



SEMINAR AGENDA

2010 "Life of a Transformer" Seminar & Exposition

February 7-12, 2010
Buena Vista Hotel
Lake Buena Vista, Florida, USA
Industry Expo: February 8-9, 2010

Saturday, February 6, 2010

10:00 – 17:00 *Registration Open*

Sunday, February 7, 2010

9:00 – 23:00 *Registration Open*

14:00 – 23:00 "THE BIG GAME" TAILGATE PARTY & NETWORKING EVENT

Come join the fun as we gear up for the 2010 BIG GAME! Our football themed site will be your afternoon home for fun, excitement, great food, and ice cold beverages! Watch the pre-game activities, enjoy an incredible pre-game concert, or just kick back and relax. Our sponsors have made sure that this will be a BIG GAME EVENT that you will never forget!!

14:30 – 17:30 PRIVATE CONCERT – featuring "BIG SWING & THE BALLROOM BLASTERS"!!

Get your game on with BIG SWING!! What a great way to kick off your "BIG GAME" experience – a non-stop 3 hour tour-de-force of classics from the 20's through today's hits. Swing, Jazz, Motown, Rock 'N' Roll, Pop – it's all here and it's hot! This show will leave you breathless.

18:30 – 23:00 "THE BIG GAME" XLIV

Watch the ultimate contest in all of sports in the ultimate of all atmospheres! We will simulcast the game on giant twin 13' X 17' video screens, and state-of-the-art audio and visual systems. Grab a cold one, and enjoy the game of games, in the comfort and surroundings of your own "STADIUM" with screens so big, and sound so powerful, you'll feel like you're there. When the game is over you won't have to wait for hours in a parking lot before driving home – you can just walk up to your hotel room!



SEMINAR AGENDA

2010 "Life of a Transformer" Seminar

TECHNICAL PROGRAM

Monday, February 8, 2010

7:00 – 8:30 *Breakfast*

8:30 – 8:45 **Welcome Introduction & Opening Remarks**
Richard K. Ladroga, P.E., General Manager
Doble Global Power Services

8:45 – 9:45 **VIDEO – "The Making of a Transformer"**
Professionally filmed and produced at the Waukesha transformer manufacturing facilities, this video presentation and narrative will provide each attendee with a unique, up close and personal tour of the inner workings of a transformer manufacturing plant. Come and see this detailed presentation which will cover all aspects of transformer manufacturing and construction – ONLY AVAILABLE AT THE "LIFE OF A TRANSFORMER" SEMINAR

9:45 – 10:00 *Break*

10:00 – 11:00 **Transformer Specifications Writing, Standards, Economics**
This popular presentation covers all aspects of specifying and purchasing a transformer. Key topics include standards, required information, unusual service conditions, ratings, vector relationships, loading, impedance, BIL, tap changers, operations, accessories, and much more. Additional topics include applications, operations, overloading, overexcitation, physical constraints, paralleling, short circuit capability, and shipping concerns. ANSI/IEEE, IEC, and CIGRE standards will be discussed.

David Harris, P.E.
Waukesha Electric Systems

11:00 – 12:00 **Special Presentation - The Making of a Transformer I**
A very in-depth, step-by-step look at the construction of a transformer, from raw materials to finished product. A large number of photos and illustrations will be used to graphically display each step in the process. Design principles and calculations will be also presented, including mechanical, electrical, and material design considerations.

Note: This presentation will be highly enhanced by a VIDEO tour of the Waukesha, Wisconsin transformer manufacturing facility – a full length professionally filmed video presentation of the entire design, manufacturing, and testing process that goes along with this presentation. Don't miss this in-depth learning opportunity.

H. Jin Sim, P.E., Vice President & Chief Technology Officer
Waukesha Electric Systems

12:00 – 13:00 *Lunch*

13:00 – 14:00 Special Presentation - The Making of a Transformer II

Continued from morning presentation.

H. Jin Sim, P.E., Vice President & Chief Technology Officer
Waukesha Electric Systems

14:00 – 15:00 Insulating Materials

Materials and the manufacturing practices used to prepare and assemble them are the link between the engineer's conceptual design and the physical product that is actually built. This presentation will focus on insulating papers, cellulose products, adhesives, and other materials will be discussed. Moisture ingress and related problems are discussed.

Tom Prevost, Vice President Technology
Weidmann Diagnostic Solutions

15:00 – 15:15 Break

15:15 – 17:00 Factory Testing

Learn about the various tests specified and performed to ensure a quality product. Learn why you need to attend and witness factory testing, and learn what you should be looking for. ANSI/IEEE C57.12.00, C57.12.90 standards will be presented.

Shirish (Sam) Mehta, Vice President R&D
Waukesha Electric Systems

EXPANDED PROGRAM OPTIONS

NEW FOR 2010: TUTORIALS!

We've added a new training opportunity to our program this year. For the first time we are presenting a series of intense, morning long tutorials. These tutorials are designed to expand the standard one hour offering into detailed, more in-depth presentations.



BACK FOR 2010: FOCUS GROUP DISCUSSIONS

Gain the knowledge you need at the "Life of a Transformer Seminar." Last year we added interactive focus group "breakout" discussions to the agenda of the Transformer Seminar. The response and feedback was fantastic and we are committed to this practical, knowledge-packed format.

Learn something new in a concentrated, relevant format. These focused sessions will allow for more in-depth discussion on the most important topics facing our attendees in the day-to-day performance of their duties related to transformers. Come learn and interact with our panel of experts and your industry colleagues while discussing anything and everything that you can imagine about transformers. This was a huge hit last year and it will be even more successful in 2010.

The expanded program options are marked with the following sign:



- 9:30 – 12:00** **MONDAY TUTORIAL – Bushings**
 This tutorial addresses all types of bushings. Learn all about composite, compound-filled, condenser, dry type, oil filled, oil immersed, oil impregnated, resin bonded, and solid ceramic bushings, presented in great detail. Low voltage, high current, high voltage, and high temperature applications are discussed by leading experts in these fields. Manufacturing methods, materials, stresses, maintenance, testing, installation, replacement, moisture ingress, contamination, cleaning, etc are all presented for your knowledge. You will learn about your specific equipment, so don't forget to bring your questions.
- 13:00 – 15:00** **MONDAY FOCUS GROUP DISCUSSION – Field Processing and Dryout**
 NOTE: The Focus Group Discussions will change each year, making the "Life of a Transformer" Seminar your annual event for continuing your transformer education. Each year we will offer new and industry relevant topics which will both challenge and inform you. This is the place to be for anyone whose job duties involve large power transformers.
- 17:00 – 17:30** **Q&A Session – "Ask the Experts"**
 Pre-submitted and new questions from the floor will be presented and answered by a panel of experts. Also – "ASK DOBLE" questions & answers will be presented.
- 17:30 – 20:00** **Manufacturers Expo & Reception**
 Up to fifty (50) of the industry's top manufacturers and service providers will be on hand to provide answers to your questions, increase your knowledge with demonstrations, present you with promotional materials and product catalogs, and help you develop new contacts.
- 20:00 – 23:00** **Entertainment**
 AC MYLES BLUES BAND
 Live and Dangerous - Fresno, California's own AC MYLES

Tuesday, February 9, 2010

- 6:00 – 7:30* *Breakfast*
- 7:30 – 8:30** **TRANSFORMER DESIGN REVIEW & FACTORY INSPECTIONS**
 Learn about the need for factory visits. Different stages of manufacture will be discussed, including Core & Coil, Pre/Post Vapor Phase, Pretanking, and Factory Test. This presentation will teach you the details of each of these critical manufacturing milestones, and more importantly, what you should be looking for when you conduct an inspection, including how to assess a manufacturer's Quality Assurance program.
- Domenico Corsi, P.E., Principal Transformer Design Engineer
Doble Global Power Services

- 8:30 – 9:30 TRANSPORTATION & RIGGING**
Today's large units typically come from overseas or across US borders. Learn about oceanic, rail, barge, and flatbed shipment and handling. Topics also include safe rigging methods, permitting, US rail issues and restrictions, and much more. Transportation method selection, reliability, impact to delivery cycle, monitoring, inspection, testing, dimension constraints, dimension measuring techniques including lasers, shipment preparation, travel concerns, receipt, impact recorders, testing, commissioning, damage, and much more.

Allen Wenturine, Hake Branch Manager
Barnhart Crane & Rigging
- 9:30 – 9:45 Break*
- 9:45 – 10:45 Site Design**
Site selection, soil mechanics, grading, bearing and jacking loads, transformer foundation and containment design, SPCC guidelines, 40CFR112, deluge systems, blast walls, cooling considerations. New code guidelines will be presented!

Curtis Smith P.E., Regional Office Manager
Mark Juneau, Design Engineer
Black & Veatch
- 10:45 – 13:30 Lunch & Manufacturers Exposition**
Up to fifty (50) of the industry's top manufacturers and service providers will be on hand to provide answers to your questions, increase your knowledge with demonstrations, present you with promotional materials and product catalogs, and help you develop new contacts.
- 13:45 - 14:30 Transformer Failures & Blast Containment**
Topics discussed include transformer fault dynamics, explosion phenomena, materials expansions, pressure rise analysis, transformer tank failure, blast containment, fire containment, physical construction, and overall critical asset protection.

TBD
Hyundai Heavy Industries, Korea

Dr. Clem Hiel, Ph.D., President
Composite Support & Solutions Inc.
- 14:30 - 15:30 Transformer Acceptance, Transformer Installation, Oil Processing, Commission Testing I**
Shipment receipt, impact recorders, acceptance testing, internal inspections, field dressing – pumps/radiators/coolers/gauges/controls, equipment requirements, oil filling, hold times, energization - includes presentation of oil processing techniques, core/coil heating, vacuum requirements, moisture limits, water removal, cold traps, filtration, field processing rigs, site requirements.

Troy Kabrich
Waukesha Electric Systems
- 15:30 – 15:45 Break*

15:45 – 16:45 Transformer Acceptance, Transformer Installation, Oil Processing, Commission Testing II
Continued from previous presentation.

Troy Kabrich
Waukesha Electric Systems

8:30 – 10:45 TUESDAY TUTORIAL – Transformer Insulating Fluids & Materials



This tutorial will include topics such as insulating paper, pressboard, and transformer insulating fluids, including mineral oils and natural esters. Napthenic mineral oil history, production, refining processes, hydrotreating, national and international standards, uninhibited and inhibited oils, and applications, moisture ingress, total moisture content, oil quality, dissolved gas, metals-in-oil, contamination, and corrosive sulfur shall be presented and discussed. Case studies and real-world applications will be presented for discussion.

13:45 – 16:45 TUESDAY FOCUS GROUP DISCUSSION – Transformer Cooling



Includes discussion of pumps, coolers, fans, unit uprating, US and International standards, ancillary and auxiliary systems, thermal constraints, ambient conditions, loading, dynamic modeling, design limitations, leak repairs, and maintenance

16:45 – 17:15 Q&A Session – "Ask the Experts"

Pre-submitted and new questions from the floor will be presented and answered by a panel of experts. Also – "ASK DOBLE" questions & answers will be presented.

Wednesday, February 10, 2010

6:00 – 7:30 *Breakfast*

7:30 – 8:30 Transformer Operations & Loading – A User's View

This practical presentation discusses the actual operation and loading of power transformers. Topics include operations/loading/overloading, thermal concerns, stray flux heating, core & coil heating, transformer degradation and loss of life, asset management, IEEE and IEC Standards, maintenance issues, economics, types of transformers and their loading capabilities, emergency ratings, and much more.

Don W. Platts
PPL Electric Utilities

8:30 – 9:15 Electrical Steel & Core Performance

A number of the performance parameters of power transformers are determined by the magnetic, surface, and mechanical parameters of the electrical steel used in the core of these transformers. Methods of manufacturing, historical development and breakthroughs, grain orientation, core loss, exciting current, noise level, lamination thickness, coatings, and much more will be presented.

Ramsis Girgis
ABB



SEMINAR AGENDA

2010 "Life of a Transformer" Seminar

9:15 – 9:30 *Break*

9:30 – 10:15 Emergency Preparedness & Transformer Contingency

During the normal course of operation, utilities need to be prepared to deal with unexpected emergency conditions brought about by triggering events such as unusual weather conditions, natural disasters, and unanticipated equipment failures. This presentation discusses planning for such emergencies. Proactive considerations such as transformer specification, station layout, fire mitigation, spare equipment strategy, as well as reactive responses and recovery are addressed. Contingencies and considerations for emergency loading limits are also explored in depth.

Bill Chiu
Southern California Edison

10:15 – 11:30 Integrating Renewable Energy Sources into the Transmission Grid

As sizes of planned windfarms (WFs) and other renewable energy sources continue to increase, utility engineers confront many issues never faced when "wind power" meant an isolated wind tower directly connected to a distribution feeder. This presentation will briefly introduce two levels of technical concerns for integration of WF's into existing power systems: Power System Level and Transmission & Operational impacts.

Jim McIver, P.E., Principal Application Engineer
Siemens Energy, Inc.

11:30 – 12:15 *Lunch*

12:15 – 14:00 SPECIAL KEYNOTE ADDRESS BY JIM QUINN, LEAD ENGINEER AT ORANGE COUNTY CHOPPERS, WITH A SPECIAL APPEARANCE BY PAUL TEUTUL SR., FOUNDER OF ORANGE COUNTY CHOPPERS (Presented by Siemens)

Siemens has teamed up with renowned custom motorcycle manufacturer Orange County Choppers to build its first custom electric chopper. Don't miss seeing the "Siemens Smart Chopper" which was featured on the hit TV show American Chopper and the Tonight Show with Conan O'Brien. Don't miss it!

14:00 – 15:00 Tapchanger Controls and Contribution to Premature Transformer Failures

This presentation focuses on LTC (Load Tap Changer) transformer control practices, which may cause tapchanger hunting and associated excessive tapchanger operations. Applications of paralleling methods and the determination and confirmation of optimum settings, which may contribute to excessive or untimely tap change operations, are discussed. The transformer applications considered in this paper will include transmission tie transformers as well as transmission–distribution interface transformers.

Tom Jauch, P.E., Application Consultant
Beckwith Electric

15:00 – 15:15 *Break*

15:15 – 16:15 Smart Grid—LTC Transformer Control and Duties

This presentation focuses on modern Load Tap Changer (LTC) transformer control practices compared to expected SMART GRID (SG) practices. The goal is to enumerate the changes in tapchanger duties and possible transformer failures associated with implementing SG control strategies.

Tom Jauch, P.E., Application Consultant
Beckwith Electric

8:30 – 11:30 WEDNESDAY TUTORIAL – Tapchangers



Energized Load Tap Changers (LTCs), De-Energized (DETC), Transmission Class, Distribution Class, Resistive, Reactive, and so very much more. This is by far one of the most impressive presentations of the week, and it is jam-packed with tons of useful information. Representatives of ABB and Reinhausen will be on hand to make presentations, and then open the floor for discussion, and most importantly, to field your questions. This extremely practical tutorial presentation will allow the attendees to ask about all types of subjects related to the everyday operations, loading, and maintenance of transformer tap changers.

13:00 – 15:00 WEDNESDAY FOCUS GROUP DISCUSSION – Transformer On-Line Monitoring



This presentation discusses the latest systems used to monitor transformers while in operation, including gas analyzers, moisture detectors, fiber optic winding temperature measurement, tap changer monitor, bushing condition, and much more.

16:15 – 17:00 Q&A Session – "Ask the Experts"

Pre-submitted and new questions from the floor will be presented and answered by a panel of experts. Also – "ASK DOBLE" questions & answers will be presented.

Thursday, February 11, 2010

6:00 – 7:30 *Breakfast*

7:30 – 12:00 *Special Presentation - Transformer Field Diagnostics*

The entire morning will deliver the crucial topic – Transformer Field Diagnostics. These topics have consistently received a strong demand for even more information, so we have expanded it to include the topics below. Presentations are delivered by top experts in the field, including information on Thermal Imaging, Acoustic Discharge, Electromagnetic Interference Testing, Transformer Turns Ratio, Megger, Power Factor, Capacitance, Leakage Reactance, Winding Resistance, Excitation Current, Sweep Frequency Response Analysis, and Partial Discharge. ANSI/IEEE standards will be presented. Diagnostic case studies, condition assessment, and actual data will be discussed in detail.

- 7:30 – 8:30** **Thermal Imaging**
The use of thermal imaging as a valuable diagnostic tool for electrical apparatus is a well known practice in the industry. Attendees at this presentation will learn how this technology is being applied to large power transformers, and how you can avoid major problems or failures of these valuable assets. Case studies and images will be presented.
- TBD
- 8:30 – 9:30** **Acoustic Emission Testing In Power Transformers**
The use of technology to monitor and interpret acoustic emissions from transformers is presented, using real-world applications and case studies.
- Arturo Nunez, Reliability Services & Products Manager
Physical Acoustics Corporation
- 9:30 – 9:45* *Break*
- 9:45 – 12:00** **Transformer Field Testing – Electrical**
Transformer Turns Ratio, Megger, Power Factor, Capacitance, Leakage Reactance, Winding Resistance, Excitation Current, Sweep Frequency Response Analysis, Electromagnetic Interference, Partial Discharge
- Robert Brusetti, P.E., Principal Engineer
Doble Engineering
- 12:00 – 13:00* *Lunch*
- 13:00 – 14:00** **Transformer Leak Repair**
This presentation focuses on field repairs, including repairs made while energized. Oil leak control, gaskets, pumps, fans, and coolers are all discussed. The goal of this very practical discussion is to present methods available to avoid costly shutdowns.
- Jim Hackett, Power Services Division Manager
Colt Atlantic Services
- 14:00 – 15:00** **On-Site Field Retrofit of Transformers**
This presentation will review some of the equipment retrofitting and refurbishment projects which can be performed in the field. Refurbishment and retrofitting can entail field dry-outs, re-gasketing, bushing replacement, repainting, LTC and DETCs, addition of monitoring equipment, and much more. Larger and more complex repairs are being performed on units at their permanent site.
- TBD
ABB
- 15:00 – 15:15* *Break*

15:15 – 16:15 Transformer Repair – Factory

This presentation will address the reasons for performing repair at a qualified repair facility as opposed to in the field. Economics will also be discussed, including the logic to repair versus new replacement.

TBD

General Electric

8:30 – 12:00 THURSDAY TUTORIAL – Failure Analysis



It's another busy morning filled with presentations of all types of transformer failures, including bushings, windings, arresters, tapchangers, insulators, isophase bus, and more! Come and learn all about methods of investigation, Foreign Material Exclusion Zones (FMEZ), materials inspection and collection, laboratory analysis, methods of elimination, and methods of determination. Common mode failure types are presented.

13:00 – 15:00 THURSDAY FOCUS GROUP DISCUSSION – Anything Transformer Related



Discuss anything that is transformer related and get your answers from the experts!

16:15 – 17:00 Q&A Session – “Ask the Experts”

Pre-submitted and new questions from the floor will be presented and answered by a panel of experts. Also – “ASK DOBLE” questions & answers will be presented.

17:00 Adjournment

OPTIONAL FIFTH DAY LAB SEMINAR:
"Electrical Apparatus Condition Assessment Using Laboratory Diagnostics"

Friday, February 12, 2010

6:30 – 7:30 *Breakfast*

7:30 – 12:00 Transformer Condition Assessment Using Laboratory Diagnostics – Part I

Provides a thorough understanding of how to assess the condition of electrical insulating materials and transformers. This section is divided into three topics:

Quality of new and service aged oils – Background information is provided on the properties of transformer oil. The presentation includes how to specify and evaluate new oils, what tests to perform and how to evaluate in-service oils.

Aging characteristics of insulating materials - This part of the session provides information on how to increase the life of transformers. There are a number of factors that accelerate the aging of the insulation system that can be controlled. This session provides information on when to reclaim or replace oil and gives specifications for reclaimed oil.

Dissolved gas-in-oil analysis – This is the single most important diagnostic test for transformers. This presentation reviews how the test is performed, how to distinguish between normal gassing behavior and problems, and how to evaluate trends. Practical case studies and examples are used to illustrate theoretical concepts. Seminar participants will be quizzed (with class participation) on their understanding in diagnosing 12 cases.

Paul Griffin
Lance Lewand
Doble Engineering Company

Note: there will be a coffee break mid-morning.

12:00 – 13:00 *Lunch*

13:00 – 16:30 Transformer Condition Assessment Using Laboratory Diagnostics – Part II

Provides a thorough understanding of how to assess the condition of electrical insulating materials and transformers. This section is divided into seven topics:

Dissolved gas in oil analysis, continued – Dissolved combustible gases in oil do not typically cause problems but can form flammable mixtures. This session discusses how to determine the flammability of combustible gasses and precautions to take.

Load tap changer diagnostics – This presentation gives the latest information on diagnostics for LTCs, how to diagnose DGA results for LTCs and some of the pitfalls to avoid. Case studies are provided.

Oil circuit breaker diagnostics – This session is about diagnostics for bulk oil breakers which are used to take transformers out of service. Diagnostic test includes dissolved gas in oil analysis. Case study examples are included.

Metals in oil – This presentation provides an understanding of the importance of metal-in-oil tests as a diagnostic. To be able to use the information, the correct test must be specified – learn the difference between dissolved and particulate metals and when to choose each test. Case studies are given.

Condition assessment of cellulosic insulation – The analysis of the condition of the paper insulation has changed quite a bit in the past 10 years. Learn how the solid insulation ages and how to assess the condition of the paper and pressboard insulation and its remaining life. Case studies are given to illustrate the distribution of paper aging in transformers and how operation and maintenance can influence it.

Water in Transformer Oil – Assessing how dry a transformer is requires more than a water in oil test. Learn how to assess the wetness of the transformer insulation system and why you need to know the operating temperature at the time of sampling. This session discusses water migration in transformers and how water affects the ability to overload them. Examples are provided.

Sampling – The presentation discusses how to save money on your sampling program through proper training and what common pitfalls to avoid. Proper sampling preparation, practices, and equipment are given.

Paul Griffin
Doble Engineering Company

Note: there will be a coffee break mid-afternoon.