fall 2016 minutes
- 4 Items of Discussion
 - Straw Vote Ballot results
 - Approved – 20
 - Approved with Comments – 11
 - Disapproved - 0
 - Disapproved with Comments – 3
 - Abstained – 1
 - Resolution of negative ballots and comments
 - Merging Clause 4 and 5 ?
 - Any other outstanding comments for discussion
5. Unfinished Business
- 6 New Business
- 7 Adjournment

Due to the time constraints, attendees did not introduce themselves.

The Spring 2017 Agenda was unanimously approved. The Fall 2016 Minutes were unanimously approved.

Chairman Lau posted the Patent Claim. No notifications or comments were received.

Chair's Remarks:

Chairman Lau reviewed the results of the straw ballot of draft version 1.4. There were 175 comments submitted that require ballot resolution. The following individuals volunteered to participate in the resolution review:

Don Dorris	Pat Rock	Paul Mushill	Pugazhenth Selvaraj
Marcos Ferreira	Attila Gyore	Rich Simonelli	Mike Lau
Alywn VanderWalt	Scott Reed	Paul Bowman	

Next, there was discussion about potentially merging sections 4 and 5 of the guide to eliminate duplication. The concern is whether there is enough time to merge the sections so it could pass a ballot before the PAR expired. Alywn VanderWalt made a motion to 'Review Merging Sections 4 and 5' by comparing the two sections side by side to determine how much duplication there is. If it is feasible to do, then go ahead and proceed. Chairman Lau commented that the review needs to be done in the next month. Allen Peterson seconded the motion and the motion carried. The following individuals volunteered to participate in the merger review:

Mike Lau
Alwyn VanderWalt
Scott Reed
Wally Binder
Allen Peterson
Jim Graham

Alwyn will head up the review.

No new business was discussed.

The meeting was adjourned at 2:20 pm.

Meeting Minutes	Page 9 of 20	REV 0
P60214-1-57-131	Working Group #	
Tap-Changers - Part 1: Performance requirements and test methods	Working Group Title	

Chair: Craig A. Colopy **Vice-Chair** Axel Kraemer

Secretary Adam M. Sewell

Current Draft Being Worked On: NA **Dated:** NA

PAR Expiration Date: December 31, 2020

Meeting Date: 04 April 2017 **Time:** 13:45 to 15:00

Location: New Orleans, LA

K.9 Attendance:	K.10 Members	<u>23</u>
	K.11 Guests	<u>40</u>
	K.12 Guests Requesting Membership	<u>0</u>
	Total	<u>63</u>

Meeting Minutes / Significant Issues / Comments:

- Meeting was called to order at 1:45 pm, April 4, 2017.
- Introductions were made and attendance sheets were passed out.
- Call for patents were made with no response from any attendees.
- Chairman created a PAR for adopting IEC 60214-1 as IEEE C57.131. PAR was approved by IEEE SA Board after the Vancouver meeting. Task force group became a working group for the New Orleans meeting.
 - TF membership was used for this WG as a start. Guests requesting membership for this WG will be given membership since this was the first meeting of the WG.
- Per IEC, adoption of IEC standards is solely for the purpose of making that standard a national body standard. As IEEE is not affiliated with any single national body, pulling itself from the USNC, it is inappropriate for IEEE to adopt an IEC standard on this basis. Currently, there is no process in place for IEEE-SA to directly adopt an IEC standard, and due to the infrequent need to do so, it is not anticipated that IEEE-SA will approach IEC to negotiate such an agreement at this time. Erin Spiewak (IEEE-SA) met with IEC in Geneva, March 2017 and spoke about this point. Even though there is a process for adopting an IEEE standard into IEC, there IS NOT an approved process in place for IEEE to adopt an IEC standard. IEC will allow a national body to adopt their standards but not IEEE which is a global body currently. Erin also checked if using ANSI to adopt the standard from IEC would work, but IEC won't approve this direction due to no procedures in place.
- Because of the inability to directly adopt the IEC 60214-1, the chair recommends doing a joint revision by IEEE/IEC of IEC 60214-1 allowing the IEEE C57.131 to expire in 2022 or have it officially superseded. Full support was given from the attendees. With a stability date for IEC 60214-1 coming up in 2019, a

reaffirmation is likely. The Convenor, Axel Kraemer, will discuss the possibilities of an early joint revision work the IEC administration.

7. Meeting closed at 2:15 pm.

Submitted by: Craig A. Colopy Date: 4/04/17

Meeting Minutes	Page 11 of 20	REV 0
P60214-2	Working Group #	
Tap-Changers - Part 2: Application guide	Working Group Title	

Chair: Craig A. Colopy **Vice-Chair** Axel Kraemer

Secretary Adam M. Sewell

Current Draft Being Worked On: 8WD **Dated:** _____

PAR Expiration Date: December 31, 2018

Meeting Date: 04 April 2017 **Time:** 15:15 to 16:30

Location: New Orleans, LA

K.13 Attendance:	K.14 Members	<u>18</u>
	K.15 Guests	<u>45</u>
	K.16 Guests Requesting Membership	<u>0</u>
	Total	<u>63</u>

Meeting Minutes / Significant Issues / Comments:

8. Meeting was called to order at 1:45 pm, April 4, 2017.
9. Introductions were made and attendance sheets were passed out.
10. Call for patents were made with no response from any attendees.
11. Agenda for this meeting was unanimously approved.
12. Minutes from October 2016 in Vancouver were unanimously approved.
13. Timing was discussed and it was noted by the chair and vice chair that a CD (committee draft) of the final draft will be sent out to IEC for comments by June 2017 and at the same time the chair will send out the document to IEEE for ballot. The final draft of the document, when available from the convenor sometime in June 2017, will be provided to the working group for review and approval to go out for ballot..
14. The latest document draft 8WD of 60214-2 from the London work session (February 2017) was presented to the WG by Axel Kramer, IEC TC14 convenor. Highlighted key text was reviewed and discussed.
 - a. Tauhid Ansari volunteered to send his suggestions on the clause regarding continuity tests to the chair and vice chair
 - b. Several comments were received from the working group on subclause 12.1.3.1 regarding winding resistance measurements on each tap. Changes to draft will be made to reflect the input.
15. Next work session is TBD and may be set up directly after the October 2017 Louisville, KY IEEE TC meeting.
16. Meeting closed at 4:30 pm.

Submitted by: Craig A. Colopy Date: _____

Unapproved Meeting Minutes from Guide for the Evaluation and Reconditioning of Liquid Immersed Power Transformers PC57.140

Meeting was held in New Orleans, LA USA from 4:45-6:00pm April 3, 2017

Chairman: Paul Boman

Vice Chairman: Brian Sparling

There were 27 of 54 members present. There were 32 guests present. The WG meeting had a membership quorum present.

The Patent Disclosure statement was read and no submission made by the attendees.

Motion to accept the agenda as proposed, and was approved without comment.

The Fall 2016 WG Meeting Minutes were circulated prior to the meeting and the WG approved them without correction or comment.

The Chairman reviewed the 1st recirculation ballot comments on Draft 7 for the Guide. There were 11 comments received that included 9 editorial and 2 rejected comments.

All ballot comments have been resolved and the changes presented to the WG.

A motion by Joe Watson was proposed to accept the resolutions as made, and seconded by Patrick McShane. There was a short comment made by Joe Watson on the need for guidance by the Subcommittee or Committee about future usage of LTC. The vote on the Motion by those members present was unanimous.

The motion passed, and the Guide will be submitted for processing by IEEE SA.

Meeting was adjourned at 5:00PM.

Respectfully Submitted,
Paul Boman, Chairman

**Revision to C57.143 – “Guide for Application of Monitoring Equipment to
Liquid-Immersed Transformers and Components”
Transformer Monitoring Working Group
Monday, April 3, 2017
New Orleans, Louisiana, USA**

Minutes of WG Meeting

The meeting was called to order at 3:15pm by Chair Mike Spurlock. Vice Chair Brian Sparling and Secretary Mark Cheatham were also present.

This was the first meeting of the working group and thus rosters were circulated and membership will be created based on the attendees present requesting membership. A complete list of attendees and membership status will be provided to the group. The WG does plan to meet at the Fall 2017 Transformers Committee Meeting in Louisville, KY.

Attendance (roster): 122

Attendance (RF Scanner): 133

Requested Membership: 65

MEETING AGENDA

- A. Welcome & Introduction
- B. Roster Circulation
- C. *Quorum Roll Call (move to next meeting?)*
- D. Chair Remarks
- E. New Members – Indicate on Roster
- F. Status of PAR Submission
- G. Working Group Activities
 1. Presentation of the Tutorial on Cigré Technical Brochure No. 630, “Transformer intelligent condition Monitoring”
 2. Comparison of IEEE C57.143-2012 and Cigré TB 630, common themes, and gaps.
 3. Feedback from users of C57.143-2012. What was useful, what gaps exist, what needs improvement.
 - a. This item is important to have active participation from the potential WG, in order to begin assignment of tasks for the revision.
 - b. From this we need to establish a rough outline of the revised guide from a content point of view.

H. New Business

If you have any new business items to present at the meeting, please inform the Chairman, and Vice Chairman, as well as the Secretary, with your suggestion, for review, to make sure it fits within the scope and time of this meeting.

I. Adjourn

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

Mike Spurlock asked for any patent claims against C57.143 to be raised by attendees, none were expressed.

Mike Spurlock provided an update of the PAR. C57.143 was approved/published in 2012 and set to expire 2022.

PAR Status: PAR for a Revision to an existing IEEE Standard

Type of Project: Revision to IEEE Standard C57.143-2012

PAR Request Date: 19-Nov-2016

PAR Approval Date: 17-Feb-2017

PAR Expiration Date: 31-Dec-2021

Mike Spurlock gave an overview of the current C57.143 document, reviewing the previous scope, Purpose and overview of Major Sections included in the document.

- Mike Spurlock asked the attendees if anyone in the room had used the current guide and if they had feedback on the current guide. Feedback from several attendees indicated that the revision should include more real world applications of monitoring and interpretation of the data for actionable intelligence.

Vice Chair– Brian Sparling presented a Tutorial on Cigre Technical Brochure No. 630 “Transformer Intelligent Condition Monitoring”

Brian Sparling introduced a comparison of IEEE C57.143-2012 and Cigre TB630, common themes and gaps that will be provided for the attendees to review. Due to time constraints, the comparison was not presented or discussed.

- Roger Fenton – City of Riverside indicated that the current C57.143 guide does not provide guidance to the end user on location of the monitoring sensors on the Transformer and suggested that this should be included in the scope of the revision.
- Mike Spurlock proposed 3 areas of Focus for the Revision of the Guide as follows:
 - New Sensors/Technology missing from the current guide
 - Data Interpretation and Classification. Task Force?
 - Communications - Protocols, Architectures and Regulatory Considerations. Task Force?
- Luiz Cheim – ABB suggested that the focus for revision is for the group to determine the structure of the guide before determining to add additional sensors.

- Mike Spurlock requested volunteers for helping to identify the structure needed for the revision and to work toward developing tasks forces to address gaps/revisions required.
- The Following Volunteers were received:
 - Mohamed Diaby – ABB
 - Scott Marshall – Power Engineers
 - Jeff Benach – Weidmann
 - Daniel Berler – ZTZ
 - Rogerio Verdolin – Verdolin Solutions
 - Donald Lamontagne – APS
 - Mickel Saad – ABB
 - Luiz Cheim – ABB
 - Bill Whitehead – Camlin
 - Emilio Morales –
 - Jeff Golarz –
 - Gustavo Leal – Dominion
 - Joe Watson –
 - Roger Fenton - City of Riverside
 - Poorvi Patel - ABB
- Gustavo Leal – Dominion noted that consideration should be given to senior standards. e.g. Bushing Monitoring sensors today are not covered by any standard to ensure that their design is safe for installation on a Transformer bushing.

A motion to Adjourn was given by Luiz Cheim of ABB and seconded by Bill Whitehead from Camlin.
Adjourned Meeting at 4:30pm.

Revision of C57.148 Standard for Control Cabinets for Power Transformers

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

The working group met at 11:00 AM on Monday 4/3/2016 in Grand Ballroom A-B at the Astor Crowne Plaza Hotel in New Orleans, Louisiana. 52 attendees were recorded, including 23 of the 38 members. A quorum was reached. It was the second official Working Group meeting for this project. The complete attendance record is available in the AMS System. 3 guests requested membership.

As required by the main committee, the Patent question was asked at the beginning of the meeting. No essential patents were claimed. The Vancouver Fall 2016 meeting minutes were approved unanimously.

The comments from the straw ballot were reviewed and the discussions were summarized below:

Multiple comments were about requirement for drawings. Ryan Musgrove of Oklahoma Gas & Electric stated that utility personnel would like to see minimum drawing requirements for NERC/FERC compliance and consistency purposes. Items of interest include wiring diagrams, control schematics, CT classes & thermal ratings, breaker ratings, etc. Devki Sharma of Entergy stated that the IEEE/PES Switchgear Committee has a sample drawing list and standard requirements that may be used as a reference.

Several design/construction details, including cabinet dimensions, ground studs, swing panels and conduit entry, were discussed. Javier Arteaga of ABB noted that the standard should not get too deep into the details. Markus Stank of Reinhausen also stated that there should not be any regulation on construction details. It appeared that the group had the consent that the amount of details should be limited in the standard; instead such details shall be discussed and agreed between the manufacturer and the purchaser. Markus Stank also pointed out that 5.18 should be revised so the use of LED lights won't be prohibited.

During discussion of electrical devices, Kris Zibert of Allgeier, Martin & Associates stated that they use single-pole fuses and breakers. Whether lamps, switches, breakers, etc. should be UL listed was also discussed. Markus Stank suggested that such requirement would be too restrictive and perhaps may raise other concerns. The WG chair also noted that getting certain devices UL-listed would be no easy task.

In response to comments on 5.22 regarding material requirements, Hakim Dulac of Qualitrol pointed out that such requirements are either included in other section of the control cabinet standard or other existing standards; therefore there is no need to edit the language that is currently in the standard.

Ryan Musgrove stated that it is not unreasonable to have clear requirements for device nameplates as they will be extremely beneficial for field troubleshooting. Stacy Kessler of Basin Electric suggested that section 6.3 may be expanded to include the nameplate info.

After multiple discussions of ground bus, CT circuits and other electrical devices, the group agreed that sections 5.10 through 5.22 definitely need some work and a task force reviewing section 5 would be the best approach.

The WG chair proceeded with calling the formation of two task forces to review sections 5, 6 and 7. The task force members are as follows:

Section 5:

Ryan Musgrove (leader) of Oklahoma Gas & Electric
Kris Zibert of Allgeier, Martin & Associates

Markus Stank of Reinhausen
Patrick Rock of American Transmission Co.
Stacey Kessler of Basin Electric

Sections 6 & 7 (leader - to be determined)
Tad Daniels of Weidmann
Ryan Musgrove of Oklahoma Gas & Electric
Gustavo Leal of Dominion Virginia Power
Shankar Nambi of Bechtel
Rakesh Rathi of Virginia Transformer
Javier Arteaga of ABB

The WG officers will review the other general and editorial comments.

The group will meet again in Louisville, Kentucky in October 2017.
The meeting was adjourned at 12:05 PM.

Minutes for the V/Hz Taskforce

The Task Force members were Ramsis Girgis, Joe Watson and Kipp Yule. The TF held two conference calls to discuss the topic and communicated by emails before the PTSC meeting in New Orleans.

A copy of the GE V/Hz curve for transformers was obtained and discussed by the group. Ramsis Girgis was familiar with the curve and noted that it was the only standard curve that was being widely used and that it was being applied to all types of GSU transformers.

The TF determined that the curve was developed by GE in the 60's or 70's and is specific to the GE design for core-form type transformers using the type of insulation commonly used at that time. The curve may not be accurate for shell form transformers, and may not be accurate for modern core-form designs with Nomex insulation in certain areas like between the core and flitch plates.

The TF concluded that more work is needed in this area and that the TF should be expanded with experts in the field to help define and develop criteria for limits based on designs and materials used, and to develop a standard process for developing V/Hz curves and to develop standard curves for different types of transformers, if needed.

During the PTSC meeting, we reported our progress and the following people volunteered to join the TF:

- Ed teNyenhuis
- Phil Hopkinson
- Waldemar Ziomek
- Jim McIver
- Javier Arteaga
- Mike Craven

The TF will continue to meet by conference call or web meeting and will request a small meeting room at the next meeting in Louisville.

Joe Watson

2017 Spring Meeting

Location: New Orleans LA

Meeting Room: "Bourbon Room", 2nd Floor Mezzanine Level (M2)

Date: Tuesday, April 4th 2017

Time: 13:45 hours – 15:00 hours

MINUTES of Task Force on Need for Guide for Condition Assessment of Transformers

The TF group met with 15 people in attendance. Membership list was updated

- A. Welcome & Introduction
- B. Roster Circulation
- C. Chair Remarks:
 - 1. Scope: Provide recommendation to the Power Transformers subcommittee if a transformer condition assessment guide should be written by the IEEE PES Transformers Committee.
 - 2. Consider as a group why document may be needed, relevance etc. Review information already published to help develop basis for decision of recommendation. We need to provide a technically sound recommendation that does not weigh in commercial interests.
- D. Review of:
 - 1. Cigré WG A2.49 Scope and Table of Contents
 - 2. What other published Guides and/or Standards may be applicable to the work
 - 3. Freedom to contribute comments, ideas, suggestions, open forum with all members

A good discussion amongst the group with respect to how they are doing a condition assessment and the reasons why they do it. Most have designed their own methods to address the needs of their company. It was clear that there are many uses of a condition they use, for various purposes, being maintenance strategies, asset replacement, assessing the risk of units to the system and/or network.

The foundation of these various methods does use various IEEE Guides published or those published by the US Bureau of Reclamation (FIST Volume 3-31), and/or Cigré to assist them in determine the condition of their units.

IEC has initiated a new TC number 123, that is intended to produce a Guide (or Standard) for condition assessment of ALL major substation components. There has not yet been a meeting, but is to be arranged for later this year.

Cigré has initiated a new WG in the Substations section (B3) to produce a Guide for Condition Assessment of Substation components. The transformer portion will be using the output of the current A2.49 working group as its contribution to this new Guide.

It was determined that many of the uses of a condition assessment can serve different purposes. The common element in all methods, was the use of the basic measurements, findings, inspection observations that are now published in these various guides produced.

It was agreed to not try to be a guide to address all the possible uses of an output, but to try to guide the reader, (utility, industrial, commercial owner), as to what to consider, and a simple methodology, of establish the condition, give the common underlying basis of the assessment.

The **SCOPE** we all agreed to is as follows and is submitted to the Power Transformers SC for consideration:

A Guide for the Assessment of Liquid Immersed Transformers, Reactors and their components, to determine and quantify the overall condition by means of an index.

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