

September 14, 2023

Dear Committee Members and Guests:

You and your spouse/companion are cordially invited to Kansas City, Missouri, USA, to attend the fall 2023 meeting of the IEEE PES Transformers Committee, October 22–26. Named one of the best places in the US to visit in 2023 by Condé Nast, labeled a “rising star” for tech jobs by the Brookings Institute, and receiving a steadily rising rating on the US News Best Places to Live list, Kansas City offers a surprising variety of attractions for visitors and residents alike. Sports fans, museum goers, music lovers, and hungry and thirsty foodies will all find themselves with lots of options. We look forward to welcoming you to the City of Fountains!

HOTEL INFORMATION: Our meeting will be held at the Westin Kansas City at Crown Center, 1 East Pershing Road. Enjoy easy access to popular downtown attractions from the hotel, including Crown Center KCMO, Union Station, Sprint Center, and the Power & Light District. After a full day of business, shopping, or sightseeing, relax in your well-appointed room or reenergize in the Fitness Studio with cardio equipment and free weights.

Our discounted guestroom rates start at US\$189 per night. All rates include complimentary wireless internet in guestrooms and hotel public space as well as complimentary fitness center access for all overnight guests. Visit the Committee's website for a link to reserve a room, or if you call the hotel, mention "IEEE Transformers" to receive the respective group rate. Cutoff date for the group rate is Friday, October 6, but we expect the hotel to sell out sooner.

GETTING THERE: The Westin Kansas City at Crown Center is located approximately 21 miles/34 km south of Kansas City International Airport (MCI). Taxi fare is approximately US\$55–\$70 one way from the airport to the hotel. UBER and Lyft (US\$32–US\$36) are also approved for ride sharing at MCI. Discounted self-parking in the hotel's garage is US\$25/car per night. Valet parking is also available at a rate of US\$35/car per night.

MEETING REGISTRATION: Register on-line for the meeting, Sunday night reception, Monday and Tuesday lunches, spouse/companion tours, technical tours, and Wednesday night event: <https://cvent.me/kREAnN>. This link can also be found on the Committee website Next Meeting page. Register by Friday, October 6, to receive a US\$50 to US\$60 early registration discount (depending on your registration type). The on-line registration system will be disabled on Wednesday, October 18 to print name badges and finalize counts. The cost to register on-site is substantially higher than the advance registration price, and some events may not be available for on-site registration.

WEATHER: October is typically an enjoyable autumn month in Kansas City, with the average temperature varying between 48°F/9°C and 65°F/18.5°C, with only a small chance of precipitation. Dress for the meeting is business casual.

SUNDAY EVENING WELCOME RECEPTION: The reception will be held inside the Westin hotel in the beautiful Century Ballroom. Featuring live music by a local group, plenty of tasty food and cash bars, kick off the week by catching up with old friends and meeting new ones. Please indicate whether you will attend this reception during the meeting registration process.

SPOUSE/COMPANION TOURS: On Monday, start the day with a guided tour of the Harry S. Truman Presidential Library & Museum followed by a BBQ lunch at Char Bar. The afternoon includes multiple stops to view the city's most photographed fountains.

Tuesday is geared towards chocolate lovers who are interested in learning chocolate-making techniques. Attendees will discover the joy of making ganache, forming the centers and tempering chocolate while exploring variations of flavors and coatings. Everyone will leave with a box of nine delicious hand-made truffles and the confidence to make them again at home.

See flyers for details and register early as attendance is limited!

TECHNICAL TOURS: Tours of Milbank Manufacturing, Garmin Headquarters, and an Evergy "Touchless" substation are planned for Monday evening, Tuesday evening and Thursday afternoon, respectively. Register online for all tours. Attendance is limited – see flyers for details.

WEDNESDAY DINNER SOCIAL: Join us at this unique venue for a BBQ buffet dinner, cash bars and an opportunity to connect with fellow committee members while experiencing together a one-of-a-kind tribute to an event of global proportions!

Opened in 1926, the National WWI Museum and Memorial is the only American museum exclusively dedicated to the Great War and its enduring impact. Visitors are first greeted by the impressive Liberty Memorial Tower – a monument to the men and women who served in the war. Beneath the monument, the main gallery is arranged as if WWI soldiers were telling visitors their own stories through the exhibits. The museum features life-size replicas of trenches, the world's most comprehensive collection of World War I artifacts, and our event will include access to the Liberty Memorial Tower observation deck (elevator plus 45 steps) with breathtaking views of the Kansas City skyline.

ADDITIONAL MEETING INFORMATION: Along with this invitation letter, additional meeting information can be downloaded from the Committee's website:

- Registration Fees Summary – Guide to review all fees before logging into the registration system.
- Meeting Schedule and General Sessions Agenda – If any noteworthy changes are made, an updated schedule will be posted on the Committee's website a few days prior to the meeting.

We are certain you will enjoy everything Kansas City has to offer and look forward to seeing you at the fall 2023 meeting!

Best regards,

Troy Tanaka, Alan Washburn
and
the Burns & McDonnell team

Fall 2023 Meeting Hosts



IEEE PES TRANSFORMERS COMMITTEE

Fall 2023 Meeting Kansas City, Missouri USA

~ Meeting Registration Fees Summary ~

- Register on-line with credit card or wire transfer (extra fee applies for wire transfer) at the registration link posted on this page: <https://www.transformerscommittee.org/meetings/2023-fall-kansas-city/>; contact the Committee at tc-meetings@ieee.org if an alternate form of payment is necessary.
- Each individual must register for the meeting and pay appropriate registration fee to attend any social event or tour
- **Print a receipt at the end of the registration process**; paper receipts are NOT provided at the meeting
- Refund provided only if request received by Wednesday, October 18, 2023, and valid once confirmation email received; US\$25 service charge for a refund of entire registration or US\$10 for a partial refund
- US Tax ID No. 13-1656633, Canadian Business No. 12563 4188, Euro Tax Registration No. EU826000081

REGISTRATION FEES AS SHOWN BELOW – all fees in US dollars – all fees stated are per person	On or Before October 6	After Oct 6, on or before October 18	On-site
MEETING REGISTRATION			
Attendee — IEEE member (will be verified when registering)	\$495	\$545	\$645
Attendee — non-IEEE member	\$595	\$655	\$775
Attendee — IEEE Life or Committee Emeritus (will be verified)	\$220	\$270	\$370
Spouse/Companion or guest* and children age 12 and over	\$235	\$285	\$385
– Attendee registration fee includes Sunday night welcome reception, entry into meeting area, coffee breaks and four breakfasts (Mon, Tues, Wed, Thurs) – Spouse/Companion registration fee includes Sunday night welcome reception, four breakfasts (Mon, Tues, Wed, Thurs) and ability to register for tours (which are subsidized by the Committee)			
* This fee category is for anyone who is attending for non-commercial reasons, i.e. not attending the technical meetings, etc. Spouses/Companions/Guests, including children (age 12 and over) must be registered for the meeting with above meeting registration fees to attend any tour, social event and/or breakfasts.			
LUNCHEONS			
Monday Standards Development Luncheon – Buffet lunch (no meal selection required)	\$35	\$35	\$35
Tuesday Awards Luncheon – Meal selection required - indicate beef, chicken or vegetarian	\$45	\$45	\$45
SOCIAL EVENTS & TOURS (see flyers for details)			
Sunday Night Welcome Reception: Century Ballroom – Westin	included in registration fee; <i>please register in advance for headcount purposes</i>		
Wednesday Evening Dinner Social: World War I Museum & Memorial** – Enjoy the world's most comprehensive collection of WWI artifacts and exhibits – Take an elevator (followed by 45 stairs) to the open-air observation deck of the Liberty Memorial Tower for a breathtaking view of the Kansas City skyline – Hors d'oeuvres, BBQ buffet dinner and cash bars	\$85	\$85	\$85
Monday Spouse/Companion Tour: Truman Library & Fountains**	\$95	\$95	\$95
Tuesday Spouse/Companion Tour: Bliss Chocolatier**	\$70	\$70	\$70
TECHNICAL TOURS			
Monday Evening: Milbank Manufacturing** <i>LIMITED TO ONE BUS/40 ATTENDEES</i>	\$30	\$30	\$30
Tuesday Evening: Garmin** <i>LIMITED TO TWO BUSES/100 ATTENDEES – INCLUDES BOXED DINNER ON BUS</i>	\$45	\$45	\$45
Thursday Afternoon: Every Touchless Substation** <i>LIMITED TO 35 ATTENDEES</i>	\$30	\$30	\$30
** Attendance will be limited for Wednesday evening social event, spouse/companion tours and technical tours due to space constraints, so register early! <i>On-site registration for these events only available if space allows.</i>			

IEEE PES TRANSFORMERS COMMITTEE

Fall 2023 Meeting: Kansas City, Missouri

Agenda - General Sessions

Chair: Ed teNyenhuis **Vice Chair:** David Wallach **Secretary:** Bill Griesacker
Treasurer: Troy Tanaka **Awards Chair/Past Chair:** Bruce Forsyth **Standards Coordinator:** Steve Shull

Opening Session

Monday, October 23, 2023: 8:00 am - 9:15 am CDT (UTC-06:00)

(Attendance recorded by roster – attendance required to maintain Member status)

1. Welcome and Announcements Ed teNyenhuis
2. Meeting Minute Tammy Behrens
3. Approval of Agenda Ed teNyenhuis
4. Approval of Minutes from Spring 2023 Meeting Ed teNyenhuis
5. Chair's Report & Administrative Subcommittee Report Ed teNyenhuis
6. Vice Chair's Report David Wallach
7. Secretary's Report Bill Griesacker
8. Treasurer's Report Troy Tanaka
9. Standards Report Steve Shull
10. Liaison Representative Reports
 - 10.1. CIGRE Craig Swinderman
 - 10.2. IEC TC-10..... Ed Casserly
 - 10.3. IEC TC-14..... Christoph Ploetner
 - 10.4. Standards Coordinating Committee, SCC4 (Electrical Insulation) Evanne Wang
 - 10.5. ASTM Ed Casserly
 - 10.6. Transactions on Power and Delivery (TPWRD) Editor Liaison Xose Lopez-Fernandez
11. Hot Topics for the Upcoming Week Subcommittee Chairs
12. New Business & Wrap-up Ed teNyenhuis

Closing Session

Thursday, October 26, 2023: 11:00 am - 12:00 pm CDT (UTC-06:00)

1. Chair's Remarks and Announcements Ed teNyenhuis
2. Meetings Planning Subcommittee Tammy Behrens
3. Reports from Technical Subcommittees (decisions made during the week)
 - 3.1. Bushings Eric Weatherbee
 - 3.2. Dielectric Tests Poorvi Patel
 - 3.3. Distribution Transformers Jerry Murphy
 - 3.4. Dry Type Transformers Casey Ballard
 - 3.5. Transformers and Reactors for HVDC Applications Ulf Radbrandt
 - 3.6. Instrument Transformers Thomas Sizemore
 - 3.7. Insulating Fluids Scott Reed
 - 3.8. Insulation Life Sam Sharpless
 - 3.9. Performance Characteristics Rogerio Verdolin
 - 3.10. Power Transformers Ryan Musgrove
 - 3.11. Standards Dan Sauer
 - 3.12. Subsurface Transformers & Network Protectors George Payerle
4. Additional Report from Standards Coordinator (issues from the week) Steve Shull
5. New Business (continued from Monday) and Wrap-up Ed teNyenhuis

KEY

Note: A PC projector will be furnished in each meeting room. Arrive early to ensure equipment operates/syncs correctly.

> = activity continued into another session / from another session

++ = not a Transformers Committee activity

TBD = To Be Determined

TRACK LEGEND

Admin	Administrative SC	Ins Life	Insulation Life SC
Bush	Bushings SC	Instr TR	Instrument Transformers SC
DiTests	Dielectric Tests SC	Mtgs	Meetings Planning SC
Distr	Distribution Transformers SC	PCS	Performance Characteristics SC
Dry Type	Dry Type Transformers SC	Power	Power Transformers SC
HVDC	HVDC Converter Transfs. and Smoothing Reactors SC	STNP	Submersible Transf. & Network Protectors SC
IF	Insulating Fluids SC	Stds	Standards SC

STATUS LEGEND

N	New
I	In-Progress
NC	Near Completion
B	Ballot Stage
C	Complete
E	Entity

SATURDAY, OCTOBER 21

No Events Planned

TIME	ACTIVITY	TRACK	MTG CHAIR	STATUS	ROOM (FLOOR)
No Events Planned					

SUNDAY, OCTOBER 22

TIME	ACTIVITY	TRACK	MTG CHAIR	STATUS	ROOM (FLOOR)
1:00 PM – 5:30 PM	Meeting Registration				Century Foyer (BR)
2:00 PM – 5:00 PM	Administrative Subcommittee - Closed meeting, by invitation only	Admin	E. teNyenhuis	–	Shawnee/Mission (BR)
6:00 PM – 8:00 PM	Welcome Reception Renew old friendships and form new ones! This reception will be held inside the beautiful Century Ballroom, so weather will not be an issue. Cash bars, plenty of fabulous food and live music will be provided. Please indicate whether you will attend this reception during the meeting registration process. All registered attendees and spouses/companions are welcome to attend.				Century A/B (BR)

MONDAY, OCTOBER 23 Breaks Sponsored by HV Technologies Inc. *

TIME	ACTIVITY	TRACK	MTG CHAIR	STATUS	ROOM (FLOOR)
7:00 AM – 5:00 PM	Meeting Registration				Century Foyer (BR)
7:00 AM – 7:50 AM	Newcomers Orientation - Arrive early, grab breakfast and get a good seat - Newcomers and guests are encouraged to attend		D. Wallach	—	Liberty (BR)
7:00 AM – 8:00 AM	Breakfast - Attendees (no spouses/companions please)				Washington Park Place (L)
8:00 AM – 9:30 AM	Breakfast - Spouses/Companions (no meeting attendees please)				Bentons (20)
8:00 AM – 9:15 AM	Opening Session - All registered meeting participants are encouraged to attend - See separate document on website for meeting agenda - Attendance required to maintain Committee Member status		E. teNyenhuis	—	Century C (BR)
9:30 AM – 3:30 PM	Spouses/Companions Tour: Truman Library & Fountains Tour - Advance on-line registration required — space is limited! - Famous KC BBQ lunch included at Char Bar - See website/flyer for details	Tour			
9:15 AM – 9:30 AM	Break (beverages only): HV Technologies Inc.				Century Foyer (BR)
9:30 AM – 10:45 AM	TF IEEE-IEC Cross Reference	Stds	A. Washburn	I	Roanoke (BR)
9:30 AM – 10:45 AM	TF CO2 Emissions in the Construction of Transformers	PCS	J. Kazmierczak	I	Century B (BR)
9:30 AM – 10:45 AM	WG Standard Requirements for Tap Changers - C57.131	Power	C. Colopy	I	Liberty (BR)
9:30 AM – 10:45 AM	WG Std Transf. Terminology C57.12.80	Stds	S. Nambi	I	Shawnee/Mission (BR)
9:30 AM – 10:45 AM	TF Transf Efficiency & Loss Evaluation (DOE Activity)	Distr	P. Hopkinson	I	Century C (BR)
9:30 AM – 10:45 AM	WG Guide for Tank Rupture Mitigation C57.156	Power	P. Zhao	I	Century A (BR)
10:45 AM – 11:00 AM	Break (beverages only): HV Technologies Inc.				Century Foyer (BR)
11:00 AM – 12:15 PM					Century B (BR)
11:00 AM – 12:15 PM	WG Loading Guide PC57.91	Ins Life	D. Wallach	I	Century A (BR)
11:00 AM – 12:15 PM	WG Class 1E Transf. for Nuclear Power Gen Std. 638	Power	C. Swinderman	I	Shawnee/Mission (BR)
11:00 AM – 12:15 PM	WG Guide for Field Testing PC57.152	Stds	M. Ferreira	I	Liberty (BR)
11:00 AM – 12:15 PM	TF Partial Discharge Tests for Class I Trfs	DiTests	D. Ayers	I	Century C (BR)
11:00 AM – 12:15 PM	WG Guide for DGA in Silicone PC57.146	IF	P. Boman	I	Roanoke (BR)
12:15 PM – 1:30 PM	Standards Development Review Luncheon Everyone is welcome to attend. All SC/WG/TF leaders are highly encouraged to attend. Doors open ~12:00 pm. Come early, get a good seat and start eating. Advance on-line registration required. To listen to the presentation without eating lunch, arrive by 12:30 pm.				Washington Park Place (L)
1:45 PM – 3:00 PM	WG 1-ph Padmount Dist Transf. C57.12.38	Distr	A. Ghafourian	I	Century B (BR)
1:45 PM – 3:00 PM	WG Dry Type Gen. Requirements C57.12.01	Dry Type	C. Ballard	I	Shawnee/Mission (BR)
1:45 PM – 3:00 PM	WG Guide for Phase Shifting Transf C57.135	Power	E. Schweiger	I	Roanoke (BR)
1:45 PM – 3:00 PM	TF DFR Test Guide C57.161	DiTests	E. Ermakov	I	Century A (BR)
1:45 PM – 3:00 PM	TF Audible Sound Revision to Test Code	PCS	R. Girgis	I	Century C (BR)
1:45 PM – 3:00 PM	WG App of High-Temp Insulation Matrs IEEE 1276 Annex B	Ins Life	K. Biggie	I	Liberty (BR)
3:00 PM – 3:15 PM	Break (beverages and treats): HV Technologies Inc.				Century Foyer (BR)
3:15 PM – 4:30 PM	WG 3-ph Padmount Dist Transf. C57.12.34	Distr	S. Shull	I	Century B (BR)
3:15 PM – 4:30 PM	WG Transformer Monitoring C57.143	Power	M. Spurlock	B	Century A (BR)
3:15 PM – 4:30 PM	WG Transformer Impulse Test Guide PC57.98	DiTests	T. Hochanh	I	Roanoke (BR)
3:15 PM – 4:30 PM	TF Test for Eval of Insulation for Dry-Type Transfs IEEE 259	Dry Type	D. Stankes	I	Shawnee/Mission (BR)
3:15 PM – 4:30 PM	TF PCS Cont. Revisions to C57.12.00	PCS	T. Ansari	I	Century C (BR)
3:15 PM – 4:30 PM	WG Bushing Application Guide C57.19.100	Bush	T. Spitzer	I	Liberty (BR)
4:30 PM – 4:45 PM	Break (beverages only): HV Technologies Inc.				Century Foyer (BR)
4:45 PM – 6:00 PM	WG Sec. Network Protectors C57.12.44	STNP	M. Faulkner	I	Century B (BR)
4:45 PM – 6:00 PM	TF Tank Touch Temperatures	Distr	B. Webb	I	Shawnee/Mission (BR)
4:45 PM – 6:00 PM	WG Failure Investigation & Reporting PC57.125	Power	H. Sahin	I	Century A (BR)
4:45 PM – 6:00 PM	TF Inverter Transf Precautions on Ground Shields C57.159	PCS	H. Shertukde	I	Century C (BR)
4:45 PM – 6:00 PM				-	Liberty (BR)
4:45 PM – 6:00 PM	SC HVDC Converter Transfs & Smoothing Reactors	HVDC	U. Radbrandt	-	Roanoke (BR)
6:30 PM – 8:30 PM	Technical Tour: Milbank Manufacturing Advance registration required—space is limited to one bus! Admission confirmed with badge at bus. Start loading bus at 6:15 PM and depart at 6:30 PM. Return at ~8:30 PM. NO dinner provided; however, snacks and water will be available on the bus. See website/flyer for more information.	Tech Tour			

TUESDAY, OCTOBER 24 Breaks Sponsored by Weidmann Electrical Technologies*

TIME	ACTIVITY	TRACK	MTG CHAIR	STATUS	ROOM (FLOOR)
7:00 AM – 11:30 AM	Meeting Registration				Century Foyer (BR)
7:00 AM – 7:50 AM	EL&P Delegation (End-users only please) - Arrive early and grab breakfast from Washington Park Place		J. Murphy	—	Brookside (L)
7:00 AM – 7:50 AM	Women in Power Breakfast - Arrive early and grab breakfast from Washington Park Place		E. teNyenhuis	—	Union Hill (L)
7:00 AM – 8:00 AM	Breakfast - Attendees (no spouses/companions please)				Washington Park Place (L)
8:00 AM – 9:30 AM	Breakfast - Spouses/Companions (no meeting attendees please)				Bentons (20)
10:00 AM – 12:30 PM	Spouses/Companions Tour: Make Your Own Chocolates! - Advance on-line registration required — limited to 12 people! - Held at Bliss Chocolatier, an artisan boutique specializing in hand-painted bonbons, chocolate bars, and fine confections - Leave with a box of nine hand-rolled truffles you'll make yourself; see flyer for details	Tour			
8:00 AM – 9:15 AM	WG Guide for Life Tests of Switch Contacts C57.157	Power	A. Sewell	I	Liberty (BR)
8:00 AM – 9:15 AM	WG Condition Assessment Guide PC57.170	Power	K. Mani	I	Century A (BR)
8:00 AM – 9:15 AM	WG Power-Line Carrier Coupling Cap & Volt Transf. C57.13.9	Instr TR	Z. Roman	I	Shawnee/Mission (BR)
8:00 AM – 9:15 AM	WG Practice for Install & Operation of Dry Type PC57.94	Dry Type	K. Klein	I	Roanoke (BR)
8:00 AM – 9:15 AM	WG Encl Int C57.12.28, C57.12.29, C57.12.31, C57.12.32	Distr	D. Mulkey	I	Century B (BR)
8:00 AM – 9:15 AM	TF on Revision of Impulse Tests C57.12.00 & C57.12.90	DiTests	S. Plante	I	Century C (BR)
9:15 AM – 9:30 AM	Break (beverages only): Weidmann Electrical Technologies				Century Foyer (BR)
9:30 AM – 10:45 AM	TF Detection of Acoustic Emissions from PD C57.127	DiTests	D. Gross	I	Liberty (BR)
9:30 AM – 10:45 AM	WG Distr Substation Transf PC57.12.36	Distr	J. Murphy	I	Century B (BR)
9:30 AM – 10:45 AM	TF Instrument Transf. Accuracy	Instr TR	I. Ziger	I	Shawnee/Mission (BR)
9:30 AM – 10:45 AM	TF Std Require for Bushings C57.19.01	Bush	S. Zhang	I	Roanoke (BR)
9:30 AM – 10:45 AM	TF PCS Cont. Rev. to Test Code C57.12.90	PCS	H. Sahin	I	Century A (BR)
9:30 AM – 10:45 AM	WG Guide for DGA Applied to Factory Temp Rise Test C57.130	IF	B. Forsyth	I	Century C (BR)
10:45 AM – 11:00 AM	Break (beverages only): Weidmann Electrical Technologies				Century Foyer (BR)
11:00 AM – 12:15 PM	WG Sw Transients Ind by TR/Bkr Interaction PC57.142	PCS	J. McBride	I	Century C (BR)
11:00 AM – 12:15 PM	WG Liquid-immersed Sec. Network TRs C57.12.40	STNP	J. Vartanian	I	Century B (BR)
11:00 AM – 12:15 PM	WG Requirements for Instrument Transformers PC57.13	Instr TR	D. Wallace	I	Century A (BR)
11:00 AM – 12:15 PM	WG Guide for Loading Dry Type Transformers C57.96	Dry Type	A. Narawane	I	Liberty (BR)
11:00 AM – 12:15 PM	WG Standard Requirements for Arc Furnace Transf. C57.17	Power	D. Corsi	I	Shawnee/Mission (BR)
11:00 AM – 12:15 PM	TF Guide for the Reclamation of Mineral Oil C57.637	IF	S. Denzer	I	Roanoke (BR)
12:15 PM – 1:30 PM	Awards Luncheon All meeting attendees are encouraged to attend to show appreciation and recognize accomplishments. Doors open ~12:00 pm. Come early, get a good seat and start eating. Advance on-line registration is required.				Washington Park Place (L)
1:45 PM – 3:00 PM	WG Guide DGA in Ester-Immersed Transformers PC57.155	IF	A. Sbravati	I	Century C (BR)
1:45 PM – 3:00 PM	WG Bar Coding for Distr Transf. C57.12.35	Distr	R. Chrysler	I	Roanoke (BR)
1:45 PM – 3:00 PM	TF Cont. Revision to Low Frequency Tests C57.12.90	DiTests	A. Varghese	I	Century A (BR)
1:45 PM – 3:00 PM	WG Guide for Mitigating Corrosion on Sub Trfs C57.12.53	STNP	W. Elliott	I	Century B (BR)
1:45 PM – 3:00 PM	WG Volts per Hertz C57.107	Power	J. Watson	I	Liberty (BR)
1:45 PM – 3:00 PM	TF to Merge C57.13.5 into C57.13	Instr TR	T. Sizemore	N	Shawnee/Mission (BR)
3:00 PM – 3:15 PM	Break (beverages and pretzels): Weidmann Electrical Technologies				Century Foyer (BR)
3:15 PM – 4:30 PM	WG Recommend Practice for Routine Impulse Tests C57.138	DiTests	H. Sahin	I	Roanoke (BR)
3:15 PM – 4:30 PM	TF Guide for Install & Maintenance of Power Trf C57.93	Power	S. Reed	I	Century A (BR)
3:15 PM – 4:30 PM	TF Test Method for Max Cont Temp of Ins Liquids	IF	A. Gamil	N	Liberty (BR)
3:15 PM – 4:30 PM	TF Reverse Power Flow Effects on Trans	Stds	D. Blaydon	I	Shawnee/Mission (BR)
3:15 PM – 4:30 PM	TF Continuous Rev Clause 11 Temp Rise Tests C57.12.90	Ins Life	D. Sankarakurup	I	Century C (BR)
3:15 PM – 4:30 PM	WG Req for Dist Trf Tank Pressure Coordination C57.12.39	Distr	C. Gayton	N	Century B (BR)
4:30 PM – 4:45 PM	Break (beverages only): Weidmann Electrical Technologies				Century Foyer (BR)
4:45 PM – 6:00 PM	Guide for App of Tertiary & Stabilizing Windings C57.158	PCS	E. Betancourt		Century A (BR)
4:45 PM – 6:00 PM					Century C (BR)
4:45 PM – 6:00 PM	WG Guide for DGA in LTCs C57.139	IF	R. Frotscher	I	Century B (BR)
4:45 PM – 6:00 PM	WG Neutral Grounding Devices C57.32	PCS	S. Kennedy	I	Roanoke (BR)
4:45 PM – 6:00 PM	WG Guide for Paralleling Transformers C57.153	Power	M. Tostrud	N	Liberty (BR)
4:45 PM – 6:00 PM	WG Dry Type Test Code C57.12.91	Dry Type	D. Walker	I	Shawnee/Mission (BR)
6:30 PM – 9:00 PM	Technical Tour: Garmin Advance registration required—space is limited to two buses! Admission confirmed with badge at bus. Start loading buses at 6:15 PM and depart at 6:30 PM. Return at ~9:00 PM. Box dinner will be provided while boarding bus. See website/flyer for more information.	Tech Tour			

IEEE PES TRANSFORMERS COMMITTEE
FALL 2023 MEETING: OCTOBER 22 TO OCTOBER 26
Westin at Crown Center; Kansas City, MO USA

10/17/2023

WEDNESDAY, OCTOBER 25 Breaks Sponsored by Raytech USA*

No Meeting Registration, Technical Tours, Spouse/Companion Tours, or Social Events Planned						
TIME	ACTIVITY	TRACK	MTG CHAIR	STATUS	ROOM (FLOOR)	
7:00 AM – 8:00 AM	Breakfast - Attendees (no spouses/companions please)				Pershing Place (BR)	
7:00 AM – 8:00 AM	SC Meetings Planning - Arrive early and grab breakfast from Pershing Place - All interested individuals welcome	Mtgs	T. Behrens	—	Shawnee (BR)	
7:00 AM – 8:00 AM	IEC TC-14 Technical Advisory Group - Breakfast Meeting - arrive early and grab breakfast from Pershing Place - All interested individuals welcome		T. Prevost	—	Liberty (BR)	
8:00 AM – 9:30 AM	Breakfast - Spouses/Companions (no meeting attendees please)				Bentons (20)	
8:00 AM – 9:15 AM	SC Instrument Transformers	Instr TR	T. Sizemore	—	Century B (BR)	
8:00 AM – 9:15 AM	SC Insulation Life	Ins Life	S. Sharpless	—	Century C (BR)	
9:15 AM – 9:30 AM	Break (beverages only): Raytech USA				Century Foyer (BR)	
9:30 AM – 10:45 AM	SC Distribution Transformers	Distr	J. Murphy	—	Century B (BR)	
9:30 AM – 10:45 AM	SC Bushings	Bush	E. Weatherbee	—	Century C (BR)	
10:45 AM – 11:00 AM	Break (beverages only): Raytech USA				Century Foyer (BR)	
11:00 AM – 12:15 PM	SC Submersible Transf. & Network Protectors	STNP	G. Payerle	—	Century B (BR)	
11:00 AM – 12:15 PM	SC Dielectric Test	DiTests	P. Patel	—	Century C (BR)	
12:15 PM – 1:30 PM	Lunch Break					
1:30 PM – 2:45 PM	SC Dry Type Transformers	Dry Type	C. Ballard	—	Century B (BR)	
1:30 PM – 2:45 PM	SC Power Transformers	Power	R. Musgrove	—	Century C (BR)	
2:45 PM – 3:00 PM	Break (beverages and treats): Raytech USA				Century Foyer (BR)	
3:00 PM – 4:15 PM	SC Insulating Fluids	IF	S. Reed	—	Century B (BR)	
3:00 PM – 4:15 PM	SC Performance Characteristics	PCS	R. Verdolin	—	Century C (BR)	
4:15 PM – 4:30 PM	Break (beverages only): Raytech USA				Century Foyer (BR)	
4:30 PM – 5:45 PM	SC Standards	Stds	D. Sauer	—	Century B (BR)	
6:00 PM – 9:00 PM	Dinner Social at World War I Museum & Memorial - Advance on-line registration required; admission confirmed with name badge at location - Venue is within easy walking distance from hotel; shuttle bus transportation will also be available to/from hotel, running between the museum and the hotel throughout the evening - In addition to enjoying the the only American museum exclusively dedicated to the Great War and its enduring impact, our event will include access to the Liberty Memorial Tower observation deck with sweeping views of the Kansas City skyline - Hors d'oeuvres, BBQ buffet dinner and cash bars (cash only - NO CREDIT CARDS ACCEPTED) - See flyer for details	Social				

THURSDAY, OCTOBER 26

No Meeting Registration, Technical Tours, Spouse/Companion Tours, or Social Events Planned						
TIME	ACTIVITY	TRACK	MTG CHAIR	STATUS	ROOM (FLOOR)	
7:00 AM – 8:00 AM	Breakfast - Attendees (no spouses/companions please)				Pershing Place (BR)	
8:00 AM – 9:30 AM	Breakfast - Spouses/Companions (no meeting attendees please)				Bentons (20)	
8:00 AM – 9:15 AM	Technical Presentation 1 Tutorial on IEEE Guide for Dielectric Frequency Response Measurements of Bushings by Poorvi Patel, Evgenii Ermakov, Ismail Guner and Peter Werelius - See flyer on website for details **	Tutorial			Century C (BR)	
9:15 AM – 9:30 AM	Break (beverages only)					
9:30 AM – 10:45 AM	Technical Presentation 2 Tutorial on IEEE Guide for Physical Security of Electric Power Substations by Connor Bowen, Isaac Cowger and Mark Smedvig - See flyer on website for details **	Tutorial			Century C (BR)	
10:45 AM – 11:00 AM	Break (beverages only)					
11:00 AM – 12:00 PM	Closing Session - All attendees are encouraged to attend - See separate document on website for meeting agenda		E. teNyenhuis		Century C (BR)	
12:00 PM	Lunch (on your own)					
1:00 PM – 3:00 PM	Technical Tour: Evergy Touchless Substation Advance registration required. Space is limited to 35 attendees! Admission confirmed with badge at bus. Start loading bus at ~12:50 PM at the hotel's main entrance and depart promptly at 1:00 PM. Return at ~3:00 PM. NO lunch provided; however, water will be available on the bus. See website/flyer for more information.	Tech Tour				

* Contact Ed Smith (edsmith@ieee.org) if you are interested in sponsoring a day of coffee breaks at a future meeting.

** Contact Tom Prevost (tprevost@ieee.org) if you are interested in making a technical presentation at a future meeting.

FUTURE COMMITTEE MEETINGS

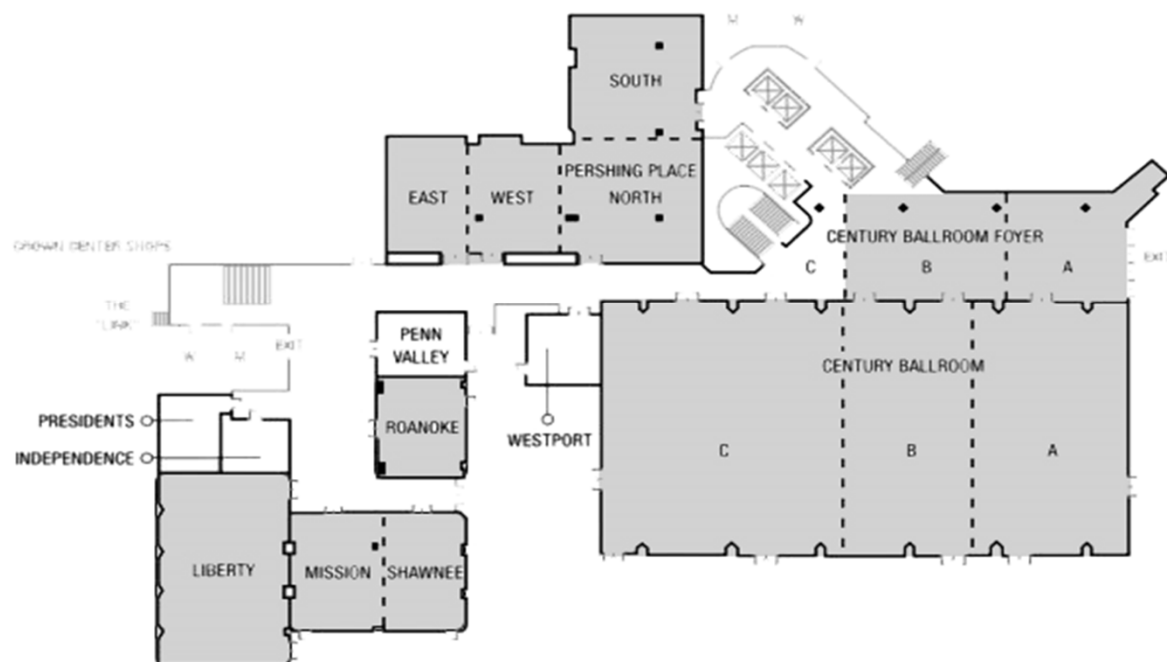
Spring 2024: Vancouver, BC Canada, March 10 – 14, 2024

Fall 2024: St. Louis, Missouri, October 27 – 31, 2024

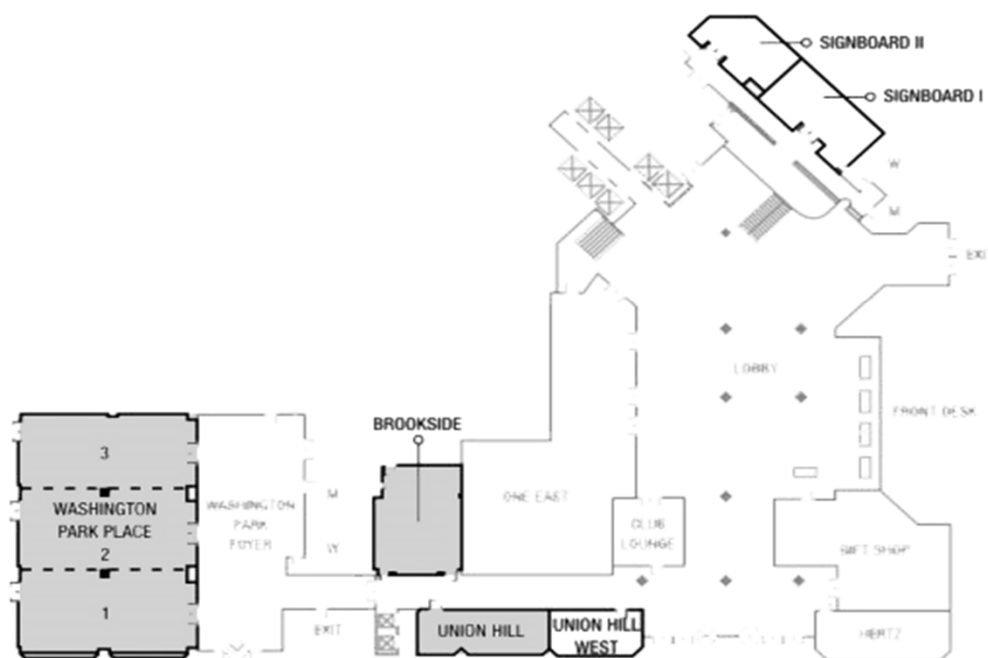
Spring 2025: Denver, Colorado USA, March 23 – 27, 2025

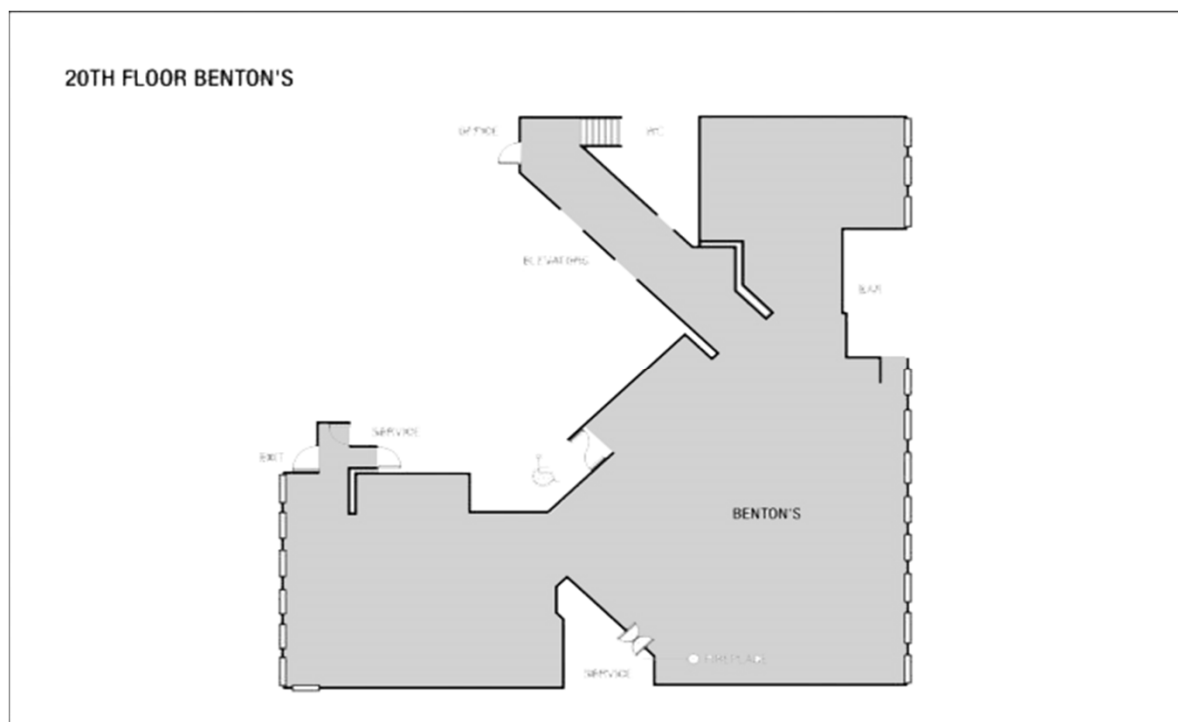
Fall 2025: TBD USA, October, 2025

BALLROOM LEVEL



LOBBY LEVEL





SUBCOMMITTEE MEETING LIST

FALL 2023 MEETING: OCTOBER 22 TO OCTOBER 26

Westin at Crown Center; Kansas City, MO USA

Date	Time Start	Time End	Session Title	Track	Chair	Room/Location
10/22/2023	2:00 PM	5:00 PM	Administrative Subcommittee - Closed meeting, by invitation only	Admin	E. teNyenhuis	Shawnee/Mission (BR)
10/23/2023	3:15 PM	4:30 PM	WG Bushing Application Guide C57.19.100	Bush	T. Spitzer	Liberty (BR)
10/24/2023	9:30 AM	10:45 AM	TF Std Require for Bushings C57.19.01	Bush	S. Zhang	Roanoke (BR)
10/25/2023	9:30 AM	10:45 AM	SC Bushings	Bush	E. Weatherbee	Century C (BR)
10/23/2023	9:30 AM	10:45 AM	TF Transf Efficiency & Loss Evaluation (DOE Activity)	Distr	P. Hopkinson	Century C (BR)
10/23/2023	1:45 PM	3:00 PM	WG 1-ph Padmount Dist Transf. C57.12.38	Distr	A. Ghafourian	Century B (BR)
10/23/2023	3:15 PM	4:30 PM	WG 3-ph Padmount Dist Transf. C57.12.34	Distr	S. Shull	Century B (BR)
10/23/2023	4:45 PM	6:00 PM	TF Tank Touch Temperatures	Distr	B. Webb	Shawnee/Mission (BR)
10/24/2023	8:00 AM	9:15 AM	WG Encl Int C57.12.28, C57.12.29, C57.12.31, C57.12.32	Distr	D. Mulkey	Century B (BR)
10/24/2023	9:30 AM	10:45 AM	WG Distr Substation Transf PC57.12.36	Distr	J. Murphy	Century B (BR)
10/24/2023	1:45 PM	3:00 PM	WG Bar Coding for Distr Transf. C57.12.35	Distr	R. Chrysler	Roanoke (BR)
10/24/2023	3:15 PM	4:30 PM	WG Req for Dist Trf Tank Pressure Coordination C57.12.39	Distr	C. Gayton	Century B (BR)
10/25/2023	9:30 AM	10:45 AM	SC Distribution Transformers	Distr	J. Murphy	Century B (BR)
10/23/2023	11:00 AM	12:15 PM	TF Partial Discharge Tests for Class I Trfs	DiTests	D. Ayers	Century C (BR)
10/23/2023	1:45 PM	3:00 PM	TF DFR Test Guide C57.161	DiTests	E. Ermakov	Century A (BR)
10/23/2023	3:15 PM	4:30 PM	WG Transformer Impulse Test Guide PC57.98	DiTests	T. Hochanh	Roanoke (BR)
10/24/2023	8:00 AM	9:15 AM	TF on Revision of Impulse Tests C57.12.00 & C57.12.90	DiTests	S. Plante	Century C (BR)
10/24/2023	9:30 AM	10:45 AM	TF Detection of Acoustic Emissions from PD C57.127	DiTests	D. Gross	Liberty (BR)
10/24/2023	1:45 PM	3:00 PM	TF Cont. Revision to Low Frequency Tests C57.12.90	DiTests	A. Varghese	Century A (BR)
10/24/2023	3:15 PM	4:30 PM	WG Recommend Practice for Routine Impulse Tests C57.138	DiTests	H. Sahin	Roanoke (BR)
10/25/2023	11:00 AM	12:15 PM	SC Dielectric Test	DiTests	P. Patel	Century C (BR)
10/23/2023	1:45 PM	3:00 PM	WG Dry Type Gen. Requirements C57.12.01	Dry Type	C. Ballard	Shawnee/Mission (BR)
10/23/2023	3:15 PM	4:30 PM	TF Test for Eval of Insulation for Dry-Type Transfs IEEE 259	Dry Type	D. Stankes	Shawnee/Mission (BR)
10/24/2023	8:00 AM	9:15 AM	WG Practice for Install & Operation of Dry Type PC57.94	Dry Type	K. Klein	Roanoke (BR)
10/24/2023	11:00 AM	12:15 PM	WG Guide for Loading Dry Type Transformers C57.96	Dry Type	A. Narawane	Liberty (BR)
10/24/2023	4:45 PM	6:00 PM	WG Dry Type Test Code C57.12.91	Dry Type	D. Walker	Shawnee/Mission (BR)
10/25/2023	1:30 PM	2:45 PM	SC Dry Type Transformers	Dry Type	C. Ballard	Century B (BR)
10/23/2023	4:45 PM	6:00 PM	SC HVDC Converter Transfs & Smoothing Reactors	HVDC	U. Radbrandt	Roanoke (BR)
10/23/2023	11:00 AM	12:15 PM	WG Guide for DGA in Silicone PC57.146	IF	P. Boman	Roanoke (BR)
10/24/2023	9:30 AM	10:45 AM	WG Guide for DGA Applied to Factory Temp Rise Test C57.130	IF	B. Forsyth	Century C (BR)
10/24/2023	11:00 AM	12:15 PM	TF Guide for the Reclamation of Mineral Oil C57.637	IF	S. Denzer	Roanoke (BR)
10/24/2023	1:45 PM	3:00 PM	WG Guide DGA in Ester-Immersed Transformers PC57.155	IF	A. Sbravati	Century C (BR)
10/24/2023	3:15 PM	4:30 PM	TF Test Method for Max Cont Temp of Ins Liquids	IF	A. Gamil	Liberty (BR)
10/24/2023	4:45 PM	6:00 PM	WG Guide for DGA in LTCs C57.139	IF	R. Frotscher	Century B (BR)
10/25/2023	3:00 PM	4:15 PM	SC Insulating Fluids	IF	S. Reed	Century B (BR)
10/23/2023	11:00 AM	12:15 PM	WG Loading Guide PC57.91	Ins Life	D. Wallach	Century A (BR)
10/23/2023	1:45 PM	3:00 PM	WG App of High-Temp Insulation Mats IEEE 1276 Annex B	Ins Life	K. Biggie	Liberty (BR)
10/24/2023	3:15 PM	4:30 PM	TF Continuous Rev Clause 11 Temp Rise Tests C57.12.90	Ins Life	D. Sankarakurup	Century C (BR)
10/25/2023	8:00 AM	9:15 AM	SC Insulation Life	Ins Life	S. Sharpless	Century C (BR)
10/24/2023	8:00 AM	9:15 AM	WG Power-Line Carrier Coupling Cap & Volt Transf. C57.13.9	Instr TR	Z. Roman	Shawnee/Mission (BR)
10/24/2023	9:30 AM	10:45 AM	TF Instrument Transf. Accuracy	Instr TR	I. Ziger	Shawnee/Mission (BR)
10/24/2023	11:00 AM	12:15 PM	WG Requirements for Instrument Transformers PC57.13	Instr TR	D. Wallace	Century A (BR)
10/24/2023	1:45 PM	3:00 PM	TF to Merge C57.13.5 into C57.13	Instr TR	T. Sizemore	Shawnee/Mission (BR)
10/25/2023	8:00 AM	9:15 AM	SC Instrument Transformers	Instr TR	T. Sizemore	Century B (BR)
10/25/2023	7:00 AM	8:00 AM	SC Meetings Planning - Arrive early and grab breakfast from Pershing Place - All interested individuals welcome	Mtgs	T. Behrens	Shawnee (BR)

SUBCOMMITTEE MEETING LIST

FALL 2023 MEETING: OCTOBER 22 TO OCTOBER 26

Westin at Crown Center; Kansas City, MO USA

Date	Time Start	Time End	Session Title	Track	Chair	Room/Location
10/23/2023	9:30 AM	10:45 AM	TF CO2 Emissions in the Construction of Transformers	PCS	J. Kazmierczak	Century B (BR)
10/23/2023	1:45 PM	3:00 PM	TF Audible Sound Revision to Test Code	PCS	R. Girgis	Century C (BR)
10/23/2023	3:15 PM	4:30 PM	TF PCS Cont. Revisions to C57.12.00	PCS	T. Ansari	Century C (BR)
10/23/2023	4:45 PM	6:00 PM	TF Inverter Transf Precautions on Ground Shields C57.159	PCS	H. Shertukde	Century C (BR)
10/24/2023	9:30 AM	10:45 AM	TF PCS Cont. Rev. to Test Code C57.12.90	PCS	H. Sahin	Century A (BR)
10/24/2023	11:00 AM	12:15 PM	WG Sw Transients Ind by TR/Bkr Interaction PC57.142	PCS	J. McBride	Century C (BR)
10/24/2023	4:45 PM	6:00 PM	Guide for App of Tertiary & Stabilizing Windings C57.158	PCS	E. Betancourt	Century A (BR)
10/24/2023	4:45 PM	6:00 PM	WG Neutral Grounding Devices C57.32	PCS	S. Kennedy	Roanoke (BR)
10/25/2023	3:00 PM	4:15 PM	SC Performance Characteristics	PCS	R. Verdolin	Century C (BR)
10/23/2023	9:30 AM	10:45 AM	WG Guide for Tank Rupture Mitigation C57.156	Power	P. Zhao	Century A (BR)
10/23/2023	9:30 AM	10:45 AM	WG Standard Requirements for Tap Changers - C57.131	Power	C. Colopy	Liberty (BR)
10/23/2023	11:00 AM	12:15 PM	WG Class 1E Transf.for Nuclear Power Gen Std. 638	Power	C. Swinderman	Shawnee/Mission (BR)
10/23/2023	1:45 PM	3:00 PM	WG Guide for Phase Shifting Transf C57.135	Power	E. Schweiger	Roanoke (BR)
10/23/2023	3:15 PM	4:30 PM	WG Transformer Monitoring C57.143	Power	M. Spurllock	Century A (BR)
10/23/2023	4:45 PM	6:00 PM	WG Failure Investigation & Reporting PC57.125	Power	H. Sahin	Century A (BR)
10/24/2023	8:00 AM	9:15 AM	WG Condition Assessment Guide PC57.170	Power	K. Mani	Century A (BR)
10/24/2023	8:00 AM	9:15 AM	WG Guide for Life Tests of Switch Contacts C57.157	Power	A. Sewell	Liberty (BR)
10/24/2023	11:00 AM	12:15 PM	WG Standard Requirements for Arc Furnace Transf. C57.17	Power	D. Corsi	Shawnee/Mission (BR)
10/24/2023	1:45 PM	3:00 PM	WG Volts per Hertz C57.107	Power	J. Watson	Liberty (BR)
10/24/2023	3:15 PM	4:30 PM	TF Guide for Install & Maintenance of Power Trf C57.93	Power	S. Reed	Century A (BR)
10/24/2023	4:45 PM	6:00 PM	WG Guide for Paralleling Transformers C57.153	Power	M. Tostrud	Liberty (BR)
10/25/2023	1:30 PM	2:45 PM	SC Power Transformers	Power	R. Musgrove	Century C (BR)
10/23/2023	9:30 AM	10:45 AM	TF IEEE-IEC Cross Reference	Stds	A. Washburn	Roanoke (BR)
10/23/2023	9:30 AM	10:45 AM	WG Std Transf. Terminology C57.12.80	Stds	S. Nambi	Shawnee/Mission (BR)
10/23/2023	11:00 AM	12:15 PM	WG Guide for Field Testing PC57.152	Stds	M. Ferreira	Liberty (BR)
10/24/2023	3:15 PM	4:30 PM	TF Reverse Power Flow Effects on Trans	Stds	D. Blaydon	Shawnee/Mission (BR)
10/25/2023	4:30 PM	5:45 PM	SC Standards	Stds	D. Sauer	Century B (BR)
10/23/2023	4:45 PM	6:00 PM	WG Sec. Network Protectors C57.12.44	STNP	M. Faulkner	Century B (BR)
10/24/2023	11:00 AM	12:15 PM	WG Liquid-immersed Sec. Network TRs C57.12.40	STNP	J. Vartanian	Century B (BR)
10/24/2023	1:45 PM	3:00 PM	WG Guide for Mitigating Corrosion on Sub Trfs C57.12.53	STNP	W. Elliott	Century B (BR)
10/25/2023	11:00 AM	12:15 PM	SC Submersible Transf. & Network Protectors	STNP	G. Payerle	Century B (BR)

IEEE Guide for Dielectric Frequency Response Measurements on Bushings

— Technical Presentation —
Thursday, October 26, 2023

By Poorvi Patel, Evgenii Ermakov, Ismail Guner and Peter Werelius

1. Abstract

This tutorial will cover four topics:

- Overview of the Guide for Dielectric Frequency Response (DFR) on Bushings C57.12.200
- Best practice for field testing of DFR on bushings
- Influence of creep current and importance of temperature correction
- Case study - Bushing DFR from a utility perspective

To start, Poorvi Patel will provide a review of the newly published IEEE C57.12.200: IEEE Guide for Dielectric Frequency Response Measurements on Bushings. Poorvi's presentation will include the difference between 50/60Hz PF, capacitance vs. DFR and interpretation guidelines for DFR test results.

Evgenii Ermakov will discuss general DFR measurement test practice and measurement considerations. He will also share some interesting cases from the field.

Peter Werelius will guide us through factors that could influence DFR measurements in the field that are not bushing related but, instead, due to influence of bushing surface creep currents, nearby energized units and temperature differences.

Finally, Ismail Guner will provide participants with a utility perspective of performing DFR. He will share a case study in which DFR helped Hydro Quebec identify problematic bushings in the field and develop a prioritization program for bushing replacement.

2. Learning Objectives

This presentation will help attendees get familiar with DFR test techniques for factory or field bushing testing. It will also provide practical application examples and case studies on how to use the test, perform the test and analyze the results as an optional FAT and maintenance test.

3. Learning Outcomes

By attending this tutorial, attendees will gain an understanding of the following:

- IEEE C57.12.200: Guide for Dielectric Frequency Response Measurements on Bushings
- How to test and analyze DFR on bushings and identify possible problematic bushings

4. Presenters' Biographies

Evgenii Ermakov, Ph.D. in high voltage technology, R&D Principal Engineer at Hitachi Energy Sweden AB, member of SEK TC14, Senior IEEE Member. Evgenii began his professional career in 2006 and joined Hitachi Energy (formerly ABB) in 2011. He is involved in transformer condition, life and risk assessments and leads research and development projects in the field of transformer condition assessment and monitoring. Evgenii also actively participates in relevant IEEE, CIGRE and IEC working groups and task forces. He is the author of more than 30 technical publications and is a key contributor for the C57.12.200 DFR guide for bushings. Evgenii received his Ph.D. from Saint-Petersburg State Polytechnical University, Russia, optimizing the methodology for diagnostics of high voltage power transformers.

Ismail Guner currently holds the position of power transformer engineer at Hydro-Québec, previously working as a power transformer electrical design engineer at ABB. He is an active member of the IEEE Transformers Committee and received his Bachelor of Science Degree in Electrical Engineering from École Polytechnique de Montréal, Canada.

Poorvi Patel is a strategic insight manager at EPRI and technical expert in power transformers and bushings. Her current research area focuses on emerging technologies to accelerate the decarbonization of the power sector. Poorvi joined EPRI in August of 2018. Before joining EPRI, she worked for 20 years at ABB TRES. During that period, she led research and development within transformer on-line monitoring solutions, such as gas monitor development and asset management development. She also performed R&D in transformer advanced diagnostic tools and analytical methods, such as dielectric frequency response (DFR) and sweep frequency response analysis (SFRA) technologies. Poorvi has been a member of the Power Engineering Society of the IEEE since 2007 and is actively involved in the work of the IEEE PES Transformers Committee. She is the key contributor of the C57.161 DFR guide and C57.12.200 DFR guide for bushings and chair of the IEEE Dielectric Subcommittee. She is also vice chair for the revision of IEEE monitoring guide and vice chair for the IEEE SFRA guide. Poorvi received her Ph.D. at Lund University in Sweden and her MSc degrees in Mechanical Engineering from the University of Luleå, Sweden.

Peter Werelius works for Megger Sweden as a senior application specialist with responsibilities related to research, product development, product sustainability and training for the Megger Global organization. He began his professional career by starting up a spin-off company, WaBtech, in 1996, where he manufactured the first DFR field test equipment, after which he was responsible to improve and further develop DFR technology and its applications under WaBtech, Programma, GE, Pax Diagnostics and now Megger. Peter is a member of SEK TC14, IEEE and CIGRE and actively participates in working groups and task forces, especially those related to FDS/DFR and SFRA. Throughout his career, he has participated in relevant technical conferences, authored technical papers and received patents. Peter earned his Ph.D. in Electrical Engineering from Kungl, Tekniska Högskolan, Sweden, developing the Dielectric Frequency Response (DFR) technique for diagnosis of medium voltage XLPE cables.



IEEE PES Transformers Committee
Fall 2023 Meeting
Kansas City, Missouri



IEEE Standard 1402:
IEEE Guide for Physical Security of Electric Power Substations

— Technical Presentation —
Thursday, October 26, 2023

By Connor Bowen, Isaac Cowger and Mark Smedvig

1. Abstract

On April 16, 2013, the Metcalf substation, south of San Francisco, was attacked with rifles. As a result of the attack, 17 transformers were put out of service and power had to be rerouted to avoid a black-out. The attack caused \$15 million in direct damages and caused 52,000 gallons of oil to be spilled. Unfortunately, the perpetrators were never caught. In summary, a ranking member of the United States House Committee on Energy and Commerce stated that the attack was “an unprecedented and sophisticated attack on an electric grid substation.” The aim of this tutorial will be to give an introductory insight into the “puzzle” of substation physical security and introduce attendees to the guidance available in IEEE Standard 1402.

2. Learning Objectives

This tutorial provides opportunities to learn about the following:

- Overview of substation physical security needs
- Introduction to and brief history of IEEE Standard 1402
- Introduction to the process of physical substation security hardening, including lessons learned and best practices

3. Learning Outcomes

By attending this tutorial, attendees will gain an understanding of the following:

- Guidance provided in IEEE Standard 1402
- Main concepts underlying substation physical security, including:
 - How to assess threats to substations
 - Key factors to consider when designing threat mitigation measures
 - Planning for physical security
 - How to analyze the design of a physical security system

4. Presenters' Biographies

Connor Bowen is a structural engineer at Burns & McDonnell with over nine years of experience working on substation projects across North America. His primary responsibilities include the design of structural steel and connections, concrete foundations, rigid bus modeling, oil containment systems, storm water management systems and site grading for substation projects. He has been active in participating in IEEE committees as well as CIGRE and ASCE events related to the T&D industry.

Isaac Cowger is an electrical engineer and project manager who leads and manages substation design teams for physical security, physical design, protection and controls and system impact and facility studies for Burns & McDonnell. His 14-year experience involves designing substations ranging from 4.16kV to 230kV and the design of security upgrades at substations at 500kV and below. Prior to joining Burns & McDonnell, Isaac was a member of the United States Army Special Forces as a Green Beret for eight years.

Mark Smedvig is currently the substation business line manager for the Burns & McDonnell Dominion Energy account and has been serving the T&D industry almost 15 years as a structural engineer and project manager. Following the sniper attack at Metcalf Substation in 2013, Mark was brought in to help Dominion Energy respond to NERC CIP 014 evaluations and to establish new substation security standard designs. Since that time, Mark has helped various utilities establish standards and has completed substation security projects at over 70 sites, with scopes spanning from conceptual design to full EPC project execution. Mark is also active in T&D professional organizations, including serving as vice chair for the recently published guide, IEEE 1402 Guide for Physical Security of Electric Power Substations. His experience in both substation design and physical security design provides a unique perspective to the security conversation within electrical substations.

Milbank Manufacturing

Technical Tour

Monday, October 23, 2023



MILBANK MANUFACTURING AND TEST FACILITIES TOUR

Join us for a tour of several Milbank manufacturing lines, a 3D prototyping lab, and a UL-certified test facility.

Founded in 1927, Milbank Manufacturing sets the standard for quality metering equipment and enclosures. A proud American manufacturer for over 90 years, Milbank has contributed significantly to technology advancements in the industry. Milbank remains a family-owned company, rooted in innovation and committed to growth. Today, Milbank products can be found in every corner of the United States and in 36 countries around the world.

Itinerary

6:30 PM Depart Westin
(snacks/water available on bus)
7:00 PM Start of Tour
8:30 PM Return to Westin
(times are approximate)



REGISTER EARLY – LIMITED SPOTS



IEEE PES Transformers Committee
Fall 2023 Meeting
Kansas City, MO

Meeting hosted by



Garmin Headquarters

Technical Tour

Tuesday, October 24, 2023



Join us for a unique tour of the Garmin headquarters, including an aviation simulator lab and testing areas.

Garmin is a global company with offices in the U.S., Europe and Asia. At its various facilities, the company carries out a range of product development activities, from initial concept to mass production of shelf-ready units.

Its “vertical integration” business model keeps all design, manufacturing, marketing, and warehouse processes in-house, allowing for a high level of quality while also responding more quickly to its ever-changing marketplace.

Itinerary

6:30 PM Depart Westin
(boxed dinner available on bus)
7:00 PM Start of tour
9:00 PM Return to Westin
(times are approximate)



REGISTER EARLY – LIMITED SPOTS

Evergy Touchless Substation

Technical Tour

Thursday, October 26, 2023



Explore Evergy's touchless substation! Learn how this utility is using cutting-edge technology and AI to minimize O&M spend and enhance maintenance efficiency. The Charlotte substation in downtown Kansas City showcases a deployment of technology, including cameras and intelligent sensors to identify operations problems and trends. The technology is used in collaboration with other systems, such as physical and cyber security threat detection. Don't miss the incorporation of Spot the Robot Dog and its role in supporting the project!

Itinerary

1:00 PM Depart Westin
1:15 PM Start of tour
3:00 PM Return to Westin
(times are approximate)



REGISTER EARLY – LIMITED SPOTS

Truman Museum & Fountains

Spouse/Companion Tour

Monday, October 23, 2023



Start the day with a guided tour of the Harry S. Truman Presidential Library & Museum. Established in 1957, the museum preserves and provides access to President Truman's historical materials through engaging exhibits. Next up is lunch at Char Bar, Kansas City's House of Meat. Pitmaster Mirch Benjamin brings his smoke, magic, and award-winning sauces to a BBQ-centric menu.

The afternoon will be spent in the "City of Fountains" seeing the most photographed water features, including J C Nichols Memorial Fountain in Kansas City Plaza and the Greek god fountains (Neptune, Ponoma, Bacus).

Itinerary

9:15 AM Board Bus
9:30 AM Depart Westin
10:00 AM Guided Tour of
Truman Library
12:00 PM Depart for Lunch
12:30 PM Family-Style
Lunch at Char Bar
1:30 PM Depart for
Fountains Tour
3:30 PM Return to Westin
(times are approximate)

Family-Style Lunch

Cornbread Muffins
Avocado Salad & Vegan Jackfruit
Half Slab Ribs, Pulled Pork Butt,
Black Angus Brisket, Turkey Breast
Bucket of Fries
Jar o' Pickles
BBQ Pit Beans
Potato Salad
Dessert Choice: Peach Bread
Pudding or Caramelized Banana
Parfait
Non-Alcoholic Beverage

REGISTER EARLY – LIMITED SPOTS



IEEE PES Transformers Committee
Fall 2023 Meeting
Kansas City, MO

Meeting hosted by



Hand-Rolled Truffle Class

Spouse/Companion Tour

Tuesday, October 24, 2023



Bliss Chocolatier Hand-Rolled Truffles

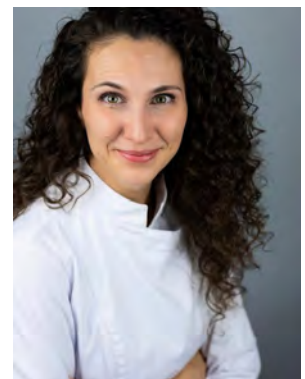
This class is geared towards chocolate lovers who are interested in learning chocolate-making techniques and how to make decadent chocolate truffles! We will cover the ins and outs of making the ganache, forming the centers, tempering chocolate, exploring variations on flavors and coatings, and proper storage of your truffles. You will leave with a box of nine delicious truffles and the confidence to make them again at home!

Itinerary

10:00 AM Depart Westin
10:30 AM Start of Class
12:30 PM Return to Westin
(times are approximate)

Instructor

Jessica Washburn has trained with master chocolatiers such as Melissa Coppel, Kriss Harvey, Ramon Morato, Nicolas Botomisy, and Andres Lara. FUN FACT: Ask Jessica about Season 1 of *Baking It* on NBC.



REGISTER EARLY – LIMITED SPOTS

National WWI Museum & Memorial

Dinner Social

Wednesday, October 25, 2023



Join us at this unique venue for an opportunity to connect with fellow committee members and experience together a one-of-a-kind tribute to an event of global proportions! Opened in 1926, the National WWI Museum and Memorial is the only American museum exclusively dedicated to the Great War and its enduring impact. Visitors are first greeted by the impressive Liberty Memorial Tower – a monument to the men and women who served in the war. Beneath the monument, the main gallery is arranged as if WWI soldiers were telling visitors their own stories through the exhibits. The museum features life-size replicas of trenches, the world's most comprehensive collection of World War I artifacts, and our event will include access to the Liberty Memorial Tower observation deck (elevator plus 45 steps) with sweeping views of the Kansas City skyline.

REGISTER EARLY – LIMITED SPOTS

Itinerary

6:00 PM Museum Doors Open;
Hors d'oeuvres and Cash Bars

7:00 PM Buffet Dinner

9:00 PM Event Ends

Venue is within easy walking distance of the Westin; shuttle buses will run continuously between the hotel and the museum from 6:00 PM to 7:00 PM and again from 8:00 PM to 9:00 PM.

Kansas City Style BBQ Sampler Buffet

Grilled Chicken Breast

Sliced Brisket

Barbecue Baked Beans

Soft Dinner Rolls

Dill Pickles

Sautéed Green Beans

Potato Salad

Fresh Garden Salad with Tomatoes, Cucumber, Red Onion and Assorted Salad Dressings

Dessert Bars

Iced Tea and Iced Water

Vegetarian "mains" available.