TRANSFORMERS COMMITTEE

January 23, 2004

Dear Committee Members and Guests:

You and your companion are cordially invited to attend the Spring 2004 Meeting of the IEEE/PES Transformers Committee to be held March 7-11, 2004 at the Catamaran Resort Hotel in spectacular San Diego, California. San Diego Gas & Electric (SDG&E) is proud to host the meeting and it promises to be a memorable event.

The Catamaran Resort Hotel is located on the beaches of Mission Bay, just steps from the Pacific Ocean, and 15 minutes from San Diego Lindbergh Field (airport code SAN). Rooms are available for US$145/night (single or double occupancy) under the group name "IEEE Transformers". Contact the hotel at (800) 422-8386 or (858) 488-1081. The room-block cut off date is February 13, 2004. After that date, our remaining rooms will be released to the public. It is anticipated that this meeting will be well attended, so you are urged to make your reservations now.

Ground transportation options from the airport to the hotel include:

- Taxicab: One-way trip from the airport to the hotel is approximately US$20-25.
- Shuttle: "*Cloud 9*" offers a shuttle from the airport for US$9.00 each way with a shared ride. The Catamaran Hotel has a discount rate with "*Cloud 9*" so be sure to inquire about this benefit. Advance registration is generally not necessary, although it is recommended-you can make advance reservation at www.cloud9shuttle.com or by calling (858) 505-4900.

Mid-March is a beautiful time in San Diego although it can be cool in the evenings. The temperature ranges from an average high of 66°F (19C) to an average low of 53°F (12C). Attire for the meetings is "business casual".

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. Register by February 13 to receive a US$20 early-registration discount.

SPECIAL EVENTS

A **Saturday Golf Outing** will be offered for those arriving early. Contact Red Hager at 760-789-3022 or redhager@ieee.org

The **Sunday Evening Reception** will be held at the Catamaran. Weather permitting, we will hold the event outside adjacent to the beach. In case of inclement weather, we will move inside into the spacious "Kon Tiki" Ballroom. Whether we are inside or outside, a local band will entertain us and casual & relaxed "island attire" (aloha shirts, etc.) is encouraged.

The speaker for the **Tuesday Luncheon** is Mr. James Tucker. Jim will enlighten us with his presentation of "Happiness is a Choice". So, take a break from a long week of technical meetings and join Jim as he shares some simple tips on how to find humor in your own life.

For our **Wednesday Evening Social**, we will take a two-hour cruise of Mission Bay on the enormous nineteenth-century-style paddlewheeler *William D. Evans*. We will board the boat from the hotel pier and enjoy a splendid sit-down buffet dinner and an evening of lively music provided by the Grand Daddy-O's.

COMPANION TOURS

Monday, March 8 – Shopping in La Jolla, San Diego's "jewel", a visit to the Cabrillo National Monument and lunch in Seaport Village.

Tuesday, March 9 – A tour of Coronado including a visit to the historic Hotel del Coronado, and San Diego's Old Town State Park with a Mexican lunch in Old Town.

TECHNICAL TOURS

Sunday, March 7 - Tour of the **SCE/Edison ESI Repair Facility**. Buses will leave from the hotel at 7:00 am for a two-hour ride to the plant. A bag breakfast will be provided on the bus. After the tour, the buses will depart and return to the Catamaran around 2:00 p.m. A box lunch will be provided on the return trip. Everyone is invited on the tour but reservations are required. Make your reservations using the on-line registration system or fax in the enclosed form.

Tuesday, March 9 - Tour of **SDG&E's Electric Distribution Operations Center**. Since SDG&E's facilities are "not spacious" - unfortunately there is a limit of 45 participants for this tour. A bus for the tour will leave from the hotel at 6:30 pm and return around 9:00 pm. An informal light pizza dinner will be provided. Make your reservations on-line or fax in the enclosed form.

Enclosed is the following information:

1. Meeting Registration Form. You may mail this form with payment to IEEE (must be received by February 13 to be eligible for the US $20 early registration discount) or register on-line using a major credit card. On-line registration is available at www.transformerscommittee.org.

2. Detailed Meeting Schedule. An update will be posted on the Committee's web-site one week before the meeting.

3. Information flyers on:
   - Technical Tours
   - Companion Tours
   - Tuesday Speaker Luncheon
   - Wednesday Evening Social
   - Technical Presentations

4. Information on San Diego. Links to additional information can be found on the Committee's website (www.transformerscommittee.org)

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 me at (858) 654-8248 or e-mail me at aharris@ieee.org. If I am not available, please contact Ms. Donna Johnson at (858) 654-8255.

See you soon in San Diego!

A. Earl Harris, P.E.
San Diego Gas & Electric Company

IEEE/PES TRANSFORMERS COMMITTEE
SPRING 2004 MEETING -- MARCH 7-11, 2004
San Diego, California, USA

Register for meeting and/or purchase Meeting Minutes using a credit card: www.transformerscommittee.org

Attendee's Name _____

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

Company / Institution _____

Full Address _____

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

Telephone _____ Fax _____ E-mail _____

PES Member? ☐Yes ☐No IEEE Standards Association Member? ☐Yes ☐ No IEEE Membership #: _____

Please check appropriate boxes (choose one only): ☐Manufacturer ☐End User ☐Consultant /Other

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, and 4 breakfasts (M, T, W, Th)
Companion Registration Fee Includes: Sunday Evening Reception and 4 breakfasts (M, T, W, Th)
-- Refunds provided **ONLY** if request is received in writing at IEEE **by March 2, 2004** (US$25.00 service charge on all refunds) **--**

Registration Fees	**On or Before Feb. 13, 2004**	**After Feb, 13, 2004**	**Total**
Attendee - IEEE member (membership will be verified with IEEE)	US$135	US$155	_____
Attendee - non-member	US$160	US$180	_____
Attendee - IEEE Life or Committee Emeritus Member (will be verified)	US$20	US$40	_____
Companion	US$65	US$85	_____

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

Monday Luncheon - Stds Develop Process Review Mtg (WG & TF Chairs encouraged to attend) # ____ @ US$15 _____

Tuesday Luncheon - Speaker: Mr. James E. Tucker, "Happiness is a Choice" # ____ @ US$25 _____

Indicate selection for Tuesday Luncheon: Beef ____ Chicken ____ Vegetarian ____

Wednesday Evening Dinner Social - Mission Bay Dinner Cruise on the "William D. Evans" # ____ @ US$45 _____

Companion Tours: Monday - La Jolla-Cabrillo Monument & Seaport Village Tour, includes lunch # ____ @ US$55 _____

Tuesday - Coronado and Old Town Tour, includes lunch # ____ @ US$55 _____

Meeting Minutes, Spring 2004 Meeting ** (can be purchased with or without meeting registration) # ____ @ US$15 _____

Technical Tours: Sunday - ESI Repair Facility Attendee: ☐Yes ☐No Companion: ☐Yes ☐No -0-

Tuesday - SDG&E Dist. Operations Center Attendee: ☐Yes ☐No Companion: ☐Yes ☐No -0-

****** - 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! (IEEE Tax ID No. 13-1656633)
Money order or check - Make check payable to: **"IEEE/PES Transformers Committee"**
- Checks not issued by a US Bank **MUST** add US$20.00 for processing fee.
Credit Card: ☐ **Visa** ☐ **MasterCard** ☐ **American Express** ☐ **Diners Club**

Call (858) 488-1081 to reserve a room at the Catamaran Resort Hotel. Identify you are with "IEEE Transformers" group.

_____
Card Number Expiration Date

_____
Name as it appears on card Signature (Important)

Optional - In case of an emergency, contact: Name _____ Phone _____

Register on-line or mail completed form with payment to: IEEE Conference Management Services, Attn: Ms. Christy Lankenau
445 Hoes Lane; Piscataway, NJ 08855-1331 USA; Phone: 732.981.3415, Fax: 732.465.6447, e-mail: c.lankenau@ieee.org
Registrations without proper payment will not be accepted!

Revised January 23, 2004

IEEE/PES TRANSFORMERS COMMITTEE

www.transformerscommittee.org
Hosted by Mr. Earl Harris and San Diego Gas & Electric Company
Catamaran Resort Hotel; San Diego, California, USA
Spring 2004 Meeting -- March 7-11, 2004

NOTE: See Page 3 for a key to the abbreviations.

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Saturday, March 6					
	No Meetings. No Meeting Registration.				
9:00 am - 3:00 pm	"Early-bird" Golf Outing. If interested, contact Red Hager at 760/789-3022 or redhager@ieee.org.				
Sunday, March 7					
7:00 am - 2:00 pm	Technical Tour #1: SCE/Edison ESI Repair Facility. Bag breakfast and box lunch provided on the bus. -- Non-restricted tour (everyone is invited, including companions). Advance registration necessary. -- Contact Rob Morrison at 714/895-0364 or robert.w.morrison@sce.com for more information. -- Buses will leave from the front of the Catamaran at 7:00 am. Return to hotel around 2:00 pm.				
1:00 pm - 7:00 pm	Meeting Registration			1 phone line	Kon Tiki Foyer
2:00 pm - 5:30 pm	Administrative SC -- Closed meeting, by invitation only	Admin.	K. Hanus	30 HS P (w/snack buffet)	Toucan
3:00 pm - 5:30 pm	ASC C57 NEMA Delegation -- Closed meeting, by invitation only	++	C. Drexler	30 HS P	Macaw
6:00 pm - 8:00 pm	Hospitality Reception -- All members, guests & companions are welcome -- Advance registration please. Casual beach attire encouraged			300 Recept.	Beach North (Kon Tiki Ballroom if inclement weather)
Monday, March 8 -- Monday Breaks Sponsored by Tamini Transformers USA, LLC. **					
7:00 am - 5:00 pm	Meeting Registration			1 phone line	Kon Tiki Foyer
7:00 am - 8:00 am	Breakfast - Attendees (no companions please)			200 RT (flow)	Multipurpose Rm
8:00 am - 9:00 am	Breakfast - Companions			75 RT	Rousseau Center
9:15 am - 3:00 pm	Companion Tour: La Jolla - Cabrillo Nat. Monument and Seaport Village Tour. Advance registration required. -- The bus will leave from front of Catamaran at 9:15 am. Return around 3:00 pm. Includes lunch.				
7:05 am - 7:50 am	Newcomers Orientation Breakfast Meeting -- All "Newcomers" & Guests are encouraged to attend. Food will be outside room at 7:00 am. Please be ready for a 7:05 am meeting start.		D. Fallon	40 CL P	Rousseau E/W (first floor)
7:05 am - 7:50 am	Distribution SC Coordination Meeting (closed mtg)		E. Smith	15 CONF	Reserved area in Atoll Restaurant
8:00 am - 9:15 am	TF Dry-Type Reactors	Dry	R. Dudley	40 CL O	Boardroom East
8:00 am - 9:15 am	TF Arc Furnace Transformers C57.17	Power	D. Corsi	40 CL P	Boardroom West
8:00 am - 9:15 am	TF Core Overexcitation Requirements **(new)**	PCS	C. Stiegemeier	60 CL *	Cockatoo
8:00 am - 9:15 am	WG Electronic Data Transmittal PC57.12.37	Dist	T. Callsen/ R. Hollingsworth	80 CL P *	Toucan
8:00 am - 9:15 am	TF Winding Temperature Indicators	IL	P. McClure	100 CL *	Macaw
8:00 am - 9:15 am	WG Acoustic Partial Discharge Measurements	DiTests	J. Harley	150 CL S3 (only 150 chairs) * add 2-3 rows of theater seating in rear of room if necessary	Kon Tiki Ballroom
9:15 am - 9:30 am	*Break (beverages only)*			Aviary Foyer	

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

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Monday, March 8 (continued)					
9:30 am - 10:45 am	WG 3-ph UG Distribut. Trans. C57.12.24	UTNP	J. Sullivan/ G. Termini	40 CL	Boardroom East
9:30 am - 10:45 am	WG Thermal Evaluation of Power and Distribution Trans. C57.100	IL	R. Wicks	40 CL P	Boardroom West
9:30 am - 10:45 am	TF Electrical Partial Discharge Measurements Guide C57.113 **(new)**	DiTests	E. Lemke	60 CL	Cockatoo
9:30 am - 10:45 am	WG 1-ph OH Dist. Trans. C57.12.20	Dist	A. Wilks/ T. Cooper	80 CL O	Toucan
9:30 am - 10:45 am	WG PCS Rev. to Test Code C57.12.90	PCS	B. Forsyth	100 CL O	Macaw
9:30 am - 10:45 am	WG Revision Installation Guide C57.93	Power	M. Lau	150 CL S3	Kon Tiki Ballroom
10:45 am - 11:00 am	*Break (beverages only)*			Aviary Foyer	
11:00 am - 12:15 pm	WG Sound Level Measurement Guide	ASV	[TBD]	40 CL	Boardroom East
11:00 am - 12:15 pm	WG Temp. Rise Test Procedures in Section 11 of C57.12.90	IL	P. Payne	40 CL	Boardroom West
11:00 am - 12:15 pm	WG Revision to Low Frequency Tests	DiTests	M. Perkins	60 CL P	Cockatoo
11:00 am - 12:15 pm	WG 1-ph Padmount Distribution Transformers C57.12.25	Dist	A. Ghafourian/ I. Ares	80 CL O	Toucan
11:00 am - 12:15 pm	WG Shunt Reactors C57.21 **(new)**	Dry	R. Dudley	100 CL O	Macaw
11:00 am - 12:15 pm	TF Trial-use Std for Control Cabinets	Power	J. Watson	150 CL S3, P	Kon Tiki Ballroom
12:15 pm - 1:30 pm	Lunch Mtg - Standards Develop. Process Review -- All WG & TF Chairs are encouraged to attend. -- Advance reservation necess. ($15 for box lunch). -- IMPORTANT: Bring your ticket to the lunch.		B. Chiu/ T. Prevost	80 RT P (keep tbls from bkfst, set food for guarantee)	Multipurpose Rm
1:45 pm - 3:00 pm	WG Dry-Type Gen. Require. C57.12.01	Dry	J. Sullivan	40 CL	Boardroom East
1:45 pm - 3:00 pm	WG Sec. Network Protectors C57.12.44	UTNP	D. Mulkey	40 CL	Boardroom West
1:45 pm - 3:00 pm	**SC HVDC Converter Transformers and Smoothing Reactors**	HVDC	R. Dudley	60 CL O	Cockatoo
1:45 pm - 3:00 pm	WG 3-ph Padmount Distribution Transformers C57.12.34	Dist	R. Stahara/ S. Shull	80 CL O	Toucan
1:45 pm - 3:00 pm	WG PCS Revisions to C57.12.00	PCS	S. Snyder	100 CL	Macaw
1:45 pm - 3:00 pm	WG LTC Performance C57.131	Power	W. Henning/ C. Colopy	150 CL S3, P	Kon Tiki Ballroom
3:00 pm - 3:15 pm	*Break (beverages and treats)*			Aviary Foyer	
3:15 pm - 4:30 pm	Joint WG Optical ITs C57.13/PSIM P1601	IT/PSIM	Rahmatian/ Gilleland	40 CL P	Boardroom East
3:15 pm - 4:30 pm	WG Liquid-immersed Secondary Network Transformers C57.12.40	UTNP	B. Klaponski	40 CL	Boardroom West
3:15 pm - 4:30 pm	WG Semiconductor Rectifier Transformers C57.18.10	PCS	S. Kennedy	60 CL P	Cockatoo
3:15 pm - 4:30 pm	WG for Bar Coding Distribution Transformers C57.12.35 **(new)**	Dist	L. Matthews/ G. Termine	80 CL P	Toucan
3:15 pm - 4:30 pm	WG Revision of Impulse Guide C57.98	DiTests	A. Molden	100 CL	Macaw
3:15 pm - 4:30 pm	WG Transformer Life Extension C57.140	Power	R. James	150 CL S3, O	Kon Tiki Ballroom
4:30 pm - 4:45 pm	*Break (beverages only)*			Aviary Foyer	
4:45 pm - 6:00 pm	Presentation #1: "Proposed Test to Determine Zo for Transformers with Interconnected Windings", by G. Rosselli **		Sponsor: PCS	150 TH S3, P (add podium and lapel mic)	Rousseau Center (first floor)
4:45 pm - 6:00 pm	Presentation #2: "Transportation Issues of Power Transformers", by T. Lundquist, E. Schweiger, and others		Sponsor: Power	150 CL S3, P (add podium and lapel mic)	Kon Tiki Ballroom (second floor)
	No Evening Activity Planned				

** Contact Greg Anderson (gwanderson@ieee.org) if you are interested in making a technical presentation at a future meeting.

KEY

> -- activity continued into another session / from another session
++ -- not a Transformers Committee activity TBD = to be determined
O = overhead projector; P = PC projector; F = flip chart; S1 = sound (see note)
S2 = stand mic in front only; S3 = stand mic in front & 1 stand mic at mid-room

CL -- classroom seating (with head table for 2-3)
TH -- theater seating (with head table for 2-3)
RT -- multiple roundtable (8-10/table)
HS -- one hollow square

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Tuesday, March 9 -- Tuesday Breaks Sponsored by Tree Tech USA **					
7:00 am - 12:00 pm	Meeting Registration			1 phone line	Kon Tiki Foyer
7:00 am - 8:00 am	Breakfast - Attendees (no companions please)			200 RT (flow)	Multipurpose Rm
8:00 am - 9:00 am	Breakfast - Companions			75 RT	Rousseau Center
9:15 am - 3:00 pm	Companion Tour: Coronado and Old Town Tour. Advance registration required. -- The bus will leave from front of Catamaran at 9:15 am. Return around 3:00 pm. Includes lunch.				
8:00 am - 9:15 am	WG Test Requirements for HV Instrument Transformers C57.13.5	IT	R. McTaggart/ P. Riffon	40 CL O	Boardroom East
8:00 am - 9:15 am	WG Switching Transients Induced by Transformer/Breaker Interaction	PCS	R. Degeneff	40 CL O, P	Boardroom West
8:00 am - 9:15 am	WG Guide for DGA in LTCs C57.139	IF	R. Ladroga	60 CL	Cockatoo
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	80 CL O	Toucan
8:00 am - 9:15 am	TF Def. Thermal Upgraded Insulation	IL	D. Platts	100 CL	Macaw
8:00 am - 9:15 am	WG West Coast	Power	M. Lau	150 CL S3	Kon Tiki Ballroom
9:15 am - 9:30 am	*Break (beverages only)*			Aviary Foyer	
9:30 am - 10:45 am	WG Thermal Evaluation C57.12.56 and C57.12.60	Dry	R. Provost/ R. Wicks	40 CL	Boardroom East
9:30 am - 10:45 am	~~TF Joint/PSIM Low PF Measurement~~	~~PCS~~	~~E. So~~	**CANCELLED**	
9:30 am - 10:45 am	WG Neutral Ground. Devices PC57.32	PCS	S. Schappell	40 CL	Boardroom West
9:30 am - 10:45 am	WG Natural Ester-based Fluids	IF	P. McShane	60 CL	Cockatoo
9:30 am - 10:45 am	WG Std Terminology C57.12.80 **(new)**	Stds	T. Raymond	80 CL	Toucan
9:30 am - 10:45 am	WG Thermal Duplicate Guide PC57.145	IL	B. Beaster	100 CL	Macaw
9:30 am - 10:45 am	TF Functional Life Tests, De-energized Tap Changers (DETC)	Power	P. Hopkinson	150 CL S3, P	Kon Tiki Ballroom
10:45 am - 11:00 am	*Break (beverages only)*			Aviary Foyer	
11:00 am - 12:15 pm	WG ITs for Electronic Meters & Relays	IT	C. TenHaagen	40 CL	Boardroom East
11:00 am - 12:15 pm	WG Loss Tolerance and Measurement	PCS	E. teNyenhuis	40 CL P	Boardroom West
11:00 am - 12:15 pm	WG Revision of Oil Guide C57.106	IF	J. Thompson/ T. Oommen	60 CL O	Cockatoo
11:00 am - 12:15 pm	WG Distribution Substation Transformers C57.12.36	Dist	Rossetti/ Plaster/Aho	80 CL P	Toucan
11:00 am - 12:15 pm	TF Rev. to Temp. Ratings in C57.12.00	IL	D. Marlow	100 CL	Macaw
11:00 am - 12:15 pm	TF Bushing Applicat. Guide C57.19.100	Bush	T. Spitzer	150 CL S3	Kon Tiki Ballroom
12:15 pm - 1:45 pm	Speaker Luncheon. Advance registration is necessary -- Mr. James E. Tucker, "Happiness is a Choice". -- IMPORTANT: Bring your ticket and place on table to indicate your meal selection.			200 RT S1, P elevated table for 6, lectern w/mic	Multipurpose Rm
1:45 pm - 3:00 pm	WG Instrument Transformer Standard Requirements C57.13	IT	T. Nelson	40 CL O	Boardroom East
1:45 pm - 3:00 pm	WG Dry-Type Test Code C57.12.91	Dry	D. Foster	40 CL P	Boardroom West
1:45 pm - 3:00 pm	WG Revision of C57.12.10	Power	J. Arteaga	60 CL P	Cockatoo
1:45 pm - 3:00 pm	WG Loss Evaluation Guide C57.12.33	Dist	D. Duckett/ T. Pekarek	80 CL	Toucan
1:45 pm - 3:00 pm	WG Revision to Loading Guide C57.91	IL	T. Raymond	100 CL	Macaw
1:45 pm - 3:00 pm	WG Dielectric Test Tables, Liquid-filled	DiTests	P. Hopkinson	150 CL S3, P	Kon Tiki Ballroom
3:00 pm - 3:15 pm	*Break (beverages and treats)*			Aviary Foyer	

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

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Tuesday, March 9 (continued)					
3:15 pm - 4:30 pm	WG Conform. Tests C57.13.2	IT	V. Khalin	40 CL	Boardroom East
3:15 pm - 4:30 pm	TF Frequency Response Analysis (FRA) Guide	PCS	R. James	40 CL O	Boardroom West
3:15 pm - 4:30 pm	TF Standardization of Bulk-type Bushings **(new)**	Bush	R. Williams/ B. Hartgrove	60 CL	Cockatoo
3:15 pm - 4:30 pm	WG Voltage Step Regulators C57.15	Dist	C. Colopy/ G. Kennedy	80 CL P	Toucan
3:15 pm - 4:30 pm	WG Revision to Impulse Tests	DiTests	P. Riffon	100 CL O	Macaw
3:15 pm - 4:30 pm	WG Monitoring of Transformers C57.143	Power	D. Chu/A. Lux	150 CL S3, P	Kon Tiki Ballroom
4:30 pm - 4:45 pm	*Break (beverages only)*			Aviary Foyer	
4:45 pm - 6:00 pm	Presentation #3: "Seismic Design Considerations for Transformers", by H. Matt, D. Ostrom, C. Riker, and others **		Sponsor: Power	150 TH S3, P (add podium and lapel mic)	Rousseau Center (first floor)
4:45 pm - 6:00 pm	Presentation #4: "Moisture Estimation in Transformer Insulation", by T. Oommen, J. Thompson, B. Ward		Sponsor: IF	150 CL S3, P (add podium and lapel mic)	Kon Tiki Ballroom (second floor)
6:30 pm - 9:00 pm	Technical Tour #2: SDG&E Electric Distribution Operations Center. Includes an informal light pizza dinner. -- Non-restricted tour (everyone is invited, but limited to 45 attendees). Advance registration is necessary. -- One bus will leave from the front of the Catamaran at 6:30 pm. Return to hotel around 9:00 pm.				
Wednesday, March 10 -- Wednesday Breaks Sponsored by Luxtron Corporation					
	No Meeting Registration, No Companion Tours				
7:00 am - 8:00 am	Breakfast - Attendees (no companions please)			200 RT (flow)	Multipurpose Rm
8:00 am - 9:00 am	Breakfast - Companions			75 RT	Rousseau Center
7:05 am - 7:50 am	WG Web-page Development Breakfast Meeting -- Open meeting (anyone may attend). -- At least one representative from each SC should attend. Food will be outside room at 7:00 am. Please be ready for a 7:05 am meeting start.		S. McNelly	40 CL P	Rousseau E/W (first floor)
8:00 am - 9:15 am	EL&P Delegation -- Users only meeting	++	C. Niemann	40 HS	Boardroom E/W
8:00 am - 9:15 am	**SC Audible Sound & Vibration**	ASV	J. Puri	60 CL O	Toucan
8:00 am - 9:15 am	**SC Instrument Transformer**	IT	J. Smith	150 CL O S3	Macaw/Cockatoo
8:00 am - 9:15 am	**SC Insulation Life**	IL	D. Platts	200 CL S3	Kon Tiki Ballroom
9:15 am - 9:30 am	*Break (beverages only)*			Aviary Foyer	
9:30 am - 10:45 am	WG Phase-shift Trans. Guide C57.135	Power	T. Lundquist	150 CL O	Macaw/Cockatoo
9:30 am - 10:45 am	**SC UG Transf. & Network Protectors**	UTNP	C. Niemann	40 HS	Boardroom E/W
9:30 am - 10:45 am	**SC Dielectric Tests**	DiTests	L. Wagenaar	200 CL S3, O	Kon Tiki Ballroom
10:45 am - 11:00 am	*Break (beverages only)*			Aviary Foyer	
11:00 am - 12:15 pm	**SC Insulating Fluids**	IF	F. Gryszkiewicz	150 CL O S3	Macaw/Cockatoo
11:00 am - 12:15 pm	**SC Performance Characteristics**	PCS	R. Girgis	200 CL S3, P	Kon Tiki Ballroom
12:15 pm - 1:30 pm	Lunch (open)			Aviary Foyer	
1:30 pm - 2:45 pm	**SC Dry Type**	Dry	C. Johnson	150 CL O S3	Macaw/Cockatoo
1:30 pm - 2:45 pm	**SC Power Transformers**	Power	E. Hager	200 CL S3 P	Kon Tiki Ballroom
2:45 pm - 3:00 pm	*Break (beverages and treats)*			Aviary Foyer	

** Contact Greg Anderson (gwanderson@ieee.org) if you are interested in making a technical presentation at a future meeting.

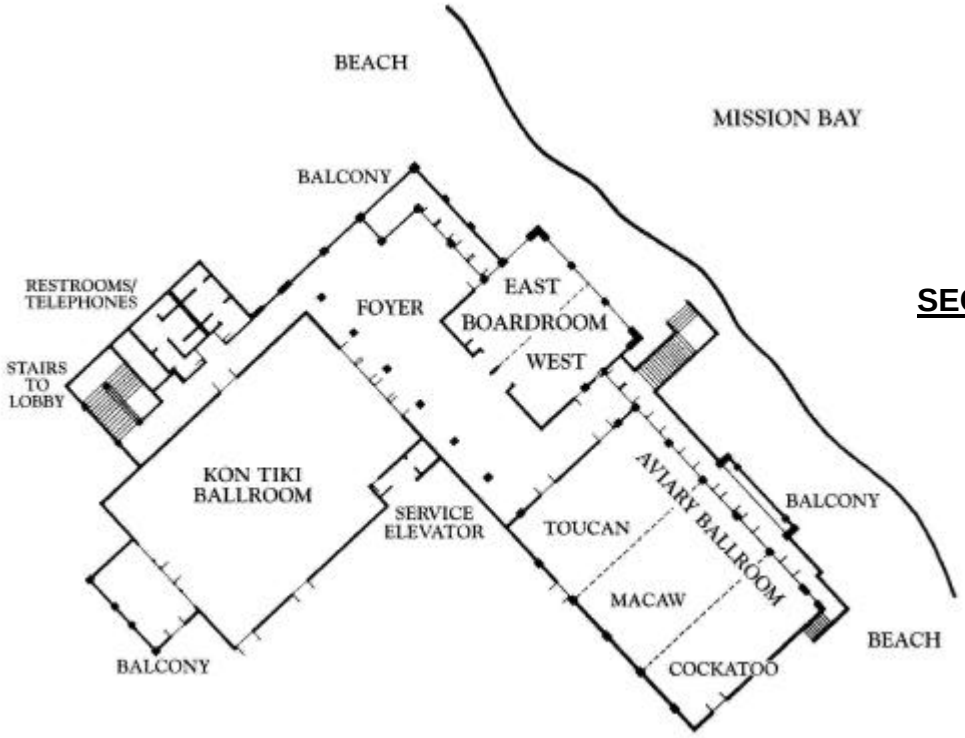
DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Wednesday, March 10 (continued)					
3:00 pm - 4:15 pm	IEC TC-14 Technical Advisory Group	++	P. Hopkinson	40 HS P	Boardroom E/W
3:00 pm - 4:15 pm	**SC Meetings Planning**	Mtgs	G. Anderson	60 CL P	Toucan
3:00 pm - 4:15 pm	**SC Distribution Transformers**	Dist	E. Smith	150 CL O S3	Macaw/Cockatoo
3:00 pm - 4:15 pm	**SC Bushings**	Bush	F. Elliott	200 CL S3, O	Kon Tiki Ballroom
4:15 pm - 4:30 pm	*Break (beverages only)*			Aviary Foyer	
4:30 pm - 5:30 pm	**SC Transformer Standards**	Stds	B. Chiu	200 CL S3, P	Kon Tiki Ballroom
6:30 pm - 9:00 pm	Dinner Social -- "Cruise of Mission Bay on the William D. Evans", entertainment, dancing, and a sit-down buffet dinner. Advance registration is necessary. -- Begin boarding from the hotel pier at 6:30 pm. Boat will depart at 7:00 pm and return at 9:00 pm. -- IMPORTANT: Show your ticket as you board the boat.				
Thursday, March 11 -- Thursday Committee Break Sponsored by [TBD] **					
	No Meeting Registration, No Companion Tours, No ASC C57 Meeting, No Technical Tour				
7:00 am - 8:00 am	Breakfast - Attendees (no companions please)			200 RT (flow)	Multifunction Rm
8:00 am - 9:00 am	Breakfast - Companions			75 RT	Rousseau Center
8:00 am - 9:45 am >	Transformers Committee -- All attendees are encouraged to attend.		K. Hanus	275 CL S1, P elevat. table for 4 lectern w/mic, one floor mic in each isle	Kon Tiki Ballroom
9:45 am - 10:00 am	*Break (beverages only)*			Kon Tiki Foyer	
> 10:00 am - 12:00 pm	Transformers Committee		K. Hanus	275 CL S1, P	Kon Tiki Ballroom
1:00 pm - 3:00 pm >	EPRI Generation Switchyards Task Force ++ -- closed meeting, EPRI members only		B. Ward	30 HS need screen, cart & power strip only	Boardroom E/W
3:00 pm - 3:15 pm	*Break (beverages only)*			Outside Boardroom	
> 3:15 pm - 5:00 pm	EPRI Generation Switchyards Task Force ++		B. Ward	30 HS	Boardroom E/W
Friday, March 12					
	No Meetings or Events				

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

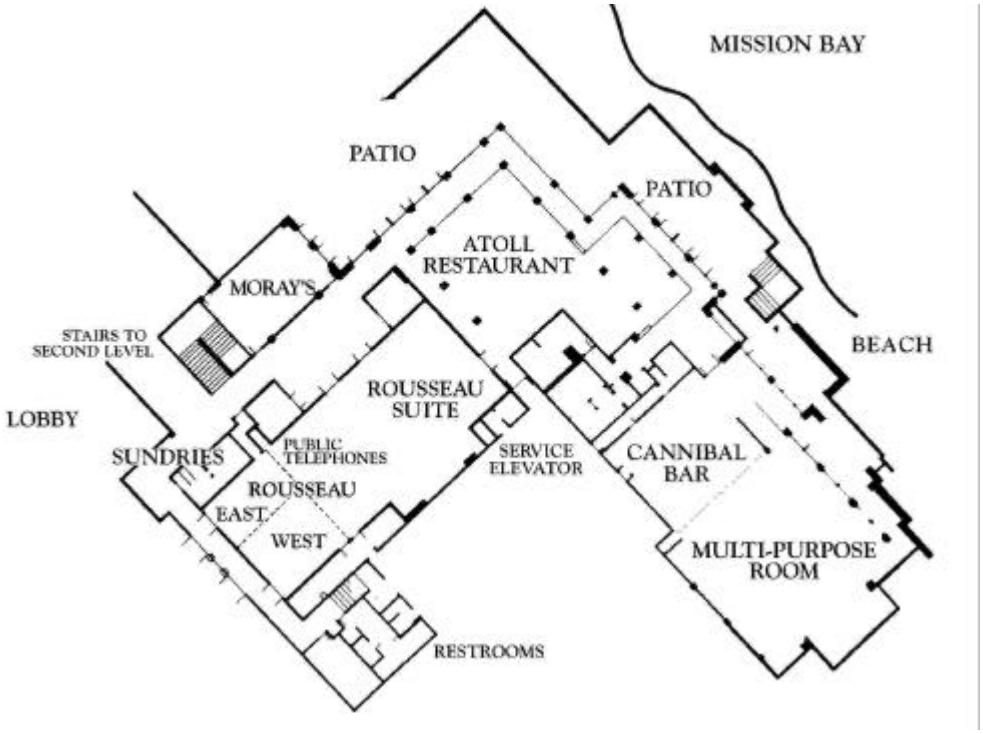
CATAMARAN
RESORT HOTEL

Catamaran Resort Hotel
San Diego, California, USA

NOTE: Attendee Breakfasts and Companion Breakfasts are held on the first floor of the hotel.



SECOND FLOOR



FIRST FLOOR

IEEE/PES TRANSFORMERS COMMITTEE

TRANSFORMERS COMMITTEE MEETING
THURSDAY, MARCH 11, 2004

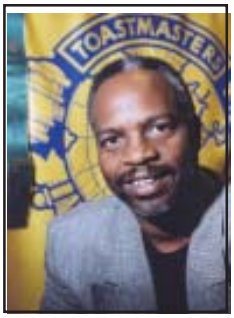
Chair: Kenneth S. Hanus Vice-chair: Donald J. Fallon Secretary: Thomas A. Prevost

1.	Chair's Remarks and Announcements		Kenneth S. Hanus
2.	Approval of Minutes from Fall 2003 Meeting		Kenneth S. Hanus
3.	Administrative Subcommittee		Kenneth S. Hanus
4.	Vice-chair's Report		Donald J. Fallon
5.	Transformer Standards		Bill Chiu
6.	Recognition and Awards		H. Jin Sim
7.	Report of Technical Subcommittees		
	7.1.	Insulation Life	Donald W. Platts
	7.2.	Performance Characteristics	Ramsis S. Girgis
	7.3.	Power Transformers	Everett G. Hager
	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	James E. (Ed) Smith
	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
8.	Editor's Report		Stephen Antosz
9.	Meetings Planning Subcommittee		Gregory W. Anderson
10.	Reports of Liaison Representatives		
	10.1.	Standard Coordinating Committee No. 4	Paulette A. Payne
	10.2.	IEC TC-14 Technical Advisor to USNC	Philip J. Hopkinson
	10.3.	CIGRE	Jean-Christophe Riboud
11.	Old Business		Kenneth S. Hanus
12.	New Business		Kenneth S. Hanus

Tuesday Speaker Luncheon

Tuesday, March 9th - 12:15 PM

Catamaran Hotel - Multi-purpose Room



"Happiness is a Choice"

Featured Speaker: Jim Tucker - SDG&E

Life is a journey of challenging circumstances that constantly test our very "will". How we respond to these circumstances determines how much happiness we have in our lives. It is not what happens "to" us that matters, but how we respond to what happens to us. How do you respond?

We all know that life is no joke....it contains twists, turns and little surprises that can be fun. Essentially, life's challenges are just set-ups. All we have to do is find the "punchline".

Jim Tucker will share some simple tips and valuable insights on how to find the "funny" in your life and now to punch things up with your own sense of humor.

Jim has been a member of Toastmasters for 30 years and recently competed in the 2002 and 2003 World Championship of Public Speaking in San Antonio, Texas and Atlanta, Georgia, respectively. He earned the right to be one of the nine contestants deemed as the "best in the world" of the 200,000 member organization.

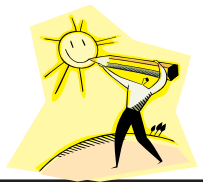
He is also the immediate Past President of the Century Toastmasters and is current Vice President Public Relations of Laughmasters. Jim is an engineer with a sense of humor (a paradox in itself). Jim has competed in humorous speech contests, performed stand-up comedy and retirement "roasts" and drawn cartoons for publications.

A native of Texas, he earned his Bachelor of Science degree in Electrical Engineering from Prairie View A&M University in Prairie View, Texas.

Presently employed at San Diego Gas & Electric as a Senior Engineer in the Electric Meter Group, he is responsible for the evaluation and purchase of electric metering equipment and software. Jim is a registered Professional Engineer in the State of California.

Jim also volunteers his time with Our Place of Self Esteem, a non-profit organization that teaches self esteem and anger management classes to children with behavior problems.

In his leisure time, Jim enjoys reading, cartooning, golfing and speaking. Jim is married with two children.



EDISON ESI
A SOUTHERN CALIFORNIA EDISON℠ Company

IEEE/PES Transformers Committee Technical Tour

YOU'RE INVITED

Companions are welcome too!

Tour SCE's/EDISON ESI Repair Facilities

Sunday, March 7, 2004

This is the Largest Electrical/Mechanical Repair Shop in the West!

Our services include: Repair of transformers, turbines, motors, generators, pumps, valves, and switchgear; Technical Services, Field Services, Lab Services, Metrology Services, Inspection Services, and Training.

We will focus the tour on our Large Apparatus Repair Shop (LARS) where large power transformers are repaired for SCE and external customers, including other utilities, independent power producers, major industrial, OEMs, and public agencies. We will also visit the Distribution Apparatus (DA) shop where pole and pad transformers are reconditioned, as well as Mechanical Services and Motor/Generator Shops.

The schedule starts early. We will board the buses at the Catamaran Hotel at 7:00 a.m.

Tour Schedule

09:00 – 09:15	Welcome/Introduction/Break into tour groups
09:15 – 10:00	DA Shop (pole and pad transformers)
10:00 – 10:45	LARS (large power transformers & winding room)
10:45 – 11:15	MSS & QIS (mechanical services & reverse engineering)
11:15 – 11:45	MGS (motors and generators)
11:45 – 12:00	Tour Summary/Pick up box lunches & board buses for return trip to San Diego
~2:00 p.m.	Arrive at hotel in San Diego

To join us on the tour, register on-line at www.transformerscommittee.org, or complete the registration form below and fax it to Lita McAllister at **714-895-0786 before February 25.**

Name: _____ Company: _____

Phone: _____ E-mail: _____

Companion's Name: _____

EDISON ESI
7300 Fenwick Lane, Westminster, CA 90283 Phone: 800-266-2299

Tour of SDG&E's Distribution Operations Center
Tuesday Evening - March 9, 2004
6:30 to 9:00 P.M.

Enjoy an informative tour of SDG&E Distribution Operations Center located in San Diego's Mission Valley

Tour will be conducted by Mr. Jason Hom, Team Leader

SDG&E's Electric Distribution Operations is a world-class organization of inspired individuals committed to safety, providing timely information and services through state of the art technology striving to improve the lives of our customers and employees. On the tour you will have an opportunity to learn about:

SDG&E Electrical System Overview
- o SDG&E service territory
- o Construction & Operations Districts and boundaries
- o Brief Transmission System Overview

Transmission Grid Operations
- o Transmission Grid Board
- o Key daily functions
- o Interaction with the CA ISO
- o Load Curtailment Procedures (CA ISO)
- o Distribution Control Center adjacencies

Distribution Control Center
- o LER Requests (scheduling routine work)
- o Authorization Requests from field personnel
- o Restoring forced outages (How we keep the lights on.)
- o Emergency Procedures
- o Outage Management Systems
- o SCADA application (Real-time status and telemetry)
- o Dispatching application for field personnel

To join us on the tour, register on-line at www.transformerscommittee.org, or complete the registration form below and fax it to Donna Johnson at 858-654-8244 before February 25.

Name: _____ Company: _____

Phone: _____ E-mail: _____

SDG&E

8316 Century Park Court, San Diego, CA 92123 Phone: 858-654-8255

Special Note: *Advance registration is necessary. Due to space constraints - this tour will be limited to 45 people - register early to ensure your place. Bus will leave from the front of the Catamaran at 6:30 p.m. and will return to the hotel around 9:00 P.M. - a "light pizza dinner" will be served*

Companion Tour
Monday, March 8, 2004
9:15 A.M. until 3:00 P.M.

La Jolla's spectacular beaches

A stroll along La Jolla Cove

- ⌘ Shopping in La Jolla
- ⌘ A Visit to the Cabrillo Monument
- ⌘ Lunch in Seaport Village

A deluxe motorcoach will pick you up at the Catamaran at 9:15 a.m. and will begin your tour to La Jolla. La Jolla isn't just another tourist town. "The jewel," is an apt description of this charming village with its many upscale boutiques, fine restaurants, art galleries, and charm of a Mediterranean isle. And the shopping in La Jolla is incomparable! Prospect Street & Girard Avenue are La Jolla's answer to Beverly Hills' Rodeo Drive. "Must See & Shop" stores include *Born to Shop*, *La Jolla Shoe Gallery* and *The Silver Store*. Mixed in with the upscale boutiques are shops created for the shoppers who love to find a great bargain as well!

Then it's off to Cabrillo National Monument on the tip of Point Loma. Commemorating the discovery of the coast of California by Juan Rodriguez Cabrillo in 1542, the park provides a visitor center, exhibits and a panoramic view of what Cabrillo called San Miguel Bay (now called San Diego Bay). Your tour will also include the scenic San Diego waterfront and the Gaslamp Quarter, the historic heart of San Diego. San Diego, "America's Finest City," is waiting to be discovered!

Finally, lunch awaits you at Seaport Village, an enchanting re-creation of an old California seaside town. You will enjoy panoramic views of San Diego Bay at Buster's Beach House. You'll enjoy the beachy, vintage surf style and aloha spirit where everyone is "ohana" (family). The ambience is warm, colorful, and relaxed. World beat music fills the air along with surfing tunes, and other 1960s classics.

Included in this wonderful day are:

- ♦ Round trip transportation via deluxe motor coach
- ♦ Professional tour guide to accompany group
- ♦ Shopping time in La Jolla - San Diego's "Jewel"
- ♦ Entry fee for Cabrillo National Monument
- ♦ Lunch at Buster's Beach House in Seaport Village

Companion Tour
Tuesday, March 9, 2004
9:15 A.M. until 3:00 P.M.

⌘ Coronado and Old Town Tours with lunch in Old Town

Aerial view of the Coronado Bridge

Alfresco dining in beautiful Old Town

Hotel del Coronado

Your motor coach will greet you at the Catamaran Hotel at 9:15 A.M. and take you to Coronado where your guide will give you an overview of this wonderful island. Take a stroll through the Hotel Del Coronado and hear the wonderful tales intertwined with this spectacular hotel, once a playground for royalty of every kind. Stroll down the Ocean Boulevard while you marvel at the waterfront mansions and see the house where *The Wizard of Oz* was written. Lastly, before your return to the mundane matters of reality, you'll hear how the North Island Naval Base was once a separate island before joining the existing peninsula.

Then it's off to San Diego's Old Town State Historic Park which conveys an authentic image of the city's glorious history between 1821 and 1872. Restored adobe homes, museums, landmarks, retail shops, restaurants, informative park rangers and volunteers, all bringing the flavor of the past into the present.

Old Town offers some of San Diego's best shopping with Bazaar del Mundo- a beautiful courtyard with a grouping of 17 shops and restaurants. Just when you think you've spent all of your energy on shopping, it's time for a relaxing lunch at Casa Guadalajara Mexican Restaurant.

Included in this all day event are:

- Deluxe Round-trip motorcoach transportation
- Tour of Coronado area and a guided tour of the Hotel Del Coronado
- Shopping in Old Town and Bazaar Del Mundo
- Lunch at Casa Guadalajara in Old Town Historical Park

Dinner Social Event
Wednesday Evening – March 10, 2004
6:30 to 9:00 P.M.

Cruise beautiful Mission Bay aboard the
"William D. Evans"
An authentic re-creation of a turn of the century paddlewheeler.

You will board the boat at the hotel and spend a delightful evening on Mission Bay where you will enjoy a sit down buffet dinner, entertainment, music by the Grandaddy-os and dancing.

Begin boarding from the hotel pier at 6:30. The boat will depart at 7:00 P.M. and return to the hotel at 9:00 P.M.

Advance registration is necessary.

Please show your tickets as you board the boat.

Don't miss this opportunity to see all that Mission Bay has to offer. A must see during your stay in San Diego.

IEEE/PES Transformers Committee
Spring 2004 Meeting, March 7-11, 2004
San Diego, California, USA

Moisture Estimation in Transformer Insulation

-- Technical Presentation, Tuesday, March 9, 4:45 p.m. --

by T. V. Oommen, Jim Thompson, and Barry Ward

1. Abstract

Transformer users are greatly interested in assessing the condition of mineral oil power transformers, including the moisture levels of the paper insulation system. These moisture levels are an important aspect of an operating transformer and may have adverse effects resulting in transformer failure, including reduced dielectric strength or gas bubble generation. Various methods for on-line modeling and off-line estimation of moisture in transformer paper insulation system are reviewed.

2. Learning Objectives

There are on-line modeling methods and off-line estimation methods of moisture in transformer paper insulation systems. These methods will be discussed briefly, and attention will be focused on the non-invasive methods that are the easiest to use. The limitations of such methods will also be discussed.

- Equilibrium values of moisture in paper insulation and oil; background and limitations
- Moisture dynamics in transformers; a thermodynamic model
- On-line moisture modeling and off-line moisture estimation; review of several methods

3. Learning Outcomes

- Cautions in using moisture data on transformer oil and insulation
- Significance in using equilibrium curves for thermodynamic moisture modeling
- Cautions in specifying moisture limits in IEEE Std C57-106 Oil Guide
- Use of off-line methods for moisture estimation in insulation
- Applicability of on-line moisture sensors and new algorithms

4. Presenter's Biographies

T. V. Oommen: is a consultant on transformer related items, particularly transformer insulation. He was a Senior R&D Scientist/Engineer for Westinghouse Electric and ABB Inc. for 24 years until his retirement in October 2000. He has been involved in leading a number of projects such as static electrification, bubble generation, particle contamination, moisture distribution and sensing, gassing behavior, and the development of a vegetable oil-based transformer fluid. He is a Senior Member of the IEEE, and is actively involved in the Transformer Subcommittee on Insulating Fluids and Insulation Life. He conducts courses and seminars on insulating fluids, insulating materials, transformer life, diagnostics and other timely topics. He and his wife reside in Raleigh, North Carolina.

James A. Thompson: is a registered Professional Engineer. He is the Manager of T&R Service Company in Colman, South Dakota. He received his BSEE from South Dakota Tech in 1974. He is a member of the IEEE Transformer Committee, the Insulating Fluids Subcommittee, the National Society of Professional Engineers, and the South Dakota Engineering Society. His professional experience includes semiconductor RF power transistor fabrication, radio frequency electronics, substation transformer installation, mineral-oil dielectric fluid testing, and transformer maintenance and repair.

Barry H. Ward: is currently Project Manager for Power Transformers and High Voltage Instrument Transformers in the Transmission & Substations Business Area of the Science & Technology Development Division of EPRI in Palo Alto, California. He is responsible for research projects on the development of diagnostics and condition assessment techniques for power transformers. Before joining EPRI in 1997, he was employed by AVO International and Blue Bell, Pennsylvania for nineteen years. He was responsible for the development of portable test and measurement instrumentation for use in the electric utility industry. He is a registered Professional Engineer and is a member of the IEEE serving on the Transformers Committee. He received his BSEE from The University of Bradford, England.

IEEE/PES Transformers Committee
Spring 2004 Meeting, March 7-11, 2004
San Diego, California, USA

Seismic Design Considerations for Transformers

-- Technical Presentation, Tuesday, March 9, 4:45 p.m. --

by Howard Matt, Dennis Ostrom, and Craig Riker

1. Abstract

Recent moderate and strong earthquakes have demonstrated that parts of electrical power systems are very vulnerable to damage. A short history of past earthquakes and their affect on the electric utilities with particular attention to transformers will be presented. An overview of how the electric utilities have responded to the earthquake hazard by the development of a standard for industry use. Requirements of IEEE 693 Standard "Recommend Practice for Seismic Design of Substations" and current research efforts through the PEER Lifeline Program will be investigated.

2. Learning Objectives

Attendees of the presentation will learn about the following items:

- Review how earthquakes affect power system facilities and equipment.
- Raise the awareness and understanding of the vulnerabilities of power transformers
- Review design details for transformers that contributes to both good performance and failure during earthquakes.
- Suggest approaches for new construction that have shown to reduce earthquake damages to transformers.
- PEER (Pacific Earthquake Engineering Research) Lifelines Program is providing data, models, and methods needed to improve the earthquake reliability and safety of lifelines systems.

3. Learning Outcomes

Attendees will learn methods to improve the earthquake response of electric power transformers. Document where the most transformer damages are concentrated. Address issues pertaining to a transformer's earthquake performance, mitigation, retrofit and recommended installation practices.

Following the presentation, there will be responses from a couple of OEM's representatives.

4. Presenter's Biographies

Howard Matt: Mr. Matt is a Graduate Student Researcher for the Department of Structural Engineering at the University of California at San Diego. Mr. Matt is working toward his PhD in Structural Engineering. Mr. Matt received his BSCE at the University of Washington. He has currently working on a project for the PEER Lifeline Program titled "Seismic Qualification Requirements for Transformer Bushings".

Dennis Ostrom: Dr. Ostrom is a RE in the state of California and received his PhD from the University of California at Los Angeles in 1973. He has been an independent consultant since 1996 specializing in the field of earthquake engineering as it relates to electric utilities. Before that, the Southern California Edison Company employed him for over 25 years working as their in-house Earthquake Engineering consultant. He is the author of many technical papers and served on the IEE344 Standard that dealt with the seismic qualification of nuclear power plant equipment. He is also past Co-Vice Chairman of the Subcommittee of the Seismic Design of Substation Working Group, which developed the first IEEE 693 Standard. He is currently working on a PEER project titled "Database of Seismic Parameters of Equipment in Substations".

Craig Riker: Mr. Riker has been employed with San Diego Gas & Electric Company for 26 years. Currently, he is a Principal Engineer in the Civil/Structural Engineering Group. He is a member of the IEEE Standard 693 Committee. Mr. Riker received his BSCE from San Diego State University and is a Registered Professional Engineer. He is currently a member of the PEER Lifelines Advisory Panel on Electrical System Seismic Safety and Reliability.

Following the presentation, there will be responses from a couple of OEM's representatives.

IEEE/PES Transformers Committee
Spring 2004 Meeting, March 7-11, 2004
San Diego, California, USA

Proposed Test to Determine Zo for Transformers with Interconnected Windings

-- Technical Presentation, Monday, March 8, 4:45 p.m. --

by Girolamo (Gerry) Rosselli

1. Abstract

Power Transformer manufacturers provide a test report that includes information about the measured positive and zero sequence impedances. This impedance is determined by tests as described by the IEEE/ANSI Standard C57.12.90. This Standard covers a variety of transformer connections such as wye-delta, delta-wye, and some three winding transformers, but it excludes transformers with interconnected windings like wye-delta-ZigZag. To date, no reference is given as to how this information can be obtained.

San Diego Gas & Electric (SDG&E) uses interconnected winding transformers in certain applications to provide a stable ground/neutral reference point. This configuration is also used to maintain an X_0/X_1 ratio of 3 or less for the high voltage system (effectively grounded system), provide a 30-degree phase-shift, and supply a neutral for the low voltage distribution side.

The purpose of this tutorial session is to provide a new way to test interconnected transformers for the zero-sequence impedance using symmetrical components to solve the line-to-ground fault general equations. These equations are then modified into a form that is easily implemented by both transformer manufacturers and utilities. The final equation reflects results in Volts, Amperes, and Percent Reactance. This test is valid for any two- or three-winding transformers because a natural installation equivalent test is utilized for a single line-to-ground fault with a balanced three-phase voltage at the source.

2. Learning Objectives

Attendees of this tutorial session will learn a new way to test interconnected windings transformers using symmetrical sequence components to solve the line-to-ground fault general equations and obtain an accurate value for the zero-sequence reactance of the transformer.

3. Learning Outcomes

The information learned from this session should help utility and manufacturer attendees in two different ways:

1. Utility Attendees: Should be able to go back and use the new equations to test interconnected transformers for the zero-sequence impedance. The test is performed at a reduced voltage and current, and the results are later proportionally calculated at rated values. This test is valid for any three-phase transformer connection regardless of the type. Besides a zero-sequence test, the positive-sequence test can also be performed to check the reactance value, and then it can be compared to the manufacturer's Test Report. The source voltage can be a portable generator for this test.

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2. Manufacturers Attendees: Should be able to test any transformer, including interconnected winding per the new standard, and also obtain the zero-sequence impedance using the new proposed equation. They will also be able to discuss these new testing requirements with their customers.

4. Presenter's Biographies

Girolamo (Gerry) Rosselli: Mr. Rosselli is presently a Principal Engineer at San Diego Gas & Electric. He joined San Diego Gas & Electric as a Substation Engineer in 1981, and in 1985 joined the System Protection group as a Relay and Protection Engineer. One of his major accomplishments is the coordination of the transmission and subtransmission systems of the Island of Guam. He has written an article on 500 kV Series Capacitors for T&D Magazine in 1987. He presented the paper, "Transformer Test to Calculate Z_0 for Interconnected Windings Transformers Using Symmetrical Sequence Components" to both Georgia Tech and the Western Protective Relay Conferences in 2003. He is a member and former Chairman of IEEE/PES Society San Diego Chapter, and a Registered Professional Engineer in the State of California. He received his B.S. degree in Electrical Engineering from the University of Illinois in 1978. Upon graduation, he was employed by Commonwealth Edison Company, where he worked on the planning side of the distribution systems, as well as electrical planning for high-rise buildings for the central Chicago area.

IEEE/PES Transformers Committee
Spring 2004 Meeting, March 7-11, 2004
San Diego, California, USA

Transportation Issues of Power Transformers

-- Panel Presentation, Monday, March 8, 4:45 p.m. --

**by Willy Hoffmann, Tom Lundquist,
Ewald Schweiger, and Manuel Silvestre**

1. Abstract

Once a transformer is properly manufactured to the owner's specifications and industry standards, the job is not complete. An essential task in procuring a quality transformer is to transport it safely to the site. Transportation is no longer an afterthought. It is an important to ensure that a well-manufactured transformer is delivered promptly, in the same condition that it left the factory.

This presentation is intended as a "teaser" to initiate a forum of discussion and resources for a potential upcoming standards activity by the Committee. The West Coast Working Group (under the Power Transformers Subcommittee) is considering starting work on a "Guide for the Transport of Power Transformers".

2. Learning Objectives

The transportation of transformers is a broad subject - much larger than can be adequately covered in this brief presentation. This presentation will "scratch the surface" by covering a few items of interest:

- Alternate design solutions to overcome transport restrictions
- Field tests to help determine hidden internal damage
- Types of potential impacts that can occur during transport
- How to specify and discover impact limitations
- Impact recorder issues
- Additional worthwhile transport bracing
- Choosing a good rigging contractor
- Manufacturers obligations
- Airborne transports ("flying transformers")
- Applying power transformers to wind power projects

3. Learning Outcomes

Attendees at this presentation will gain a better understanding of the importance of specifying preferences and requirements that will help ensure a prompt and safe transport of power transformers. They will also discover a couple of unique solutions to overcome barriers that may exist when moving a large transformer to a difficult location.

It is desired that the presentation will also initiate excitement in the anticipation of an upcoming guide document. Furthermore, this presentation is an opportunity to identify individuals who have experience in transportation & rigging issues and is an opportunity to solicit their involvement in standards work.

4. Presenter's Biographies

Willy Hoffman: Mr. Hoffman is Senior Vice-president of J. H. Bachmann, Inc. North America. He is responsible for all heavy and oversized transport in the United States and is a member of the Railway Industrial Clearance Association as well as the Federal Maritime appointed qualifying officer for J. H. Bachmann. Mr. Hoffmann began his career in the forwarding industry in 1971 and has worked for many years in the Middle East and Asia before coming to the United States in 1986. He holds a degree in international business from the Dr. Ruessler Business School in Düsseldorf/ Germany.

Thomas G. Lundquist: Mr. Lundquist is an Executive Engineer, in the Electric System Engineering Department at Salt River Project in Phoenix, Arizona. Work assignments include special projects involving EHV equipment, consulting for system grounding and shielding, and transformer applications in utility facilities. Tom worked for Westinghouse Electric Corporation as a district engineer and as a service center manager. He is Chairman of ASTM International D27 Electrical Insulating Liquids and Gases Committee and a senior member of IEEE, Transformer Committee. Tom received a BS degree in Electrical Engineering from the University of Arizona and an MBA -Technology Management from the University of Phoenix. He is a registered Professional Engineer in Arizona and Colorado.

Ewald Schweiger: Mr. Schweiger is Sales Manager of VA TECH ELIN Transformatoren. He is part of the Marketing and Sales Team of VA TECH Transformers, Austria. Within this team he is responsible for sales efforts and the strategy for Large Power Transformers within the South East of the States. Mr. Schweiger is also responsible for the acquisition and execution of transformer and shunt reactor contracts. He joined VA TECH ELIN Transformatoren in 1997. From the beginning, he worked in the Marketing and Sales department for the US market. He is a member of IEEE/PES Transformers Committee. Ewald received a Dipl.-Ing. Degree from the Technical University in Graz in 1997.

Manuel Silvestre da Silva Barbosa: Mr. Silvestre is R&D Director of Power Transformers at EFACEC Energia, S.A., located in Portugal. Previously, he was Manager of Quality Assurance and was also General Manager of the EFACEC Factory in China. Manuel began his career at EFACEC as a shell-form and core-form design engineer. His Electrical Engineer Degree was awarded by the University of Porto in 1971.