THE LIFE OF A TRANSFORMER
SEMINAR & EXPOSITION

Buena Vista Palace
Lake Buena Vista, Florida
Seminar: February 2-6, 2009
Industry Expo: February 2 & 3
Breakfast and lunch is provided to seminar attendees and is included in price of the seminar fee.

Saturday, January 31, 2009

10:00 AM – 6:00 PM **Registration Open**

Sunday, February 1, 2009

8:00 AM – 9:00 PM **Registration Open**
12:00 NOON – 11:00 PM **Sunday Networking Extravaganza – DON'T MISS IT! See separate Sunday Agenda for details.**

Technical Presentations Schedule will be followed by the Focus Group Discussions Schedule.

Monday, February 2, 2009

6:00 – 7:30 AM **Breakfast**

7:30 – 7:45 AM **Welcome Introduction & Opening Remarks**
Richard K. Ladroga, P.E., General Manager
Doble Global Power Services

7:45 – 8:15 AM **Global Transformer Insurance Industry Update**
Donald Schubert, Senior VP
Marsh USA Inc.

8:15 – 9:15 AM **Replacement of a Large Power Transformer**
So you need to buy a transformer… This topic will include Factory Selection, Manufacturing Plant Assessment, and the Entire Procurement Process – Transformer Purchasing 101. Learn from an industry specialist who shares his recent experiences with a large power transformer purchase. Learn how this company evaluated their needs, researched manufacturers and assessed the different manufacturing plant capabilities. Considerations such as technical expertise, plant equipment, transportation, and long term support are discussed.
Ethan Vaagene, Systems Engineer
GRE - Coal Creek Station

9:15 – 9:30 AM **Break**

9:30 – 10:30 AM **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., Customer Technical Executive
Waukesha Electric Systems SPX

10:30 – 11:30 AM **Special Presentation - The Making of a Transformer**

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 Wisconsin Waukesha transformer manufacturing facility. This is the first time in transformer industry history that a full length professionally filmed video presentation of the entire design, manufacturing, and testing process has been produced and shown to the general public. Don't miss this in-depth learning opportunity!

H. Jin Sim, P.E., Chief Technology Officer
Waukesha Electric Systems SPX

11:30 AM – 12:30 PM **Lunch**

12:30 – 1:30 PM **COMEDY**

Your week will be very intense and jam-packed with reams of transformer related data, methods, and overall knowledge. We'll make sure your mind is in the right framework to receive all that information, by presenting a well deserved comedy break.

Live comedy sponsored by Waukesha Electric Systems SPX

1:30 – 2:30 PM **Special Presentation - The Making of a Transformer**

Continued from morning presentation

H. Jin Sim, P.E., Chief Technology Officer
Waukesha Electric Systems SPX

2:30 – 3:30 PM **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 – **NEVER SEEN BEFORE AND ONLY AVAILABLE AT THE "LIFE OF A TRANSFORMER" SEMINAR.**

3:30 – 3:45 PM **Break**

3:45 – 4:45 PM **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 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, VP Technology
Weidmann Diagnostic Solutions

4:45 – 5:15 PM **Continuously Transposed Conductor**

Continuously Transposed Conductor (CTC) is used for magnet wire in transformer coil winding applications. Learn what a CTC is, how it is manufactured, and why it is used. Presentation covers the effect of CTC use on stray flux and eddy current losses, along with improvements in physical strength for short-circuit withstand.

Michael Byrne
Superior Essex

5:15 – 6:00 PM **Question & Answer Period**

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.**

Back by popular demand! **CONCURRENT FOCUS GROUP DISCUSSION**

9:30 –11:30 AM **Transformer Condition Assessment**

This Focus Group discussion will feature a number of top industry experts well versed in the art and science of transformer condition assessment. Learn how to prioritize your fleet, or how to analyze and assess your individual unit. Please come prepared with questions about your own unique transformers, this expert panel will be prepared to answer! Also, your peers will be on hand to jump into the discussions. This topic will become very critical as a tightened economy makes extending the life of your existing assets a better option.

Afternoon Session **No FOCUS GROUP DISCUSSIONS will be held on Monday afternoon**

5:15 – 8:30 PM **Manufacturer's Exposition**

Up to sixty (60) 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. Don't miss this opportunity!

Tuesday, February 3, 2009

6:00 – 7:30 AM **Breakfast**

7:30 – 8:30 AM **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.

William R. Herron III
ABB

8:30 – 9:30 AM **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, Principle Transformer Design Engineer
Doble Global Power Services

9:30 – 9:45 AM **Break**

9:45 – 10:45 AM **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.

Shaun Sipe
Barnhart Crane & Rigging

10:45 - 11:45 PM **Large Power Transformer Transportation – A Manufacturer's Perspective**

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.

Enrique Betancourt, Applied Technology Leader
Carlos Hernandez, Commercial and Development Manager – Services
Prolec GE Internacional

10:45 AM–2:15 PM **Manufacturer's Exposition Open**

Up to sixty (60) 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. Don't miss this opportunity!

Lunch will be served from 11:30 am – 1:30 pm.

1:30 - 2:30 PM **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

2:30 - 3:30 PM **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.

Jae-Cheol Yang, Deputy General Manager
Joon-Yeob Lee, Senior Researcher
Jin-Ki Ham, Chief Researcher
Hyundai Heavy Industries Co., Ltd.

Dr. Clem Hiel, President
Composite Support & Solutions, Inc.

3:30 – 3:45 PM **Break**

3:45 – 4:45 PM **Special Designs – Extra-High Voltage (EHV) TRANSFORMERS**

Come and see some of the world's largest transformer designs, including a single phase, 1000 KV, 1000 MVA unit. This presentation will certainly catch your attention. Learn about the difficulties in building such large units, and the solutions developed to address these difficulties.

Dennis Marlow
TBEA, CHINA

4:45 – 5:15 PM **Question & Answer Period**

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

CONCURRENT FOCUS GROUP DISCUSSION

8:30 – 10:45 AM **Transformer Maintenance, Operations, & Loading**

This extremely practical Focus Group discussion will allow the attendees to ask about all types of subjects related to the everyday operations, loading, and maintenance of large power transformers.

Afternoon Session **Transformer Insulation Materials**
This Focus Group discussion will include topics such as insulating paper, pressboard, and transformer oils. Issues such as moisture ingress, total moisture content, oil quality, and corrosive sulfur shall be presented and discussed. Some case studies may be shown, and attendees are invited to share their experiences and knowledge, as we all struggle to learn more about these issues, which have become center-stage topics in recent years.

Wednesday, February 4, 2009

6:00 – 7:30 AM **Breakfast**

7:30 – 8:30 AM **Uninhibited vs. Inhibited Transformer Oils**
Napthenic mineral oil history, production, refining processes, hydrotreating, national and international standards, uninhibited and inhibited oils, and applications.
Jimmy Rasco, VP Product Services
Ergon Refining Inc.

8:30 – 9:15 AM **Transformer Acceptance, Transformer Installation, Oil Processing, Commission Testing**
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 SPX

9:15 – 9:30 AM **Break**

9:30 – 10:15 AM **Transformer Acceptance, Transformer Installation, Oil Processing, Commission Testing**
Continues from the session before break.
Troy Kabrich
Waukesha Electric Systems SPX

10:15 – 11:30 AM **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, transformer degradation and loss of life, asset management, IEEE and IEC Standards, maintenance issues, economics, types of transformers and their loading capabilities, and much more.
Phillip Prout, Principal Engineer
National Grid USA

11:30 AM – 12:15 PM **Lunch**

12:15 – 1:00 PM **KEYNOTE ADDRESS**
"How to Procure and Produce Reliable Power Transformers in a Global Market"
Thomas Fogelberg, Head of Quality
ABB

1:00 – 2:00 PM **On-Line Transformer Monitoring Systems**

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 monitoring, cooler control, fan operation, an alarm indication.

Mark Tostrud
Dynamic Ratings

2:00 – 3:00 PM **On-Line Transformer Oil Processing**

Various Drying Methods for Transformers in the field; treatment of oil, regeneration of oil, online purification on energized transformer, oil spray methods, and more.

Andreas Gruber, Managing Director
Micafluids AG

3:00 – 3:15 PM **Break**

3:15 – 4:15 PM **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. The transformer applications presented will include transmission tie transformers along with transmission-distribution interface units.

Andrew Craig, P.E., Senior Applications Engineer
Beckwith Electric

4:15 – 5:00 PM **Question & Answer Period**

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

CONCURRENT FOCUS GROUP DISCUSSION

Morning Session **Tapchangers**

Load (Energized) 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.

Afternoon Session **Bushings, Arresters, Control Cabinets, Cooling Systems**

It's an afternoon filled with discussion of appurtenances. Come and learn all about cooling systems and control cabinets with presentations by leading experts in these fields, and then these topics will be opened up for discussion, along with bushings and arresters. Come and learn about your about your equipment! Don't forget to bring your questions.

Thursday, February 5, 2009

6:00 – 7:30 AM **Breakfast**

Thursday morning's special Presentation - Transformer Field Diagnostics

We're taking the entire morning to deliver this crucial topic. We have looked closely at the surveys over the years and this topic has consistently received your approval with an indication of a strong demand for even more information. Presentations are delivered by six separate experts in the field and include 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. Oil and dissolved gas analysis will also be discussed. ANSI/IEEE standards will be presented. Diagnostic case studies, condition assessment, and actual data will be discussed in detail.

7:30 – 8:30 AM **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.

8:30 – 9:30 AM **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 AM **Break**

9:45 AM – 12:00 PM **Transformer Field Testing – Electrical**

Electromagnetic Interference Testing, Transformer Turns Ratio, Megger, Power Factor, Capacitance, Leakage Reactance, Winding Resistance, Excitation Current, Sweep Frequency Response Analysis.

James Timperley, Principle Engineer, Doble Global Power Services
Robert Brusetti, P.E., Principle Engineer, Doble Engineering
Paul Griffin, VP Laboratory Services, Doble Engineering

12:00 – 1:00 PM **Lunch**

1:00 – 2:00 PM **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 Transformer Services, Inc.

2:00 – 3:00 PM **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 mush more.

Pierre Feghali, P.E., VP Business Development
North American Substation Services, Inc.

3:00 – 3:15 PM **Break**

3:15 – 4:15 PM **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.

Bruce Forsyth, P.E., General Manager
Southwest Electric

4:15 – 5:00 PM **Question & Answer Period**

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

CONCURRENT FOCUS GROUP DISCUSSION!

Morning Session **Open Forum – Anything Transformer Related**

Afternoon Session **No Focus Group Discussions will be held Thursday afternoon.**

5:00 PM **Adjournment**

Optional Fifth Day Lab Seminar:

"Electrical Apparatus Condition Assessment Using Laboratory Diagnostics"

Friday, February 6, 2007

6:30 – 7:30 AM **Breakfast**

7:30 AM – 12:00 PM **Transformer Condition Assessment Using Laboratory Diagnostics**
Presented by Paul Griffin, VP Laboratory Services
Lance Lewand, Materials Laboratory Manager
Doble Engineering Company

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.

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

12:00 – 1:00 PM **Lunch**

1:00 – 5:00 PM **Transformer Condition Assessment Using Laboratory Diagnostics**
Presented by Paul Griffin, Doble Engineering Company

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.

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

4:15 – 4:45 PM **Question & Answer Period**
Pre-submitted and new questions from the floor will be presented and answered by a panel of experts.

4:45 – 5:00 PM **Adjournment**