Annex K Power Transformers Subcommittee

October 30, 2024
St. Louis, Missouri, USA
Meeting Time: 1:30-2:45 p.m.

Chair: Ryan Musgrove
Vice Chair: Alwyn VanderWalt
Secretary: Weijun Li

K.1 Meeting Attendance

The Power Transformers Subcommittee (PTSC) met on Wednesday, October 30 at 1:30 p.m. The attendance record indicates that 87 out of 109 members of the subcommittee were in attendance; a quorum at the meeting was achieved. A total of 247 individuals attended the meeting. PTSC Chair Ryan Musgrove (Oklahoma Gas & Electric), Vice Chair Alwyn VanderWalt (Electrical Consultants, Inc.), and Secretary Weijun Li (Braintree Electric Light Department) were present.

Nine individuals requested membership by speaking with or emailing PTSC officers after the meeting. Eight attended at least 3 out of the last 5 meetings and therefore qualified for "Member" status. The 9th has not been recorded in attendance in 3 out of the last 5 meetings, and therefore not yet qualified for membership.

A total of 55 individuals were added as "Guests" to the subcommittee. Ten individuals updated their contact information. Two individuals have been moved from "Member" to "Guest" for not having recorded attendance at the last 3 out of 5 meetings.

With the membership changes stated above, PTSC has a total of 115 members after the Fall 2024 meeting.

The complete attendance record is provided in Attachment K.1.

K.2 Approval of Agenda and Meeting Minutes

The Chair presented the meeting agenda and mentioned that a typo was corrected in the previously circulated Spring 2024 meeting minutes. Stephen Shull (BBC Electrical Services, Inc.) made a motion to approve the agenda as presented, which was seconded by Juan Carlos Cruz-Valdes (Prolec GE). The agenda was approved without objection. The approved agenda can be found in Attachment K.2. Sanjib Som (Pennsylvania Transformer) made a motion to approve the Spring 2024 meeting minutes with correction, which was seconded by Stephen Shull (BBC Electrical Services, Inc.). The Spring 2024 meeting minutes were approved without objection.

K.3 Chair's Remarks

The Chair provided an update on the PTSC roster. One member had been moved to Guest status due to not having attended at least 3 out of the last 5 meetings. Attendees were reminded to verify their email address and update as necessary. Using IEEE alias as contact email is highly recommended. The Chair also announced that guests who wish to become a member of the Power Transformers Subcommittee should see subcommittee officers after the meeting or contact one of

the officers by email requesting membership. Membership requests on paper roster will not be accepted.

The Chair provided an overview of the future scheduled meetings and proposed locations.

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. The Chair suggested that short meetings be held virtually so they won't take up in-person meeting slots.

The Chair provided an update on the new system tracking attendance and reminded the membership to create their account in the new committee management system Memberplanet if they haven't already done so. Paper roster will continue to be used until the new system is ready and data migration is complete.

The Chair reminded the working groups of patent calls and copyright & participant behavior review at each meeting and note in the minutes.

The Chair asked the audience to use a microphone and state their name and affiliation when speaking. The Chair also reminded the group not to interrupt an ongoing motion with a technicality that a motion or second may not be required.

The Chair shared a note from AdCom suggesting that a WG form a comment resolution group to handle comments from the ballot when moving a draft to ballot.

The Chair announced that Malia Zaman is transitioning away from the Transformers Committee. Patrycja Jarosz will be the IEEE staff point of contact for PTSC going forward.

The Chair showed a summary slide and provided an overview of the documents that PTSC is responsible for developing and maintaining.

The Chair introduced 3 new members that were added to the PTSC membership list since the Spring 2024 meeting. The new members are listed below:

Jose Machain (Prolec GE)
Ed teNyenhuis (Hitachi Energy)
Dharam Vir (Prolec GE)

The Chair provided the requirements for establishing & maintaining membership and urged members to participate in all email ballot requests. When a voting member is absent for more than two consecutive scheduled regular meetings and fails to participate by correspondence, the member may be removed.

K.4 Working Group and Task Force Reports

K.4.1 Revision of C57.131, Standard Requirements for Tap Changers – Craig Colopy

This group didn't meet in St. Louis. The final draft (D1.3) was approved as a revised standard by IEEE SA Standards Board Standards Review Committee (RevCom) on February 15, 2024.

K.4.2 WG C57.156, Guide for Tank Rupture Mitigation of Liquid-Immersed Power Transformers and Reactors – Peter Zhao

This working group met on Monday. A quorum was achieved. WG Chair Peter Zhao (BC Hydro) reported that Marc Foata (Maschinenfabrik Reinhausen) gave a presentation on rupture proof OLTC solutions. The group reviewed the proposed modifications to sections 4.2.2 & 4.2.3 that were prepared by a task force formed by Samuel Brodeur (Hitachi Energy) and Enrique Betancourt (Prolec GE). The group also reviewed some of the proposed modifications to Section 5.2 that were prepared by another task force formed by Marc Foata (Maschinenfabrik Reinhausen), Chris Johnson (Oncor), Ryan Musgrove (Oklahoma Gas & Electric), Samson Debass (EPRI), and Didier Hamoir (Transformer Protector Corp). Discussion of these technical topics will continue at the next meeting.

The complete meeting minutes can be found in Attachment K.4.2. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.3 Revision of C57.116, Guide for Transformers Directly Connected to Generators – Weijun Li

This working group completed its work in 2022; therefore, they won't meet again until the next revision cycle, possibly 2027.

K.4.4 WG IEEE 638, Standard for Qualification of Class 1E Transformers for Nuclear Power Generating Stations – Craig Swinderman

This working group met on Monday with 6 members and 27 guests present. 2 guests requested membership. WG Chair Craig Swinderman (Mitsubishi Electric Power Products) said that the PAR was approved on December 6, 2023 with an expiration date of December 31, 2027. The group reviewed Draft 2 of the document. The WG Chair indicated that further updating of IEEE 638 will be based on changes to another standard IEEE/IEC 60980-344-2020. The group will also review Annex A for update.

The complete meeting minutes can be found in Attachment K.4.4. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.5 WG C57.135, Guide for the Application, Specification, and Testing of Phase-Shifting Transformers – Ewald Schweiger

This working group met on Monday with 48 attendees and achieved a quorum. WG Chair Ewald Schweiger (Siemens Energy) provided an update on document review since the Vancouver meeting. Kevin Juchem (Hitachi Energy) and Luc Dorpmanns (Royal SMIT Transformers) presented ideas about harmonization and redistribution of contents in Guide C57.135 and Standard 60076-57-1202. The group recognized that this is a unique opportunity to harmonize, clean up, and enhance the contents of three relevant documents simultaneously: C57.135 (60076-57-135) Guide for the Application, Specification, and Testing of Phase-Shifting Transformers, IEEE/IEC 60076-57-1202 International Standard Power Transformers, Part 57-1202: Liquid-immersed Phase-Shifting Transformers, and C37.245 IEEE Guide for the Application of Protective Relaying for Phase-Shifting Transformers.

This working group is looking for volunteers to review the existing document for improvements and help with editorial changes.

The complete meeting minutes can be found in Attachment K.4.5. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

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

This group didn't meet in St. Louis due to the new draft guide being in the final ballot resolution stage. WG Chair Mike Spurlock (Spurlock Engineering Services, LLC) was not in attendance. WG Vice Chair Poorvi Patel (EPRI) reported that Draft 1.7 completed the 3rd recirculation on October 12, 2024 with a 98% approval rate and an 89% response rate. No comments were received. The final review by RevCom is expected to take place on December 10, 2024.

K.4.7 WG C57.12.10, Standard Requirements for Liquid-Immersed Power Transformers – Scott Digby

This working group met on Monday with 93 attendees. 38 individuals requested membership. 24 members from the task force carried over as new working group members. The new working has a total of 62 members. The current document expires at the end of 2027.

WG Chair Scott Digby (Duke Energy) discussed the revising plan with the group. The document will be circulated to the WG membership in "straw ballot" type format to gather comments for discussion and revision consideration. The group will then determine the next steps based on return/response from document circulation.

The complete meeting minutes can be found in Attachment K.4.7. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.8 TF C57.140, Guide for Evaluation and Reconditioning of Liquid-Immersed Power Transformers – Sanjib Som

This task force had their second in-person meeting on Monday with 64 attendees and achieved a quorum. After much discussion, the task force approved the following new Title and Scope (not including Purpose):

Title: IEEE Guide for Life Extension of Liquid Immersed Power Transformers and Reactors

Scope: This document provides guidelines to assist the user in extending the useful life of liquid-immersed Power Transformers and Reactors.

Being mindful of the definitions of Reconditioning and Refurbishment, the task force noted that the Chairs of C57.140, C57.637, and C57.170 should coordinate and make sure that there is clear understanding that this document (C57.140) would not encroach on the scope of C57.637 or C57.170.

TF Chair Sanjib Som (Pennsylvania Transformer) made a motion to create a PAR to revise C57.140, Guide for Evaluation and Reconditioning of Liquid-Immersed Power Transformers. Ewald Schweiger (Siemens Energy) seconded the motion. The motion passed with unanimous approval.

The complete meeting minutes can be found in Attachment K.4.8. Marcos Ferreira (Quanta Technology) is now the group's new chair.

The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.9 Revision of C57.125, Guide for Failure Investigation, Documentation, Analysis and Reporting for Power Transformers and Shunt Reactors – Hakan Sahin

This working group met on Monday and achieved a quorum. WG Chair Hakan Sahin (Virginia/Georgia Transformer) reminded the group of the tight timeline for completing a draft guide. The current document expires on December 31, 2025.

The group reviewed and approved the proposed modifications to Section 4.2 (Flowchart) and Table 8. With this, the WG completed the review of the existing document with appropriate revisions approved by the WG. The plan is to complete a draft document with all proposed revisions before the Spring 2025 meeting and proceed with ballot. The WG may request a PAR extension at the next meeting as needed.

The complete meeting minutes can be found in Attachment K.4.9. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.10 WG C57.157, Guide for Conducting Functional Life Tests on Switch Contacts Used in Insulating Liquid-Immersed Transformers – Adam Sewell

This working group met on Tuesday with a total of 37 attendees. A quorum was achieved. The PAR was approved June 2023 and expires December 2027. WG Chair Adam Sewell (Quality Switch, Inc.) reviewed the project timeline with the group. Attila Gyore (Midel) presented at the meeting on topic of synthetic esters.

The complete meeting minutes can be found in Attachment K.4.10. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.11 WG C57.170, Guide for the Condition Assessment of Liquid Immersed Transformers, Reactors and Their Components – Kumar Mani

This working group met on Tuesday and achieved a quorum. WG Chair Kumar Mani (Duke Energy) reported that an initial ballot was completed with 80% response rate and 91% approval rate. A total of 172 comments were received including 37 technical and 135 editorial/general comments. The group plans to resolve all comments by the end of this year and go for recirculation in the first quarter of 2025.

The complete meeting minutes can be found in Attachment K.4.11. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.12 Revision of C57.150, Guide for the Transportation of Transformers and Reactors Rated 10,000 kVA or Higher – Greg Anderson

This group didn't meet in St. Louis. The revised guide was approved in 2023. According to the standards report, this document was marked as being published in 2023, with next revision due December 2033.

K.4.13 WG PC57.17, Standard Requirements for Arc Furnace Transformers – Dom Corsi

This working group met on Tuesday with a total of 34 attendees. 13 of 21 members were present; therefore, a quorum was achieved. This was the third meeting as a working group. With one member removal and two newly added members, the WG now has 22 members.

The group reviewed the current working draft and the comments from the 1st straw ballot. The group agreed to go for 2nd straw ballot for additional comments.

The WG Chair Dom Corsi (Doble Engineering) transitioned chair position to Secretary (Jason Varnell, Doble Engineering) who will preside as WG chair going forward. Trenton Williams (Advanced Power Tech.) will be the new secretary.

The complete meeting minutes can be found in Attachment K.4.13. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.14 WG C57.107, Recommended Practice for Developing Short-Term Overexcitation V/Hz Curves for Transformers Directly Connected to Generators – Joe Watson

This working group didn't meet in St. Louis. This document was approved and published in 2024 with next revision due December 2034.

K.4.15 WG Liquid-Immersed Phase-Shifting Transformers 60076-57-1202 – Ewald Schweiger

This working group met on Tuesday with 50 attendees and achieved a quorum. WG Chair Ewald Schweiger (Siemens Energy) provided an update on document review since the Vancouver meeting.

Kevin Juchem (Hitachi Energy) and Luc Dorpmanns (Royal SMIT Transformers) presented ideas about harmonization and redistribution of contents in Guide C57.135 and Standard 60076-57-1202 and the input from IEC Polish NC for the separate measurements of the impedances of the HV/LV (series/exciter unit). The group recognized that this is a unique opportunity to harmonize, clean up, and enhance the contents of three relevant documents simultaneously: C57.135 (60076-57-135) Guide for the Application, Specification, and Testing of Phase-Shifting Transformers, IEEE/IEC 60076-57-1202 International Standard Power Transformers, Part 57-1202: Liquid-immersed Phase-Shifting Transformers, and C37.245 IEEE Guide for the Application of Protective Relaying for Phase-Shifting Transformers.

This working group is seeking volunteers to review the existing document for improvements.

The complete meeting minutes can be found in Attachment K.4.15. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.16 WG C57.93, IEEE Guide for Installation and Maintenance of Liquid-Immersed Power Transformers – Scott Reed

This working group met on Tuesday and achieved a quorum. This was the 1st official working group meeting.

WG Chair Scott Reed (MVA) presented the project timeline and an overview of the existing document.

The WG formed 7 task forces:
-TF1: Shipping Method and Assembly – Ryan Musgrove (Oklahoma Gas & Electric)
-TF2: Vacuum Processing Methods – Kyle Stechschulte (American Electric Power)
-TF3: Final Testing and Energization – Elizabeth Bray (Southern Company Services)
-TF4: Relocation and Field Repair – Alwyn VanderWalt (Electrical Consultants, Inc.)
-TF5: Maintenance – Weijun Li (Braintree Electric Light Department)
-TF6: Storage – Patrick Rock (American Transmission Co.)
-TF7: Editorial and Definitions – Jesse Duffy (Nashville Electric Service)

The task forces will report back to the WG at the Spring 2025 meeting with recommendations on how to revise the existing document.

The complete meeting minutes can be found in Attachment K.4.16. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.17 Liaison to PC57.93a Guide for Installation and Maintenance of Liquid-Immersed Power Transformers – Scott Reed

This is liaison activity related to the topic of low temperature cold starts for transformers with natural ester fluid. The Chinese entity went out to ballot and are resolving comments. Because it was an entity PAR, individuals were not permitted to vote on the guide amendment.

There were no meeting minutes for this liaison activity.

K.4.18 WG C57.153, Guide for Paralleling Regulating Transformers – Mark Tostrud

This working group met on Tuesday and achieved a quorum. WG Chair Mark Tostrud (Dynamic Ratings, Inc.) reviewed the PAR and project timeline with the group.

A modification to bibliography was discussed and approved. Proposed revisions to Annex C – Apparent Circulating Current were presented. The draft document will be updated with the proposed revisions and distributed to the WG. The definition of Reverse Power Flow was discussed. The WG decided there isn't a need to define it at this point and will proceed with work. The WG will wait to see how C57.12.80 and C57.133 define Reverse Power Flow. The group requested volunteers to draft a section on acceptable actions during reverse power flow conditions.

The group also discussed the impact IEEE P3400 may have on the language in the guide.

The complete meeting minutes can be found in Attachment K.4.18. The next in-person meeting is planned for Spring 2025 in Denver, Colorado.

K.4.19 Liaison to Entity PAR C57.145, Recommended Practice on Digital Twin Modeling and Analysis based on Spatial-temporal Data of Switch Cabinet and Transformer with 110kV and Below – Brian Sparling

This entity PAR was approved in June 2023. Liaison Brian Sparling (Kinectrics) provided the following progress report:

Draft 3.0 still under development
November 1, 2024 – Draft 3.0 completion

December 26, 2024 – Draft 4.0 completion
February 2, 2025 – Submit to Pre-MEC and MEC
April 2, 2025 – Submit draft to PE/TR for approval
June 1, 2025 – Initiate ballot invitation

There were no meeting minutes for this liaison activity.

K.4.20 Liaison to Entity PAR "Guide for Power Transformers for Low-frequency (10-30Hz) Power Transmission"

Sheldon Kennedy (Sheldon P. Kennedy Engineering, PLLC), the liaison to this entity PAR, provided the following progress report:

Draft 1 still under development
November 27, 2024 – Draft 1.0 Completion
December 12, 2024 – The Second WG Meeting and Approval of Draft 1.0
February 17., 2025 – The Third WG Meeting and Approval of Draft 2.0
April 22, 2025 – The Fourth WG Meeting and Approval of Draft 3.0 (Ballot Ready Draft)
June 18, 2025 – The Fifth WG Meeting (If needed)
July 16, 2025 – Submit to Mandatory Editorial Coordination (MEC)
September 3, 2025 – Update draft based on MEC Report
November 19, 2025 – Initiate SA Ballot

There were no meeting minutes for this liaison activity.

K.5 Old Business

Discussion on Creation of a New IoT Document – Hemchandra Shertukde and Sanjib Som

Study group chair Hemchandra Shertukde (University of Hartford) said that he contacted an engineer with IoT experience and talked about the possibility of putting together a short article on this topic. Dan Sauer (Eaton Corporation) made a motion to table the topic until further solid update becomes available. Stephen Shull (BBC Electrical Services, Inc.) seconded the motion. The motion passed with unanimous approval.

IEEE 693 Recommended Practice for Seismic Design of Substations – Substations Standards Committee

PTSC Chair Ryan Musgrove (Oklahoma Gas & Electric) provided an update on the so-called IEEE 693 Amendment "P693a" and Bushings Subcommittee Chair Eric Weatherbee's efforts appealing IEEE SA's approval of the "Amendment". Note that Eric Weatherbee is affiliated with PCORE Electric. Transformers Committee Chair David Wallach (Duke Energy) confirmed that the "Amendment" was approved and Eric Weatherbee's appeal was turned down. PTSC Chair Ryan Musgrove (Oklahoma Gas & Electric) pointed out that any changes in the next revision of IEEE 693 would likely affect power transformer designs. We need volunteers from the Power Transformers and Bushings subcommittees, especially users and transformer manufacturers, to participate in the review and ballot of IEEE 693 once the document is open for revision. Standards Coordinator Stephen Shull (BBC Electrical Services,

Inc.) echoed the Chair's comments and urged participation from bushing and transformer experts. Anyone who is interested in getting involved is encouraged to contact the PTSC Chair at ryan.musgrove@ieee.org. The Chair plans on emailing all PTSC members and guests when further information about the next revision becomes available.

K.6 New Business

60076-16 Power Transformers – Part 16: Transformers for Wind Turbine Applications – Revision due 2028

The revision of this document is due in 2028. The Chair will appoint a volunteer to lead a study group to review the document and suggest next steps. The Chair has noted that PAR study group will be postponed until work is completed on at least two of the ongoing PTSC standards to help try to prevent future meeting scheduling conflicts. This will fall under old business to be reviewed at the next subcommittee meeting.

It should be noted that after the Performance Characteristics Subcommittee meeting and further conversation with the standards coordinator, it appears that IEC/IEEE 60076-16 was improperly marked as belonging to the Power Transformers Subcommittee and it actually belongs to the Performance Characteristics Subcommittee

60214-2 Draft Guide for Tap-Changers – Part 2: Application Guide – Revision due 2029

The revision of this document is due in 2029. The Chair will appoint a volunteer to lead a study group to review the document and suggest next steps. The Chair has noted that PAR study group will be postponed until work is completed on at least two of the ongoing PTSC standards to help try to prevent future meeting scheduling conflicts. This will fall under old business to be reviewed at the next subcommittee meeting.

C57.148 – Standard for Control Cabinets for Power Transformers – Revision due 2030

The revision of this document is due in 2030. The Chair will appoint a volunteer to lead a study group to review the document and suggest next steps. The Chair has noted that PAR study group will be postponed until work is completed on at least two of the ongoing PTSC standards to help try to prevent future meeting scheduling conflicts. This will fall under old business to be reviewed at the next subcommittee meeting.

SCATE P3476 – Standard for Unique IDs and Smart Tags for Supply Chain and Asset Traceability for the Electric Grid – Alicia Farag

P3476 Work Group Chair Alicia Farag (LocusView) gave a presentation titled Supply Chain and Asset Traceability for Energy (SCATE) on industry standard unique IDs and smart tags (QR codes) for power equipment. This standard addresses unique identification numbers for electric grid assets including generation, transmission, substation, distribution, storage, and electric vehicle charging stations. The unique identifiers include a universal catalog identifier, manufacturer identifier, and traceability identifier.

Existing IEEE standard C57.12.35 (IEEE Standard Bar Coding for Distribution Transformers and Step-Voltage Regulators) covers manufacturer, serial number, manufacture date, customer

catalog ID, etc. but such information may not include all critical attribute data. SCATA P3476 covers industry standard catalog IDs with all critical attributes that are embedded directly into a smart tag that does not require look-up in another system and is consistent across all asset types (not just transformers).

The scope of the IEEE P3476 WG is to convert the SCATE specification into a standard and develop unique ID data models for each asset type.

The presentation touched on use cases and success stories from the natural gas industry. The presentation also illustrated various asset types and associated data model.

P3476 Work Group Chair Alicia Farag (LocusView) mentioned that the following asset types will likely be prioritized for Version 1 of the document and the WG will need Subject Matter Experts (SMEs) for each of these in the work group:

Liquid-filled power and distribution transformers, C57.12.00
Dry-type power and distribution transformers, C57.12.01
Instrument transformers, C57.13.5
Voltage regulators, C57.15

Extensive discussions were carried out during the Q&A session following the presentation. Topics included approximate project timeline (raised by Timothy Raymond, Consultant), optional attributes such as customer purchase order number (raised by Ewald Schweiger of Siemens Energy), advantages of interchangeability & mutual aid assistance (raised by Francis Mills of Power Engineers), potential impact on OEM's existing inventory/tracking systems (raised by Joshua Yun of Virginia Transformer Corp.), whether serial number being part of the new ID and a potentially challenging decoding process as time changes (raised by Trenton Williams of Advanced Power Technologies), and similar activities on the IEC side (raised by Brian Sparling of Kinectrics).

Gary Hoffman (Advanced Power Technologies) pointed out that the Transmission & Distribution Committee is the sponsor committee of P3476.

The presentation given was a condensed version. Once available, a copy of the full presentation provide by Alicia Farag will be posted on the PTSC website:
https://www.transformerscommittee.org/subcommittees/powertransf/

Power System Relaying and Control Committee Seeking Liaison – Michael Thompson

Power System Relaying and Control Committee (PSRC) Chair Michael Thompson (SEL Engineering Services, Inc.) introduced himself and shared his view of mutual benefits of having a liaison from the Transformers Committee participate in PSRC's activities. Participation from PTSC would be especially important due to PSRC's involvement in protection and control of power transformers and reactors. The PSRC group meets 3 times a year. A liaison attending PSRC meetings at least once a year would be beneficial. The goal is to share updates/reports between the two committees. Anyone who is interested in being the liaison is encouraged to contact Michael Thompson at michael.thompson@ieee.org and/or the PTSC Chair at ryan.musgrove@ieee.org.

K.7 Adjournment

The meeting adjourned at 2:45 p.m.

K.8 Attachments

Attachment K.1 – Attendance
Attachment K.2 – Agenda
Attachment K.4.1 – C57.131 (No Meeting)
Attachment K.4.2 – C57.156 Minutes
Attachment K.4.3 – C57.116 (No Meeting)
Attachment K.4.4 – IEEE 638 Minutes
Attachment K.4.5 – C57.135 Minutes
Attachment K.4.6 – C57.143 (No Meeting)
Attachment K.4.7 – C57.12.10 Minutes
Attachment K.4.8 – C57.140 Minutes
Attachment K.4.9 – C57.125 Minutes
Attachment K.4.10 – C57.157 Minutes
Attachment K.4.11 – C57.170 Minutes
Attachment K.4.12 – C57.150 (No Meeting)
Attachment K.4.13 – C57.17 Minutes
Attachment K.4.14 – C57.107 Minutes (No Meeting)
Attachment K.4.15 – 60076-57-1202 Minutes
Attachment K.4.16 – C57.93 Minutes
Attachment K.4.17 – Liaison to PC57.93a (No Meeting Minutes)
Attachment K.4.18 – C57.153 Minutes
Attachment K.4.19 – Liaison to Entity PAR for C57.145 (No Meeting Minutes)
Attachment K.4.20 – Liaison to Entity PAR for Guide for Power Transformers for Low-Frequency Power Transmission (No Meeting Minutes)

Attachment K.1

Attendance Record

Role	First Name	Last Name	Company
Member	Kayland	Adams	Prolec GE Waukesha
Guest	Anthony	Alexander	Hitachi Energy
Guest	Rehan	Ali	Siemens Energy
Guest	Rehan	Ali	Siemens Energy, Inc.
Guest	Robert	Allison	Dominion Energy
Member	Tauhid Haque	Ansari	Hitachi Energy
Guest	Elise	Arnold	SGB
Member	Onome	Avanoma	MJ Consulting
Guest	Paulo	Avelino	Hitachi Energy BR
Member	Donald	Ayers	Ayers Transformer Consulting
Member	Gilles	Bargone	FISO Technologies Inc.
Guest	Gilles	Barthes	Hitachi Energy
Member	Christopher	Baumgartner	We Energies
Guest	Hugo	Bayona	H-J Family of Companies
Guest	Jason	Beaudoin	Weidmann Electrical Technology
Guest	Orlando	Benitez	Hyosung HICO
Member	Enrique	Betancourt	Prolec GE
Guest	Edwin	Betancourt	Siemens Energy
Guest	Naveen	Bhardwaj	Trench Group
Guest	Kevin	Biggie	Weidmann Electrical Technology
Member	Wallace	Binder	WBBinder Consultant
Guest	Piotr	Blaszczyk	Specialty Transformer Components LLC
Member	Daniel	Blaydon	Baltimore Gas & Electric
Member	William	Boettger	Boettger Transformer Consulting LLC
Guest	Sanket	Bolar	Oncor Electric Delivery
Member	Paul	Boman	Hartford Steam Boiler
Member	Jeremiah	Bradshaw	Bureau of Reclamation
Guest	Garrett	Bradshaw	Howard Industries
Guest	Samuel	Brodeur	Hitachi ABB Power Grids
Guest	Steven	Brzoznowski	Bonneville Power Administration
Member	David	Calitz	Siemens Energy
Guest	Juan Alfredo	Carrizales	Prolec GE
Member	Juan	Castellanos	Prolec GE
Guest	Vivian	Chan	Hitachi Energy
Guest	Luiz	Cheim	Hitachi Energy
Guest	Caleb	Colby	Schneider Electric
Member	Craig	Colopy	Retired - General Interest

Guest	Michael	Craven	Qualus Corp.
Guest	Janet	Crockett	Fayetteville PWC
Member	Juan Carlos	Cruz Valdes	Prolec GE
Guest	Marcos	Czernorucki	Hitachi Energy
Guest	Roberto	Da Silva	Maschinenfabrik Reinhausen
Guest	Tim	Dappen	Cargill
Guest	Thomas	Dauzat	AEP-SWEPCO
Member	Eric	Davis	Consultant
Guest	Pouneh	Davoudi	Delta Star Inc.
Guest	Gabriel	Delgado	Invenergy
Member	Scott	Digby	Duke Energy
Guest	Nikolaus	Dillon	Dominion Energy
Guest	Paul	Dolloff	East Kentucky Power
Guest	Jeffrey	Door	H-J Family of Companies
Guest	Peter	Dopplmair	Trench Group
Guest	Luc	Dorpmanns	Royal SMIT Transformers
Guest	Jesse	Duffy	Nashville Electric Service
Guest	Kenneth	Dugger	Voltyx/NASS
Guest	Janko	Dzodan	Koncar D&ST
Guest	William	Elliott	AEP-SWEPCO
Guest	Eric	Elson	SDGE
Member	Evgenii	Ermakov	Hitachi Energy
Guest	Egui	Espitia	Reinhausen Mfg
Member	Reto	Fausch	RF Solutions
Member	Marcos	Ferreira	Quanta Technology
Guest	Joseph	Foldi	Foldi & Associates, Inc.
Guest	Raymond	Frazier	Ameren
Guest	Jose	Gamboa	H-J Family of Companies
Member	Eduardo	Garcia Wild	Siemens Energy
Guest	Miguel	Garcia Wild	Hitachi Energy
Guest	James	Gardner	Prolec GE Waukesha
Guest	Joshua	Garner	Independent Dielectrics
Guest	Dragana	Gasic	Koncar D&ST
Guest	Orlando	Giraldo	H-J Family of Companies
Member	Ramsis	Girgis	Hitachi Energy
Guest	Alireza	Gorzin	Black & Veatch
Guest	Brad	Grooms	NTS
Member	Ismail	Guner	Hydro-Quebec
Member	Niklas	Gustavsson	Hitachi Energy
Member	Attila	Gyore	MIDEL

Guest	Jesse	Hall	Virginia Transformer Corp.
Guest	Didier	Hamoir	Transformer Protector Corp
Guest	Kevin	Hampton	Siemens Energy
Guest	Eric	Hatton	Tempel
Guest	Ronald	Hernandez	Doble Engineering Co.
Guest	William	Herron	Reinhausen
Member	Gary	Hoffman	Advanced Power Technologies
Member	Saramma	Hoffman	PPL Electric Utilities
Member	Ryan	Hogg	Bureau of Reclamation
Guest	Thomas	Holifield	Howard Industries
Guest	Traci	Hopkins	H2Scan
Member	Philip	Hopkinson	HVOLT Inc.
Guest	Zinan	Huang	Sieyuan
Guest	Marion	Jaroszewski	Delta Star Inc.
Guest	Nicholas	Jensen	Delta Star Inc.
Member	John	John	Virginia Transformer Corp.
Guest	Christopher	Johnson	Oncor Electric Delivery
Member	Akash	Joshi	Kimley-Horn
Member	Kurt	Kaineder	Trench Austria
Guest	Sergiusz	Kapka	Hitachi Energy
Guest	Mick	Kasonga	ONCOR Electric
Guest	Jerzy	Kazmierczak	Hitachi Energy
Guest	Thomas	Keels	kEElectric Engineering PLLC
Member	Sheldon	Kennedy	Sheldon P. Kennedy Engineering, PLLC
Guest	Qasim	Khan	Neetrac Georgia Tech
Guest	Yeounsoo	Kim	MEPPI
Guest	Seungmo	Kim	Hyosung HICO
Guest	Yonghui	Kim	ILJIN Electric
Member	Zan	Kiparizoski	Howard Industries
Member	Egon	Kirchenmayer	Siemens Energy
Guest	Anton	Koshel	Delta Star Inc.
Guest	Andreas	Kurz	MR
Guest	Mateusz	Kwiatkowski	Hitachi Energy
Guest	Ashwini	Labh	Hitachi Energy
Guest	Donald	Lamontagne	Arizona Public Service Co.
Guest	Fernando	Leal	Prolec GE
Guest	Jihun	Lee	HD HYUNDAI electric
Guest	Junho	Lee	Hyundai Electric
Guest	Stefan	Lembacher	Siemens Energy
Secretary	Weijun	Li	Braintree Electric Light Dept.

Guest	Luc	Loiselle	Tetra Tech
Guest	Xose	Lopez-Fernandez	Universidade de Vigo
Member	Jose	Machain	Prolec GE
Guest	Jinesh	Malde	M&I Materials Inc.
Member	Kumar	Mani	Duke Energy
Guest	Francis	Mantoan	Siemens Energy
Guest	Moses	Manzano	Hyosung HICO
Guest	Daniel	Martinez	Lamination Specialties Inc.
Guest	Daniel	Martinez	
Guest	Katherine	Marulanda	Magnetron
Member	Thomas	Melle	HIGHVOLT
Guest	Toni	Mellin	Vaisala
Guest	Omar	Mendez Zamora	Prolec GE
Guest	Philip	Miller	Memphis Light, Gas & Water
Member	Francis	Mills	Power Engineers, Inc.
Member	Emilio	Morales-Cruz	Qualitrol Company LLC
Guest	Marta	Munoz	Hitachi Energy
Guest	Fredy	Murcia	Siemens Energy
Guest	Hugo	Murillo	H-J Family of Companies
Member	David	Murray	Tennessee Valley Authority
Chair	Ryan	Musgrove	Oklahoma Gas & Electric
Guest	Anthony	Natale	HICO America
Guest	Mark	Newbill	Hitachi Energy
Guest	Rudolf	Ogajanov	Hitachi Energy
Member	Anastasia	O'Malley	Consolidated Edison Co. of NY
Guest	Eduardo	Orozco	GE Grid Solutions
Guest	Parminder	Panesar	Virginia Transformer Corp.
Guest	Dean	Park	Hyosung HICO
Guest	Dwight	Parkinson	EATON Corporation
Member	Poorvi	Patel	Electric Power Research Institute (EPRI)
Guest	Sanjay	Patel	Smit Transformer
Guest	Pedro	Pedro	Efacec Energia
Guest	Verena	Pellon	Florida Power & Light
Guest	Harry	Pepe	Phenix Technologies, Inc.
Guest	Jason	Perkins	Moehn Electrical
Guest	Goran	Plisic	Siemens Energy KPT
Guest	Christoph	Ploetner	Siemens Energy
Guest	Dominic	Pollaro	NASS
Guest	Homero	Portillo	Advanced Power Technologies
Guest	Nicholas	Post	WEC Energy Group

Guest	Gustavo	Prado	Siemens Energy
Member	Ion	Radu	Hitachi Energy
Guest	Timothy	Raymond	Electric Power Research Institute (EPRI)
Member	Scott	Reed	MVA
Guest	Perry	Reeder	PA Transformer
Guest	Sebastian	Rehkopf	Maschinenfabrik Reinhausen
Guest	David	Reyes	ONCOR
Guest	Michael	Richardson	Ameren
Guest	Diego	Robalino	Megger
Guest	Rodrigo	Ronchi	WEG-Voltran
Guest	Yuri	Rossini	Siemens Energy
Member	Marnie	Roussell	Entergy
Member	Mickel	Saad	Hitachi Energy
Member	Hakan	Sahin	Virginia/Georgia Transformer
Member	Dinesh	Sankarakurup	Duke Energy
Guest	Amitabh	Sarkar	Virginia Transformer Corp.
Member	Daniel	Sauer	EATON Corporation
Member	Markus	Schiessl	SGB
Guest	Eric	Schleismann	Southern Company Services
Guest	Alfons	Schrammel	Siemens Energy
Member	Dan	Schwartz	Quality Switch, Inc.
Member	Ewald	Schweiger	Siemens Energy
Member	Cihangir	Sen	Duke Energy
Member	Adam	Sewell	Quality Switch, Inc.
Guest	Jeremy	Sewell	Quality Switch, Inc.
Member	Abdul Majid	Shaikh	Delta Star Inc.
Member	Hemchandra	Shertukde	University of Hartford
Member	Stephen	Shull	BBC Electrical Services, Inc.
Guest	Stefan	Siebert	BROCKHAUS Measurements
Guest	Jonathan	Sinclair	Black & Veatch
Guest	Christopher	Slattery	FirstEnergy Corp.
Guest	Jason	Snyder	FirstEnergy Corp.
Guest	Muhammad Abdullah	Sohail	Trench
Member	William	Solano	Reinhausen Manufacturing Inc.
Member	Sanjib	Som	Pennsylvania Transformer
Guest	Jonathan	Sonclair	Black and Veatch
Guest	Brian	Sparling	Kinectrics
Member	Brad	Staley	Leeward Energy
Member	Kyle	Stechschulte	American Electric Power
Guest	Hampton	Steele	Tennessee Valley Authority

Guest	Andrew	Steineman	Delta Star Inc.
Guest	Sunny	Swarna	Virginia Transformer Corp
Guest	Charles	Sweetser	OMICRON electronics Corp USA
Member	Craig	Swinderman	Mitsubishi Electric Power Products
Guest	Jonathan	Tan	Northern Transformer
Member	Troy	Tanaka	Burns & McDonnell
Guest	Samuel	Tekle	WEG Transformers USA
Guest	Jesse	Theberge	Tempel
Guest	Andreas	Thiede	Highvolt
Guest	Scott	Thomas	Hitachi Energy
Member	Ryan	Thompson	Burns & McDonnell
Guest	Michael	Thompson	SEL Engineering Services, Inc.
Guest	James	Thompson	T & R Service Company
Guest	Timothy	Tillery	Howard Industries
Guest	Francis	Topol	Siemens Energy KPT
Member	Mark	Tostrud	Dynamic Ratings, Inc.
Vice-Chair	Alwyn	Van Der Walt	Electrical Consultants, Inc.
Member	Ajith	Varghese	Prolec Energy
Member	Jason	Varnell	Doble Engineering Co.
Guest	Juan	Velasquez	Magnetron
Member	Rogerio	Verdolin	Verdolin Solutions Inc.
Guest	Karsten	Viereck	Maschinenfabrik Reinhausen
Guest	Krishnamurthy	Vijayan	Pennsylvania Transformers
Member	Dharam	Vir	Prolec GE
Member	Richard	vonGemmingen	Dominion Energy
Member	Pragnesh	Vyas	Sunbelt-Solomon
Guest	John	Wagner	AEP
Member	David	Wallach	Duke Energy
Guest	Alan	Washburn	Burns & McDonnell
Guest	Joshua	Watson	NPPD
Member	Bruce	Webb	Knoxville Utilities Board
Guest	Matthew	Webb	GE Vernova
Guest	Drew	Welton	Intellirent
Guest	Peter	Werelius	Megger
Member	Daniel	Weyer	Monolith
Guest	Joe	White	Power Engineers
Guest	Leon	White	Hedrich
Member	William	Whitehead	H2scan Corporation
Member	Trenton	Williams	Advanced Power Technologies
Member	Jeffrey	Wright	Duquesne Light Co.

Guest	Fei	Yang	Hitachi Energy
Guest	Tim	Young	Hitachi Energy
Guest	Zhenguan	Yu	Sieyuan Toshiba
Member	Joshua	Yun	Virginia Transformer Corp.
Guest	Malia	Zaman	IEEE
Guest	Jie	Zhang	Chint ELECTRIC CO.,LTD
Member	Peter	Zhao	Hydro One
Guest	Zhu	Zhixiang	Chint ELECTRIC CO.,LTD
Member	Kris	Zibert	Allgeier, Martin and Associates
Member	Waldemar	Ziomek	PTI Transformers

Attachment K.2

Agenda

1. Call to order
2. Distribution of Roster
3. Chair remarks
4. New Members
5. Determine quorum
6. Approval of agenda, approval of previous meeting minutes (sent by e-mail)
7. Working Group and Task Force reports
   a. WG Revision of C57.131, Tap Changers (no meeting)..... Craig Colopy
   b. WG C57.156, Guide for Tank Rupture Mitigation..... Peter Zhao
      i. Monday Oct 28th, 9:30-10:45 – Grand Ballroom GH (4)
   c. WG Revision of C57.116, GSU Transformers (Completed 2022 – no meeting)..... Weijun Li
   d. WG Class 1E Transformer for Nuclear Power gen Std. 638 ..... Craig Swinderman
      i. Monday Oct 28th, 11:00-12:15 – Grand Ballroom F (4)
   e. WG C57.135, Guide for Phase shifting Transformers.....Ewald Schweiger
      i. Monday Oct 28th, 1:45-3:00 – Grand Ballroom GH (4)
   f. WG Revision of C57.143, Monitoring Guide (no meeting)..... Mike Spurlock
   g. WG Requirement for Liquid-Immersed Power TR – C57.12.10..... Scott Digby
      i. Monday Oct 28th, 3:15-4:30 – Grand Ballroom D (4) First meeting
   h. TF Guide for Evaluation & Reconditioning of Liquid Immersed TR C57.140..... Sanjib Som
      i. Monday Oct 28th, 3:15-4:30 – Grand Ballroom E (4)
   i. WG Revision of C57.125, Failure Investigating and Reporting ..... Hakan Sahin
      i. Monday Oct 28th, 4:45-6:00 – Grand Ballroom GH (4)
   j. WG C57.157, Guide for Life test of Switch Contacts..... Adam Sewell
      i. Tuesday Oct 29th, 8:00-9:15 – Grand Ballroom C (4)
   k. WG C57.170, Condition Assessment Guide ..... Kumar Mani
      i. Tuesday Oct 29th, 9:30-10:45 – Grand Ballroom D (4)
   l. WG Revision of C57.150, Transportation Guide (No meeting)..... Greg Anderson
   m. WG C57.17, Standard Requirements for Arc Furnace Transformers..... Dom Corsi
      i. Tuesday Oct 29th, 11:00-12:15 – Grand Ballroom C (4)
   n. WG C57.107, Transformer Volts per Hertz (No meeting)..... Joe Watson
   o. WG Liquid Immersed Phase-Shifting Transformers 60076-57-1202 ..... Ewald Schweiger
      i. Tuesday Oct 29th, 1:45-3:00 – Grand Ballroom C (4) First meeting
   p. WG C57.93, Installation and Maintenance Guide ..... Scott Reed
      i. Tuesday Oct 29th, 3:15-4:30 – Grand Ballroom D (4) First meeting
   q. Liaison to PC57.93a – Installation and Maintenance Guide ..... Scott Reed
   r. WG C57.153, Guide for Paralleling Transformers ..... Mark Tostrud
      i. Tuesday Oct 29th, 4:45-6:00 – Grand Ballroom C (4)
   s. Liaison to Entity PAR C57.145 – Digital Twin for Power Equipment (DTPE)..... Brian Sparling
   t. Liaison to Entity PAR Guide for PT for Low-Frequency Power Transmission ..... Sheldon Kennedy
8. Old business
   a. Discussion on the creation of a new IOT Document – Sanjib Som/Hemchandra Shertukde
   b. IEEE 693 Recommended Practice for Seismic Design of Substations – Substations Standards Committee – Need volunteers, especially users and transformer manufacturers.
9. New business
10. Adjournment

Title: WG Guide for Tank Rupture Mitigation PC57.156
Time: 9:30 AM- 10:45 AM, Monday, October 28, 2024
Place: Hyatt Regency St. Louis at the Arch, St Louis, MO, US
Chair: Peter Zhao Vice-Chair: Samuel Brodeur Secretary: Hakim Dulac

1. **Call to Order at 9:30am**
    a. Chair's Remarks
    b. IEEE-SA Policies
        i. Call for Essential Patents slide presented and the group made no patent claims.
        ii. Copyright policies slide presented
    c. Quorum

WG active member	Member required for Quorum (> 50%)	Member present	Total attendance (Guest and member)	Quorum established
25	13	16	63	Yes

2. **Approval of Meeting Minutes**
    a. Motion to accept minutes of the spring 2024 meeting (Vancouver).
        i. Moved: Kevin Juchem
        ii. Seconded: Eduardo Garcia
        iii. The Spring 2024 meeting minutes were unanimously approved.
3. **Technical Topics**
        i. Presentation of a Rupture proof OLTC solutions by Marc Foata.
        ii. Reviewed and discussed of the proposal for Sections 4.2.2 &4.2.3 by task force (Samuel Brodeur & Enrique Betancourt). The updated proposal from the discussions will be presented next week for further review and approval.
        iii. Partially reviewed and discussed of the proposal for Section 5.2 by task force (Marc Foata, Chris Johnson, Ryan Musgrove, Samson Debass and Didier Hamoir) due to time limit, and will continue into next meeting.
4. **Action Items**
    a. None
5. **Unfinished Business**

a. None

6. New Business

a. None

7. Next Meeting

a. Next Meeting date and location Denver Colarado, March 23-27 2025

Reported by:
Samuel Brodeur, P.Eng.
WG Vice-Chair
Attendance:

Name	Affiliation	Member (yes, no or requested)
Alex Zeigher	Hitachi Energy	no
Alireza Gorzin	Black & Veatch	yes
Andy Speegle	ENTERGY	no
Ashwin Padmanaban Iyer	Transformer protector Corp	requested
Avila Hugo	Hitachi Energy	requested
Chao Li	Eaton	requested
Christop Ploetner	Siemens Energy	no
Christopher Johnson	Oncor	Yes
David Calitz	Siemens Energy	yes
David Murray	TVA	yes
David Reyes	Oncor	no
Derek Hollrah	Burns&McDonnell	yes
Didier Hamoir	Transformer Protector CORP.	requested
Eduardo Garcia	Siemens Energy	yes
Egui Espitia	MR	no
Emilio Morales Cruz	Qualitrol	requested
Enrique Betancourt	Prolec-GE	no
Eric Schleismann	Southern Company	no
Francis Mills	Power Engineers	requested
Hector Garza	Orto de Mexico	no
Hugo Avila	Hitachi Energy	no
Ismael Guner	Hydro Quebec	no
James Gardner	Prolec-GE Waukesha	no
Jason Snyder	FirstEnergy	no
Jerzy Kazmierczak	Hitachi Energy	requested
Jihun Lee	HD HYUNDAI ELECTRIC	no

Joe Nims	Allen& Hoshall	no
Jose Luis Machain	Prolec GE	yes
Joshua Yun	Virginia Transformer	yes
Junho Lee	Hyundai Electric	yes
Kannan Veeran	Virginia Transformer	requested
Kevin Hampton	Siemens Energy	no
Kevin Juchem	Hitachi Energy	no
Luc Loiselle	Tetra Tech	yes
Luke Wang	BC hydro	requested
Malia Zaman	IEEE SA	no
Manan Pandya	Siemens energy	requested
Marc Foata	MR	yes
Martin Munoz	Orto de Mexico	requested
Michael Botti	Hyosung HICO	yes
Michael Nolte	Kiewit	requested
Moses Manzano	Hyosung HICO	yes
Niklas Gustavsson	Hitachi Energy	no
Olivier David Uhlmann	Reinhausen Canada Inc.	no
Omar Mendez	Prolec	no
Oscar Mendiola	Transformer Protector Corp.	no
Paul Dolloff	EKPC	no
Peter Zhao	Hydro One	yes
Rehan Ali	Siemens Energy, Inc.	no
Richard Vongemminen	Dominion Energy	no
Rogerio Verdolin	Verdolin Solutions	requested
Ryan Musgrove	Oklahoma Gas & Electric	no
Samson Debass	EPRI	yes
Samuel Brodeur	Hitachi Energy	yes
Sanjib Som	PTT, LLC	yes
Sebastian Rehkopf	MR	requested
Sergiusz Kapka	Hitachi Energy	no
Stephen Antosz	Consultant	no
Steven Brzoznowski	BPA	no
Sunny Swarna	Virginia Transformer Corporation	requested
Verena Pellon	NEXTERA	yes
Waldemar Ziomek	PTI Transformers	requested
William Solano	Voltyx	requested

Document #: **638**

Document Title: **Qualification of Class 1E Transformers for Nuclear Power Generating Stations**

Chair: Craig Swinderman Vice Chair Robert Allison* new
Secretary: Dominic Pollaro Percent Complete: 25%

Meeting Date: Monday, October 28, 2024 Time: 11:00 am to 12:15 pm.
Location: Hyatt Regency; St. Louis Missouri – Grand Ballroom F.

Current draft being worked on: 2.0 Dated: October 6, 2024
PAR Expiration date: December 31, 2027

Attendance:		
	Members:	6 of 11
	Guests:	27
	Guests requesting membership:	2
	Total*:	33

* A list of attendees is included at the end of these minutes.

Meeting Minutes / Significant Issues / Comments:

1. Meeting was called to order at 11:00am by Chair Craig Swinderman.

2. Presentation of Agenda:
   The agenda for the meeting was submitted for review in advance of the meeting.

3. Presentation of IEEE Standards Slides:
   IEEE Essential Patent Slides and Copyright policy were presented, and no issues received from the attendees.

4. Distribution of attendance sheets:
   a. Attendance was taken with a paper roster.
   b. Please send an email to craig.swinderman@meppi.com with the subject: P638 EMAIL to be added to the P638 email list.

5. Checking the Quorum:
    a. 6 out of 11 members were in attendance of the meeting so quorum was achieved.

6. Approval of the Meeting Minutes from Vancouver Spring 2024 and Agenda for Fall 2024:
    a. Approval of the Spring 2024 meeting unapproved minutes
        i. Ryan Musgrove motioned to approve.
        ii. Robert Allison seconded.
        iii. Motion was carried unanimously with no objections or abstentions. – Approved.
    b. Approval of the Fall 2024 agenda
        i. Robert Allison motioned to approve.
        ii. Ryan Musgrove seconded.
        iii. Motion was carried unanimously with no objections or abstentions. – Approved.

7. Chair announcements:

    The PAR for revision of 638 was recently approved on December 6, 2023, and will expire on December 31, 2027. The target date for completing the updated standard is mid-2026 for submittal to start the ballot process.

    Robert Allison of Dominion Energy volunteered to be the working group's Vice Chair during this meeting.

8. Old work:

    Discussed scope and purpose to IEEE 638, closely linked standards from IEEE/IEC 60780-323 and IEEE/IEC 60980-344. These dual logo standards are targeted to all safety related nuclear equipment, of which transformers are a subset. Both documents have been updated since IEEE 638 was published in 2013, and reviews have been done to target changes that have been made by these revisions.

    Several changes reviewed from IEEE 323 2003 document to the 2016 revision. Much of the wording matched the previous

version but needed to have further detailed reviews of specific sections. These reviews are in progress. Chair called for other volunteers to assist with reviews. IEEE/IEC 60780-323 2016 will be due for re-publication by December 2026, so we need to be aware of those potential changes as well.

Initial review topics of IEEE/IEC 60980-344 2020 was reviewed. Shared notes and comments from Robert Allison.

Chair continued with review of new chapters and additions to the IEEE/IEC 60980-344 standards for the 2020 version, noting that there appear to be some significant changes included in the 2020 version, which the corresponding material will require updating in 638.

Chair noted Sections 5 (Approaches to Transformer Qualifications) and 6 (Design Qualification Procedure) need to be reviewed for updating based on changes to IEEE/IEC 60780-323 and IEEE/IEC 60980-344.

Chair discussed request for deeper review and shared access to draft document.

9. New Work:
   Robert Allison of Dominion Energy agreed to review and update Section 6 of the Draft 2.

Craig Swinderman presented Draft 2 to the working group and indicated specifically the areas where we are looking for help.

Craig reviewed the highlights.

Grace Guang Yuan of Hitachi Energy volunteered to assist with the ANNEX A review.

Jason Beaudoin of Weidmann volunteered to assist with the ANNEX A review with respect to solid insulation aging for oil immersed transformers.

10. Next meeting: Denver Colorado, Spring 2025_ March 23-27, 2025

11. Close of meeting:
The meeting adjourned at 12:00 pm

Submitted by: Craig Swinderman Date: October 30, 2024

List of Meeting Attendees at Fall '24 Meeting, including affiliation & voting member status.

NAME	COMPANY	ROLE
WEIJU LI	BRAINTREE ELECTRIC	GUEST
GERALD SUMAN	ETSI	GUEST
PRESTON SIMON	ETSI	GUEST
CHERYL BASEL	WEG TRANSFORMERS	GUEST
JASON PERKINS	MOELEVE ELECTRIC	GUEST
MARK NEWBILL	HITACHI ENERGY	GUEST
ARVIND KUMAR	DELTA STAR	GUEST
ANDREW LUGGE	HITACHI ENERGY	GUEST
CHRIS WHITTEN	HITACHI ENERGY	GUEST
MARNIE ROUSSELL	ENTERGY	GUEST
ANDREAS THIEDO	HIGH VOLT DRESDEN	GUEST
GILLIS BARGONE	FISCO	GUEST
ZHINGSANG ZHU	CHINT	GUEST
SUDIP CHANDRA	DELTA STAR	GUEST
CHENY CAI	SIEYUAN ELECTRIC	GUEST
ALEX ZEIGHER	HITACHI ENERGY	GUEST
JASON BEAUDOIN	WEIDMANN	GUEST
DAVID MURRAY	TVA	GUEST
DOMINIC POLLARO	NASS	MEM
DAN SAUER	EATON	GUEST
KEYLAND ADAMS	PROLEC GE	GUEST
ANDY SPEEGLE	ENTERGY	GUEST
SAMMEL GRUSHIEWTZ	GE VERONA	GUEST
WILLIAM SOLANO	VOLTYX	GUEST
JOSE ANTONIO GONZALEZ	VIRGINIA TRANSFORMER	GUEST

EGUI ESPITIA	REINHAUSEN	GUEST
MARIA ZAMAN	IEEE SA	GUEST
YEONUNSOO KIM	MITSUBISHI ELECTRIC	MEM
CRAIG SWINDERMAN	MITSUBISHI ELECTRIC	MEM
RYAN MUSGROVE	OGE	MEM
ROBERT ALLISON	DOMINION ENERGY	MEM
ALFREDO CARRIZALES	PROLEC GE	GUEST
GRACE YUAN	HITACHI ENERGY	GUEST

Attachment K.4.5

Working Group C57.135 - IEC/IEEE 60067-57-135

Chair: Ewald Schweiger
Secretary: Richard von Gemmingen

Guide for the Application, Specification and Testing of Phase-Shifting Transformers

1. Meeting was called to order at 1:45 PM (CDT) on Tuesday October 28th, 2024 with Welcome & Chair's remarks
2. Details about attendance:
    a) Attendance: 48
    b) Members: 15
    c) Guests: 33
3. Call for essential patents
    d) IEEE slides on essential patents have been provided in the meeting invitation, posted on the internet and were shown and a call for essential patents was made.
    → No essential patents or issues were reported.
4. Copyright policy
    e) Slides of the IEEE copyright policy have been provided in the meeting invitation, posted on the internet and were shown and request made to identify any potential copyright issues.
    → No issues were reported.
5. Quorum check
    f) Total number of members is 26 requiring 14 members for quorum.
    First member couple had only 12 in attendance. Decision was to continue with status update on IEC / IEEE 60076-57-135 and re-check attendance later.
6. IEC Decisions Taken in Rome, April 18, 2024
    g) Kevin Juchem and Ewald Schweiger presented information from Rome meeting
    h) IEC TC 14 decides to participate in revision of IEC/IEEE 600076-57-1202
    i) Further decided to transfer both aspects, phase-shifting standard (60076-57-1202) and technical guideline standard (60076-57-135), into one new MT (Maintenance Team)
    j) Kevin Juchem is appointed as convenor for the new established MT 60076-57-PST.
    k) Members nominated by the IEC NC (National Committee) of 60076-57-PST were displayed
7. Presentation of proposals for content redistribution IEEE/IEC 60076-57-135 and IEEE/IEC 60076-57-1202
    l) Kevin Juchem and Luc Dorpmanns presented many observations from reviews and suggestions for updates of the documents.
    m) Topics included Definitions, Control Systems, Testing, Power flow, GIC, PST Load flows and more
    n) Note was made of the fact that IEC does not allow work GUIDE to be used and title will likely have to be changed to GUIDANCE or other term for IEEE/IEC 60076-57-135
    o) Particular note and discussion were on ARS (Advance Retard Switch) a technology that is mentioned in the standard but is am unique manufacture technology and it was challenged if this should belong in the document.
    p) The significant complexities of design, protection, reliability etc were discussed at length
    q) Suggestion was made that ARS should possibly be moved from the Standard to the Guide
8. Quorum recount was made at 2:10 and 14 members were present
    9. →establishing quorum.
10. Approval of agenda
    a) Motion to approve agenda was made by Eric Davis and seconded by Luc Dorpmanns.
    No discussion or objections were made.

b) Motion was carried unanimously with no objections or abstentions.

11. Approval of meeting minutes of the previous Spring 2024 meeting
    a) Motion to approve agenda was made by Eric Davis and seconded by Luc Dorpmanns. No discussion or objections were made.
    b) Motion was carried unanimously with no objections or abstentions.

11) Status and Next steps were discussed for PAR update now with dual logo.
    a) The information from Michael Thompson was shared that the Power System Relaying and Control Committee (PSRC) will establish a Study group for C37.345 (IEEE Guide for the Application of Protective Relaying for Phase-Shifting Transformers) in the next PSRC meeting in January
    b) Guide will need to be aligned with IEEE C37.245 (IEEE Guide for the Application of Protective Relaying for Phase-Shifting Transformers) for consistency of definitions etc.
    c) Noted on the task list are the needs of a PAR modification:
    Title: Technical guideline for the Application, Specification, and Testing of Phase-Shifting Transformers
    Document number: IEC/IEEE 60076-57-135

12) Review of needed work on Clauses 1-6 and 4-12 were discussed and call for volunteers was put out.

13) Old Business
    - None

14) New Business
    a) Sanjay Patel commented on a need to clean up ARS
    b) Patrycja Jarosz with IEEE/SA commented on need to modify PAR though it is not an urgent need now.
    c) No other Discussions were presented

15) The meeting was adjourned at 2:32 PM (CST)

16) Next meetings (planned):
    - Virtual meeting – might be scheduled before March 2025
    - In-person meeting S25 – March 23-27, 2025 in Denver, CO

Respectfully submitted,

Ewald Schweiger – WG Group Chair
Richard von Gemmingen – WG Secretary

List of attendees for this meeting:

Last name	First name	Company / Affiliation	Status
Antosz	Stephen	Consultant	G
Barker	Sean	Hitachi Energy	G
Beaudoin	Jason	Weidmann Electrical Technology	G
Calitz	David	Siemens Energy	G
Chan	Vivian	Hitachi Energy	G
Colopy	Craig	Retired	G
Corsi	Domenico	Doble Engineering Co.	G
Davis	Eric	Consultant	M
Dorpmanns	Luc	Royal SMIT Transformers B.V.	M
Espitia	Egui	Reinhausen Manufacturing Inc.	G

Garza	Hector	Orto de Mexico	G
Gonzalez Ceballos	Jose Antonio	Georgia Transformer	G
Grushiewrz	Samuel	GE Vernova	G
Hampton	Kevin	Siemens Energy	G
Heiden	Kyle	EATON Corporation	G
Hoffman	Saramma	PPL	M
Jarosz	Patrycia	IEEE SA	G
Juchem	Kevin	Hitachi Energy	M
Katapalli	Thrinadha	Virginia Transformer Corporation	M
Labh	Ashwini	Hitachi Energy	G
Lembacher	Stefan	Siemens Energy	G
McCullough	Douglas	Maxima / Hyundai	M
Mendez Zamora	Omar	Prolec GE	M
Munoz	Martin	Orto de Mexico	G
Musgrove	Ryan	OG+E	M
Orozco	Eduardo	GE Grid Solutions	G
Pandza	Thiomir	Siemens Energy	G
Patel	Sanjay	TD-Smit Transformers	M
Pavicic	Tomislav	Siemens Energy	G
Rashide	Adnan	Measurement Canada	G
Rehkopf	Sebastian	Maschinenfabrik Reinhausen GmbH	M
Reyes	David	Oncor	G
Sarkar	Amitabh	Virginia Transformer Corporation	G
Schindler	Stefan	Maschinenfabrik Reinhausen GmbH	G
Schrammel	Alfons	Siemens Energy	M
Schweiger	Ewald	Siemens Energy	M
Scott	Thomas	Hitachi Energy	G
Shimpi	Leena	MGM Transformer Co.	G
Solano	William	Voltyx	G
Stechschulte	Kyle D	AEP	M
Thompson	Michael	SEL Engineering Services, Inc.	M
Viereck	Karsten	Maschinenfabrik Reinhausen	G
Vir	Dharam	Prolec GE Waukesha	G
von Gemmingen	Richard	Dominion Energy	M
Weisensee	Matthew	Pacificorp	G
White	Joe	Power Engineers	G
Zeigher	Alex	Hitachi Energy	G
Zhangh	Jie	CHINT	G

Attachment K.4.7

WG for the Revision of C57.12.10

IEEE Standard Requirements for Liquid-Immersed Power Transformers

3:15 p.m. – 4:30 p.m. Central Time, Monday, October 28, 2024

Hyatt Regency St. Louis, St. Louis, Missouri, USA

Unapproved Meeting Minutes

WG Chair Scott Digby called the meeting to order at 3:19 p.m., Monday, October 28, 2024. As this was the first meeting of this new WG, the vice-chair role has not yet been established or filled. WG Secretary is Juan Castellanos.

Total Attendance was:	93
Members from previous TF	10 (total members from TF carried over to WG = 24)
Guests requesting Membership:	38 (membership granted thus quorum achieved)
Guests not requesting membership:	45

The total new WG membership stands now at 62. The meeting attendance list is included at the end of these minutes.

The WG Chair reviewed with the group the revision plan. The PAR was approved at the September 25,2024 NESCOM meeting with an expiration date of 12/31/2028, It was noted that the active document was published in 2017, so it expires 12/31/2027 (~3.0 years from now). So the chair looks forward to finish the revision by the end of year 2026 and allows the entire 2027 for the SA sponsor balloting process.

A proposed meeting agenda was presented by the WG Chair, with there being no comments so the meeting proceeded accordingly. Attendance rosters were circulated, with attendees being advised that as this is the first meeting of this group, that those requesting membership on the roster would be granted membership. The WG Chair made the requisite Call for Patents and there was none noted by those present. The WG Chair presented the IEEE SA Copyright Policy slides as well as the IEEE-SA activity participant behavior slides. There were no minutes approved because it was the first meeting of this WG.

During the meeting it was discussed how to proceed with the revision. The idea of creating task forces (TFs) was recognized as a more efficient way to get the work done. The possible TFs may be:

Section 2	Normative References
Section 3	Definitions and Acronyms
Section 4	Rating Data
Section 5	Construction

Section 6 OLTC

Annex A OLTC considerations

Ryan Musgrove, chair of the Power Transformers Subcommittee, recommended to create the Task Forces, and in parallel circulate the document among members of the WG calling for comments to get the best input for the next spring meeting. Regarding the last rounds of recirculation during the previous sponsor ballot in 2017, Patrycja Jarosz (IEEE-SA) to double check how to gather comments from previous revision.

Adriana Cisco (Salt River Project) commented there are conflicts between C57.12.00 and C57.12.10, minor wording issues, inconsistencies that should be resolved in this revision. Craig Colopy suggested having virtual work sessions between face-to-face meetings and splitting the task in sub-groups because the document is too large to be revised by the entire WG. The time slot for this WG is scheduled at the same time as the C57.12.00 TF for continuous revision, the chairman would look for a solution of this overlap. Two persons volunteered for the position of vice-chairman, Rogerio Verdolin (Verdolin Solutions) and Thomas Keels (Keelectric Engineering), the chairman to decide who would get the position.

The document to be circulated to WG membership in "straw ballot" type format to gather comments for discussion and revision consideration.

There being no new business, the meeting was adjourned.

The next in-person meeting will be at the Spring 2025 Transformers Committee Meeting in Denver, CO that is scheduled for March 23-27, 2025.

Respectfully Submitted,

Juan Castellanos, WG Secretary

First Name	Last Name	Affiliation	Requested membership ?
Saramma	Hoffman	PPL	Member
Ryan	Musgrove	OG&E	Member
Rodrigo	Ronchi	Weg-Voltran	Member
Gabriel	Delgado	Invenergy	Member
John	John	Virginia Transformer	Member
Anthony	Natale	Hico America	Member
Didier	Hamoir	Transformer Protector Corp.	Member
Matthew	Webb	GE Vernova	Member
Juan	Castellanos	Prolec GE	Secretary
Scott	Digby	Duke Energy	Chair
Garret	Bradshaw	Howard industries	Y
Daniel	Martinez	IFE Canada	Y

Sami	Debass	EPRI	Y
Sunny	Swarna	Virginia Transformer	Y
Tim	Dappen	Cargill	Y
Scott	Thomas	Hitachi Energy	Y
Gustavo	Do Prado	Siemens Energy	Y
Ashwini	Labh	Hitachi Energy	Y
Piotr	Blaszezyk	Specialty Transformer Components	Y
Alireza	Gorzin	Black and Veatch	Y
Brad	Stacey	Leeward Renewable Energy	Y
Will	Elliot	ACP/SWEPCO	Y
Kaman	Neeran	VTC/GTC	Y
Yeun Soo	Kim	MEPPI	Y
Caleb	Colby	Schneider Electric	Y
Bill	Whitehead	H2 Scan	Y
Thomas	Keels	Keelectric Engineering	Y
Dominic	Polard	NASS	Y
Kayland	Adams	Prolec GE - Waukesha	Y
Shankar	Nambi	Bechtel Energy	Y
Matt	Weisensse	Pacificorp	Y
Florin	Faur	Prolec GE - Waukesha	Y
Luke	Wang	BC Hydro	Y
Rashid	Hussain	Mississippi State University	Y
Jason	Snyder	First Energy	Y
Kyle	Stechschulte	AEP	Y
Egui	Espitia	Reinhausen Manufacturing	Y
Martín	Muñoz	Orto de Mexico	Y
Garret	Sarkinen	Xcel Energy	Y
Rogerio	Verdolin	Verdolin Solutions	Y
Jason	Beaudoin	Weidmann	Y
Eduardo	García	Siemens Energy	Y
Luc	Loiselle	Tetra Tech	Y
Adriana	Cisco Sullberg	SRP	Y
Sebastian	Renhopf	Machinenfabrik Reinhausen	Y
Richard	Von Gemingen	Dominion Energy	Y
David	García Perales	Virginia Transformers	Y
Manen	Panelya	Siemens Energy	Y
Craig	Colopy	Retired from Eaton	N
Angela	Leigi	Eaton	N
Dan	Crockett	Ameren	N
David	Calitz	Siemens Energy	N
Roberto	Da Silva	Machinenfabrik Reinhausen	N
Tihomir	Pandza	Siemens Energy	N
Ponggki	Kim	Iljin Electric	N
Yonghui	Kim	Iljin Electric	N

Patrycja	Jarosz	IEEE SA	N
Besja	Pajaziti	Brochhaus Measurements	N
Chris	Franklin	MG Power Association	N
Gilberto	Garza	Prolec GE	N
Dragana	Gasic	Koncar	N
Janko	Pzodan	Koncar	N
Pedro	Pedro	Efacec	N
Mike	Craven	Qualus Power Service	N
Olivier	Uhlmann	RM Canada	N
Gerey	Suman	Electrical Technologies	N
Ali	Naderian	Enerparts	N
Kevin	Hampton	Siemens Energy	N
Stefan	Lembacher	Siemens Energy	N
Anton	Kashel	Delta Star	N
Ewald	Schweiger	Siemens Energy	N
Attila	Gyore	Midel & Midel Fluids	N
Park	Dean	Hyosung - HICO	N
Christopher	Johnson	Oncor	N
Andrew	Lugge	Hitachi Energy	N
Daniel	Obregon	TTE Transformers	N
Samuel	Brodeur	Hitachi Energy	N
Andrew	Steineman	Delta Star	N
Gerard	Paleo	Midel	N
Dan	Schwartz	Quality Switch	N
Paulo	Avelino	Hitachi Energy	N
Oscar	Mendiola	Transformer Protector Corporation	N
Drew	Welton	Intellirent	N
Paul	Salvato	intellirent	N
Samuel	Gruskicwitz	GE Vernova	N
Ronald	Hernandez	Doble	N
Samuel	Tekle	Weg Transformers USA	N
Alex	Zugher	Hitachi Energy	N
Jie	Zhang	CHINT	N
Mark	Tostrud	Dynamics Ratings	N
Pedro	Trujillo	Hyundai	N
Carlos	Hernandez	Delta Star	N

Task Force C57.140 Meeting

Fall 2024 Meeting

Grand Ballroom E, St. Louis, MO

Monday, October 28th, 2024

3:15PM – 4:30 PM Central Time Zone

Chair: Sanjib Som Vice-Chair: Marcos Ferreira Secretary: Traci Hopkins

TFC57.140 IEEE Guide for Evaluation and Reconditioning of Liquid Immersed Power Transformers
Fall 2024 IEEE Transformers Committee Meeting
St. Louis, MO, USA
28 October 2024
UNAPPROVED MINUTES

Chair: Sanjib Som – PTT
Vice-chair: Marcos Ferreira – Quanta Technology
Secretary: Traci Hopkins – H2scan
Meeting Start Time: 1515

SUMMARY:

At 1515 on the afternoon of Monday 28 October 2024, the chair opened the meeting with an introduction and attendance. The sign-in sheet was distributed by the Secretary. The chair then reviewed the required IEEE policies and reviewed the Agenda and Minutes from the Spring 2024 meeting.

There was a Motion to Approve the Minutes from previous Spring 2024 meeting by Jeremiah Bradshaw and it was seconded by Joe White – **UNANIMOUS approval of minutes**. Then there was a review of the Agenda, there was a motion to approve the agenda by Ed teNyenhuis and it was seconded by Mickel Saad. This was passed unanimously.

There were 64 attendees in total. 13 of the 22 members were present, Quorum was Achieved. Member List is provided below.

Role	First Name	Last Name	Company
Chair	Sanjib	Som	PTT
Vice-chair	Marcos	Ferreira	Quanta Technologies
Secretary	Traci	Hopkins	H2scan
Member	Jeff	Benach	Megger
Member	Sanket	Bolar	Oncor
Member	Jeremiah	Bradshaw	Bureau of Reclamation

Member	Luiz	Cheim	Hitachi Energy
Member	Jesse	Duffy	Nashville Electric Service
Member	Zan	Kiparizoski	Howard Industries
Member	Emilio	Morales Cruz	Qualitrol
Member	Ryan	Musgrove	Oklahoma Gas and Electric
Member	Timothy C.	Raymond	Inductive Reasoning
Member	Scott	Reed	MVA
Member	Mickel	Saad	Hitachi Energy
Member	Brian	Sparling	Kinectrics
Member	Brad	Staley	Leeward Energy
Member	Shankar	Subramany	KEMA, Netherland
Member	Ed	teNyenhuis	Hitachi Energy
Member	Pragnesh	Vyas	Sunbelt Solomon
Member	Joe	White	Power Engineers
Member	Guang	Yuan	Hitachi Energy
Member	Kris	Zibert	ALLGEIER, MARTIN and ASSOCIATES, INC.

The chair then opened discussions by reviewing Title, Scope and Purpose. Discussion began regarding the Scope and if it needed to be changed. There was discussion around the use of the words reconditioning and refurbishing. Jeremiah Bradshaw – USBR, noted that in C12.80 the word reconditioning was defined for the liquid insulation only. However, the word Refurbished was not. It was decided that "Refurbishing" would be defined in the revised C57.140 document and that part of the definition would include terminology such as "upgrades."

After extensive discussion, there was a suggestion to change the Title and scope to:

Title: IEEE Guide for Life Extension of Liquid Immersed Power Transformers and Reactors

1. Overview

1.1 Scope

This document provides guidelines to assist the user in extending the useful life of liquid-immersed Power Transformers and Reactors.

A Motion to approve new Title & Scope and not to include Purpose by proposed by Mickel Saad and seconded by Tim Raymond. A vote was taken, and the approval was unanimous.

It was noted by **Marc Foata – Reinhausen** there is a CIGRE Document with the same Title and the new approved title. He also shared that CIGRE spent a lot of time discussing and defining "end of life." And suggested we look at what they have already done and mentioned that CIGRE End of Life definitions are broken down into three categories:

1. Functional life
2. Economic life
3. Technical life

A final concern was presented by **Jeremiah Bradshaw USBR** to ensure that C57.140, C57.170 & C57.637 chairs coordinate with each other to clearly understand the purpose of each document. **Sanjib Com, Chair,** will raise this with Subcommittee Chair.

The meeting was adjourned at 1615. Below is a list of attendees for the St. Louis meeting. The task forced achieved the task assigned in two meetings.

Attendee List for Fall 2024 Meeting:

Role	First Name	Last Name	Company
Guest	Paul	Boman	HSB
Member	Jeremiah	Bradshaw	Bureau of Reclamation
Guest	Wilerson	Calil	Hitachi Energy
Guest	Edward	Casserly	Ergon
Member	Luiz	Cheim	Hitachi Energy
Guest	David	Cordova	Maddox Industrial Transformer
Guest	Eric	Doak	DY Energy Solutions
Member	Jesse	Duffy	Nashville Electric Service
Guest	Evgenii	Ermakov	Hitachi Energy
Guest	Zlatan	Fazlic	Camlin Energy
Vice-chair	Marcos	Ferreira	Quanta Technologies
Guest	Mark	Finn	Hitachi Energy
Guest	Marc	Foata	Reinhausen
Guest	Peng	Fu	Chint Global
Guest	Eduardo	Garcia	Siemens
Guest	James	Gardner	Prolec-GE Waukesha
Guest	Jose Antonio	Gonzalez Ceballos	GA Transformers
Guest	Brad	Greaves	Weidmann Group
Guest	Brad	Grooms	NTS
Guest	Ismail	Guner	Hydro Quebec
Guest	Niklas	Gustavsson	Hitachi Energy
Guest	Roger	Hayes	GE
Guest	William	Herron	US Reinhaussen
Guest	Thang	Ho	BC Hydro
Guest	Derek	Hollrah	Burns & McDonnell
Secretary	Traci	Hopkins	H2scan
Guest	Ryan	Jonak	PGE
Guest	Braxton	Jones	SD Myers

Guest	Kurt	Kaineder	Trench Group
Guest	Thrinadha	Katapalli	VA Transformers
Guest	Mathieu	Lachance	Omicron Energy
Guest	Don	Lamontague	Arizona Public Service
Guest	Tiffany	Lucas	PROLEC
Guest	Jose Luis	Machain	Prolec GE
Guest	Jinesh	Malde	MIDEL
Guest	Kumar	Mani	Duke Energy
Guest	Balakrishnan	Mani	Delta Star FS
Guest	Moses	Manzano	Hyosung Hico
Guest	Mohammed	Megdad	IPS
Guest	Toni	Mellin	Vaisala
Guest	Robert	Mennonna	Maddox Industrial Transformer
Member	Emilio	Morales Cruz	Qualitrol
Guest	Anastasia	O'Malley	Con Edison NY
Guest	Cuauhtemor	Ortiz	Niagara Power
Guest	Parminder	Panesar	VA Transformers
Guest	John	Pruente	APC Construction
Member	Timothy C.	Raymond	Inductive Reasoning
Member	Scott	Reed	MVA
Guest	Patrick	Rock	ATC
Member	Mickel	Saad	Hitachi Energy
Guest	Alfonso	Schrammel	Siemens-Energy
Guest*	John	Sinclair	Black & Veatch
Chair	Sanjib	Som	PTT
Member	Brian	Sparling	Kinectrics
Guest	Greg	Steeves	Baron USA
Guest	Marc	Taylor	JFESHOJI Power
Member	Ed	teNyenhuis	Hitachi Energy
Guest	Jim	Thompson	T&R Service Company
Guest	Alvyn	Vanderwalt	ECI
Guest	Joshua	Watson	NPPD
Member	Joe	White	Power Engineers
Guest	Elliot	White	SD Myers
Guest	Deanna	Woods	Prolec GE Waukesha
Guest	Jeffrey	Wright	Duquesne Light

Minutes:
1515 called to order
Reviewed: patents, Participant behavior, Copy-wright policy
Reviewed Member list
Quorum: 13 of 21members Quorum **achieved**

Review of minutes sent from last meeting:
Motion To Approve Minutes from previous Spring 2024 meeting: Jeremiah Bradshaw, seconded Joe White – **UNANIMOUS approval of minutes**

Review of Agenda:
Motion to approve agenda: Ed teNyenhuis, seconded Mickel Saad

Review & Discussion of Title, Scope & Purpose:

Brian Sparling – Kinectrics – Scope: Is this truly for Mineral Oil only or should we be talking about other insulating liquid types?

Suggests: changing scope to align with title

Scott Reed-MVA: is reclaiming part of this it is already in 637…need clear delineation of this guide and 637. Suggest keep scope broad to "liquid maintenance & diagnostics"

Ed teNyenhuis – Hitachi Energy: include cooling in the scope

Jim Thompson-T&R Service Company: C57.637 is detailed on methods and tied into c57.106 – previous C57.140 references C57.637 & C57.106.

Marcos Ferreira – Luma: 637 covers alternate liquids.

Thrinadha Katapalli – VA Transformer: loss of life – are we talking about returning to nameplate rating
Sanjib Som - Chair: loss of life – not listed

Jerimiah Bradshaw USBR – tech editor of 637 is for all liquid items – remove all liquid items and point to 637, 140 should be for xfmrs remove all liquid and diagnostics from here and point to 637 for appropriate reclamation

Kumar Mani – Duke Energy: say insulation life or condition

Jeff Thompson: another guide that combines all liquids is this just for mineral oil?
Sanjib Som- Chair: hearing from the TF this doc should be expanded to include alternate liquids

Tim Raymond – Inductive Reasoning: biggest challenge with Scope & Purpose of this doc is a lot of this material has been cannibalized by other documents. What can we strike as parts are

covered elsewhere…focus is the reconditioning (Life extension). Reword scope to focus on the reconditioning component.

Jeremiah Bradshaw - USBR: 170 condition assessment of liquid xfmrs. 140 should focus on the extension of life.

Suggests the Scope should read:
This document provides guidelines to assist the user in extending the useful life of a transformer.

Mickel Saad: add through reconditioning and refurbishing to scope

Jeremiah: reconditioning and refurbishing are in the purpose. What about upgrading?
Kumar: also include repair.
Jeff T.: thinks this should be enough:

This document provides guidelines to assist the user in extending the useful life of a transformer through repairing, reconditioning, or refurbishment.

Tim: are we limiting this to Field activities?
Jeremiah: refurbishment includes repair. To bring to "like new" need to include upgrades.
Sanjib: Is refurbishment defined in C12.80, if not then we need to add to the definitions.

Decision made to define the word refurbishment in revision of C57.140.
The word refurbishment to be defined to include "upgrades."

Marcos F.: assess the xfmr is it beyond repair in the field? Need guide to address should we repair or put out of service?
Brian S: Getting into economics…cannot do this.
Jeremiah: reconditioning is in 12.80 – definitely in 637 need different name…suggestion is Refurbishment
UNKNOWN: clarifying the 12.80 definition f reconditioning
Jinesh: retrofilling – refurbishing
TIM: need to be careful with 12.80
KURT: Likes broad definition of SCOPE. Add reactors too.
Mickel S.: Evaluation includes Risk Assessment which is in another guide…170…GUIDE FOR REFURBISH MENT

Ed T.: Suggested title read:
IEEE GUIDE FOR LIFE EXTENSION OF LIQUID IMMERSED POWER TRANSFORMERS AND REACTORS

KUMAR: Scope – need to add word, **suggested:**
This document provides guidelines to assist the user in extending the useful life of a liquid-immersed Power transformer and Reactors.

Marc Foata – Reinhausen: Observed new proposed Title is same as CIGRE Document: advised that CIGRE spent a lot of time discussing and defining "end of life." Suggested we take a look at

what they have already don… CIGRE End of Life broken down into three categories:

4. Functional life
5. Economic life
6. Technical life

Proposal of New Title and Scope to:

Title: IEEE Guide for Life Extension of Liquid Immersed Power Transformers and Reactors

2. Overview

2.1 Scope

This document provides guidelines to assist the user in extending the useful life of liquid-immersed Power Transformers and Reactors.

Motion to approve new Title & Scope and not to include Purpose: Mickel Saad, seconded Tim Raymond…unanimous.

Approved New Title & Scope and decided to not include Purpose

Final Note:

Jeremiah Bradshaw USBR: make sure C57.140, C57.170 & C57.637 chairs coordinate with each other to clearly understand the purpose of each document…needs coordinated. Sanjib to raise this with Subcommittee Chair.

Meeting Adjourned: 1615

Power Transformers Subcommittee
Working Group Report

Document #:	**C57.125**
Document Title:	**Guide for Failure Investigation, Documentation, Analysis and Reporting for Power Transformers and Shunt Reactors**

Chair:	**Hakan Sahin**	**Vice-Chair**	**Thomas Melle**
Secretary	**Adam Sewell**	**Percent Complete**	**75%**

Current Draft Being Worked On: **1.0** **Dated:** **n/a**

PAR Expiration Date: **December 31, 2025**

Meeting Date: **10/28/2024** **Time:** **4:45pm – 6:00pm**

Location: **St. Louis, MO, USA**

Attendance:	**Members**	**26 of 41**
	Guests	**71**
	Guests Requesting Membership	**13**
	Total*	**97**

*** Attendance list for this meeting is shown at end of meeting minutes**

Meeting Minutes / Significant Issues / Comments:

Meeting was called to order at 4:45pm, October 28, 2024 at Hyatt Regency St. Louis at The Arch.

1. Administrative
    a. IEEE Patent Policy and Call for Patents
        i. No comments from group
    b. IEEE SA Copyright Policy
        i. No comments from group
    c. Review of agenda
        i. No comments from group
    d. Reminder on the purpose and the scope of the working group, and the timeline
        i. The expectation from this WG is to review and update the document as it expires on 12/31/2025.
        ii. Projected Completion Date for Submittal to RevCom: Dec 2024
    e. Introductions of the attendees

i. Attendance sheets were passed out. Name/affiliation was announced as attendees spoke during the meeting.

ii. Secretary asked all who wanted on email distribution for the C57.125 Working Group to send him an email at: adamsewell@ieee.org

f. Updated membership review and count for quorum

i. 41 members and 24 were counted as present via hand count.

1. QUORUM ACHIEVED

ii. *Attendance sheets after meeting completed showed 26 members attended*.

iii. Members are expected to attend and stay in the meeting so business can be conducted.

g. Approvals of previous minutes and agenda:

i. Approval of the agenda for Fall 2024

ii. Approval of the Spring 2024 unapproved meeting minutes

iii. MOTION to approve agenda/minutes – R.Verdolin, 2nd – S.Chambers

1. No objection to unanimous approval – ALL APPROVED

2. Old Business

a. Review of the online voting results and comments on Section 4.2 – Flowchart, and re-vote.

i. 19/41 members responded, with all approved, or approved with comments. Below are the comments with approval votes:

1. Hakim Dulac: I would keep the DP testing before scraping. Or at least suggest or make it optional.
2. Zachary Draper: I kind of wish there was a box right before "SCRAP", that said "Consider performing a methodical tear-down investigation." Then a transformer owner doesn't immediately send for scrap, but considers trying to learn from the experience by having a slower tear-down process (before the Jawas get their hands on it), where they take photographs of key internal components, things perhaps not visible from an internal inspection when it is still in its tank. Something optional of course, but it gives the hint that something can still be learned from it. Especially when you performed all the tests leading up to that point, it would be nice to have the "smoking gun" photograph, or even to find nothing.

ii. MOTION to approve changes to Section 4.2-Flowchart as presented – S.Chambers, 2nd – S. Som

1. After some discussion, a vote was called
2. 23 – APPROVE, 1 – Abstain – MOTION PASSES

b. Review of the online voting results and comments on Table-8 – Internal inspection of the main tank, and re-vote

i. 19/41 members responded, 18 approved or approved with comments, 1 abstain. We need to vote again during this meeting (Pending quorum). Below is the only comment with approval vote:

1. Hakim Dulac: I would keep “Evidence of low insulating liquid level inside tank” in the Condition of Core section.

ii. MOTION to approve changes to Table 8 as shown – W.Binder, 2nd – R.Musgrove

1. After some discussion an amended MOTION was made to approve changes to Table 8 as shown but keep the words “Lead clamping” – T.Raymond, 2nd – S.Chambers
2. Vote on the Amended MOTION to approve changes to Table 8 as shown but keep the words “Lead clamping” was taken
    a. 21 APPROVE, 4 Abstain – MOTION PASSES

3. New Business
    a. Officers will work on getting Draft 1 created using all the approved changes from previous meetings and will send out to the Working Group.
    b. From Enrique Betancourt – warning related to stakeholders
        i. I wanted to look at the Draft document because I think there is a paragraph missing with some warning related to stakeholders who must approve and even witness the investigation process. When the transformer is under warranty from the manufacturer, and or there is an insurance company to be claimed about the event, they may also request some preliminary steps, before starting with the technical part of the investigation process recommended in the Guide.
        ii. MOTION to review the stakeholders in the document – E.Betancourt, 2nd- E.Garcia Wild
            1. After some discussion, E.Betancourt WITHDREW this MOTION.
4. Membership changes
    a. Officers will look at attendance of members and member requests to make changes to WG membership list before the Spring 2025 meeting.
5. Next meeting: March 2025 in Denver, CO, USA.
6. Close of meeting
    a. Meeting adjourned at 6:00pm

Submitted by: Hakan Sahin Date: 11/15/24

October 28, 2024 Meeting Attendance (RM = Request Membership):

Last Name	First Name	Company (Affiliation)	Role
Bedoya	Duvier	Hitachi Energy	Guest
Betancourt	Enrique	Prolec GE	Member
Binder	Wallace	WBBinder Consultant	Member
Boettger	William	Boettger Transformer Consulting LLC	Member
Bolar	Sanket	Oncor	Member
Bradshaw	Jeremiah	Bureau of Reclamation	Guest
Brodeur	Samuel	Hitachi Energy	Guest
Chambers	Stuart	EPRI	Member
Craven	Michael	Qualus Power Serv.	Guest
Crockett	Daniel	Ameren	Guest-RM3
DaSilva	Roberto	Maschinenfabrik Reinhausen	Guest
Debass	Samson	EPRI	Guest-RM3
Dillon	Nikolaus	Dominion Energy	Member
Dolloff	Paul	East Kentucky Power	Guest
Foata	Marc	Maschinenfabrik Reinhausen	Guest
Garcia Wild	Eduardo	Siemens Energy	Member
Gardner	James	Prolec GE Waukesha	Guest
Gorzin	Alireza	Black & Veatch	Guest-RM2
Greaves	Brad	Weidmann Electrical Technology	Guest
Hamoir	Didier	Transformer Protector Grp	Guest
Hernandez	Ronald	Doble Engineering Co.	Member
Hollrah	Derek	Burns & McDonnell	Guest
Johnson	Christopher	Oncor	Guest-RM2
Lamontagne	Donald	Ariz Public Svc	Guest
Li	Weijun	Braintree Electric Light Dept.	Member
Lopes Mamede	Gabriel	Siemens Energy	Guest
Lucas, P.E.	Tiffany	Prolec GE Waukesha	Guest
Machain	Jose Luis	Prolec GE	Guest-RM2
Mani	Balakrishman	Delta Star Inc	Guest
Manzano	Moses	Hyosung HICO	Guest
McBride	Jim	JMX High Voltage	Guest
Melle	Tom	Highvolt	Member-ViceChair
Mills	Francis	Power Engineers	Guest-RM3
Morales-Cruz	Emilio	Qualitrol	Member
Munoz	Marta	Hitachi Energy	Guest
Murray	David	TVA	Member
Musgrove	Ryan	Oklahoma Gas & Electric	Member
O'Malley	Anastasia	Consolidated Edison Co. of NY	Member
Panesar	Parminder	Virginia Transformer Corp.	Member
Pedro	Pedro	EFFACEC Energia	Guest
Pellon	Verena	FPL	Guest
Plisic	Goran	Siemens Energy	Guest
Raymond	Timothy	Inductive Reasoning	Member
Reyes Perez	Juan	Hitachi Energy	Guest
Saad	Mickel	Hitachi Energy	Member
Sahin	Hakan	Virginia Transformer Corp.	Member-Chair
Sarkar	Amitabh	Virginia Transformer Corp.	Member
Scardazzi	Alaor	Siemens Energy	Guest
Schleismann	Eric	Southern Compnay	Guest-RM1

Last Name	First Name	Company (Affiliation)	Role
Schwartz	Dan	Quality Switch, Inc.	Guest-RM1
Sewell	Adam	Quality Switch, Inc.	Member-Secretary
Sewell	Russ	Quality Switch, Inc.	Guest
Snyder	Jason	First Energy	Guest
Som	Sanjib	Pennsylvania Transformer	Member
Steele	Hampton	TVA	Guest
Tanaka	Troy	Burns & McDonnell	Member
Thompson	Ryan	Burns & McDonnell	Guest
Uhlmann	Olivier	Reinhausen Canada	Guest
Vanderwalt	Alwyn	ECI	Guest
Veeran	Kannan	Georgia Transformer	Guest-RM1
Verdolin	Rogerio	Verdolin Solutions Inc.	Member
vonGemmingen	Richard	Dominion Energy	Member
Washburn	Alan	Burns & McDonnell	Member
Weyer	Daniel	Monolith	Guest-RM2
Wright	Jeffrey	Duquesne Light Co.	Guest
Yang	Fei	Hitachi Energy	Guest-RM1
Yuan	Guang	Hitachi Energy	Guest-RM2
Yun	Joshua	Virginia Transformer Corp.	Member
Kim	Seungmo	Hyosung HICO	Guest
Li	Chao	EATON Corporation	Guest
Lim	Donggi	Iljin Electric	Guest
Kim	Yonghui	Iljin Electric	Guest
Pandya	Manan	Siemens Energy	Guest
Chanda	Sudip	Delta Star Inc	Guest-RM1
Zhu	Zhixzang	Chimt	Guest
Bailey	Anne	A-Line E.D.S.	Guest
Labh	Ashwini	Hitachi Energy	Guest
Tekle	Samuel	WEG TX USA	Guest
Sexton	Aron	Kinectrics	Guest
Sanchez Rodriguez	Jesus	Voltyo	Guest
Trujillo	Pedro	Hyundai Electric	Guest
Park	Dean	Hyosung HICO	Guest
Keels	Andy	kEElectric Engineering PLLC	Guest
Munoz	Martin	Orto de Mexico	Guest
Garza	Hector	Orto de Mexico	Guest
Kesedogi	Nihat	Hitachi Energy	Guest
Zhang	Hongzhi	Hitachi Energy	Guest
White	Elliot	SD Myers	Guest
Janes	Braxton	SD Myers	Guest
Hruac	Miljenko	Hitachi Energy	Guest
Garner	Joshua	Independent Dielectrics	Guest
Cheksi	Bhaumilc	Hitachi Energy	Guest
Finn	Mark	Hitachi Energy	Guest
Kurz	Andreas	Maschinenfabrik Reinhausen	Guest
Herron	Bill	Reinhausen	Guest
Pavicic	Tomislav	Siemens Energy	Guest
Swarna	Sunny	Virginia Transformer Corp.	Guest

Power Transformers Subcommittee
Working Group Report

Document #:	**C57.157**
Document Title:	**Guide for Conducting Functional Life Tests on Switch Contacts Used in Insulating Liquid-Immersed Transformers**

Chair:	**Adam M. Sewell**	**Vice-Chair**	**N/A**
Secretary	**Piotr Blaszczyk**	**Percent Complete**	**N/A**

Current Draft Being Worked On: **N/A** **Dated:** **N/A**

PAR expires 12/31/2027

PAR Expiration Date: **Std expires 12/31/2025**

Meeting Date:	**29 March 2024**	**Time:**	**8:00am-9:15am**
Location:	**St. Louis, MO, USA**		

Attendance:	**Members**	**10 of 18**
	Guests	**27**
	Guests Requesting Membership	**1**
	Total*	**37**

*** Attendance list for this meeting is shown at end of meeting minutes**

Meeting Minutes / Significant Issues / Comments:

1. Meeting was called to order at 8:00am, October 29, 2024 at Hyatt Regency St. Louis at The Arch- Grand Ballroom C (4th Floor).
2. Presentation of Agenda
3. Presentation of IEEE Standards Slides
    a. Call for Patent Claims & Copyright Notice
    b. No comments from working group about any patent claims or copyright notice
4. Distribution of attendance sheets
    a. Please send an email to adamsewell@ieee.org with the subject: C57.157 EMAIL to be added to the C57.157 email list
5. Checking the Quorum – 18 members so 10 needed for quorum.
    a. 10 out of 18 members were in attendance of the meeting so quorum was achieved.
6. Approval of the Meeting Minutes from Spring 2024 and Fall 2024 Agenda.

a. MOTION was made by D.Schwartz and 2nd by J.Sewell to approve Meeting Minutes from Spring 2024 and Fall 2024 Agenda.
b. No opposition to unanimous approval of the MOTION - APPROVED

7. Chair announcements
    a. Current guide is set to expire December 31, 2025
    b. This group was to determine work needed for this standard and create a PAR for revision if needed. Par was created after the Spring 2023 meeting and has PAR Approval Date of 05 Jun 2023 and expiration of 31 Dec 2027.
8. Old work
    a. Request was made to share previous presentations that were used to develop this guide
        i. Chair posted previous presentations and 2015 C57.157 standard on IEEE Collabratec and IEEE TC Power Transformer Subcommittee pages
        ii. Chair presented background information on this guide during the meeting by showing one of the presentations that is available on IEEE Collabratec.
    b. Members of this group were tasked to review current guide and previous presentations before Spring 2024 meeting and make suggestions as to what recommendations they have for this guide
    c. Presentation was made by F. Faur of his observations of the current guide:

Summary

The purpose of the test described in C57.157 is to verify if the contacts of a tap changer would perform adequately over 30 years of its life.
The test makes the simplification hypothesis that the contact life depends on the thermal runaway due to the increased resistance of the contact points. The main conclusion after this test is that Ag-Ag contacts perform better than any other combination, and Sn plated contacts perform the worst.
While this is true, it is not the only practical option to mitigate the problem of overheating, and not the only cause of overheating. Also, the number of other causes that can trigger a contact failure is so high, that performing the test in every condition is impractical. Having passed the test in one configuration doesn't guarantee that the same contact or even switch will pass the test in another configuration.

Comments

(in the comments below, when I mention contact, I am referring to the entire body of a stationary or a moving contact, as opposed to the contact point as the sum of A-spots between 2 contacts)

1. Trapped hot oil
   Sometimes, either the tap changer manufacturer or the transformer manufacturer adds extra barriers to increase dielectric strength. In this case, the hot oil created by the contact would keep overheating, accelerating the contact failure.

2. Different coefficient of thermal expansion
   A long moving contact that operates close to its thermal capabilities, would thermally expand differently than the insulating material that separates the stationary contacts. That makes the contact points move slightly every time the temperature changes. Each time the contact moves, it breaks new areas of oxidation that accumulate around the contact points, increasing the electrical resistance and preventing oil cooling. The longer the contacts, the more predominant is this phenomenon.

3. Number of cycles
   The test exclusively assesses the deleterious effects of the contacts' prolonged exposure to high temperatures, disregarding the cycle count in a heavy-duty switch application. In some of the documentation from the time the test was developed, it was *observed that most failures were in*

peaking, pulsing loads: Rectifier Loads, Motor Starting Loads, Furnace Supplies, or Emergency Generator Transformers. No failures were observed *in utility transformers or units that had more "homogenized" loads*. That means that an increased number of cycles might be more important than the current, temperature, and time itself.

4. Operating the tap changer
   If a contact point is Ag-Cu, then, by operating it several times, part of the silver from AG contacts is smeared over the blank Cu contact. For this reason, pure Ag-Cu contacts don't exist.

5. Oil properties
   Transformer oil can have different properties that affect contact cooling, gas generation, coke formation, etc. The transformer manufacturer decides what oil to use. I am not referring to structural differences like mineral vs. ester vs. silicone oils. I am referring to subtle differences like additives in the oil, inhibited vs. non-inhibited oil, etc. All those small changes may, among other things, affect oil thermal breakdown and the formation of film deposits and increase contact point resistance.

6. Spring force
   Sometimes the springs in the contacts lose their compression force in a longer time than the 30 days of testing, leading to contact failure. The test would pass a contact that would fail in the real world with the same symptoms.

7. Insufficient contact section
   The heat generated by the contact point itself couldn't be eliminated properly. Sometimes, just increasing the cross-section of the contact could solve the heat problem.

8. Cable & Cable lug heat sink
   The section of the cables and cable lugs and the insulation over the cable affect the elimination of heat from the contacts, or they can even contribute to heating the contacts.

9. Water, gases, and contaminants
   The test doesn't address the possible presence of water or gases in oil and their effect on the oxidation and aging of the oil. Those can affect the behavior of contacts at elevated temperatures more than the temperature itself.

10. Oxygen concentration
    The oil behaves differently if the tank is sealed, has a nitrogen blanket, has a conservator, or is free breathing.

From the above observation, I think that this test has a similar kind of performance prediction ability to the standard temperature rise test from C57.131, but using more harsh conditions (longer test and higher temperature).

Slightly related to the above, in the standard C57.131 I think that it would be beneficial if we could add some comments about the testing conditions: the amount of oil, distance to the walls and oil surface, the length of cables in the oil, the thermal insulation of the tank, dielectric barriers, etc.

9. New Work
   a. T. Tillery and P. Hopkinson brought up looking at synthetic esters for use in this guide in Kansas City Fall 2023 meeting.
      i. Chair has requested a presenter/presentation to give at a future meeting from a synthetic ester producer. No presentation was ready for Vancouver meeting so plan on having a presenter/presentation for Fall 2024 St. Louis meeting.

b. Attila Gyore (Midel) presented at the meeting on topic of synthetic esters
    i. History of synthetic ester liquids
    ii. Chemistry of synthetic ester liquid and how is it different to mineral oil and natural ester liquids
    iii. Standards that apply to synthetic ester liquid (IEEE, ASTM and IEC)
    iv. Material compatibility

10. Next meeting: March 25, 2025 at Spring 2025 Transformers Committee Meeting scheduled for March 23-27, Denver, CO, USA.
11. Close of meeting
    a. Meeting adjourned at 8:55am

Submitted by: Adam Sewell Date: November 5, 2024

Meeting Attendance October 29, 2024 (RM = Request Membership):

Last Name	First Name	Company (Affiliation)	Role
Allison	Robert	Dominion Energy	Guest
Almeida	Nabi	PROLEC GE	Guest
Bayern	Hugo	H-J Family of Companies	Guest
Blaszczyk	Piotr	Specialty Transformer Components LLC	Member-Secretary
Colopy	Craig	Retired from EATON	Guest
Corsi	Domenico	Doble Engineering Co.	Guest
Cruz Valdes	Juan Carlos	Prolec GE	Member
Faur	Florin	Prolec GE Waukesha	Member
Gamboa	Jose	H-J Family of Companies	Guest
Greaves	Brad	Weidmann	Guest
Gustavsson	Niklas	Hitachi Energy	Guest
Gyore	Attila	MIDEL	Guest
Harley	Jack	First Power Group LLC	Guest
Hopkinson	Phil	Hvolt Inc	Guest
Labh	Ashwini	Hitachi Energy	Guest
Leigl	Angela	EATON	Guest
Machain	Jose Luis	Prolec GE	Guest
Mani	Balakrishnan	Delta Star Inc.	Guest
Matthews	Lee	Howard Industries	Guest
Miller	Philip	Memphis Light, Gas and Water Division	Guest
Musgrove	Ryan	Oklahoma Gas + Electric	Guest
Newbill	Mark	Hitachi Energy	Member
Paleo	Gerard	Midel	Guest
Pruente	John	Prolec GE Waukesha	Guest-RM1
Rehkopf	Sebastian	Maschinenfabrik Reinhausen	Member
Rossini	Yuri	Siemens Energy	Guest
Schwartz	Dan	Quality Switch, Inc.	Member
Sewell	Adam	Quality Switch, Inc.	Member-Chair
Sewell	Jeremy	Quality Switch, Inc.	Member
Sewell	Russ	Quality Switch, Inc.	Guest
Tillery	Timothy	Howard Industries	Member
Uhlmann	Olivier	Reinhausen Canada	Guest
Verdolin	Rogerio	Verdolin S	Guest
Whitten	Christopher	Hitachi Energy	Member
Yavuz	Koray	Noark Electric	Guest
Zaman	Maria	IEEE SA	Guest
Zeigher	Alex	Hitachi Energy	Guest

Attachment K.4.11

IEEE TC MEETING Minutes

Working Group PC57.170

Condition Assessment Guide

October 29, 2024

9:30 AM – 10:45 AM (CST)

Hyatt Regency, St. Louis, Missouri, Conference Room: Grand Ballroom D (4)

***Chair**:* Kumar Mani ***Vice-Chair**:* James Cross (Not Present) ***Secretary**:* Akash Joshi

1. Call to Order
    a. Chair's Remarks
    b. IEEE-SA Policies, including Essential Patent Policy Reviewed
    c. Copyright Policy Reviewed
    d. A quorum was established with 35 of 62 members being present. There was a total of 95 attendees.

2. Fall 2024 Meeting Agenda Review and Approval. Reviewed and approved without any objections or abstentions.
    a. Motion Moved by Marcos Ferreira.
    b. Seconded by Scott Reed.
    c. Motion was approved unanimously.

3. Approval of Spring 2024 Vancouver Meeting Minutes of the Previous meeting, No objections, or abstentions.
    a. Motion Moved by William Whitehead.
    b. Seconded by Jeremiah Bradshaw.
    c. Motion was approved unanimously.

4. PC57.170 Guide Progress
    a. The chair provided an update on the initial ballot circulation- we received an 80% response and 91% approval rate with 171 comments.
    b. Saramma Hoffman, the CRG Team Lead provided an update on comment resolution - a total of 172 Comments were received with 37 being of technical nature and the remaining 135 editorial. The Team met twice after the ballot and has resolved 17 technical comments so far. It is planned to resolve the remaining comments by Dec 31, 2024.
    c. The Chair remarked that the guide will be sent out for a recirculation ballot after the comment resolution process is completed. The PAR for the guide expires on Dec 31, 2025.

d. Marcus Ferreira suggested collaboration with the C57.140 guide PAR Team to avoid the duplicating details about OLTC maintenance between that guide and the C57.170 guide. Jeremiah suggested we discuss overlap topics between the two guides at the next meeting. Weijun Li and Ryan Musgrove then clarified that as per current rules, no new topic can be introduced now that the guide is in ballot stage while the CRG is resolving it and that new topics can now be added only in the next revision cycle.
   The Chair and Brian Sparling remarked that chapters in the guide draft were written after mapping out the contents of other existing guides like C57.140 and C57.93 and there should be overlap.
e. Thomas A Keels requested a draft copy of the guide. Since he is not a member of the working group currently, he cannot be provided with a copy of it.

5. Next meeting will be held at Denver, Colorado between March 23-27, 2025.

6. Meeting was adjourned after no new items were discussed.

Attendee List:

PC57.170 Condition Assessment Fall-2024 Attendance			
First Name	**Last Name**	**Company**	**WG Member/Guest**
Daniel	Aleusandrowicz	Hitachi Energy	G
Robert	Allison	Dominion Energy	G
Orlando	Benitez	Hyosung HICO	G
Enrique	Betancourt	Prolec GE	M
William	Boettger	Boettger Transformer Consulting LLC	M
Sanket	Bolar	Oncor Electric Delivery	M
Paul	Boman	Hartford Steam Boiler	G
Mike	Bonn	Soltex	G
Jeremiah	Bradshaw	Bureau of Reclamation	M
Samuel	Brodeur	Hitachi Energy	G
Wilerson	Calil	Hitachi energy	G
Alonso	Castilo	Kaedi energy	G
Stuart	Chambers	EPRI	G
Luiz	Cheim	Hitachi Energy	M
Roberto	Da Silva	MR Reinhausen	G
Thomas	Dauzat	AEP-SEPCO	G
Eric	Doak	D4EnergySolutions LLC	G
Jesse	Duffy	Nashville Electric Service	M
William	Elliott	AEP	G
Evgenii	Ermakov	Hitachi Energy	M
Marco	Espindola	Hitachi Energy	M
Florin	Faur	Prolec GE Waukesha	G
Zlatan	Fazlic	Camlin Power	G
Todd	Felton	Not Avaialble	G
Marcos	Ferreira	Quanta Techno	M
Mark	Finn	Hitachi energy	G
Jose Antonio	G	Georgia Transformer	G
Eduardo	Garcia Wild	Siemens Energy	M
James	Gardner	Prolec GE Waukesha	G
Joshua	Garner	Independent Dielectrics	G
Ismail	Guner	Hydro-Quebec	M
Attila	Gyore	Midel M&I	M
Roger	Hayes	General Electric	G
Kyle	Heiden	EATON Corporation	G
Jean	Hernandez	Georgia tech	G
Ronald	Hernondez	Doble Engineering Co.	G

Bill	Herron	Reinhausen	G
Thang	Hochanh	BC Hydro	G
Saramma	Hoffman	PPL Electric Utilities	M
Derek	Hollrah	Burns & McDonnell	G
Traci	Hopkins	h2Scan	G
Christopher	Jhonson	Oncor Electric Delivery	G
Ryan	Jonak	PG&E	G
Braxton	Jones	SD Myers	G
Akash	Joshi	Black & Veatch	M
Jerzy	Kaznierezah	Hitachi Energy	G
Thomas	Keels	KE Electric Engineering PLLC	G
Bob	Kelley	Nass	G
Rafal	Kowlaski	Hitachi Energy	G
Donald	Lamontagne	Arizona Public Service Co.	G
Weijun	Li	Braintree Electric Light Dept.	M
Andrew	Logge	Hitachi Energy	G
Luc	Loiselle	Tetra Tech	G
Tiffany	Lucas	Prolec GE Waukesha	G
Stephanie	Mabrey	AVO Diagnostics	M
Balakrishnan	Mani	Delta start	G
Kumar	Mani	Duke Energy	M
Toni	Mellin	Vaisala	G
Emilio	Morales-Cruz	Qualitrol Company LLC	M
Ryan	Musgrove	OG&E	G
Mark	Newbill	Hitachi Energy	G
Mike	Nolte	Kiewit	G
Shane	Oakley	NASS	G
Poorvi	Patel	Electric Power Research Institute (EPRI)	M
Timothy	Raymond	Inductive Reasoning	M
Scott	Reed	MVA	M
Diego	Robalino	Megger	G
Mickel	Saad	Hitachi Energy	M
Amitabh	Sarkar	Virginia Transformer Corp.	M
Alaor	Scardozzi	Siemens Energy	G
Hemchandra	Shertukde	University of Hartford	M
Jonathan	Sinclair	Black & Veatch	M
Brian	Sparling	Dynamic Ratings, Inc.	M
Andy	Speegle	Entergy	G
Brad	Staley	Leeward renewable energy	M
Charles	Sweetser	OMICRON electronics Corp USA	M

Ed	TeNyenhuis	Hitachi energy	M
Olivier	Uhlmann	Reinhausen Canada Inc.	G
Alwin	Van Der Walt	Electrical Consultants, Inc.	G
Rogerio	Verdolin	Verdolin Solutions Inc.	G
Dharam	Vir	GE Prolec	M
Alan	Washburn	Burns & McDonnell	M
Joshua	Watson	NPPD	G
Matthew	Webb	GE Prolec	G
Drew	Welton	Intellirent	G
Elliot	White	SD Myers	G
Joe	White	Power engineers	G
William	Whitehead	H2scan Corporation	M
Trenton	Williams	Advanced Power Technologies	M
Jeffrey	Wright	Duquesne Light Co.	M
Shazhan	Xu	FM global	G
Koray	Yavuz	Noark Electric	G
Guang	Yuan	Hitachi Energy	G
Joshua	Yun	Virginia Transformer	M
Zhu	Zhinoiang	Chint Transformers	G

Attachment K.4.13

Working Group Meeting for IEEE Standard PC57.17

St. Louis, Missouri, USA Meeting – October 29, 2024 11:00-12:15 pm CST
Chair: Dom Corsi
Secretary: Jason Varnell

1. The meeting was called to order at 11:00 AM CST.
2. There were 34 active participants present, which consisted of 13 of the 21 members. Quorum was achieved.
3. Two (2) participants requested membership and both were granted membership due to attendance. One member requested to be moved to guest. Therefore, the new membership total after the F24 meeting is 22.
4. The chair reviewed the IEEE patent slides and the group made no patent claims.
5. The chair reviewed the copyright policy with the group.
6. A motion was made by Jason Beaudoin (Weidmann) and seconded by Trenton Williams (Advanced Power Technologies) to approve the Fall 2024 meeting agenda. There were no objections to unanimous approval of the agenda. A motion was made by Jason Beaudoin (Weidmann) and seconded by Trenton Williams (Advanced Power Technologies) to approve the Spring 2024 Vancouver, BC Working group meeting minutes. There were no objections to unanimous approval of the Spring 2024 Vancouver, BC working group meeting minutes.
7. **Old Business:** The chair reviewed changes that were incorporated into the D1.1 draft after the S24 meeting.
8. **Old Business:** May 31, 2024 straw ballot:
    a. Only two sub-groups submitted comments to the straw ballot, it was agreed by the working group to resubmit the straw ballot with increased focus to obtain responses prior to the S25 meeting.
    b. One comment requested to increase the insulation levels in clause 5 to include 115kV; however, it was decided by the WG to not include 115kV in clause 5 but it was noted that the scope of the standard was previously revised to remove restrictions to limit the standard to 69kV class. This will be old business in the S25 WG meeting.
    c. One comment requested to increase the kVA rating from 100,000 kVA to 300,000 kVA in Subclause 4.2. The commenter was not at the WG meeting and the WG wanted more information before agreeing to make the change. This will be old business in the S25 WG meeting.
    d. One comment requested to increase the typical impedance range from 4.0 % – 5.5 % to 8.0 % - 10.0 % in subclause 6.1. The commenter was not at the WG meeting and the WG wanted more information before agreeing to make the change. This will be old business in the S25 WG meeting.
    e. The straw ballot comments were reviewed and the following changes were agreed to be incorporated in Draft D1.2
        i. Editorial change to Annex A to add the word “transformer.”
        ii. Add a note to subclause 4.4.
            1. “Note: This is to protect the LV windings from over current if the wye connected HV windings were operated at design current levels.”
        iii. Add text to subclause 8.1 to state that additional losses may be generated in and from the shorting bars and risers during load loss measurement and an allowance for a loss correction method should be agreed upon between manufacturer and purchaser at the bid stage. Additionally, agreement should be made if less than rated current will be used for loss measurement.
        iv. Add text to subclause 8.2 to state that fiber optic probes may be used to determine winding temperature rise when agreed upon between the manufacturer and purchaser at the bid stage.
        v. Add requirement to subclause 8.6 that arc furnace transformers with series reactors built in the same tank as the main transformer should be tested for linearity up to 200 % rated current.
    f. Draft D1.2 will be sent out for straw ballot prior to the S25 WG meeting.
9. **New Business:** The chair, Dom Corsi, announced that he is stepping down from the chair position and that Jason Varnell (Doble Engineering) will transition from secretary to chair. William Herron (Reinhausen) will be vice-chair and Trenton Williams (Advanced Power Technologies) will be secretary.
10. The next working group meeting will be in Denver, Colorado, USA during the Spring 2025 Transformers Committee Meeting.
11. The meeting adjourned at 12:00 PM CST.

Attendance Record:

Status as of 10/30/2024 (After F24 Meeting)	Last Name	First Name	Affiliation
Member	BARGONE	GILLES	FISO
Guest	BETANCOURT	EDWIN	SIEMENS ENERGY
Member	BEAUDOIN	JASON	WEIDMANN
Member	BOETTGER	WILLIAM	BOETTGER TRANSFOMER CONSULTING LLC
Guest	COLOPY	CRAIG	CONSULTANT
Guest	CORSI	DOMENICO	Doble Engineering Co.
Guest	DOAK	ERIC	D4ENERGY SOLUTIONS
Member	GORZIN	ALIREZA	BLACK & VEATCH
Guest	GRIESACKER	BILL	WILLIAM GRIESACKER AND ASSOC.
VICE-CHAIR	HERRON	WILLIAM	REINHAUSEN
Guest	JIE	ZHANG	CHINT HEEVIE CO. LTD
Guest	JUNG	FRANCISCO	REINHAUSEN
Guest	KELLEY	BOB	NASS
Member	KENNEDY	SHELDON	SHELDON KENNEDY ENGINEERING PLLC
Guest	LABH	ASHWINI	HITACHI ENERGY
Guest	LUGGE	ANDREW	HITACHI ENERGY
Guest	MARTINEZ	DANIEL	JFE CANADA
Guest	MENDEZ	OMAR	PROLEC-GE
Member	MORALES-CRUZ	EMILIO	QUALITROL
Guest	MURCIA	FREDY	SIEMENS ENERGY
Member	MUSGROVE	RYAN	OG&E
Member	NEWBILL	MARK	HITACHI ENERGY
Guest	PREVOST	THOMAS	WEIDMANN
Member	SAUER	DAN	EATON
Member	SOM	SANJIB	PTTI
Guest	SPARLING	BRIAN	KINECTRICS
Guest	SWARNA	SUNNY	VIRIGINA TRANSFORMER
Guest	TENYENHAUS	EDWIN	HITACHI ENERGY
CHAIR	VARNELL	JASON	Doble Engineering Co.
SECRETARY	WILLIAMS	TRENTON	ADVANCED POWER TECHNOLOGY
Member	WHITTEN	CHRISTOPHER	HITACHI ENERGY
Guest	YAVUZ	KORAY	NOARK ELECTRIC
Member	XU	SHUSHEN	FM GLOBAL
Guest	ZEIGHER	ALEX	HITACHI ENERGY

Attachment K.4.15

Working Group – 60076-57-1202

Chair: Ewald Schweiger

60076-57-1202
IEC/IEEE International Standard Power Transformers Part 57-1202:
Liquid immersed phase-shifting transformers

1. Meeting started at 1:45 PM (CDT) on Tuesday October 29th.
2. This was the first meeting as WG (Working Group).
    - Attendance: 48
    - Members: 11
    - Guests: 37
3. A brief overview about the previous meetings of 60067-57-1202 was presented:
    - Kansas City F23: Started a Study Group for the 60076-57-1202 IEC/IEEE Standard of Liquid immersed Phase-Shifting Transformers.
    - The objective: To provide the Power Transformers Subcommittee (PTSC) with a recommendation whether the document needs revision.
    - Vancouver S24: PTSC approved the title & scope of PAR.
    - Virtual 07/24: Finalized wording for PAR (Need for the project)
    - PAR approved on September 26th by IEEE SA Standard Board
    - → 1st meeting as **W**orking **G**roup here in St Louis
4. Call for patents & Copyright statement
    r) The slides on essential patents from IEEE have been uploaded on the internet and were presented during the meeting. A call for essential patents was made.
    → No essential patents or issues were reported.
    s) The slides on IEEE copyright policy from IEEE have been uploaded on the internet and were presented during the meeting. A call for essential patents was made.
    → No issues were reported.
5. Establish quorum
    - A quorum was achieved.
    - Total number of members is 14 requiring 8 members for quorum.
    - 11 members were present establishing quorum.
6. Approval of agenda
    a) Motion to approve agenda was made by Joe Watson and seconded by Alfons Schrammel.
    No discussion or objections were made.
    b) Motion was carried unanimously with no objections or abstentions.
7. Approval of meeting minutes of the previous Virtual meeting on July 24th, 2024 via Webex
    a) The Meeting Minutes were posted on the PTRC website.
    b) Motion to approve agenda was made by Luc Dorpmanns and seconded by Sanjay Patel.
    No further discussion or objections were made.
    c) Motion was carried unanimously with no objections or abstentions.

8. Discussion on status of the PAR, structured review of the standard and guide, collaboration with IEC
    a. It was reported that the PAR was approved on Sept 25, 2024 and will expire Dec 31, 2028.
    b. Collaboration with IEC
    Kevin Juchem, the convener at IEC TC 14 MT "Phase-Shifting Transformers," presented the list of IEC experts nominated by the national committees. He also mentioned that this group will be involved in the development of 60076-57-135, the "Guide for the Application, Specification, and Testing of Phase-Shifting Transformers."
    c. Michael Thompson shared that the Power System Relaying and Control Committee (PSRC) will establish a Study group for C37.345 (IEEE Guide for the Application of Protective Relaying for Phase-Shifting Transformers) in the next PSRC meeting in January.
    d. The discussions indicate that alignments with PCRS will bring benefit to the development of all three documents C57.135 (60076-57-135), 60076-57-1202 and C37.345.
    Like duplications should be avoided and the best place where to move needs serious considerations.
    e. Kevin Juchem presented a presentation created together with Luc Dorpmanns about ideas about "Content redistribution at IEEE/IEC 60076-57-135 and IEEE/IEC 60076-57-1202"
    f. Kevin Juchem presented the feedback received by the IEC Polish National Committee on Clause 13.7 in IEEE/IEC 60076-57-1202". During the EN adaption the request was received to separate testing of short circuit impedance and losses oft he excitation unit (to add a clause at 13.7.2)
    An extensive discussion about the request took place and the purpose of such a request was challenged. Since no one from the polish NC was present
    --> Kevin Juchem will go back to the Polish NC and will request clarification and more information
9. Planned next steps
    a. *Continue to review* (Standard posted – PTSC)
    Volunteers are requested to reach out to the ones who took over tasks and / or officers
    b. Collection of feedback (via email)
    Outcome of Rev 60076-1 if impact to PST – Paul Jarman
    c. In-person S25 Meeting in Denver, CO - Present the status and next steps
    March 23-27, 2025
10. The meeting was adjourned at 14:30 PM (CDT)
11. Next meetings (planned):
    - Virtual meeting – might be scheduled before March 2025
    - In-person meeting S25 – March 23-27, 2025 in Denver, CO

Respectfully submitted,
Ewald Schweiger - WG Chair

List of attendees for this meeting on the next page

List of attendees for this meeting:

Last Name	First name	Affiliation	Status
Barker	Sean	Hitachi Energy	G
Beaudoin	Jason	Weidmann	G
Bhardwaj	Naveen	Trench Group	G
Biggie	Kevin	Weidmann	G
Brodeur	Samuel	Hitachi energy	G
Chan	Vivian	Hitachi Energy	G
Colopy	Craig	Retired from EATON	G
Czernorucki	Marcos	Hitachi Energy	G
Dorpmanns	Luc	Royal SMIT Transformers	M
Espitia	Egui	Reinhausen Mfg	G
Fu	Renjie	ERMCO	G
Hossain	Saif	Trench Group	G
Jarosz	Patrycja	IEEE SA	G
Juchem	Kevin	Hitachi Energy	M
Kaineder	Kurt	Trench	G
Katapalli	Thrinadha	Virginia Transformer Corp	G
Lee	Junho	HD Hyundai Electric	G
Lee	Jihun	HD Hyundai Electric	G
Lembacher	Stefan	Siemens Energy	G
Lugge	Andrew	Hitachi Energy	G
Martinez	Daniel	JFE Shoji Power Canada	G
McCullough	Douglas	Maxima - Hyundai	G
Murcia	Fredy	Siemens Energy	G
Musgrove	Ryan	Oklahoma Gas & Electric	M / Chair PTSC
Naderian	Ali	Consultant	G
Patel	Sanjay	SGB-Smit USA	M
Ploetner	Christoph	Siemens Energy	M
Rehkopf	Sebastian	Reinhausen Germany	M
Schrammel	Alfons	Siemens Energy	M
Schweiger	Ewald	Siemens Energy	M / Chair
Shannon	Mike	Rea Magnet Wire	G
Shertukde	Hemchandra	University of Hartford	G
Siebert	Stefan	Brockhaus Measurements	G
Simon	Preston	ETSI	G
Suman	Gerry	Electrical Technologies	G
Thompson	Michael	SEL Engineering Services	M / Chair PCRS
Van Dreel	Cole	American Transmission Co.	G
Velasquez	Juan	Magnetron sas	G
Viereck	Karsten	Reinhausen Germany	G
Watson	Joe	JD Watson and Associates	M

Attachment K.4.16

WG Guide for Installation and Maintenance of Power Trf C57.93
Tuesday, October 29th, 2024
3:15 – 4:30 PM
Hyatt Regency, Grand Ballroom D
St. Louis, MO

Chairman: Scott Reed
Vice Chairman: Alwyn VanderWalt
Secretary: Kyle Stechschulte

The meeting was called to order at 3:15 pm by Chair Scott Reed. This is the first meeting for this Working Group. The current guide expires 12/31/2029. The PAR for this WG expires 12/31/2028.

Chairman posted the Patent Claim and Copyright slides. No notifications or comments were received.

Because this was the first Working Group meeting, there was no members or guests. 58 people were in attendance with 50 requesting membership to the WG with all requests granted.

The chair shared the title and scope as approved for the PAR. The chair suggested to form 7 study groups to target specific sections of the document as follows:

TF1 Shipping and Assembly–Ryan Musgrove
TF2 Vacuum Processing Methods—Kyle Stechschulte
TF3 Final Testing and Energization—Elizabeth Bray
TF4 Relocation and Field Repair—Alwyn VanderWalt
TF5 Maintenance—Weijun Li
TF6 Storage—Pat Rock
TF7 Editorial and Definitions—Jesse Duffy

Each TF leader presented a brief overview of their intensions and made a call for volunteers to be part of the task force groups. The Chair called on the task force leaders to report back progress for the spring meeting.

The chair called for new business: Wallace Binder asked about on incorporating C57.93a into the guide. The chair confirmed that after C57.93a is approved the WG will incorporate this amendment into our new guide. The WG will have the opportunity to review and approve/comment on what is incorporated into C57.93 after C57.93a is completed.

The meeting was adjourned at 4:30 p.m.

First name	Last Name	Affiliation	Your Email	Member/ Guest
Elise	ArGuestId	SGB	Elise.arGuestId@sgb-smit.group	Member

Jason	Beaudoin	Weidmann	Jason.beaudoin@weidmann-group.com	Guest
Wallace	Binder	wbbinder consultant	wbbinder@ieee.org	Member
Sanket	Bolar	Oncor Electric Delivery	sanket.bolar@oncor.com	Member
Jeremiah	Bradshaw	Bureau of Reclamation	jeremiah.l.bradshaw@ieee.org	Member
Stuart	Chambers	EPRI International	schambers@epri.com	Member
sudip	chanda	Delta Star Inc	sudip.chanda2503@yahoo.com	Member
Eunyoung	Cho	HICO AMERICA	echo@hicoamerica.com	Member
Juan Carlos	Cruz Valdes	PROLEC GE	juancarlos.cruz@prolec.energy	Guest
Tim	Dappen	Cargill	Tim_dappen@cargill.com	Member
Sami	Debass	EPRI	Sdebass@epri.com	Member
Gabriel	Delgado	Invenergy	gdelgado@invenergy.com	Member
Eric	Doak	D4EnergySolutions	Ericdoak@d4energysolutions.com	Member
Jesse	Duffy	Nashville Electric Service	jduffy@nespower.com	Member
Evgenii	Ermakov	Hitachi Energy	evgenii.ermakov@hitachienergy.com	Member
Lorne	Gara	Shermco	lgara@telus.net	Member
Brad	Grooms	NTS	B.grooms@atsllcwi.com	Member
Samuel	Gruskiewicz	Ge verGuestva	Samuel.gruskiewicz@ge.com	Guest
Ismail	Guner	Hydro-Quebec	ismailguner@ieee.org	Member
Roger	HaMember	GE VerGuestva	Roger.haMember1@ge.com	Member
William	Herron	Reinhausen	W.herron@us.reinhausen.com	Member
Ryan	Jonak	Portland General Electric	Ryan.Jonak@pgn.com	Guest
Thomas A.	Keels	kEElectric Engineering PLLC	thomasakeels@ieee.org	Member
Yeounsoo	Kim	MEPPI	Yeounsoo.kim@meppi.com	Member
Weijun	Li	Braintree Electric Light Department	wli@beld.com	Member
Mario	LocarGuest	Doble Engineering	mlocarGuest@doble.com	Member
Jose	Machain	Prolec Ge	joseluis.machain@prolec.energy	Member
Balakrishnan	Mani	Delta star field service	Balakrishnan_mani@ieee.org	Member
Kumar	Mani	Duke Energy	kumar.mani@duke-energy.com	Member
Douglas	McCullough	Maxima Hyundai	Doug@maxima-sales.com	Guest
David	Murray	TVA	Dbmurray@tva.gov	Member
Ryan	Musgrove	Oklahoma Gas & Electric	Ryan.musgrove@ieee.org	Member
Anthony	Natale	HICO America	anatale@hicoamerica.com	Member
Mike	Guestlte	Kiewit	Guestlte@ieee.org	Member
Parminder	Panesar	Virginia Transformer Corp	parminder_panesar@vatransformer.com	Member
Rakesh	Patel	Hitachi energy	rakesh.patel@hitachienergy.com	Member
Pedro	Pedro	Efacec Energia	pedropedro@efacec.com	Member
Homer	Portillo	Advanced Power TechGuestlogies	hportillo@advpowertech.com	Member

Scott	Reed	Mva	sreed@mvadiagGueststics.com	Member
Perry	Reeder	PA Transformer	Perry.reeder@patransformer.com	Member
Diego	RobaliGuest	Megger	Diego_robaliGuest@ieee.org	Member
Patrick	Rock	American Transmission Company	patrock@ieee.org	Member
Alaor	Scardazzi	Siemens Energy	alaor.scardazzi@siemens-energy.com	Member
Stefan	Schindler	Maschinenfabrik Reinhausen GmbH	s.schindler@reinhausen.com	Guest
Ewald	Schweiger	Siemens Energy	ewald.schweiger@ieee.org	Member
Thomas	Spitzer	City Transformer Service Co	t.spitzer@sbcglobal.net	Member
Kyle	Stechschulte	AEP	Kdstechschulte@aep.com	Member
H. Allen	Steele	TVA	hasteele@tva.gov	Member
David	Stockton	SBC	david@stockton-consulting.com	Member
Jonathan	Tan	Guestrthern Transformer	jtan@Guestrtherntransformer.com	Member
Troy	Tanaka	Burns & McDonnell	ttanaka@burnsmcd.com	Member
Jim	Thompson	T & R Service Company	jim@svtv.com	Member
Eduardo	Tolcachir	TTE Transformers	etolcachir@tte.com.ar	Member
Alwyn	Vanderwalt	ECI	A.vanderWalt.us@eciusa.com	Member
Alan	Washburn	Burns and McDonnell	awashburn@burnsmcd.com	Member
Matthew	Webb	GE VerGuestva	Matthew.webb@ge.com	Guest
Elliot	White	SD Myers	Elliot.white@sdmyers.com	Guest
Kris	Zibert	Allgeier, Martin & Associates	Kris.zibert@amce.com	Member

Attachment K.4.18

Unapproved Meeting Minutes

PC57.153 WG Guide for Paralleling Regulating Transformers

Minutes from October 29, 2024 – St. Louis Meeting

Officers

Chair – Mark Tostrud
Vice Chair – Cihangir Sen
Secretary – Zan Kiparizoski

1. Call to Order

The meeting was called to order at 4:45 PM on October 29, 2024

2. Chairs Remarks

After the officer's introduction, several changes to the previously sent agenda were noted. These changes include the addition of a draft for Annex C of the document, detailing aspects related to circulating current, and a new topic addressing issues with inclusive language, particularly terminology such as "master/follower.

2.1 Essential Patent Claims
IEEE SA slides related to the Essential Patent Claims were reviewed. The Chair provided an opportunity to identify any patent related claim. No claims were made.

2.2 Copyright Policy
IEEE slides related to Copyright Policy were reviewed. No copyright issues were raised.

2.3 Participant Behavior
IEEE slides related to participant behavior in the individual working group/task force process were reviewed. There were no comments.

3. Attendance

- There were 43 attendees in the meeting
  - 17 members were present
  - 7 guests requested membership

- Quorum check
  - Quorum was achieved, 17 of 20 members were present

4. Approval of the agenda and minutes from the last task force meeting

4.1. Meeting Agenda

As noted in the chair's remarks, modifications to the emailed agenda were made.

- Welcome and call to order
- QR Code Attendance Registration and Distribution of attendance rosters
- Call for Essential Patents
- Review of IEEE-SA Copyright policy
- Review of Code of Conduct Policy
- Introductions
- Quorum Check
- Review and approval of the meeting agenda
- Review and approval of the minutes from the Spring 2024 meeting
- Review and discussion of reverse power flow definition
    - Request for volunteers to draft a section on "Recommended actions during reverse power flow"
- Review draft of Annex C – Concept of Apparent Circulating Current - Dr Karsten Viereck
- Old Business –
    - Resolution of Bibliography Reference B.1 - CEMA Std L10-1 CEMA Standard for Load Tap Changing Paralleling Schemes
- Use of Inclusive Language in Technical Terminology and Communications (IEEE P3400)
        - Standard is still in draft but will likely be approved before we go to ballot
        - Concerns were raised over the terminology for the "Master/Follower" parallel method
- Next Meeting(s)

- Virtual - TBD
- In Person – March 25, 2025 – Denver, CO

- Adjourn

Motion to approve the agenda

- Motion by Dan Sauer
- Seconded by Dharam Vir
- Unanimous approval

4.2 Approval of the minutes from the last working group meeting in spring , 2024

No objection to unanimous approval of the meeting minutes from spring 2024 working group meeting.

5. Review and discussion of reverse power flow definition and document section

Discussion began with a review of the reverse power flow definition agreed upon in the last meeting. It was brought to attention that WG for C57.133 is forming a task force for further review of the reverse power flow definition. It was proposed to retain the current definition in our document unless there are objections.
A question was raised about whether C57.133 had already defined reverse power flow. It was clarified that the group would create its own definition instead.
A suggestion to reference C57.133 in the documentation was discussed, but concerns were raised about the number of external references already included.
Ultimately, it was decided to table the definition final text decision for future discussion.

Volunteers were asked to write the section related to the reverse power flow of the transformers.

- Francis Mill and
- Mark Tostrud

Volunteered to work on this section

6. Old Business

6.1 Resolution of Bibliography Reference B.1 - CEMA Std L10-1 CEMA Standard for Load Tap Changing Paralleling Schemes

A review of the references in the old document revealed that a CEMA L10-1 standard, , was used . However, further investigation confirmed that the CEMA organization no longer exists, and this standard is now unavailable. Given the lack of access to this document, the working group discussed whether to retain any excerpts or images from it. Due to availability and copyright concerns, it was agreed that the reference to the CEMA Standard should be removed from the updated draft.

A motion to eliminate the B.1 reference from the document was made:

- Motion by Dharam Vir
- Seconded by Francis Mills
- Unanimous approval

6.2 Review of the draft for the Annex C , Concept of the apparent circulating currents

Presentation detailing the concept of the apparent circulating currents was presented by Dr. Karsten Viereck. Presentation will be distributed among the WG members.

6.3 Use of Inclusive Language in Technical Terminology and Communications (IEEE P3400)

During the approval PAR process, concerns were raised regarding terminology in the guide, specifically with terms like "master/follower related to the specific control scheme. This terminology was questioned for potentially non-inclusive language. IEEE attempted to address this by suggesting guidelines for more neutral terminology. Initially, the terms were removed temporarily from the guide's purpose to facilitate PAR approval, deferring the issue for later resolution.
The proposed change is to replace "master/follower" with terms like "primary/secondary" or "leader/follower." This change would standardize terminology within the guide, although it would not address terminology inconsistencies in field use.
During the discussion it was noted that manufacturers commonly use "master/follower," and it was suggested including an informative note acknowledging that alternate terminology exists in the industry. This would help readers understand the broader industry context.
It was also discussed that the IEEE P3400 document, which might provide additional guidance, has not yet been approved.

At the end of discussion, a motion was made to: suspend further discussion related to the "master/follower" terminology until formal guidance is received from IEEE.

- Motion by Weijun Li
- Seconded by Ryan Musgrove
- Unanimous approval

7. New Business

No new business was identified.

8.Next Meeting

The next scheduled meeting will be at the spring meeting, 2025.

9.The meeting adjourned at 5:45 PM

10.Minutes

The minutes were recorded by Zan Kiparizoski – secretary and reviewed by Mark Tostrud – Chair and John Sen vice-chair

C57.153 – Guide for Paralleling Regulating Transformers			
Last Name	**First Name**	**Affiliation**	**Role**
Avelino	Paulo		Guest
Bargone	Gilles	FISO	Member
Berancourt	Edwing	Siemens Energy	Guest
Blaydon	Daniel	Baltimor Electric	Member
Crockett	Janet	Fayetteville PWC	Guest
Elson	Eric	San Diego G&E	Guest
Eopitla	Equi	MR	Guest
Fong	Satford	Georgia Power	Guest
Gambco	Jose	H-J fammily of Companies	Guest
Garnder	James	Prolec GE	Guest
Heiden	Kyle	Eaton	Member

Hoffman	Saramma	PPL	Member
Hollrah	Derek	Burnes&McDonnell	Guest
Joshi	Akash	Kimley-Hash/Kleev USA	Guest
Jung	Francisco	MR	Guest
Katapalli	Thrinadhia	Virginia Transformers	Guest
Kiparizoski	Zan	Howard Industries	Secretary
Knapp	Evan	Eaton	Member
Li	Weijun	Braintree Electric Light Dept.	Member
Marulanda	Katherine	Magnetron	Guest
Mendez	Omar	Prolec GE	Guest
Mills	Francis	Power Engineers	Member
Murcia	Fredy	Siemens Energy	Guest
Musgrove	Ryan	Oklahoma Gas&Electric	Member
Obcegan	Daniel	TTE Transformers	Guest
Park	Den	Hico	Guest
Radu	Ion	Hitachi Energy	Member
Rock	Pat	American Transmission	Guest
Rossini	Yuri	Siemens Energy	Guest
Sauer	Dan	Eaton	Member
Schindler	Stefan	MR	Guest
Schleismann	Eric	Southern Company	Member
Sen	Cihangir	Duke Energy	Vice-chair
Shalbi	Jaber	Vantran Transfomrers	Guest
Sherturde	Heinchora	Uhart/Ddi	Guest
Thompson	Michael	SEL Engineering Services	Guest
Tostrud	Mark	Dynamic Ratings	Chair
Vaagensmith	Bjorn	Idaho National Lab	Guest
Last Name	**First Name**	**Affiliation**	**Role**
Viereck	Karsten	Reinhausen	Member
Vir	Dharam	Prolec GE	Member
Young	Tim	Hitachi Energy	Guest
Zaman	Malia	IEEE SA	Guest
Zhang	Shibao	Pcore Electric	Member