

IEEE PES TRANSFORMERS COMMITTEE
DIELECTRIC TEST SUBCOMMITTEE

Meeting held on at the room, Sheraton/Le Meridien Charlotte, Charlotte, NC

Dielectric Tests Subcommittee		
Chair: Poorvi Patel	Vice-Chair: Thang Hochanh	Secretary: Diego Robalino
Room: Symphony 4	Date: Wednesday, October 19th, 2022	Time: 11:00 am to 12:15 pm
Total DTSC Members: 163	Members present at the meeting: 103	Attendance according AMS: 199
Guests present: 96	Membership requested: 6	Membership accepted: 2

○ **Chair's Remarks**

The Chair welcomed members and guests to the Fall 2022 in-person meeting.

During this meeting no AMS system was available. Secretary distributed 4 sets of printed roasters for attendees to sign in attendance.

The chair requested to review the information provided in the rosters. Not yet able to use an automatic system, we continue printing the attendance lists. It is requested to update the e-mail address as many have changed but not updated.

Agenda was presented before any count was made of members attending this meeting. It was emphasized the need of having the minutes of each TF and WG submitted to the DTSC Secretary no later than 15 (fifteen) days after the meeting. The DTSC must submit its report by December 1st, the latest and therefore it is expected to receive the reports from TF and WG in the next two weeks following this meeting.

Requested to keep the PAR deadlines. Suggested to keep virtual meeting in-between in-person meetings. Any material used during the TF or WG meetings should be posted in our website and submitted together with the report.

- ADCOM highlights
 - There will be a mandatory training for existing officers. Deadline for completion is December 31st. **The training takes between 6 – 8 hours to complete and ~~Malia will send reminder emails will be sent to~~ those who have not yet completed it. In 2023 if assigned a Chair, vicechair or secretary position, you will be required to take this training within 90 days.**

- AMS system not yet ready. PLEASE KEEP your paper rosters up to date and available. Make sure e-mails are updated for easy communication.

DTSC Chair presented to the group the IEEE SA Copyright and Patent Policies with links to the IEEE SA website.

Status of Active Standards			
Project	Title	Valid until	PAR Status
C57.127	Guide for the Detection of Acoustic Emissions from Partial Discharges	2028	WG inactive – possible next year create TF for review
C57.160	Guide for the Elec. Measurement of PD in HV bushings and Instrument Transformers	2020 _ In comment resolution since 2019. One year extension given.	PAR 2022
C57.113	Recommended practice for PD Measurement Power	Document in good shape and ready for ballot	PAR 2023
C57.98	Guide for transformer Impulse Tests	2021 – PAR extension requested for 2 years	PAR 2022
C57.138	Recommended Practice for Routine Impulse Tests for Distribution Transformers	2026	PAR approved to create a WG
C57.161	Guide for DFR Measurements	2028	WG Inactive
C57.168	Low Frequency Test Guide	Work on - going	PAR 2023
C57.12.200	Bushing Dielectric Frequency Response Guide (ENTITY WG)	Work completed and addressed to IEEE SA	PAR 2022

Chair reminded the upcoming NesCom/RevCom meeting dates and deadlines for 2022 and 2023 standard submissions.

Standard Board Meeting	Submittal Deadlines
January 30 th , 2023	December 20 th , 2022
Oct 25 th , 2023	September, 2023

Chair requested Secretary to verify attendance.

Diego Robalino informed that the meeting is recorded for the only purpose of minutes reporting. Formally asked for unanimous agreement of the audience to have the session recorded. All in favor none against.

- Seven (7) members lost membership due to lack of attendance to DSTC meetings
- During the last meeting 11 guests requested membership and 9 were approved:

Name	Last Name
Kayland	Adams
Juan Alfredo	Carrizales
Juan Carlos	Cruz Valdes
Sami	Debass
Shamaun	Hakim
Ashmita	Niroula
Scott	Reed
Dinesh	Sankarakurup
Markus	Soeller

- New members were requested to be recognized and the SC welcomed them all.
- summarized attendance and minded the requirements to become a DTSC Member:

Two attendance requirements:

- Attend 2 out of last three DTSC meetings
- Attend 3 out of last five DTSC meetings

New requests for membership

1. Contact chair or secretary directly
 2. Request will be approved if you meet attendance requirements
- **Quorum, Approval of Minutes and Agenda**

To verify quorum the list of 167 members **was displayed**. Secretary informed that DTSC has a total of 167 active members listed. Required number of members to reach quorum is 84.

Headcount performed. During the meeting, 95 members attended and therefore **quorum was achieved**.

Attendance Summary

	Roster
Total Attendees	199
Total # Of Members	167
Members Present	103
Quorum Present	YES (56.8%)

Chair request a motion to approve the Agenda for F22 meeting. Motion by Dan Sauer and David Wallach seconded it. Agenda was approved by unanimous decision.

Chair request a motion to approve minutes from S22 and F21. Motion by James McBride and Dan Sauer seconded it. Minutes from S22 and F21 were approved by unanimous decision.

- **SC Discussions and Motion passed.**

Old Business:

1. No old business

- **Taskforce and Working Group Reports**

Reports are in the order **presented** during the meeting

TF: Core Ground and Winding Insulation Resistance

Chair: Diego Robalino

Secretary: Aniruddha Narawane

Minutes of 2nd Meeting held on Monday 10/17/2022 from 4:45 PM to 6:00 PM

Meeting Location: Symphony 4, Sheraton/Le Meridien Charlotte, Charlotte, NC

Attendance 17 members out of 30 on the list

Agenda

1. Call for Patents
2. Copyright Policy

3. Suggested Agenda: Agenda was approved by Dan Sauer and Poorvi Patel seconded it.

4. Attendees Introduction:

1. Total Attendees after roster's review: 72

2. Members attending: 17 out of 32

3. Guests: 55

4. Guests Requesting Membership: 16

5. TF Scope of Work

1. Section 1 - Test Performance – Consistency and best practices.

1. Steve Antosz asked what document this was going into. Generate a document internally and see where it fits. C57.12.90 has a section that deals with this. Limited to factory testing.
2. Don Dorris made comments that the testing in the field is not consistent and data in the field can not be correlated back to the factory. This information can be used in the field to standardize the measurements.

Topics	Volunteers
Connections - Guard vs. no-guard	Diego Robalino
Voltages – suggest voltages	

2. Section 2 - Factor affecting IR measurements

Topics	Volunteers
Temperature	Joe Tedesco
Shielding	Samragui Dutta Roy
Bushings	Eduardo Tolcachir
Core ground resistance	Don Dorris
Core design	Pragnesh Vyas
Mineral oil vs Natural Esters vs Dry Type	

3. Section 3 - Magnitude and interpretation

1. Dan Sauer made a comment that data reported in GOhms
2. Dan Sauer commented on the need for a range of values

Topics	Volunteers
M / G / T (Ohm)	Dan Sauer
Typical values for different class transformers	Tauhid Ansari
	Krish Vijayan

4. Section 4 - Core Ground Resistance

Topics	Volunteers
Measurement	Krish Vijayan
Interpretation	Parminder Panesar
	Joe Tedesco

5. Section 5 - Frame (core clamp) to ground: Depending on the design – to include

1. A comment was made that the core clamp is sitting on the tank. The scope needs to specify when the core ground is measured when the core is isolated from the tank.

Topics	Volunteers
TBD	Krish Vijayan

6. **TF Purpose**

1. The development of best practices to perform Insulation Resistance Testing on Power and Distribution Transformers including factors affecting measurements and reference values for comparison and/or interpretation of results.

7. **Presentation of IR testing on a 2-winding transformer**

1. Diego Robalino gave a presentation showing the differences in using an insulation resistance instrument with or without a guard.
2. The pdf of the presentation is attached to this report.

8. **Meeting Adjourn @ 5:36pm**

LIST OF ATTENDEES

Last Name	First Name	Email	F22-Charlotte	Member(M)/Guest (G)
Adams	Kayland	Kayland.Adams@prolec.energy	1	M
Ansari	Tauhid	tauhid.ansari@hitachienergy.com	1	M
Arevalo	Edmundo	erarevalo@bpa.gov	1	G
Avanoma	Onome	o.avanoma@outlook.com	1	M
Betancourt	Edwin	edwin.betancourt@siemens-energy.com	1	G
Blaydon	Daniel	dblaidon@ieee.org	1	G
Boettger	William	WEBOETTGER@aol.com	1	M
Britton	Jeffrey	jbritton@doble.com	1	MR
Brzoznowski	Steven	stbrzoznowski@bpa.gov	1	G
Calitz	David	david.calitz@siemens-energy.com	1	M
Carrizales	Alfredo	juanalfredo.carrizales@prolecge.com	1	G
Castellanos	Juan	juangonzalo.castellanos@prolecge.com	1	M
Cruz	Jorge	jcruz@niagaratransformer.com	1	
Debass	Samson	sdebass@epri.com	1	MR
Dinh	Huan	huan.m.dinh@hitachienergy.com	1	G
Dorris	Don	ddorris@nespower.com	1	G
Duffy	Jesse	jduffy@nespower.com	1	G
Dutta Rey	Samragui	samragui.dutta_roy@siemens-energy.com	1	MR
Elliott	William	will.elliott@alumni.lsu.edu	1	G
Ferreira	Marcos	mferreira@bridgeviewllc.com	1	MR
Franchitti	Anthony	anthony.franchitti@exeloncorp.com	1	G
Frazier	Raymond	rfrazier@ameren.com	1	G
Gonzalez	Luis	lgonzalez@canduct.com	1	G
Gossett	Shawn	sgossett@ameren.com	1	G
Gyore	Attila	attilagore@mimaterials.com	1	MR
Hayes	Roger	roger.hayes1@ge.com	1	G
Heiden	Kyle	kylejheiden@eaton.com	1	G
Hernandez	Giovanni	dhernandez@vatransformer.com	1	G
Hernandez Cano	Sergio	shernan@	1	
Herron	John	herronjph@aol.com	1	MR
John	John	john_john@vatransformer.com	1	G
Kirchenmaya	Egon	egon.kirchenmaya@siemens-energy.com	1	G

Koshel	Anton	akoshel@deltastar.com	1	G
Leal	Fernando	ferleal@gmail.com	1	MR
Mahajan	Kushal	kushalmahajan@eaton.com	1	M
Mani	Balkrishnan	Balkrishnan_Mani@vatransformer.com	1	M
Matthews	Lee	lmattthews@ieee.org	1	G
Miller	Mike	michael.miller@siemens-energy.com	1	G
Neild	Kris	kris.neild@megger.com	1	G
Nims	Joe	jnims@allenhoshall.com	1	G
Panesar	Parminder	parminder_panesar@vatransformer.com	1	M
Parrales	Herman	herman.parrales@prolec.energy	1	G
Patel	Poorvi	ppatel@epri.com	1	M
Patel	Sanjay	spatel@smitusa.com	1	G
Patel	Rakesh	rakesh.patel@hitachienergy.com	1	MR
Reed	Scott	sreed@mvdiagnostics.com	1	G
Rezai	Hossein	rezaih@msn.com	1	G
Robalino	Diego	diego_robalino@ieee.org	1	Chair
Rodriguez	Leopoldo	apolo15@live.com	1	MR
Sankarakurup	Dinesh	dinesh.sankarakurup@duke-energy.com	1	G
Scott	Dennis	scott.dennis@hitachienergy.com	1	MR
Sen	Cihangir	cihangir.sen@duke-energy.com	1	M
Sharma	Devki	devkisharma@ieee.org	1	G
Singh	Kushal	kushal.singh@coned.com	1	MR
Slattery	Chris	cslattery@firstenergycorp.com	1	G
Sohail	Muhammad	muhammad.sohail@trench-group.com	1	G
Som	Sanjib	ssom@patransformer.com	1	M
Sweetser	Charles		1	G
Tedesco	Joseph	joseph.l.tedesco@hitachienergy.com	1	G
Tendulkar	Vijay	vijaytendulkar@eaton.com	1	MR
Tim	Morris	tmorris@waltonemc.com	1	G
Tolcachir	Eduardo	ETOLCACHIR@TTE.COM.AR	1	M
Van Dreel	Cole	cvandreel@atclk.com	1	G
Varghese	Ajith	Ajith.Varghese@prolec.energy	1	M
Vernell	Jason	jvarnell@doble.com	1	G
Vijayan	Krish	kvijayan@ptitransformer.com	1	MR
Vyas	Pragnesh	pragnesh.vyas@sunbeltsolomon.com	1	G
Wallach	David	david.wallach@duke-energy.com	1	M
Wazir	Areeb	areebawazir@eaton.com	1	M

Weiseusee	Matt	matthew.weiseusee@pacificorp.com	1	MR
Yang	Baitun	yangbaitun@hotmail.com	1	MR
Zhang	Shibao	shibao.zhang@ieee.org	1	MR
			72	

TASK FORCE FOR REVISION TO LOW FREQUENCY DIELECTRIC TESTS

▪ **Charlotte, North Carolina Meeting – October 18, 2022 1:45-3:30pm EDT**

Chair: Ajith Varghese

Vice Chair: Markus Schiessl

Secretary: Jason Varnell

1. The meeting was called to order at 1:45 PM.
2. 59 individuals were in attendance. A quorum was achieved with 23 of 42 total members present. 11 individuals requested membership; however, only 5 were given member status based on attendance and participation.
3. A motion was made by Kris Zibert (Allgeier, Martin, and Associates) and seconded by Dan Sauer (Eaton Corporation) to approve the minutes from the Spring 2022. There were no objections to unanimous approval of the Spring 2022 meeting minutes. A motion was made by Dan Sauer (Eaton Corporation) and seconded by Don Ayers (Ayers Transformer Consulting) to approve the agenda for the working group meeting. There were no objections to unanimous approval of the agenda.
4. Task Force on PD Testing of Class 1 Power Transformers – Don Ayers
 1. The task force met on Monday, October 17, 2022. There was no quorum. They had previously sent out a survey with wording that was originally from 2015 revision. The initial text for the survey was scrapped and a reworded survey was resent to be more consistent with 2021 revisions. There were 24 comments on the new text and some were significant. Some of the comments focused on emphasizing that the class I pd test was optional and not a routine test. Intent is next meeting is to have agreed upon wording and tables. Will have web meetings prior next WG meeting. See TF minutes in Appendix A.
 2. Factory PD Limits and Procedure Survey Results
 3. The proposed changes from the Study Group on the factory PD procedure and limits were surveyed. The survey obtained 84 total votes, with an 88.1% approval rating. The comments received from the survey were reviewed. The recommendation from the study group was the following:
 1. Add a requirement for the measurement of PD at the Maximum System Voltage
 2. PD limit 100 pC at Maximum System Voltage
 3. Change the interval between measurements from 5 minutes to now 3 minutes during 1-hour period
 4. The task force reviewed the recommendation and after much discussion agreed to carry the recommendation to the dielectric test subcommittee for additional survey. The following motion was made by Vijayan Krishnamurthy (PTI Transformers) and seconded by Steve Antosz (Steve Antosz and Associates):
 1. The Motion is to survey the text of proposed changes to Class II PD Procedure per word file attached (and Summarized below) within DTSC

PD measurement at Maximum System Voltage

PD limit 100 pC at Maximum System Voltage

Measure PD every 3 minutes during 1-hour period

There were no objections to unanimous approval of the motion.

5. Old business

6. PD in Bushings During Factory Testing

1. There was discussion on prior survey results from within the TF on proposed changes to allow venting of bushings during factory acceptance testing, which is a common practice by most transformer manufacturers but objected by many users.
2. The survey had an 86% approval rate, but had significant negative comments that were mainly from users, who are concerned with field performance and others who would like the cause of bushing PD addressed.
3. The chair agreed to setup another task force with members from the Bushing SC and RLFT to address some of the concerns and negative votes from survey. The following people volunteered: Shibao Zhang (PCORE) , Daniel Blaydon (BG&E), David Wallach (Duke Energy), Scott Digby (Duke Energy), Jon Cihangir (Duke Energy), Eric Schleismann (Southern Company), Kurt Kaineder (Siemens Energy), Matthew Weisensee (PacifiCorp), Egon Kirchenmayer (Siemens Energy), Durand Stacy (Hitachi Energy), Onome Avanoma (MJ Consulting) and Elise Arnold (SGB SMIT).

7. New business

8. There was a request to add the nominal system voltage of 1100 kV and associated values to Table 4. After discussion, It was agreed that it can wait until there is demand for these transformers built according to the IEEE Standards.

9. Unresolved comments from the SA Ballot of C57.12.90 were reviewed.

1. Two comments related to Annex D were briefly mentioned but deferred to C57.168 since Annex D will move there.
- 2.
3. Another comment was related to the RIV limits but it was decided that the task force would not revise the RIV limits since the practice is defined in an informative annex.
- 4.
5. Jason Varnell (Doble Engineering) began to introduce the comment regarding the definition of overvoltage factor and its use in the procedure. This item will be presented as old business in the Spring 2023 meeting in Milwaukee.

10. The meeting was adjourned at 3:30 p.m.. The next meeting will be in Milwaukee, WI at the Spring 2023 Transformer Committee Meeting.

Attendance

Role	First Name	Last Name	Company
Member	Stephen	Antosz	Stephen Antosz & Associates, Inc
Member	Elise	Arnold	SGB
Member	Javier	Arteaga	Hitachi ABB Power Grids
Guest	Onome	Avanoma	MJ Consulting
Member	Donald	Ayers	Ayers Transformer Consulting
Member	Christopher	Baumgartner	We Energies
Guest	Duvier	Bedoya	Hitachi ABB Power Grids
Member	Daniel	Blaydon	Baltimore Gas & Electric
Member	William	Boettger	Boettger Transformer Consulting LLC
Guest	Steven	Brzoznowski	Bonneville Power Administration
Member	David	Calitz	Siemens Energy
Guest	Scott	Digby	Duke Energy
Member	Hugo	Flores	Hitachi ABB Power Grids
Guest	Rich	Frye	Eaton
Member	Shawn	Gossett	Ameren
Member	Bill	Griesacker	Duquesne Light Co.
Guest	Ravi	Gupta	Megger
Guest	Peter	Heinzig	Weidmann Electrical Technology
Guest	Jean Carlos	Hernandez	GT NEETRAC
Guest	Rodrigo	Hernandez	Arteche
Member	Sergio	Hernandez Cano	Hammond Power Solutions
Guest	Gary	Hoffman	Advanced Power Technologies
Guest	Vladimir	Khalin	KV Consulting
Guest	Peter	Kleine	US Army Corps of Engineers
Member	Vijayan	Krishnamurthy	PTI Transformers

Member	Mark	Lachman	Doble Engineering Co.
Member	Fernando	Leal	Prolec GE
Guest	Jose	Machain	Prolec GE
Guest	Mama	Mbouonbollo	Hitachi Energy
Guest	Mike	Miller	Siemens Energy
Guest	Paul	Mushill	Ameren
Guest	Kristopher	Neild	Megger
Guest	Herman	Parrales	Prolec GE Waukesha
Member	Poorvi	Patel	Electric Power Research Institute (EPRI)
Member	Harry	Pepe	Phenix Technologies, Inc.
Guest	Ulf	Radbrandt	Hitachi ABB Power Grids
Guest	Leopoldo	Rodriguez	Transformer Testing Services LLC
Guest	Dale	Rogers	Duke Energy
Member	Hakan	Sahin	Virginia and Georgia Transformers
Member	Daniel	Sauer	EATON Corporation
Vice-Chair	Markus	Schiessl	SGB
Guest	Eric	Schleismann	Southern Company Services
Guest	Cihangir	Sen	Duke Energy
Guest	Abdal Magrid	Shaikh	Delta Star Inc.
Guest	Hemchandra	Shertukde	University of Hartford
Guest	H. Jin	Sim	Jin Sim & Associates, PC
Guest	Thomas	Sizemore	ABB Inc.
Member	Christopher	Slattery	FirstEnergy Corp.
Guest	Jason	Snyder	FirstEnergy Corp.
Member	Sanjib	Som	Pennsylvania Transformer
Member	Kyle	Stechschulte	American Electric Power

Member	Janusz	Szczechowski	Maschinenfabrik Reinhausen
Chair	Ajith	Varghese	SPX Transformer Solutions, Inc.
Secretary	Jason	Varnell	Doble Engineering Co.
Member	Pragnesh	Vyas	Sunbelt-Solomon Solutions
Guest	Alan	Washburn	Burns & McDonnell
Guest	Eric	Weatherbee	PCORE Electric
Guest	Matthew	Weisensee	PacifiCorp
Guest	Jeffrey	Wright	Duquesne Light Co.

TASK FORCE FOR REVISION TO IMPULSE TESTS

- **Charlotte, North Carolina Meeting – October 18, 2022 8:00-9:15pm EDT**

Chair: Pierre Riffon

Secretary: Dan Sauer

Pierre Riffon – TF Chair – Announced to step down from his Chair position of this Task Force

As agreed in our last TF "Revision to Impulse Tests" meeting held on October 18, 2022 in Charlotte NC, this revised proposal has been approved unanimously. The initial proposal has also been approved by 98% of the peoples who responded to a previous survey made within the TF roster. The negative received from the survey has been fully resolved.

In addition, the TF agreed upon to survey the revised proposal within the Dielectric Tests SubCommittee. A motion to survey the proposal within the Dielectric Test SubCommittee has been approved during the Dielectric Test SubCommittee meeting held on October 19, 2022 (Charlotte NC).

The basis of this proposal is to have impulse type test, at least equally or more stringent than routine tests and not the other way around as actually stated for distribution transformers in the current edition of IEEE C57.12.90.

Actual wording:

10.3.2.2 Windings for series or multiple connections

When either connection is 25 kV nominal system voltage or above, the windings shall be tested on both series and multiple connections. The test voltage for the two conditions shall correspond to the BIL of the winding for that connection. For nominal system voltages of 15 kV and below, only the series connections shall be tested, unless tests on both connections are specified.

10.3.2.3 Windings for delta or wye connections

When either connection is 25 kV nominal system voltage or above, the three-phase transformer shall be tested on both delta and wye connections. The test voltage for each connection shall correspond to the BIL of the winding for that connection. For nominal system voltages of 15 kV and below, only the wye connection shall be tested, unless tests on both connections are specified.

10.4.4 Windings for series or multiple connections

For high-voltage windings with series or multiple connections, the routine impulse test shall be conducted on each connection at its assigned BIL.

10.4.5 Windings for delta or wye connections

For high-voltage windings with delta or wye connections, the routine impulse test shall be conducted on each connection at its assigned BIL.

Proposed revised wording:

10.3.2.2 Windings for series or multiple connections

The windings shall be tested on both series and multiple connections. The test voltage for the two conditions shall correspond to the BIL of the winding for that connection.

10.3.2.3 Windings for delta or wye connections

The three-phase transformer shall be tested on both delta and wye connections. The test voltage for each connection shall correspond to the BIL of the winding for that connection.

10.4.4 Windings for series or multiple connections

For high-voltage windings with series or multiple connections above 15 kV, the routine impulse test shall be conducted on each connection at its assigned BIL. For nominal system voltages of 15 kV and below, only the series connections shall be tested, unless tests on all connections are specified.

10.4.5 Windings for delta or wye connections

For high-voltage windings of three-phase transformers with delta or wye connection above 15 kV, the routine impulse test shall be conducted on each connection at its assigned BIL. For nominal system voltages of 15 kV and below, only the wye connection shall be tested, unless tests on all connections are specified.

First Name	Last Name	Company
Kayland	Adams	SPX Transformer Solutions, Inc.
Stephen	Antosz	Stephen Antosz & Associates, Inc
Onome	Avanoma	MJ Consulting
Donald	Ayers	Ayers Transformer Consulting
Christopher	Baumgartner	We Energies
Duvier	Bedoya	Hitachi Energy
Eolwin	Betancourt	Siemens Energy
Alain	Bolliger	HV TECHNOLOGIES, Inc.
Jeffrey	Britton	Phenix Technologies, Inc.
Steven	Brzoznowski	Bonneville Power Administration
Mateja	Bubnjar Kucko	Siemens Energy
David	Caverly	Trench Limited
Jorge	Cruz	PTI Transformers
Richard	Cryer	Digital Grid
Eric	Davis	Burns & McDonnell
Everton	De Oliveira	Siemens Energy
Scott	Dennis	Hitachi Energy
Reto	Fausch	RF Solutions
Hugo	Flores	Hitachi Energy
Joe	Foldi	Foldi & Associates, Inc.
Anthony	Franchitti	PECO Energy Company
Raymond	Frasier	Ameren
Richard	Frye	Eaton
Eduardo	Garcia Wild	Siemens Energy
Jose Antonio	Gonzalez Ceballos	Georgia Transformer
Shawn	Gossett	Ameren
Jeffrey	Gragert	Xcel Energy
Kevin	Hampton	Siemens Energy
Peter	Heinzig	
Sergio	Hernandez Cano	Hammond Power Solutions
Thang	Hochanh	Surplec Inc.
Philip	Hopkinson	HVOLT Inc.
Cole	Jan Dreel	ATC
John	John	Virginia Transformer Corp.
Stephen	Jordan	Tennessee Valley Authority
Sheldon	Kennedy	Niagara Transformers
Cristoph	Kerschbaeur	Siemens Energy
Zan	Kiparisoski	Howard Industries
Mark	Lachman	Doble Engineering Co.
Fernando	Leal	Prolec GE
Moonhee	Lee	Hammond Power Solutions

Gabriel	Lopes Mamede	Siemens Energy
Mbouombouo	Mama	Hitachi Energy
Balakrishnan	Mani	Virginia Transformer
Rogelio	Martinez	Georgia Transformers
James	McBride	JMX Services, Inc.
Juliano	Montanha	Siemens Energy
Curtis	Moore	Digital Grid
David	Murray	Tennessee Valley Authority
Parminder	Panesar	Virginia Transformer
Herman	Parrales	GE Prolec
George	Partyka	PTI Transformers
Sanjay	Patel	Smit Transformer
Harry	Pepe	Phenix Technologies, Inc.
Sylvain	Plante	Hydro-Quebec
Goran	Plisic	Siemens Energy
Klaus	Pointner	Trench Austria GmbH
Ion	Radu	Hitachi Energy
Leslie	Recksiedler	Manitoba Hydro
Pierre	Riffon	Pierre Riffon Consultant Inc.
Leopoldo	Rodriguez	Transformer Testing Services LLC
Hakan	Sahin	Virginia/Georgia Transformer
Daniel	Sauer	EATON Corporation
Eric	Schleisman	Southern Company Services
Cihangir	Sen	Duke Energy
Mike	Shannon	RSA Magnet Wire
Ebrahim	Shtegh	
Jin	Sim	Jin Sim & Associates
Kushal	Singh	ComEd
Christopher	Slattery	FirstEnergy Corp.
Steven	Snyder	Hitachi Energy
Sanjib	Som	Pennsylvania Transformer
Mike	Spurlock	Spurlock Engineering Services, LLC
Kyle	Stechschulte	American Electric Power
Hampton	Steele	Tennessee Valley Authority
Andrew	Steineman	Delta Star Inc.
Shankar	Subramany	KEMA
Scott	Thomas	Hitachi Energy
Eduarda	Tolcachir	TTE
Ajith	Varghese	SPX Transformer Solutions, Inc.
Jason	Varnell	Doble Engineering Co.
Krishnamurthy	Vijayan	PTI Transformers
Nick	Walder	Eaton Corp.
Hugh	Waldrop	Memphis Light, Gas & Water

David	Wallach	Duke Energy
Joe	Watson	Joe Watson & Associates
Matthew	Weisensee	PacifiCorp
Rene	Wind	Siemens Energy
Baitun	Yang	R.E. Uptegraff
Shibao	Zhang	PCORE Electric
Fang	Zhu	R.E Liptegraff
Kris	Zibert	Allgeier, Martin and Associates
Waldemar	Ziomek	PTI Transformers

- **TF Transient failure mitigation (WG PC57.142) (Jim McBride)**

**WG to Investigate the Interaction between Substation Transients
And Transformers in HV and EHV Applications and Revision of C57.142**

Charlotte, NC

Tuesday, October 18, 2022

1:45 PM – 3:00 PM Eastern Time Zone – USA Symphony 6,7

Chairman – Jim McBride

Vice Chair – Xose Lopez-Fernandez Secretary – Tom Melle

1. Meeting called to order at 1:45 PM Eastern Daylight Time.
2. Welcome and Chair's Remarks
3. 73 Attendees were present (28 of 46 Members were present and 45 Guests)
Quorum was achieved.
- 3) IEEE Patent Policy Slides and Copyrights slides (NO essential patent claims or copyright issues)
- 4) Approval of Agenda (motion to approve by Tom Melle / 2nd by Steve Snyder)
Minutes from Spring 2022 (motion to approve by Dave Caverly / 2nd by Jeff Briton)
- 5) C57.142 SA Ballot and Comment Resolution – Jim McBride
305 comments received. 107 editorial changes (required) and 109 editorial (not required).
67 Technical required. 22 Technical (not required).

The Chair asked the group for a motion to form a Comment Resolution Group (CRG) and for the CRG to act on behalf of the Working Group without further consultation, provided all CRG members are in agreement with any actions/resolutions. Motion passed with no objection (motion by Marnie Roussel / 2nd by Phil Hopkinson)

The ballot resolution group volunteers are:

1. WG Officers (Jim McBride, Xose Lopez, Tom Melle, Dave Caverly)
2. Klaus Pointner (volunteered to assist with figures)
3. Phil Hopkinson
4. Curtis Frazier
5. Akash Joshi
6. Weijun Li
7. Amitabh Sarkar
8. Dharam Vir

- 6) Switchgear Liaison Update (Dave Caverly)
No new business from the Switchgear group. The Spring Switchgear Committee meeting is being held in parallel in Burlington, VT. . Dave Caverly will check with Switchgear Taskforce for any interested parties to join the CRG.
- 7) Mitigation Methods Task Force Update – Jim McBride / Phil Hopkinson
- 8) There was no New Business
- 9) Next Meeting (Spring 2023 – Milwaukee, WI)
- 10) Adjournment (motion by Phil Hopkinson / 2nd by Dave Caverly)

1. Following the meeting, there was a Special Presentation on the effects of High Frequency Transients on CTs – Dr. Zoltan Roman (GE Grid Solutions)

Meeting Attendance

Role	Last Name	First Name	Company
Chair	McBride	James	JMX High Voltage
Secretary	Melle	Thomas	HIGHVOLT
Member	Betancourt	Enrique	Prolec GE
Member	Boettger	William	Boettger Transformer Consulting LLC
Member	Britton	Jeffrey	Phenix Technologies, Inc.
Member	Caverly	David	Trench Limited
Member	Del Rio	J. Arturo	Siemens Energy
Member	Heiden	Kyle	EATON Corporation
Member	Hopkinson	Philip	HVOLT Inc.
Member	Iman	Mohammad	MGM Transformer Company
Member	John	John	Virginia Transformer Corp.
Member	Joshi	Akash	Black & Veatch

Member	Kirchenmayer	Egon	Siemens Energy
Member	Lee	Moonhee	Hammond Power Solutions
Member	Li	Weijun	Braintree Electric Light Dept.
Member	Lovins	Colby	Federal Pacific
Member	Rezaei-Zare	Afshin	York University
Member	Riffon	Pierre	Pierre Riffon Consultant Inc.
Member	Roussell	Marnie	Entergy
Member	Sarkar	Amitabh	Virginia Transformer Corp.
Member	Sizemore	Thomas	ABB Inc.
Member	Snyder	Steven	Hitachi Energy
Member	Spurlock	Mike	Spurlock Engineering Services, LLC
Member	Subramany	Shankar	KEMA Labs
Member	Verdolin	Rogério	Verdolin Solutions Inc.
Member	Vir	Dharam	Prolec-GE Waukesha
Member	Yang	Baitun	R.E. Uptegraff
Member	Ziomek	Waldemar	PTI Transformers
Guest	Areuglo	Edmund	BPA
Guest	Bubnjar Kucko	Mateja	Siemens Energy, KPT
Guest	Craven	Michael	Qualus Corporation
Guest	Cruz	Jorge	Niagara Transformer
Guest	Debass	Samson	EPRI
Guest	Dillon	Nikolaus	Dominion Energy
Guest	Espindola	Marco	Hitachi Energy
Guest	Frazier	Raymond	Ameren
Guest	Gamboa	Jose	H-J Family of Companies
Guest	Gaziloda	Dora	KONCAR - Instrument Transformers
Guest	Hayes	Ramon	Dominion Energy South Carolina
Guest	Hoffman	Saramma	PPL Electric Utilities
Guest	Kennedy	Sheldon	Niagara Transformer

Guest	Klempner	Dmitriy	Southern California Edison
Guest	Konfa	Nan	KONCAR - Instrument Transformers
Guest	Locarno	Mario	Doble Engineering Co.
Guest	Lowman	Don	Dominion Energy South Carolina
Guest	Mai	Tim-Felix	Siemens Energy
Guest	Meyers	Aaron	EATON Corporation
Guest	Montanha	Juliano	Siemens Energy
Guest	Morris	Tim	Walton EMC
Guest	Narango	Volney	Megger
Guest	Oliveira	Jonas	Hitachi Energy
Guest	Plante	Sylvain	Hydro-Quebec
Guest	Plisic	Goran	Siemens Energy
Guest	Ploetner	Christoph	t.b.a.
Guest	Posadas	Daniel	Prolec SA de CV
Guest	Recksiedler	Leslie	Manitoba Hydro
Guest	Roman	Zoltan	GE Grid Solutions
Guest	Rottenbacher	Andre	Ritz Instrument Transformers
Guest	Saraf	Manish	Hammond Power Solutions
Guest	Shariei	Masoud	Siemens Gamesa Renewable Energy
Guest	Sonnenberg	Brian	Instrument Transformers, LLC
Guest	Steele	Hampton	Tennessee Valley Authority
Guest	Steineman	Andrew	Delta Star Inc.
Guest	Tedesco	Joseph	Hitachi Energy
Guest	Tendulkar	Vijay	EATON Corporation
Guest	Trifunoski	Risto	Trench Group
Guest	Villagran	Deniss	GE Grid Solutions
Guest	Wagner	Dieter	Hydro One
Guest	Walder	Nicholas	EATON Corporation
Guest	Wimberly	Barrett	GE Grid Solutions

Guest	Zaman	Malia	IEEE
Guest	Zhang	Shibao	PCORE Electric
Guest	Zhu	Fang	R.E. Uptegraff

- **WG – Guide for Dielectric frequency Response on Bushings**
- Poorvi Patel reported work completed.
- Congratulations to the Entity group and special recognition to the support received from Malia Zaman

• **TF – C57.138 – Recommended Practice for Routine Impulse Tests**

Chair:	<u>Hakan Sahin</u>	Vice-Chair	<u>N/A</u>
Secretary	<u>David Wallace</u>	Percent Complete	<u>N/A</u>
Current Draft Being Worked On:	<u>Draft not started</u>	Dated:	<u>n/a</u>
PAR Expiration Date:	<u>Dec. 2026</u>		
Meeting Date:	<u>18 October 2022</u>	Time:	<u>3:15pm EST</u>
Location:	<u>Charlotte, NC, USA</u>		
Attendance:	Members		<u>10</u>
	Guests		<u>27</u>
	Guests Requesting Membership		<u>18</u>
	Total*		<u>37</u>
* Attendance list for this meeting is shown at end of meeting minutes			

Meeting Minutes / Significant Issues / Comments:

Meeting was called to order at 3:15pm EST, October 18, 2022.

1. Administrative
 1. IEEE Patent Policy and Call for Patents
 1. No comments from group.
 2. IEEE SA Copyright Policy
 1. No comments from group.
 3. Review of agenda
 1. No comments from group.
 4. Introductions of the attendees
 1. Attendance sheets were passed out.
 5. Updated membership review and count for quorum

1. 37 people were in attendance with 10 members present. Quorum was met as this was the first official WG meeting
 2. 18 attendees requested membership.
6. Approval of Agenda
 1. Anonymously approved with no objections.
7. Approval of minutes
 1. Anonymously approved with no objections.
2. New Business
3. Discussed the changes to the Scope from the last meeting with no comments from the WG.
4. Questioned if dry type would be included. The answer was no.
5. Changes to the purpose from the last meeting was shown and discussed with no comments made.
6. Asked for volunteers to work on sections between the meetings. No one volunteered.
7. Phil Hopkinson said the mission should be to try and make the routine test at sufficient voltages to be more stringent than what it would see in service. He discussed the history of problems experienced with AEP and how this TF could address this.
8. Discussion was held about clause 4: one reduced/one full or Full/Full, should we make it only one of the series? Multiple people discussed the pros and cons with each of the series. Both suppliers and end users commented in the discussion. The end resolution was to leave it as written.
9. Discussion was held on clause 5. It was decided to leave it as is.
10. Discussion on 6.1.2 paragraph 2: no changes were needed.
11. Discussion on 6.1.3: Effects of impulse generator loading. Jim McBride questioned the inductance (Lg) shown in the circuit. The WG suggested adding a note that the LG in the circuit diagram is an inherent value. Possibly add a note about what the effect of (Cpl) in the circuit.
12. Jim McBride agreed to look at the circuit diagram and provide insight into any changes or clarifications that may need to be made.
13. Discussion on Figure 2: possibly revise the impulse portion of the circuit based on Jim's finding. Reto Fausch suggested to take out "resistive divider" designation in the circuit and only state "divider".
14. Discussion on 6.2.1: Modify the circuit diagram based on Jim's findings.
15. Hakan proposes reaching out to individuals to work on sections between Fall and Spring meeting.
16. Dan Sauer motioned adjourn, Florian Costa seconded the motion.
17. Next meeting: TBD at Spring 2023 Transformer Committee Meeting scheduled for March 19-23, 2023 in Milwaukee, WI, USA.
18. Close of meeting
 1. Meeting adjourned at 4:30pm EST

Submitted by: Hakan Sahin

Date: 11/6/2022

Meeting Attendance:

Last Name	First Name	Company	Checkbox to request membership
Alonso	Mario	Georgia Transformers	
Avanoma	Onoma	MJC	X
Binder	Wallace	Consultant	
Bolliger	Alain	HV Technologies	
Carr	Deniss	GE	
Costa	Florian	Corimpex	X
CruzValdes	Juan Carlos	Prolec GE	
Davis	Eric	Burns and McDonald	
Diaz	Cesar	Eaton	
Dolloff	Paul	EKPC	
Door	Jeffrey	H-J	X
Elliott	William	Prolec GE	
Fausch	Reto	RF Solutions	
Flores	Hugo	Hitachi	
Frye	Rich	Eaton	
Frye	Richard	Eaton	
Garcia	Eduardo	Siemens Energy	X
Givaldo	Orlando	HJ Family	X
Hernandez	Giovannie	Virginia Transformers	
Hochanh	Thang	PowerTech	
Hopkinson	Phil	Hvolt	X

Jordan	Steve	TVA	
Lachman	Mark	Doble	
McBride	Jim	JMXHV	X
Morris	Tim	Walton EMC	
Murray	David	TVA	
Orozco	Polo	GE Grid Solutions	X
Parrales	Herman	Prolec GE	X
Patel	Poorvi	EPRI	
Plante	Sylvain	Hydro-Quebec	X
Posadas	Daniel	CELECO	X
Prince	Jarrold	ERMCO	
Sahin	Hakan	Virginia and Georgia Transformer	
Salinas	Fernando	Power Partners	X
Sauer	Dan	Eaton	X
Shalabi	Jaber	Vantran	
Slattery	Chris	First Energy	X
Snyder	Steve	Hitachi Energy	
Traut	Alan	Howard	X
Walker	David	MGM Transformers	X
Wallace	David	Mississippi State University	
Wimbery	Barret	GE	
Winter	Alexandar	Highvolt	
Yun	Joshua	Virgina Transformer Corp	X
Zhang	Shibao	Pcore	X

- **WG – Low Frequency Test Guide PC57.168**

Unapproved Meeting Minutes

Charlotte, NC. USA | October 18th, 2022 | 9:30 – 10:45 AM CDT

Chair: Dan Sauer
Vice Chair: -
Secretary: Sergio Hernandez

Meeting Attendance

The working group met at 9:36am. There were 36 attendees and 9/25 members present. Quorum was not achieved.

Attendance

	Roster
Total Attendees	36
Total # Of Members	25
Members Present	9
Quorum Present	36%

Discussions

1. Chair noted over the last summer asked for a PAR extension until the end of 2023, request which was approved.
2. The participants introduced themselves.
3. No essential patent claims noted.
4. The IEEE copyright policy was shown; no objections were noted.
5. Quorum was verified. No quorum achieved.
6. Chair noted Spring 2021 minutes were approved via e/vote.
7. Chair noted Fall 2021 minutes were approved via e/vote.
8. Chair noted to create a ballot resolution group was approved.
9. Chair noted the request to go to sponsor ballot was approved by 17 of 25 members of the WG (68%)
10. Chair noted that all the comments received in the request to proceed to sponsored ballot from the WG and from the Di-Test Subcommittee were addressed and the updated working draft has been submitted to MEC review prior to going to formal ballot.
11. Chair noted that to form the ballot pool was approved.

12. Chair noted that once MEC comes back with the document it can be forwarded to a formal ballot.
13. Looked for volunteers to form the ballot resolution group.
Volunteers are:
 1. Ajith Varghese
 2. Jeff Briton
 3. Drew Welton
 4. Kyle Stechschulte
 5. Dan Sauer
 6. Sergio Hernandez

Old Business

1. No old business.

New Business

2. No new business.

No quorum to adjourn the meeting.

Sergio Hernandez / Dan Sauer

Attendee List:

First Name	Last Name	Email	Company
William	Boettger	weboettger@aol.com	Boettger Transformer Consulting LLC
Dominique	Bolliger, Ph.D.	d.bolliger@hvtechnologies.com	HV TECHNOLOGIES, Inc.
David	Calitz	david.calitz@siemens-energy.com	Siemens Energy
Juan Alfredo	Carrizales	juanalfredo.carrizales@prolecge.com	Prolec GE
Lorne	Gara	lgara@telus.net	Shermco
Orlando	Giraldo	orlandog@h-j.com	The HJ Family of Companies
Bill	Griesacker	bgriesacker@verizon.net	Duquesne Light Co.
Roger	Hayes	roger.hayes1@ge.com	GE grid solutions
Jean Carlos	Hernandez		Georgia Tech NEETRAC
Sergio	Hernandez Cano	shernan@hammondpowersolutions.com	Hammond Power Solutions
Phil	Hopkinson	phopkinson@ieee.org	HVOLT Inc.
Moonhee	Lee	lee.moonhee@gmail.com	Hammond Power Solutions
Mama	Mbouombouo	mama.mbouombouo@hitachienergy.com	Hitachi Energy
Jim	McBride	jim@jmxhv.com	JMX High voltage
Mike	Miller	michaelmiller@siemens-energy.com	Siemens Energy
Rakesh	Patel	rakesh.patel@hitachienergy.com	Hitachi Energy
Ion	Radu	ion.c.radu@hitachienergy.com	Hitachi Energy
Tim	Rocque	tim.rocque@spx.com	SPX Transformer Solutions, Inc.
Mickel	Saad	mickel.saad@hitachienergy.com	Hitachi Energy
Manish	Saraf	sarafmk@gmail.com	Hammond Power Solutions
Amitabh	Sarkar	amitabh_sarkar@vatransformer.com	Virginia Transformer Corp.
Dan	Sauer	dmsauer@mtu.edu	EATON Corporation
Jeff	Schneider	jvbslm@gmail.com	Power Partners
Aron	Sexton	aron.sexton@kinectrics.com	Kinectrics
Mike	Shannon	mshannon@reawire.com	REA Magnetic wire
Janusz	Szczechowski	j.szczechowski@reinhausen.com	Maschinenfabrik Reinhausen
Val	Tatu		Powersmiths
Vijay	Tendulkar	vijaytendulkar@eaton.com	Eaton
Tim	Tillery	ttillery@howard-ind.com	Howard Industries
Alan	Traut		Howard Industries
Ajit	Varghese	ajith.varghese@spx.com	SPX Transformer Solutions, Inc.
Krishnamurthy	Vijayan	kvijayan@ptitransformers.com	PTI Canada
Alan	Washburn	awashburn@burnsmcd.com	Burns & McDonnell
Drew	Welton	dwelton88@live.com	Intellirent

Shibao	Zhang	shibao.zhang@ieee.org	PCORE Electric
Waldemar	Ziomek	wziomek@ptitransformers.com	PTI Transformers

- **WG – Partial Discharge Test – C57.113 (A. Naderian)**

Unapproved Meeting Minutes

Charlotte, Monday Oct 17, 2022

Chair: Ali Naderian
Vice Chair/Secretary: Janusz Szczechowski

Meeting Attendance

The working group met on Monday Oct 17th at 01:45 pm. There were 56 attendees, and 9 of 16 members were present. Quorum was achieved.

Discussions

- Meeting started with introduction of meetings participants with name and affiliation.
- Check of the quorum was done. Quorum was reached. The agenda of Fall 2022 and Past minutes of Fall 2021 and Spring 2022 meetings were approved.
- The essential patent slides were shown, and no patent claims were noted.
- The copyright policy and important links to additional document were shown.
- The chair mentioned the vacant position for working group secretary and asked for volunteers.
- New draft of the standard D4. Dated September 2022 was circulated to members and an email vote was conducted in Sep 24 to October 10, 2022 for balloting approval. Out of 16 members, 12 members voted. All voted members voted positive to start the balloting process.
- Based on the WG approval, it was proposed to seek the Subcommittee approval to start the formal ballot process.
- **The motion was seconded by Sanjib Som and approved by the DTSC members by unanimous decision.**

List of Attendees:

First name	Last Name	First name	Last Name
James	Blackmon, Jr.	Ravi	Gupta
Stephen	Jordan	Cole	Vandreeel
Jeffrey	Britton	Chonepa	Jaroslav
Hemchandra	Shertukde	Lorne	Gara
Charles	Sweetser	Jason	Varnell
Don	Dorris	Raymond	Frazier
Shibao	Zhang	Fernando	Duarte
Zan	Kiparizoski	Yaw	Nyanteh
Tauhid Haque	Ansari	Onome	Avanoma
Baitun	Yang	Fabiua	Cirino
Harry	Pepe	Will	Knapek
Leopoldo	Rodriguez	Christopher	Whitten
David	Murray	Tolcachie	Eduardo
Anthony	Franchitti	Hakan	Sahan
Dominique	Bolliger, Ph.D.	Hossein	Rezai
Peter	Kleine	Richard	Frye
Akash	Joshi	Alvin	Kore
Duvier	Bedoya	Philip	Miller
Shawn	Gossett	Jesse	Duffy
Saramma	Hoffman	Amitabb	Sarkar
Donald	Ayer	Matthew	Sze
Rakesh	Patel	Abdulmajid	Shaikh
Tani	Mellin	Matthew	Weisensee
Kris	Neild	Jean Carlos	Hernandez Mejia
Hampton	Steele	Kushal	Singh
Mike	Waldrop	Herman	Parrules
Kayland	Adams	Ali	Naderian
Janusz	Szczechowski	Poorvi	Patel

- WG C57.160 PD in Bushings/PTs/CTs (T. Hochang)

Unapproved Meeting Minutes

MEETING | October 17, 2022 | 4:45pm - 6:00pm EST

Chair: Thang Hochanh

Vice Chair: Reto Fausch

Secretary: vacant

Meeting Attendance

The working group met at 3:45pm EST

There were 40 attendees 33 Guest 5 of the guests requested membership and 7 of 20 members present.

Quorum was NOT achieved to conduct official business.

Discussions

- No essential patent claims or copyright violations noted.
- The Minutes from Spring 2022 meeting could not be approved. (no quorum)
- The WG asked for a last extension of the PAR (2023).
- The actual revised document before circulation is cleaned and in conformity with all the *technical comments* after ballots.
- IEEE rules asked that all comments, should get the same explanation as the technical comments.
- To solve the time constraint and the high number of editorial comments, the chair requested volunteers and many members responded positively.
- The following Volunteers were assigned to review the comments.

Volunteers for review	
Sylvain	Plante
Zoltan	Roman
Matthew	Sze
Eric	Weatherbee
Barrett	Wimberly

- The WG adjourned the meeting without a motion.

Adjournment

The meeting was adjourned at 5:45pm EST without a motion.

Reto Fausch

Total attendance: 40

Guests: 33

Members attending Fall 2022	
Reto	Fausch
Thang	Hochanh
Vladimir	Khalin
Zoltan	Roman
Steve	Snyder
Eric	Weatherbee
Shibao	Zhang

Members	20
Memb. Present	7
Quorum	35.0%

Requested Membership	
Dominique	Bolliger
Jonas	Oliveira
Daniel	Posadas
Fabian	Stacy
Barrett	Wimberly

Membership Req. 5

Attendance Fall 2022	
Mubarak	Abbas
Alex	Ayala
Jeff	Benach
Dominique	Bolliger
Steven	Brzoznowski
Deniss	Carr
Posadas	Daniel
Ege	Davasli
Jeffrey	Door
Rodrigo	Hernandez
Nathan	Lange
Gabriel	Mamede
Jim	McBride
Klaus	Meuhlein
Mike	Miller
Juliano	Montanha
Jonas	Oliveira
Herman	Parrales
Poorvi	Patel
Rakesh	Patel
Sylvain	Plante
Daniel	Posadas
Ulf	Radbrandt
Adrian	Rashid
Diego	Robalino
Chris	Slattery
Chris	Slattery
Muhammad	Sohail
Fabian	Stacy
Matthew	Sze
Risto	Trifunoski
Barrett	Wimberly
Malia	Zaman

- **WG – Transformer Impulse Test Guide PC57.98 (T. Hochang)**

Unapproved Meeting Minutes

October 17th, 2022 | 3:15pm – 4:30pm CT

Chair: Thang Hochanh

Vice Chair: Reto Fausch

Secretary: vacant

Meeting Attendance

The Chair Thang Hochanh was able to achieve quorum for today's meeting

The working group met at 3:15pm ET. There were 31 attendees and 10/20 members present.

Quorum was met.

Total attendance was 31

Discussions

- An updated membership list was presented based on attendance.
- The last meeting minutes (spring 2022) was presented, and approved.
 - Motion: Fernando Leal, 2nd: Polo Rodriguez
- No copyright or patent concerns were brought to the attention of the WG.
- During the revision of the final draft before approval by the WG, the test voltage function applied during a lightning impulse test wave with chopping, was explained and discussed. Before acceptance of the document, the WG asked for a description of the *problematics* and *issues* of lightning impulses chopped waves on transformers, where a "deep valley" is present on the waveshape after the peak.
- The revised draft will then be sent by email to the WG for approval, days after the end of the meeting.
- No questions or comments from the attendants.
- No old business.
- No new business.
- Vice chair commented is expected to ask for a PAR extension.

Adjournment

adjourn the meeting.

Motion: Polo Rodriguez 2nd: Sergio Hernandez

Meeting concluded at 4:10 pm

Reto Fausch

Quorum

Total attendance: 31

Guests: 21

Members attending Fall 2022	
Dominique	Bolliger
Jeffrey	Britton
Reto	Fausch
Sergio	Hernandez Cano
Thang	Hochanh
Peter	Kleine
Fernando	Leal
Sylvain	Plante
Pierre	Riffon
Leopoldo	Rodriguez

Members	20
Memd. Present	10
Quorum	50.0%

Requested Membership	
Parminder	Panesar

Attendance Fall 2022	
Jhala	Anirvdhdhsinh
Onome	Avanoma
Deniss	Carr
Jaroslaw	Chorzepa
Rich	Frye
Peter	Heinzig
Toby	Johnson
Gabriel	Lopez Mamede
Mama	Mboudmbouo
Juliano	Montanha
David	Murray
Parminder	Panesar
Herman	Parrales
Harry	Pepe
Oscar	Pinon
Goran	Plisic
Abdul	Shaikh
Ibrahim	Shteyh
Jason	Snyder
Reng	Wind
Waldemar	Ziomek

- **Liaison Report – HVTT (J. Britton)**

HV Testing Techniques Subcommittee met virtually on April 22nd.

Active projects:

- IEEE Std. 1122 – for digital recorders for measurement in HV Impulse tests
 - about to finish up . Ballot completed in August 2022. Going through ballot resolution process.
- IEEE 510 - Recommended Practices for Safety in High-Voltage and High-Power Testing
 - It is almost ready. A small WG looking at the document. Monthly meetings going on for at least a year
 - PAR extension will be requested
- 4.1 implementation of IEEE 4
 - Looking at tutorials specially focused on:
 - Properly apply k-factor estimation from oscillating impulse
 - How to properly estimate uncertainty in measurements
- IEEE Std. 454 – Interpretation of PD. Continues work
- IEEE 2426 – Reached a point where comments are not able to resolve. WG decided to break that into several. WG decided not to work now on Part 1.
- IEEE 4.- PAR to be submitted 2023. Some virtual meeting scheduled for November 2022. No registration required. Anyone interested to contact Jim.
- SC meeting for January 2023.

B5. New Business

No new business reported.

Meeting Adjourned

B6. List of Attendees to the DTSC meeting

First Name	Last Name	Email	Company	City	State	Country	IEEE Member ID	3/27/01	10/3/2019	10/2/2020	4/28/2021	11/17/2021	3/30/22	10/9/2022
Kayland	Adams	kayland.adams@prolec.energy	SPX Transformer Solutions, Inc.	Goldsboro	NC	USA	Yes		X		X	X	X	X
Edmund	Arevalo	erarevalo@bpr.gov												X
Elise	Arnold	elise.arnold@sgb-smit.group	SGB	Regensburg	OH	Germany	No		X		X	X	X	X
Javier	Arteaga	javier.arteaga@ieee.org	Hitachi Energy	Raleigh	NC	USA	Yes	X	X	X	X	X	X	X
Onome	Avanoma	o.avanoma@outlook.com	MJ Consulting	Winipeg	MB	Canada	Yes		X	X	X		X	X
Alexander	Ayala	alex.ayala@powerpartners-usa.com												X
Donald	Ayers	donald.ayers@ieee.org	Ayers Transformer Consulting	Waxhaw	NC	USA	Yes	X	X	X	X	X	X	X
Brian	Baumann	brian.baumann@cargill.com												X
Christopher	Baumgartner	chris.baumgartner@we-energies.com	We Energies	Milwaukee	WI	USA	Yes		X	X	X	X		X
Barry	Beaster	blbeaster@ieee.org	H-J Family of Companies	High Ridge	MO	USA	Yes		X		X	X	X	X

First Name	Last Name	Email	Company	Country	Region	Language	Gender	Age	Height	Weight	Eye Color	Hair Color	Complexion	Religion	Marital Status	Children	Spouse	Parents	Siblings	Other
Duvier	Bedoya	duvier.bedoya@hitachienergy.com	Hitachi Energy	Crystal Springs	M	US	No													
Jeff	Benach	jeff.benach@megger.com	Megger																	
Enrique	Betancourt	ebetanco@iee.e.org	Prolec GE	Apodaca	Othier	Mexico	Yes	X	X	X	X	X	X	X	X	X				
Vivek	Bhatt	vivek.bhatt@prolec.energy																		
Daniel	Blaydon	dblaidon@iee.e.org	Baltimore Gas & Electric	Baltimore	M	US	Yes	X	X	X	X	X	X	X	X	X				
William	Boettger	weboettger@anol.com	Boettger Transformer Consulting LLC	Danville	C	US	Yes	X	X	X	X	X	X	X	X	X				
Sanjay	Bolar	sanket.bolar@oncor.com	Megger	Dallas	T	US	Yes				X	X								
Alain	Bolliger	bolliger@hvtechnologies.com	HV TECHNOLOGIES, Inc.	Manassas	V	US	Yes	X			X	X	X	X	X	X				
Dominique	Bolliger	d.bolliger@hvtechnologies.com	HV TECHNOLOGIES, Inc.	Manassas	V	US	Yes	X	X	X	X	X				X	X			
Jeremiah	Bradshaw	jeremiah.l.bradshaw@ieee.org	Bureau Of Reclamation	Denver	C	US	Yes		X	X	X	X	X	X	X	X				
Jeffrey	Britton	jbritton@doable.com	Phenix Technologies, Inc.	Accident	M	US	Yes	X				X	X	X	X	X				
Steven	Brzozowski	stbrzozowski@bpa.gov	Bonneville Power Administration	Vanouver	W	US	Yes		X	X	X	X	X	X						
David	Calitz	david.calitz@siemens-energy.com	Siemens Energy	Weathford	T	US	Yes	X	X	X	X	X	X	X	X	X				

Juan Alfredo	Carrizales	juanalfredo.carrizales@prolecge.com	Prolec GE	Apo daca 66600	O ther	M exico	No						X	X	X
Camilo	Casallas	camilo.casallas@trench-group.com	Trench Limited												X
Juan	Castellanos	juangonzalo.castellanos@prolecge.com	Prolec GE	Apo daca	O ther	M exico	Yes	X	X	X	X	X	X	X	X
Solomon	Chiang	schiang@thegundcompany.com	The Gund Company	Fergus	O N	Canada	Yes							X	X
Ennyun	Cho	echo@hicoamerica.com	HICO America												X
Larry	Christodoulou	l.christodoulou@epsii.com	Electric Power Systems	Nashville	T N	USA	Yes						X		X
Juan Carlos	Cruz Valdes	juancarlos.cruz@prolecge.com	Prolec GE	Apo daca	O ther	M exico	Yes			X	X			X	X
Roberto	Dasilva	roberto.ignacio@cargill.com													X
Eric	Davis	edavis@burnsmcd.com	Burns & McDonnell	Kansas City	M O	USA	Yes	X	X	X	X	X	X	X	X
Everton	De Oliveira	everton.oliveira@siemens-energy.com	Siemens Energy	Jun diai	O ther	Brazil	Yes	X				X			X
Sami	Debass	sdebass@epri.com	Electric Power Research Institute (EPRI)	Charlotte	N C	USA	Yes						X	X	X
J. Arturo	Del Rio	a.delrio@ieee.org	Siemens Energy	Raleigh	N C	USA	Yes	X	X	X	X				X
Scott	Dennis	scott.dennis@hitachienergy.com	Hitachi Energy	South Boston	V A	USA	Yes		X			X			X
Scott	Digby	scott.digby@duke-energy.com	Duke Energy	Raleigh	N C	USA	Yes	X	X	X	X			X	X

Huan	Dinh	huan.m.dinh@hitachienergy.com	Hitachi Energy	Lexington	KY	US	Yes	X	X	X	X	X	X	X
Paul	Dolloff	paul.dolloff@epkc.coop	East Kentucky Power	Lexington	KY	US	Yes		X					X
Jeffrey	Dorris	jeffreyd@h-j.com	H-J Family of Companies	High Ridge	MO	US	Yes			X	X			X
Don	Dorris	ddorris@nespower.com	Nashville Electric Service	Nashville	TN	US	Yes	X	X	X	X	X		X
Jesse	Duffy	jduffy@nespower.com												X
Samraghi	Dutta Roy	samraghi.dutta_roy@siemens-energy.com	Siemens Energy	Richland	MS	US	Yes		X	X	X	X		X
Marco	Espinola	marco.a.espinola@hitachienergy.com	Hitachi Energy	Earth City	MO	US	Yes			X	X	X	X	X
Reto	Fausch	retofausch@ieee.org	RF Solutions	Monte Rey	CA	US	Yes	X	X	X	X	X	X	X
Marco	Ferreira	mferreira@bridgeviewllc.com	Bonneville Power Administration	Vanouver	WA	US	Yes							X
Hugo	Flores	hafg@dusty.tamu.edu	Hitachi Energy	Alamo	TN	US	Yes	X	X		X	X	X	X
Joseph	Foldi	foldi.joseph@ieee.org	Foldi & Associates, Inc.	Toronto	ON	Canada	Yes		X	X	X			X
Bruce	Forsyth	bruce.forsyth@ieee.org	Bruce Forsyth and Associates PLLC	Norman	OK	US	Yes	X		X	X	X	X	X
Anthony	Franchitti	anthony.franchitti@exeloncorp.com	PECO Energy Company	Elvers	PA	US	Yes	X		X	X	X		X
Raymond	Frazier	rfrazier@ameren.com	Ameren	Arnold	MO	US	Yes		X	X	X	X		X
George	Frimpong	george.k.frimpong@hitac	Hitachi Energy	Raleigh	NC	US	Yes		X	X	X	X	X	X

		hienergy.co m													
Jos e	Ga mb oa	joseg@h-j.com	H-J Family of Compani es	Hig h Rid ge	M O	US A	Yes		X	X	X	X	X	X	
Edu ard o	Gar cia Wil d	eduardo.garcia @ieee.org	Siemens Energy	Gua naj uat o	O th er	M exi co	Yes	X	X		X	X	X	X	
Orl and o	Gira ldo	orlandog@h- j.com	H-J Family of Compani es	Hig h Rid ge	M O	US A	Yes				X				X
Luis	Gon zale z	lgonzalez@c anduct.com													X
Sha wn	Gos sett	sgossett@am eren.com	Ameren	Blo omi ngt on	IL	US A	Yes	X	X	X	X	X			X
Jeff rey	Gra gert	jeffrey.a.grag ert@xcelen ergy.com	Xcel Energy	Den ver	C O	US A	Yes	X	X		X	X	X	X	
Bill	Grie sack er	bgriesacker@v erizon.net	Duquesne Light Co.	Cor aop olis	P A	US A	Yes	X	X	X	X	X	X	X	
Atti la	Gyo re	attilagore@m imaterials.com	M&I Materials Ltd	Ma nch este r	O th er	UK	Yes		X	X	X	X			X
Kev in	Ha mpt on	kevin.hampt on@siemen s- energy.com													X
Rog er	Hay es	roger.hayes1@ ge.com	General Electric	Ayr	O N	Ca na da	Yes	X	X	X	X	X			X
Kyl e	Hei den	kylejheiden@e aton.com	EATON Corporati on	Mil wau kee	W I	US A	Yes			X	X				X
Pet er	Hei nzig	peter.heinzig@ weidmann- group.COM	Weidmann Electrical Technolo gy	Rap per swil	O th er	Sw itz erl an d	Yes	X							X

Ronald	Hernandez	rhernandez@double.com	Doble Engineering Co.	Waterto wn	MA	USA	Yes			X		X		X
Juan Carlos	Hernandez	jh480@gatech.edu												X
Sergio	Hernandez Cano	shernan@hammondpowersolutions.com	Hammond Power Solutions	Monterrey	OT	Mexico	Yes	X	X	X	X	X	X	X
John	Herron	herronjph@aol.com	Raytech USA	Fernandina Beach	FL	USA	Yes	X	X	X	X	X	X	X
Thang	Hochanh	thanghochanh@surplec.com	Surplec Inc.	Shelbroke	QC	Canada	Yes	X	X	X	X	X		X
Sarama	Hoffman	shoffman@pplweb.com	PPL Electric Utilities	Fogelsville	PA	USA	No	X	X	X	X	X	X	X
Ryan	Hogg	rhogg@ieee.org	Bureau of Reclamation	Denver	CO	USA	Yes				X	X	X	X
Philip	Hopkinson	phopkinson@ieee.org	HVOLT Inc.	Charlotte	NC	USA	Yes	X	X	X	X	X	X	X
Anirudh	Jhazha	asjhala@transformerindia.com												X
John	John	john_john@va-transformer.com	Virginia Transformer Corp.	Roanoke	VA	USA	Yes	X	X	X	X	X		X
Toby	Johnson	toby.johnson@huntelelectric.com	Hunt Electric	Salt Lake City	UT	USA	Yes	X	X		X	X		X
Stephen	Jordan	shjordan@tva.gov	Tennessee Valley Authority	Chattanooga	TN	USA	Yes	X	X	X	X	X		X
Kurt	Kaineder	kurt.kaineder@siemens-energy.com	Siemens Energy	Leonding	OT	Austria	Yes	X	X	X	X	X		X

Jerzy	Kazmierczak	jerzy.kazmierczak@hitachienergy.com	Hitachi Energy	Fenton	MO	USA	Yes		X						X
Sheldon	Kennedy	skennedy@niagaratransformer.com	Niagara Transformer	Buffalo	NY	USA	Yes	X		X	X	X			X
Gal	Kennedy	grkennedy@ieee.org	GR Kennedy & Associates LLC	York	NE	USA	Yes		X	X	X	X			X
Christoph	Kerschensbauer	christoph.kerschensbauer@siemens-energy.com													X
Gary	King	garyking@ieee.org	Howard Industries	Lauriel	MS	USA	Yes				X				X
Zan	Kiparizoski	zkiparizoski@ieee.org	Howard Industries	Ellisville	MS	USA	Yes		X	X				X	X
Egon	Kirchmayr	egon.kirchenmayr@siemens-energy.com	Siemens Energy	Nuremberg	OT	Germany	Yes	X	X	X	X			X	X
Peter	Kleine	peter.e.kleine@usace.army.mil	US Army Corps of Engineers	Portland	OR	USA	Yes	X	X	X	X				X
Anton	Koshel	akoshel@delta-star.com	Delta Star Inc.	San Carlos	CA	USA	Yes	X			X	X	X	X	X
Andrew	Larison	andrew.t.larison@hitachienergy.com	Hitachi Energy	Jefferson City	MO	USA	No						X		X
Fernando	Leal	ferleal@gmail.com	Prolec GE	Apothaca	OT	Mexico	No			X	X	X			X
Moonhee	Lee	lee.moonhee@gmail.com	Hammond Power Solutions	Milton	ON	Canada	Yes	X	X	X	X	X	X		X
Aleksandr	Levin	aleksandr.levin@weidmann-group.COM	Weidmann Electrical Technology	Lynndonville	VT	USA	Yes	X	X	X	X	X	X	X	X
Weijun	Li	wli@beld.com	Braintree Electric Light Dept.	Braintree	MA	USA	Yes	X		X	X	X	X	X	X

Mario	Locarino	mlocarno@double.com	Doble Engineering Co.	Marlborough	MA	US	Yes	X	X	X	X	X		X
Luis	MacHain	joseluis.machain@prolecgce.com												X
Tim-Felix	Mai	timm-felix.maier@siemens-energy.com	Siemens Energy	Kirchheim	Osthering	Germany	Yes	X		X	X	X	X	X
Gabriel	Mamedes	gabriel.mamedes@siemens-energy.com												X
Alberto	Martinez	martineza@weg.net												X
Mama	Mbouomoumbouo	mamambouombouo@hitachienergy.com	Hitachi Energy	Cristal Springs	MS	USA	Yes						X	X
James	McBride	jim@jmxhv.com	JMX Services, Inc.	Fayetteville	GA	USA	Yes	X	X	X	X	X	X	X
Brian	McBride	brian_mcbride@cargill.com	Cargill, Inc.	Plymouth	MA	USA	Yes							X
Thomas	Melle	tom.melle.us@ieee.org	HIGHVOLT	Holly Springs	NC	USA	Yes	X		X	X		X	X
Omar	Mendez	omar.mendez@prolecge.com												X
Kent	Miller	kent.miller@trelectric.com	T&R Electric Supply Co.	Colman	S.D	USA	Yes	X	X		X		X	X
Michael	Miller	michaelmillier@siemens-energy.com												X
Francis	Mills	francis.mills@powereng.com												X
Goran	Miloevic	goran@dvpower.com												X

Poorvi Patel	poorvi.patel@hotmail.com	Electric Power Research Institute (EPRI)	Ballwin	MO	USA	Yes	X	X	X	X		X	X
Rakesh Patel	rakesh.patel@hitachienergy.com	Hitachi Energy	Ballwin	MO	USA	No				X			X
Harry Pape	hpepe@double.com	Phenix Technologies, Inc.	Accident	MD	USA	Yes	X			X	X	X	X
Oscar Pinon	opinon@otcservices.com	OTC Services Inc.	Louisville	OH	USA	No							X
Sylvain Plante	plante.sylvain.3@hydro.qc.ca	Hydro-Quebec	Montreal	QC	Canada	Yes	X		X	X	X		X
Christopher Ploetner	cp.xfmr@gmail.com	t.b.a.	Schwarzenbruck	OR	Germany	Yes	X		X				X
Klaus Pointner	klaus.pointner@trench-group.com	Trench Austria GmbH	Leonding	OR	Austria	Yes	X	X	X			X	X
Jarrod Prince	jarrod.prince@ermco-eci.com	ERMCO	Dyersburg	TN	USA	Yes	X	X	X	X	X	X	X
Ion Radu	ion.c.radu@hitachienergy.com	Hitachi Energy	Raleigh	NC	USA	Yes	X	X	X	X			X
Timothy Raymond	tc.raymond@iee.org	Electric Power Research Institute (EPRI)	Glenville	NY	USA	Yes		X	X	X	X		X
Leslie Recksiedler	lrecksiedler@yahoo.ca	Manitoba Hydro	Winnipeg	MB	Canada	Yes	X	X					X
Scott Reed	sreed@mvadiagnostics.com	MVA	Canoton	OH	USA	Yes		X	X		X	X	X
Pierre Riffon	riffon@sympatico.ca	Pierre Riffon Consultant Inc.	Longueuil	QC	Canada	Yes	X	X	X	X	X		X

[illegible]

majid														
Devki	Sharma	devkisharma@ieee.org	Entergy	Lee sburg	V A	US A	Yes	X	X		X	X		X
Hemendra	Shertukde	shertukde@hartford.edu	University of Hartford	W. Hartford	C T	US A	Yes	X	X	X	X	X		X
lbrahim	Shteyh	ishteyh41@gmail.com												X
Stephen	Shull	sshull@ckt.net	BBC Electrical Services, Inc.	Joplin	M O	US A	Yes	X	X	X	X	X	X	X
Jin	Sim	jin.sim@ieee.org	Jin Sim & Associates, PC	Raleigh	N C	US A	Yes							X
Jonathan	Sinclair	jjsinclair@pplweb.com	PPL Electric Utilities	Wilkes Barre	P A	US A	Yes	X		X	X	X	X	X
Kushal	Singh	kushal.singh@comed.com	ComEd	Oakbrook Terrace	IL	US A	No		X		X			X
Keneth	Skinger	krskinger@scituateconsulting.com	Scituate Consulting, Inc.	Scituate	M A	US A	Yes		X		X			X
Christopher	Slattery	cslattery@firstenergycorp.com	FirstEnergy Corp.	Akron	O H	US A	Yes		X	X	X	X		X
Steven	Snyder	slsnnyder@ieee.org	Hitachi Energy	Verailles	K Y	US A	Yes	X	X	X	X		X	X
Jason	Snyder	JOSnyder@firstenergycorp.com												X
Sanjib	Som	ssom@patransformer.com	Pennsylvania Transformer	Cannonburg	P A	US A	Yes	X	X		X	X	X	X
Mike	Spurlock	mspurlock@ieee.org	Spurlock Engineering	Columbus	O H	US A	Yes	X	X	X		X	X	X

Services, LLC													
Fabian	Stacy	durand.stacy@hitachienergy.com	Hitachi Energy	Alamo	TN	US	Yes	X	X		X	X	X
Brad	Staley	brad.staley@srpnet.com	Salt River Project	Mesa	AZ	US	Yes		X	X	X	X	X
Kyle	Stechulte	kdstechschulte@aep.com	American Electric Power	Powell	OH	US	Yes	X	X	X	X	X	X
Hampton	Steele	hasteele@tva.gov	Tennessee Valley Authority	Chattanooga	TN	US	Yes				X	X	X
Andrew	Steineman	asteineman@delta-star.com	Delta Star Inc.	Lynchburg	VA	US	Yes	X	X			X	X
Shankar	Subramany	shankar.subramany@kema.com	KEMA Labs	Arnhem	ON	Netherlands	Yes						X
Katrina	Swanson	swanske10@gmail.com											X
Charles	Sweeter	charles.sweeter@omicronenergy.com	OMICRON electronics Corp USA	Falmouth	ME	US	Yes	X	X		X	X	X
Janusz	Szczekowski	j.szczekowski@reinhausen.com	Maschinenfabrik Reinhausen	Regensburg	ON	Germany	Yes	X	X	X	X	X	X
Matthew	Sze	matthew.sze@omicronenergy.com	Omicron Electronics										X
Troy	Tanaka	ttanaka@burnsmcd.com	Burns & McDonnell	Kansas City	MO	US	Yes	X	X	X	X	X	X
Marc	Taylor	marc.taylor@jfe-shojipower.com	JFE Shoji Power Canada Inc.	Burlington	ON	Canada	Yes		X	X	X	X	X
Vijay	Tendulkar	vijay.tendulkar@pdicorp.com	Power Distribution, Inc. (PDI)	Cerritos	CA	US	Yes	X	X	X	X		X

Sco tt	Tho mas	scott.thomas@hitachiergy.com	Hitachi														X
Edu ard o	Tolc achi r	etolcachir@tte.com.ar	Tubos Trans Electric S.A.	Cor dob a	O th er	Ar ge nti na	Yes										X
Alw yn	Van Der Wal t	alwyn.vanderwalt@eciusa.com	Electrical Consultan ts, Inc.	Alb uqu erq ue	N M	US A	Yes	X	X				X	X			X
Ajit h	Var ghe se	ajith.varghese@prolec.energy	SPX Transfor mer Solutions, Inc.	Har tlan d	W I	US A	Yes	X	X	X	X	X	X	X			X
Jas on	Var nell	jason.r.varnell@ieee.org	Doble Engineeri ng Co.	Mar lbor oug h	M A	US A	Yes	X	X	X	X	X	X				X
Kir an	Ved ant e	kiran.vedante@yahoo.com	Ritz Instrume nt Transfor mers	Lav oni a	G A	US A	Yes		X			X					X
Dh ara m	Vir	dharam.vir@prolec.energy	SPX Transfor mer Solutions, Inc.	Wa uke sha	W I	US A	Yes	X	X	X	X						X
Her nan	Vog el	vogel@tjh2b.com															X
Pra gne sh	Vya s	pragnesh.vyas@sunbelt-solomon.com	Sunbelt- Solomon Solutions	Solo mo n	K S	US A	Yes		X	X	X	X	X	X			X
Nic k	Wal der	nickwalder@eaton.com															X
Mik e	Wal dro p	mwaldrop@mlgw.org	Memphis Light, Gas & Water	Me mp his	T N	US A	No				X	X	X				X
Dav id	Wal lace	daweleceng@aol.com	Mississippi State Universit y	Mis sissi ppi Stat e	M S	US A	Yes		X	X					X		X

Alan	Was hburn	awashburn@burnsmcd.com	Burns & McDonnell	Kansas City	MO	USA	Yes		X	X	X	X	X	X
Areeb	Wazir	areebawazir@eaton.com												X
Eric	Weatherbee	eweatherbee@hubbell.com	PCORE Electric	LeRoy	NY	USA	Yes	X	X	X	X			X
Bruce	Webb	bruce.webb@kub.org	Knoxville Utilities Board	Knoxville	TN	USA	Yes	X	X		X	X		X
Matthew	Weissen	matthew.weissen@pacificorp.com	PacificCorp	Portland	OR	USA	Yes	X	X					X
Zachery	Weiss	zweiss@weg.net	WEG Transformers USA Inc.	Winfield	MO	USA	Yes		X				X	X
Drew	Welton	dwelton88@live.com	Intellirent	Large	FL	USA	Yes				X	X		X
Christopher	Whitten	christopher.l.whitten@hitachienergy.com	Hitachi Energy										X	X
Dave	Wilson	dave@wilson.work												X
Barrett	Wimberly	barrett.wimberly@ge.com	GE Grid Solutions	Waynesboro	GA	USA	Yes		X		X			X
Rene	Wind	rene-juevgen.wind@siemens-energy.com												X
Deanna	Woods	deannawoods@alliantenergy.com	Alliant Energy	Williamport	IN	USA	Yes			X				X
Jeffrey	Wright	jwright@duqlight.com	Duquesne Light Co.	Pittsburgh	PA	USA	Yes	X	X	X	X	X	X	X
Baitun	Yang	yangbaitun@hotmail.com	R.E. Uptegraff	Scottdale	PA	USA	Yes	X	X	X	X	X		X

Mal ia	Zam an	m.zaman@i eee.org	IEEE Allgeier, Martin and	Pisc ata way	N J	US A	No	X		X	X	X	X	X
Kris	Zibe rt	kris.zibert@am ce.com	Associate s	Jopl in	M O	US A	Yes	X	X	X	X	X	X	X
Wa lde ma r	Zio mek	wziomek@ptitr ansformers.CO m	PTI Transfor mers	Win nip eg	M B	Ca na da	Yes	X		X	X	X		X