

## **Annex K Power Transformers Subcommittee**

**October 19, 2022**

**Charlotte, North Carolina, USA**

**Meeting Time: 1:30-2:45 p.m. EDT**

**Chair: Ryan Musgrove**

**Vice Chair: Alwyn VanderWalt**

**Secretary: Weijun Li**

### **K.1 Meeting Attendance**

The Power Transformers Subcommittee (PTSC) met on Wednesday, October 19 at 1:30 PM EDT. The attendance record indicates that 96 out of 126 members of the subcommittee were in attendance; a quorum at the meeting was achieved. A total of 226 individuals attended the meeting; 7 guests requested membership.

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

### **K.2 Approval of Agenda and Meeting Minutes**

The Chair asked the membership for a motion to approve the agenda. Dan Sauer (Eaton Corporation) made a motion to approve the agenda which was seconded by Wallace Binder (WBBinder Consultant). The agenda was approved without objection. The approved agenda can be found in Attachment K.2.

The Chair asked the membership for a motion to approve the Spring 2022 minutes. Scott Reed (MVA) made a motion to approve the minutes which was seconded by Dan Sauer (Eaton Corporation). The minutes were approved without objection.

### **K.3 Chair's Remarks**

PTSC Chair Ryan Musgrove (Oklahoma Gas & Electric) introduced the subcommittee officers including vice chair Alwyn VanderWalt (Electrical Consultants, Inc.) and new secretary Weijun Li (Braintree Electric Light Department).

The Chair introduced 2 new members that were added to the PTSC membership list since the Spring 2022 meeting. These members are listed below:

Juan Carlos Cruz Valdes (Prolec GE)

Hakan Sahin (Virginia Transformer)

The Chair provided the requirements for establishing and maintaining membership.

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 announced that new working group leadership training through IEEE needs to be completed by the end of 2022.

The Chair also announced that a new system tracking attendance is expected to be available in late 2023.

#### **K.4 Working Group and Task Force Reports**

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

This working group met on Monday and achieved a quorum. The working group voted unanimously to take the document to the PTSC to request approval to move to ballot.

Craig Colopy (Retired) made a motion to move Draft 1.2 of C57.131, Standard Performance Requirements and Test Methods for Tap-changers to ballot. Dan Sauer (Eaton Corporation) seconded the motion. The motion passed with unanimous approval.

The complete meeting minutes can be found in Attachment K.4.1.

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

The current document was published in 2016. The industry has taken a quick response in adoption of this standard, specifying and building explosion-resistant transformer tanks per the standard. Peter Zhao (BC Hydro) suggested focusing on the scope and purpose for pursuing a PAR.

The complete meeting minutes can be found in Attachment K.4.2.

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

This working group met on Monday and achieved a quorum. The final ballot (Recirculation 2) is complete with 100% approval rate and no comments. Draft 5 has been submitted to RevCom for review & approval at the December 2022 meeting. This working group has completed its work; therefore, they won't meet again until the next revision cycle, probably in 4-5 years.

The complete meeting minutes can be found in Attachment K.4.3.

##### **K.4.4 Revision of C57.135, Guide for the Application, Specification, and Testing of Phase-Shifting Transformers – Ewald Schweiger**

This working group had their first official meeting on Monday. Joe Watson (JD Watson and Associates Inc.) made a motion to recommend creating an IEEE/IEC dual logo document of the PC57.135 – Guide for the Application, Specification, and Testing of Phase-Shifting Transformers. The motion was seconded by Kurt Kaineder (Siemens Energy). The motion passed unanimously. This working group is looking for volunteers to review the existing guide for improvements. Volunteers are asked to contact the working group chair Ewald Schweiger (Siemens Energy) by email.

The complete meeting minutes can be found in Attachment K.4.4.

##### **K.4.5 Revision of C57.143, Guide for Application of Monitoring Equipment to Liquid-Immersed Transformers and Equipment – Mike Spurlock**

This working group met on Monday and achieved a quorum. Working Group Chair Mike Spurlock (Spurlock Engineering Services, LLC) reported on the progress for resolution of straw ballot

comments received last spring. The working group is targeting December 15, 2022 for final resolution of the straw ballot comments. After that time, the revised draft will be circulated, and an electronic ballot will be issued to determine if the working group believes the document is ready for official ballot. The PAR expires in December 2023.

The complete meeting minutes can be found in Attachment K.4.5.

**K.4.6 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. A quorum was not achieved. Discussions continued on 7 old business topics (sections to be reviewed and revised). The working group created 6 task forces to work on each section that needs review and revision. This guide expires on December 31, 2025.

The complete meeting minutes can be found in Attachment K.4.6.

**K.4.7 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. Presentations were given by various task forces within the working group. The PAR expires on December 31, 2023. A 2-year PAR extension may be required to complete the revision of the guide. Working Group Chair Kumar Mani (Duke Energy) requested help from the attendees to support writing the remaining sections pertaining to TF # 1, 2, and 3.

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

**K.4.8 TF C57.157, Guide for Conducting Functional Life Tests on Switch Contacts Used in Insulating Liquid-Immersed Transformers – Adam Sewell**

This task force had their first meeting on Tuesday. The guide is to be reviewed by all members before the spring 2023 meeting to determine whether to create a PAR to re-affirm or revise the document. Two members volunteered to be task force secretary.

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

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

This working group met on Tuesday and achieved a quorum. The working group voted unanimously to take the document to the PTSC to request approval to move to ballot.

Greg Anderson (GW Anderson & Associates, Inc.) made a motion to move Draft 3 of PC57.150 – IEEE Guide for Transportation of Transformers and Reactors Rated 10,000 kVA or Higher to ballot. Dan Sauer (Eaton Corporation) seconded the motion. The motion passed with unanimous approval.

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

#### **K.4.10 TF PAR for C57.17, Standard Requirements for Arc Furnace Transformers – Dom Corsi**

This task force met on Tuesday. The current document expires on December 31, 2022. The group concluded that there was reasonable interest to form a working group to revise the standard and therefore request a PAR from the PTSC.

Gary Hoffman (Advanced Power Technologies) made a motion to form a working group to revise C57.17, IEEE Standard Requirements for Arc Furnace Transformers. Dan Sauer (Eaton Corporation) seconded the motion. The motion passed with unanimous approval.

The complete meeting minutes can be found in Attachment K.4.10.

#### **K.4.11 WG C57.107, Transformer Volts per Hertz – Joe Watson**

This working group met on Tuesday and achieved a quorum. The focus of the meeting was resolution of the general and technical comments on the straw ballot for Draft 1 of the document. The working group voted to change the title of the document to “Recommended Practice for Developing Short-term Overexcitation V/Hz Curves for Transformers Directly Connected to Generators”. Working Group Chair Joe Watson (JD Watson and Associates Inc.) will follow up with IEEE on the proposed title change and update the PAR accordingly.

The complete meeting minutes can be found in Attachment K.4.11.

#### **K.4.12 TF C57.93, IEEE Guide for Installation and Maintenance of Liquid-Immersed Power Transformers – Scott Reed**

This task force met on Tuesday. A quorum was not achieved. CIGRE Technical Brochure of Maintenance was presented as an option for the group to consider developing as part of the guide. They plan to present LTC at the Spring 2023 meeting and then start to develop the title, scope, and purpose.

The complete meeting minutes can be found in Attachment K.4.12.

#### **K.4.13 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. Scott Reed noted that the third meeting of IEEE PC57.93a was held on October 18, 2022 in China. The Chinese task force studying cold start up for natural esters performed testing at -15°C, -25°C, and -35°C, and monitored the winding and fluid temperatures as the load increased. Preliminary conclusions were 2 additional hours of no load for every 10°C drop in temperature.

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

#### **K.4.14 TF C57.153, Guide for Paralleling Regulating Transformers – Mark Tostrud**

This task force met on Tuesday. Volunteers are needed to fill the open officer positions. The task force approved a motion to request a straw ballot of the existing guide be performed at the subcommittee level to solicit comments and identify what, if any, changes need to be made in the guide.

Mark Tostrud (Dynamic Ratings, Inc.) made a motion to perform a straw ballot of the existing guide (C57.153, IEEE Guide for Paralleling Regulating Transformers) to identify changes required. Dan Sauer (Eaton Corporation) seconded the motion. The motion passed with unanimous approval.

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

#### **K.4.15 PAR Study Group for IEEE 638, Standard for Qualification of Class 1E Transformers for Nuclear Power Generating Stations – Craig Swinderman**

This highly specialized standard expires on December 31, 2023. The PAR study group didn't meet in Charlotte. They are experiencing difficulties finding experienced users/manufacturers to volunteer with revising the document. Task Force Chair Craig Swinderman (Mitsubishi Electric Power Products) has again requested individuals with experience using the standard to volunteer with revising the document.

#### **K.5 Old Business**

There was no old business.

#### **K.6 New Business**

##### Reverse Power Flow Concerns on Distribution and Power Transformers

Dan Blaydon (Baltimore Gas & Electric): Reverse power flow concerns on distribution and power transformers seem to be a “blind spot”. Currently there isn't a standard, recommended practice, or guide providing any requirements or guidance on reverse power flow. Continued development in DG/renewables may make it even more concerning. PTSC or another subcommittee should consider establishing a study group/task force to investigate this matter.

Discussion: This topic probably should be covered/sponsored by the Standards Subcommittee as it affects various types of transformers.

##### Entity PAR request

Brian Sparling (Dynamic Ratings, Inc.): CIGRE is starting a technical brochure. Basic information is as follows:

Title: Recommended Practice on Digital Twin Modeling and Analysis based on Spatial-temporal Data of Switch Cabinet and Transformer with 110kV and Below

Scope: This recommended practice applies to digital twin modeling and analysis based on spatial-temporal data of switch cabinet and transformer in substations (110kV or lower). It covers deployment, management, architecture, data processing, and application services about switch cabinet and transformer in DT system, with a focus on 1) the spatial-temporal data structure, 2) the unified characterization of virtual entities, 3) the extraction of high-dimensional/deep features, and 4) the construction of DT-SA index systems.

Working group: IEEE PES Working Group of Digital Twin for Power Equipment

Application date: June 2021

*Transformer Seismic Concerns (listed on PTSC Chair's PPT slides but not discussed in the PTSC meeting due to time constraints)*

**K.7 Adjournment**

The meeting adjourned at 2:45 p.m. EDT.

**K.8 Attachments**

Attachment K.1 – Attendance  
Attachment K.2 – F22 PTSC Agenda  
Attachment K 4.1 – C57.131 Minutes  
Attachment K 4.2 – C57.156 Minutes  
Attachment K 4.3 – C57.116 Minutes  
Attachment K 4.4 – C57.135 Minutes  
Attachment K 4.5 – C57.143 Minutes  
Attachment K 4.6 – C57.125 Minutes  
Attachment K 4.7 – C57.170 Minutes  
Attachment K 4.8 – C57.157 Minutes  
Attachment K 4.9 – C57.150 Minutes  
Attachment K 4.10 – C57.17 Minutes  
Attachment K 4.11 – C57.107 Minutes  
Attachment K 4.12 – C57.93 Minutes  
Attachment K 4.13 – Liaison to PC57.93a Minutes  
Attachment K 4.14 – C57.153 Minutes

Attachment K.1

<b><u>Role</u></b>	<b><u>First Name</u></b>	<b><u>Last Name</u></b>	<b><u>Company</u></b>
Member	Kayland	Adams	Prolec GE Waukesha
Guest	Jennie	Aldenlid	Hitachi Energy
Member	Gregory	Anderson	GW Anderson & Associates, Inc.
Guest	Edmundo	Arevalo	Bonneville Power Administration
Guest	Elise	Arnold	SGB
Guest	Kush	Arora	Reinhausen
Member	Javier	Arteaga	Hitachi Energy
Member	Onome	Avanoma	MJ Consulting
Member	Donald	Ayers	Ayers Transformer Consulting
Member	Gilles	Bargone	FISO Technologies Inc.
Member	Christopher	Baumgartner	We Energies
Guest	Barry	Beaster	H-J Family of Companies
Guest	Jeff	Benach	Megger
Guest	Edwin	Betancourt	Siemens Energy
Member	Enrique	Betancourt	Prolec GE
Guest	Vivek	Bhatt	Prolec GE
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
Guest	Jeremiah	Bradshaw	Bureau of Reclamation
Guest	Jeffrey	Britton	Doble Engineering Co.
Member	Steven	Brzoznowski	Bonneville Power Administration
Member	David	Calitz	Siemens Energy
Guest	Juan Alfredo	Carrizales	Prolec GE
Member	Juan	Castellanos	Prolec GE
Member	Stuart	Chambers	Powertech Labs Inc.
Member	Luiz	Cheim	Hitachi Energy
Guest	Eun	Cho	HICO America
Guest	Larry	Christodoulou	Electric Power Systems
Member	Craig	Colopy	Retired
Guest	Domenico	Corsi	Doble Engineering Co.
Guest	Michael	Craven	Qualus Corp.
Member	Juan Carlos	Cruz Valdes	Prolec GE
Guest	Rich	Cryer	Digitalgrid, Inc.
Guest	Roberto	Da Silva	Cargill, Inc.

Guest	Everton	De Oliveira	Siemens Energy
Guest	Samson	Debass	EPRI
Member	Scott	Digby	Duke Energy
Guest	Nikolaus	Dillon	Dominion Energy
Member	Don	Dorris	Nashville Electric Service
Guest	Jesse	Duffy	Nashville Electric Service
Member	Hakim	Dulac	Advanced Power Technologies
Member	Samraghi	Dutta Roy	Siemens Energy
Guest	Marco	Espindola	Hitachi Energy
Member	Marcos	Ferreira	Bridge View Resources
Member	Hugo	Flores	Hitachi Energy
Guest	Marc	Foata	Maschinenfabrik Reinhausen
Member	Joseph	Foldi	Foldi & Associates, Inc.
Member	Bruce	Forsyth	Bruce Forsyth and Associates PLLC
Member	Anthony	Franchitti	PECO Energy Company
Guest	Raymond	Frazier	Ameren
Guest	George	Frimpong	Hitachi Energy
Guest	Jose	Gamboa	H-J Family of Companies
Member	Eduardo	Garcia Wild	Siemens Energy
Guest	Carlos	Gaytan	Prolec GE
Member	Ramsis	Girgis	Hitachi Energy
Guest	Luis	Gonzalez	Conduct Industries
Guest	Jose Antonio	Gonzalez Ceballos	Georgia Transformer
Guest	Shawn	Gossett	Ameren
Guest	Jeffrey	Gragert	Xcel Energy
Guest	SCott	Gray	Siemens Energy
Member	Bill	Griesacker	Duquesne Light Co.
Member	Ismail	Guner	Hydro-Quebec
Member	Niklas	Gustavsson	Hitachi Energy
Member	Attila	Gyore	M&I Materials Ltd
Guest	Kevin	Hampton	Siemens Energy
Member	Roger	Hayes	General Electric
Guest	Ramon	Hayes	Dominion Energy
Member	Kyle	Heiden	EATON Corporation
Guest	Peter	Heinzig	Weidmann Electrical Technology
Guest	Ronald	Hernandez	Doble Engineering Co.
Member	John	Herron	Raytech USA
Member	Gary	Hoffman	Advanced Power Technologies
Member	Saramma	Hoffman	PPL Electric Utilities
Member	Ryan	Hogg	Bureau of Reclamation
Guest	Traci	Hopkins	H2Scan



Member	Philip	Hopkinson	HVOLT Inc.
Guest	Anirudhdhsinh	Jhala	Transformers & Rectifiers (India) Ltd
Member	John	John	Virginia Transformer Corp.
Guest	Christopher	Johnson	Oncor Electric Delivery
Guest	Toby	Johnson	Hunt Electric
Guest	Stephen	Jordan	Tennessee Valley Authority
Member	Kurt	Kaineder	Siemens Energy
Guest	Jerzy	Kazmierczak	Hitachi Energy
Member	Sheldon	Kennedy	Niagara Transformer
Guest	Gael	Kennedy	GR Kennedy & Associates LLC
Guest	Christoph	Kerschenbauer	Siemens Energy
Member	Zan	Kiparizoski	Howard Industries
Member	Egon	Kirchenmayer	Siemens Energy
Member	Peter	Kleine	US Army Corps of Engineers
Member	Dmitriy	Klempner	Southern California Edison
Guest	Anton	Koshel	Delta Star Inc.
Member	Axel	Kraemer	Maschinenfabrik Reinhausen
Guest	Fernando	Leal	Prolec GE
Guest	Gustavo	Leal	Dominion Energy
Secretary	Weijun	Li	Braintree Electric Light Dept.
Guest	Mario	Locarno	Doble Engineering Co.
Guest	Don	Lowman	Dominion Energy
Guest	Jose	Machain	Prolec GE
Guest	Jinesh	Malde	M&I Materials Inc.
Guest	Alberto	Martinez	WEG
Guest	Robert	Mayer	Siemens Energy
Guest	Mama	MbouoMbouo	Hitachi Energy
Guest	James	McBride	JMX Services, Inc.
Guest	Brian	McBride	Cargill, Inc.
Guest	James	McGee	H2Scan
Member	Thomas	Melle	HIGHVOLT
Guest	Toni	Mellin	Vaisala
Guest	Omar	Mendez Zamora	Prolec GE
Guest	Mike	Mille	Siemens Energy
Guest	Kent	Miller	T&R Electric Supply Co.
Guest	Philip	Miller	Memphis Light, Gas & Water
Guest	Francis	Mills	Power Engineers, Inc.
Guest	Juliano	Montanha	Siemens Energy
Guest	Curtis	Moore	Digitalgrid, Inc.
Member	Emilio	Morales-Cruz	Qualitrol Company LLC
Guest	Hugo	Murillo	H-J Family of Companies

Member	David	Murray	Tennessee Valley Authority
Guest	Paul	Mushill	Ameren
Member	Kristopher	Neild	Megger
Guest	Yaw	Nyanteh	Hyosung HICO
Guest	Tomas	Olsson	Hitachi Energy
Member	Anastasia	O'Malley	Consolidated Edison Co. of NY
Guest	Dwight	Parkinson	EATON Corporation
Guest	Herman	Parrales	Prolec GE Waukesha
Member	Sanjay	Patel	Smit Transformer
Member	Poorvi	Patel	Electric Power Research Institute (EPRI)
Guest	Verena	Pellon	Florida Power & Light
Guest	Harry	Pepe	Phenix Technologies, Inc.
Guest	Christoph	Ploetner	t.b.a.
Guest	Dominic	Pollaro	NASS
Guest	Daniel	Posadas	Prolec SA DECV
Member	Ion	Radu	Hitachi Energy
Guest	Adnan	Rashid	Measurement Canada / ISED
Guest	Timothy	Raymond	Electric Power Research Institute (EPRI)
Guest	Leslie	Recksiedler	Manitoba Hydro
Member	Scott	Reed	MVA
Guest	Sebastian	Rehkopf	Maschinenfabrik Reinhausen
Guest	Clemens	Reiss IV	Custom Materials, Inc.
Guest	Kevin	Riordan	WEG Transformers USA Inc.
Guest	Diego	Robalino	Megger
Guest	Patrick	Rock	American Transmission Co.
Guest	Tim	Rocque	Prolec GE Waukesha
Member	Marnie	Roussell	Entergy
Member	Mickel	Saad	Hitachi Energy
Member	Hakan	Sahin	Virginia/Georgia Transformer
Member	Albert	Sanchez	Knoxville Utilities Board
Member	Dinesh	Sankarakurup	Duke Energy
Guest	Amitabh	Sarkar	Virginia Transformer Corp.
Member	Daniel	Sauer	EATON Corporation
Member	Alan	Sbravati	Hitachi Energy
Member	Markus	Schiessl	SGB
Guest	Alfons	Schrammel	Siemens Energy
Member	Dan	Schwartz	Quality Switch, Inc.
Member	Ewald	Schweiger	Siemens Energy
Guest	Pugal	Selvaraj	Virginia Transformer Corp.
Member	Cihangir	Sen	Duke Energy
Guest	Jeremy	Sewell	Quality Switch, Inc.

Guest	Russell	Sewell	Quality Switch, Inc.
Member	Adam	Sewell	Quality Switch, Inc.
Guest	Abdul Majid	Shaikh	Delta Star Inc.
Guest	Devki	Sharma	Entergy
Guest	Peter	Sheridan	SGB USA, Inc.
Guest	Hemchandra	Shertukde	University of Hartford
Member	Stephen	Shull	BBC Electrical Services, Inc.
Guest	H. Jin	Sim	Jin Sim & Associates, PC
Guest	Andre	Simons	Cogent Power Inc.
Guest	Jonathan	Sinclair	PPL Electric Utilities
Guest	Kushal	Singh	ComEd
Guest	Kenneth	Skinger	Scituate Consulting, Inc.
Guest	Jason	Snyder	FirstEnergy Corp.
Member	William	Solano	
Member	Sanjib	Som	Pennsylvania Transformer
Guest	Brian	Sparling	Dynamic Ratings, Inc.
Member	Mike	Spurlock	Spurlock Engineering Services, LLC
Member	Fabian	Stacy	Hitachi Energy
Member	Brad	Staley	Leeward Energy
Member	Markus	Stank	Maschinenfabrik Reinhausen
Member	Kyle	Stechschulte	American Electric Power
Guest	Hampton	Steele	Tennessee Valley Authority
Guest	Andrew	Steineman	Delta Star Inc.
Guest	Shankar	Subramany	KEMA Labs
Guest	Charles	Sweetser	OMICRON electronics Corp USA
Member	Janusz	Szczechowski	Maschinenfabrik Reinhausen
Guest	Matthew	Sze	OMICRON electronics Corp USA
Member	Troy	Tanaka	Burns & McDonnell
Guest	Marc	Taylor	JFE Shoji Power Canada Inc.
Guest	Ed	teNyenhuis	Hitachi Energy
Guest	Scott	Thomas	Hitachi Energy
Guest	Ryan	Thompson	Burns & McDonnell
Guest	Timothy	Tillery	Howard Industries
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	Kiran	Vedante	Ritz Instrument Transformers
Member	Rogério	Verdolin	Verdolin Solutions Inc.
Guest	Krishnamurthy	Vijayan	PTI Transformers
Guest	Dharam	Vir	Prolec GE

Guest	Herman	Vogel	TJH2B
Guest	Richard	vonGemmingen	Dominion Energy
Member	Pragnesh	Vyas	Sunbelt-Solomon Solutions
Guest	Nick	Walder	EATON Corporation
Member	(Hugh) Mike	Waldrop	Memphis Light, Gas & Water
Member	David	Wallach	Duke Energy
Guest	Evanne	Wang	DuPont
Guest	Alan	Washburn	Burns & McDonnell
Member	Joe	Watson	JD Watson and Associates Inc.
Member	Bruce	Webb	Knoxville Utilities Board
Guest	Matthew	Weisensee	PacifiCorp
Guest	Drew	Welton	Intellirent
Guest	Leon	White	H2scan
Member	William	Whitehead	H2scan Corporation
Guest	Trenton	Williams	Advanced Power Technologies
Guest	Rene	Wind	Siemens Energy
Member	Jeffrey	Wright	Duquesne Light Co.
Guest	Baitun	Yang	R.E. Uptegraff
Guest	Joshua	Yun	Virginia Transformer Corp.
Guest	Malia	Zaman	IEEE
Member	Peter	Zhao	Hydro One
Guest	Fang	Zhu	R.E. Uptegraff
Member	Kris	Zibert	Allgeier, Martin and Associates
Member	Waldemar	Ziomek	PTI Transformers

# AGENDA

## Power Transformers Subcommittee

IEEE PES Transformers Committee

Wednesday, October 19<sup>th</sup>, 2022, 1:30-2:45 PM EST, Symphony 4

In Person – Welcome All

**Ryan Musgrove – Chair, Alwyn VanderWalt – Vice Chair, Weijun Li – Secretary**

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
7. Working Group and Task Force reports
  - a. WG Revision of C57.131, Tap Changers.....Craig Colopy
  - b. TF C57.156, Guide for Tank Rupture Mitigation..... Peter Zhao
  - c. WG Revision of C57.116, GSU Transformers .....Weijun Li
  - d. WG C57.135, Guide for Phase shifting Transformers.....Ewald Schweiger
  - e. WG Revision of C57.143, Monitoring Guide .....Mike Spurlock
  - f. WG Revision of C57.125, Failure Investigating and Reporting.....Hakan Sahin
  - g. WG C57.170, Condition Assessment Guide .....Kumar Mani
  - h. TF C57.157, Guide for Life test of Switch Contacts.....Adam Sewell
  - i. WG Revision of C57.150, Transportation Guide.....Greg Anderson
  - j. TF C57.17, Standard Requirements for Arc Furnace Transformers.....Dom Corsi
  - k. WG C57.107, Transformer Volts per Hertz .....Joe Watson
  - l. TF C57.93, Installation and Maintenance Guide.....Scott Reed
  - m. Liaison to PC57.93a – Installation and Maintenance Guide.....Scott Reed
  - n. TF C57.153, Guide for Paralleling Transformers.....Mark Tostrud
  - o. PAR Study Group IEEE 638 Class 1E Xfmrs for Nuclear Stations..... Craig Swinderman
8. Old business
9. New business
10. Adjournment

## Power Transformer Subcommittee

### Working Group Report

Document #:	C57.131		
Document Title:	Standard Performance Requirements and Test Methods for Tap-changers		
Chair:	Craig A. Colopy	Vice-Chair	Axel Kraemer
Secretary	Adam M. Sewell	Percent Complete	99%
Current Draft Being Worked On:	1.2	Dated:	October 2022
PAR Expiration Date:	December 31, 2024		
Meeting Date:	17 October 2022	Time:	9:30am-10:45am
Location:	Charlotte, NC, USA		
Attendance:	Members	33 out of 44	
	Guests	32	
	Guests Requesting Membership	Send email to secretary	
	Total*	65	

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

### Meeting Minutes / Significant Issues / Comments:

1. Meeting was called to order at 9:45am, October 17, 2022 at SHERATON CHARLOTTE & LE MÉRIDIEN CHARLOTTE HOTELS Symphony 1 room.
2. Distribution of attendance sheets
  - a. If you didn't receive an email from this working group before this meeting or are not on the attendance sheet, please send an email to [adamsewell@ieee.org](mailto:adamsewell@ieee.org) with the subject: C57.131 EMAIL to be added to the C57.131 WG email list
3. Quorum Check / Introductions
  - a. Introductions were made by name and affiliation
  - b. 33 members out of 44 were in attendance – QUORUM MET
  - c. Member requests can be sent to ADAMSEWELL@IEEE.ORG
4. Approval of Agenda and Approval of minutes from Spring 2022 Denver Meeting
  - a. Motion – H.Flores 2<sup>nd</sup>-M.Stank. No opposition to unanimous approval. APPROVED
5. Discussion of Draft 1.1 located on PSC website
  - a. Current C57.131-2012 expires Dec. 31, 2022 and PAR expires Dec. 31, 2024
  - b. Chair reviewed changes from last meeting that were posted on PSC website
6. Discussion of Draft 1.2 generated from work session held on October 16, 2022
  - a. 17 members attended 10/16/22 work session and created Draft 1.2

- b. Changes were shown to working group which were in annexes and editorial
- 7. OLD BUSINESS - Keep the following notes for joint revision with IEC 60214-1
  - a. Section 6.1.15 Protection against access to hazardous parts - check if there is an equivalent designation in NEMA 250 for IP1X
    - i. Chair discussed this with working group and explained the wording shown in the current draft for this item.
  - b. Section 7.2.2 Temperature rise - To be considered in a future joint IEC/IEEE revision. Some discussion is warranted regarding the difference between contact temperatures of OLTC and DETC along with defining contact test temperature methodology to normalize testing. This could include switch orientation, liquid volume and parameters you have to prevent unwarranted advantageous results.
  - c. Table 3 values for switching impulse test values
    - i. Current IEEE and IEC standards do not list switching impulse values less than 100kV and for joint revision, switching impulse values will be looked at for less than 100kV. 69kV was a value brought up in the 3/28/22 meeting.
- 8. NEW BUSINESS - Discussion from S. Patel (WG Guest) about reactor type vs reactance type and resistor type vs resistance type wording change that was done on previous draft.
  - a. Chair agreed to change wording back to reactance type and resistance type where the current wording has reactor type and resistor type.
  - b. No MOTION was made to vote on this change to the document, so Draft 1.2 wording will not be changed. Draft 1.1 and 1.2 have both had this wording when worked on at work sessions on 3/26/22 and 10/16/22. Both drafts were voted on by the working group members as accepted changes.
  - c. Chair will follow-up with S. Patel on this discussion
- 9. Chair asked for unanimous approval to move Draft 1.2 of C57.131, Standard Performance Requirements and Test Methods for Tap-changers to ballot
  - a. No objections – 100% approval
  - b. Motion to be made in Power Subcommittee Meeting on 10/19/2022 to move Draft 1.2 to ballot
- 10. Next meeting: March 20 at Spring 2023 Transformer Committee Meeting scheduled for March 19-23, 2023, Milwaukee, WI, USA.
- 11. Close of meeting – 10:00am
  - a. Motion – T.Dauzat, 2<sup>nd</sup> – P.Kleine. No opposition to unanimous approval. ADJOURNED.
- 12. Working group membership changes – members who only attended one of the virtual meetings (on 4/26/21 or 11/15/21) and no further meetings have been changed to guest status. New membership for Spring 2023 meeting will be 41 members.

Submitted by: Craig A. Colopy

Date: 10/25/2022

**Meeting Attendance 10/17/2022:**

<b>Last Name</b>	<b>First Name</b>	<b>Company (Affiliation)</b>	<b>Role</b>
Aikens	Tom	VTC	Guest
Aldenlid	Jennie	Hitachi Energy	Member
Arora	Kush	Maschinenfabrik Reinhausen	Guest
Betancourt	Edwin	Siemens Energy	Guest
Blaszczyk	Piotr	Specialty Transformer Components LLC	Member
Calitz	David	Siemens Energy	Member
Colopy	Craig	EATON Corporation	Chair
Cruz Valdes	Juan Carlos	Prolec GE	Member
Dauzat	Thomas	General Electric	Member
Debass	Samson	EPRI	Guest
Dillon	Nikolaus	Dominion Energy	Guest
Dix	Larry	Quality Switch, Inc.	Member
Dutta Rey	Samragui	Siemens Energy	Guest
Faur	Florin	Prolec GE Waukesha	Member
Flores	Hugo	Hitachi Energy	Member
Franchitti	Anthony	PECO Energy Company	Member
Griesacker	Bill	Duquesne Light Co.	Member
Gustavsson	Niklas	Hitachi Energy	Member
Gyore	Attila	M&I Materials Ltd	Member
Hardin	Michael	H-J Family of Companies	Guest
Hayes	Ramon	Dominion Energy SC	Guest
Johnson	Christopher	Oncor	Guest
Kleine	Peter	US Army Corps of Engineers	Member
Kraemer	Axel	Maschinenfabrik Reinhausen	Vice-Chair
Kurth	Bernhard	Maschinenfabrik Reinhausen	Guest-RM
Lejay	Olivier	Huaming USA Corp.	Member
Mellin	Toni	Vaisala	Guest
Mills	Francis	Power Engineers	Guest
Montanha	Juliano	Siemens Energy	Guest
Mora	Joseph	GlobeCore	Guest
Munoz Molina	Martin	Orto de Mexico	Member
Neild	Kristopher	Megger	Member
Patel	Sanjay	Smit Transformer	Guest
Pollaro	Dominic	NASS	Guest
Posadas	Daniel	Prolec GE	Guest
Pruente	John	Prolec GE Waukesha	Member
Rehkopf	Sebastian	Maschinenfabrik Reinhausen	Member
Richardson	Michael	Ameren	Guest
Rock	Patrick	American Transmission Company	Guest
Sanchez	Oliverio	PGE	Guest
Schleismann	Eric	Southern Company Services	Member



<b>Last Name</b>	<b>First Name</b>	<b>Company (Affiliation)</b>	<b>Role</b>
Schwartz	Dan	Quality Switch, Inc.	Member
Sewell	Adam	Quality Switch, Inc.	Secretary
Sewell	Jeremy	Quality Switch, Inc.	Member
Sewell	Russ	Quality Switch, Inc.	Guest
Shertukde	Hemchandra	University of Hartford	Guest
Snyder	Jason	First Energy	Guest
Solano	William	Maschinenfabrik Reinhausen	Guest
Sparling	Brian	Dynamic Ratings, Inc.	Member
Stacy	Fabian	Hitachi Energy	Member
Staley	Brad	Leeward Renewable Energy	Guest
Stank	Markus	Maschinenfabrik Reinhausen	Member
Stechschulte	Kyle	American Electric Power	Member
Szczechowski	Janusz	Maschinenfabrik Reinhausen	Guest
Tanaka	Troy	Burns & McDonnell	Guest
Thompson	Clifton	Voltyx/NASS	Guest
Tillery	Timothy	Howard Industries	Member
Vijayan	Krishnamurthy	PTI Transformers	Guest
Vogel	Herman	TJH2b	Guest
Waldrop	Hugh (Mike)	Memphis Light, Gas & Water	Member
Washburn	Alan	Burns & McDonnell	Member
Whitehead	William	H2scan Corporation	Member
Whitten	Christopher	Hitachi Energy	Member
Yang	Baitun	R.E. Uptegraff	Guest-RM
Yaw	Nyanteh	Hyosung Hico	Guest

#### **Meeting Attendance Draft 1.2 Work Session on 10/16/2022:**

<b>Last Name</b>	<b>First Name</b>	<b>Company (Affiliation)</b>	<b>Role</b>
Aldenlid	Jennie	Hitachi Energy	Member
Blaszczyk	Piotr	Specialty Transformer Components LLC	Member
Colopy	Craig	EATON Corporation	Chair
Dauzat	Thomas	General Electric	Member
Dix	Larry	Quality Switch, Inc.	Member
Faur	Florin	Prolec GE Waukesha	Member
Ferreira	Marcos	Bridge View Resources	Member
Gustavsson	Niklas	Hitachi Energy	Member
Jhala	Aniruddh	Transformers & Rectifiers (India) Ltd	Guest
Kraemer	Axel	Maschinenfabrik Reinhausen	Vice-Chair
Lejay	Olivier	Huaming USA Corp.	Member
Pruente	John	Prolec GE Waukesha	Member
Rehkopf	Sebastian	Maschinenfabrik Reinhausen	Member
Schwartz	Dan	Quality Switch, Inc.	Member
Sewell	Adam	Quality Switch, Inc.	Secretary

<b>Last Name</b>	<b>First Name</b>	<b>Company (Affiliation)</b>	<b>Role</b>
Sewell	Jeremy	Quality Switch, Inc.	Member
Sewell	Russ	Quality Switch, Inc.	Guest
Solano	William	Maschinenfabrik Reinhausen	Guest
Szczechowski	Janusz	Maschinenfabrik Reinhausen	Guest
Tillery	Timothy	Howard Industries	Member
Whitten	Christopher	Hitachi Energy	Member

Title: TF Guide for Tank Rupture Mitigation C57.156

Time: 9:15 AM- 10:45 AM, Monday, Oct 17, 2022

Place: Sheraton Charlotte, NC

Meeting Minutes:

At 9:15 AM, Chair called the meeting to order.

There were 56 participants, among which, 16 requested for membership and were granted as this was the first meeting of the TF.

Chair gave introduction to the background and development history of C57.156 – 2016 Transformer Tank Rupture and Mitigations (~10 years history for its development).

Since its publication in 2016, the industry has taken a quick response in adaption of this Std, specifying and building the explosion resistance transformer tank per the Std.

Chair mentioned that CIGRE/IEC are planning to develop the same type of Std.

Chair reported the feedbacks and new developments from the industry.

Marc Foata from MR presented their initiative: tap changer compartment and explosion mitigations.

Sam Brodeur from Hitachi Energy provided his comment prior to the meeting: to enlarge the scope (1.1) to cover oil leak risk mitigation of components: load tap changer, bushings and their turrets, piping, valves, pumps, and radiators.

Open floor discussions were carried out. Joe Watson suggested to review the standard and provide more feedbacks. Chair is going to request IEEE SA for a copy of working document of C57.156, and then send it to the members.

Chair suggested to focus on the Scope and Purpose for pursuing a PAR.

Meeting adjourned at 10:45AM.

Reported by:

Peter Zhao, P.Eng.

Chair of the TF

Attendance List:

Name	Affiliation	Membership requested (yes or no)
Alberto Martinez Mores	WEG	no
Alfons Schrammel	Siemens Energy	yes
Anastasia O'Malley	Con Edison NY	yes
Andrea Ynui	Siemens Energy	no
Andy Steineman	Delta Star	no
Anirudhdhsinh Jhala	Transformers & Rectifiers India	no
Attila Gyore	M&I Materials	no
Bob Middleton	RHM International	yes
Christoph Kerschauer	SE Transformers	no
Christopher Johnson	Oncor	no
Edvardo Tolcachie	TTE	yes
Elise Arnold	SGB	yes
Elvardo Garcia	Siemens Energy	yes
Emilio Norales-Cruz	Qualitro	yes
Everton Luis De Oliveira	Siemens Energy	yes
Ewald Schweiger	Siemens Energy	yes
Filip Mikulecky	Siemens Energy, KPT	no
Gael R Kennedy	GR Kennedy & Associates	no
Goran Plisic	Siemens Energy, KPT	no
Hakim Dulac	APT	no
Huan Dinh	Hitachi Energy	no
Jason Snyder	First Energy	no
Jeff Gragert	Xcel Energy	no
Jeremiah Bradshaw	Bureau of Reclamation	yes
Jim Sim	Jim Sim & Associates	no
Joe Foldi	F&A	no
Joe Nims	Allen& Hoshall	no
Joe Watson	JDWatson & Associates	yes
Jose Luis Machain	Prolec GE	no
Joshua Yun	Virginia Transformer	yes
Juan Alfredo Carrizales	Prolec GE	no
Juan Castellanos	Prolec	yes
Kevin Hampton	SE Transformers	no
Krishnamurthy Vijayan	PTI, Canada	no
Luis Gonzales	Conduct industries	no
Marc Foata	MR	yes
Mateja Bubyar	Siemens Energy, KPT	no
Matt Weisensee	Pacific Corp	no
Mavcin Pietraszyk	Hitachi Energy	no
Michael Botti	Hyosung HICO	no
Omar Mendez Zomors	Prolec	no
Onome Avonoma	MJC	yes
Peter Zhao	Hydro One	Chair
Rakesh Rathi	Virginia Transformer	no
Rene Wind	Siemens Energy	no
Rogério Verdolin	Verdolin Solutions	yes
Ronald Hernandez	Doble	no
Sanford Fong	Georgia Power	no
Sanjib Som	Pennsylvania Transformers	yes
Sebastian Rehkopf	Reinhausen Germany	no
Sheldon Kennedy	Niagara Transformer	no
Tim Rocque	Prolec GE	no
Toby Johnson	Hunt Electric	no
Tomes Olsson	Hitachi Energy	no
Verena Pellon	FPL	yes
Waldemar Ziomek	PTI	yes

Working Group PC57.116  
Guide for Transformers Directly Connected to Generators  
Fall 2022 Meeting  
Monday, October 17, 2022, 11 a.m. – 12:15 p.m.  
Sheraton/Le Meridien, Charlotte, NC  
Meeting Room: Mecklenburg 1,2

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**Chair:** Weijun Li, **Vice Chair:** Jason Varnell, **Secretary:** Bill Griesacker

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1. Introductions, establishment of quorum:

The members of the WG were counted. There are 22 members of the working group so quorum is 12. There were 13 members present at the meeting, therefore quorum was achieved.

Attendance summary from paper rosters circulated during meeting:

Members	13
Guests	36
Total Attendance	49
Guests Requested Membership	0

Membership to the Working Group was effectively closed since the work was complete and there were no future meetings planned.

2. Agenda review and approval:

There was no objection to unanimous approval of the agenda.

3. Call for patents:

The IEEE patent slides were presented and there were no responses voiced.

4. IEEE SA copyright policy:

The copyright slides were presented and no responses were voiced.

5. Approval of -Spring 2022 meeting minutes

There was no objection to unanimous approval of the Spring 2022 meeting minutes.

6. Review of project timeline:

The chair reviewed the project timeline, noting that draft 3 was submitted to the IEEE SA for initial balloting on June 22, 2022. A Comment Resolution Group was formed to address balloting feedback. A recirculation of draft 4 was submitted on September 22, 2022, and a second recirculation on October 4, 2022. The submittal of draft 5, including the document, WG roster and all supporting information was completed on October 4, 2022.

7. Comment Resolution Group (CRG) report

The comment resolution group met three times, initially to address 79 of the 81 comments, a second meeting addressed the remaining 2 comments, and then a third meeting to address comments on the transfer of transient voltages.

The chair offered to review the CRG responses and there was no response showing interest.

8. Old business – No old business.

9. New business – No new business was brought before the Working Group.

10. Action items / next steps

There are no action items for the Working Group.

Draft 5 of the document will be reviewed by RevCom on December 2, 2022.

11. The Working Group does not plan to meet again.

12. Adjournment

The meeting adjourned at 11:23 a.m.

**Attendance:**

<u>First Name</u>	<u>Last Name</u>	<u>Company Name</u>	<u>Role</u>
Kayland	Adams	SPX Transformer Solutions, Inc.	Member
Gilles	Bargone	FISO Technologies Inc.	Guest
Enrique	Betancourt	Prolec GE	Guest
Mateja	Bubnjarkucko	Siemens Energy	Guest
David	Calitz	Siemens Energy	Guest
Juan Carlos	Cruz Valdes	Prolec GE	Guest
Everton	De Oliveira	Siemens Energy	Guest
Samson	Debass	EPRI	Guest
Joe	Foldi	Foldi and Associates	Guest
Raymond	Frazier	Ameren	Guest
Rich	Frye	EATON Corporation	Guest
Eduardo	Garcia Wild	Siemens Energy	Guest
Bill	Griesacker	William Griesacker and Associates	Secretary
Kevin	Hampton	Siemens Energy	Guest
Ryan	Hogg	Bureau of Reclamation	Member
John	John	Virginia Transformer Corp.	Member
Toby	Johnson	Hunt Electric	Member
Sergiusz	Kapka	Hitachi Energy	Guest
Gael	Kennedy	GR Kennedy & Associates LLC	Guest
Christoph	Kerschenbauer	Siemens Energy	Guest
Zan	Kiparizoski	Howard Industries	Guest
Anton	Koshel	Delta Star Inc.	Guest
Weijun	Li	Braintree Electric Light Dept.	Chair

Don	Lowman	Dominion Energy	Guest
Jose Luis	Machain	Prolec GE	Guest
Omer	Madrez Zanora	Prolec GE	Guest
Kumar	Mani	Duke Energy	Member
Balakrishnan	Mani	Virginia Transformer Corp.	Guest
Mama	Mbouombouo	Hitachi Energy	Guest
Emilio	Morales-Cruz	Qualitrol Company LLC	Member
Ryan	Musgrove	Oklahoma Gas & Electric	Guest
Shankar	Nambi	Bechtel	Member
Yaw	Nyanteh	Hyosung HICO	Guest
Polo	Orozeo	GE Grid Solutions	Guest
Dinesh	Sankarakurup	Duke Energy	Member
Amitabh	Sarkar	Virginia Transformer Corp.	Member
Alfons	Schrammel	Siemens Energy	Guest
Arthur	Speegle	Entergy Services, Inc.	Guest
Andrew	Steineman	Delta Star Inc.	Guest
Shankar	Subramany	KEMA Labs	Guest
Ed	teNyenhuis	Hitachi Energy	Guest
Ryan	Thompson	Burns & McDonnell	Guest
Jason	Varnell	Doble Engineering Co.	Vice-Chair
Kiran	Vedante	Ritz Instrument Transformer	Guest
Richard	vonGemmingen	Dominion Energy	Guest
David	Wallach	Duke Energy	Guest
Joe	Watson	JD Watson and Associates Inc.	Member
Rene	Wind	Siemens Energy	Guest
Waldemar	Ziomek	PTI Transformers	Guest

**C57.135****Guide for the Application, Specification, and Testing of Phase-Shifting Transformers****Monday, October 17, 2022****Charlotte, NC, USA****Minutes of WG Meeting**

The meeting was called to order at 1:45PM by Chair Ewald Schweiger (writer of Minutes).

This was the first meeting as a WG. There were **18** of the **total 40 attendees** that requested membership at the meeting.

List of Meeting Attendees is provided below:

A	Aldenlid Jennie	M	McCullough Douglas	S	Schrammel Alfons
	Arevalo Edmundo		Mendez Zamora Omar		Schweiger Ewald
C	Chu Donald		Miller Michael		Scott Thomas
	Colopy Craig		Moore Curtis		Sim Jin
	Corsi Domenico		Morrow Gianette		Snyder Jason
	Cryer Richard		Musgrove Ryan		Stank Markus
D	Davis Eric	N	Nambi Shankar		Stechschulte Kyle D
G	Gustavsson Niklas		Narungo Volney		Subramany Shankar
H	Hampton Kevin	P	Patel Sanjay	V	Van Der Walt Alwyn
	Heiden Kyle		Pellon Verena		vonGemmingen Richard
	Heinzig Peter		Ploetner Christoph	W	Watson Joe
K	Kaineder Kurt	R	Recksiedler Leslie		Williams Trenton
	Kerschenbauer Christoph		Rehkopf Sebastian		
	Kraemer Axel		Rock Patrick		

Introductions of the Chair was made. Due to the number of attendees no individual introductions were made. Attendees were asked to state their name and affiliations when making comments or asking questions.

The patent slides and the copyright policy were shown with no response.

The chair presented the agenda and since this was the first meeting as a WG the chair suggested to continue with the agenda as it was shown. No objection was raised.

The members of the previous WG in 2011 had been shown and their work had been appreciated by the attendees.

The chair presented a brief summary of the work done by the PAR Study group and the approved



PAR for the current work of the WG.

Further an overview on the existing PST documents at IEEE and IEC have been shown and the relation of the documents between IEC and IEEE had been pointed out.

During the previous meetings of the PAR Study Group, the topic about the involvement of IEC in the revision if the guide PC57.135 has been brought up. Possible ways of the collaboration had been presented.

This was the base for an intensive discussion. All statements made, had been in favor to do an IEEE/IEC dual logo document.

Joe Watson made the motion, to recommend, to create an IEEE/IEC dual logo document of the PC57.135 – Guide for the Application, Specification, and Testing of Phase-Shifting Transformers.

The motion was second by Kurt Kaineder.

The chair asked if there are any objections for anonymous approval of the motion.

No objections had been brought up.

The motion passed

The result of the comments on the need of improvements / changes / corrections of the PAR Study Group had been presented.

The chair asked for volunteers to take over one or more sections of the guide for review.

The meeting participants have been asked to contact the chair directly or via email.

Joe Watson volunteered to review section 12 and brought up the importance about the difference of the no-load shift angle and shift angle under load. The following intensive discussion showed the need for the consideration in the new revision of the guide.

The WG plans to meet at the spring 2023 Transformers Committee Meeting in Milwaukee, WI.

The meeting was adjourned at 2:50 PM.

Ewald Schweiger WG Chair

**C57.143 – IEEE Guide for Transformer Monitoring**  
**Monday, October 17, 2022 (3:15 pm EDT)**  
**Charlotte, NC, USA**  
**Minutes of WG Meeting**

The meeting was called to order at 3:15 PM by Chair Mike Spurlock. Vice-Chair Poorvi Patel was present. Secretary Elizabeth Bray was not present. Deanna Woods filled the role of Secretary for the meeting.

There were 108 people in attendance for this meeting. A quorum was reached. There were 52 of 97 members present and 56 guests. Eleven guests requested membership. The attendance for this meeting was as follows:

- Number of Members in Activity = 97
- Number of Members Present = 52
- Percentage of Members Present = 53.6%
- Number of attendees = 108
- Attendees requesting Membership = 11

A List of Meeting Attendees is provided below.

Last Name	First Name	Association	
Aldenlid	Jennie	Hitachi	Guest
Almeida	Nabi	Prolec GE	Member
Al Yousuf	Mohammed	PSEG Long Island	Guest
Arora	Kush	Reinhausen	Guest
Bargone	Gilles	FISO Technologies Inc.	Member
Benach	Jeff	Megger	Member
Boettger	William	Boettger Transformer Consulting LLC	Member
Boman	Paul	Hartford Steam Boiler	Member
Bradshaw	Jeremiah	Bureau of Reclamation	Member
Calitz	David	Siemens Energy	Member
Carrizales	Juan Alfredo	Prolec GE	Guest
Castellanos	Juan	Prolec GE	Guest
Chambers	Stuart	Powertech Labs Inc.	Member
Cheatham	Jonathan	General Electric	Member
Cheim	Luiz	Hitachi Energy	Member
Cho	Eun	HICO America	Guest
Colopy	Craig	Consultant	Guest
Cox	Paul	GE Grid Solutions	Member
Cross	James	Kinectrics	Guest
Cryer	Rich	DigitalGrid, Inc.	Guest
Da Silva	Roberto Ignacio	Cargill, Inc.	Guest
Debass	Sam	EPRI	Guest
Draper	Zachary	Delta-X Research Inc.	Guest
Dulac	Hakim	Advanced Power Technologies	Member
Faur	Florin	Prolec GE	Member
Felton	Todd	MVA	Guest

Foata	Marc	Maschinenfabrik Reinhausen	Guest
Fong	Sanford	Georgia Power Co.	Guest
Forsyth	Bruce	Bruce Forsyth and Associates PLLC	Guest
Frimpong	George	Hitachi Energy	Member
Gara	Lorne	Shermco	Member
Guner	Ismail	Hydro-Quebec	Member
Gustavsson	Niklas	Hitachi Energy	Member
Hayes	Ramon	Dominion Energy SC	Guest
Hayes	Roger	General Electric	Member
Heiden	Kyle	EATON Corporation	Member
Hernandez	Javier	Orto de Mexico	Guest
Hoffman	Saramma	PPL Electric Utilities	Member
Hopkins	Traci	H2Scan Corporation	Guest
Kapka	Sergiusz	Hitachi Energy	Guest
Kennedy	Gael	GR Kennedy & Associates LLC	Guest
Klempner	Dmitriy	Southern California Edison	Member
Kraemer	Axel	Maschinenfabrik Reinhausen	Member
Leal	Gustavo	Dominion Energy	Guest
Lewand	Lance	Doble Engineering Co.	Guest
Loman	Don	Dominion Energy SC	Guest
Mabrey	Stephanie	Weidmann	Member
Mani	Balakrishnan	Virginia Transformer Corp.	Member
Mani	Kumar	Duke Energy	Member
McBride	Brian	Cargill, Inc.	Guest
McBride	James	JMX Services, Inc.	Member
McCullough	Douglas	Maxima / Hyundai	Guest
Mendez	Omar	Prolec GE	Guest
Miller	Michael	Siemens Energy	Guest
Mellin	Toni	Vaisala	Guest
Moore	Curtis	DigitalGrid, Inc.	Guest
Mora	Jose	GlobeCore	Guest
Morales-Cruz	Emilio	Qualitrol Company LLC	Member
Muñoz Molina	Martin	Orto de Mexico	Member
Naderian	Ali	METSCO Energy Solutions Inc.	Guest
Nunez	Arturo	Mistras Group, Inc.	Member
Nyanteh	Yaw	HICO America	Guest
O'Malley	Anastasia	Consolidated Edison Co. of NY	Member
Olsson	Tomas	Hitachi Energy	Guest
		Electric Power Research Institute (EPRI)	Vice-Chair
Patel	Poorvi	Weidmann Electrical Technology	Member
Prevost	Thomas	Prolec GE	Member
Pruente	John	MVA	Member
Reed	Scott	MVA	Member
Rehkopf	Sebastian	Maschinenfabrik Reinhausen	Guest
Richardson	Michael	Ameren	Guest

Robalino	Diego	Megger	Guest
Rock	Patrick	American Transmission Co.	Guest
Rocque	Tim	Prolec GE	Guest
Rossini	Yuri	Siemens Energy	Guest
Saad	Mickel	Hitachi Energy	Member
Sawant	Anil	Virginia Transformer Corp.	Guest
Sbravati	Alan	Cargill, Inc.	Guest
Schweiger	Ewald	Siemens Energy	Guest
See	Matthew	OMICRON electronics Corp USA	Guest
Selvaraj	Pugal	Virginia Transformer Corp.	Guest
Sharp	Michael	Trench Limited	Guest
Silgado	Adrian	IFD Corporation	Guest
Sparling	Brian	Dynamic Ratings, Inc.	Member
Speegle	Andy	Entergy	Guest
Spurlock	Mike	Spurlock Engineering Services, LLC	Chair
Staley	Brad	Leeward Renewable Energy	Member
Stank	Markus	Maschinenfabrik Reinhausen	Member
Stechschulte	Kyle	American Electric Power	Member
Szczechowski	Janusz	Maschinenfabrik Reinhausen	Member
Thompson	Clifton	N. American Substation Services	Guest
Tolcachir	Eduardo	TTE	Guest
Tostrud	Mark	Dynamic Ratings, Inc.	Member
Trifunski	Risto	Trench Limited	Guest
Van Der Walt	Alwyn	Electrical Consultants, Inc.	Member
		Electric Power Research Institute (EPRI)	
van der Zel	Gordon		Guest
Vedante	Kiran	Ritz Instrument Transformers	Guest
Verdolin	Rogerio	Verdolin Solutions Inc.	Member
Vogel	Herman	TJH2b Analytical Services	Guest
Walder	Nick	EATON Corporation	Guest
Waldrop	Mike	Memphis Light, Gas & Water	Member
Watson	Joe	JD Watson and Associates Inc.	Member
Webb	Matthew	SPX Transformer Solutions, Inc.	Member
Welton	Drew	Intellirent	Member
Whitehead	William	H2scan Corporation	Member
Williams	Trenton	Advanced Power Technologies	Member
Woods	Deanna	Alliant Energy	Member
Wright	Jeffrey	Duquesne Light Co.	Member
Yeboah	Kwasi	GE Energy Management	Guest

## MEETING PROPOSED AGENDA

1. Welcome & Introduction
2. Call for Patent Disclosure/Review Copyright Policy/Review Individual Participation Process
3. Chair Remarks
4. Quorum Check
5. Approval of Agenda
6. Approval of the following meeting minutes:
  - Fall 2021 Virtual Meeting
  - Spring 2022 Meeting (Denver)
  - June 6, 2022 Web Meeting
  - June 27, 2022 Web Meeting
  - July 11, 2022 Web Meeting
  - July 25, 2022 Web Meeting
  - August 22, 2022 Web Meeting
  - September 12, 2022 Web Meeting
  - September 26, 2022 Web Meeting
  - October 10, 2022 Web Meeting
7. Status of Work on Straw Ballot Resolution
8. Discussion/entertain motions.
9. Next Steps
10. New Business

Chair Mike Spurlock issued a call for patents disclosure. No new patent claims were reported. Mike also presented slides on the IEEE Copyright Policy and Individual Participation.

A motion to approve the Agenda was made by Jeremiah Bradshaw and seconded by Trent Williams. The motion passed unanimously. A motion to approve the F2021 and S2022 minutes plus minutes for eight web meetings held since June 2022 was made by Scott Reed and second by Emilio Morales-Cruz. The motion passed unanimously.

The Chair reported on the progress for resolution of straw ballot comments received last Spring. These totaled 541 comments, 30% of which were technical, 63% editorial and 7% general. The Working Group has 4 straw ballot resolution groups working on these and they have been able to resolve or complete 441, which is 77% of the 541 total. Of the remaining 100 comments, 70% are technical, 23% editorial, and 7% general. The Chair explained that the PAR for the Guide expires in December of 2023, and the WG will need most of 2023 to get through the official balloting process. Vice Chair Poorvi Patel discussed a date needed to be established to end the work and the document will need to be circulated before the balloting process. The Chair then made the decision that the cutoff date for resolution of the straw ballot comments is to be December 15, 2022. After that time, the revised draft will be circulated to the WG for review and an electronic ballot will be issued to determine if the WG believes the document is ready for official ballot. In addition, invitations to join the ballot resolution group will be sent out.

Toni Mellin offered comments and suggestions related to the monitoring guide revisions: Table 8, the minimum 25 mm bore for ball or gate valves (clause 5.8.5), environmental operating conditions for monitors (clause 5.8.6), and copyright for figure 28. Since the straw ballot is now closed, it may not be possible to address all of these comments until the draft guide is sent out for official ballot. Toni will submit these comments to the Chair in a follow up email.

A motion to adjourn was made by Rogerio Verdolin and seconded by Bill Whitehead. The meeting ended by 4:00 pm.

## Power Transformer 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	20%
Current Draft Being Worked On:	1.0	Dated:	n/a
PAR Expiration Date:	December 31, 2025		
Meeting Date:	17 October 2022	Time:	4:45pm – 6:00pm
Location:	Charlotte, NC, USA		
Attendance:	Members	25 of 59	
	Guests	79	
	Guests Requesting Membership	To be done with email to chair/secretary	
	Total*	104	

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

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### **Meeting Minutes / Significant Issues / Comments:**

Meeting was called to order at 4:45pm, October 17, 2022.

#### 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. Introductions of the attendees
  - i. Attendance sheets were passed out. Due to time constraints, chair did not have each attendee announce their name/affiliation
  - ii. Secretary asked all who wanted on email distribution for the C57.125 Working Group to send him an email at: adamsewell@ieee.org
- e. Updated membership review and count for quorum
  - i. 59 members were listed and 21 were counted as present by hand count

- ii. Attendance sheets after meeting completed showed 25 members attended.
  - iii. Members are expected to attend and stay in the meeting so business can be conducted.
- f. Approvals needed but not made due to lack of quorum:
  - i. Fall 2021 agenda and minutes
  - ii. Spring 2022 agenda and minutes
  - iii. Fall 2022 agenda
- 2. Old Business
  - a. 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. Expected Date of submission of draft to the IEEE SA for Initial Standards Committee Ballot: May 2024. Projected Completion Date for Submittal to RevCom: Dec 2024
  - b. Review the changes proposed for Section 4.2 Investigation flow chart
    - i. See New Business Task Force formation
  - c. Review the changes proposed for Section 5.3.6.3 Testing under vacuum
    - i. See New Business Task Force formation
  - d. Review the changes proposed for Table-2
    - i. See New Business Task Force formation
- 3. New Business – Formation of Task Forces
  - a. Task forces will be formed to look at specific sections of the standard and work will be done between Fall 2022 and Spring 2023 meetings to have suggested revisions reported at the Spring 2023 meeting. Leaders for each section listed and other volunteers are welcome. Please contact the chair, vice-chair, or secretary if any contact info is needed.
  - b. Section 4.2 Investigation flow chart
    - i. Task Force Leader – Emilio Morales-Cruz
    - ii. Task Force Members
      - 1. Stuart Chambers
      - 2. Ronald Hernandez
  - c. Section 5.3.6.3 Testing under vacuum
    - i. Task Force Leader – Ed teNyenhuis
  - d. Section Table 2 – Suggested checklist of general observations
    - i. Task Force Leader – James Cross
  - e. Section Table 4 – Electrical tests
    - i. Task Force Leader – Hakan Sahin
  - f. Section Table 7 – Field test interpretation
    - i. Task Force Leader – Amitabh Sarkar
    - ii. Task Force Members
      - 1. Weijun Li
      - 2. Akash Joshi
  - g. Section Table 8 – Internal inspection – main tank
    - i. Task Force Leader – Tim Raymond
    - ii. Task Force Members
      - 1. Stuart Chambers
  - h. Section 6.3.3.3 - Troubleshoot a Winding Failure
    - i. Task Force Leader – Hakan Sahin

- i. Section Introduction
    - i. Task Force Leader – Hakan Sahin
- 4. Membership changes
  - a. Officers will look at attendance of members and change membership based on attendance before Spring 2023 meeting.
- 5. Next meeting: March 20 at Spring 2023 Transformer Committee Meeting scheduled for March 19-23, 2023, Milwaukee, WI, USA.
- 6. Close of meeting
  - a. Meeting adjourned at 6:00pm

Submitted by: Hakan Sahin      Date: \_\_\_\_\_

**10/17/2022 Meeting Attendance:**

Last Name	First Name	Company (Affiliation)	Role
Alaor	Scardozzi	Siemens Energy	Guest
Aldenlid	Jennie	Hitachi Energy	Guest
Betancourt	Enrique	Prolec GE	Member
Bhatt	Vivele	Prolec Energy	Guest
Binder	Wallace	WBBinder Consultant	Member
Blackmon	Bo	GPC	Guest
Boettger	William	Boettger Transformer Consulting LLC	Member
Bolar	Sanket	Megger	Member
Bradshaw	Jerimiah	Bureau of Reclamation	Guest
Chambers	Stuart	Powertech Labs	Member
Chu	Donald	Guest	Guest
Cross	James	Kinetrics	Guest
DaSilva	Roberto	Cargill, Inc.	Guest
De Oliveira	Everton	Siemens Energy	Member
Dillon	Nikolaus	Dominion Energy	Guest-RM1
Dix	Larry	Quality Switch, Inc.	Member
Dolloff	Paul	East Kentucky Power	Guest
Draper	Zachary	Delta-X Research	Guest
Dulac	Hakim	Advanced Power Technologies	Guest
Espindola	Marco	Hitachi Energy	Member
Faur	Florin	Prolec GE Waukesha	Guest-RM1
Flores	Hugo	Hitachi Energy	Guest
Foata	Marc	Maschinenfabrik Reinhausen	Guest
Forsyth	Bruce	Bruce Forsyth and Associates PLLC	Member
Frye	Richard	EATON Corporation	Guest
Garcia Wild	Eduardo	Siemens Energy	Member
Glasson	Scott	Siemens Energy	Guest
Guner	Ismail	Hydro-Quebec	Guest
Gustavsson	Niklas	Hitachi Energy	Guest
Gustavsson	Niklas	Hitachi Energy	Guest
Hampton	Kevin	Siemens Energy	Guest



Last Name	First Name	Company (Affiliation)	Role
Hayes	Ramon	Dominion Energy SC	Guest
Hernandez Cano	Sergio	Hammond Power Solutions	Member
Hernandez-Mejia	Jean Carlos	Georgia Tech	Guest
Hernandez	Ronald	Doble Engineering Co.	Member
Hoffman	Saramma	PPL	Guest
Hopkins	Traci	H2Scan Corporation	Guest
Johnson	Christopher	Oncor Electric Delivery	Guest
Johnson	Toby	Hunt Electric	Guest
Joshi	Akash	Black & Vcatch	Guest-RM1
Kazmierczak	Jerzy	Hitachi Energy	Guest
Kerschenbouer	Christoph	Siemens Energy	Guest
Kiparizoski	Zan	Howard Industries	Guest-RM1
Klempner	Duritriy	Southern California Edison	Guest
Lawless	Andrew	Potencia Partners	Guest
Li	Weijun	Braintree Electric Light Dept.	Member
Lopes Mamede	Gabriel	Siemens Energy	Guest
Lowman	Don	Dominion Energy SC	Guest
Mabrey	Stephanie	Weidmann Electrical Technology	Guest-RM2
Machain	Jose Luis	Prolec GE	Guest
Mani	Balakrishman	Virginia Transformer Corp.	Guest
Martinez	Alberto	WEG	Guest
Mayer	Robert	Siemens Energy	Guest
McCullough	Doug	Maxima Hyundai	Guest
Melle	Tom	Highvolt	ViceChair
Mellin	Toni	Vaisala	Guest
Mikulecky	Filip	Siemens Energy	Guest
Montanha	Juliano	Siemens Energy	Guest
Mora	Jose	Globecore	Guest
Morales-Cruz	Emilio	Qualitrol	Guest-RM1
Murray	David	TVA	Guest-RM1
Musgrove	Ryan	Oklahoma Gas & Electric	Member
Mushill	Paul	Ameren	Guest
Naderian	Ali	METSCO Energy Solutions Inc.	Guest
Nambi	Shankar	Bechtel Energy	Guest
Naranyo	Volney	Megger	Guest
Nunez	Arturo	Mistras	Guest-RM1
O'Malley	Anastasia	Consolidated Edison Co. of NY	Member
Orozco	Polo	GE Grid Solutions	Guest
Pellon	Verena	FPL	Guest
Plisic	Goran	Siemens Energy	Guest
Radu	Ion	Hitachi Energy	Guest-RM1
Rathi	Rakesh	Virginia Transformer Corp.	Guest

<b>Last Name</b>	<b>First Name</b>	<b>Company (Affiliation)</b>	<b>Role</b>
Raymond	Timothy	EPRI	Guest-RM1
Rehkopf	Sebastian	Maschinenfabrik Reinhausen	Guest
Richardson	Michael	Ameren	Guest
Rock	Patrick	American Transmission Company	Guest
Rocque	Timothy	Prolec GE Waukesha	Guest
Rodriguez	Leopoldo	Transformer Testing Services LLC	Guest-RM1
Saad	Mickel	Hitachi Energy	Guest
Sahin	Hakan	Virginia/Georgia Transformer	Chair
Sarkar	Amitabh	Virginia Transformer Corp.	Member
Schleismann	Eric	Southern Compnay	Guest
Selvaraj	Pugal	Virginia Transformer Corp.	Member
Sewell	Adam	Quality Switch, Inc.	Secretary
Sinclair	Jonathan	PPL Electric	Guest
Solano	William	Maschinenfabrik Reinhausen	Guest
Spurlock	Mike	Spurlock Engineering Svcs	Guest
Subramany	Shankar	KEMA Netherlands	Guest
Szczechowski	Janusz	Maschinenfabrik Reinhausen	Member
Tanaka	Troy	Burns & McDonnell	Member
teNyenhuis	Ed	Hitachi Energy	Member
Thompson	Ryan	Burns & McDonnell	Guest
Van der Zel	Gordon	EPRI	Guest
Vanderwalt	Alwyn	ECI	Guest
Verdolin	Rogério	Verdolin Solutions Inc.	Member
Vir	Dharam	Prolec GE Waukesha	Guest-RM1
vonGemmingen	Richard	Dominion Energy	Member
Waldrop	Mike	Memphis Light, Gas & Water	Guest
Whitten	Christopher	Hitachi Energy	Guest
Williams	Trenton	Advanced Power Technologies	Guest
Wind	Rene	Siemens Energy	Guest-RM1
Woods	Deanna	Alliant Energy	Guest-RM2
Yun	Joshua	Virginia Transformer Corp.	Guest-RM1

**IEEE PC.57.170 Condition Assessment Guide Working Group Meeting Minutes**

Time, Date and Venue: 08:00-9:30 AM, October 18<sup>th</sup>, 2022 @ Charlotte NC

Total Attendees: 93 Total Members Present: 47 (out of 83) Guests Present: 46

Guest Requesting Membership: 16 56.6% quorum was achieved.

1. The chair outlined the IEEE Patent disclosure policy, and no disclosure was noted.
2. The chair outlined the IEEE Copyright Policy.
3. A membership quorum was polled, and a quorum was established.
4. Adoption of this meeting's agenda: Approved unopposed.
5. Adoption of Spring 2021 Meeting Minutes: Approved unopposed.
6. Adoption of Fall 2021 Meeting Minutes: Approved unopposed.
7. Adoption of Spring 2022 Meeting Agenda: Approved unopposed.
8. A guide draft was circulated to members and guests before this meeting. Task force reports were presented by:
  - 8.1. Luiz Cheim (TF#1 Leader) for Chapters 4 and 5. He mentioned that progress has been made on these chapters and remaining work is scheduled to be finished by the Spring 2023 meeting.
  - 8.2. Saramma Hoffman (TF#2 Leader) for Chapters 6, 7 and 8. Saramma stated their task force work was mostly complete and they plan to have the final draft ready for a WG straw ballot review by 12/31/2022.
  - 8.3. Jonathan Sinclair for (TF#3 Leader) for Chapters 9, 10 and 11. Jonathan reported that their task force had made progress on these chapters, and they plan to finish the remaining sections before the Spring 2023 meeting. He requested help for writing the remaining portions and providing more pictures. Marcos Ferreira and Mark Tostrud volunteered to help.
  - 8.4. Alan Sbravati (TF#4 Leader) for Chapter 12. Alan conveyed that straw ballot comments were received and necessary revisions to the current have been made. He added that the comments were mostly minor, and some were related to Chapters 6, 7 and 8.
9. The chair gave an update on the PAR expiration date of 12/31/2023. Going by the progress of the guide so far, he remarked that a PAR extension may be required until Dec 31, 2025. The chair requested help from the attendees to support writing the remaining sections pertaining to TF # 1,2 and 3.
10. The chair then opened the floor for comments and questions:
  - Poorvi Patel has requested more photos of failed bushings for reference in the guide.
  - Peter Zhao suggested a detailed review of the guide to check if all relevant existing IEEE C57 documents are referenced in the guide.
  - Tim Raymond wanted to know if the guide methodologies are based upon qualitative or quantitative information.
  - Luiz Chem commented that Chapters 4 and 5 mention different methodologies that users of this guide can chose from.
  - Bruce Forsyth remarked that the different methodologies provided can be helpful for users to create their own asset management plan.

- Brian Sparling spoke about papers that have been written about how using different methodologies can result in different conclusions.
- The chair remarked he will request the TF leaders to consider these comments and come up with suitable responses in the next revision of the guide document.

11. The meeting was adjourned at 09:15 am.

Kumar Mani  
Chair

James Cross  
Vice Chair

Akash Joshi  
Secretary

List of Attendees:

Mohammed	Al Yousuf	PSEG	G
Elise	Arnold	SGB-SMIT	G
Kush	Arora	Reinhausen	G
Javier	Arteaga	Hitachi Energy	G
Silles	Bargove	Fiso	G
Barry	Beaster	H-J Family of Companies	M
Enrique	Betancourt	Prolec GE	M
William	Boettger	Boettger Transformer Consulting LLC	M
Sanket	Bolar	Oncor Electric Delivery	G
Jeremiah	Bradshaw	Bureau of Reclamation	M
David	Calitz	Siemens Energy	G
Juan Alfredo	Carrizales	Prolec GE	G
Stuart	Chambers	Power Tech Labs	G
James	Cross	Kinectrics	M
Juan Carlos	Cruz Valdes	Prolec GE	M
Robersto	Da Silva	Cargill, Inc.	G
Scott	Digby	Duke Energy	G
Paul	Dolloff	ekpc	G
Don	Dorris	Nashville Electric Service	G
Zachary	Draper	Delta-X Research Inc.	M
Jessey	Duffy	Nashville Electric Service	G
Hakim	Dulac	Advanced Power Technologies	M
Marco	Espindola	Hitachi Energy	M
Michael	Ferrcirea	BVR	G
Marc	Foata	MR	G
Bruce	Forsyth	Bruce Forsyth and Associates PLLC	M
George	Frimpong	Hitachi Energy	M
Eduardo	Garcia Wild	Siemens Energy	M
Bill	Griesacker	Duquesne Light Co.	M
Ismail	Guner	Hydro-Quebec	M
Niklas	Gustavsson	Hitachi Energy	M

Attila	Gyore	M&I Materials Ltd	M
Kyle	Heiden	EATON Corporation	M
Giovanni	Hernandez	Virginia Transformer Corp.	M
Jean	Hernandez	Georgia tech	G
Saramma	Hoffman	PPL Electric Utilities	M
Ryan	Hogg	Bureau of Reclamation	G
Rezai	Hosseini	Consultant	G
Karl	Jakob	Cargill, Inc.	G
Anirudhdh	Jhaza	Transformer & Rectifier	G
Christopher	Jhonson	Oncor Electric Delivery	G
Toby	Johnson	Hunt Electric	M
Akash	Joshi	Black & Veatch	M
Peter	Kleine	US Army Corps of Engineers	M
Dmitriy	Klempner	Southern California Edison	G
Lance	Lewand	Doble Engineering Co.	G
Weijun	Li	Braintree Electric Light Dept.	M
Mario	Locarno	Doble Engineering Co.	G
Don	Lowman	DESC	G
Stephanie	Mabrey	Alliant Energy	M
Jose	Machain	Prolec GE	G
Kumar	Mani	Duke Energy	M
James	Mcgree	H2Scan	G
Toni	Mellin	Vaisala	G
Filip	Mikulency	Siemens Energy KPY	G
Mike	Miller	Siemens Energy	G
Emilio	Morales-Cruz	Qualitrol Company LLC	M
Martin	Munoz	Orto	G
Ryan	Musgrove	OG&E	G
Paul	Mushill	Ameren	G
Ali	Naderian	METSCO Energy Solutions Inc.	G
Volney	Naranyo	Megger	G
Joe	Nims	Allen & Hoshall, Inc.	M
Arturo	Nunez	Mistras Group, Inc.	G
Tomas	Olsson	Hitachi Energy	G
Poorvi	Patel	Electric Power Research Institute (EPRI)	M
Rakesh	Patel	hitachi Energy	G
Verena	Pellon	fpl	G
Rominic	Pollaro	NASS	G
John	Pruente	prolec energy	M
Rakesh	Rathi	Virginia Transformer	G
Timothy	Raymond	Electric Power Research Institute (EPRI)	M

Scott	Reed	MVA	M
Michael	Richardson	Ameren Corp	G
Tim	Rocque	SPX Transformer Solutions, Inc.	M
Dale	Rogers	Duke Energy	G
Yuri	Rossini	Siemens Energy	G
Mickel	Saad	Hitachi Energy	M
Tommy	Salmon	GE grid solution	G
Amitabh	Sarkar	Virginia Transformer Corp.	M
Alan	Sbravati	Hitachi energy	M
Hemchandra	Shertukde	University of Hartford	M
Jonathan	Sinclair	PPL Electric Utilities	M
Brian	Sparling	Dynamic Ratings, Inc.	G
Brad	Staley	Leeward renewable energy	M
Charles	Sweetser	OMICRON electronics Corp USA	M
Janusz	Szczechowski	Maschinenfabrik Reinhausen	M
Matthew	Sze	Omnicon electronics	G
Troy	Tanaka	Burns & McDonnell	M
Felton	Todd	MVA	G
Rogério	Verdolin	Verdolin Solutions Inc.	M
Dharam	Vir	GE prolec	G
Herman	Vogel	TJH2b Analytical Services	G
Pragnesh	Vyas	Sunbelt-Solomon Solutions	M
Matthew	Webb	GE	G
William	Whitehead	H2scan Corporation	M
Trenton	Williams	Advanced Power Technologies	M
Jeffrey	Wright	Duquesne Light Co.	M
Peter	Zhao	Hydro One	G

## Power Transformer Subcommittee Task Force 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 Expiration Date: NO PAR - std expires 12/31/2025

Meeting Date: 18 October 2022 Time: 8:00am-9:15am

Location: Charlotte, NC, USA

<b>Attendance:</b>	<b>Members</b>	<u>16</u>
	<b>Guests</b>	<u>6</u>
	<b>Guests Requesting Membership</b>	<u>1<sup>st</sup> meeting – all membership requests granted</u>
	<b>Total*</b>	<u>22</u>

\* 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 18, 2022 at SHERATON CHARLOTTE & LE MÉRIDIDIEN CHARLOTTE HOTELS Mecklenburg 3 room.
2. Presentation of Agenda
  - a. No comments on agenda
3. Distribution of attendance sheets
  - a. Since this is the first meeting of this task force, all attendees requesting membership were given membership – 16 attendees were given membership at this meeting.
  - b. Please send an email to [adamsewell@ieee.org](mailto:adamsewell@ieee.org) with the subject: C57.157 EMAIL to be added to the C57.157 TF email list
4. Introductions
  - a. Introductions were made by name and affiliation of all attendees.

5. Chair announcements
  - a. Current guide standard is set to expire December 31, 2025
  - b. This task force is to determine work needed for this guide standard and create a PAR for revision
  - c. Secretary volunteer was requested for this task force
    - i. P. Blaszczyk will be secretary starting for Spring 2023 meeting
6. Future work
  - a. Request was made to share previous presentations that were used to develop this guide standard
    - i. Chair will post previous presentations on IEEE Collabratec and IEEE TC Power Transformer Subcommittee pages
  - b. Members of this task force are tasked to review current guide standard and previous presentations before Spring 2023 meeting and make suggestions as to what recommendations they have for this guide standard.
7. Next meeting: March 21 at Spring 2023 Transformer Committee Meeting scheduled for March 19-23, 2023, Milwaukee, WI, USA.
8. Close of meeting
  - a. ADJOURNED at 8:30am

Submitted by: Adam Sewell      Date: 10/27/2022

#### **Meeting Attendance 10/18/2022:**

<b>Last Name</b>	<b>First Name</b>	<b>Company (Affiliation)</b>	<b>Role</b>
Bhatt	Viveh	Prolec GE	Guest
Blaszczyk	Piotr	Specialty Transformer Components LLC	Secretary
Castellanos	Juan	Prolec GE	Member
Colopy	Craig	Consultant	Guest
Cruz Valdes	Juan Carlos	Prolec GE	Member
Dix	Larry	Quality Switch, Inc.	Member
Dutta Rey	Samragui	Siemens Energy	Member
Elliott	William	Crescent Power Systems	Member
Faur	Florin	Prolec GE Waukesha	Member
Gonzalez	Luis	Conduct Industries	Member
Jhala	Aniruddh	Transformers & Rectifiers (India) Ltd	Member
Kraemer	Axel	Maschinenfabrik Reinhausen	Guest
Lejay	Olivier	Huaming USA Corp.	Member
Matthews	Lee	Howard Industries	Guest
Mendez Zamora	Omar	Prolec GE	Guest
Rehkopf	Sebastian	Maschinenfabrik Reinhausen	Member
Schwartz	Dan	Quality Switch, Inc.	Member
Sewell	Adam	Quality Switch, Inc.	Chair
Sewell	Jeremy	Quality Switch, Inc.	Member
Sewell	Russ	Quality Switch, Inc.	Guest



Solano	William	Maschinenfabrik Reinhausen	Member
Tillery	Timothy	Howard Industries	Member

**PC57.150 – IEEE Guide for Transportation of Transformers and Reactors**  
**Tuesday, October 18, 2022; 9:30 am- 10:45 am**  
**Sheraton/Le Meridien Charlotte, NC USA; Mecklenburg 1,2**  
**Unapproved Minutes of Working Group Meeting**

The meeting was called to order at 9:30 am by Chair Greg Anderson. Vice-Chair Ewald Schweiger and Secretary Marnie Roussell (writer of minutes) were also present.

There was a total of 65 people present, 26 members, and 38 guests. Attendance was taken as paper rosters were passed around since the RFID system was not utilized during this meeting. A quorum was reached. A list of meeting attendees is included at the end of these minutes.

C57.150 is in draft status "Rev D3" and is complete, so new material and new members were not accepted.

**Chairs Remarks**

A call for essential patent claims was made. No patent claims were identified. The IEEE Copyright Policy was also shown.

**Meeting Agenda**

1. Welcome & Call to Order
2. Question, Essential Patent Issues, and IEEE Copyright Policy
3. Determination of Quorum (more than 24 of 48 members is necessary to have a quorum)
4. Old Business, with Approval of Minutes
5. New Business

The Chair reviewed the timeline for the PAR expiring December 2023. The plan is to form the Ballot Pool and initiate SA Ballot by EOY 2022.

Results of the WG "Straw Ballot" in September/October 2022 were reviewed:

- 39 votes cast, 4 abstained,
- 43 of 48 members responded (90%)
- Of the 39 votes cast, 36 approved, 5 approved with comments

**Old Business**

A motion to approve the Spring 2022 minutes was made by Wallace Binder and seconded by Ken Skinger. Motion passed with unanimous approval of the 26 members present.

A motion to approve the Fall 2019 minutes was made by Marcos Ferreira and seconded by Ken Skinger. Motion passed with unanimous approval of the 26 members present.

**New Business**

A motion to move the draft document to SA Ballot was made by Marcos Ferreira and seconded by Wallace Binder. Motion passed with unanimous approval of the 26 members present.

A motion to form a Comment Resolution Group (CRG) was made by Marcos Ferreira and seconded by Krishnamurthy Vijayan. Motion passed with unanimous approval of the 26 members present.

The working group has agreed to authorize the Comment Resolution Group (CRG) to resolve all comments during the SA Ballot process. The Chair offered membership to all volunteers of the CRG who are not currently members. CRG members/participants:

<u>FIRST_NAME</u>	<u>LAST_NAME</u>	<u>COMPANY_NAME</u>	<u>Status</u>
Gregory	Anderson	GW Anderson & Associates, Inc.	Chair
Marcos	Ferreira	Bridge View Resources	Member
Jerzy	Kazmierczak	Hitachi Energy	Guest
Andrew	Lawless	Potencia Partners	Guest
Kraig	Nunn	ShockWatch	Guest
Rakesh	Rathi	Virginia Transformer Corp.	Member
Ewald	Schweiger	Siemens Energy	Vice-Chair
Kenneth	Skinger	Scituate Consulting, Inc.	Member
Alwyn	Van Der Walt	Electrical Consultants, Inc.	Member
Krishnamurthy	Vijayan	PTI Transformers	Member

The meeting was adjourned at 10:10 am with a motion by Peter Kleine and seconded by Rogerio Verdolin. The WG plans to meet at the Spring 2023 Meeting in Milwaukee, Wisconsin.

Greg Anderson  
WG Chair

Ewald Schweiger  
WG Vice Chair

Marnie Roussell  
WG Secretary

List of Meeting Attendees at Fall '22 Meeting, including affiliation & voting member status.

Count	<u>LAST_NAME</u>	<u>FIRST_NAME</u>	<u>COMPANY_NAME</u>	<u>Status</u>
1	Anderson	Gregory	GW Anderson & Associates, Inc.	Chair
2	Bhatt	Vivek	Prolec GE Waukesha	Guest
3	Binder	Wallace	WBBinder Consultant	Member
4	Blackmon	James "Bo"	Georgia Power Co.	Guest
5	Boettger	William	Boettger Transformer Consulting LLC	Member
6	Bradshaw	Jeremiah	Bureau of Reclamation	Member
7	Cai	Jim	JSHP Transformer	Guest
8	Cho	Eun Young	HICO-America	Guest
9	Christodoulou	Larry	Electric Power Systems	Guest
10	Dolloff	Paul	East Kentucky Power	Member
11	Elkins	Dan	TBEA USA	Guest
12	Ferreira	Marcos	Bridge View Resources	Member
13	Garcia Wild	Eduardo	Siemens Energy	Member
14	Garza	Hector	Orto de Mexico	Guest
15	Gaun	Alexander	Coil Innovation GMBH	Guest
16	Gonzalez	Luis	Conduct Industries	Guest
17	Gragert	Jeffrey	Xcel Energy	Guest
18	Gupta	Ravi	Megger	Guest
19	Hampton	Kevin	Siemens Energy	Guest
20	Hayes	Ramon	Dominion Energy	Guest
21	Hayes	Roger	GE Grid Solutions	Guest

Count	LAST_NAME	FIRST_NAME	COMPANY_NAME	Status
22	Hernandez	Javier	Orto de Mexico	Guest
23	Jhala	Anirudhdhsinh	Transformers & Rectifiers (India) Ltd	Member
24	Kazmierczak	Jerzy	Hitachi Energy	Guest
25	Kennedy	Gael	GR Kennedy & Associates LLC	Guest
26	Kerschenbauer	Christoph	Siemens Energy	Guest
27	Kleine	Peter	US Army Corps of Engineers	Member
28	Lambert	Jason	JST Power Equipment	Guest
29	Lawless	Andrew	Potencia Partners	Guest
30	Locarno	Mario	Doble Engineering Co.	Member
31	Lowman	Don	Dominion Energy	Guest
32	Machain	Jose	Prolec GE	Guest
33	Mendez Zamora	Omara	Prolec GE	Guest
34	Munoz Molina	Martin	Orto de Mexico	Guest
35	Murphy	Jerry	Reedy Creek Energy Services	Guest
36	Nambi	Shankar	Bechtel	Member
37	Nims	Joe	Allen & Hoshall, Inc.	Guest
38	Nunn	Kraig	ShockWatch	Guest
39	Orozco	Edward "Polo"	GE Grid Solutions	Guest
40	Rathi	Rakesh	Virginia Transformer Corp.	Member
41	Reeder	Perry	GE	Guest
42	Roussell	Marnie	Entergy	Secretary
43	Sanchez	Albert	Knoxville Utilities Board	Guest
44	Sarkar	Amitabh	Virginia Transformer Corp.	Member
45	Schrammel	Alfons	Siemens Energy	Member
46	Schweiger	Ewald	Siemens Energy	Vice-Chair
47	Sen	Cihangir	Duke Energy	Member
48	Sharma	Devki	Entergy	Guest
49	Shull	Steve	BBC Electrical Services Inc.	Guest
50	Simons	Andre	JFE Shoji Power Canada	Member
51	Skinger	Kenneth	Scituate Consulting, Inc.	Member
52	Snyder	Jason	FirstEnergy Corp.	Guest
53	Tanaka	Troy	Burns & McDonnell	Guest
54	Thompson	Clifton	N. American Substation Services	Guest
55	Tolcachir	Eduardo	Tubos Trans Electric S.A.	Guest
56	Van Der Walt	Alwyn	Electrical Consultants, Inc.	Member
57	Verdolin	Rogério	Verdolin Solutions Inc.	Member
58	Vijayan	Krishnamurthy	PTI Transformers	Member
59	Wallach	David	Duke Energy	Member
60	Watson	Joe	JD Watson and Associates Inc.	Member
61	Webb	Bruce	Knoxville Utilities Board	Member
62	Webb	Matthew	Prolec -GE Waukesha, Inc.	Guest
63	Wind	Rene	Siemens Energy	Guest
64	Zaman	Malia	IEEE SA	Guest
65	Zibert	Kris	Allgeier, Martin and Associates	Member

### PAR Study Group for IEEE Standard C57.17

Charlotte, North Carolina Meeting – October 18, 2022 11:00-12:15 pm EDT

Chair: Dom Corsi

Acting Secretary: Jason Varnell

1. The meeting was called to order at 11:00 AM EDT.
2. There were 35 active participants present.
3. The chair reviewed the history of the standard starting with the first version of the standard from 1965.
4. The chair reviewed the reasons for the PAR study group meeting.
5. The scope from the 2012 revision of C57.17 was shared with the group.
6. The chair shared areas of the 2012 revision that may need updates, which included:
  - a. Editorial Changes
  - b. References to Standards
  - c. Cooling Class Designations
  - d. Figures and Images
  - e. Technical Changes/Updates
    - i. HV Voltage Ratings (Table 3)
    - ii. Subclause 7.1.1 for Tap Changers
    - iii. Temperature Rise Testing
    - iv. Dielectric Testing
    - v. Short Circuit
    - vi. Accessories
7. The PAR study group concluded that there was reasonable interest to form a working group to revise the standard and therefore request a PAR from the Power Transformer Sub-committee.
8. The group discussed changes to the standard's scope. A motion made by Dan Sauer was seconded by Ryan Musgrove to change the scope to the following:

**This standard covers electrical characteristics and mechanical features of liquid-immersed transformers, used for directly supplying electric power to arc-melting furnaces (including rectifiers for arc-melting furnaces).**

**All characteristics and definitions, except as specifically covered in this standard, shall be in accordance with the IEEE Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers (C57.12 Series).**

- a. The motion passed with 5 in favor, 1 against and 6 abstain.
9. The group reviewed the standard's purpose and agreed that no changes from the 2012 revision were necessary. A motion made by Dan Sauer was seconded by Trenton Williams to keep the purpose as the following:

**The purpose is to provide an industry standard on the design and application of power and distribution transformers for the specific application of feeding arc furnaces and related foundry equipment.**

  - a. The motion passed with unanimous consent.
10. The group reviewed the standard's title and agreed no changes from the 2012 revision were necessary. A motion made by Dan Sauer was seconded by Sheldon Kennedy to keep the title as the following:

**IEEE Standard Requirements for Arc Furnace Transformers**

  - a. The motion passed with unanimous consent.
11. The title, scope and purpose will be submitted to Power Transformer sub-committee for PAR approval. The work of the PAR study group has concluded and no further meetings are planned. If the PAR is accepted by the sub-committee then the interested participants from the PAR study group will be added as active participants of the working group.
12. The meeting adjourned at 12:15 EDT.

### Active Participants

<u>Last Name</u>	<u>First Name</u>	<u>Affiliation</u>	
SAUER	DAN	EATON CORP	Active Participant
KENNEDY	SHELDON	NIAGARA TRANSFORMER	Active Participant
VIR	DHARAM	PROLEC-GE	Active Participant
JOSHI	AKASH	B&V	Active Participant
SHERTUKDE	HEM	UHART	Active Participant
MUSGROVE	RYAN	OG&E	Active Participant
WELTON	DREW	INTELLIRENT	Active Participant
SAKAHR	ANIL	VIRIGINA TRANSFORMER	Active Participant
MUNOZ	MARTIN	ORTO DE MEXICO	Active Participant
GARZA	HECTOR	ORTO DE MEXICO	Active Participant
HERNANDEZ	JAVIER	ORTO DE MEXICO	Active Participant
PIONION	OSCAT	OTC SERVICES	Active Participant
CRUZ	JORGE	NIAGARA TRANSFORMER	Active Participant
CARRIZALES	JUAN ALFREDO	PROLEC-GE	Active Participant
BARGONE	GILLES	FISO	Active Participant
BOETTGER	WILLIAM	BOETGER TRANSFOMER CONSULTING LLC	Active Participant
COLOPY	CRAIG	CONSULTANT	Active Participant
KIRCHENMAYER	EGON	SIEMENS ENERGY	Active Participant
HEINZIG	PETER	WEIDMANN	Active Participant
SNYDER	JASON	FIRST ENERGY CORP	Active Participant
SEBASTIAN	REHKOPF	MR	Active Participant
MARKUS	STANK	MR	Active Participant
FANG	ZHU	R.E.UPTGRAFF	Active Participant
BAITUN	YANG	R.E.UPTGRAFF	Active Participant
AMITABH	SANKAR	VIRIGINA TRANSFORMER	Active Participant
JHALA	AMRUDHDHSINH	TRANSFORMER & RECTIFIERS LTD.	Active Participant
ESPINDOLA	MARCO	HITACHI ENERGY	Active Participant
WILLIAMS	TRENTON	ADVANCED POWER TECHNOLOGY	Active Participant
DULAC	HAKIM	ADVANCED POWER TECHNOLOGY	Active Participant
ONAME	AVANOMA	MJC	Active Participant
MAMA	MBOUOMBOUO	HITACHI ENERGY	Active Participant
KOSHEL	ANTON	DELTA STAR INC	Active Participant
KAZMIERCZAK	JERZY	HITACHI ENERGY	Active Participant
VARNELL	JASON	DOBLE ENGINEERING CO.	TF Acting Secretary
CORSI	DOMENICO	DOBLE ENGINEERING CO.	TF Chair

*WG – C57.107*  
*IEEE / PES Transformers Committee*

“Recommended Practice for Developing Design Specific Operational Limits for Transformers Connected to Generators or Power Systems Subject to Significant Short-term Changes in Voltage and/or Frequency”

Tuesday October 18, 2022, 1:45PM – 3:00PM, EDT  
Sheraton/Le Meridian, Charlotte, NC Symphony 4

***UNAPPROVED MINUTES***

**Welcome**

The chair, Joe Watson, opened the meeting at 1:45PM.

**1. Attendance and Attendance for Quorum**

At the time of the meeting there were 20 of 37 members and 31 guests present, allowing for a Quorum.

**2. Approval of Agenda**

The group unanimously approved the agenda sent out to members and guests in advance.

**3. Approval of Minutes of Meeting from Spring 2022 and Fall of 2021**

After a motion by Eduardo Garcia, seconded by Giovanni Hernandez, the group approved the minutes from the previous two meetings

**4. Call for Patents**

The chair presented slide 1-4, dated January 2, 2018, informing the IEEE patent policy and participants duty to inform. There were no issues related to patent assurance brought up by attendees in the meeting.

**5. IEEE Copyright Policy**

The chair presented IEEE-SA Copyright Policy slides 1-2 informing the audience of the policy.

**6. Chair’s Remarks**

The focus of the meeting was resolution of the general and technical comments on the straw ballot for Draft 1 of the document. A summary of the comments was prepared by Ramsis Girgis and presented to the WG. The editorial comments were mostly formatting and template issues and will be incorporated into Draft 2 and will be subject to review at that time.

**7. Areas of Discussion**

There were 4 main areas of discussion on Sections 5 and 6.

1. The first step of the 4-step process for developing the recommended V/Hz curves was revised to recommend a method for determining the hottest metal part rather than just saying to determine which part was the hottest.
2. We discussed the resolution of the curve, or number of points to calculate, and agreed to revise the existing text to clarify that the first few minutes were the critical values for relay considerations and should be calculated more frequently. Ryan Hogg brought up that at his utility, the generator

protection relays respond to the first 6 seconds of overexcitation for their generators. This will be considered in the discussion of the number of data points needed in the first part of the V / Hz curve.

3. The curve should be calculated for a 200 C temperature on the hottest metallic part, consistent with C57.91 (the loading guide) for short time emergency loading. The temperature requirement will be moved to Section 6 which is titled “Recommended short time temperature limits for metallic parts.”
4. We also discussed the need to state that the V/Hz curve is showing the resulting hottest metallic part temperature in the transformer as a result of overexcitation and time and is not indicating that the transformer can be operated at 200C for longer 30 minutes. This would be consistent with C57.91.

#### **8. New Business**

The WG voted to revise (shorten) the title of the document. The existing title, as listed on the PAR, is:

“Recommended Practice for Developing Design Specific Operational Limits for Transformers Connected to Generators or Power Systems Subject to Significant Short-term Changes in Voltage and/or Frequency”

The Chair will request to change the title to:

“Recommended Practice for Developing Short-term Overexcitation V/Hz Curves for Transformers Directly Connected to Generators”.

Motion to approve title change by Ed teNyenhuus, seconded by Bruce Web. Motion passed

#### **9. Meeting Adjournment**

A motion to adjourn the meeting was raised by Eduardo Garcia and seconded by Emilio Morales-Cruz. The meeting adjourned at 3:00 PM.

Respectfully submitted,

Joe Watson – Chair

Ramsis Girgis – Vice Chair

Drew Welton – Secretary

#### **List of attendees**

<b>Name</b>	<b>Affiliation</b>	<b>Status</b>
Joe Watson	JD Watson and Associates	Chair
Ramsis Girgis	Hitachi Energy	Vice chair
Drew Welton	intellirent	Secretary
Kayland Adams	SPX	Member
Mats Bernesjo	Hitachi PowerGrid	Member
Antonio Ceballos	Georgia Transformer	Member
Juan Carlos Cruz-Valdes	Prolec/GE	Member
Eric Davis	Burns & McDonnell	Guest
Huan Dinh	Hitachi Energy	Member
Eduardo Garcia	Siemens Energy	Member
Jeff Gragert	XCEL Energy	Guest
Giovanni Hernandez	Virginia Transformer	Member
Ryan Hogg	Bureau of Reclamation	Member
Anton Koshel	Delta Star	Guest



Balakrishnan Mani	Virginia Transformer	Member
Emilio Morales-Cruz	Qualitrol	Member
David Murry	TVA	Member
Ryan Musgrove	OG&E	Guest
Shankar Nambi	Bechtel	Guest
Sanjay Y. Patel	Royal Smit Transformers	Guest
Ion Radu	Hitachi Energy	Guest
Ed teNyenhuis	Hitachi PowerGrid	Member
Kiran Vedante	Ritz Instrument Transformers	Member
Bruce Webb	KUB	Member
<b>New Attendees</b>		
Eunyoung Cho	Hico	Guest
Everton De Oliveira	Siemens Energy	Guest
Jose Gamboa	?	Guest
Jose Antonio Gontalet-Ceballos	Georgia Transformer	Guest
Oscar Pinon	OTC Services	Guest
Kevin Hampton	Siemens Energy	Guest
Juan Alfredo Carrezales	Prolec GE	Guest
Omar Mendez Zamora	Prolec GE	Guest
Filip Mikulecky	Siemens Energy	Guest
Gionetta Morrow	Crane	Guest
Andy Speegle	Entergy	Member
Gael Kennedy	GR Kennedy and Associates	Guest
Dinesh Sankarakurup	Duke Energy	Guest
Yan Nyanteh	HICO	Guest
Hugo Murillo	?	Guest
Alberto Martinez	WEG	Guest
Val Tatu	Powersmiths	Guest
Christoph	Kersohendauer	Guest
Brad Staley	Leeward Energy	Guest
Rogelio Martinez	Georgia Transformer	Guest
Scott Thomas	Hitachi	Guest
Rene Wind	Siemens	Guest
Tim Rocque	Prolec GE	Guest
Cole Vandreeel	American Transmission Co.	Guest

Task Force for Installation of Power Transformers C57.93

Tuesday, October 18, 2022

3:15 – 4:30 PM

Sheraton/Le Meridien

Charlotte, NC

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 second meeting for this Task Force. The PAR for this Task Force expires 12/31/29

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

There were 59 guests in attendance. 11 members present and 13 were needed for a quorum. 3 guests whom attended the spring and fall meetings asked for membership and membership was granted. It was suggested to reach out to the current members and review if they would like removed as members.

Unofficial agenda was presented, but because we could not achieve a quorum they were not approved.

Unofficial Agenda

1. Call to Order
2. Chair Remarks
  - a. IEEE-SA Policies
  - b. Establishment of Quorum
3. Agenda Review and Approval
4. Approval of minutes from Fall 2022
5. Review of the current title, Scope, and Purpose
6. Title
7. Scope
8. Purpose
9. Next Meeting
10. Adjournment

The chair reviewed the following areas:

Title

Scope statement

Lack of document purpose

The chair provided feedback from first meeting

Brian Sparling presented an overview of a CIGRE's TB 445 document which covers maintenance on transformers.

There was a discussion after the presentation regarding exercising DETCs. The majority of the room do not perform this type of maintenance although the manufacturers suggest it.

Alwyn presented different topics and ideas regarding LTC maintenance

A more formal presentation was suggested for the spring 2023 meeting

#### Open floor discussions

It was suggested this task force review the scope to remove all associated maintenance information and focus C57.93 on the installation only. There was support for both to develop the maintenance section in this guide and to create a separate guide. This will be determined and voted on by the task force when we develop the new Title, Scope and Purpose. Additional suggestion was to bring to the subcommittee the idea to start a new guide dedicated to maintenance. There was a lot of reference documents mentioned regarding maintenance from other working groups such as C57.152, C57.139, C57.170, C57.137

It was suggested to bring to the subcommittee the idea of another guide for LTC maintenance alone.

The meeting adjourned at 4:23 p.m.

Jennie	Aldenlid	Hitachi Energy	Guest
Greg	Anderson	GWAnderson & Assoc. Inc	Member
Vivek	Bhatt	Prolec GE	Guest
Bo	Blackmon	GPC	Guest
Sankey	Bolar	Oncor	Guest
Ray	Chapa	WEG Transformers	Guest
James	Cross	Kinectrics AES	Guest
Juan Carlos	Cruz Valdes	Prolec GE	Guest
Don	Dorris	Nashville Electric Service	Guest
Jesse	Duffy	Nashville Electric Service	Guest
Marc	Foata	Reinhausen	Guest
Lorne	Gara	Shermco	Guest (Membership Granted F22)
Scott	Glasson	Siemens-Energy	Guest
Scott	Gray	Siemens-Energy	Guest
Ravi	Gupta	Megger	Guest
Niklas	Gustavsson	Hitachi Energy	Guest (Membership Granted F22)
Kevin	Hampton	Siemens-Energy	Guest
Ramon	Hayes	Dominion Energy	Guest
Roger	Hayes	GE Grid Solutions	Guest
Jean Carlos	Hernandez	GT - NEETRAC	Guest
Ronald	Hernandez	Doble	Guest
Ryan	Hogg	Bureau of Reclamation	Guest
Guner	Ismail	Hydro Quebec	Guest
Christopher	Johnson	Oncor	Guest
Toby	Johnson	Hunt Electric	Guest
Jerzy	Kazmierczak	Hitachi Energy	Member
Axel	Kraemer	Reinhausen	Guest

Weijun	Li	Braintree Electric Light Dept	Guest
Mario	Locarno	Doble	Guest
Doug	McCullough	Maxima-Hyundai	Member
Mike	Miller	Siemens-Energy	Guest
David	Murray	TVA	Member
Ryan	Musgrove	OG&E	Member
Paul	Mushill	Ameren	Guest
Volney	Naranjo	Megger	Guest
Lange	Nathan	Siemens-Energy	Guest
Joe	Nims	Allen & Hoshall	Guest
Dominic	Pollaro	NASS	Guest
Adnan	Rashid	Measurement Canada	Guest
Rakesh	Rathi	Virginia Transformer	Guest
Scott	Reed	MVA	Member
Sebastian	Rehkopf	Reinhausen	Guest
Michael	Richardson	Ameren	Guest
Patrick	Rock	American Transmission Co	Guest
Tim	Rocque	Prolec GE Waukesha	Guest
Marnie	Roussell	Entergy	Guest
Mickel	Saad	Hitachi Energy	Member
Albert	Sanchez	Knoxville Utilities Board	Guest
Anil	Sawant	Virginia Transformer	Guest
Alaor	Scardazzi	Siemens-Energy	Guest
Alfons	Schrammel	Siemens-Energy	Guest
Ewald	Schweiger	Siemens Energy	Member
Pugal	Selvaraj	Virginia Transformer	Guest
Steve	Shull	BBC Electgrical Service Inc.	Guest
Jason	Snyder	First Energy	Guest
William	Solano	Reinhausen	Guest
Brian	Sparling	Dynamic Ratings	Guest (Membership Granted F22)
Tommy	Spitzer	City Transformer Service Co.	Guest
Kyle	Stechschulte	AEP	Member
Troy	Tanaka	Burns & McDonnell	Guest
Ed	teNyenhuis	Hitachi Energy	Guest
Ryan	Thompson	Burns & McDonnell	Guest
Eduardo	Tolcachir	TTE	Member
Alwyn	VanderWalt	ECI	Member
Mike	Waldrop	Memphis Light, Gas, & Water	Guest
Bruce	Webb	knoxville Untilites Board	Guest
Malia	Zaman	IEEE SA	Guest

**Working Group for Installation & Maintenance of Power Transformers C57.93a**

**8:30 am – 11:00 am**

**Chongqing, China**

**Wednesday October 18, 2022**

Chairman Wei Yao

Vice Chairman Feipeng Wang

Secretary Hanbo Zheng

The meeting was called to order at 8:30 am by Chair Wei Yao.

Wei Yao	Malia Zaman
Xiaohui Yang	Jinhua Han
Tao Yang	Tao Zhao
Ji Wang	Yunpeng Liu
Tian Wang	Jie Liu
DongWang	Huaqiang Li
Honglu Guang	Guochao Qian
Wei Wang	Qingdan Huang
Hua Yu	Yihua Qian
Mengzhao Zhu	Qing Wang
Wei Sun	Zhiqiang Huang
Suning Liang	Xiaoming Yue
Shaigen Han	Bo Gao
Shengwei Cai	Xianqing Guo
Qian Hong	Xingyu Chen
Jian Li	Xuan Xuan
Feipeng Wang	Ewald Schweiger
Zhengyong Huang	Li Li
Jian Hao	Ruifeng Wang
Hanbo Zheng	Songjiang Li
Xianwei Wu	Ting Hu

**Agenda**

1. Call to order and introduction
2. Approval of the Agenda
3. Call for patents
4. Review the minutes of the second meeting
5. Technical Discussion
6. Task Assignment
7. Summary
8. Adjournment

The third meeting of IEEE PC57.93a held on 18th, Oct, 2022 is very successful. It includes 8 procedures, as

shown in Fig. 6, and 25 professors or experts have attended the online meeting. Some reasonable advices are given after the oral presentation of technical investigations, mainly about the optimization of data sampling and figures. The members of the IEEE PC57.93a will take these suggestions into concern and improve the results to meet the requirements as soon as possible. The summary of the 3rd meeting of IEEE PC57.93a.

In the last few months, we have done some experiments to investigate the cold start method of natural ester fluid of transformer at cold temperatures. We choose 3 temperatures, which are  $-15^{\circ}\text{C}$ ,  $-25^{\circ}\text{C}$ , and  $-35^{\circ}\text{C}$ , as 3 cases to study. The current source is connected to the low voltage winding in each experiment. The figures of the results are shown in Fig.1. The red line represents the no load condition or the load rate, and the black line is the temperature of the low voltage winding. It can be seen that the temperature of LV winding increases with the increased load time of the transformer due to the thermal effect of the electric current. The same temperature results can also be seen in the HV winding in Fig. 2.

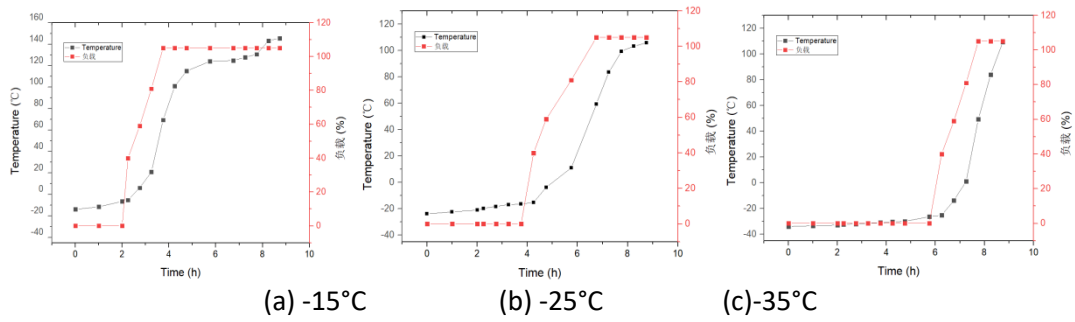


Fig.1 The temperature of the LV winding

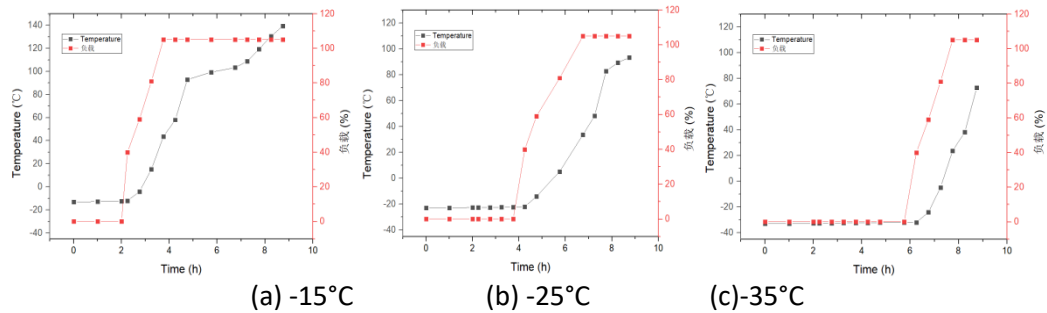


Fig.2 The temperature of the HV winding

In order to study the trend of natural ester fluid temperature inside the oil tank, there special measurement points in each case are selected. The temperatures at bottom surface, top surface and oil outlet are concerned. The natural ester fluid temperatures of the three locations under  $-15^{\circ}\text{C}$ ,  $-25^{\circ}\text{C}$ ,  $-35^{\circ}\text{C}$  are shown in Fig.3, Fig. 4 and Fig. 5, respectively.

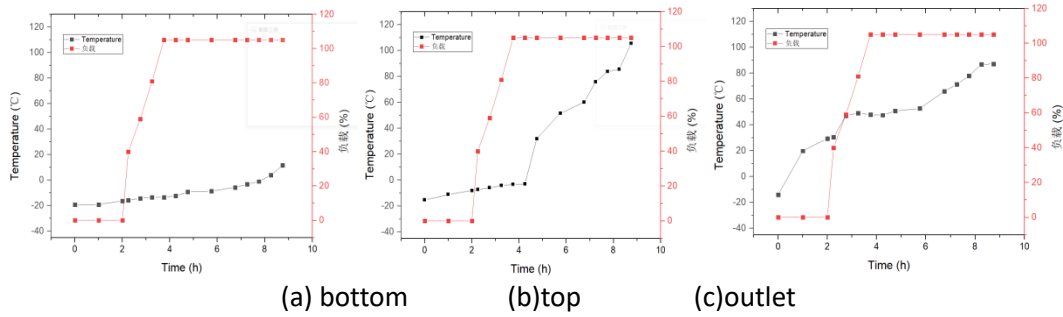


Fig.3 The temperatures at three special locations under -15°C

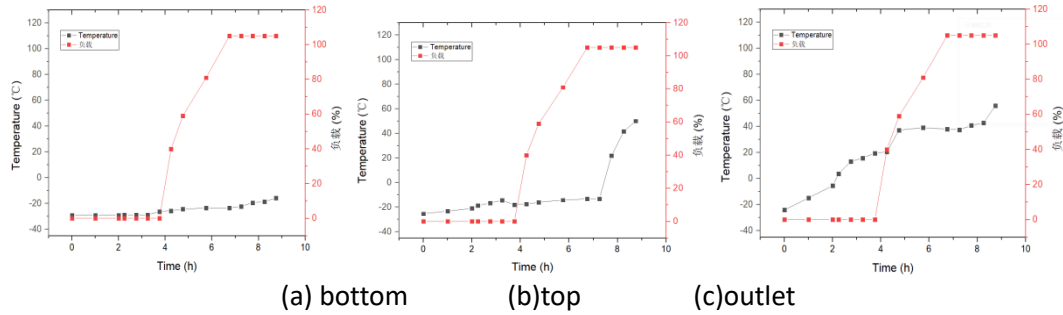


Fig.4 The temperatures at three special locations under -25°C

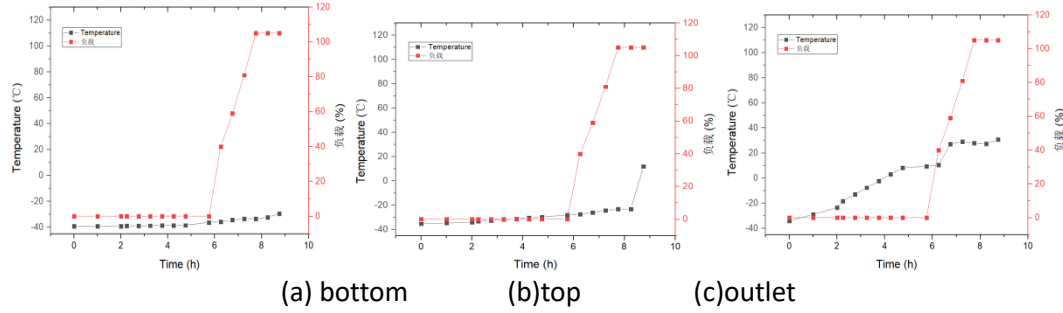


Fig.5 The temperatures at three special locations under -35°C

From Fig. 3 to Fig. 5, it is concluded that the temperature at bottom and top of oil tank increases slowly under colder temperature, and more no load time is needed. In addition, the temperature of natural ester fluid increases obviously after the increasing no load time.

Summary: The cold start of natural ester insulating oil transformer can determine the empty load time according to the temperature. For example, with -15°C as the limit, every drop of 10°C, increase the no-load time for 2 hours, The load is increased by 40% per hour.

## Unapproved Meeting Minutes

### TF C57.153 IEEE Guide for Paralleling Regulating Transformers

Minutes from Fall 2022 Charlotte Meeting

#### Officers

Chair – Mark Tostrud

Vice Chair – Open

Secretary – Open

#### 1. Meeting Date and Time: 10/18/2022 at 4:45-6:00pm EST

Meeting started at 4:45pm

#### 2. Call for essential patents

The patent slides were shared on screen and a request for any known patents that were essential to the work of the Working Group was made. No response.

#### 3. Reviewed IEEE-SA Copyright Policy

The copyright policy slides were shared on screen and a request for any known copyright issues was made. No Response.

#### 4. Chairs remarks

The task force is being organized to review the existing guide to determine what, if any changes need to be made. Existing guide was approved in 2015 so it will expire in 2025.

The title, scope, and purpose of the existing guide were reviewed. Present scope is limited to paralleling of transformers, it does not address interaction with distributed generation or volt/var optimization schemes. The opinion of the attendees was that this should remain outside the scope of the guide.

#### 5. Attendance

There were 20 attendees in the meeting

- XX attendees requested membership – (needs verification)

Quorum check

- This was the 1<sup>st</sup> meeting

#### 6. Approval of the agenda and minutes

- No objection to unanimous approval of the agenda
- This was the first meeting so there were no meeting minutes to approve

#### 7. Call was made to fill the open officer positions

No volunteers were received during the meeting



## 8. Old Business

No old business – this was the 1<sup>st</sup> meeting

## 9. New Business

Motion was passed to request permission from the Power Transformers Subcommittee to perform a straw ballot of the existing guide to identify changes required

- Motion – Dan Sauer
- 2nd – Markus Stank
- Unanimous approval

## 10. The meeting adjourned at 5:20pm

- Motion – Dan Sauer
- 2nd – Markus Stank
- Unanimous approval

## 11. Minutes

The minutes were recorded by Mark Tostrud – Chair

TF C57.153 – Participation List - Fall 2022 Meeting - Charlotte			
Role	First Name	Last Name	Company
	Markus	Stank	Reinhausen
	Luis	Gonzalez	Conduct
	Vivek	Bhatt	Prolec Energy
	Luis	Machain	Prolec GE
	Juan Alfredo	Carrizales	Prolec GE
	Ramon	Hayes	Dominion Energy
	Oliverio	Sanchez	Pacific Gas & Electric
	Ryan	Musgrove	Oklahoma Gas & Electric
	Edmondo	Arevalo	Bonneville Power Association
	Yaw	Nyan Teh	
	Doug	McCullough	Maxima Sales
	Dan	Sauer	Cooper Power
	Craig	Colopy	Retired
	Mark	Tostrud	Dynamic Ratings, Inc.
	Orlando	Givaldo	H-J Companies
	Patrick	Rock	American Transmission Company
	Polo	Orozco	General Electric
	Everton	De Oliveira	Siemens Energy
	Nikolaus	Dillon	Dominion Energy
	Ajith	Varghese	Prolec Energy