



# TRANSFORMERS COMMITTEE



September 12, 2011

Dear Committee Members and Guests:

You and your companion are cordially invited to attend the Fall 2011 Meeting of the IEEE-PES Transformers Committee to be held **October 30 to November 3** in Boston, Massachusetts. It is my pleasure, and the pleasure of OMICRON electronics Corp. USA, to be your host for this event.

Our meeting will be at the **Renaissance Boston Waterfront Hotel** (606 Congress Street). This hotel is about a 15 minute walk from Downtown Boston, in the growing Seaport District on the Boston Harbor. It is convenient to many activities including shopping, restaurants, sporting & music venues, theatre and museums. We have planned some tours and social events, however there is so much to do and see in Boston and the surrounding areas, we have also left some time for you to discover our beloved city. There are some ideas at the end of this letter, and more information is provided on the Committee's web site. OMICRON host employees and hotel staff will also be available during the meeting to provide assistance and suggestions.

The discounted guestroom rate is US\$159, including complimentary Internet in the guest rooms. Just mention "IEEE Transformers" to receive the group rate. Visit the Committee's web site for a link to registration. The cut-off date for this group rate is October 7, but we expect the hotel to sell-out before then. Parking at the hotel is US\$42 per day, however we encourage you to take a taxi or public transportation from the airport, due to its close proximity and because Boston is very easily accessible by walking and public transportation.

## ON-LINE REGISTRATION

Register on-line at [www.transformerscommittee.org](http://www.transformerscommittee.org) for tours, social events, and meeting registration. Register by October 7 to receive the US\$50 early registration discount. The on-line registration system will be disabled on October 26 to print name badges and to finalize counts. Note that the cost to walk-up register at the meeting is substantially higher than for registering on-line in advance.

At this meeting, we are again offering **free meeting registration for first-time end-user attendees**. (Note: Typically an "end-user" is someone who works for an electric utility or an industrial facility which purchases transformers covered by IEEE standards.)

**Boston Logan International Airport (BOS)** is located 3 miles northeast of the hotel. Cost of one-way transportation to/from Logan Airport:

Taxi - Approx. \$25  
Watertaxi (on request) - \$12  
Train/Bus - \$2

## BOSTON WEATHER

In late October, the autumn foliage will be in full effect. This time of year it tends to be chilly, although you will not need your snow gear. A light to heavy jacket would be suitable for day and the nights can be quite cold so please keep that in mind. Normal daytime highs for -this time of the year average 57°F (14°C), and night time lows are 42°F (6°C). You will need medium weight clothing and possibly some rain gear. Dress at the meeting is business casual.

## **SPECIAL EVENTS**

### **Sunday - Boston Duck Tour**

This is a great way to familiarize yourself with the area and begin to learn about Boston's rich history. The "DUCK", a W.W.II style amphibious landing vehicle, will pick you up from the hotel and take you on an 80-minute tour of Boston, including a dip in the Charles River. Space is limited, so register early!

### **Monday Evening - Boston Frightseeing Tour**

Make the most of Halloween Night in Boston by joining us on this haunted tour of one of America's oldest cities. This guided trolley and walking tour will pick you up from the hotel and take you to graveyards and sites of "haunted" scandals from throughout history. Space is limited to one bus-load so register early!

### **Sunday Evening Reception - Renaissance Waterfront Hotel Ballroom**

OMICRON is proud to host this reception set amongst gorgeous views of the Boston skyline. Cash-bar and complimentary hors d'oeuvres will be provided. Please indicate your intention to attend this event during the on-line registration process.

### **Tuesday Speaker Luncheon - Mr. Frank DePaola**

Massachusetts Department of Transportation (MassDOT) Highway Administrator, Frank DePaola will speak of innovation in Massachusetts at the newly formed MassDOT. His speech will include the efficiencies of combining the MBTA (subway and train system), RMV, Mass Aeronautics, and the Highways under one umbrella.

### **Wednesday Evening Social - Spirit of Boston**

Enjoy a gourmet dinner, live music, and a private tour of the Boston Harbor waterfront aboard the Spirit of Boston. Located directly across the street from the hotel, this dinner cruise will show you all Boston has to offer!

## **SPOUSE/COMPANION TOURS**

### **Monday, October 31**

Join us for a guided bus and walking tour of **Boston and the North End** in the morning, followed by an **Italian lunch at Maggiano's**. After lunch, visit the renowned Museum of Fine Arts featuring the new Art of the Americas wing.

### **Tuesday, November 1**

Take a bus ride to **JFK Presidential Library** and take a walk through the life and times of one of America's most beloved Presidents. From there you will take a bus to **Pickering Wharf for Lunch in the Seaport** before touring through Salem. This will include a tour of the Salem Witch Museum, before returning to Boston in late afternoon.

## **TECHNICAL PRESENTATIONS**

We have two interesting and practical presentations planned on Monday and Tuesday afternoon: "Partial Discharge Measurements", and "Use of Furans as a Diagnostic Tool to Estimate Insulation Life". Arrive early to get a good seat.

## **TECHNICAL TOUR**

### **Tuesday Evening - Doble Laboratories in Watertown, MA**

Open tour for all conference attendees and their spouses/companions. See the enclosed flyer for more information. Indicate your desire to attend when registering on-line for the meeting.

## ADDITIONAL INFORMATION

Along with this invitation letter, additional meeting information can be downloaded from the Committee's website ([www.transformerscommittee.org](http://www.transformerscommittee.org)).

1. Meeting Registration Form. This document is primarily used for those who do not have access to the Internet or need to pay by paper check or money order. It also makes a good guide to review the fees before you begin the on-line registration process. On-line registration is strongly encouraged.

2. Detailed Meeting Schedule & Thursday General Session Agenda. If there are any noteworthy changes, an updated schedule will be posted on the Committee's web site approximately one week prior to the meeting.

3. Information Flyers:

- Sunday Duck Tour and Monday Frightseeing Tour
- Spouse/Companion Tours
- Tuesday Speaker Luncheon
- Wednesday Evening Dinner Social
- Technical Tour
- Technical Presentations

The entire OMICRON Host Team and we are committed to making your visit to Boston a memorable one. We look forward to seeing you in Beantown!

Sincerely,

**Charles and Mary Ann Sweetser**

Fall 2011 Meeting Host

OMICRON electronics Corp. USA



Register on-line for the meeting using a credit card at: [www.transformerscommittee.org](http://www.transformerscommittee.org) (preferred method).  
Use this form only if you do not have access to the Internet, or need to pay by check or money order.

## IEEE/PES TRANSFORMERS COMMITTEE

### Fall 2011 Meeting; Boston, Massachusetts USA

Name of Attendee \_\_\_\_\_  
 Company / Institution \_\_\_\_\_  
 City \_\_\_\_\_ State / Prov. \_\_\_\_\_ Country \_\_\_\_\_  
 Telephone \_\_\_\_\_ Email \_\_\_\_\_  
 IEEE-PES Member? ☐ Yes ☐ No IEEE Standards Association Member? ☐ Yes ☐ No IEEE Membership #: \_\_\_\_\_  
 Will a companion accompany you? ☐ Yes ☐ No Full name of companion (for nametag) \_\_\_\_\_  
 Indicate if vegetarian meal(s) are required for: Attendee: ☐ Yes ☐ No Companion: ☐ Yes ☐ No  
 Other special requirements (special diets, wheelchair, etc.): \_\_\_\_\_

**Attendee Registration Fee Includes:** Entry into Meeting Area, Sunday Reception, coffee breaks, and 4 breakfasts (M, T, W, Th)

**Spouse/Companion Registration Fee Includes:** Sunday Reception and 4 breakfasts (M, T, W, Th)

-- Refund provided **ONLY** if the request is received by **Wednesday, October 26** (by confirmed email, see below) --

-- There is a US\$25.00 service charge for a refund of the entire registration (US\$10 for a partial refund) --

**NOTE: Complete meeting registration (with fees) is necessary to attend ANY social event or tour**

	On or Before October 7	After October 7, on or before October 26	On-site, at Meeting	Total
<b>Meeting Registration Fees (all fees in US\$ funds)</b>				
Attendee - IEEE Member (will be verified with IEEE)	\$225	\$275	\$375	_____
Attendee - not IEEE member	\$250	\$300	\$400	_____
Attendee - IEEE Life or Committee Emeritus (will be verified)	\$50	\$100	\$200	_____
Spouse or Companion, and children age 12 and over	\$75	\$125	\$225	_____

Note: A Companion is a "significant other", boy/girl friend, attending for non-commercial reasons (not attending technical meetings, etc.).

Spouses/companions & children (age 12 and over) must be registered for the meeting - with above fees - to attend any tour or social event.

**Sunday Evening Reception** (cost included in above registration fee) Attendee: ☐ Yes ☐ No Spouse/Companion: ☐ Yes ☐ No

**Monday Standards Luncheon:** all SC, WG, TF leaders are encouraged to attend # \_\_\_\_ @ \$20 \_\_\_\_\_

**Tuesday Luncheon:** Speaker - Mr. Frank DePaola, Massachusetts Dept of Transportation # \_\_\_\_ @ \$30 \_\_\_\_\_

Indicate selection for Tuesday Luncheon: Beef \_\_\_\_, Chicken \_\_\_\_, Vegetarian \_\_\_\_

**Spouse/Companion Tours:** Monday - North End Tour and Museum of Fine Arts, includes lunch # \_\_\_\_ @ \$85 \_\_\_\_\_

Tuesday - JFK Library and Salem Tour, includes lunch # \_\_\_\_ @ \$85 \_\_\_\_\_

**Social Events:** Sunday Boston Duck Tour -- adult pass, age 12 and over \*\* # \_\_\_\_ @ \$30 \_\_\_\_\_

-- child pass, age 4-11 (no charge for age 4 or less) # \_\_\_\_ @ \$20 \_\_\_\_\_

Monday Frightseeing Tour -- adult pass, age 12 and over \*\* # \_\_\_\_ @ \$35 \_\_\_\_\_

-- child pass, age 4-11 (no admit for less than age 4) # \_\_\_\_ @ \$25 \_\_\_\_\_

Wednesday Evening Dinner Social, aboard "The Spirit of Boston" # \_\_\_\_ @ \$75 \_\_\_\_\_

**Technical Tour:** Tuesday Evening, Doble Laboratories \*\* # \_\_\_\_ @ \$0 \_\_\_\_\_

**IEEE-PES Product:** Logo Shirt, indicate size: S \_\_\_\_, M \_\_\_\_, L \_\_\_\_, XL \_\_\_\_, 2XL \_\_\_\_ # \_\_\_\_ @ \$20 \_\_\_\_\_

CD-ROM, Transformers Standards Collection -- IEEE member # \_\_\_\_ @ \$735 \_\_\_\_\_

-- not IEEE member # \_\_\_\_ @ \$920 \_\_\_\_\_

-- Committee Member # \_\_\_\_ @ \$635 \_\_\_\_\_

Shirts and CD-ROMs must be picked-up at meeting (no mailed product). Shirts can be exchanged at meeting for proper size/fit.

**TOTAL REMITTED -- US\$** \_\_\_\_\_  
(all fees quoted in US dollars)

\*\* - This event will likely sell-out early

**METHODS OF PAYMENT:** 1. Register on-line with a credit card (preferred). 2. Mail paper form with check or money order to:

IEEE Transformers Committee; 13110 Birch Drive, Suite 148, PMB 330; Omaha, Nebraska 68164 USA

email: [transformers@ieee.org](mailto:transformers@ieee.org). Cancellation by email is not considered accepted unless confirmed by return email.

**Check or money order** - Make payable to: "IEEE Transformers Committee"

Funds not from a US Bank must add US\$25.00 for processing fee.

US Tax ID No. 13-1656633, Canadian Business No. 12563 4188, Euro Tax Registration No. EU826000081

*Mailed registrations without proper payment will not be accepted.*

# IEEE/PES TRANSFORMERS COMMITTEE

[www.transformerscommittee.org](http://www.transformerscommittee.org)

Fall 2011 Meeting; October 30 - November 3

Hosted by OMICRON electronics Corp. USA

Renaissance Waterfront Hotel; Boston, Massachusetts USA

**NOTES:** See Page 5 for a key to abbreviations. A vertical line in the left margin indicates a noteworthy revision since last revision.

<u>DATE/TIME</u>	<u>ACTIVITY</u>	<u>SUB-COM</u>	<u>ACTIVITY CHAIR</u>	<u>ROOM CAP/ARR/AV</u>	<u>MEETING ROOM</u>
<b>Saturday, October 29</b>					
No Meeting Registration, No Transformers Committee Meetings, No Social Events or Tours					
<b>Sunday, October 30</b>					
10:30 am - 12:00 pm	<u>Special Event: "Boston Duck Tour"</u> -- Indicate your desire to attend while registering on-line for the Committee Meeting (will sell-out early!). -- Ducks depart the Renaissance Hotel at 10:30 am; and return to hotel approx 12:00 pm. -- Eat breakfast before boarding. Lunch on your own.				
1:00 pm - <u>5:30 pm</u>	Meeting Registration				3rd Floor Foyer
2:00 pm - 5:30 pm	Administrative SC -- Closed meeting, by invitation only	Admin.	E. Smith	26 US (w/snack buffet)	Atlantic 1 (3rd Floor)
2:00 pm - 5:30 pm	NEMA Transformers -- Closed meeting, by invitation only	++	C. Drexler	20 US (w/beverages)	Atlantic 2 (3rd Floor)
6:00 pm - 8:00 pm	Welcome Reception			450 Reception	Pacific ABCDE
<b>Monday, October 31 (Happy Halloween!) -- Monday Breaks Sponsored by Waukesha Electric Systems ***</b>					
7:00 am - <u>4:00 pm</u>	Meeting Registration				3rd Floor Foyer
7:00 am - 6:00 pm	Internet Cafe'			10 BR	Bering
<u>7:00 am</u> - 7:50 am	Newcomers Orientation (arrive early!) -- Newcomers & Guests are encouraged to attend! -- Get food in Atlantic 1&2 and carry into Atlantic 3		B. Chiu	54 CL	Atlantic 3 (with opening in airwall)
7:00 am - 7:45 am	Distribution SC Leaders Coordination -- Closed meeting, by invitation only		S. Shull	16 CONF	606 Congress Restaurant Private Dining Rm
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			240 RT (9/tbl)	Atlantic 1&2
8:00 am - 9:00 am	Breakfast - Spouses/Companions (no meeting attendees please)			80 RT (9/tbl)	Brewster (4th Floor)
9:15 am - 4:15 pm	<u>Spouses/Companions Tour: "Boston North End Tour and Museum of Fine Arts"</u> . Includes lunch. -- Advance registration required. Buses depart the Renaissance at 9:15 am, and return approx 4:15 pm.				
	<del>WG Dry-Type Reactors C57.16</del>	Dry	Document submitted to Standards Board		
8:00 am - 9:15 am	TBD			50 MX	Pacific C
8:00 am - 9:15 am	WG 3-ph Underground Distribution Transformers C57.12.24	UTNP	G. Termini	60 MX	Caspian
8:00 am - 9:15 am	WG Distr. Substation Transf. C57.12.36	Dist	J. Murphy	80 MX S3	Pacific AB
8:00 am - 9:15 am	WG Natural Ester-Based Fluids C57.147	IF	P. McShane	120 MX S3	Pacific FGH
8:00 am - 9:15 am	TF Tertiary/Stabilization Windings	PCS	E. Betancourt	150 MX S3	Pacific E
8:00 am - 9:15 am	WG Failure Analysis & Reporting Guide C57.125	Power	W. Binder	150 MX S3	Pacific D
8:00 am - 10:45 am	IEC TC-14 Technical Advisory Group (all interested individuals welcome)	++	P. Hopkinson	50 MX	Mediterranean
9:15 am - 9:30 am	Break (beverages only)				3rd Floor Foyer

\*\*\* Contact Joe Watson ([joe\\_watson@ieee.org](mailto:joe_watson@ieee.org)) if you are interested in sponsoring a coffee-break at a future meeting.

<u>DATE/TIME</u>	<u>ACTIVITY</u>	<u>SUB-COM</u>	<u>ACTIVITY CHAIR</u>	<u>ROOM CAP/ARR/AV</u>	<u>MEETING ROOM</u>
<b>Monday, October 31 (continued)</b>					
9:30 am - 10:45 am	WG Sealed Dry-Type Power Transformers C57.12.52	Dry	S. Kennedy	50 MX	Pacific C
9:30 am - 10:45 am	WG Liquid-immersed Secondary Network Transformers C57.12.40	UTNP	B. Klaponski	60 MX	Caspian
9:30 am - 10:45 am	WG Overhead Distr. Transf. C57.12.20	Dist	A. Traut	80 MX S3	Pacific AB
9:30 am - 10:45 am	TF Furan Tests	IL	S. Xu	120 MX S3	Pacific FGH
9:30 am - 10:45 am	WG External Dielectric Clearances	DiTests	E. Davis	150 MX S3	Pacific E
9:30 am - 10:45 am	WG PCS Rev. to Test Code C57.12.90	PCS	M. Perkins	150 MX S3	Pacific D
10:45 am - 11:00 am	<i>Break (beverages only)</i>			3rd Floor Foyer	
	<del>WG Thermal Evaluation C57.100</del>		Work is complete		
11:00 am - 12:15 pm	WG Dry-Type Gen. Require. C57.12.01	Dry	T. Holdway	50 MX	Pacific C
11:00 am - 12:15 pm	WG Standard Requires for Secondary Network Protectors C57.12.44	UTNP	B. Wimmer	60 MX	Caspian
11:00 am - 12:15 pm	WG 1-ph Padmount Distribution Transformers C57.12.38 (12.21 & 12.25)	Dist	A. Ghafourian	80 MX S3	Pacific AB
11:00 am - 12:15 pm	WG Frequency Response Analysis (FRA) Guide PC57.149	PCS	C. Sweetser	120 MX S3	Pacific FGH
11:00 am - 12:15 pm	TF Audible Sound Revision to Test Code	PCS	R. Girgis	150 MX S3	Pacific E
11:00 am - 12:15 pm	WG Tank Rupture & Mitigation PC57.156	Power	P. Zhao	150 MX S3	Pacific D
12:15 pm - 1:30 pm	<u>Lunch Meeting:</u> Standards Development Review		B. Bartley	140 (7/tbl)	Atlantic 123
	-- Presentation/Discussion: "Demise of Reaffirmations and the NEW Standards Process"				
	-- <u>Everyone</u> is welcome to attend. All SC/WG/TF leaders are <u>highly encouraged</u> to attend.				
	-- Advance reservation required (\$20 for box lunch). No paper tickets. Admission verified at the door.				
1:45 pm - 3:00 pm	<b>SC HVDC Converter Transformers and Smoothing Reactors</b>	HVDC	R. Dudley	50 MX	Pacific C
1:45 pm - 3:00 pm	WG Tap Changer Performance C57.131	Power	W. Henning	60 MX	Caspian
1:45 pm - 3:00 pm	WG 3-ph Padmount Distribution Transformers C57.12.34	Dist	R. Stahara	80 MX S3	Pacific AB
1:45 pm - 3:00 pm	WG High Temp. Transformers PC57.154	IL	R. Marek	120 MX S3	Pacific FGH
1:45 pm - 3:00 pm	TF Particle Count Limits in Mineral Oil	IF	M. Scarborough	150 MX S3	Pacific E
1:45 pm - 3:00 pm	TF Dielectric Frequency Response	PCS	G. Frimpong	150 MX S3	Pacific D
3:00 pm - 3:15 pm	<i>Break (beverages and treats)</i>			3rd Floor Foyer	
	<del>WG Harmonizing IEEE &amp; IEC Standards</del>	will not meet; work is complete			
3:15 pm - 4:30 pm	WG Dry-Type Test Code C57.12.91	Dry	D. Foster	50 MX	Pacific C
3:15 pm - 4:30 pm	WG Transformers Directly Connected to Generators C57.116	Power	G. Hoffman	60 MX	Caspian
3:15 pm - 4:30 pm	TF Tank Pressure Coordination	Dist	C. Gaytan	80 MX S3	Pacific AB
3:15 pm - 4:30 pm	TF PD in Bushings and PTs/CTs	DiTests	T. Hochanh	120 MX S3	Pacific FGH
3:15 pm - 4:30 pm	TF Moisture in Oil	IF	B. Rasor	150 MX S3	Pacific E
3:15 pm - 4:30 pm	WG PCS Revisions to C57.12.00	PCS	S. Snyder	150 MX S3	Pacific D
4:30 pm - 4:45 pm	<i>Break (beverages only)</i>			3rd Floor Foyer ** remove Pacific ED airwall **	
4:45 pm - 6:00 pm	Presentation: "Partial Discharge Measurements", by B. Poulin and others. Sponsored by DiTests SC **			300 MX S3	Pacific ED
8:00 pm - 9:30 pm	<u>Special Event:</u> "Boston Frightseeing Tour" -- Indicate your desire to attend while registering on-line for the Committee Meeting ( <u>will sell-out early!</u> ). -- Trolleys depart the Renaissance at 8:00 pm; and return at approx 9:30 pm. Eat dinner before boarding. -- May not be suitable for children under age 13. Children under age 4 are not allowed.				

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

<u>DATE/TIME</u>	<u>ACTIVITY</u>	<u>SUB-COM</u>	<u>ACTIVITY CHAIR</u>	<u>ROOM CAP/ARR/AV</u>	<u>MEETING ROOM</u>
<b>Tuesday, November 1 -- Tuesday Breaks Sponsored by Brockhaus Messtechnik ***</b>					
7:00 am - 12:00 pm	Meeting Registration				3rd Floor Foyer
7:00 am - 6:00 pm	Internet Cafe'			10 BR	Bering
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			280 RT (9/tbl)	Atlantic 123
8:00 am - 9:00 am	Breakfast - Spouses/Companions (no meeting attendees please)			80 RT (9/tbl)	Brewster (4th Floor)
9:15 am - 4:15 pm	<u>Spouses/Companions Tour</u> : "JFK Library and Salem Tour". Lunch included. -- Advance registration required. Buses depart the Renaissance at 9:15 am, and return approx 4:15 pm.				
8:00 am - 9:15 am	WG Req. for Instrument Transf. C57.13	IT	R. McTaggart	50 MX	Pacific C
8:00 am - 9:15 am	WG Enclosure Integrity C57.12.28, C57.12.29, C57.12.31, C57.12.32	Dist	R. Olen	60 MX	Caspian
8:00 am - 9:15 am	WG Oil Reclamation Guide PC57.637	IF	J. Thompson	80 MX S3	Pacific AB
8:00 am - 9:15 am	WG PC57.152 Field Test Guide	Stds	J. Verner	120 MX S3	Pacific FGH
8:00 am - 9:15 am	WG Transportation Issues Guide PC57.150	Power	G. Anderson	150 MX S3	Pacific E
8:00 am - 9:15 am	TF Functional Life Tests, De-energized Tap Changers (DETC)	Power	P. Hopkinson	150 MX S3	Pacific D
9:15 am - 9:30 am	<i>Break (beverages only)</i>			3rd Floor Foyer	
9:30 am - 10:45 am	WG Std Require. for Bushings C57.19.01	Bush	A. Del Rio	50 MX	Pacific C
9:30 am - 10:45 am	WG Bar Coding for Distribution Transformers C57.12.35	Dist	L. Matthews	60 MX	Caspian
9:30 am - 10:45 am	WG Impulse Test Guide C57.98 (Power Transformers)	DiTests	A. Molden	80 MX S3	Pacific AB
9:30 am - 10:45 am	WG DGA Natural Ester Fluids PC57.155	IF	P. Boman	120 MX S3	Pacific FGH
9:30 am - 10:45 am	WG Revision to Loading Guide C57.91	IL	D. Duckett	150 MX S3	Pacific E
9:30 am - 10:45 am	TF Wind Power Transformers	PCS	D. Buckmaster	150 MX S3	Pacific D
10:45 am - 11:00 am	<i>Break (beverages only)</i>			3rd Floor Foyer	
11:00 am - 12:15 pm	WG Milli-amp Current Transf. C57.13.7	IT	H. Alton	50 MX	Pacific C
11:00 am - 12:15 pm	WG Bushing Applicat. Guide C57.19.100	Bush	T. Spitzer	60 MX	Caspian
11:00 am - 12:15 pm	TF DPV Grid Transformers	Power	H. Shertukde	80 MX S3	Pacific AB
11:00 am - 12:15 pm	WG Guide for DGA in LTCs C57.139	IF	D. Wallach	120 MX S3	Pacific FGH
11:00 am - 12:15 pm	WG Loss Evaluation Guide C57.120	PCS	A. Traut	150 MX S3	Pacific E
11:00 am - 12:15 pm	WG Temperature Rise Test Procedures in Section 11 of C57.12.90	IL	P. Powell	150 MX S3	Pacific D
12:15 pm - 1:30 pm	<u>Speaker Luncheon</u> : Mr. Frank DePaola, Mass. Dept of Transportation -- Topic: "Innovation at MassDOT; Reshaping Transportation in Massachusetts" -- Advance registration is necessary. -- Paper tickets are not provided. Admission verified at the door.			250 (8/tbl) with elevated table for 5	Atlantic ABC
1:45 pm - 3:00 pm	WG Dry-Type Loading Guide PC57.96	Dry	R. Marek	50 MX	Pacific C
1:45 pm - 3:00 pm	WG GSU Bushing Standardization	Bush	TBD	60 MX	Caspian
1:45 pm - 3:00 pm	WG Test Data Reporting C57.12.37	Dist	J. Crotty	80 MX S3	Pacific AB
1:45 pm - 3:00 pm	WG DGA Factory Temperature Rise Tests PC57.130	IF	J. Thompson	120 MX S3	Pacific FGH
1:45 pm - 3:00 pm	WG Life Extension C57.140	Power	R. James	150 MX S3	Pacific E
1:45 pm - 3:00 pm	WG Revision to Low Frequency Tests	DiTests	B. Poulin	150 MX S3	Pacific D
3:00 pm - 3:15 pm	<i>Break (beverages and treats)</i>			3rd Floor Foyer	

\*\*\* Contact Joe Watson (joe\_watson@ieee.org) if you are interested in sponsoring a coffee-break at a future meeting.

<u>DATE/TIME</u>	<u>ACTIVITY</u>	<u>SUB-COM</u>	<u>ACTIVITY CHAIR</u>	<u>ROOM CAP/ARR/AV</u>	<u>MEETING ROOM</u>
<b>Tuesday, November 1 (continued)</b>			Work		
	TF Semiconductor Rectifier Transformers C57.18.10		Work is complete. Will provide report in PC SC mtg.		
3:15 pm - 4:30 pm	WG Neutral Grounding Devices PC57.32	PCS	S. Schappell	50 MX	Pacific C
3:15 pm - 4:30 pm	WG Terminal Markings C57.12.70	Stds	S. Shull	60 MX	Caspian
3:15 pm - 4:30 pm	TF Transformer Efficiency and Loss Evaluation (DOE Activity)	Dist	P. Hopkinson	80 MX S3	Pacific AB
3:15 pm - 4:30 pm >	WG Transformer Paralleling Guide	Power	T. Jauch	120 MX S3	Pacific FGH
3:15 pm - 4:30 pm	WG Revision to Gas Guide C57.104	IF	R. Ladroga	150 MX S3	Pacific E
3:15 pm - 4:30 pm	WG Revisions to Impulse Test Sections of C57.12.00 and C57.12.90	DiTests	P. Riffon	150 MX S3	Pacific D
4:30 pm - 4:45 pm	<i>Break (beverages only)</i>			3rd Floor Foyer ** remove Pacific ED airwall **	
4:45 pm - 6:00 pm	Presentation: "Use of Furans as a Diagnostic Tool to Estimate Insulation Life", by S. Xu, T. Prevost, L. Chiem and D. Platts. Sponsored by Insulation Life SC **			300 MX S3	Pacific ED
Technical Tour of Massachusetts Institute of Technology (MIT): CANCELED					
6:30 pm - 10:00 pm	<u>Technical Tour:</u> Doble Laboratories, in Watertown, MA -- "Technical Demonstrations and New England Lobster Clambake" -- Everyone is invited, but this event will sell-out early. Dinner will be provided. -- Indicate your desire to attend while registering on-line for the Committee Meeting. -- Buses depart the Renaissance at 6:30; and return to hotel by 10:00 pm. Dinner will be served at the facility. -- For more information, refer to the flyer on the website, or contact events@doble.com or +617.926.4900.				
<b>Wednesday, November 2 -- Wednesday Breaks Sponsored by ABB Inc. ***</b>					
No Meeting Registration, No Technical Tours, No Spouse/Companion Tour					
7:00 am - 6:00 pm	Internet Cafe'			10 BR	Bering
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			240 RT (9/tbl)	Atlantic 123
8:00 am - <u>9:30 am</u>	Breakfast - Spouses/Companions (no meeting attendees please)			80 RT (9/tbl)	Brewster (4th Floor)
7:00 am - 7:50 am	<b>SC Meetings Planning</b> (arrive early, food buffet in room)	Meetings	G. Anderson	24 CL	Mediterranean
8:00 am - 9:15 am	EL&P Delegation (Users only meeting)	++	S. Shull	120 MX S3	Pacific FGH
8:00 am - 9:15 am	<b>SC Instrument Transformers</b>	IT	R. McTaggart	80 MX S3	Pacific AB
8:00 am - 9:15 am	<b>SC Insulation Life</b>	IL	B. Forsyth	250 MX S3	Pacific DE
9:15 am - 9:30 am	<i>Break (beverages only)</i>			3rd Floor Foyer	
9:30 am - 10:45 am	<b>SC Bushings</b>	Bush	P. Zhao	120 MX S3	Pacific FGH
9:30 am - 10:45 am	<b>SC Distribution Transformers</b>	Dist	S. Shull	250 MX S3	Pacific DE
10:45 am - 11:00 am	<i>Break (beverages only)</i>			3rd Floor Foyer	
11:00 am - 12:15 pm	<b>SC UG Transf. &amp; Network Protectors</b>	UTNP	C. Niemann	80 MX S3	Pacific AB
11:00 am - 12:15 pm	<b>SC Dielectric Tests</b>	DiTests	L. Wagenaar	250 MX S3	Pacific DE
12:15 pm - 1:30 pm	Lunch (on your own)				

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

\*\*\* Contact Joe Watson (joe\_watson@ieee.org) if you are interested in sponsoring a coffee-break at a future meeting.



## KEY

Note: A PC projector will be furnished in each meeting room. Arrive early to ensure that equipment operates/syncs correctly. Overhead projectors are available in the meeting registration area.

> -- activity continued into another session / from another session

++ -- not a Transformers Committee activity    TBD = "To Be Determined"

FC = flip chart; S1 = sound (special set-up)

S2 = stand mic in front only; S3 = one stand mic in front & stand mic(s) at mid-room

CL -- classroom seating (w/head table for 2)

TH -- theater seating (w/head table for 2)

RT -- multiple roundtables

US -- U-shape table

MX -- mix classroom & theater (w/head table)

<u>DATE/TIME</u>	<u>ACTIVITY</u>	<u>SUB-COM</u>	<u>ACTIVITY CHAIR</u>	<u>ROOM CAP/ARR/AV</u>	<u>MEETING ROOM</u>
<b>Wednesday, November 2 (continued)</b>					
1:30 pm - 2:45 pm	<b>SC Dry Type</b>	Dry	C. Johnson	120 MX S3	Pacific FGH
1:30 pm - 2:45 pm	<b>SC Power Transformers</b>	Power	T. Lundquist	250 MX S3	Pacific DE
2:45 pm - 3:00 pm	<i>Break (beverages and treats)</i>			3rd Floor Foyer	
3:00 pm - 4:15 pm	<b>SC Insulating Fluids</b>	IF	S. McNelly	120 MX S3	Pacific FGH
3:00 pm - 4:15 pm	<b>SC Performance Characteristics</b>	PCS	S. Antosz	250 MX S3	Pacific DE
4:15 pm - 4:30 pm	<i>Break (beverages only)</i>			3rd Floor Foyer	
4:30 pm - 5:30 pm	<b>SC Transformer Standards</b>	Stds	B. Bartley	250 MX S3	Pacific DE
6:30 pm - 10:00 pm	<b>Dinner Social:</b> "The Spirit of Boston". Advance registration is necessary. -- The boat is docked directly across the street from the Renaissance Hotel (2-minute walking distance). -- Boarding and cocktails 6:30 to 7:00 pm. Embark at 7:00 pm. Dinner at 7:00 pm. Return approx 10:00 pm. -- Paper tickets will not be provided. Admission will be verified with a registration list as you board the boat. -- It will be cool temperature in the evening, so dress appropriately!				

## Thursday, November 3

No Meeting Registration, No Spouses/Companions Tours, No Internet Cafe'					
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			240 RT (9/tbl)	Atlantic 123
8:00 am - <u>9:30 am</u>	Breakfast - Spouses/Companions (no meeting attendees please)			72 RT (9/tbl)	Brewster (4th Floor)
8:00 am - 9:45 am >	General Session, Transformers Committee -- <u>All attendees</u> are encouraged to attend. -- See separate document for meeting agenda.		E. Smith	200 CL S1 100 TH elevat. table for 4	Pacific Ballroom
9:45 am - 10:00 am	<i>Break (beverages only)</i>			Atlantic Foyer	
> 10:00 am - 11:30 am	General Session, Transformers Committee		E. Smith	200 CL S1 100 TH	Pacific Ballroom
12:00 pm - 4:45 pm	No Technical Tours or Socials planned				

## Friday, November 4

No Transformer Committee Meetings, No Internet Cafe', No Social Events or Tours.					
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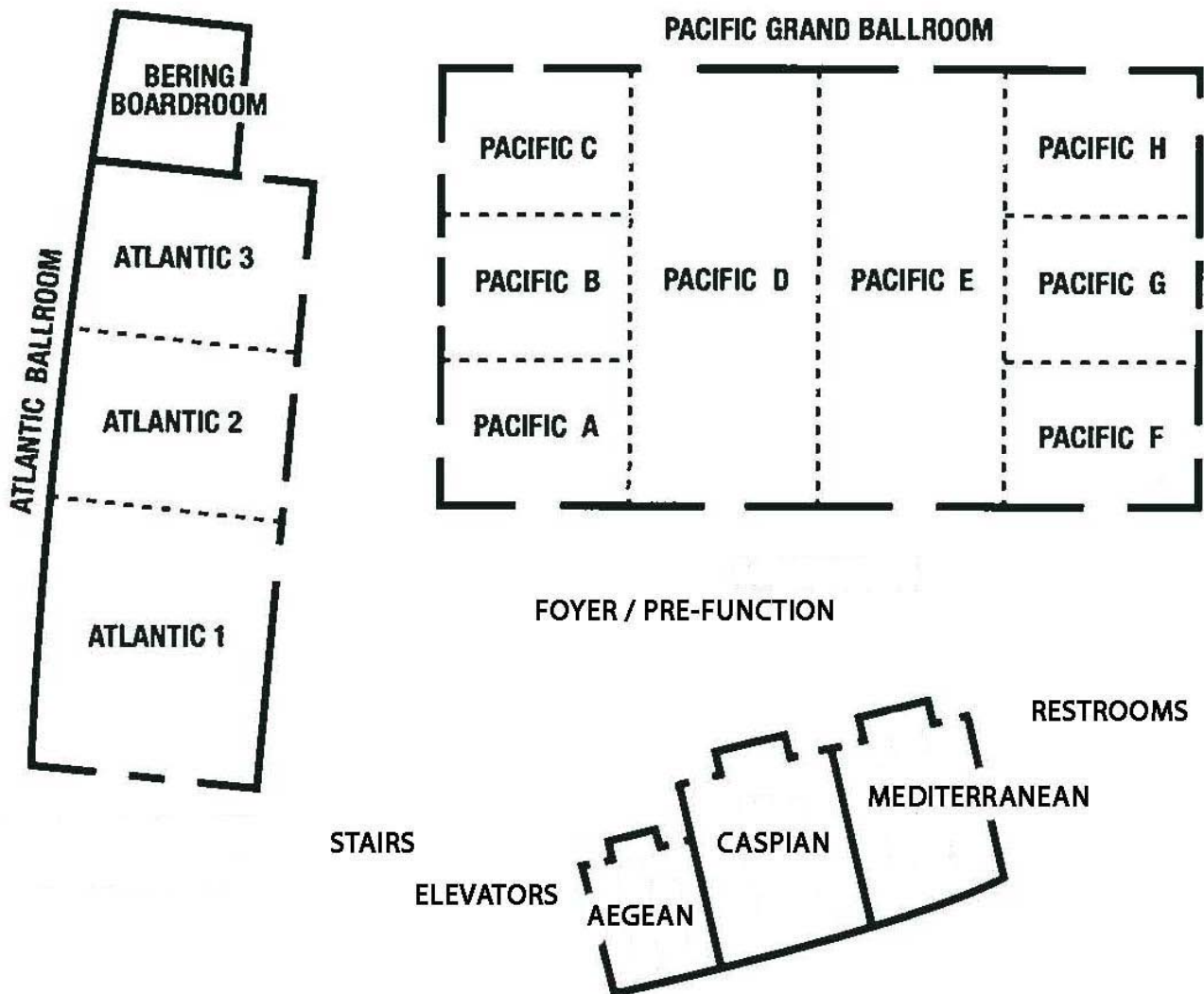
## FUTURE COMMITTEE MEETINGS

Spring 2012 - March 11-15; Nashville, Tennessee USA. Hosted by Derek & Diana Baranowski and Baron USA, Inc.

Fall 2012 - date and location to be determined

**Renaissance Boston Waterfront Hotel**  
606 Congress Street; Boston, Massachusetts 02110  
+617.338.4111

**3rd FLOOR**



# IEEE/PES TRANSFORMERS COMMITTEE

## General Session - Fall 2011 Meeting Thursday, November 3

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Chair: Ed Smith      Vice Chair: Bill Chiu      Secretary: Don Platts      Treasurer: Greg Anderson

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- |        |   |                        |
|--------|---|------------------------|
| 1.     | Chair's Remarks and Announcements             | Ed Smith               |
| 2.     | Approval of Minutes from Spring 2011 Meeting  | Ed Smith               |
| 3.     | Administrative Subcommittee                   | Ed Smith               |
| 4.     | Vice Chair's Report                           | Bill Chiu              |
| 5.     | Secretary's Report                            | Don Platts             |
| 6.     | Treasurer's Report                            | Greg Anderson          |
| 7.     | Transformer Standards                         | Bill Bartley           |
| 8.     | Recognition and Awards                        | Tom Prevost            |
| 9.     | New Business (continued below)                | Ed Smith               |
| 10.    | Report of Technical Subcommittees             |                        |
| 10.1.  | Instrument Transformers                       | Ross McTaggart         |
| 10.2.  | Insulating Fluids                             | Susan McNelly          |
| 10.3.  | Insulation Life                               | Bruce Forsyth          |
| 10.4.  | Performance Characteristics                   | Steve Antosz           |
| 10.5.  | Power Transformers                            | Tom Lundquist          |
| 10.6.  | Underground Transformers & Network Protectors | Carl Niemann           |
| 10.7.  | Bushings                                      | Peter Zhao             |
| 10.8.  | Dry Type Transformers                         | Chuck Johnson          |
| 10.9.  | Distribution Transformers                     | Steve Shull            |
| 10.10. | Dielectric Tests                              | Loren Wagenaar         |
| 10.11. | HVDC Converter Transformers & Reactors        | Richard Dudley         |
| 11.    | Editor's Report                               | Ed teNyenhuis          |
| 12.    | Meetings Subcommittee                         | Greg Anderson          |
| 13.    | Reports of Liaison Representatives            |                        |
| 13.1.  | Standard Coordinating Committee No. 4         | Paulette Payne Powell  |
| 13.2.  | IEC TC-14 Technical Advisor to USNC           | Phil Hopkinson         |
| 13.3.  | CIGRE   | Jean-Christophe Riboud |
| 14.    | Old Business                                  | Ed Smith               |
| 15.    | New Business (further discussion as needed)   | Ed Smith               |



## **Boston Duck Tour**

Date: Sunday, October 30

Pick-up from the Renaissance Hotel

Time: 10:30 am - 12:00 pm

A great way to start your week out in Boston - this 80 minute tour will acquaint you with the city and all it has to offer. This narrated tour takes place on a "DUCK", a W.W.II style amphibious landing vehicle, that goes from the streets of Boston directly in to the Charles River. You'll cruise by all the places that make Boston the birthplace of freedom and a city of firsts, from the golden-domed State House to Bunker Hill and the TD Banknorth Garden, Boston Common and Copley Square to the Big Dig, Government Center to fashionable Newbury Street, Quincy Market to the Prudential Tower, and more. And, as the best of Boston unfolds before your eyes, your ConDUCKtor will be giving you lots of little known facts and interesting insights about our unique and wonderful city.

Space on this tour is extremely limited so sign up early!

[www.transformerscommittee.org](http://www.transformerscommittee.org) | [www.bostonducktours.com](http://www.bostonducktours.com)





## **Boston Frightseeing Tour - Halloween Night**

Date: Monday, October 31

Pick-up from the Renaissance Hotel

Time: 8:00 - 9:30 pm

Walk amongst the dead in burying grounds nearly four hundred years old, hear stories of those whose mortal remains lie beneath your feet, and listen to tales of many of the sordid practices that went along with them. Venture to the site of the biggest grave-robbing scandal in New England's history. Walk atop Boston's largest unmarked burying ground and hear tales of the tortures, punishments and executions that took place there.

You will stroll through King's Chapel Burying Ground, the oldest burying ground within the confines of downtown Boston; this is the final resting place of many of Boston's first inhabitants. Here you may peer inside a decrepit charnel house which contains the jumbled bones of hundreds of forgotten souls and learn of Ephraim Littlefield and his shocking black-market body trading scandal of the Victorian era. Or perhaps you will hear the tale of King's Chapel's Strangers Tomb and the ghost who haunts it.

Tour includes trolley ride and walking portions and lasts an hour and a half. Please wear comfortable and sturdy shoes as the terrain on the walking portion can be unlevel. Advance registration required, limited space available.

\*\*This tour may not be suitable for children under 13 years of age. Due to the loud noises on the tour, children under the age of 4 are not allowed onboard.

[www.transformerscommittee.org](http://www.transformerscommittee.org) | [www.ghostsandgravestones.com/boston](http://www.ghostsandgravestones.com/boston)







## Tuesday Luncheon Speaker

"Innovation at MassDOT; Reshaping Transportation in Massachusetts"

Speaker: Highway Administrator Frank DePaola

Date: Tuesday, November 1st

Location: Renaissance Hotel Ballroom

Lunch: 12:15 - 1:30 pm

Frank DePaola is the Highway Administrator for the Massachusetts Department of Transportation (MassDOT), and will speak to innovation in Massachusetts at the newly formed MassDOT. His presentation will include the efficiencies of combining the MBTA (Massachusetts Bay Transportation Authority), RMV, Mass Aeronautics, and the Highways under one umbrella.

Prior to Mr. DePaola's appointment to the Highway Division, he was the Assistant General Manager for the MBTA's Design and Construction Directorate providing oversight to all aspects of the design and construction projects for the MBTA's Capital Management Program.

Mr. DePaola has over thirty years experience in the design and construction industry. Prior to joining the Massachusetts Department of Transportation in 2009, Mr. DePaola was Senior Project Manager for Infrastructure for Harvard University's Allston Development Group. Mr. DePaola was also Director of Construction for the Massachusetts Water Resources Authority.

Mr. DePaola is a licensed, registered Professional Engineer in Massachusetts and Rhode Island, and holds a Master of Science Degree in Civil Engineering from Northeastern University and a Bachelor of Science Degree from the University of Massachusetts-Dartmouth.

[www.transformerscommittee.org](http://www.transformerscommittee.org) | [www.massdot.state.ma.us](http://www.massdot.state.ma.us)





## Spouses / Companions Tour - Day One

### Boston's North End and Museum of Fine Arts

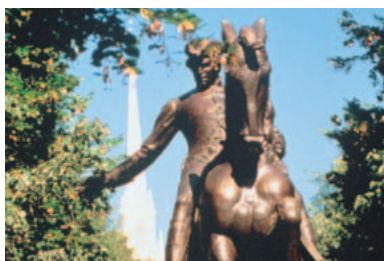
Date: Monday, October 31st  
Pick-up from the Renaissance Hotel  
Time: 9:15am - 4:15 pm

Start the day off with a tour into the culinary traditions and marketplaces of Boston's Little Italy. As you stroll through some of the oldest streets in the country, you will visit the Paul Revere House and the Old North Church. After a quick photo stop at the USS Constitution, the oldest commissioned warship still afloat in the world, you will enjoy a traditional Italian lunch at Maggiano's Restaurant.

In the afternoon you will travel to Boston's renowned Museum of Fine Arts. This will include a self-guided tour of the newly opened Art of the Americas Wing, which takes a global perspective on Art of the Americas, showcasing more than 5,000 works of art produced in North, Central, and South America over the course of three millennia.

9:15	Depart the Renaissance Hotel by bus with your local tour guides
	Walk through Boston's North End to visit the Paul Revere House and the Old North Church
	Tour through some of the North End's best Italian Food Shops
11:30	Travel to Charlestown by bus to see the USS Constitution
12:30	Three course lunch at Maggiano's Italian Restaurant
3:00	Tour through Boston's Museum of Fine Arts
4:15	Return to the Renaissance Hotel

[www.transformerscommittee.org](http://www.transformerscommittee.org) | [www.mfa.org](http://www.mfa.org)





## Spouses / Companions Tour - Day Two

### JFK Presidential Library and Tour of Salem

Date: Tuesday, November 1st  
Pick-up from the Renaissance Hotel  
Time: 9:15am - 4:15 pm

Begin the day with a look in to the life, love, and political greatness of John F. Kennedy at the JFK Presidential Library in Boston with a self-guided tour. Located on a ten-acre park, overlooking the sea that he loved and the city that launched him to greatness, the Library stands as a vibrant tribute to the life and times of John F. Kennedy. It includes a short movie with footage of JFK throughout his life, and also showcases exhibits such as a sampling of Jackie Kennedy's wardrobe and her tour of the White House.

From there, depart on a journey back in time to the bewitching seaport of Salem. You will start with a three course lunch at Capt's Waterfront Restaurant in Pickering Wharf, and then learn about Maritime history, the famed author Nathaniel Hawthorne, beautiful architecture spanning centuries, and the notorious Witchcraft Hysteria of 1692. After touring the Seaport you will visit the Salem Witch Museum, which chronicles the spring and summer of 1692 where 180 people were accused of witchcraft and imprisoned, and tried in a court where the result was almost always execution.

9:15	Depart the Renaissance Hotel by bus with your local tour guides
	Visit to JFK Library
11:00	Depart to Salem
12:00	Three course lunch at Capt's Waterfront Restaurant
1:30	Tour the seaport of Salem
	Visit the Salem Witch Museum
4:15	Arrive back at the Renaissance Hotel

[www.transformerscommittee.org](http://www.transformerscommittee.org) | [www.jfklibrary.org](http://www.jfklibrary.org) | [www.salemwitchmuseum.com](http://www.salemwitchmuseum.com)







## Wednesday Evening Social Event

The Spirit of Boston, Dinner Social

Date: Wednesday, November 2nd

Location: 2 min. walk from the Renaissance Hotel

Cocktails: 6:30 - 7:00 pm

Cruise and Dinner: 7:00 - 10:00 pm

We are pleased to offer you the opportunity to join us aboard the Spirit of Boston for a gourmet dinner, live music, and private tour of the Boston Harbor waterfront.

Located directly across the street from The Renaissance Hotel, this elegant private dinner cruise offers you the chance to see spectacular views of the Boston Skyline, the World Trade Center, the Boston Tea Party, the Boston Massacre Site, the Old North Church, Bunker Hill Monument, Old Ironsides, the USS Cassin Young, and much, much more! Ticket price includes a four course dinner, two complimentary drink tickets, access to all four decks, a private tour, live jazz trio, and DJ.

- > Dress is casual, although November in Boston can be rather chilly, so dress appropriately.
- > The boat sails at 7:00 pm, so ensure you are on board by 6:30 pm.
- > The boat is docked directly across the street from the Renaissance Hotel. There will be signs and guides to point you in the right direction for your short walk over.
- > Sit-down buffet dinner begins at approx. 7:00 pm.
- > The cruise docks at 10:00 pm in the same location that it left from.

Advance reservations are required.

[www.transformerscommittee.org](http://www.transformerscommittee.org) | [www.spiritofboston.com](http://www.spiritofboston.com)





## Technical Demonstrations & New England Lobster Clambake

**Please join us for a tour of Doble Engineering Company's  
Worldwide Headquarters in Watertown, Massachusetts**

*Featuring: Doble's High Voltage Testing, Laboratory & Engineering Facilities  
Plus: A Series of Technical Demonstrations by Doble Experts*

**Tuesday evening, November 1, 2011**

**As part of the Fall 2011 IEEE/PES Transformers Committee Meeting**

### **Tour and Lobster Clambake Details:**

6:15 to 6:30 PM: Buses board at the Renaissance Boston Waterfront Hotel

6:30 PM: Last bus to depart

7:00 PM: Traditional New England Lobster Clambake

8:00 PM: Tour of the Watertown Facility including demonstrations

9:30 PM: Buses depart back to the Renaissance Hotel

**Space is limited. This tour will sell-out early! Indicate your desire to attend this event when registering on-line for the IEEE meeting.**

Companions are welcome to attend.

*Please be sure to wear your IEEE name badge during the tour. Transportation will be provided between the Renaissance Boston Waterfront Hotel and Doble's Watertown headquarters. No cameras are allowed on the tour. Vegetarian and non-seafood options will be available upon request.*

For more information or questions regarding the tour contact Doble Events:  
[events@doble.com](mailto:events@doble.com) or 617-926-4900.

### **Doble Engineering Company**

For over 90 years, Doble has partnered with our clients to improve operations and optimize system performance. Doble offers diagnostic instruments, services and the world's premier library of statistically significant apparatus test results for the benefit of energy generation, transmission, delivery and industrial companies worldwide. Doble has a reputation for excellence, earned through the expertise of its engineers and the quality of its products and services. We support the sharing of knowledge and best practices through a robust schedule of educational conferences, seminars and users group meeting held throughout the year at locations around the globe.



**IEEE/PES Transformers Committee**  
**Fall 2011 Meeting**  
**Boston, Massachusetts USA**



## **"Measurement of Partial Discharges in Transformers"**

**-- Technical Presentation --**  
**Monday, October 31, 2011**  
**4:45 to 6:00 pm**

**By Dr. Raymond Bartnikas, Dr. Alexander Kraetge, Dr. Eberhard Lemke**

### **1. Abstract**

The tutorial will cover three topics:

- History of Partial Discharge Measurements
- Fundamentals of Partial Discharge Measurements
- Modern Instrumentation and Computer Aided Interpretation of PD Signals

In the first part, Dr. Bartnikas will present a brief review of the history of partial measurements in the high voltage industry, from the early days of the RIV measurements to the more modern practices. This part will provide people with a better understanding of how this field evolved over the years.

The second topic presented by Dr. Lemke will assist HV test field engineers in a better understanding of the fundamentals of electrical PD measurements. Based on various PD models developed for explanation the characteristic PD recurrence under power frequency test voltage, the PD pulse charge transfer in HV test objects is discussed. Based on this, the design of basic circuits recommended for PD tests of power transformers as well as the calibration procedures according to IEC 60270 are discussed, where reference is made to the recently edited IEEE C57.113.

The last topic presented by Dr. Kraetge will provide participants with a short description of what information modern instrumentation and digital signal processing can add to the interpretation of PD measurements.

### **2. Learning Objectives**

This presentation will help personnel associated with PD tests of HV equipment to familiarize with:

- Characteristic PD occurrences under power frequency test voltages
- PD Charge transfer in HV equipment
- Main quantities recommended for electrical PD measurements
- Calibration procedures for apparent charge measurements
- Modern instrumentation available today for detecting PD in transformers
- Some of the digital techniques available nowadays to help with the interpretation of the pd measurements

### 3. Learning Outcomes

As a result of attending this tutorial session, members will gain an understanding of the following:

- The history and evolution of pd measurements
- Design of PD measuring circuits
- Evaluation of PD test results
- Recommendations of IEEE C57.113
- Advanced techniques for interpretation of PD data

### 4. Presenters' Biographies

**Dr. Eberhard Lemke:** Dr. Lemke graduated from the Dresden University of Technology in Germany in 1962. He earned the PhD degree, focused on the breakdown of large air gaps, in 1967 and the Dr.SC. degree, focused on wide-band PD detection, in 1975. From 1978 until 1981, he joined the power cable factory KWO in Berlin where he developed the so-called LEMKE PROBE for non-conventional PD measurement. In 1987 Dr. Lemke was appointed Professor at the Department of High Voltage Engineering of the Dresden University of Technology, where he was involved in education and research for more than three decades. In 1990 he founded the company LEMKE DIAGNOSTICS GmbH, now named DOBLE LEMKE GmbH, which manufactures systems for PD diagnostics of HV equipment. Eberhard Lemke is author and co-author of several books and published a large number of technical papers. He holds various patents and is active in various working groups of CIGRE, IEC, IEEE, and VDE.

**Dr. Alexander Kraetge:** Dr. Kraetge is product manager for transformer testing equipment with OMICRON since 2006. His main focus is on partial discharge and SFRA testing. He was born in Berlin, Germany. After vocational education and practice as electrician he studied high voltage and power engineering at the Berlin University of Technology (Germany) and graduated in 2001 as M.E.E. Until 2006, he worked as a research engineer for power transformer condition assessment at the High Voltage Department of the same university on behalf of the German Scientific Society and received a PhD degree in engineering sciences in 2007. He is member of the German Electrical Engineering Society, Cigré, IEC TC14 and the IEEE Transformers Committee and serves as an active member of several working groups regarding testing of power transformers. He authored more than 70 technical and scientific papers about this subject.

**Dr. Raymond Bartnikas:** Dr. Bartnikas received his early education at St. Michael's College School in Toronto, Ontario. He obtained the B.A.Sc. degree in Electrical Engineering from the University of Toronto in 1958 and M.Eng. and Ph.D. degrees from McGill University in 1962 and 1964, respectively, also in Electrical Engineering. In 1958 Dr. Bartnikas joined the Cable Development Laboratories, Northern Electric Company, Lachine, Québec, transferring in 1963 to the Northern Electric Research and Development Laboratories in Ottawa. In 1968 he joined the Hydro-Québec Research Institute and held the position of Scientific Director of the Materials Science Department until he was named Master of Research in 1982. He is an Adjunct Professor in the Department of Electrical and Computer Engineering at the University of Waterloo, associated professor in the Department of Engineering Physics and Materials at École Polytechnique (University of Montréal) and a Visiting Professor at the University of Rome "La Sapienza". Dr. Bartnikas is the editor of the ASTM monograph/book series *Engineering Dielectrics* and two books entitled *Elements of Cable Engineering* and *Power Cable Engineering*. He is a recipient of many scientific awards, bestowed upon him in recognition for his contributions to the fields of dielectrics, electrical insulation and gaseous discharges and electrical measurements; he is a Fellow of ASTM, the IEEE, the Institute of Physics (UK), and the Royal Society of Canada (Academy of Science) and the Canadian Academy of Engineering. He held the position of Chairman of the ASTM Committee on Electrical and Electronic Insulating Materials from 1979 to 1985, served as President of the IEEE Dielectrics and Electrical Insulation Society, and is a member of the IEEE Energy and the IEEE Insulated Conductors Committees. He is currently chairperson of the International Electrotechnical Commission (IEC) Committee TC15E Endurance Tests.



**IEEE/PES Transformers Committee**  
**Fall 2011 Meeting**  
**Boston, Massachusetts USA**



## **“Use of Furans as a Diagnostic Tool to Estimate Insulation Life”**

**-- Technical Presentation --**  
**Tuesday, November 1, 2011**  
**4:45 to 6:00 pm**

**By Luiz Cheim, Donald Platts, Thomas Prevost, Shuzhen Xu**

### **1. Abstract**

Furans are one of several chemical compounds that are produced as the paper insulation in a transformer ages and degrades. The topic on furan analysis has been extensively studied and many technical papers have been written on the formation of furanic compounds, which are dissolved in oil, and analyzed through normal transformer oil sampling. This tutorial will present the major finding of a literature review conducted by the furan analysis task force including the history and the development of furan testing, the known technical information and recommendations for analysis of furan test results. It will also discuss the technical base for continued gathering and evaluation of furan data for liquid power transformers.

### **2. Learning Objectives**

This tutorial consists of:

- History of furan analysis
- How furans are formed including paper insulation degradation background and the furan chemistry
- The stability of furan especially the issue in thermally-upgraded insulation paper
- The correlation between the DP of the paper insulation and the furan in the oil
- The statistical analysis of furan data and the outcomes that has been conducted by the industry
- Technical issues and limitations
- Recommendations on how to use results from furan testing from the task force
- Recommendations for data collection from the task force

### **3. Learning Outcomes**

As a result of attending this tutorial session, members will gain an understanding of the following:

- What impacts the furan production
- What impacts the correlation between the DP and the furan
- The use of furan analysis technique for transformers with kraft paper insulation and thermally upgraded paper
- What should be aware when using furan analysis in real applications

#### **4. Presenters' Biographies**

**Thomas A. Prevost:** Tom is Primary Manager for OMICRON electronics USA. Prior to joining the OMICRON team, Tom worked for twenty-five years at Weidmann Electrical Technologies, a manufacturer of insulation materials and provider of diagnostic services for the transformer industry. Early in his career Tom worked at Tampa Electric Company as an engineer in distribution and production. Tom received his BSEE from Virginia Polytechnic Institute. Tom is a senior member of IEEE. He is vice-chair of the P2030 "Smart Grid" working group. He is the past-chair of the IEEE/PES Transformers Committee. He is a member-at-large of the IEEE/PES Board of Governors. Tom is also active in ASTM committee D27 on Insulating Fluids and IEC TC10 on Insulating Fluids.

**Shuzhen Xu:** Shuzhen works as a Senior Research Specialist at FM Global. Her responsibility includes risk and reliability assessment for high voltage equipment such as transformers, generators and industrial motors. She has more than 7 years experience in failure root cause analysis, diagnostic testing data analysis, condition evaluation and reliability assessment for HV equipment. She published numerous technical papers on the subject of HV equipment reliability assessment. Shuzhen is an active member of IEEE/PES Transformers Committee and is the chair of the task force on furan analysis for liquid power transformers. She received her Ph.D degree from Shanghai Jiaotong University in China.

**Donald W. Platts:** Don is presently a Senior Staff Engineer - Transmission and Substation Standards Engineering with PPL Electric Utilities. He is responsible for most engineering activities involving transformers: from preliminary studies and selection; purchase projects including writing specifications, performing inspections, and witnessing testing; maintenance and operation support; DGA Analysis; loading studies; failure analysis; and equipment repair processes. His experience with PPL includes 21 years in various Engineering groups - Standards Engineering, System Maintenance Engineering, and Substation Component Engineering, etc. For 16 years prior to that, he worked in the Substation Engineering design group. He is an active member of the IEEE/PES Transformers Committee where he presently serves as the Secretary of the Committee. He has a BSEE degree from Lafayette College, and is a Registered Professional Engineer in Pennsylvania.

**Luiz Cheim:** Luiz joined ABB TRES North America in August 2009 as a Consulting R&D Engineer to support the Transformer Condition Assessment program through advanced DGA, Transformer Aging Analytical Tools as well as Online Monitoring and Diagnostic systems. Luiz is part of an ABB global R&D organization that works on the development of those tools in order to support our customer's effort in maintaining their critical assets through the new Smart Grid Initiatives. Before joining ABB Luiz had 10 years experience with Siemens Transformers, and 18 years experience with the Center for Electric Power Research (CEPEL) in Rio de Janeiro, Brazil. Luiz has been an active member of Cigre Paris since 1984, acting as Chairman of the Study Committee A2-Transformers in Brazil from 2000-2006. Luiz is an active member of the IEEE Transformer Committee and holds a PhD in Electrical Electronic Engineering from the University of Nottingham, UK as well as a MSc and a BSc in EEE from the Federal University of Rio de Janeiro, Brazil.



## Power Distribution &amp; Regulating Transformers Standards 2011 Collection

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## Features:

- **This CD-ROM Includes 85 active standards,** guides, and recommended practices of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) Transformers Committee.
- **Also known as the IEEE C57 Series,** many of the standards are recognized by the American National Standards Institute (ANSI).
- **New VuSpec™ Series Interface:** Starts automatically in your web browser with free Adobe Reader software.
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- **Index:** Find the standard you need fast, from a list of pre-sorted keywords.
- **Significant Savings:** Save more, get more! Individually, these standards sell for over \$7000.

## Contents:

Includes the following standards (titles condensed)

- IEEE 32-1972™ Neutral Grounding Devices
- IEC 62032 (IEEE C57.135-2005) Phase-Shifting Trans
- IEEE 62™-1995 Field Testing of Power Transformers
- IEEE 259™-1999 Eval. Insul. for Dry-Type Specialty rs
- IEEE 637™-1985 Reclamation of Insulating Oil
- IEEE 638™-1992 Class 1E Transf. Nuclear Stations
- IEEE 638™-1992, Errata
- IEEE 1276™-1997 High Temp Insul MatsLiquid-immer
- IEEE 1277™-2010, Dry & Oil-Reactors for DC Trans.
- IEEE 1538™-2000 Max Winding Temp Rise Liquid-Fill
- IEEE C57.12.00™-2010 Gen Req for Liquid-Immersed
- IEEE C57.12.01™-2005 Solid-Cast Resin-Encapsulate
- IEEE C57.12.10™-2010 Std Req for Liquid-Immersed
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