

IEEE PES TRANSFORMERS COMMITTEE
DIELECTRIC TEST SUBCOMMITTEE

Meeting held on Wednesday, March 30, 2022 at the Hyatt Regency (Centennial E), Denver, Colorado, USA

Dielectric Tests Subcommittee		
Chair: Poorvi Patel	Vice-Chair: Thang Hochanh	Secretary: Diego Robalino
Room: Centennial E	Date: March 30 th , 2022	Time: 11:00 am to 12:15 pm
Total DTSC Members: 157	Members present at the meeting: 71	Attendance according AMS: N/A
Guests present: 133	Membership requested: 12	Membership accepted: 10

B.1 Chair's Remarks

The Chair welcomed members and guests to the Spring 2022 in-person meeting. The new Chair Dr. Poorvi Patel, briefly introduced the new DTSC Secretary Dr. Diego Robalino, and informed attendees that the session will be recorded just to later prepare the minutes. The recording is to be deleted afterward.

Poorvi requested Ajith Varghese to stand up. The new DTSC Chair expressed her gratitude to Ajith for the last 5 years serving as DTSC Chair and followed by the applause of all attendees.

The 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. It was also reminded that any presentation made during the meeting should be posted on the website.

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

a. ADCOM highlights

- There will be a mandatory training for existing officers to be launched June 1st. Deadline is December 31st.
- AMS system under discussion and being replaced. The goal is to have it ready for the fall meeting.
- A new document 'participation behavior policy' underworks. Malia to provide it and probably, it will be part of the registration process.

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
C57.160	Guide for the Elec. Measurement of PD in HV bushings and Instrument Transformers	2020 _ In comment resolution since 2019. Expected completion by 12/22	PAR 2022
C57.113	Recommended practice for PD Measurement Power	2020	PAR 2023
C57.98	Guide for transformer Impulse Tests	2021 – Need to see if PAR extension is needed	PAR 2022
C57.138	Recommended Practice for Routine Impulse Tests for Distribution Transformers	2026	Need PAR and WG
C57.161	Guide for DFR Measurements	2028	WG Inactive
C57.168	Low Frequency Test Guide	NEW	PAR 2022
C57.12.200	Bushing Dielectric Frequency Response Guide (ENTITY WG)	NEW. Should be completed by 12/22	PAR 2022

Next Chair reminded the NesCOM/RevCom meeting dates and deadlines for 2022 standard submissions. If PAR extension is needed the last date for that next year is **13 October 2022**

Standard Board Meeting	Submittal Deadlines
Apr 27, 2022	May 06, 2022
Oct 25, 2022	Aug 11, 2022

Chair reminded the requirements to become a DTSC Member:

Two attendance requirements:

1. Attend 2 out of last three DTSC meetings
2. 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

From last meeting, two participants requested membership, One was approved: Alain Bollinger. The group welcomed the new member.

To date, total active Members of the DTSC are 157 and 79 should be present in order to achieve quorum.

B.2 Quorum, Approval of Minutes and Agenda

To verify quorum the list of 157 members is displayed. Chair indicated that because the last three meetings were in virtual environment, there has not much been done cleaning the members list, but now going back to in-person meetings, the list will be revised for the next meeting.

Members' headcount was 71 (seventy one). Quorum was not reached. Agenda not approved / neither minutes from last meeting.

Attendance Summary

	Webex
Total Attendees	204
Total # Of Members	157
Members Present	71
Quorum Present	no (45%)

B.3 SC Discussions and Motion passed.

Old Business:

- PD in Bushing during factory induced testing of transformers- Survey was performed for adding the below text in C57.12.90 Section 10.8.5
 - 87% Approved and 13% Rejected
 - Survey to go back to the TF to review the comments and address the comments
 - Review of statement by the specific TF

- **Establish Limits Core to Ground Insulation Resistance :**
 - Does SC see a need to come up with a limit ?
 - If so need a TF , a motion to establish – This was approved and a new TF is created
- **Frame to ground Insulation Resistance :**
 - Is it performance requirement to include in standards
 - Does SC see a need to review this topic further ? - This topic to be discussed
 - This item is part of the TF scope. More details to be discussed with the TF members

B.4 Taskforce and Working Group Reports

Reports are in the order presented during the meeting

**B.4.1 Task Force Winding Insulation Power Factor & Winding Insulation Resistance Limits,
Diego Robalino (Chair) and Aniruddha Narawane (Secretary) at the meeting**

Minutes of 1st Meeting held on 03/29/2022 from 8.00 am MST to 9.15 am MST

**In person Meeting: CENTENIAL H meeting hall, Hyatt Regency, Colorado Convention Center,
Denver**

1. Meeting was called to order at 8.00 am with a welcome by Chairman Diego Robalino.
2. As this was the first meeting for the TF, Secretary explained to the attendees that anybody wishes to be a member can become a member of the TF.
3. Chairman checked for any patents and copy rights and there were none.
4. As this was the first meeting there was no quorum check. There were 60 attendees and 27 requesting Membership.

5. Attendance

	WebEx
Total Attendees	58
Total # Of Members Requested	30
Members Present	32
Quorum Present	First meeting N/A

- 6.
7. Chairman presented the general agenda, Scope of the task force and requested to have a discussion on the Scope.
8. There were discussions and some suggestions for additions to scope like - considering the IR values for: Core to Ground & Core Clamps to Ground, Special designs, construction of core and Coil for various types of designs, inclusion of series Auto and PA with main transformer. Categorization of IR values for Field and Factory tests. Analyzing Polarization Index, Usage of Digital v/s Analog instrument for testing.
9. Chairman shared his opinion of starting the TF scope with more general points and the TF work progresses more specific points can be discussed and if agreed can be worked on. There was consensus on this view.
10. There was also discussion about considering Oil, Ester and Dry type transformers. Chairman explained that the TF does not specifically mention oil immersed transformers. He also mentioned that it is very important to receive the data from attendees to consider all these types of transformers. One attendee mentioned that this TF is tied to dielectric sub committee and as such DI-Electric Subcommittee covers all types of transformers.
11. One attendee asked what the goal of the TF is, and chair explained that as directed by Di-electric subcommittee, the goal is to develop best practices only.
12. Chairman and Secretary mentioned that all the attendees will be contacted via email with relevant details to request the data. Data collection procedure will be same as that followed during the previous work of TF -Winding Insulation PF-IR Limits.

13. With no further discussions on scope, purpose and goal, Chairman thanked all the attendees and meeting adjourned at 9.00am MST.

14. Attendee List

Sr. No.	Last Name	First Name	Email	Column1	Column2	Column3	Member(M)/Guest (G)
1	Adams	Kayland	Kayland.Adams@prolec.energy				M
2	Almeida	Nabi	nabi.almeida@prolecge.com				M
3	Ansari	Tauhid	tauhid.ansari@hitachienergy.co				M
4	Antosz	Stephen	santos@ieee.org				M
5	Artega	Javier	javier.artega@hitachienergy.co				M
6	Avanoma	Onome	o.avanoma@outlook.com				M
7	Ayers	Don	donald.ayers@ieee.org				M
8	Beggie	Kevin	kevin.beggie@weidmann-group.com				G
9	Benzler	Olle	olle.benzler@megger.com				G
10	Boettger	William	WEBOETTGER@aol.com				M
11	Byrnes	Ryan	rbyrnes@hicoamerica.com				G
12	Calitz	David	david.calitz@siemens-energy.com				M
13	Carrizales	Alfredo	juanalfredo.carrizales@prolecge.com				G
14	Castellanos	Juan	juangonzalo.castellanos@prolecge.com				M
15	Dillon	Nikolaus	nikolaus.dillon@dominionenergy.com				G
16	Dolloff	Paul	PAUL.DOLLOFF@ekpc.coop				G
17	Elliott	William	will.elliott@alumni.lsu.edu				G
18	Flores	Hugo	hugo.flores@hitachienergy.com				M
19	Gara	Loren	lgara@shermco.com				M
20	Garza	Hector	hector.garza@orto.mx				G
21	Griesaker	B	bgriesacker@verizon.net				G
22	Havens	Bridget	Bhavens@Ameren.com				G
23	Herron	John	herronjph@aol.com				G
24	Hogg	Ryan	rhogg@ieee.org				G
25	Hollrah	Derek	dhollrah@burnsmcd.com				M
26	Kiparizoski	Zan	ZKIPARIZOSKI@HOWARD.COM				M
27	Levin	Aleksandr	aleksandr.levin@weidmann-group.com				G
28	Mahajan	Kushal	kushalmahajan@eaton.com				M
29	Mani	Balkrishana n	Balkrishnan_Mani@vatransformer.com				M
30	Martinez	Rogelio	ROGELIO.MARTINEZ@gatransformer.com				G
31	Mbouombouo	Mama	mama.mbouombouo@hitachienergy.com				M
32	Munoz	Martin	martin.munoz@orto.mx				G

33	Nesudd	Brody	broddy.a.nesudd@xcelenergy.com	G
34	Panesar	Parminder	parminder_panesar@vatransformer.com	M
35	Patel	Poorvi	ppatel@epri.com	M
36	Pepe	Harry	hpepe@doble.com	G
37	Pollard	Dominic	dpollard@nassusa.com	G
38	Riggins	Benjamin	Benjamin.D.Riggins@xcelenergy.com	G
39	Sauer	Dan	dmsauer@eaton.co	M
40	Schappel	Steven	Steven.Schappel@prolecge.com	G
41	Schrammel	Alfons	alfons.schrammel@siemens-energey.com	G
42	Sen	Cihangir	cihangir.sen@duke-energy.com	M
43	Shalabi	Jaber	jshalabi@vantran.co	M
44	Shannon	Michael	MSHANNON@REAWIRE.COM	G
45	Shosanya	Adetokunbo	toksjiidesho@yahoo.com	M
46	Simons	Andre	andre.simons@jfeshojipower.com	G
47	Som	Sanjib	ssom@patransformer.com	M
48	Steineman	Andy	asteineman@deltastar.com	G
49	Swan	Phil	phil.swan@resapower.com	G
50	Taylor	Marc	mark.taylor@jfeshojipower.com	M
51	Tolcachir	Eduardo	ETOLCACHIR@TTE.COM.AR	M
52	Varghese	Ajith	Ajith.Varghese@prolec.energy	M
53	Wallach	David	david.wallach@duke-energy.com	M
54	Wazir	Areeb	areebawazir@eaton.com	M
55	Weiss	Zachery	zweiss@weg.net	M
56	ynui	Andrea	andrea.ynui@siemens-energy.com	G
57	Robalino	Diego	diego_robalino@ieee.org	Chair
58	Narawane	Aniruddha	Aniruddha Narawane <a href="mailto:<anarawane@ieee.org>"><anarawane@ieee.org>	Secretary

B.4.2 TF on Revision of Low-Frequency Tests

Chair: Bill Griesacker, Vice Chair: Daniel Blaydon (acting secretary), Secretary: Myron Bell (not present). Denver, Colorado Meeting – March 29, 2022 1:45-3:30pm MDT

- 1. The meeting was called to order at 1:45 PM.**
2. A quorum was achieved with 26 of 52 total members present. Three individuals requested membership by email and were given member status based on attendance and participation.
- 3. A motion was made by Dan Sauer (Eaton Corporation) and Akash Joshi (Black & Veatch) to approve the agenda and Fall 2021 meeting minutes. There were no objections to unanimous approval of the agenda and meeting minutes.**
4. The chair stated that this would be his last meeting chairing the TF, due to the committee rotation preference to limit position terms to 5 years. The new Chair will be Ajith Varghese (GE Prolec SPX).
- 5. Task Force on PD Testing of Class 1 Power Transformers – Don Ayers**

B.5 The proposed procedure and limits from the task force was surveyed to the members and guests of the RLFT Task Force. The survey results and comments were reviewed. The survey obtained 47 total votes, with an 78.7 % approval ratings. It was noted that the survey was conducted at the same time that the new C57.12.00 and C57.12.90 standards were published, and therefore, there was a need to update the proposal in the survey based on new versions of 12.00 and 12.90. In the new proposal, Class I PD limits will not be reduced down to new limits for Class II transformers. The comments received from the survey were reviewed. Don Ayers will address these comments in the TF and will send out an updated version of the survey.

6. Factory PD Limits and Procedure Survey Results

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. Some minor revisions will be made to the proposal and the TF will proceed to move the proposal toward voting. Comments related to maximum system voltage in Table 4 and test levels will be worked into the proposal.

7. PD in Bushings During Factory Testing

The TF on PD in Bushings During Transformer Factory Testing will be reconvened to address the comments received from the survey.

8. Old business

No old business.

9. New business

Unresolved comments from the balloting of C57.12.00 and C57.12.90 were reviewed. These will need to be addressed separately at upcoming TF meetings.

10. The meeting was adjourned at 2:55 p.m.

Attendance

Role	First Name	Last Name	Company
Guest	Javier	Arteaga	Hitachi ABB Power Grids
Member	Donald	Ayers	Ayers Transformer Consulting
Guest	Barry	Beaster	H-J Family of Companies
Vice-Chair	Daniel	Blaydon	Baltimore Gas & Electric
Member	William	Boettger	Boettger Transformer Consulting LLC
Guest	Josh	Bohrn	Siemens Energy
Guest	Alain	Bolliger	HV TECHNOLOGIES, Inc.
Member	Jeffrey	Britton	Phenix Technologies, Inc.
Member	David	Calitz	Siemens Energy
Guest	Arup	Chakraborty	Delta Star Inc.
Guest	Nikolaus	Dillon	Dominion Energy
Guest	Evgenii	Ermakov	Hitachi Energy
Guest	Marco	Espindola	Hitachi ABB Power Grids
Member	Reto	Fausch	RF Solutions

Guest	Rich	Frye	Eaton
Chair	Bill	Griesacker	Duquesne Light Co.
Member	Shamaun	Hakim	WEG Transformers USA Inc.
Guest	Kyle	Heiden	EATON Corporation
Member	Sergio	Hernandez Cano	Hammond Power Solutions
Member	John	Herron	Raytech USA
Member	Philip	Hopkinson	HVOLT Inc.
Member	Stephen	Jordan	Tennessee Valley Authority
Member	Akash	Joshi	Black & Veatch
Guest	John	Kotula	Dominion Energy
Guest	Axel	Kraemer	Maschinenfabrik Reinhausen
Guest	Alexander	Kraetge	Omicron
Member	Mark	Lachman	Doble Engineering Co.
Member	Weijun	Li	Braintree Electric Light Dept.
Guest	Rogelio	Martinez	Georgia Transformer
Guest	Thomas	Melle	HIGHVOLT
Guest	Rhea	Montpool	Schneider Electric
Member	David	Murray	Tennessee Valley Authority
Guest	Brady	Nesvold	Xcel Energy
Guest	Poorvi	Patel	Electric Power Research Institute (EPRI)
Member	Harry	Pepe	Phenix Technologies, Inc.
Guest	Daniel	Posadad	Prolec SA DE CV
Guest	Ulf	Radbrandt	Hitachi ABB Power Grids
Member	Marnie	Roussell	Entergy
Member	Daniel	Sauer	EATON Corporation

Guest	Steven	Schappell	SPX Transformer Solutions, Inc.
Member	Steven	Snyder	Hitachi ABB Power Grids
Member	Sanjib	Som	Pennsylvania Transformer
Member	Mike	Spurlock	Spurlock Engineering Services, LLC
Guest	Brad	Staley	Salt River Project
Member	Kyle	Stechschulte	American Electric Power
Guest	Andrew	Steineman	Delta Star Inc.
Member	Janusz	Szczechowski	Maschinenfabrik Reinhausen
Guest	Jason	Varnell	Doble Engineering Co.
Guest	Pragnesh	Vyas	Sunbelt-Solomon Solutions
Guest	Alan	Washburn	Burns & McDonnell
Guest	Zachery	Weiss	WEG Transformers USA Inc.
Member	Dr. Alexander	Winter	HIGHVOLT Pruftechnik Dresden
Guest	Jeffrey	Wright	Duquesne Light Co.
Member	Kris	Zibert	Allgeier, Martin and Associates

B.5.1 Task Force for Impulse Guide – PC57.98

TF Chair: Pierre Riffon

- TF – Revision to Impulse Tests (P. Riffon)
- No meeting carried out but he sent some highlights to DTSC Chair
 - Survey on Impulse Test procedures
 - 57 approved , 1 rejected, therefore survey carried
 - Editorials 98%, the negative will be discussed next time in Charlotte



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TF Revision to Impulse Test– P. Riffon

Quorum: N/A MOM: N/A Agenda: N/A

Highlights:

- ❖ A survey on impulse test procedure for multiple connection transformers, clauses 10.3.2.2, 10.3.2.3, 10.4.4 and 10.4.5 of IEEE C57.12.90 was performed.
- ❖ The survey was sent to the TF roster on December 27, 2021 (closing date January 31st 2022). The survey was sent to 194 individuals (members and guests).
- ❖ 52 replied (28,8%), one disapproved, one abstained and 3 approved with editorial comments, approval rate was 98%.
- ❖ The negative and the comments received will be discussed in Charlotte.
- ❖ A draft regarding the use of impulse amplitude tolerance ($\pm 3\%$) for will be prepared for discussion in Charlotte



B.5.2 Task Force for Bushing DFR – PC57.12.200,; TF Chair: Poorvi Patel; TF Vice Chair: Charles Sweetser, TF Secretary: Diego Robalino

- Document sent to ballot – approved by DTSC via e-mail
- Entity Members are the only ones able to vote during the ballot process
- PAR expires before December 2022. Possible extension needed. But meetings will be planned in between.


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TF C57.12.200 Bushing DFS– P. Patel

Quorum: N/A MOM: N/A Agenda: N/A

Highlights:

- ❖ Ballot invitation was opened 1st of March for entity members.
- ❖ The window closes March 31st
- ❖ Ballot process will be initiated April 1st.
- ❖ Par expires December 2022. It is possible and extension is needed to complete the work

Power & Energy Society

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

Chair:	Hakan Sahin	Vice-Chair	N/A
Secretary	David Wallace	Percent Complete	N/A

Current Draft Being Worked On:	Draft not started	Dated:	n/a
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PAR Expiration Date:	PAR not started
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Meeting Date:	29 March 2022	Time:	3:15pm MDT
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Location:	Denver, CO, USA
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Attendance:	Members	Par Study Group. All attendees considered members
		20
	Guests	
	Guests Requesting Membership	To be granted to those attended and requested – 10 requested
	Total*	20

* 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 MDT, March 29, 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.
- e. Updated membership review and count for quorum
 - i. Informed the group on the PAR study group and the membership status to be granted when the PAR is approved
 - ii. As this was PAR study group, all attended were considered members for the Spring-22 meeting
- f. Approval of Agenda
 - i. Anonymously approved with no objections
- g. Approval of minutes
 - i. No previous meeting minutes as this WG was inactive

2. New Business

- a. Currently C57.138 is inactive. The document expires in 2026. The Spring-22 meeting was conducted as a group study that relies on majority of agreements.
- b. All attended reviewed the title, scope and purpose, and discussed if any of them may need to be changed. Group also discussed if the document should be reviewed and updated as it expires.
- c. There were total of 20 attendees in the meeting. The PAR study group (TF) reviewed the title, scope, purpose and 18 attendees agreed to the following motion to be presented during the Dielectric Test Subcommittee meeting, 2 abstain with no objections.

Motion

Create a PAR project type: Revision to Standard C57.138-2016

Project Title: IEEE Recommended Practice for Routine Impulse Tests for Distribution Transformers

Change to Scope:

This recommended practice covers routine impulse tests performed on distribution transformers, as required in IEEE Std C57.12.00™, and described in 10.4 of IEEE Std C57.12.90™-2015-2021¹. Distribution transformers covered by this recommended practice are ~~liquid-immersed, single- and three-phase overhead type up to 500 kVA; single-phase pad-mounted compartmental type and underground type up to 167 kVA; three-phase pad-mounted compartmental type; and underground type up to 2500 kVA.~~ overhead, pad-mounted, and underground liquid-immersed distribution transformers with requirements specified in IEEE Std C57.12.20, IEEE Std C57.12.23, IEEE Std C57.12.24, IEEE Std C57.12.34, IEEE Std C57.12.36, IEEE Std C57.12.38 and IEEE Std C57.12.40. This recommended practice covers only those aspects of impulse testing that are specific to routine testing of distribution transformers. For more thorough coverage of impulse testing of transformers in general, IEEE Std C57.98™ should be consulted.

Change to purpose:

This recommended practice assists manufacturers of distribution transformers in the setup and ~~operation of performing a routine impulse test~~ and assists distribution transformer users and purchasers in understanding the routine impulse test and how it differs from design tests.

Need for the project:

Review and update the document as it expires on 12/31/2026.

3. Next meeting: TBD at Fall 2022 Transformer Committee Meeting scheduled for October 16-20, 2022 in Charlotte, NC, USA.
4. Close of meeting
 - a. Meeting adjourned at 4:30pm MDT

Submitted by: Hakan Sahin Date: 4/19/22

3/28/2022 Meeting Attendance:

Last Name	First Name	Company (Affiliation)	Requesting Membership
Winter	Alexandar	Highvolt	Yes
Hernandez	Giovannie	Virginia Transformers	
Alonso	Mario	Georgia Transformers	
Murray	David	TVA	
Shalabi	Jaber	Vantran	Yes
Frye	Rich	Eaton	Yes
Wallace	David	Mississippi State University	Yes
Bolliger	Alain	HV Technologies	Yes
Sahin	Hakan	Virginia and Georgia Transformer	Yes
CruzValdes	Juan Carlos	Prolec GE	Yes
Wimbery	Barret	GE	
Carr	Deniss	GE	
Davis	Eric	Burns and McDonald	
Fausch	Reto	RF Solutions	Yes
Elliott	William	Prolec GE	
Flores	Hugo	Hitachi	

Last Name	First Name	Company (Affiliation)	Requesting Membership
Prince	Jarrold	ERMCO	
Diaz	Cesar	Eaton	Yes
Patel	Poorvi	EPRI	Yes
Dolloff	Paul	EKPC	

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TF C57.138– TF Chair: Hakan Sahin



Quorum: N/A **Agenda:** TF is inactive. Review the existing title, scope, purpose and decision on a PAR to review and update the document as it expires in 2026

Highlights:

- ❖ 20 attended. Reviewed the title, scope, purpose and majority agreed to the following motion

Motion (to be voted on at the SC-meeting)
Create a PAR project type: Revision to Standard C57.138-2016

Project Title: IEEE Recommended Practice for Routine Impulse Tests for Distribution Transformers

Motion was made to create a PAR for starting C57.138 WG. The guide expires in December 2026.

Motion could not be voted on as the DTSC did not have Quorum. This motion will be sent to all the DTSC members to vote on by email.

- **Task Force Transient Failure Mitigation (WG PC57.142), WG to Investigate the Interaction between Substation Transients and Transformers in HV and EHV Applications and Revision of C57.142**

Denver, CO

Tuesday, March 29th, 2022

3:15 PM – 4:30 PM Mountain Time Zone - USA

Chairman – Jim McBride

Vice Chair – Xose Lopez-Fernandez

Secretary – Tom Melle

- 1) Meeting called to order at 3:15 PM Central Time.
Welcome and Chair's Remarks
- 2) 53 Attendees were present (32 Guests) 21 of 49 Members present
Quorum was not achieved.
- 3) IEEE Patent Policy Slides and Copyrights slides (NO essential patent claims or copyright issues)
- 4) Approval of Agenda and Minutes from Last Meeting.
Quorum was not achieved. Therefore, the Minutes will be sent by e-mail for approval.
- 5) SA Ballot– Jim McBride

C57.142 Draft 10 is now under ballot. Only the slight editorial changes and mandatory changes requested by MEC were made between Draft 10 and the Draft 9B which was approved by the WG.

6) Switchgear Liaison Update

No new business from the Switchgear group. The Spring Switchgear Committee meeting will be held in Orlando, FL from April 10th – 14th 2022. We will encourage voting on the ballot at the meeting.

The WG focus now will be on Mitigation Methods until balloting begins.

7) Mitigation Methods Task Force Update – Jim McBride / Phil Hopkinson

The membership of task force was shown. Several of the suggested mitigation methods follow:

- Resistor-Capacitor Snubbers
- Increasing Insulation in Key Areas with Additional Test Requirement for Special Terminated Lightning Impulse to Better Test for Field Conditions.
- Using Shielding to increase Series Capacitance and reduce capacitance to ground in order to Improve Impulse Distribution and Reduce Series Resonance
- Introduce Internal Surge Protection to Limit Over-voltages During Resonant Conditions
- Reignition Mitigation with Controlled Switching
- Using Resistance Load During Switching to Provide Damping During the Event

- Online Monitoring to Identify Actual Field Interactions and Identify Real World Conditions at the Transformer Terminals and Within the Transformer.
- 8) Presentation: *Mitigation of internal over-voltages with MOV's* - Juliano Montanha, Egon Kirchenmayer. The presentation will be available on the working group website.

Following the presentation several questions were fielded by Mr. Kirchenmayer and the Chair regarding ZnO varistors in practical use by manufacturers and about preliminary quality checks and testing of MOV's. There is an IEC standard for surge arrester testing used as a reference for MOV test procedures. The chair also discussed the effect of temperature on losses.

- 9) Preview of Presentation: Mitigation of Failure using online monitoring – Jim McBride (to be presented next meeting)

The Chair provided a brief summary about the mitigation methods discussed in previous meetings.

- 10) New Business – During the Fall 2021 (virtual) meeting, Deepak Kumaria suggested the possibility of including the study of transients on instrument transformers in the WG. This topic will be investigated during the next meeting.
- 11) Next Meeting - Fall 2022 – Charlotte, NC USA (TBD) October 16th – 20th, 2022
- 12) Motion to Adjournment made by the Chair at 4:30 PM with no objection.

Meeting Attendance List

Role	Last Name	First Name	Company	City	State	Present 3/29/22	Rqst Mmbrs hp
Chair	McBride	James	JMX High Voltage	Fayetteville	GA	X	
Sec.	Melle	Thomas	HIGHVOLT	Holly Springs	NC	X	
Member	Betancourt	Enrique	Prolec GE	Apodaca	Other	X	
Member	Boettger	William	Boettger Transformer Consulting LLC	Danville	CA	X	
Member	Britton	Jeffrey	Phenix Technologies, Inc.	Accident	MD	X	
Member	Dinh	Huan	Hitachi Energy	Lexington	KY	X	
Member	Garcia Wild	Eduardo	Siemens Energy	Guanajuato	Other	X	
Member	Heiden	Kyle	EATON Corporation	Milwaukee	WI	X	
Member	Hopkinson	Philip	HVOLT Inc.	Charlotte	NC	X	

Member	Joshi	Akash	Black & Veatch	Cary	NC	X	
Member	Kirchenmaye r	Egon	Siemens Energy	Nuremberg	Other	X	
Member	Li	Weijun	Braintree Electric Light Dept.	Braintree	MA	X	
Member	Pepe	Harry	Phenix Technologies, Inc.	Accident	MD	X	
Member	Pointner	Klaus	Trench Austria GmbH	Leonding	Other	X	
Member	Radbrandt	Ulf	Hitachi Energy	Ludvika	Other	X	
Member	Roussell	Marnie	Entergy	New Orleans	LA	X	
Member	Sarkar	Amitabh	Virginia Transformer Corp.	Roanoke	VA	X	
Member	Sharp	Michael	Trench Limited	Scarboroug h	ON	X	
Member	Sizemore	Thomas	ABB Inc.	Greenville	NC	X	
Member	Snyder	Steven	Hitachi Energy	Versailles	KY	X	
Member	Spurlock	Mike	Spurlock Engineering Services	Columbus	OH	X	

X

Guest	Ayers	Donald	Ayers Transformer Consulting	Waxhaw	NC	X	
Guest	Craven	Michael	Phoenix Engineering Services	Atlanta	GA	X	
Guest	Gamboa	Jose	H-J Family of Companies	High Ridge	MO	X	
Guest	Harley	John	FirstPower Group LLC	Peninsula	OH	X	X
Guest	Jordan	Stephen	Tennessee Valley Authority	Chattanooga	TN	X	
Guest	Leigl	Angela	EATON Corporation	Waukesha	WI	X	X
Guest	Parkinson	Dwight	EATON Corporation	Waukesha	WI	X	
Guest	Patel	Nitesh	Hyundai Power Transformers USA	Montgomery	AL	X	X
Guest	Roman	Zoltan	GE Grid Solutions	Charleroi	PA	X	
Guest	Sanchez	Albert	Knoxville Utilities Board	Knoxville	TN	X	
Guest	teNyenhuis	Ed	Hitachi Energy	Stoney Creek	ON	X	
Guest	Varghese	Ajith	SPX Transformer Solutions, Inc.	Hartland	WI	X	X
Guest	vonGemmingen	Richard	Dominion Energy	Mechanicsville	VA	X	
Guest	Zaman	Malia	IEEE	Piscataway	NJ	X	
Guest	Ziger	Igor	KONCAR - Instrument Transformers	Zagreb	Other	X	
Guest	Rocque	Tim	Prolec GE Waukesha	Waukesha	WI	X	
Guest	Posadas	Daniel	Prolec SA de CV	Mty, NL, MX	Other	X	

Guest	Oliveira	Jonas	Hitachi Energy	Crystal Springs	MS	X	
Guest	Al Ahmed	Alex	Eergy Wolf Creek	Kansas City	MO	X	
Guest	Pandza	Tihomir	Siemens Energy	Zagreb	Other	X	
Guest	Gaziloda	Dora	KONCAR - Instrument Transformers	Zagreb	Other	X	
Guest	Kotuna	John	Dominion Energy	Richmond	VA	X	
Guest	Plisic	Goran	Siemens Energy	Zagreb	Other	X	
Guest	Dillon	Nikolaus	Dominion Energy	Richmond	VA	X	
Guest	Dolloff	Paul	East Kentucky Power	Winchester	KY	X	
Guest	Door	Jeffrey	H-J Family of Companies	Hill Ridge	MO	X	
Guest	Shosanya	Adetokunbo	XCEL Energy	Amarillo	TX	X	
Guest	Avanoma	Onome	MJC	Winnipeg	Canada	X	X
Guest	Salmon	Tommy	GE Grid Solutions	Chesterfield	VA	X	
Guest	Deverick	Jonathan	Dominion Energy	Richmond	VA	X	
Guest	Zhery	Rigi	HICO	Memphis	TN	X	
Guest	Debass	Samson	EPRI	Charlotte	NC	X	X

- Next Meeting:
Fall 2022 – Charlotte, NC October 18th, 2022.

We will be discussing mitigation methods for failures associated with instrument transformers.

- The meeting was Adjourned at 4:30pm.

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

Unapproved Meeting Minutes

DENVER, COLORADO, USA | March 29th, 2022 | 9:30 – 10:45 AM CDT

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

Meeting Attendance

The working group met at 9:30am. There were 34 attendees and 11/27 members present. Quorum was not achieved.

Attendance	
	Rosters
Total Attendees	34
Total # of members	27
Members present	11
Quorum present	41%

Discussions

- No essential patent claims noted.
- The IEEE copyright policy was shown; no objections were noted.
- The chair introduces to the working group the new secretary, Sergio Hernández.
- The agenda of the Spring 2021 meeting still unapproved as no quorum was achieved at the meeting.

Old Business

- The draft 4 of PC57.168 was circulated back in February 2022 by email to members and guests to vote on its suitability to proceed to sponsor ballot. There were no enough responses. Chair remains the attendants that members have the responsibility to attend to the meetings and to respond by email.
- Several comments were received at the time the draft was circulated by email, those were shared and discussed during the meeting:
 - Section 6.6 – Effect of core inter-laminar resistance on measured power factor
 - Group agreed to modify the term scratching by scribing.
 - It was recommended to add some ohmic resistance values to interlamination resistance. The group agreed this is a QA matter of the transformer's manufacturer and no need to include into the guide.
 - Comment received that the material focuses on stacked core form transformers but the issue also applies to some shell form transformers. Chair will review with the person who issued the comments to clarify.

- Group asks if the figure 17, Dissipation factor relative to core lamination resistance, is supported by actual data. Chair will review with person who submitted the graph.
- Section 6.2 & 6.3. The comments are related to upcoming updates to a future revision of the c57.12.90. The group agrees to not modify the draft.
- Section 5, induced testing with continuous monitoring. The group asks if this is a common practice in the industry. Chair will review with person who submitted the section.
- Figure 1- Alternate induced test circuit used in lieu of applied voltage test for two-winding transformers with delta-wye connected transformers. The group requests to add the standard test circuit to the guide. The chair will add to the draft.
- Several editorial comments were received, will be addressed in the draft.

New Business

- A new attempt to get members and guests to vote on the draft suitability to proceed to sponsor ballot will be done by email in the following weeks.
- An extension to the PAR will be requested by the chair, if necessary.

Adjournment

- No quorum to adjourn the meeting.

Meeting concluded at 10:16 am

Sergio Hernández

Attendee List:

First Name	Last Name	Company
Onome	Ananoma	MJ Consulting
Barry	Beaster	H-J Family of Companies
Wallace	Binder	WBBinder Consultant
William	Boettger	Boettger Transformer Consulting LLC
Alain	Bolliger	HV TECHNOLOGIES, Inc.
Dominique	Bolliger, Ph.D.	HV TECHNOLOGIES, Inc.
David	Calitz	Siemens Energy
Juan Alfredo	Carrizales	Prolec GE
Eric	Davis	Burns & McDonnell
Samson	Debass	Epri
Marco	Espindola	Hitachi Energy
Lorne	Gara	Shermco
Eduardo	Garcia Wild	Siemens Energy
Giovani	Hernandez	Virginia Transformer Corp.
Sergio	Hernandez Cano	Hammond Power Solutions
Stephen	Jordan	Tennessee Valley Authority
Evan	Knapp	EATON Corporation
Mama	Mbduomboud	Hitachy Energy
Tom	Melle	Highvolt
Brady	Nesvold	Xcel Energy
Poorvi	Patel	EPRI
Harry	Pepe	Phenix Technologies, Inc.
Daniel	Posadas	Prolec SA de CV
Ulf	Radbrandt	
Tim	Rolque	Prolec GE Waukesha
Amitabh	Sarkar	Virginia Transformer Corp.
Daniel	Sauer	EATON Corporation
Avijit	Shingari	Pepco Holdings
Markus	Soeller	Power diagnostix systems
Mike	Spurlock	Spurlock Engineering Services, LLC
Janusz	Szczechowski	Maschinenfabrik Reinhausen
Alan	Traut	Howard Industries
Zachery	Weiss	WEG Transformers USA Inc.
Dr. Alexander	Winter	HIGHVOLT Pruftechnik Dresden

B.5.3 WG C57.113 - Recommended Practice for PD Testing,

Unapproved Meeting Minutes

Denver March 27th, 2022

Chair: Ali Naderian
Vice Chair/Secretary: Janusz Szczechowski

Meeting Attendance

The working group met on Monday March 28th at 01:45 pm. There were 50 attendees, and 5 of 16 members present. Quorum was not achieved.

Discussions

- Meeting started with introduction of meetings participants with name and affiliation.
- Check of the quorum was done. Quorum was not reach. Past minutes of meeting and agenda could not be approved. Approval of the minutes of the meeting will be done over email.
- 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 explained again situation with vacant position for working group secretary and asked for volunteers.
- New draft of the standard was sent to the members. Members will be asked to put comments and send them over email.
- V-ce chair introduce new CIGRE brochure 861 "Improve to PD measurements for factory and site acceptance tests of power transformers". The full text will be presented on the next meeting after clarification of the CIGRE permission (copyright).

Janusz Szczechowski (01.04.2022)

DTSC Chair made a comment about e-mails not received by active participants. It might be because we have old information not up to date. It was requested to communicate any update to DTSC Chair or Secretary.- move this to main section

List of attendees

IEEE/PES TRANSFORMERS COMMITTEE

WG ROSTER

WG C57.113 - RECOMMENDED PRACTICE FOR PD TESTING

1:45 PM - 3:00 PM MONDAY MARCH 28TH, 2022

LAST/FAMILY/SURNAME	FIRST/GIVEN NAME	COMPANY NAME	CITY, STATE COUNTRY
✓ ROMAN	ZOLTAN	GE	PITTSBURGH, PA
✓ Wimbely	Barnett	GE	Pittsburg, PA
✓ Prevost	Thomas	Westinghouse	St Johnsbury, VT
✓ CALITE	DAVID	SIEMENS ENERGY	Wheatland, TX, US
✓ BOHRN	JOSH	SIEMENS ENERGY	Salt Lake City, UT, US
✓ OLIVEIRA	JONAS	Hitachi Energy	MISSISSIPPI
✓ SNYDER	STEVEN	HITACHI	LEX, KY, USA
✓ DOOR	JEFFREY	THE H-S FAMILY OF COMPANIES	ILLINOIS, USA
✓ WEISS	zachary	weg Transformer	WASINGTON, DC
✓ Dinh	thuan	Hitachi Energy	Lexington, KY
✓ SÖLLER	MARKUS	Power Diagnostic Systems	Aachen, Germany
✓ ALONSO	MARIO	GEORGE TRANSFORMER	RICHMOND, USA
✓ SARUAR	AMITABH	Virginia Transformer	Richmond, USA
✓ JORDAN	STEVE	TVA	CHATT, TN, USA
✓ BRANNEN	RANDY	SOUTHERN CO	ATLANTA, USA
✓ ZIGER	BOB	KORVEAR	CHATT, TN, USA
✓ KIRCHENMAYER	EGON	SIEMENS ENERGY	Germany
✓ CHORREPA	JAROSLAW	ABB Inc	Powder Springs, GA, USA
✓ Patel	Pooni	EPRI	Indianapolis, IN, USA
✓ Benach	Jeff	AMERGEN	St Louis, MO, USA
✓ HAINES-SPILLERS	BRIDGET	IEEE SA	PISCATAWAY, NJ, USA
✓ Zaman	MALIA	Burns & McDonnell	Kansas
✓ Holbrook	Derek	Emcon	Waukegan, WI, USA
✓ Knapf	Evan	Emcon	Waukegan, WI, USA
✓ Frye	Rich	Emcon	Waukegan, WI, USA
✓ Bellinger	Dominique	Emcon	Waukegan, WI, USA

IEEE/PES TRANSFORMERS COMMITTEE			
- WG ROSTER -			
WG C57.113 - RECOMMENDED PRACTICE FOR PD TESTING			
1:45 PM - 3:00 PM MONDAY MARCH 28th, 2022			
LAST/FAMILY/SURNAME	FIRST/GIVEN NAME	COMPANY NAME	CITY, STATE COUNTRY
✓ MARTINEZ	ROGERIO	GEORGE A. TRASTAS	EL PASO, TX
✓ Morales Guiz	Emilio	Qualitrol	Belton, TX USA
✓ Arce	Quaker	Belta star	Montreal, CA
✓ shamaun	Isabel	WEA	MO USA
✓ Ayers	Donald	Ayers Tr. Cons.	Waxahatchie, NC
✓ Dix	LARRY	Quality Switch	Newton Falls OH
✓ jtechschulte	Kyle	AEP	New Albany, IN
✓ Pepe	Harry	Phenix Technologies	Accident, MD
✓ Britton	Jeff	Phenix Tech. Div of Cable Engineering	Accident, MD USA
✓ McIVER	James	Siemens Energy	Raleigh, NC
✓ Carrizosa	Joan	Protec 65	Montgomery, AL
✓ Winter	Alexander	HIGHVOLT	Dresden, Germany
✓ Nesvold	Brady	Xcel Energy	Minneapolis, MN USA
✓ Riggins	Benjamin	Xcel Energy	Denver, CO, USA
✓ Schappach	Steven	Protec 65	Waukegan, IL
✓ BOLLIGER	ALVIN	WTECHNOLOGIES, Inc.	Perkasie, PA
✓ VARGHESE	AGITH	Protec 65	Waukegan, IL
✓ BELVARAT	PUGAL	VERMILION TRASP	Roanoke, VA
✓ SCHWARTZ	DAN	QUALITY SWITCH	NEWTON FALLS OH
✓ SOWELL	JEREMY	QUALITY SWITCH	NEWTON FALLS OH
✓ Knebel	Alexander	OLIVIERON	Germany
✓ Spurlock	Mike	Spurlock Engineering Svc	Columbus OH USA
✓ rambler Abbas	mubarek	Siemens Energy	Raleigh, NC
✓ Sinclair	Jonathan	PPL Electric Utilities	Millersburg, PA

- Working Group for PD in bushings, PTs and CTs – PC57.160, WG Secretary: Reto Fausch; WG Chair: Thang Hochanh -Meeting Minutes: VIRTUAL MEETING | November 16th, 2021 | 3:45pm - 5:00pm CT

T. Hochang did not attend the meeting, on his behalf Reto Fausch

Did not reach quorum during the meeting

Ballot resolution almost done on a spread sheet, meeting set via e-mail.

Most of comments have been entered into this spreadsheet. Technical discussion going on.

- **Working Group for Impulse Guide – PC57.98**

WG Secretary: John Foschia; WG Chair: Thang Hochanh; WG Vice Chair: Reto Fausch

Work on going and on schedule probably no additional PAR extension is needed.

B.6 Liaison Reports

IEEE High-Voltage Testing Techniques Subcommittee

Liaison Report to Dielectric Tests Subcommittee of IEEE Transformers Committee

Submitted by Jeff Britton (HVTT Subcommittee Chair)

- **Liaison Report – HVTT (J. Britton)- Copy in the text from the slides**

HVTT has had no meeting

Safety guide – working on editorial. PAR expires end of the 2022 year

4.1 and 454 – working to finish

Looking at a TF to look into revisions for the main Std IEEE Std. 4.

Jim invited all interested in participating in these activities.

B5. New Business

No new business reported.

At this point attendance was verified one more time. Headcount did not change. Quorum was not reached.

B6. List of Attendees to the DTSC meeting

Role	First Name	Last Name	Company	3/30/2022
Guest	Kayland	Adams	SPX Transformer Solutions, Inc.	X
Member	Gregory	Anderson	GW Anderson & Associates, Inc.	X
Member	Tauhid Haque	Ansari	Hitachi Energy	X
Member	Stephen	Antosz	Stephen Antosz & Associates, Inc	X
Member	Elise	Arnold	SGB	X
Member	Javier	Arteaga	Hitachi Energy	X
Member	Onome	Avanoma	MJ Consulting	X
Member	Donald	Ayers	Ayers Transformer Consulting	X
Guest	Gilles	Bargone	FISO Technologies Inc.	X
Guest	Barry	Beaster	H-J Family of Companies	X
Guest	Olle	Benzler	Megger	X
Guest	Jean-Noel	Berube	Rugged Monitoring Inc.	X
Member	Enrique	Betancourt	Prolec GE	X
Member	Daniel	Blaydon	Baltimore Gas & Electric	X
Member	William	Boettger	Boettger Transformer Consulting LLC	X
Guest	Alain	Bolliger	HV TECHNOLOGIES, Inc.	X
Member	Dominique	Bolliger, Ph.D.	HV TECHNOLOGIES, Inc.	X
Guest	Michael	Botti	Hyosung HICO	X
Guest	Jeremiah	Bradshaw	Bureau of Reclamation	X
Member	Jeffrey	Britton	Phenix Technologies, Inc.	X
Guest	Darren	Brown	Howard Industries	X
Member	David	Calitz	Siemens Energy	X
Guest	Juan Alfredo	Carrizales	Prolec GE	X
Member	Juan	Castellanos	Prolec GE	X
Member	Arup	Chakraborty	Delta Star Inc.	X
Guest	Solomon	Chiang	The Gund Company	X
Guest	Jaroslav	Chorzepa	ABB Inc.	X
Guest	Juan Carlos	Cruz Valdes	Prolec GE	X
Member	Eric	Davis	Burns & McDonnell	X
Guest	Pouneh	Davoudi	Delta Star Inc.	X

Guest	Sami	Debass	Electric Power Research Institute (EPRI)	X
Guest	Scott	Digby	Duke Energy	X
Member	Huan	Dinh	Hitachi Energy	X
Guest	Zachary	Draper	Delta-X Research Inc.	X
Member	Evgenii	Ermakov	Hitachi Energy	X
Guest	Marco	Espindola	Hitachi Energy	X
Member	Reto	Fausch	RF Solutions	X
Member	Hugo	Flores	Hitachi Energy	X
Member	Bruce	Forsyth	Bruce Forsyth and Associates PLLC	X
Member	George	Frimpong	Hitachi Energy	X
Guest	Jose	Gamboa	H-J Family of Companies	X
Member	Eduardo	Garcia Wild	Siemens Energy	X
Guest	Jeffrey	Gragert	Xcel Energy	X
Member	Bill	Griesacker	Duquesne Light Co.	X
Guest	Shamaun	Hakim	WEG Transformers USA Inc.	X
Member	John	Harley	FirstPower Group LLC	X
Guest	Bridget	Havens	Ameren	X
Member	Sergio	Hernandez Cano	Hammond Power Solutions	X
Member	John	Herron	Raytech USA	X
Guest	Gary	Hoffman	Advanced Power Technologies	X
Member	Saramma	Hoffman	PPL Electric Utilities	X
Guest	Ryan	Hogg	Bureau of Reclamation	X
Guest	Derek	Hollrah	Burns & McDonnell	X
Member	Philip	Hopkinson	HVOLT Inc.	X
Guest	Nicholas	Jensen	Delta Star Inc.	X
Member	Akash	Joshi	Black & Veatch	X
Guest	Zan	Kiparizoski	Howard Industries	X
Member	Egon	Kirchenmayer	Siemens Energy	X
Guest	Anton	Koshel	Delta Star Inc.	X
Member	Axel	Kraemer	Maschinenfabrik Reinhausen	X
Member	Alexander	Kraetge	OMICRON electronics Deutschland GmbH	X
Guest	Angela	Leigl	EATON Corporation	X
Member	Aleksandr	Levin	Weidmann Electrical Technology	X
Member	Weijun	Li	Braintree Electric Light Dept.	X
Member	Tim-Felix	Mai	Siemens Energy	X
Guest	Kumar	Mani	Duke Energy	X
Member	James	McBride	JMX Services, Inc.	X
Member	Thomas	Melle	HIGHVOLT	X
Member	Kent	Miller	T&R Electric Supply Co.	X
Guest	Rhea	Montpool	Schneider Electric	X
Member	Emilio	Morales-Cruz	Qualitrol Company LLC	X
Member	David	Murray	Tennessee Valley Authority	X
Guest	Ryan	Musgrove	Oklahoma Gas & Electric	X

Guest	Shankar	Nambi	Bechtel	X
Guest	Brady	Nesvold	Xcel Energy	X
Guest	Ashmita	Niroula	Ergon, Inc.	X
Member	Dwight	Parkinson	EATON Corporation	X
Chair	Poorvi	Patel	Electric Power Research Institute (EPRI)	X
Member	Nitesh	Patel	Hyundai Power Transformers USA	X
Member	Harry	Pepe	Phenix Technologies, Inc.	X
Member	Klaus	Pointner	Trench Austria GmbH	X
Member	Thomas	Prevost	Weidmann Electrical Technology	X
Member	Jarrold	Prince	ERMCO	X
Guest	Scott	Reed	MVA	X
Secretary	Diego	Robalino	Megger	X
Guest	Tim	Rocque	SPX Transformer Solutions, Inc.	X
Guest	Zoltan	Roman	GE Grid Solutions	X
Guest	Marnie	Roussell	Entergy	X
Member	Mickel	Saad	Hitachi Energy	X
Member	Hakan	Sahin	Virginia/Georgia Transformer	X
Guest	Dinesh	Sankarakurup	Duke Energy	X
Member	Manish	Saraf	Hammond Power Solutions	X
Member	Amitabh	Sarkar	Virginia Transformer Corp.	X
Guest	Steven	Schappell	SPX Transformer Solutions, Inc.	X
Member	Markus	Schiesl	SGB	X
Member	Jeffrey	Schneider	Power Partners/Spire Power Solutions	X
Guest	Alfons	Schrammel	Siemens Energy	X
Member	Ewald	Schweiger	Siemens Energy	X
Guest	Cihangir	Sen	Duke Energy	X
Guest	Stephen	Shull	BBC Electrical Services, Inc.	X
Member	Jonathan	Sinclair	PPL Electric Utilities	X
Guest	Thomas	Sizemore	ABB Inc.	X
Member	Steven	Snyder	Hitachi Energy	X
Guest	Markus	Soeller	Power Diagnostix	X
Member	Sanjib	Som	Pennsylvania Transformer	X
Member	Mike	Spurlock	Spurlock Engineering Services, LLC	X
Member	Brad	Staley	Salt River Project	X
Member	Kyle	Stechschulte	American Electric Power	X
Guest	Hampton	Steele	Tennessee Valley Authority	X
Member	Andrew	Steineman	Delta Star Inc.	X
Member	Charles	Sweetser	OMICRON electronics Corp USA	X
Member	Janusz	Szczechowski	Maschinenfabrik Reinhausen	X
Member	Troy	Tanaka	Burns & McDonnell	X
Guest	Marc	Taylor	JFE Shoji Power Canada Inc.	X
Guest	Ed	teNyenhuis	Hitachi Energy	X
Guest	Mark	Tostrud	Dynamic Ratings, Inc.	X

Member	Alwyn	Van Der Walt	Electrical Consultants, Inc.	X
Member	Ajith	Varghese	SPX Transformer Solutions, Inc.	X
Guest	Richard	vonGemmingen	Dominion Energy	X
Member	Pragnesh	Vyas	Sunbelt-Solomon Solutions	X
Member	David	Wallace	Mississippi State University	X
Member	David	Wallach	Duke Energy	X
Guest	Alan	Washburn	Burns & McDonnell	X
Guest	Joe	Watson	JD Watson and Associates Inc.	X
Guest	Zachery	Weiss	WEG Transformers USA Inc.	X
Member	Daniel	Weyer	Nebraska Public Power District	X
Member	Dr. Alexander	Winter	HIGHVOLT Pruftechnik Dresden	X
Guest	Jeffrey	Wright	Duquesne Light Co.	X
Guest	Malia	Zaman	IEEE	X
Member	Kris	Zibert	Allgeier, Martin and Associates	X
Guest	Cesar	Diaz	EATON Corporation	X
Guest	Alex	Alahmed	Energy Wolf Creek	X
Guest	David	Burka	Xcel Energy	X
Guest	Benjamin	Rigging	Xcel Energy	X
Guest	Mama	Mbouombouo	Hitachi Energy	X
Guest	Robert	VanTool	Commonhealth Associates	X
Guest	Olivia	Cordova	Bureau of Reclamation	X
Guest	John	Kotua	Dominion Energy	X
Guest	Christopher	Whitten	Hitachi Energy	X
Guest	Jonas	Oliveira	Hitachi Energy	X
Guest	Kyle	Zemanovic	EATON Corporation	X
Guest	Rich	Fryc	EATON Corporation	X
Guest	Ryan	Byrnes	HICO America	X
Guest	Evan	Khapp	EATON Corporation	X