



# TRANSFORMERS COMMITTEE



February 7, 2006

Dear Committee Members and Guests:

You and your companion are cordially invited to attend the Spring 2006 Meeting of the IEEE/PES Transformers Committee to be held March 19-23, 2006 in Costa Mesa, California. My wife Minnie and I are excited to represent Southern California Edison (SCE) as your host and hostess of this meeting.

Our meeting will take place at the Costa Mesa Hilton, 3050 Bristol Street, located just minutes away from the John Wayne Orange County Airport (SNA). The reduced group rate is US\$139 for single & double occupancy. Guest rooms are reserved under the group name "IEEE Transformers" and can be reserved by going to the hotel's website ([www.costamesa.hilton.com](http://www.costamesa.hilton.com)) and entering the group/conference code "PTC", or by calling 1-800-HILTON or 714-540-7000, or by fax at 714-540-9176 (include your email in the fax). The room block cut-off date is February 24. After that date, all remaining rooms will be released to the public.

The hotel offers a complimentary shuttle service for those of you arriving at the SNA Airport. The shuttle runs every half-hour and on the hour from 5:30 am to 11:00 pm. You may want to also consider renting a car for the selected days when you plan on venturing out to explore the riches of Southern California. Free parking is available at the Hotel. Bring your family along and enjoy a mini-family vacation with all the activities that are available to you near-by. Spend a day at the world famous Disneyland/California Adventure Park, take a quite sunset stroll on the beautiful coastal beaches, shop at the nearby world-class South Coast Plaza, or take a hot-air balloon ride in Temecula wine country. The sky is the limit!

The weather could get a little chilly in the morning and evening hours. Temperature ranges from an average high of 64°F (18°C), to an average low of 58°F (11°C), so be sure to bring a jacket. If you plan to be outdoors for extended period during the day time, sun-protection is a must. In addition to our meetings, we have also planned some exciting tours to make you and your companion's visit to Southern California enjoyable.

## **ON-LINE REGISTRATION**

We again have a full agenda planned for this meeting. 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](http://www.transformerscommittee.org). Register by February 24 to receive the early-registration discount. Note that the cost of walk-up registration at the hotel is substantially higher than registering on-line.

## **SPECIAL EVENTS**

**Sunday, March 19 -- Downtown Disney & the Crystal Cathedral:** The Sylmar Tour which was originally planned has been moved to Thursday afternoon due to staffing constraints at the Sylmar Converter Station. Instead of the Sylmar tour, we'll take you to **Downtown Disney**, a lively promenade that offers unique shopping, dining and entertainment. From AMC Theatres®, to House of Blues®, to ESPN Zone®, the *Downtown Disney*® District offers something for every member of your family. In the afternoon, we'll stop by the famous **Crystal Cathedral** for a short visit before heading back for the Evening Reception at the hotel.

The **Sunday Evening Reception** will be held at the Catalina Ballroom of the Hilton. The reception will begin at 6:30 pm. Don't miss this event to mingle with some old friends and meet new ones.

The speaker for the **Tuesday Luncheon** is Mr. Michael Lattimore. An active member of the National Speakers Association and Edison Expressions Speakers Bureau, Mr. Lattimore has competed in the International World Championship of Public Speaking, and will be sharing with us "Life Work that Makes the Heart Sing". It's an upbeat topic that speaks both to mid-lifers who have "arrived", and feel they want to get back on the train and ride some more, as well as younger folk who may not be sure they are on the "right" train!

Our **Wednesday Evening Dinner Social** will give you and your companion the opportunity to spend an evening at the Richard Nixon Library and Birthplace. Have you wonder what President Nixon was really like, beside the scandal of Watergate that unseated his administration? The nine-acre facility is a three-dimensional walk-through memoir featuring a 52,000 square foot museum, 22 high-tech galleries, movie and interactive video theaters, the spectacular First Lady's Garden, the President's faithfully restored 1910's birthplace, and the flower-ringed memorial sites of President and Mrs. Nixon. A sit-down buffet dinner will be served in the stunning replica of White House East Room.

### **COMPANION TOURS**

**Monday, March 20 -- Whale Watching and Mission San Juan Capistrano:** We've arranged the whale watching activity with a local company from the Newport Beach area. Following our sea outing, we will enjoy lunch at the Sarducci's Capistrano Depot followed by a tour of the historical Mission San Juan Capistrano, the Birthplace of Orange County.

**Tuesday, March 21 -- Getty Center and Hollywood:** The Center presents the Getty's collection of Western art from the Middle Ages to the present against a backdrop of dramatic architecture, tranquil gardens, and breathtaking views. After lunch we'll head off to explore the world famous **Grauman's Chinese Theatre** and locate the hands & footprints of your favorite movie stars along the sidewalks of Hollywood Blvd.

### **TECHNICAL TOUR**

**Thursday Afternoon, March 22 -- Sylmar Converter Station:** Due to space limitation, this event is limited to only 50 Committee Members residing outside of Southern California Area. Attendees are required to provide a PDF-format image of their government issued photo ID (driver's license for US resident, passport for non-US resident), emailed to [bill.chiu@ieee.org](mailto:bill.chiu@ieee.org) at time of registration. Due to strict security requirement, only those who pass security screening will be allowed on the bus. No exceptions. Thank you for understanding.

### **ADDITIONAL INFORMATION**

The following additional information comprises the Meeting Invitation Package. This information can be found on the Committee's website ([www.transformerscommittee.org](http://www.transformerscommittee.org)).

1. Meeting Registration Form. You may mail or fax this form with payment or register on-line using a major credit card (must be received by February 24 to be eligible for the early registration discount). On-line registration is encouraged and is available at [www.transformerscommittee.org](http://www.transformerscommittee.org).
2. Detailed Meeting Schedule. An updated schedule will be posted on the Committee's web-site approximately 7-10 days before the meeting.
3. Information Flyers:
  - Sunday Activity
  - Monday & Tuesday Companion Tours
  - Tuesday Speaker Luncheon
  - Wednesday Evening Dinner Social
  - Thursday Technical Tour
  - Technical Presentations

We are pleased to host this event and hope your visit will be enjoyable and memorable. If you require further information or assistance, please phone us at 909-477-6429, or email me at [bill.chiu@ieee.org](mailto:bill.chiu@ieee.org).

We look forward to seeing you in Costa Mesa!



Bill Chiu  
Host, Spring 2006 Meeting  
Southern California Edison

**IEEE/PES TRANSFORMERS COMMITTEE  
SPRING 2006 MEETING -- MARCH 19-23, 2006  
Costa Mesa, California, USA**

**Pre-register for meeting and/or purchase Meeting Minutes using a credit card: [www.transformerscommittee.org](http://www.transformerscommittee.org)**

Attendee's Name \_\_\_\_\_

Name to appear on your nametag (nickname, etc.) \_\_\_\_\_

Company / Institution \_\_\_\_\_

Street Address \_\_\_\_\_

City \_\_\_\_\_ State / Prov. \_\_\_\_\_ Postal Code \_\_\_\_\_ Country \_\_\_\_\_

Telephone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

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:** Meeting Attendance, Sunday Evening Reception, breaks, and 4 breakfasts (M, T, W, Th)

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

-- Refund provided **ONLY** if request is received by **March 15** (by snail-mail or fax, or confirmed email to the contact below) --

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

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

Meeting Registration Fees (all fees in US\$ funds)	On or Before Feb. 24	After Feb. 24 Before March 15	At the Meeting	Total
Attendee - IEEE Member (will be verified with IEEE)	\$175	\$225	\$325	_____
Attendee - non-member	\$200	\$250	\$350	_____
Attendee - IEEE Life or Committee Emeritus (will be verified)	\$50	\$100	\$200	_____
Companion, including children age 10 and over	\$75	\$100	\$200	_____

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

**Monday Luncheon:** Stds Develop Process Review Mtg (all WG & TF Chairs encouraged to attend) # \_\_\_\_ @ \$20

**Tuesday Luncheon:** Speaker: Mr. Michael Lattimore, "Life Work That Makes the Heart Sing" # \_\_\_\_ @ \$30

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

**Wednesday Evening Event:** Dinner Social at Richard Nixon Library & Birthplace # \_\_\_\_ @ \$75

**Companion Tours:** Monday - Whale Watching, San Juan Capistrano, with lunch # \_\_\_\_ @ \$55

Tuesday - Getty Museum/Center and Hollywood, with lunch # \_\_\_\_ @ \$55

**Sunday Activity:** Downtown Disney, Crystal Cathedral # \_\_\_\_ @ \$20

**Technical Tour:** Thursday Afternoon - Sylmar HVDC Converter Station # \_\_\_\_ @ \$30

Limited to only 50 attendees (first come, first serve), Committee Members only, no companions

**Meeting Minutes, Spring 2006 Meeting \*\*** (can be purchased with or without meeting registration) # \_\_\_\_ @ \$20

\*\* - The primary source for Meeting Minutes is the Committee's web-site. Printed minutes (in paper format) can be purchased and will be mailed to the above address at a later date.

**TOTAL REMITTED -- US\$** \_\_\_\_\_

**Method of Payment** - All funds in US dollars only!

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

**Money order or check** - Make check payable to: "IEEE/PES Transformers Committee"

- Checks not issued by a US Bank must add US\$25.00 for processing fee.

**Credit Card:** ☐ Visa ☐ MasterCard ☐ American Express ☐ Diners Club

Mailed or faxed registrations without proper payment will not be accepted.

Card Number \_\_\_\_\_ CVV Number \_\_\_\_\_ Expiration Date \_\_\_\_\_ Name as it appears on card \_\_\_\_\_ Signature (Important) \_\_\_\_\_

**Pre-register on-line, or mail completed form with payment to:**

IEEE/PES Transformers Committee, c/o Greg Anderson;  
13110 Birch Drive, Suite 148, PMB 330; Omaha, Nebraska 68164-4160 USA  
fax: (816) 222-0828, email: [transformers@ieee.org](mailto:transformers@ieee.org)

**IEEE/PES TRANSFORMERS COMMITTEE**

www.transformerscommittee.org

Spring 2006 Meeting; March 19-23, 2006

Hosted by Bill Chiu and Southern California Edison Co.

Hilton Orange County/Costa Mesa Hotel; Costa Mesa, California, USA

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

<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, March 18</b>					
No Meetings. No Meeting Registration. No tours.					
<b>Sunday, March 19</b>					
10:00 am - 5:00 pm	Sunday Activity: <u>Downtown Disney District, Crystal Cathedral</u> -- All attendees & companions welcome. Bus leaves from the Hilton at 10:00 am and return by 5:00 pm. -- Advance registration necessary. Lunch on your own at Downtown Disney.				
1:00 pm - <u>6:00 pm</u>	Meeting Registration (open until 6:00 pm only)			L-shaped table	B-2 Alcove
<u>2:00 pm</u> - 5:30 pm	NEMA Transformers -- Closed meeting, by invitation only	++	C. Drexler	20 US P (w/beverages)	B-2 Emerald 2
<u>2:30 pm</u> - 6:00 pm	Administrative SC -- Closed meeting, by invitation only	Admin.	D. Fallon	25 US P (w/snack buffet)	B-2 Emerald 1
<u>6:30 pm</u> - 8:30 pm	Hospitality Reception <b>NOTE START AT 6:30 PM</b> -- All members, guests & companions are welcome -- Register in advance please			300 Recept.	Catalina Ballroom (Lobby Level)
<b>Monday, March 20 -- Monday Breaks Sponsored by <u>North American Substation Services</u> ***</b>					
7:00 am - 5:00 pm	Meeting Registration			L-shaped table	B-2 Alcove
7:00 am - 4:30 pm	<b>Internet Cafe'</b>			20 SQ	B-1 Laguna 1 (upstairs)
7:00 am - 8:00 am	Breakfast - Attendees (no companions please)			275 RT (9/tbl)	B-2 Pacific 3/4
<u>7:30 am</u> - 8:15 am	Breakfast - Companions, no attendees, <b>NOTE EARLY START!</b>			80 RT (8/tbl)	Fountain Terrace (Lobby Level)
<u>8:30 am</u> - 4:30 pm	Companion Tour: <u>Dana Point Whale Watching, Mission San Juan Capistrano</u> . Includes lunch. -- Advance registration required. The bus will leave the Hilton at <u>8:30 am</u> and return around 4:30 pm.				
<u>7:00 am</u> - 7:50 am	<u>Newcomers Orientation</u> Breakfast Meeting -- Newcomers & Guests are encouraged to attend. Get breakfast in Pacific 1/2 and take to Emerald 1.		T. Prevost	40 CL P	B-2 Emerald 1
7:00 am - 7:50 am	Distribution SC Coordination Meeting (closed mtg)		K. Hanus	15 CONF	Bristol Palms Private Room
8:00 am - 9:15 am	WG 3-ph UG Distribution Transformers C57.12.24	UTNP	G. Termini /J. Sullivan	30 CL	B-2 Balboa 2
8:00 am - 9:15 am	TF Arc Furnace Transformers C57.17	Power	D. Corsi	40 CL	B-2 Emerald 1
8:00 am - 9:15 am	TF Dry-Type Reactors	Dry	R. Dudley	40 CL	B-2 Balboa 1
8:00 am - 9:15 am	WG Electronic Test Data Reporting PC57.12.37	Dist	T. Callsen/ R. Hollingsworth	80 CL	B-2 Emerald 2/3
8:00 am - 9:15 am	TF Electrical Partial Discharge Measurements Guide C57.113	DiTests	E. Lemke	150 CL S3	B-2 Pacific 1
8:00 am - 9:15 am	WG Transformer Monitoring C57.143	Power	D. Chu/A. Lux	125 CL S3 (with raised tbl for 5)	B-2 Pacific 2
9:15 am - 9:30 am	<i>Break (beverages only)</i>			B-2 Foyer	

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

<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>
Monday, March 20 (continued)					
9:30 am - 10:45 am	WG Liquid-immersed Secondary Network Transformers C57.12.40	UTNP	B. Klaponski	30 CL	B-2 Balboa 2
9:30 am - 10:45 am	TF Winding Temperature Indicators	IL	P. McClure	40 CL	B-2 Emerald 1
9:30 am - 10:45 am	WG Revision of C57.12.10	Power	J. Arteaga	40 CL	B-2 Balboa 1
9:30 am - 10:45 am	WG Overhead Dist. Trans. C57.12.20	Dist	A. Wilks/ T. Cooper	80 CL	B-2 Emerald 2/3
9:30 am - 10:45 am	WG PCS Rev. to Test Code C57.12.90	PCS	M. Perkins	150 CL S3	B-2 Pacific 1
9:30 am - 10:45 am	WG Acoustic PD Measurements	DiTests	J. Harley	125 CL S3	B-2 Pacific 2
10:45 am - 11:00 am	Break (beverages only)			B-2 Foyer	
11:00 am - 12:15 pm	WG Std Terminology C57.12.80	Stds	T. Raymond	30 CL	B-2 Balboa 2
11:00 am - 12:15 pm	WG Thermal Evaluation of Power and Distribution Trans. C57.100	IL	R. Wicks	40 CL	B-2 Emerald 1
11:00 am - 12:15 pm	WG Shunt Reactors C57.21	PCS	R. Dudley	40 CL	B-2 Balboa 1
11:00 am - 12:15 pm	WG 1-ph Padmount Distribution Transformers C57.12.25	Dist	A. Ghafourian/ I. Ares	80 CL	B-2 Emerald 2/3
11:00 am - 12:15 pm	WG Revision to Low Frequency Tests	DiTests	B. Poulin	150 CL S3	B-2 Pacific 1
11:00 am - 12:15 pm	WG Standard for Control Cabinets	Power	J. Watson	125 CL S3	B-2 Pacific 2
12:15 pm - 1:30 pm	Lunch Mtg - Standards Develop. Process Review -- All WG & TF Chairs are encouraged to attend. -- Advance reservation required (\$20 for box lunch). -- Paper tickets will not be provided. -- Admission to verified at the door.		B. Chiu	80 RT (8/tbl) (same set from bkfst, prep food for guarantee)	B-2 Pacific 3/4
1:45 pm - 3:00 pm	WG Sec. Network Protectors C57.12.44	UTNP	D. Mulkey	30 CL	B-2 Balboa 2
1:45 pm - 3:00 pm	WG Thermal Evaluation C57.12.56 and C57.12.60	Dry	R. Provost/ R. Wicks	40 CL	B-2 Emerald 1
1:45 pm - 3:00 pm	<b>SC HVDC Converter Transformers and Smoothing Reactors</b>	HVDC	R. Dudley	40 CL	B-2 Balboa 1
1:45 pm - 3:00 pm	WG 3-ph Padmount Distribution Transformers C57.12.34	Dist	R. Stahara/ S. Shull	75 CL	B-2 Emerald 2/3
1:45 pm - 3:00 pm	WG PCS Revisions to C57.12.00	PCS	S. Snyder	150 CL S3	B-2 Pacific 1
1:45 pm - 3:00 pm	WG LTC Performance C57.131	Power	W. Henning	125 CL S3	B-2 Pacific 2
3:00 pm - 3:15 pm	Break (beverages and treats)			B-2 Foyer	
3:15 pm - 4:30 pm	WG 1-ph Submersible Distribution Transformers C57.12.23	UTNP	A. Traut/ B. Basu	30 CL	B-2 Balboa 2
3:15 pm - 4:30 pm	Joint WG Optical ITs C57.13/PSIM P1601	IT/PSIM	Rahmatian/ Gilleland	40 CL	B-2 Emerald 1
3:15 pm - 4:30 pm	WG Dry-Type Test Code C57.12.91	Dry	D. Foster	40 CL	B-2 Balboa 1
3:15 pm - 4:30 pm	WG Revision of Impulse Guides C57.98 and C57.138	DiTests	A. Molden	80 CL	B-2 Emerald 2/3
3:15 pm - 4:30 pm	TF Core Overexcitation Requirements	PCS	C. Stiegemeier	150 CL S3	B-2 Pacific 1
3:15 pm - 4:30 pm	WG Transf. Life Extension PC57.140	Power	R. James/ W. Bartley	125 CL S3	B-2 Pacific 2
4:30 pm - 4:45 pm	Break (beverages only)			B-2 Foyer	
4:45 pm - 6:00 pm	Tutorial/Presentation #1: " <u>Environmental Impact of Audible Sound Produced by Transformers and Reactors</u> ", by Dudley, Girgis, Papp, Ploetner, and Verner **			125 CL S3 (add 50 TH seats in rear)	B-2 Pacific 2
No Evening Activity Planned					

\*\* Contact N. Kent Haggerty (n.kent.haggerty@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, March 21 -- Tuesday Breaks Sponsored by MGM Transformer Company ***</b>					
7:00 am - <u>12:00 pm</u>	Meeting Registration		B-2 Alcove	L-shaped table	B-2 Alcove
7:00 am - 4:30 pm	<b>Internet Cafe'</b>			20 SQ	B-1 Laguna 1
7:00 am - 8:00 am	Breakfast - Attendees (no companions please)			300 RT (9/tbl)	B-2 Pacific 3/4
<u>7:30 am</u> - 8:15 am	Breakfast - Companions, no attendees, <b>NOTE EARLY START!</b>			80 RT (8/tbl)	Fountain Terrace
<u>8:30 am</u> - 5:00 pm	Companion Tour: <u>Getty's Museum/Center, Grauman's Chinese Theater at Hollywood</u> . Includes lunch. -- Advance registration required. The bus will leave the Hilton at 8:30 am and return by 5:00 pm.				
8:00 am - 9:15 am	WG Test Requirements for HV Instrument Transformers C57.13.5	IT	R. McTaggart/ P. Riffon	30 CL	B-2 Balboa 2
8:00 am - 9:15 am	WG Temp. Rise Test Procedures in Section 11 of C57.12.90	IL	P. Payne Powell	40 CL	B-2 Emerald 1
8:00 am - 9:15 am	WG Enclosure Integrity C57.12.28, C57.12.29, C57.12.31, C57.12.32	Dist	R. Olen/ D. Mulkey	40 CL	B-2 Balboa 1
8:00 am - 9:15 am	WG Switching Transients Induced by Transformer/Breaker Interaction	PCS	R. Degeneff	80 CL	B-2 Emerald 2/3
8:00 am - 9:15 am	WG Natural Ester-based Fluids C57.147	IF	P. McShane	150 CL S3	B-2 Pacific 1
8:00 am - 9:15 am	TF Transformers for Wind Farms	TBD	J. Watson	125 CL S3 (with raised tbl for 5)	B-2 Pacific 2
9:15 am - 9:30 am	<i>Break (beverages only)</i>			B-2 Foyer	
	<del>WG Dry Type Gen. Require. C57.12.04</del>		Postponed until the Fall 2006 Meeting		
9:30 am - 10:45 am	TF Joint/PSIM Low PF Measurement	PCS	E. So	30 CL	B-2 Balboa 2
9:30 am - 10:45 am	TF Functional Life Tests, De-energized Tap Changers (DETC)	Power	P. Hopkinson	40 CL	B-2 Emerald 1
9:30 am - 10:45 am	(TBD)			40 CL	B-2 Balboa 1
9:30 am - 10:45 am	WG Rev. Field Test Guide IEEE 62	DiTest	L. Wagenaar	80 CL	B-2 Emerald 2/3
9:30 am - 10:45 am	WG Revision of Oil Acceptance & Maintenance Guide C57.106	IF	J. Thompson/ T. Oommen	150 CL S3	B-2 Pacific 1
9:30 am - 10:45 am	WG Revision to Loading Guide C57.91	IL	T. Raymond	125 CL S3	B-2 Pacific 2
10:45 am - 11:00 am	<i>Break (beverages only)</i>			B-2 Foyer	
11:00 am - 12:15 pm	TF Power Transf. Tank Rupture & Mitigation ( <b>new</b> )	Power	P. Zhao	30 CL	B-2 Balboa 2
11:00 am - 12:15 pm	WG Phase-shift Trans. Guide C57.135	Power	J. McIver	40 CL	B-2 Emerald 1
11:00 am - 12:15 pm	WG Loss Tolerance and Measurement	PCS	E. teNyenhuis	40 CL	B-2 Balboa 1
11:00 am - 12:15 pm	TF IEEE-IEC Cross Reference ( <b>new</b> )	Stds	S. Beckman	80 CL	B-2 Emerald 2/3
11:00 am - 12:15 pm	WG Dist. Substation Transf. C57.12.36	Dist	Aho/Rossetti	150 CL S3	B-2 Pacific 1
11:00 am - 12:15 pm	WG Guide for DGA in LTCs C57.139	IF	F. Jakob	125 CL S3	B-2 Pacific 2
12:15 pm - <u>1:30 pm</u>	<u>Speaker Luncheon</u> . Mike Lattimore, "Life Work That Makes the Heart Sing". Advance registration is necessary. -- Paper tickets will not be provided. Admission to the event and meal selection will be verified with a registration list at the door.			150 RT (8) P add <u>elevated</u> tbl for 5, add lectern w/mic & lapel	Fountain Terrace (Lobby Level) <b>NOTE LOCATION!</b>
1:45 pm - 3:00 pm	WG Rev. Transf. for Non-sinusoidal Loads C57.110	PCS	R. Marek	30 CL	B-2 Balboa 2
1:45 pm - 3:00 pm	<b>SC Instrument Transformer</b>	IT	J. Smith	40 CL	B-2 Emerald 1
1:45 pm - 3:00 pm	WG Voltage Step Regulators C57.15	Dist	C. Colopy/ G. Kennedy	40 CL	B-2 Balboa 1
1:45 pm - 3:00 pm	WG Dielectric Test Tables, Liquid-filled	DiTests	P. Hopkinson	80 CL	B-2 Emerald 2/3
1:45 pm - 3:00 pm	WG Revision Installation Guide C57.93	Power	M. Lau	150 CL S3	B-2 Pacific 1
1:45 pm - 3:00 pm >	WG Revision to Gas Guide C57.104	IF	R. Ladroga	125 CL S3	B-2 Pacific 2
3:00 pm - 3:15 pm	<i>Break (beverages and treats)</i>			B-2 Foyer	

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

<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, March 21 (continued)</b>					
	<del>TF Arc Furnace Transformers C57.17</del>	<del>Power</del>	moved to Monday at 8:00 am		
3:15 pm - 4:30 pm	TF Revision to IEEE 638 ( <b>new</b> )	Power	C. Swinderman	30 CL	B-2 Balboa 2
3:15 pm - 4:30 pm	WG Semiconductor Rectifier Transformers C57.18.10	PCS	S. Kennedy	40 CL	B-2 Emerald 1
3:15 pm - 4:30 pm	TF Bushing Applicat. Guide C57.19.100	Bush	T. Spitzer	40 CL	B-2 Balboa 1
3:15 pm - 4:30 pm	WG for Bar Coding Distribution Transformers C57.12.35	Dist	L. Matthews/ G. Termine	80 CL	B-2 Emerald 2/3
3:15 pm - 4:30 pm	WG Revision to Impulse Tests	DiTests	P. Riffon/ P. Heinzig	150 CL S3	B-2 Pacific 1
> 3:15 pm - 4:30 pm	WG Revision to Gas Guide C57.104	IF	R. Ladroga	125 CL S3	B-2 Pacific 2
4:30 pm - 4:45 pm	<i>Break (beverages only)</i>			B-2 Foyer	
4:45 pm - 6:00 pm	Tutorial/Presentation #2: "Aging Rate of Kraft Paper Insulation Immersed in Natural Ester Based Dielectric ", by McShane, Duckett, and Jakob **			125 CL S3 (add 50 TH seats in rear)	B-2 Pacific 2
No Evening Activity Planned					
<b>Wednesday, March 22 -- Wednesday Breaks Sponsored by <u>Serveron</u> ***</b>					
No Meeting Registration, No Companion Tours					
7:00 am - 5:30 pm	<b>Internet Cafe'</b>			20 SQ	B-1 Laguna 1
7:00 am - 8:00 am	Breakfast - Attendees (no companions please)			275 RT (9/tbl)	B-2 Pacific 3/4
8:00 am - 9:00 am	Breakfast - Companions (no attendees please)			72 RT (8/tbl)	Fountain Terrace
7:00 am - 7:45 am	<b>SC Meetings Planning</b> -- get your breakfast in Pacific 1/2 and take to Emerald 1	Mtgs	G. Anderson	40 CL	B-2 Emerald 1
8:00 am - 9:15 am	EL&P Delegation -- Users only meeting	++	K. Hanus	40 CL	B-2 Emerald 1
8:00 am - 9:15 am	WG Sound Level Measurement Guide	ASV	J. Puri	80 CL	B-2 Balboa 1/2
8:00 am - 9:15 am	<b>SC Insulation Life</b>	IL	D. Platts	80 CL S3	B-2 Emerald 2/3
8:00 am - 9:15 am	<b>SC Dielectric Tests</b>	DiTests	L. Wagenaar	200 CL S3	B-2 Pacific 1/2
9:15 am - 9:30 am	<i>Break (beverages only)</i>			B-2 Foyer	
9:30 am - 10:45 am	WG Neutral Ground. Devices PC57.32	PCS	S. Schappell		
9:30 am - 10:45 am	WG Transportation Issues Guide	Power	G. Anderson/ E. Schweiger	80 CL	B-2 Balboa 1/2
9:30 am - 10:45 am	<b>SC Audible Sound &amp; Vibration</b>	ASV	J. Puri	40 CL	B-2 Emerald 1
9:30 am - 10:45 am	<b>SC Distribution Transformers</b>	Dist	K. Hanus	80 CL S3	B-2 <u>Emerald 2/3</u>
9:30 am - 10:45 am	<b>SC Bushings (w/special presentation on "Interaction of Bushings and Transformers During Seismic Events"</b>	Bush	F. Elliott	200 CL S3	B-2 Pacific 1/2
10:45 am - 11:00 am	<i>Break (beverages only)</i>			B-2 Foyer	
11:00 am - 12:15 pm	WG Frequency Response Analysis (FRA) Guide PC57.149	PCS	C. Sweetser	40 CL	B-2 Emerald 1
11:00 am - 12:15 pm	<b>SC UG Transf. &amp; Network Protectors</b>	UTNP	C. Niemann	80 CL	B-2 Balboa 1/2
11:00 am - 12:15 pm	<b>SC Dry Type</b>	Dry	C. Johnson	80 CL S3	B-2 Emerald 2/3
11:00 am - 12:15 pm	<b>SC Power Transformers</b>	Power	T. Lundquist	200 CL S3	B-2 Pacific 1/2
12:15 pm - 1:30 pm	Lunch (on your own)				

\*\* 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 a future coffee-break.

**KEY**

&gt; -- activity continued into another session / from another session

++ -- not a Transformers Committee activity    TBD = to be determined

P = PC projector (all rooms have OH projector); F = flip chart; S1 = sound (see note)

S2 = stand mic in front only; S3 = stand mic in front &amp; 1 stand mic at mid-room

CL -- classroom seating (w/head table for 2-3)

TH -- theater seating (with head table for 2-3)

RT -- multiple roundtable (8-9/table)

US -- one hollow square or U-shape

<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, March 22 (continued)</b>					
	<b>NEMA ST-1/ST-20 Revision</b>	++	Canceled		
1:30 pm - 2:45 pm	(TBD)			40 CL	B-2 Emerald 1
1:30 pm - 2:45 pm	TF West Coast	Power	M. Lau	80 CL	B-2 Balboa 1/2
1:30 pm - 2:45 pm	<b>SC Insulating Fluids</b> (will move to Tues., 3:15 pm in Fall '06)	IF	F. Gryszkiewicz	80 CL S3	B-2 Emerald 2/3
1:30 pm - 2:45 pm	<b>SC Performance Characteristics</b>	PCS	R. Girgis	200 CL S3	B-2 Pacific 1/2
2:45 pm - 3:00 pm	<i>Break (beverages only)</i>			B-2 Foyer	
3:00 pm - 4:15 pm	IEC TC-14 Technical Advisory Group (all interested parties welcome)	++	P. Hopkinson	80 CL	B-2 Balboa 1/2
3:00 pm - 4:15 pm	<b>SC Transformer Standards</b>	Stds	B. Chiu	200 CL S3	B-2 Pacific 1/2
4:30 pm - 9:30 pm	Dinner Social at <u>Richard Nixon Library &amp; Birthplace</u> . Advance registration is necessary. -- Buses begin departing at 4:30 pm. Last bus will depart at 5:00 pm. Return to the hotel around 9:30 pm. -- Paper tickets will not be provided as in the past. Admission to the event will be verified with a registration list as you board the bus.				

**Thursday, March 23**

	No Meeting Registration, No Companion Tours, No EPRI Meetings, <u>No Internet Cafe</u>				
7:00 am - 8:00 am	Breakfast - Attendees (no companions please)			250 RT	B-2 Pacific 3/4
8:00 am - 9:00 am	Breakfast - Companions (no attendees please)			64 RT	Fountain Terrace
8:00 am - 9:45 am >	Transformers Committee -- <u>All attendees</u> are encouraged to attend. -- See separate document for meeting agenda.		D. Fallon	250 CL S1, P <u>elevat.</u> table for 4	B-2 Pacific 1/2 (3 per 8')
9:45 am - 10:00 am	<i>Break (beverages only)</i>			B-2 Foyer	
> 10:00 am - 11:30 pm	Transformers Committee		D. Fallon	250 CL S1, P	B-2 Pacific 1/2
12:30 pm - 5:30 pm	Technical Tour: <u>Sylmar HVDC Converter Station</u> -- Limited openings. See security requirements in event flyer. No meals, eat lunch at the hotel beforehand. -- The bus will leave from The Hilton at 12:30 pm and return by 5:30 pm.				
1:00 pm - 3:00 pm >	EPRI Power Transformer Project Review -- Closed meeting, EPRI members only	++	B. Ward	48 CL	B-2 Emerald 2/3
3:00 pm - 3:15 am	<i>Break (beverages only)</i>			B-2 Foyer	
> 3:15 pm - 5:00 pm >	EPRI Power Transformer Project Review -- Continued into Friday morning	++	B. Ward	48 CL	B-2 Emerald 2/3

**Friday, March 24**

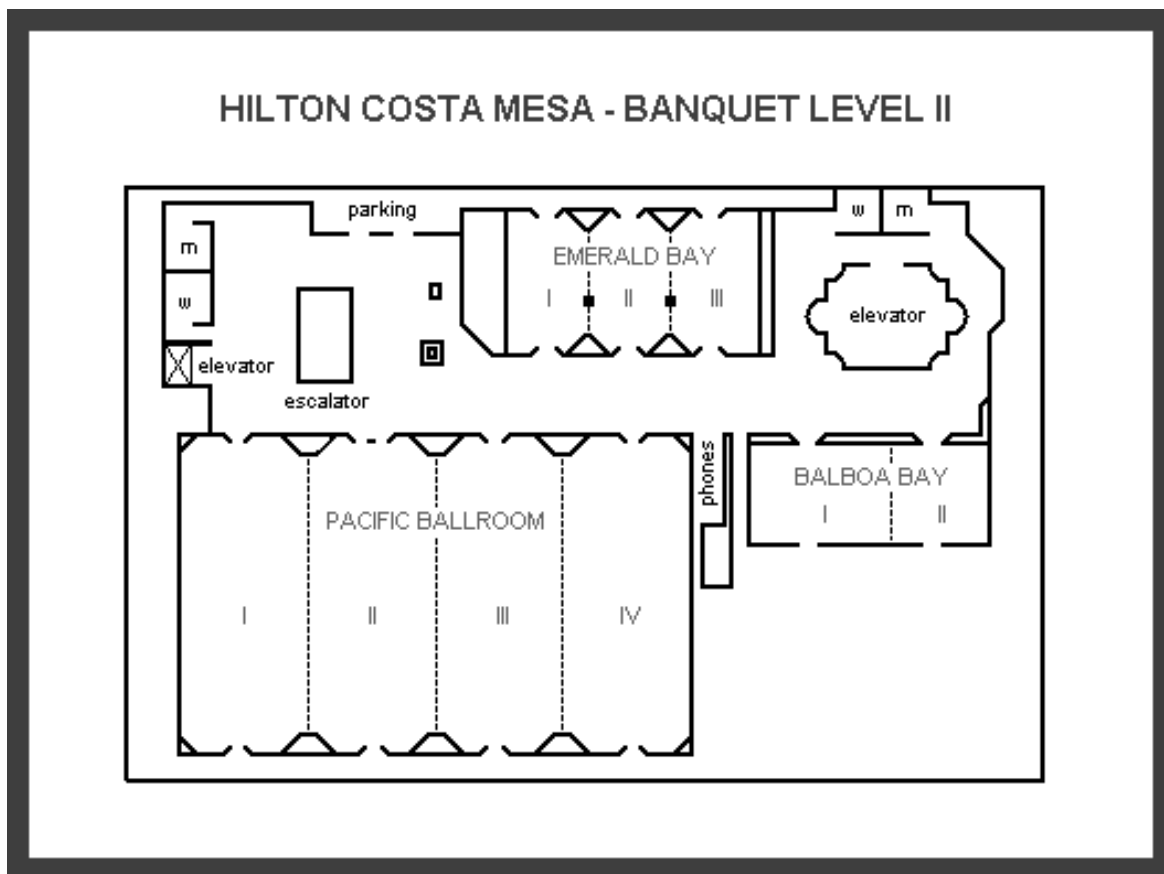
	No Transformer Committee Meetings, No Internet Cafe'				
7:30 am - 8:00 am	Breakfast - EPRI members only			32 RT	B-2 Emerald 2
> 8:00 am - 10:00 am >	EPRI Power Transformer Project Review -- Closed meeting, EPRI members only -- Continued from Thursday afternoon	++	B. Ward	32 CL	B-2 Emerald 2
10:00 am - 10:15 am	<i>Break (beverages only)</i>			B-2 Foyer	
> 10:15 am - 12:00 pm	EPRI Power Transformer Project Review	++	B. Ward	32 CL	B-2 Emerald 2

**FUTURE COMMITTEE MEETINGS**FALL 2006 - October 22-26; Montreal, Quebec; Delta Center-Ville. Hosted by Thang Hochanh and Hydro Quebec/IREQ.SPRING 2007 - March 11-15; location to be determinedFALL 2007 - Date TBD; Minneapolis, Minnesota. Hosted by Susan McNelly and Xcel Energy.



# Hilton Orange County/Costa Mesa

Costa Mesa, California, USA



# IEEE/PES TRANSFORMERS COMMITTEE

## TRANSFORMERS COMMITTEE - SPRING 2006 MEETING THURSDAY, MARCH 23, 2006

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Chair: Donald J. Fallon

Vice-chair: Thomas A. Prevost

Secretary: J. Edward Smith

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- |       |   |   |
|-------|---|---|
| 1.    | Chair's Remarks and Announcements             | Donald J. Fallon                              |
| 2.    | Approval of Minutes from Spring 2005 Meeting  | Donald J. Fallon                              |
| 3.    | Administrative Subcommittee                   | Donald J. Fallon                              |
| 4.    | Vice-chair's Report                           | Thomas A. Prevost                             |
| 5.    | Transformer Standards                         | Bill Chiu                                     |
| 6.    | Recognition and Awards                        | Kenneth S. Hanus                              |
| 7.    | Report of Technical Subcommittees             |   |
| 7.1.  | Insulation Life                               | Donald W. Platts                              |
| 7.2.  | Performance Characteristics                   | Ramsis S. Girgis                              |
| 7.3.  | Power Transformers                            | Thomas G. Lundquist                           |
| 7.4.  | Underground Transformers & Network Protectors | Carl G. Niemann                               |
| 7.5.  | Audible Sound and Vibration                   | Jeewan L. Puri                                |
| 7.6.  | Bushings                                      | Fred E. Elliott                               |
| 7.7.  | Dry Type Transformers                         | Charles (Chuck) W. Johnson                    |
| 7.8.  | Distribution Transformers                     | Kenneth S. Hanus                              |
| 7.9.  | Dielectric Tests                              | Loren B. Wagenaar                             |
| 7.10. | HVDC Converter Transformers & Reactors        | Richard F. Dudley                             |
| 7.11. | Instrument Transformers                       | James E. (Jim) Smith                          |
| 7.12. | Insulating Fluids                             | Frank J. Gryszkiewicz /<br>Richard K. Ladroga |
| 8.    | Editor's Report                               | John C. Crouse                                |
| 9.    | Meetings Planning Subcommittee                | Gregory W. Anderson                           |
| 10.   | Reports of Liaison Representatives            |   |
| 10.1. | Standard Coordinating Committee No. 4         | Paulette Payne Powell                         |
| 10.2. | IEC TC-14 Technical Advisor to USNC           | Philip J. Hopkinson                           |
| 10.3. | CIGRE   | Jean-Christophe Riboud                        |
| 11.   | Old Business                                  | Donald J. Fallon                              |
| 12.   | New Business                                  | Donald J. Fallon                              |

# Sunday Activity

## Downtown Disney & Crystal Cathedral

### Sunday, March 19

Take a walk on this lively promenade that offers unique shopping and dining. From AMC Theatres® to House of Blues® to ESPN Zone®, the *Downtown Disney®* District, located just outside the Theme Parks, offers something for every member of your family.



[www.disneyland.disney.go.com](http://www.disneyland.disney.go.com)



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

Located in Garden Grove, the Crystal Cathedral was designed by American Institute of Architects gold medal winner Philip Johnson with his partner John Burgee. The sanctuary seats 2,890 persons and over 1,000 singers and instrumentalists can perform in 185 foot long chancel area. The Cathedral was built with more than 10,000 windows of tempered silver colored glass and it's a must see landmark in Orange County.

**Bus Pick-up at Hotel Front Entrance**  
**10:00 AM - Departing to Downtown Disney**  
**2:45 PM - Departing to Crystal Cathedral**  
**5:00 PM - Arrive back at Costa Mesa Hilton**

# Companions Tour

## Whale Watching & San Juan Capistrano

### Monday, March 20

The Giants of the Deep welcome you to Southern California! Come join us on a privately chartered boat for a two hour whale-watching cruise. We'll be looking for whales\*, dolphins, and sea lions – and enjoying a relaxing morning on the Pacific Ocean. The Gray Whales migrate annually along the west coast of North America from the summer feeding grounds in the Bering Sea to the winter grounds of the Baja California lagoons and back again along the Orange County coast.



[www.NewportLanding.com](http://www.NewportLanding.com)

\*Whale sighting is not guaranteed.



Then we're headed inland to historic **San Juan Capistrano**. We'll start with lunch at Sarducci's Capistrano Depot where you will experience the finest cuisine while dining in San Juan Capistrano's historic train depot built in 1894 followed by a tour of the famous Mission, the Birthplace of Orange County – you'll see why the swallows return year after year!



[www.capistranodepot.com](http://www.capistranodepot.com)



[www.MissionSJC.com](http://www.MissionSJC.com)

Note: Since we'll be outdoors most of the day, be sure to be prepared with sun protection and comfortable walking shoes with a light weight jacket. Don't forget your camera and binoculars if you have one handy. If you are concerned about motion sickness, OTC Dramamine or Bonine is strongly recommended.

**Bus Pick-up at Hotel Front Entrance**

**8:30 AM - Departing to NewportLanding**

**12:00 PM - Lunch at Sarducci's Capistrano Depot**

**2:00 PM - Docent Guided Tour - Mission San Juan Capistrano**

**4:30 PM - Arrive back at Costa Mesa Hilton**



# Companions Tour

## The Getty Center & Grauman's Chinese Theatre

### Tuesday, March 21



[www.getty.edu/visit/see\\_do](http://www.getty.edu/visit/see_do)



**The Getty Center** presents the Getty's collection of Western art from the Middle Ages to the present against a backdrop of dramatic architecture, tranquil gardens, and breathtaking views. We will have a guided tour through the museum, then lunch al fresco, in the picnic area of the Center.

**Grauman's Chinese Theatre** has been a Hollywood landmark for over 75 years! We'll get a exclusive backstage tour of the theater, as well as see the "Forecourt to the Stars" – where many of Hollywood's biggest stars left their footprints (literally!).



[www.MannTheatres.com](http://www.MannTheatres.com)

**Bus Pick-up at Hotel Front Entrance**  
**8:30 AM - Departing to the Getty's**  
**12:00 PM - Lunch at the Getty's**  
**2:30 PM - Tour Grauman's Chinese Theatre & Hollywood Blvd.**  
**5:00 PM - Arrive back at Costa Mesa Hilton**

# Speakers Luncheon

## Tuesday, March 21



**Speaker: Mr. Michael Lattimore**

### **Life Work that Makes the Heart Sing.**

**It's an upbeat topic that speaks both to mid-lifers who have "arrived," and feel they want to get back on the train and ride some more, as well as younger folk who may not be sure they are on the "right" train!**

Michael Lattimore, R.Sc.P. is a licensed practitioner of spiritual technology and currently completing the Masters program in Spiritual Psychology at the University of Santa Monica and the Ministerial Degree program at the University of Transformational Studies. He is a former scoutmaster with The Boy Scouts of America and has been a community volunteer since he was 10 years old in the Southside Chicago community of Chatham. In 1996, Mike founded a community technology ministry, Appleseeds Across America, to help build computer labs in under-served neighborhoods. A 2002 Leadership LA Alumni, Michael is also an advisory contributor to the Pasadena Youth Fund and a board member of the Community Technology Organizing Consortium. He is a professional member of the National Speakers Association, and has successfully represented in the 1999 Toastmasters World Championship of Public Speaking. Prior to his current speaking career, Michael was a game show casting director for the *All-New Dating Game* and has a multi-careered background as a cable television producer, entrepreneur, and professional photographer. As America's "Digital Defender", Mike facilitates the 2006 Season for Nonviolence and life skills workshops for high schools and community organizations. Michael lives in Altadena, has 2 daughters, a son, 4 grandsons and two dogs, Spike and Joey.

Speak  
Inspire  
ENCOURAGE  
Communicate  
Educate  
MOTIVATE  
Care  
Update  
Share

# Dinner Social Event

## Wednesday, March 22

### Welcome to The Richard Nixon Library & Birthplace

Have you wonder what President Nixon was really like, beside the scandal of Watergate that unseated his administration? Our **Wednesday Evening Dinner Social** will give you and your companion the opportunity to spend an evening at the Richard Nixon Library and Birthplace - - the most active, innovative and visited Presidential center in America. <http://www.nixonfoundation.org/>



Our evening will begin with a tour of the our 37<sup>th</sup> President's Library – a dramatic roller coaster ride through half a century of California, U.S. and world history! We'll be dining in the prestigious East Room, a stunning replica of the White House East Room, to the sway of a jazz trio. Dinner will be served by an exclusive Nixon Library caterer and a cash bar will be available.

**Bus Pick-up at Hotel Front Entrance**  
**Buses will begin departing at 4:30PM.**  
**Last Bus will depart at 5:00PM**

**Returning to Costa Mesa Hilton ~9:30PM**



Before you sit down to dinner in the White house East Room, join your guests for a sunset reception in our spectacular gardens. Promenade down the colonnade walkways, tour the original birthplace home of the President, and muse on the tranquility of our handsome reflecting pool.





# Technical Tour

## Sylmar HVDC Converter Station

### Thursday, March 23

Southern Terminal of the  $\pm 500$  kV, 3,100 MW Pacific HVDC Intertie.

In 1999 the Sylmar Partners (Los Angeles Department of Water & Power (LADWP), Southern California Edison (SCE), and the Cities of Glendale, Burbank, and Pasadena ) decided to build a 500 kV, 3,100 MW Converter at the existing Sylmar East facility. This was achieved by upgrading and modifying the existing Sylmar East converters to the 3,100 MW converters and by using the existing control building and the valve halls and as much of the existing equipment as possible.



**Aerial View of Sylmar Converter Station**



The \$118 million project to upgrade the Sylmar Converter Station, which anchors the southern end of the 846-mile Pacific DC Intertie—one of the world's longest and highest rated transmission lines, was completed in December 2004. The modernization project involved replacing outdated technology and consolidating the facility into one location on the East side of the 5 Freeway. "

This facility plays a key role in providing additional energy resources to the greater Los Angeles area. Southern California receives hydroelectric power in the summer, when the southwest energy load peaks. During the winter, when the energy demand peaks in the northwest, excess energy can be sent northward.



Note: Visitor should wear long sleeve cotton shirt, with sturdy & comfortable shoes. Tour open to Transformers Committee Members residing outside the greater Southern California Area only. Must have photo ID and passed security check prior to boarding bus. Must provide PDF-format image of government issued photo id (driver's license for US resident, passport for non-US resident) emailed to [bill.chiu@ieee.org](mailto:bill.chiu@ieee.org) at time of registration. Information must be received no later than February 17.

#### **Bus Pick-up at Hotel Front Entrance**

**12:30 PM – Departing to Sylmar**

**1:30 PM – Arriving at Sylmar**

**3:30 PM – Departing from Sylmar**

**5:30 PM – Arrive back at Costa Mesa Hilton**





IEEE/PES Transformers Committee  
Spring 2006 Meeting  
Costa Mesa, California, USA



## **"Environmental Impact of Audible Sound Produced by Transformers and Reactors"**

-- Technical Presentation --  
Monday, March 20; 4:45 to 6:00 p.m.

By Ramsis Girgis, Christoph Ploetner, Klaus Papp, Jane Ann Verner & Others

### **1. Abstract**

All electrical power equipment produces sound. With increasing urbanization, electrical power equipment is now often installed in close proximity to where people work and live. Additionally with the bulk transfer of electrical power using both A.C. power transmission and HVDC, the environmental impact of "hub" substations, in both urban and rural environments, is a key consideration; including the acoustic impact. Therefore the characterization, predictive modeling, measurement and control of sound emitted by the wide variety of electrical power equipment has taken on an even increasing importance; including the impact on electrical power equipment standards development.

The focus of the tutorial will be the environmental impact of audible sound produced by transformers and reactors. The rapid urbanization that has taken place in many countries has resulted in an increased focus on the environmental impact related to the application of power equipment such as transformers and reactors. Audible sound and the affect on people living near installations of power equipment is a key issue. Key subject areas that will be covered include:

- Regulatory requirements, including factors that influence zoning sound levels, examples of zoning requirements and project specific initiatives to meet zoning requirements.
- Sources and characteristics of different contributors to transformer noise will be described and with a focus on load noise; including a perspective of its significance re new power transformer designs.
- The unique sound characteristics of transformers biased with direct current or loaded with harmonic current in specific applications, such as converter transformers for HVDC, will be presented.
- The unique characteristics and special nature of the audible sound produced by oil-immersed shunt reactors will be addressed.
- The audible sound produced by dry-type air-core reactors including shunt reactors, filter reactors and HVDC smoothing reactors will be described. Sound mitigation approaches will be presented.
- The sound intensity method of audible sound determination will be presented as it is being considered for inclusion in IEEE standards.

### **2. Learning Objectives**

This tutorial will provide basic background information; including

- Appreciation of the scope and direction of regulatory requirements
- Modern transformer design strategy and the impact on audible sound
- Characterization and basic theory of sound generated by transformers and reactors, oil immersed and dry type, based on application and current loading (including DC current and harmonics)
- Designs for reduced audible sound and mitigation

### 3. Learning Outcomes

Attendees will gain

- A general understanding of the physics of audible sound generation in transformers and reactors.
- Improved perspective on environmental impact and regulatory requirements
- A qualitative understanding of the audible sound generation mechanism plus possible mitigation and achievable results will allow attendees to better understand the environmental acoustic aspect of applying transformers and reactors in urban sensitive areas.
- Increased knowledge to participate in this aspect of standards development and also in the application of this content area of standards for equipment design, purchase and application.

### 4. Presenter's Biographies

**Ramsis S. Girgis, Ph.D.:** Dr. Ramsis S. Girgis is presently the Technical Manager of ABB Power Transformer Division located in St. Louis, Missouri. He is also the leader of the global ABB R&D activities in the "Transformer Core Performance" area. Ramsis received his Ph.D. degree from the University of Saskatchewan, Canada, in Electrical Power Engineering in 1978. He has over 35 years of R&D experience in the area of power, distribution, and high frequency transformers, rotating machines, and pulse power components. His main areas of expertise at present are core performance, leakage flux, and audible noise of power transformers. He was awarded the IEEE Fellow Grade in 1986. He is the past Technical Advisor representing the US National Committee in the IEC Power Transformer Technical Committee (14).

**Klaus Papp:** Mr. Papp is R&D manager of Trench Austria GmbH in Linz, Austria where he has been employed since 1970. He received the Dipl.-Ing. Degree from the University of Technology, Vienna, Austria in 1970. His interests include the design, production, testing and application of reactors for power systems. He is a member of the IEC maintenance team for revision of IEC 60076-6 "Reactors" and he is a member of the HVDC Converter Transformers & Smoothing Reactors Subcommittee of the IEEE/PES Transformers Committee.

**Christoph Ploetner, Ph.D.:** Dr. Christoph Ploetner graduated from the Technical University of Ilmenau, Germany and received his Ph.D. in Electrical Engineering in 1998 from the same University. In 1999 he joined Siemens Power Transformer Factory Nuremberg, Germany as specialist for transformer modeling, magnetic and current related issues, including noise problems. He became Head of the Electrical Design Department in the Nuremberg Transformer Factory in 2005. Dr. Ploetner actively participates in the IEEE transformer committee and serves currently as convener for the maintenance team of the standard IEC 60076-6 "Reactors".

**Jane Ann Verner, P.E.:** Jane Ann Verner is the Manager of Pepco's Substation Engineering and Design Department. She has been the responsible project engineer on new substation projects, power transformer and switchgear installations. She also has worked on a number of generation interconnection projects. Jane obtained her Bachelor's Degree in Electrical Engineering from the University of Pittsburgh and is a registered professional engineer in Pennsylvania, Maryland and the District of Columbia. She is an IEEE member and is a member of various working groups within the IEEE Transformers Committee.



IEEE/PES Transformers Committee  
Spring 2006 Meeting  
Costa Mesa, California, USA



## **"Aging Rate of Kraft Paper Insulation Immersed in Natural Ester Based Dielectric Coolant"**

-- Technical Presentation --  
Tuesday, March 21; 4:45 to 6:00 p.m.

By C. Patrick McShane, Fredi Jacob, Don Duckett

### **1. Abstract**

Accelerated insulation systems aging studies have been conducted following IEEE C57.100 methods, comparing aging rates of different cellulose papers immersed in mineral oil to those immersed in natural ester dielectric coolant. The studies have included thermally upgraded Kraft, non-thermally upgraded Kraft, and high cotton fiber insulating paper. All studies, both full scale (distribution class) and lab scale, have been reported in several IEEE Technical conferences. All have demonstrated a significantly slower aging rate for cellulose insulation in natural (vegetable oil) ester based dielectric fluid compared to the rate in conventional transformer oil.

This tutorial will review the summary data, analysis of chemistry behind the interactions of natural ester fluid and cellulose insulation, and the potential practical applications for this discovery.

### **2. Learning Objectives**

Four areas will be covered:

- Scope of IEEE C57.100 and brief description of two distinct test methods for the thermal evaluation of the insulation system will be reviewed.
- Comparative data between an insulation system using natural ester based dielectric coolant vs. conventional mineral oil will be evaluated.
- Theories and confirming testing on mechanisms that point to the significant difference in aging rates will be reviewed.
- A model will be shown on how to use this information to extend the transformer life and/or increase its rating.

### **3. Learning Outcomes**

Attendees at the presentation will gain:

- A better understanding of the basis for reduction in aging rates of insulation in natural ester fluids.
- Potential methods for reducing the aging rate of transformers using either thermally or non-thermally upgraded paper.
- Increased knowledge and tools for increasing transformer ratings and life.

#### **4. Presenter's Biographies**

**Fredi Jacob, Ph.D.:** Dr. Jakob received his Ph.D. at Rutgers, The State University of New Jersey, in 1961. He is professor emeritus of analytical chemistry at California State University, Sacramento and was the founder and Laboratory Director of Analytical ChemTech International, Inc. (ACTI), which is a wholly owned subsidiary of Weidmann Systems International. As a long-term member of ASTM and IEEE and author of over fifty published articles, Dr. Jakob is a traveling lecturer to private and governmental agencies. He has been invited to speak at Doble Conferences, NETA Meetings, AVO Conferences, American Public Power Meetings, ASTM Symposia as well as other industrial organizations.

**C. Patrick McShane:** C. Patrick McShane received his BS in Electrical Engineering from Marquette University in 1970, and an MS in Engineering Management from the Milwaukee School of Engineering in 1998. Currently the Product Line Manager for Dielectric Fluid at Cooper Power Systems Transformer Products, his employment experience includes International Area Manager for RTE Corp. (1977-1984) and Regional Technical Director for the State of Sao Paulo (Brazil) Rural Electrification Program 1970 - 1976). His professional activities have included USA Delegate International Electrical Commission (IEC) TC99, IEC TC99 Liaison to TC64, IEC TC89 Expert Delegate, Chair ASTM W.G. D-5222, and W.G. Chair IEEE TC Dielectric Fluids Subcommittee C57.121, and IEEE TC Task Force Chair for Ester Based Dielectric Coolants. Several of his proposals have been adopted by Codes and Standards (NEC, NESC, FM Global, IEC). He has presented papers at domestic and international engineering conferences including IEEE, EPRI, Doble, and CIREP. He is the principal inventor of six US patents relating to dielectric fluids. Projects managed by Mr. McShane have received regional and national recognition, including Governor's (WI) Environmental Product of the Year, Plant Engineering Magazine Electrical Product of the Year.

**Don Duckett:** Don Duckett received his B.S. in Electrical Engineering from the University of Texas, El Paso. He is currently the Technical Sales Engineer for Hughes Supply in Orlando, Florida. His responsibilities include technical sales support on Hughes Agency products and services which include reclosers, regulators, circuit breakers, and distribution and power transformers. His past experience includes development of a transformer application program for distribution and power transformers, participation in the 2005 Department of Energy Building Technologies peer review evaluation of energy efficiency standards, development of System Restoration Modeling software to determine impact from storms, and technical support to Florida and Carolinas on RFI issues. He received the 1985 GE Power Systems Sector Engineer Award and 1991 GE Industrial and Power Systems Engineering Award. Don has been a member of the IEEE Transformer Committee of the Power Engineering Society for more than 30 years. He currently holds a 1976 US patent for a Transformer Pallet Pad.