TRANSFORMERS COMMITTEE

10 September 2008

Dear Committee Members and Guests:

On behalf of our Group EFACEC, we would like to invite you to attend the Fall 2008 Meeting of the IEEE/PES Transformers Committee during 5-9 October, and to know the pleasure and wonders of Portugal. Your hosts, Group EFACEC and my wife Gabriele and I, look forward to your visit.

Our meeting will take place at the newly renovated Porto Palácio Hotel, located in the City of Porto (1269 Avenida Boavista), and is a convenient location within easy reach of shops, restaurants and entertainment. Although the Palácio Hotel is likely sold-out at this time, there are several other hotels within easy walking distance. More details are available at the Transformers Committee website (www.transformerscommittee.org).

Porto is the second largest city in Portugal and is served by Aeroporto Francisco Sá Carneiro (airport code "OPO"). The Palácio Hotel is 20-25 minutes from the airport and is best served by public taxi. The taxi fare between the airport and hotel is approx. €20. Although the Porto Airport has many direct flights from other locations in Europe and the United States (generally from the Newark Airport), some people find it convenient to fly directly into Lisbon ("LIS") and then connect to Porto. Porto is located about 320 kilometers (200 miles) from Lisbon, and is connected by a modern highway. Driving time from Lisbon to Porto is 3 hours. There is also train transportation available from Lisbon to Porto, with a traveling time of 2-1/2 hours (www.cp.pt). As a service to you, EFACEC will have people available at the Palácio Hotel to assist with local issues, suggest restaurants, etc.: in the hotel lobby on Saturday afternoon (Oct 4), and in the meeting area Sunday afternoon (Oct 5) and all day Monday (Oct 6).

Portugal is a member of the European Community; therefore no visa is necessary for U.S. citizens. The official currency is the Euro, and the power supply is 240 VAC and 50 Hz. You will need an adaptor to plug your devices into power outlets as the plug has a different physical configuration.

The weather in early October is pleasant. Being near the seashore, we might experience some occasional rain that should clear away in hours. Temperatures range from an average high of 22°C (71°F), to an average low of 12°C (54°F). At night it might get a bit cool, so a sweater or a light jacket are a good idea. The dress at the meeting is business casual as usual, but dress at the Sunday Reception and the Wednesday Dinner Social is slightly more formal. A jacket or nice sweater would be appropriate at those events.

For the companions we have selected different tours that will be surely enjoyable -- such as visiting beautiful cities like Guimarães & Braga, which are north of Porto, and Aveiro, which is south of Porto. We also suggest you consider some time to explore the City of Porto, especially the old city center and the banks of the Douro river, which are full with nice restaurants and cafes. Especially interesting is an evening walk “at the other side of the river”, in the Cais the Gaia area where all of the Porto Wine cellars and warehouses are located. The view across the river, with the old facades of historical buildings is certainly an old European city spectacle.

ON-LINE REGISTRATION

Use the on-line registration system to register for all tours and events. The on-line registration system can be accessed at www.transformerscommittee.org. Register on-line with a credit card by Friday, 19 September to receive the US$50 early registration discount. The on-line registration system will be disabled on Tuesday, 30 September to print name badges and to finalize counts. Our goal for this meeting is to get EVERYONE registered in advance for the meeting. Note that the cost for walk-up registration for the meetings at the hotel is substantially higher than registering on-line in advance.

SPECIAL EVENTS

Sunday, 5 October. For those who wish to get a look at our wonderful city of Porto, we will take a tour of the highlights of the town. Note the time of departure and return on the Meeting Schedule. Later on Sunday there will be a gala Welcome Reception in the ballroom of the Palácio Hotel. This will be your first chance to sample some of the unique tastes of Portugal, while reacquainting with friends. **NOTE THE GOLF EVENT HAS BEEN CANCELED.**

Companion Tours. There are two day-tours planned for the spouses/companions. On Monday, 6 October, we will visit the City of Guimarães, considered the "Birthplace of Portugal", and also the cosmopolitan City of Braga. On Tuesday, 7 October, we will take a one-hour excursion to the town of Aveiro, often called the "Venice of Portugal". Each of the cities is a MUST SEE of Northern Portugal. **NOTE THE EXCHANGE OF DATES OF THESE TOURS.**

Luncheons at the Palacio Hotel. On Monday, 6 October, there will be a special luncheon sponsored by the Standards Subcommittee. There will be an interesting comparison of the IEEE/ANSI and IEC transformer standards. For lunch on Tuesday, 7 October, Mr. António Sá da Costa, a professor at the Technical University of Lisbon, and President of the Portuguese Renewable Energy Association, will entertain us with an interesting presentation on wind power and other renewables.

Wednesday, 8 October. We at EFACEC are very excited about this event. We promise you a great time at the social reception with a variety of Port wine tastings followed by a Portuguese dinner. At the Taylor's Restaurant, located at their cellar and warehouse, you will experience a breathtaking view of the Douro River and the old city facades. Transportation will be provided from the Palacio Hotel.

Thursday, 9 October. After the General Session meeting, there will be a tour of our EFACEC Transformer Facility, located in Arroteia, about 30 minutes away from the Palacio Hotel. Transportation will be provided. **NOTE THE REN SUBSTATION TOUR HAS BEEN CANCELED.**

Friday, 10 October. For those who wish to stay longer in Portugal, we will have a unique tour of the heartland of Portugal, the "Rio Douro Valley Region". This is a once in a lifetime scenic tour of this region and World Heritage Landscape, which reveals the secrets of the port wine producers.

ADDITIONAL INFORMATION

Along with this Invitation Letter, the following information comprises Meeting Invitation Package.

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 encouraged.

Detailed Meeting Schedule. Note that to suit our local environment, the schedule each day has been "shifted" by one hour. Meetings and tours will start and end one hour later than usual. An updated schedule will be posted on the committee's website approximately one week before the meeting.

Information Flyers:

- Sunday Porto City Tour
- Monday & Tuesday Companion Tours
- Wednesday Dinner Social at Taylor's
- Friday Tour of Rio Douro Valley Area
- Tours of EFACEC and REN Substation
- Technical Presentations

Once again, we would like to invite you to Portugal and sincerely hope you enjoy your time with us, making this trip a very memorable one. If you need further assistance, please do not hesitate to contact Ms. Tânia Fernandes at +351 22 9562366 or <tania.fernandes@efacec.pt>.

Artur Fuchs
Host, Fall 2008 Meeting
EFACEC Group

Register on-line for the meeting using a credit card at: 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 2008 Meeting; 5-9 October
Porto, Portugal

Name of Attendee _____

Company / Institution _____

Street Address _____

City _____ State / Prov. _____ Postal Code _____ Country _____

Telephone _____ Email _____

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: Attendance at all technical meetings, Sunday Evening Reception, and coffee breaks
Companion Registration Fee Includes: Sunday Evening Reception (breakfasts are generally provided by your hotel)
-- Refund provided **ONLY** if the request is received **by September 30** (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 event (including socials & tours)

Meeting Registration Fees (all fees in US$ funds)	**On or Before Sept 19**	**After Sept 19, on or before Sept 30**	**On-site, at the Meeting**	**Total**
Attendee - IEEE Member (will be verified with IEEE)	$150	$200	$350	_____
Attendee - not IEEE member	$175	$225	$375	_____
Attendee - IEEE Life or Committee Emeritus (will be verified)	$25	$75	$225	_____
Spouse or Companion, including children age 10 and over	$50	$100	$250	_____

** Note: Spouses/companions & children must be registered for the meeting (with above fees) to attend any tour or social event. **

Sunday Evening Reception (included in above registration fee) Attendee: ☐Yes ☐No, Companion: ☐Yes ☐No **-0-**

Monday Standards Luncheon: "IEEE & IEC Transf. Standards" (everyone encouraged to attend) # ____ @ $30 _____
(buffet dinner, no need to choose meal selection)

Tuesday Speaker Luncheon: Prof. António Sá da Costa, "Wind Power & Other Renewables" # ____ @ $35 _____
(buffet dinner, no need to choose meal selection)

Spouse/Companion Tours: Monday - Guimarães and Braga, includes lunch # ____ @ $85 _____
Tuesday - Aveiro, the Venice of Portugal, includes lunch # ____ @ $120 _____

Wednesday Evening Event: Dinner Social at Taylors Winery # ____ @ $45 _____
Indicate selection for meal: Beef ____, Fish ____, Vegetarian ____

Special Tours: Sunday Porto City Tour, October 5, lunch NOT included # ____ @ $65 _____
Friday Douro Valley Tour, October 10, lunch included # ____ @ $185 _____

Technical Tour: Thursday, EFACEC Transformer Facility (everyone invited) # ____ @ $0 _____

Note: Meeting Minutes in paper format is no longer available. The primary source for Meeting Minutes is downloads from the Committee's web-site.

TOTAL REMITTED -- US$ _____
All funds in US dollars

METHODS OF PAYMENT: 1. Register on-line with a credit card (preferred). 2. Mail paper form with check or money order to:
IEEE/PES Transformers Committee; 13110 Birch Drive, Suite 148, PMB 330; Omaha, Nebraska 68164 USA
email: 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"**
Checks not issued by a US Bank must add US$25.00 for processing fee.

Mailed registrations without proper payment will not be accepted.

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

Revised 10 September

IEEE/PES TRANSFORMERS COMMITTEE

www.transformerscommittee.org
Fall 2008 Meeting; 5-9 October 2008
Porto Palácio Congress Hotel & Spa; Porto, Portugal
Hosted by EFACEC

NOTES: The schedule of this meeting is "shifted" one hour later than previous meetings.
A vertical line in the left margin indicates a noteworthy revision since last revision.
See Page 5 for a key to abbreviations.

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM (Floor)
Saturday, October 4 (no meeting registration this day)					
	No Meeting Registration, No Meetings, No Social Events				
Sunday, October 5					
	"Golf Event" CANCELED				
9:00 am - 3:00 pm	"Porto City Tour". Advance registration required. Limited attendance (limited to one bus). -- Open to attendees and companions. Lunch "on your own" at the cafes. -- The bus will depart the Palácio Hotel at 9:00 am and return by 3:00 pm. -- Includes a visit to the Historic City Centre, Sé Cathedral, Port Wine Cellars, Cafes on the banks of the Douro River, Stock Exchange Palace, and Clerigos Church.				
2:00 pm - 6:00 pm	Meeting Registration				Foyer, Piso 1
3:30 pm - 6:30 pm	Administrative SC -- closed meeting, by invitation only	Admin.	T. Prevost	24 US (w/snack buffet)	Douro, Piso 1
7:00 pm - 9:30 pm	Welcome Reception -- All Attendees & Companions are Welcome! -- Appropriate dress recommended			300 Reception	Porto, Piso 1
Monday, October 6 -- Monday Breaks Sponsored by Amorim Cork Composites, S.A. * **					
	Attendee and companion breakfasts are "on your own" (generally provided by your hotel)				
9:00 am - **5:00 pm**	Companion Tour: **"Guimarães and Braga Cities".** Includes lunch. -- Advance registration required. Buses depart the Palácio Hotel at 9:00 am and return around **5:00 pm**.				
8:00 am - 5:00 pm	Meeting Registration				Foyer, Piso 1
8:00 am - 7:00 pm	Internet Cafe'			10 BR	Sousa, Piso 2
8:00 am - 8:50 am	Newcomers Orientation Breakfast Meeting -- Newcomers & Guests are encouraged to attend -- Arrive early! (suggest arrive at 7:45 am)		E. Smith	50 CL	Le Coin Restaurant Piso -1
8:30 am - 10:15 am	IEC TC-14 Technical Advisory Group (all interested individuals welcome)	++	P. Hopkinson	40 CL	3 Rios, Piso 1
9:00 am - 10:15 am	WG Dry-Type Reactors C57.16	Dry	R. Dudley	30 CL	Corgo, Piso 2
9:00 am - 10:15 am	TF Arc Furnace Transformers C57.17	Power	D. Corsi	30 CL	Tâmega, Piso 2
9:00 am - 10:15 am	TF Electrical Partial Discharge Measurements Guide C57.113	DiTests	E. Lemke	100 CL	Douro, Piso 1
9:00 am - 10:15 am	Short Circuit Tests Guide C57.133 and revision to C57.12.90, Section 12	PCS	M. Fortin	150 CL S3	Porto, Piso 1
10:15 am - 10:30 am	*Break (beverages only)*			Foyers, Piso 1	

*** Contact Joe Watson (joe_watson@ieee.org) if you are interested in sponsoring coffee-breaks at a future meeting.

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Monday, October 6 (continued)					
10:30 am - 11:45 am	WG Sealed Dry-Type Power Transformers C57.12.52	Dry	S. Kennedy	30 CL	Corgo, Piso 2
10:30 am - 11:45 am	WG Liquid-immersed Secondary Network Transformers C57.12.40	UTNP	B. Klaponski	30 CL	Tâmega, Piso 2
10:30 am - 11:45 am	TF Transf. Tank Rupture & Mitigation	Power	P. Zhao	40 CL	3 Rios, Piso 1
10:30 am - 11:45 am	TF Furan Tests	IL	K. Haggerty	100 CL	Douro, Piso 1
10:30 am - 11:45 am	WG PCS Rev. to Test Code C57.12.90	PCS	M. Perkins	150 CL S3	Porto, Piso 1
11:45 am - 12:00 pm	*Break (beverages only)*			Foyers, Piso 1	
12:00 pm - 1:15 pm	WG 3-ph Underground Distribution Transformers C57.12.24	UTNP	G. Termini	30 CL	Corgo, Piso 2
12:00 pm - 1:15 pm	**SC HVDC Converter Transformers and Smoothing Reactors**	HVDC	R. Dudley	30 CL	Tâmega, Piso 2
12:00 pm - 1:15 pm	WG Control Cabinets PC57.148	Power	J. Watson	40 CL	3 Rios, Piso 1
12:00 pm - 1:15 pm	WG Thermal Evaluation of Power and Distribution Transformers C57.100	IL	R. Wicks	100 CL	Douro, Piso 1
12:00 pm - 1:15 pm	WG Revision to Low Frequency Tests	DiTests	B. Poulin	150 CL S3	Porto, Piso 1
1:15 pm - 2:30 pm	Standards Development Review Luncheon Meeting (Special Topic): "An Overview of IEC Transformer Standards and the New Dual Logo Process". -- Everyone is encouraged to attend. -- Advance reservation required. -- No paper tickets. Admission verified at the door.		B. Bartley and J. Sim	100 RT (8/tbl)	Madruga Restaurant Piso -1
2:45 pm - 4:00 pm	WG Thermal Evaluation C57.12.56/60	Dry	R. Wicks	30 CL	Corgo, Piso 2
2:45 pm - 4:00 pm	WG Bar Coding C57.12.35	Dist	G. Termini	30 CL	Tâmega, Piso 2
2:45 pm - 4:00 pm	WG Tap Changer Performance C57.131	Power	W. Henning	40 CL	3 Rios, Piso 1
2:45 pm - 4:00 pm	TF Special Dielectric Test Issues	DiTests	B. Forsyth	100 CL	Douro, Piso 1
2:45 pm - 4:00 pm	WG Frequency Response Analysis (FRA) Guide PC57.149	PCS	C. Sweetser	150 CL S3	Porto, Piso 1
4:00 pm - 4:15 pm	*Break (beverages and treats)*			Foyers, Piso 1	
4:15 pm - 5:30 pm	TF High Temp. Transformers **(New!)**	IL	R. Marek	30 CL	Corgo, Piso 2
4:15 pm - 5:30 pm	WG Transformer Paralleling Guide	Power	T. Jauch	30 CL	Tâmega, Piso 2
4:15 pm - 5:30 pm	WG Revision to Impulse Tests	DiTests	P. Riffon/ P. Heinzig	40 CL	3 Rios, Piso 1
4:15 pm - 5:30 pm	WG PCS Revisions to C57.12.00	PCS	S. Snyder	100 CL	Douro, Piso 1
4:15 pm - 5:30 pm	TF IEEE-IEC Cross Reference	Stds	J. Sim	150 CL S3	Porto, Piso 1
5:30 pm - 5:45 pm	*Break (beverages only)*			Foyers, Piso 1	
5:45 pm - 7:00 pm	Presentation #1: "Indoor Measurement of Transformer Noise Using Sound Pressure and Sound Intensity Methods", by Don Chu, Ramsis Girgis, Chris Ploetner. Sponsored by ASV. **			200 CL S3 (add 50 TH seats in rear)	Porto, Piso 1

** Contact N. Kent Haggerty (n.kent.haggerty@ieee.org) if you are interested in making a technical presentation at a future meeting.

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Tuesday, October 7 -- Tuesday Breaks Sponsored by LDIC Group ***					
	Attendee and companion breakfasts are "on your own" (generally provided by your hotel)				
9:00 am - 5:00 pm	Companion Tour: **"Aveiro, The Venice of Portugal".** Includes lunch. -- Advance registration required. Buses depart the Palácio Hotel at 9:00 am and return around 5:00 pm.				
8:00 am - 5:00 pm	Meeting Registration				Foyer, Piso 1
8:00 am - 7:00 pm	Internet Cafe'			10 BR	Sousa, Piso 2
9:00 am - 10:15 am	WG Test Requirements for HV Instrument Transformers C57.13.5	IT	R. McTaggart/ P. Riffon	30 CL	Corgo, Piso 2
9:00 am - 10:15 am	WG Phase-shift Transf. Guide C57.135	Power	J. Sim	30 CL	Tâmega, Piso 2
9:00 am - 10:15 am	(TBD)			40 CL	3 Rios, Piso 1
9:00 am - 10:15 am	WG Switching Transients Induced by Transf./Breaker Interaction PC57.142	PCS	R. Degeneff	100 CL	Douro, Piso 1
9:00 am - 10:15 am	WG PC57.152 Field Test Guide (Rev. IEEE 62)	Stds	J. Verner	150 CL S3	Porto, Piso 1
10:15 am - 10:30 am	*Break (beverages only)*			Foyers, Piso 1	
10:30 am - 11:45 am	WG Loss Evaluation Guide for Distribution Transformers **(New!)**	Dist	A. Traut/ D. Duckett	30 CL	Corgo, Piso 2
10:30 am - 11:45 am	TF Functional Life Tests, De-energized Tap Changers (DETC)	Power	P. Hopkinson	30 CL	Tâmega, Piso 2
10:30 am - 11:45 am	TF GSU Bushing Standardization	Bush	C. Hurley	40 CL	3 Rios, Piso 1
10:30 am - 11:45 am	TF DGA Natural Ester Fluids	IF	P. Boman	100 CL	Douro, Piso 1
10:30 am - 11:45 am	WG Revision to Loading Guide C57.91	IL	T. Raymond	150 CL S3	Porto, Piso 1
11:45 am - 12:00 pm	*Break (beverages only)*			Foyers, Piso 1	
12:00 pm - 1:15 pm	WG Loss Tolerance and Measurement	PCS	E. teNyenhuis	30 CL	Corgo, Piso 2
12:00 pm - 1:15 pm	TF External Dielectric Clearances	DiTests	E. Davis	30 CL	Tâmega, Piso 2
12:00 pm - 1:15 pm	TF Transformer Efficiency and Loss Evaluation (DOE Activity)	Dist	P. Hopkinson	40 CL	3 Rios, Piso 1
12:00 pm - 1:15 pm	WG Guide for DGA in LTCs C57.139	IF	F. Jakob	100 CL	Douro, Piso 1
12:00 pm - 1:15 pm	WG Temperature Rise Test Procedures in Section 11 of C57.12.90	IL	P. Powell	150 CL S3	Porto, Piso 1
1:15 pm - 2:30 pm	Speaker Luncheon: **"Wind Power & Other Renewables", by Professor António Sá da Costa** -- Advance registration is necessary. -- Paper tickets are not provided. Admission verified at the door.			150 CL (8/tbl) with elevated table for 5	Madruga Restaurant Piso -1
2:45 pm - 4:00 pm	WG Revision to IEEE 638	Power	C. Swinderman	30 CL	Corgo, Piso 2
2:45 pm - 4:00 pm	WG HVDC Bushings C57.19.03	Bush	L. Recksiedler	30 CL	Tâmega, Piso 2
2:45 pm - 4:00 pm	WG Voltage Step Regulators C57.15	Dist	Colopy/Kennedy	40 CL	3 Rios, Piso 1
2:45 pm - 4:00 pm	WG Dielectric Test Tables, Liquid-filled	DiTests	P. Hopkinson	100 CL	Douro, Piso 1
2:45 pm - 4:00 pm	WG Revision to Gas Guide C57.104	IF	R. Ladroga	150 CL S3	Porto, Piso 1
4:00 pm - 4:15 pm	*Break (beverages and treats)*			Foyers, Piso 1	

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DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Tuesday, October 7 (continued)					
4:15 pm - 5:30 pm	WG Semiconductor Rectifier Transformers C57.18.10	PCS	S. Kennedy	30 CL	Corgo, Piso 2
4:15 pm - 5:30 pm	TF Moisture Estimation in Transformer Insulation **(New!)**	IL	J. Sim	30 CL	Tâmega, Piso 2
4:15 pm - 5:30 pm	WG Sound Level Measurement Guide	ASV	J. Puri	40 CL	3 Rios, Piso 1
4:15 pm - 5:30 pm	TF Field Applications of Natural Ester Fluids	IF	J. Graham	100 CL	Douro, Piso 1
4:15 pm - 5:30 pm	WG Transportation Issues Guide	Power	G. Anderson	150 CL S3	Porto, Piso 1
5:30 pm - 5:45 pm	*Break (beverages only)*			Foyers, Piso 1	
5:45 pm - 7:00 pm	Presentation #2: "Frequency Conversion Factors of Measured Transformer Performance Parameters", by Ramsis Girgis and Ed teNyenhuis. Sponsored by PCS. **			200 CL S3 (add 50 TH seats in rear)	Porto, Piso 1
Wednesday, October 8 -- Wednesday Breaks Sponsored by (TBD) * **					
	No Meeting Registration, No Companion Tours, No EL&P Delegation Meeting				
	Attendee and companion breakfasts are "on your own" (generally provided by your hotel)				
8:00 am - 7:00 pm	Internet Cafe'			10 BR	Sousa, Piso 2
9:00 am - 10:15 am	Joint WG Optical Instrument Transformers C57.13/PSIM P1601	IT/PSIM	Rahmatian/ Gilleland	30 CL	3 Rios, Piso 1
9:00 am - 10:15 am	**SC Audible Sound & Vibration**	ASV	J. Puri	100 CL	Douro, Piso 1
9:00 am - 10:15 am	**SC Insulation Life**	IL	D. Platts	150 CL S3	Porto, Piso 1
10:15 am - 10:30 am	*Break (beverages only)*			Foyers, Piso 1	
10:30 am - 11:45 am	**SC Instrument Transformer**	IT	J. Smith	30 CL	3 Rios, Piso 1
10:30 am - 11:45 am	**SC Distribution Transformers**	Dist	K. Hanus	100 CL	Douro, Piso 1
10:30 am - 11:45 am	**SC Power Transformers**	Power	T. Lundquist	150 CL S3	Porto, Piso 1
11:45 am - 12:00 pm	*Break (beverages only)*			Foyers, Piso 1	
12:00 pm - 1:15 pm	**SC UG Transf. & Network Protectors**	UTNP	C. Niemann	30 CL	3 Rios, Piso 1
12:00 pm - 1:15 pm	**SC Insulating Fluids**	IF	R. Ladroga	100 CL	Douro, Piso 1
12:00 pm - 1:15 pm	**SC Dielectric Tests**	DiTests	L. Wagenaar	150 CL S3	Porto, Piso 1
1:15 pm - 2:30 pm	Lunch (on your own)				
2:30 pm - 3:45 pm	**SC Dry Type**	Dry	C. Johnson	30 CL	3 Rios, Piso 1
2:30 pm - 3:45 pm	**SC Bushings**	Bush	F. Elliott	100 CL	Douro, Piso 1
2:30 pm - 3:45 pm	**SC Performance Characteristics**	PCS	R. Girgis	150 CL S3	Porto, Piso 1
3:45 pm - 4:00 pm	*Break (beverages and treats)*			Foyers, Piso 1	
4:00 pm - 5:15 pm	**SC Transformer Standards**	Stds	B. Bartley	150 CL S3	Porto, Piso 1
7:00 pm - 11:00 pm	Dinner Social: Dinner at the "Taylor's Winery". Advance registration is necessary. -- Buses begin boarding at the Palácio Hotel at 6:30 pm. The last bus departs the hotel at 7:00 pm. All buses return to the hotel before 11:00 pm. -- Paper tickets will not be provided. Admission will be verified with a list as you board the bus. -- Appropriate dress recommended.				

** Contact N. Kent Haggerty (n.kent.haggerty@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 coffee-breaks 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 (see note)
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 (with head table for 2)
RT -- multiple roundtables (8/table max)
US -- U-shape table
BR -- boardroom arrangement

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Thursday, October 9					
	No Meeting Registration, No Companion Tours, No Internet Cafe', No EPRI Meeting				
	Attendee and companion breakfasts are "on your own" (generally provided by your hotel)				
9:00 am - 10:30 am >	General Session, Transformers Committee -- All attendees are encouraged to attend. -- See separate document for meeting agenda.		T. Prevost	200 CL S1 elevat. table for 4	Porto, Piso 1
10:30 am - 10:45 am	*Break (beverages only)*			Foyers, Piso 1	
> 10:45 am - 12:30 pm	General Session, Transformers Committee		T. Prevost	200 CL S1	Porto, Piso 1
	Lunch, "on your own"				
2:00 pm - 5:00 pm	Technical Tour: EFACEC Transformers Factory. All attendees and companions are welcome. Buses will depart the Palácio Hotel at 2:00 pm and return around 5:00 pm. Eat lunch beforehand. Does NOT include dinner. **The tour of the Rede Electrica Nacional (REN) electrical substation is canceled.**				
Friday, October 10					
	No Transformer Committee Meetings, No Internet Cafe', No EPRI Meeting				
9:00 am - **6:30 pm**	Social Tour: "Tour of Douro Valley Region". **Includes lunch only. Does NOT include dinner).** -- Advance registration required. Buses depart the Palácio Hotel at 9:00 am and return around 6:30 pm.				

IEEE/PES TRANSFORMERS COMMITTEE

General Session - Fall 2008 Meeting
Thursday, 9 October 2008

Chair: Thomas A. Prevost Vice Chair: J. Edward Smith Secretary: Bill Chiu

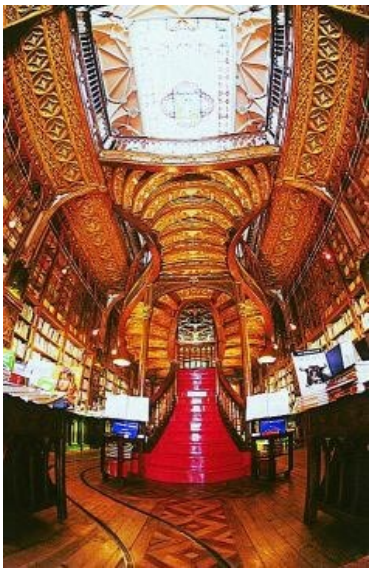
1.	Chair's Remarks and Announcements	Thomas A. Prevost
2.	Approval of Minutes from Spring 2008 Meeting	Thomas A. Prevost
3.	Administrative Subcommittee	Thomas A. Prevost
4.	Vice Chair's Report	J. Edward Smith
5.	Transformer Standards	William H. Bartley
6.	Recognition and Awards	Donald J. Fallon
7.	New Business (continued below)	Thomas A. Prevost
8.	Report of Technical Subcommittees	
	8.1. Underground Transformers & Network Protectors	Carl G. Niemann
	8.2. Audible Sound and Vibration	Jeewan L. Puri
	8.3. Bushings	Fred E. Elliott
	8.4. Dry Type Transformers	Charles W. Johnson
	8.5. Distribution Transformers	Kenneth S. Hanus
	8.6. Dielectric Tests	Loren B. Wagenaar
	8.7. HVDC Converter Transformers & Reactors	Richard F. Dudley
	8.8. Instrument Transformers	James E. Smith
	8.9. Insulating Fluids	Richard K. Ladroga
	8.10. Insulation Life	Donald W. Platts
	8.11. Performance Characteristics	Ramsis S. Girgis
	8.12. Power Transformers	Thomas G. Lundquist
9.	Editor's Report	John C. Crouse
10.	Meetings Planning Subcommittee	Gregory W. Anderson
11.	Reports of Liaison Representatives	
	11.1. Standard Coordinating Committee No. 4	Paulette Payne Powell
	11.2. IEC TC-14 Technical Advisor to USNC	Philip J. Hopkinson
	11.3. CIGRE	Jean-Christophe Riboud
12.	Old Business	Thomas A. Prevost
13.	New Business (further discussion as needed)	Thomas A. Prevost

Special Tour
Sunday, 5 October 2008

Porto City Tour

Panoramic Porto Sightseeing City Tour

On the right side of the River Douro, the city of Porto is the second largest of Portugal and one of the oldest and most beautiful towns of Europe. You can appreciate the beauty of this city in a tour of the edges of Porto. Beginning by the castle *Castelo do Queijo*, passing by the gardens of Montevideu Avenue, to the beaches of Foz, and the Ribeira Square, to its street cafés in the riverbank of the Douro. Discover in its steep streets that goes down to Douro, the unique architecture of the houses, and the Flemish influence in the downtown of Porto.



Guided Tour at the Historic Centre of Porto

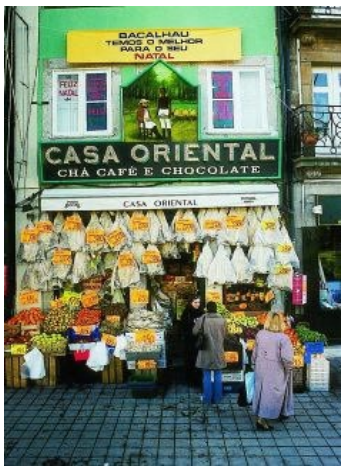
This unforgettable guided tour will walk you through the Historic Centre of Porto, a UNESCO World Heritage property. As you amble leisurely along the ancient streets and medieval lanes you will visit some of the most important monuments of Porto such as The Stock Exchange Palace, a true neoclassic jewel, and pass through the Clérigos Church and the Cathedral. In the busting and colorful markets and the traditional, highly unique shops such as the Lello Bookshop and the Majestic Café, you will discover the authentic heart of Porto, in its people. You will enjoy the stops we have arranged in charming locations so that you can relax as you sip a glass of wine from the North of Portugal and nibble on a traditional specialty.

Wine Tasting at Historic Port Wine Cellar

Port Wine is a nectar known everywhere in the world. Port is a wine of a unique aroma, taste and a body, but the best way to know it is to taste it. And for that, nothing better than a visit to a wine cellar, where you will learn more about the famous wine and where it is grown. Situated in Vila Nova de Gaia, facing the Douro River, the port wine cellar offers to the visitor one marvelous view of the city of Porto. The visit is guided through the wonderful world of Porto, passing through the ancient cellars purchased in 1811, full of casks of aging wines, and completing the visit with a tasting of premium ports.

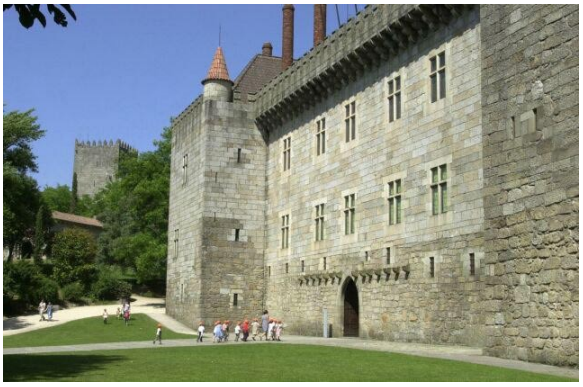
Itinerary

9:00 am -- Depart the Porto Palacio Hotel, buses will park in front of the hotel, on the street
-- Tour of the outer area of Porto
-- Guided Tour of Historic Centre
-- Time allowed for lunch in historic area (lunch "on your own")
-- Wine Tasting at a Historic Cellar
3:00 pm -- Return to Porto Palácio Hotel



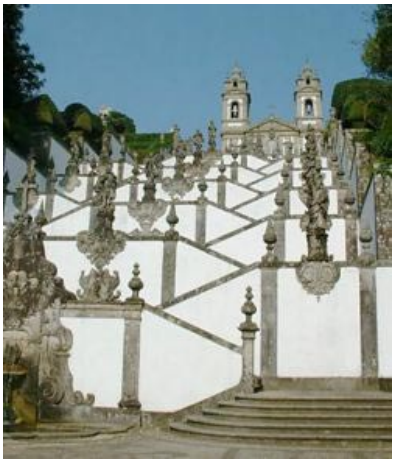
Companions Tour
Monday, 6 October 2008

Tour to Guimarães and Braga

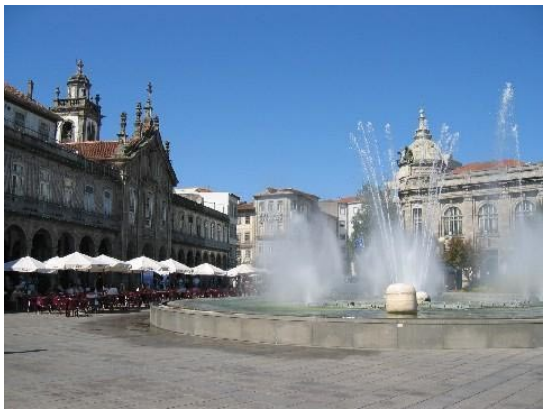


Our trip will start with a visit to Guimarães, which historical center is classified as a World Heritage Site by Unesco. Guimarães is considered the "Cradle of Portugal" and there exists the castle of the first King of Portugal that from there, in 1143, he conquered the independence to Portugal. The narrow streets with a medieval look that leads to the beautiful Largo de Oliveira are interesting points of this unforgettable city. Our tour will include a guided tour of Paço dos Duques de Bragança (the Palace of the Dukes of Braganza), built in 1420.

We will then visit Braga, the third largest city in Portugal, that shelters an enchanting historical center of the greatest and most important nucleus of religious heritage and architecture found in Portugal. Under the Roman Empire, Braga was known as "Bracara Augusta" and was capital of the province of Gallaecia. With a great university (Minho University), intriguing streets, and gardens and squares including beautiful shops and cafés, Braga is a beautiful example of a European city.



Our trip to Braga will include lunch in a remarkable quality restaurant overlooking the Sanctuary of Bom Jesus do Monte. The Sanctuary of Bom Jesus do Monte -- meaning "*Good Jesus of the Mountain"* -- is a magnificent pilgrimage site with a monumental Baroque stairway that climbs 116 metres (381 feet), where the work of nature unites with a notable work of man. We will taste the famous gastronomy from the Minho region: cocktail appetizers plus a 3-course menu including wine, soft drink, coffee or tea.



Itinerary

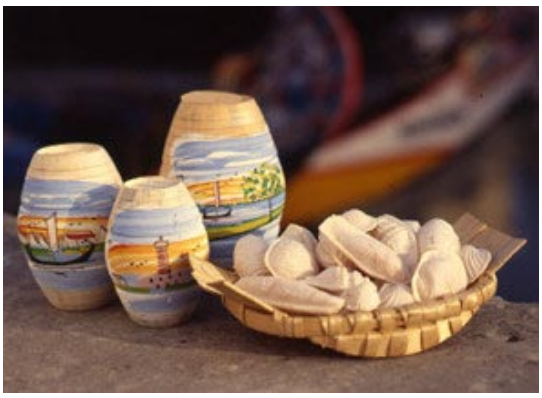
9:00 am -- Depart the Porto Palacio Hotel, buses will park in front of the hotel, on the street
-- Guided Visit of historical centre of Guimarães
-- Departure to Braga
-- Lunch in Braga (cost included in fee)
5:00 pm -- Return to Porto Palácio Hotel (approximate time of return)

Suggest wear sturdy shoes or sneakers for walking on cobblestone roads.

Companions Tour
Tuesday, 7 October 2008

Tour to Aveiro, The Venice of Portugal

Known as the "Venice of Portugal", Aveiro is surrounded by salt-flats, beaches and lagoons and dominated by the Central Canal running through town. This city, located on the shore of the Atlantic Ocean, was once a great seaport with a history linked to its production of salt, dating back prior to 959 AD. Much later, in the 16th Century it acquired new prosperity through its cod fishing industry, practiced off the coast of Newfoundland. Today the old lagoon of about 65 sq. km. still has its charm with the many canals and the distinctive and colorful *"moliceiros"* boats that are used to collect seaweed which is used for fertilizer. The town is basically a mixture of neat fishermen's cottages and Art Nouveau mansions with a few historic buildings. The small houses lining the beach area are most attractive with their distinct colorful facades of different painted colors. The church of *Misericórdia* dates from the 16th Century, whilst the more modest Cathedral *São Domingos* is from the 15th Century.



Hands-on Workshop of Making Traditional Sweets

The *ovos-moles* (egg sweet) from Aveiro is one of the emblematic pastries of the country, an ancient recipe marked by religious influence, left by local convents. A local specialist will organize a didactic hands-on workshop where participants will learn by doing, and finally tasting. A delicious active discover and a unique cultural experience.

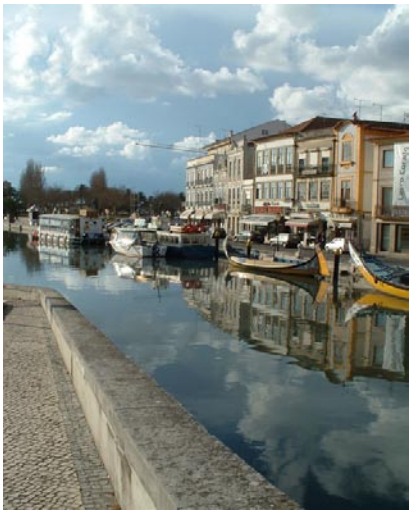
Lunch in the Fish Market

The vibrant fish market, in beautiful architecture of iron and glass, is located in the oldest quarter of the city, with the houses of fisherman facing the channels. The restaurant in the typical fisherman's quarter, specializing in fresh fish and regional recipes. Menu: variety of starters, fish soup, typical fish as main course (or alternate upon request), regional sweet or fruit, soft drinks, wine and coffee.

Itinerary

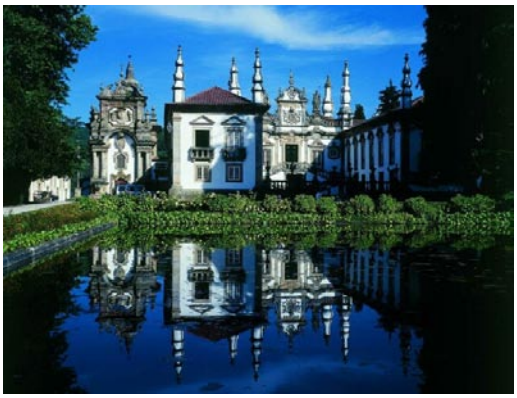
9:00 am -- Depart the Porto Palacio Hotel, buses will park in front of the hotel, on the main street
-- Guided visit to Aveiro
-- Lunch in Aveiro
-- Hands-on workshop of making traditional sweets
5:00 pm -- Return to Porto Palácio Hotel (approximate time of return)

Suggest wear sturdy shoes or sneakers for walking on cobblestone roads.



Special Tour
Friday, 10 October 2008

Tour to Douro Valley

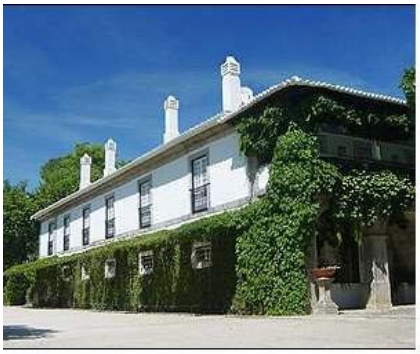


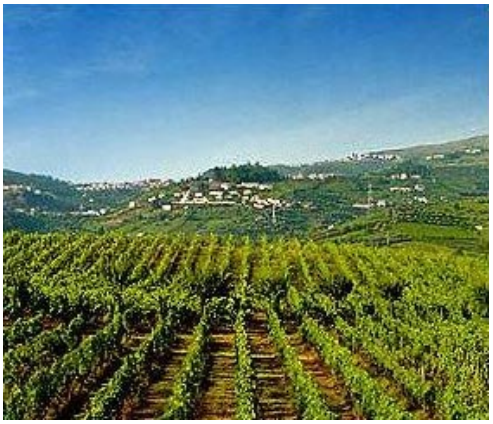
Guided Visit of the Palace of Mateus

Also known as the Solar de Mateus, and famously depicted on bottles of Mateus rosé wine, the palace epitomizes the flamboyance of Baroque architecture in Portugal. This baroque recreation was built in the early 18th century, probably by Nicolau Nasoni, for António José Botelho Mourão. His descendants still live here, but visitors can tour the gardens and part of the house. Its granite wings shelter a forecourt dominated by an ornate balustrade stairway and overlooked by rooftop statues. Behind the palace is an Alice in Wonderland garden of tiny box hedges, prim statues and a fragrant cypress tunnel. Inside, you can visit a few rooms, heavy with velvet drapes and fussy period furnishing. As the rosé, it is actually made down the road by the Sogrape Company (Portugal's largest exporter of bottled wines). The palace produces its own range of jams and wines, which are sold in a shop on the premises.

Traditional Wine Lunch at a Charming Port Wine Estate

This is a family owned "quinta" (wine estate) with an history that goes back to the 15th century. The vineyards have an average age of more than 45 years and the wine estate maintains the tradition of winemaking of Douro and Port wines. The welcome meeting includes the familiarization with the history of the estate to explain the specific characteristics of the grape harvest and wine production. The typical cellar of the house includes granite-treading tanks (*lagares*) that are still used for winemaking today. During harvest season (Sept-Oct), visitors enjoy the chance to experience this ancestral tradition with popular music so characteristic for this great party of the year!





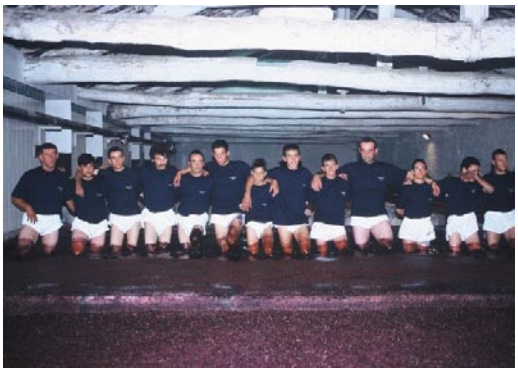
Example of Luncheon Menu

Appetizers: Selection of regional sausages in the charcoal - *moiras, alheiras, chouriças*, cheeses, *empadinhas* (typical meat-cakes), *broa* (typical bread of corn), varieties of *bola* (typical bread-cake with smoked ham), and traditional olives.

Seated lunch: *Caldo verde* (typical cabbage soup) or *crème of spinach with smoked ham, cozido à portuguesa* (traditional Portuguese dish consisting of beef, pig's trotter, smoked ham and other meats and vegetables), a traditional sweet desert with port wines from the property, soft drinks and coffee included.

Itinerary

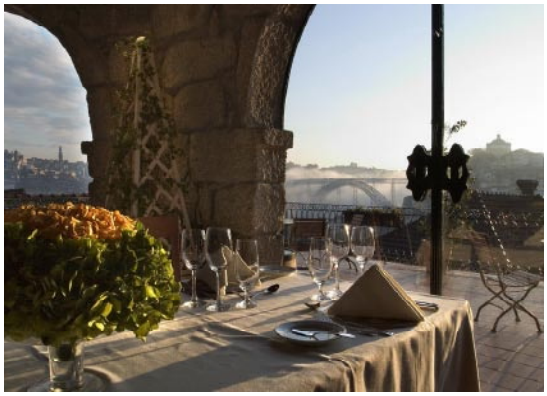
9:00 am -- Depart the Porto Palacio Hotel, buses will park in front of the hotel, on the street
-- Guided Visit of the Palace of Mateus
-- Traditional wine lunch, wine tasting, and grape harvest festivities
6:30 pm -- Return to Porto Palácio Hotel (approximate time of return)



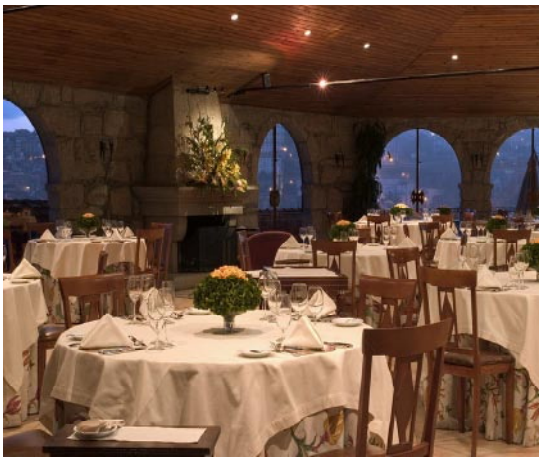
Wednesday Evening Dinner Social
Wednesday, 8 October 2008

TAYLOR'S PORT

On the south bank of the Douro River, where the waters gently lap against the Vila Nova de Gaia Promenade, port wine lodges and cellars can be found blended neatly into the bold granite and intricate arcades of this charming riverside community.



It is here, in the oasis of Taylor's Port Lodge, where one steps inside the domain of Três Séculos Restaurant - the perfect space to please and welcome, which offers refined gastronomy, skilful friendly service and the best port wine. Surrounded by leafy quarters, resistant to the city's influence, Três Séculos elegant interiors lie within beautiful natural gardens; an ambiance that lends luxury to grand banquets.



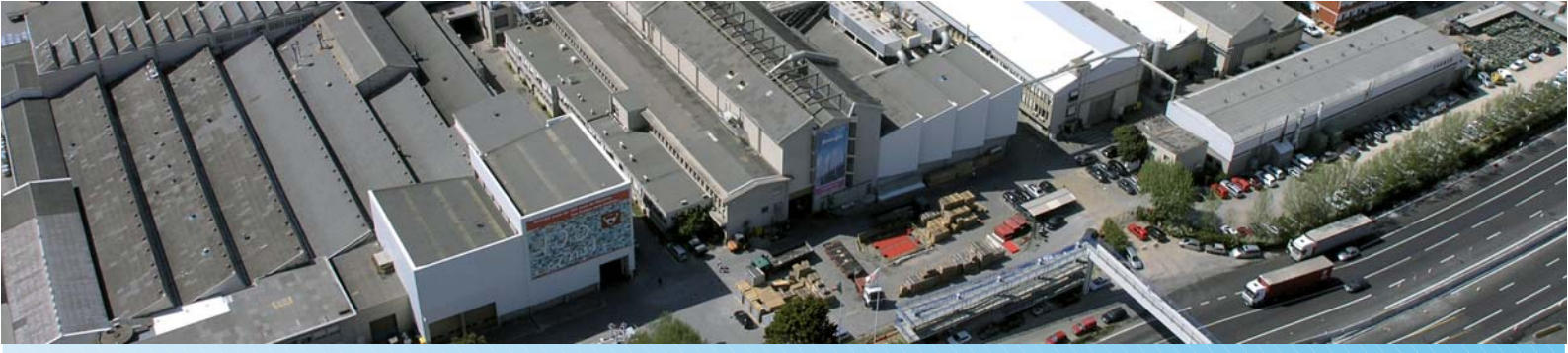
Our dinner location has spectacular views over old Porto and proclaimed World Estate Area by Unesco; being a pleasure that daily renovates to indulge yourselves with the spectacular views to the riverside Porto zone known as "Ribeira".

Founded in 1692 by Job Bearsley, Taylor's is now over 300 years old and is accepted by most wine authorities to be the greatest of all port shippers, famous especially for its sublime and long-lived Vintage port or old, distinguished Tawny ports.

When we arrive at Taylor's, we will enjoy a variety of welcoming hors d'oeuvres such as codfish balls, meat balls, "chamuças", vegetable pies, pâtés, and cheeses. For the main course, there will be beef, fish and vegetarian and options, followed by the almond and sweet egg cream pie and Douro almond and fresh cream charlotte, with hot chocolate sauce for desert ... and of course, with the best selection of Taylor's port wines.

Itinerary

6:30 pm -- Buses begin departing the Porto Palacio Hotel,
buses will park in front of the hotel, on the street.
7:00 pm -- Last bus departs the hotel
-- Welcome Reception at Taylor's
-- Tour of Taylor's caves
-- Sit-down dinner
11:00 pm -- Last bus will return to the hotel by 11:00 pm



IEEE/PES Transformers Committee Technical Tour
Fall 2008 Meeting

EFACEC Transformer Facility

Thursday, October 9, 2008
(2:00 pm - 4:00 pm)

Estabilished in 1948 and backed up with the know-how and technology from ACEC Belgium, EFACEC company corporate philosophy has been based on continuous innovation and technical development. As a result, the sophisticated manufacturing facilities and advanced techniques are evident in the new power transformer factory, which started in 1994.

This philosophy, together with the continuous development in quality and technical product upgrading, has led EFACEC Power Transformers to prestige and excellence among worldwide manufacturers. Since 1948, the following milestones in lhe manufacturing of transformers and autotransformers are highlighted:

- 245 kV transformers in 1967
- 420 kV transformers in 1977
- 525 kV transformers in 2007

The current range of products of lhe new power transformers factory, includes:

- Mobile Substations up to 60 MVA and 230 kV (BIL 1050 kV)
- Transformers and autotransformers, Core type, up to 150 MVA and 245 kV (BIL 1050 kV)
- Transformers and autotransformers, Shell type, up to 800 MVA and 525 kV (BIL 1675 kV)
- Special transformers
- Shunt reactors, core type and shell type
- Phase-shifters

For power plants, substations, electrical traction systems and industrial systems, including special transformers for rectifier and electric fumace installations.

Notes:

- All attendees and companions are welcome to attend the technical tour
- Cameras and mobile phones with cameras are not allowed
- Questions are limited to the guide/speaker of each of the groups
- All participants must remain with their guide/speaker

efacec

IEEE/PES Transformers Committee
Fall 2008 Meeting
Porto, Portugal

"Indoor Measurement of Transformer Noise"

-- Technical Presentation --
Monday, October 6, 5:45-7:00 p.m.

By Donald Chu, Dr. Ramsis Girgis, and Dr. Christoph Ploetner

1. Abstract

Power Transformers are now often installed in close proximity to residential areas, where strict noise level requirements are imposed by City and County ordinances. Hence, the demand for low and ultra-low noise transformers and reactors, has grown around metropolitan areas around the world. Accurate indoor measurement of the noise of such transformers and reactors is therefore very critical. Establishing the correct industry standard for the techniques for the appropriate methods and conditions to perform these measurements accurately is of utmost importance. For this reason, the Audible Sound & Vibrations Subcommittee is presently in the process of upgrading the IEEE Standards of transformer noise measurement to include the "Sound Intensity" method of measuring noise and also incorporates the "Wall-reflection Correction" into the Sound Pressure method. Both of these methods have already been part of the IEC Standards of noise measurement for years .

2. Learning Objectives

This tutorial is planned to:

- Provide background to why it is important to, and the challenges of, accurately measure transformer noise and its frequency spectrum.
- Review IEC Standards of sound measurement; including the "Sound Intensity" method and the "Wall-reflection Correction" Method.
- Present advantages and appropriate conditions for measuring transformer noise using the "Sound Intensity" method.
- Explain the improvement of accuracy of the "Sound Pressure" measuring method when sound wall–reflections are properly accounted for.

3. Learning Outcomes

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

- Technical challenges of measuring noise of low – noise transformers and reactors indoors.
- Sources of inaccuracies in indoor noise measurements
- Contributors to the difference between measurements using the "Sound Pressure" and "Sound Intensity" methods.
- Technical background to the development of appropriate conditions for accurate measurement of transformer and shunt reactor noise using the "Sound Pressure" and "Sound Intensity" methods.

4. Presenters' Biographies

Donald Chu: Donald is presently Section Manager of the Substation Equipment Engineering Section of Con Edison Company of New York, located in New York City, NY. Donald has over 30 years of engineering and R&D experience in distribution and substation equipment. He is responsible for the development, design, engineering, construction, failure analysis, and maintenance support for all major electrical equipment in transmission and area substations. Previously, he was Technical Specialist for power transformers responsible for providing all technical expertise to internal organizations, manufacturers, and R&D organizations. Donald received his BS degree (1975) and MSEE degree (1976) from Cornell University, New York, NY, all in electrical engineering. He is a registered Professional Engineer in State of New York and an active member of IEEE, EEI, CEATI and EPRI. He is presently the chairman of the IEEE/PES Transformers Committee's Working Group on the development of the new "Guide for Application of Monitoring of Liquid-Immersed Transformers and Components, C57.143". He is also a member of several working groups and subcommittees in the Committee.

Dr. Ramsis Girgis: Ramsis is presently the Technical Manager of ABB Power Transformer Division located in St. Louis, Missouri. He is also the leader of the ABB's global R&D activities in the area of "Transformer Core Performance" and the co-leader of the global R&D activities in the area of "Transformer Noise & Vibrations". Most recently, he has been the project leader for developing the ABB technology for designing, manufacturing, and noise testing of ultra-low noise transformers for a US utility. Ramsis received his Ph.D. degree from the University of Saskatchewan, Canada, in Electrical Power Engineering in 1978. He has over 40 years of R&D experience in the area of power, distribution, pulse power, high-frequency transformers. and rotating machines. He has published and presented over 70 scientific papers in IEEE, IEE, CIGRE, and other international journals. He was awarded the IEEE Fellow Grade in 1986. He is presently the Chair of the IEEE/PES Transformers Committee's Sub-committee on "Performance Characteristics". Ramsis co-authored chapters in two electrical engineering handbooks on transformer design and transformer noise. He is the past Technical Advisor representing the US National Committee in the IEC Power Transformer Technical Committee (14).

Dr. Christoph Ploetner: Christoph graduated from the Technical University of Ilmenau, Germany and received his Ph.D. in Electrical Engineering in 1998 from the same University during his engagement as research assistant, dealing with power transformer modeling. In 1999, he joined Siemens Power Transformer Factory in Nuremberg, Germany as a specialist for transformer modeling, magnetic, and current related issues, including noise problems. Beside other R&D projects in 2003, he was decisively participating in the design of a 65 MVA low-noise transformer without for the United States. Being increasingly involved with special technical support items for customers and suppliers and dealing with design issues, in 2005 he became Head of the Electrical Design Department in the transformer factory in Nuremberg. Dr. Ploetner is active participating in the IEEE/PES Transformers Committee and serves currently as convener for the maintenance team of the standard IEC 60076-6 "Reactors". He has written several technical papers on magnetic related problems on power transformers.

IEEE/PES Transformers Committee
Fall 2008 Meeting
Porto, Portugal

"Frequency Conversion of Measured Transformer Performance Parameters"

-- Technical Presentation --
Tuesday, October 7, 5:45-7:00 p.m.

By Dr. Ramsis Girgis and Ed teNyenhuis

1. Abstract

While it is most preferable that the performance parameters of a transformer be measured at the frequency at which it will be in operation, this is not always possible. Transformer manufacturers normally establish their testing facilities for the power frequency of the main market(s) they serve (50 Hz or 60 Hz). Only a few manufacturers have testing facilities to measure transformer performance parameters at both power frequencies. In situations where manufacturers do not have equipment to perform measurements at the rated power frequency required by the customer, manufacturers must convert the measured values from the measurement frequency to the desired frequency. Today, there exists a wide discrepancy amongst frequency conversion factors used by different manufacturers. Hence, it is advantageous for both the manufacturers and users to have a standard / uniform set of conversion factors to be used by all manufacturers. To address this, the IEEE/PES Transformers Committee requested the development of such conversion factors for no-load loss, exciting current, load loss, noise level, etc.

2. Learning Objectives

This tutorial presentation will provide the background to the development of the proposed frequency conversion factors using analytical methods confirmed by measurements for the different transformer performance parameters. It will also explain the theory behind the proposed formulae for thermal and short-circuit tests. Finally, the text of this frequency conversion, implemented in the new revision of both the C57.12.00 and C57.12.90 Standards, as agreed upon by the PCS and ASV Subcommittees, will be presented.

3. Learning Outcomes

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

1. Effect of operating power frequency on no-load loss, exciting current, load loss, no-load and load sound level, and temperature rises in windings and structural parts of power and distribution transformers.
2. Theoretical work, assumptions, and test results used to develop the proposed frequency conversion factors.
3. Advantages of using a standard set of conversion factors by all manufacturers.
4. Conditions to be observed by both manufacturers and customers for appropriate frequency conversion of the different performance parameters of transformers tested at a different power frequency than the eventual operating frequency.

4. Presenters' Biographies

Ed teNyenhuis: Ed is presently Technical Manager at ABB's Transformer Remanufacturing and Engineering Services in Brampton, Ontario. Ed was born in Barrie, Canada. He received his B.A.Sc. degree from the University of Waterloo, Canada, in 1990 and his M. Eng. Degree from North Carolina State University, USA, in 2000, all in electrical engineering. Ed has worked in the power transformer industry for 18 years. His past experience includes positions at ABB Power Transformers in Guelph Canada, Ludvika Sweden, ABB Electrical Systems Technology Institute in Raleigh, NC, USA. Ed has published several technical papers in IEEE, SMM, Doble and 2DM pertaining to power transformers, magnetics, and electrical steel. He is presently Chair of the IEEE/PES Transformers Committee's Working Group on Loss Measurement and Tolerances of Power and Distribution Transformers.

Dr. Ramsis Girgis: Ramsis is presently the Technical Manager of ABB Power Transformer Division located in St. Louis, Missouri. He is also the leader of the ABB's global R&D activities in the area of "Transformer Core Performance" and the co-leader of the global R&D activities in the area of "Transformer Noise & Vibrations". Most recently, he has been the project leader for developing the ABB technology for designing, manufacturing, and noise testing of ultra-low noise transformers for a US utility. Ramsis received his Ph.D. degree from the University of Saskatchewan, Canada, in Electrical Power Engineering in 1978. He has over 40 years of R&D experience in the area of power, distribution, pulse power, high-frequency transformers. and rotating machines. He has published and presented over 70 scientific papers in IEEE, IEE, CIGRE, and other international journals. He was awarded the IEEE Fellow Grade in 1986. He is presently the Chair of the IEEE/PES Transformers Committee's Sub-committee on "Performance Characteristics". Ramsis co-authored chapters in two electrical engineering handbooks on transformer design and transformer noise. He is the past Technical Advisor representing the US National Committee in the IEC Power Transformer Technical Committee (14).