

# IEEE PES Transformers Committee



Phoenix PES Luncheon

April 17, 2008

# Transformers!

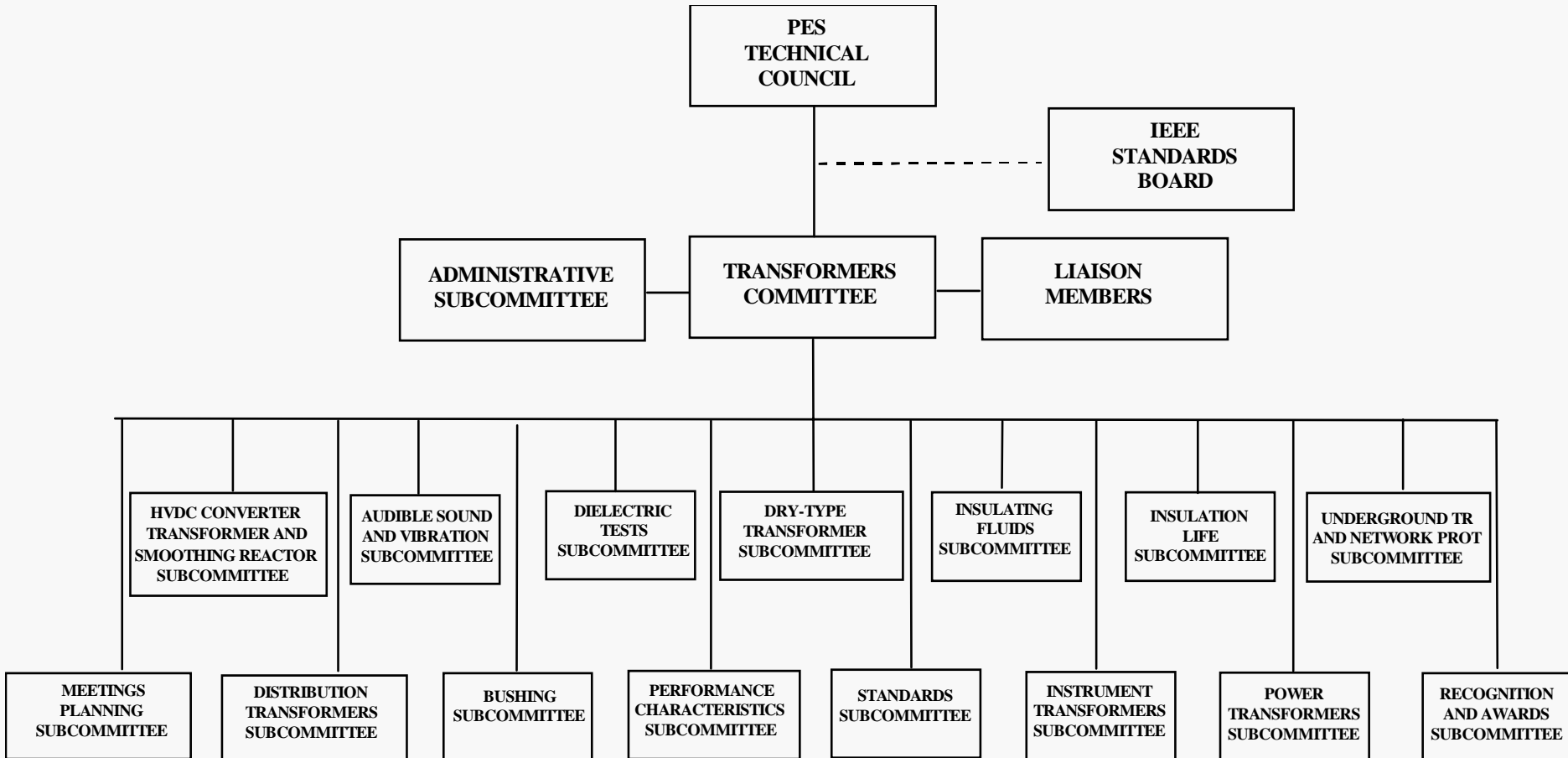


# Committee Introduction - Agenda



- Who are we?
- What do we do?
- What can YOU do?
- Meeting Schedule and Locations
- Key Projects for Technical Subcommittees

# Who are we?



# Officers of the Committee

## Chairman

**Donald J. Fallon, PSE&G, 80 Park Plaza T14A, Newark, NJ 07102 U.S.A.**

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## Vice-Chairman

**Thomas A. Prevost, Weidmann-ACTI, Inc, One Gordon Mills Way, St. Johnsbury VT 05819**

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## Secretary

**J. Edward Smith, H-J Enterprises Inc., 3010 High Ridge Blvd. High Ridge, MO 63049**

**Phone: +1 (636) 677-3421 Fax: +1 (636) 376-1915 E-Mail: edsmith@h-jenterprises.com**

## Past-Chairman

**Kenneth S. Hanus, TXU Electric Delivery, 2525 W. Story Road, Fort Worth, Irving, TX 75038 U.S.A.**

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## Standards Coordinator

**Bill Chiu, Southern California Edison, 501 S. Marengo Ave., Bldg. C, Alhambra, CA 91801 U.S.A.**

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# What do we do?



**Treat all matters in which the dominant factors are the application, design, construction, testing and operation of transformers, reactors and other similar equipment. Included is treatment of the following:**

- **Generator Step-Up, Transmission and Distribution Transformers**
- **Voltage Regulators (step and induction regulators)**
- **Reactors and Grounding Transformers**
- **HVDC Converter Transformers and Smoothing Reactors**
- **Rectifier Transformers**
- **Instrument Transformers (voltage transformers and current transformers)**
- **Insulation and Dielectric Problems Relating to Transformers**
- **Bushings**
- **Insulating Fluids**
- **Underground Transformers and Network Protectors**
- **Phase Angle Regulating Transformers**

# Check out the Committee Website: [www.transformerscommittee.org](http://www.transformerscommittee.org)

The screenshot shows a Microsoft Internet Explorer browser window displaying the IEEE/PES Transformers Committee website. The browser's address bar shows the URL <http://www.transformerscommittee.org/>. The website features a blue header with the IEEE and PES logos and the text "IEEE/PES TRANSFORMERS COMMITTEE". Below the header is a "WELCOME" message and a yellow banner announcing the "Next Meeting: Porto, Portugal, October 5 - 9, 2008. Hosted by EFACEC".

The main content area is divided into several sections:

- SPECIAL NOTICES:** A notice regarding the "Next Meeting" page being enabled by March 31, 2008, and providing information about the host hotel, The Porto Palácio.
- ASSOCIATION MANAGEMENT SYSTEM:** A notice about a new web-based system for communication and membership management, which is now the committee's primary mode of communication.
- SUBCOMMITTEES:** A list of subcommittees with checkboxes indicating their status. The "Checked box" indicates that unapproved minutes from the Spring 2008 Charlotte meeting are available. The subcommittees listed are: Administrative, Audible Sound and Vibration, Bushing, Dielectric Tests, Distribution Transformers, Dry-Type Transformers, HVDC Converter Transf. and Smoothing Reactors, Instrument Transformers, Insulating Fluids, Insulation Life, Meetings Planning, Performance Characteristics, Power Transformers, Standards, UG Transf. and Network Protectors, and Complete Minutes.
- COMMITTEE INFORMATION:** A section with a photograph of Charlotte, North Carolina, USA, dated March 2008. It includes links for Executive Officers, Voting Members, Committee Scope, Eligibility, Organization, and Revision of Membership.
- COMMITTEE MEETINGS:** A section with a link to the "Membership application Form".
- MINUTES:** A section with a link to the "IEC TC-14 TAG".

The left sidebar contains a "WEB COUNTER" showing 100002 visitors from September 1999, a search site, and various navigation links such as Home Page, Member Directory, Assoc. Mgmt. Sys., Companions' Page, External Links, Industry Calendar, Tutorials/Forms/Info, Minutes, Next Meeting, Past Meetings, Subcommittees, and Standards. It also features the IEEE and IAS logos.

# What do we do?



- **Sponsor and develop standards, recommended practices, guidelines and policies as well as preparation of position papers**
- **Cooperation with other technical committees, societies, groups and associations concerned with items listed in the scope of the Committee**
- **Continuing education for our attendees through Tutorial presentations on current state of the art in the industry, on new issues requiring attention in Standards documents, and on significant work in the Committee.**
- **Reviewing and writing technical papers in areas covered by the Committee scope**
- **Technical Subcommittee activities are outlined in the Key Projects later**

# What can YOU do?



- **Join the activities that you are interested in**
  - **Working Groups (WG) / Task Forces (TF) / Subcommittees (SC)**
- **Participate in these activities by volunteering for work**
  - **Write drafts**
  - **Review what others write**
  - **Provide comments and discuss issues**
- **Join Standards Association and participate in balloting process**
- **Work together with a group of dedicated professionals to serve our industry**

# What can YOU do?

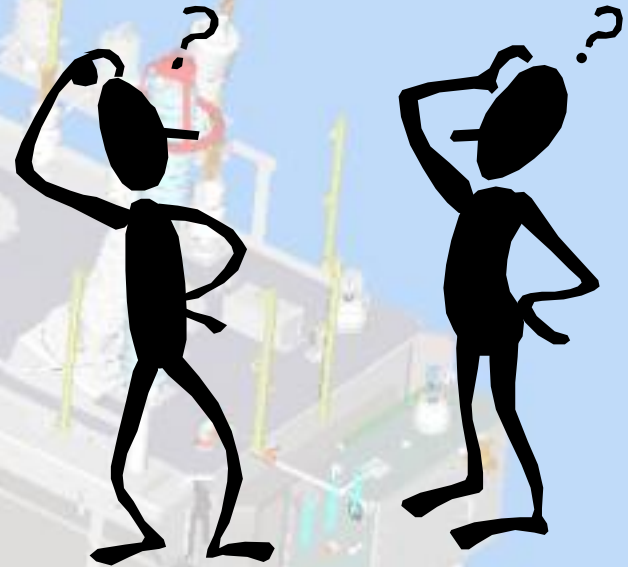
- **Learn**

- **Industry trends**
- **Issues that impact your work**
- **Solutions to those issues**

- **Practice / Implement**

- **What you learn**
- **Simplify / Standardize**

- **Build a strong NETWORK of industry experts - and good friends too!**



# What can YOU do?

- **Technical Papers**

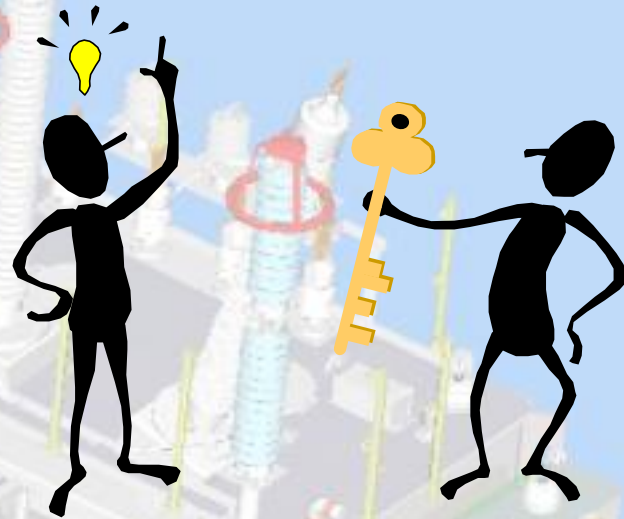
- Write them

- Review them

- Attend presentations

- **Tutorials, Symposiums, Special Technical Sessions**

- Present your developmental work to your peers



# Meeting Schedule



- 4 day meeting schedule
  - First 2 days reserved for TF and WG meetings
  - 3<sup>rd</sup> day Sub Committee meetings
  - 4<sup>th</sup> day General Meeting, 1/2 day
- Technical Presentations
- Social Events
- Spouse/Companion Tours

# Typical Day

<u>DATE/TIME</u>	<u>ACTIVITY</u>	<u>SUB-COM</u>	<u>ACTIVITY CHAIR</u>	<u>ROOM CAP/ARR/AV</u>	<u>MEETING ROOM</u>
<b>Monday, March 17 (continued)</b>					
9:30 am - 10:45 am	WG Sealed Dry-Type Power Transformers C57.12.52	Dry	S. Kennedy	25 CL	Trade
9:30 am - 10:45 am	WG Liquid-immersed Secondary Network Transformers C57.12.40	UTNP	B. Klaponski	35 CL	Independence
9:30 am - 10:45 am	WG Revision of C57.12.10	Power	J. Arteaga	50 CL	Tryon
9:30 am - 10:45 am	WG Overhead Distribution Transformers C57.12.20	Dist	A. Wilks/ T.Cooper	80 CL S3	Grand Ballroom A
9:30 am - 10:45 am	TF Furan Tests ( <b>New!</b> )	IL	K. Haggerty	100 CL S3	Grand Ballroom B
9:30 am - 10:45 am	WG PCS Rev. to Test Code C57.12.90	PCS	M. Perkins	150 CL S3	Grand Ballroom C
10:45 am - 11:00 am	<i>Break (beverages only)</i>			Grand Promenade	
	<del>WG Shunt Reactors C57.24</del>	<del>PCS</del>	Will not meet.	Successful ballot, submitted to RevCom.	
11:00 am - 12:15 pm	WG Dry-Type Gen. Require. C57.12.01	Dry	J. Sullivan	25 CL	Trade
11:00 am - 12:15 pm	(TBD)			35 CL	Independence
11:00 am - 12:15 pm	WG Control Cabinets PC57.148	Power	J. Watson	50 CL	Tryon
11:00 am - 12:15 pm	WG 1-ph Padmount Distribution Transformers C57.12.38 (12.21 & 12.25)	Dist	A. Ghafourian/ I. Ares	80 CL S3	Grand Ballroom A
11:00 am - 12:15 pm	WG Revision to Low Frequency Tests	DiTests	B. Poulin	100 CL S3	Grand Ballroom B
11:00 am - 12:15 pm	WG Thermal Evaluation of Power and Distribution Transformers C57.100	IL	R. Wicks	150 CL S3	Grand Ballroom C
12:15 pm - 1:30 pm	<u>Lunch Meeting</u> : Standards Development Review -- All activity chairs are encouraged to attend. -- Advance reservation required (\$20 for box lunch). -- No paper tickets. Admission verified at the door.		B. Bartley	120 RT (8/tbl)	Grand Ballroom D
1:45 pm - 3:00 pm	WG Thermal Evaluation C57.12.56/60	Dry	R. Wicks	25 CL	Trade
1:45 pm - 3:00 pm	<b>SC HVDC Converter Transformers and</b>	HVDC	R. Dudley	35 CL	Independence

# Meeting Locations



- **Spring 2008 – Charlotte, North Carolina, USA**
- **Fall 2007 - Minneapolis, Minnesota, USA**
- **Spring 2007 - Dallas, Texas, USA**
- **Fall 2006 - Montréal, Québec, Canada**
- **Spring 2006 - Costa Mesa, CA, USA**
- **Fall 2005 - Memphis, TN, USA**
- **Spring 2005 - Jackson, MS, USA**
- **Fall 2004 - Las Vegas, NV, USA**
- **Spring 2004 - San Diego, CA, USA**
- **Fall 2003 - Pittsburgh, PA, USA**
- **Spring 2003 - Raleigh, NC, USA**
- **Fall 2002 - Oklahoma City, OK, USA**
- **Spring 2002 - Vancouver, BC, Canada**
- **Fall 2001 - Orlando, FL, USA**
- **Spring 2001 - Amsterdam, The Netherlands**
- **Fall 2000 - Niagara Falls, ON, Canada**
- **Spring 2000 - Nashville, TN, USA**

# Next Meeting



- **Porto, Portugal**
  - **October 5-9, 2008**
  - **Hosted by EFACEC and includes factory tour**
  - **Hotel comparable to US rates, even with exchange rate**
  - **Offering 10-20% discounted airfare**



# Key Projects for Technical Subcommittees

Audible Sound and Vibration – Jeewan Puri

**Study and review engineering aspects of the requirements and methods of measurement (testing) of matters relating to audible sound and vibration of products within the scope of the Committee.**

- **A TF has finished developing Sound Intensity Measurement procedures for inclusion in section 13 of the test codes IEEE C57.12.90 and C57.12.91**
- **A TF is developing Standard Sound Levels for Liquid Filled and Dry Type Transformers to fill the gap where these levels do not exist for certain kVA ranges or exist in obsolete standards.**

# Key Projects for Technical Subcommittees

Bushings – Fred Elliott

**Study and review engineering aspects of apparatus bushings having BIL of 110kV or above and used as components of power transformers, reactors and oil circuit breakers.**

## **•TF on GSU (High Current, Low BIL) Bushing Standardization**

**Maintains the Following Standards:**

- C57.19.00 – IEEE Standard General Requirements and Test Procedures for Outdoor Power Apparatus Bushings**
- C57.19.01 – IEEE Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings**
- C57.19.03 – IEEE Standard Requirements, Terminology, and Test Code for Bushings for DC Applications**
- C57.19.100 – IEEE Guide for Application of Power Apparatus Bushings**

# Key Projects for Technical Subcommittees

## Dielectric Test – Loren Wagenaar

**Study and review engineering aspects of test voltage requirements for service conditions, or conversely, voltage tests that will determine that service requirements are met for liquid filled transformers and reactors.**

- **WG on revision of Low Frequency Dielectric Tests covered by standards C57.12.00 & C57.12.90**
  - **Temperature correction factors for power factor tests**
  - **New TF on revision of Electrical PD Guide, C57.113**
- **WG on Liquid-Immersed Transformer Dielectric Test Tables**
  - **Simplify tables and make them more understandable**
- **WG on Acoustic PD tests**
  - **PC57.127, Guide for Detection and Location of Acoustic Emissions from PD in Oil-Immersed Power Transformers and Reactors - Update of existing guide to add location aspect**
- **WG on revision of Impulse Tests covered by standards C57.12.00 & C57.12.90**
  - **Proposal regarding minimum impulse generator energy level during test when 50% tail time is shorter than 40 microseconds**
- **WG on revision of Impulse Test Guide, C57.98**
  - **Complete update to add digital measurement techniques, testing with internal arresters, other impulse test methods**

# Key Projects for Technical Subcommittees

Distribution Transformers – Ed Smith

**Study and review engineering aspects of overhead, pad mounted, unit substation and certain underground type distribution transformers. Evaluation to include enclosure integrity and surface coatings.**

- **Revise and update existing standards on Distribution Transformers, Distribution Substation Transformers, and Voltage Regulators**
- **Completed balloting on C57.12.34 – Three Phase Padmount Transformers (document based on combination of C57.12.22 & C57.12.26) – Metrification Issue**
- **Begin work to combine C57.12.21 & C57.12.25 – Single Phase Padmount Transformers (Livefront and Deadfront)**
- **Guide for DT Loss Evaluation C57.12.33 - finishing up on balloting process**
- **Joint WG's with other technical committee (C37) to update and develop "Enclosure Integrity" standards now under the TC umbrella**
- **Responsible for 13 Guides and Standards**

# Key Projects for Technical Subcommittees

Dry Type Transformers – Chuck Johnson

**Study and review engineering aspects of those transformers and reactors in which a significant component of the internal insulation is air or other insulating gas.**

- **Main Standard Documents**
  - **C57.12.01 Requirement standard for Dry type transformers – Completed ballot and submitted for printing**
  - **C57.12.91 Test Code for Dry type transformers – various changes in progress**
- **C57.12.56 & 60 - WG on Thermal Evaluation of Insulation Systems for Power & Distribution Xfmrs. – Work to begin to merge both standards.**
- **TF on Dry Type Reactors**
  - **Annex on Thyristor-Controlled Reactors (C57.21)**
  - **Revision of the parts of C57.21 relating to dry type reactors and addressing negative ballots from reaffirmation of C57.21**

# Key Projects for Technical Subcommittees

HVDC Converter Transformers & Smoothing Reactors – Richard Dudley

**Study and review engineering aspects of the requirements, design, testing and installation of HVDC converter transformers and smoothing reactors.**

- **This group is responsible for two documents**
  - **IEEE 1277-2000 Smoothing Reactors for HVDC application (Dry and Liquid-Immersed)**
  - **IEEE C57.129-1999 Converter Transformers for HVDC application**
- **Both standards are due for revision in 2005 & 2004 respectively**
- **Focus of this group is on obtaining feedback resulting from the use of these standards on HVDC projects from manufacturers and users**
- **Provide input on the revision of the standard covering DC bushings**
- **Evaluate standards requirements for emerging technologies such as voltage source converters as applied to HVDC**

# Key Projects for Technical Subcommittees

Instrument Transformers – Jim Smith

**Study and review the engineering aspects of instrument current transformers and inductively coupled instrument voltage transformers.**

- **Current documents balloted by IEEE:**
  - **C57.13.5 - Test Requirements for High Voltage Instrument Transformers 115 kV Nominal System Voltage and above**
  - **C57.13.6 - Instrument Transformers for use with Electronic Meters and Relays**
- **Current documents under revision:**
  - **C57.13 - Requirements for Instrument Transformers**
  - **C57.13.2 -- Conformance Test Procedure for Instrument Transformers**

# Key Projects for Technical Subcommittees

Insulating Fluids –Rick Ladroga

**Study and review the engineering aspects of electrical insulating fluid properties for use in transformers and other electrical apparatus. Consider matters pertaining to acceptance maintenance and handling of such fluids. Determine the effect of various treatments, aging in service, gas evolution and other phenomena on the fluids' properties and determine the criteria for serviceability of the equipment.**

**•C57.104 – IEEE Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers**

- Wide acceptance and usage to interpret DGA results**
- Revision project is underway**

**•C57.106 – Guide for Acceptance and Maintenance of Insulating Oil in Equipment**

- New revision**

**•C57.130 – Trial Use Guide for the Use of Dissolved Gas Analysis During Factory Thermal Tests for the Evaluation of Oil Immersed Transformers and Reactors**

- Draft 14 is presently being balloted**

**•C57.139 – IEEE Guide for Dissolved Gas Analysis of Load Tap Changers**

# Key Projects for Technical Subcommittees

Insulation Life – Don Platts

**Study and review methods to determine maximum safe insulation temperatures, ambient temperatures, insulation aging characteristics, safe duration of loads in excess of nameplate (including short circuits) and also to determine methods of calculating or measuring temperatures reached during both transient and steady state loads.**

- **Major rewrite of the loading guide, C57.91**
- **TF on winding temperature indicators - Writing a technical paper (and possible tutorial) on the problems with making accurate winding measurements**
- **TF on temperature rise clause 5 in C57.12.00 - formed to make a recommendation to the Insulation Life SC concerning changes to this clause**
- **WG on revision of Thermal Evaluation of Power & Distribution Transformers C57.100**
- **New projects being considered**
  - **Summarize experience with the overload heat run test**
  - **Standardize procedures for calculations of heat run data**

# Key Projects for Technical Subcommittees

Meetings Planning - Greg Anderson

## **Administrative Responsibility for Planning and Managing Committee Meetings**

**The Subcommittee will promote the scope of the Committee by providing pleasant and productive meeting events.**

### **•On-going duties include:**

- Locating, soliciting, educating, and assisting local meeting hosts**
  - Supervising the negotiation and signing of hotel and vendor contracts**
  - Maintaining on-going Committee funds (treasurer duties)**
  - Overseeing individual meeting budgets & expenditures**
  - Developing each detailed meeting schedule**
  - Coordinating educational tutorial sessions and presentations to the Committee**
  - Coordinate with related organizations and industry events to reduce conflicts in event schedules**
- WG on Web-site Development -- maintains the Committee's web-site ([www.transformerscommittee.org](http://www.transformerscommittee.org))**

# Key Projects for Technical Subcommittees

Performance Characteristics – Ramsis Girgis

**Study and review the treatment of loss, impedance, exciting current, inrush current and other performance characteristics and their methods of application, measurement or test for liquid filled transformers and reactors.**

- **Loss Measurement Guide finalized**
- **Switching Transient Induced by Transformer/Breaker Interaction, PC57.142**
  - **Coordination with IEC, CIGRE, and other IEEE Committee (C37 )**
- **Frequency Response Analysis (FRA) testing WG set up to develop standard or guide – liaison with Power Transformers SC**
- **WG on revision of Requirements for Shunt Reactors C57.21**
- **TF on Core Overexcitation Requirements**

# Key Projects for Technical Subcommittees

Power Transformers – Tom Lundquist

**Study and review engineering aspects of liquid filled power transformers, including transmission transformers, primary unit substation transformers, generator step-up transformers, phase angle regulating transformers and related products.**

- **Revision of C57.12.10 (Product Standard for Power Transformers)**
  - Will cover all kVA and Voltage ratings
  - Will cover LTC application for Delta or Wye, HV or LV
  - Will cover new monitoring and control devices (electronic gauges and meters)
- **Revision of C57.131 (Standard Performance Requirements for LTC)**
  - Will define the LTC Contact Life
- **Working Group for Control Cabinet Guide - guide for layout, functionality and construction of control cabinets for power transformers**
- **WG Evaluation and Reconditioning of Liquid Immersed Transformers**
- **C57.93 (Power Transformer Installation Guide) will work on field processing, shipping, and general revision of the guide**
- **DETC WG - Tap Changer for De-Energized Operation Specification and Test**
  - **Coordination with IEC 60214**
- **WG Transportation Issues guide**

# Key Projects for Technical Subcommittees

Underground Transformers and Network Protectors – Carl Niemann

**Study and review the engineering aspects of secondary network protectors and secondary network transformers (liquid filled and dry-type) and three phase underground type distribution transformers.**

- **Working on Revision of the following documents**
  - **C57.12.24, Underground type Three Phase Distribution Transformers**
  - **C57.12.40, Secondary Network Transformers, Subway and Vault types**
  - **C57.12.44, Secondary Network Protectors**
  - **C57.12.57, Ventilated Dry-Type Network Transformers**

# Key Projects for Technical Subcommittees

Standards – Bill Chiu

**Coordinate revision work of base standards by maintaining a list of requested changes and assigning them to the appropriate Technical Subcommittees.  
Coordinate inputs into a complete and logical document for submission to the Standards Board**

- **Continuous Revision of the following main standards (Every 2-3 years)**
  - **C57.12.00, General Req. for Liquid Immersed Distb., Power & Reg. Xfmrs.**
  - **C57.12.90, Std. Test Code for Liq. Immers. Distb., Power & Reg. Xfmrs.**
  - **C57.12.80, Standard Terminology for Power and Distribution Transformers**
  - **C62.91 (IEEE 32), Rev. to Req. and Tests for Neutral Grounding**
- **Transformers Committee, as a whole, develops new standards and maintain the existing ones.**
  - **70 documents (standards, recommended practices, and guides) are maintained by us. These need to be reviewed by industry experts to determine if they reflect “state of the art” at least every five years.**
  - **22 Active projects. 11 are revising existing documents, 11 are developing new documents.**

# What's in it for me? –

Past PES President John Estey's message on PES membership

## FOR THE PARTICIPANT

- Attend and participate in world-class meetings
- Participate in the Standards Development process
- Learn from the experts during technical sessions and tutorials
- Share your experience and knowledge
- Access to Committee and PES web-based information
- Stay up-to-date with technological advances

## FOR THE EMPLOYER

- Cost effective access to the latest information on transformer technology
- Opportunity to significantly influence industry standards through employee participation in standards development
- Provide employees with top-notch ongoing training through tutorials and technical sessions
- Contribute to employees professional development and morale
- Access to Industry trends, problems, solutions, contacts

Thanks, Any Questions?

