



**PLANNED TUTORIALS FOR THE  
2010 INTERNATIONAL CONFERENCE OF DOBLE CLIENTS  
UPDATED FEBRUARY 2, 2010**

**TRANSFORMERS TUTORIAL SESSION**

**GUIDELINES FOR FORENSIC EXAMINATION AND TEAR-DOWN OF  
TRANSFORMERS TUTORIAL**

*Sunday, March 21, 2010*

*1:30 PM - 5:30 PM*

*America Center & South Ballroom*

This tutorial will provide Doble Clients with information and practical experience on how to get the most out of tear-downs. Transformer tear-downs and the associated forensic examinations, provide a unique opportunity to learn about how different designs perform in service. Tear-downs can be used to investigate how and why transformers fail or develop problems in service. Tear-downs on redundant transformers can also provide useful information on incipient faults or design defects so that transformers can be rebuilt to lengthen their service life.

The transformer tear-down process will be described in detail including how tear-downs are carried out, both in the field and at factories or repair shops. The tutorial will also address what can be learned and how this knowledge can be used to improve the management of other transformers in service. Tear-downs also allow materials to be recovered for investigation and testing to investigate ageing of the solid insulation or other possible problems.

A large number of case studies from Doble Clients will be including which will give field experience on how they carried out the tear-downs and what was learned from them. This tutorial will also include insights from the insurance industry. It will also show that sometimes it is advantageous to rebuild failed, faulty or aged transformers. A manufacturer will also include insights on when to do a rebuild and how it is accomplished.

*Featured Speakers for this tutorial include:*

**David Grant**

*Manitoba Hydro, Canada*

David was trained in Chemical and Materials Engineering in Ontario in the 60s. He has worked in a variety of industries, from brewing to Uranium refining, for 15 years in Michigan and Ontario, primarily in process troubleshooting, with some years spent in project management and retrofit design. In the 24 years with Manitoba Hydro, David has taken on a variety of research and method-development tasks. A few of David's original test methods have evolved into methods used by ASTM and IEC. David has been a regular presenter at the Doble Client Conference.

David has been taking part in transformer dissections for quite a few years, eventually suggesting that this topic would be of use to other Doble clients and their engineers. He has a few techniques and pieces of apparatus that are unique and useful in the forensic dismantling of oil-filled equipment.

David's other interests have involved engineering and volunteering. He has been a racetrack flagger and autocrosser for over 40 years. In 2008, he won the Porsche Club's top award, Enthusiast of the Year, for his volunteer efforts, winning out over 100,000 (mostly very enthusiastic) Porsche owners across Canada and the US. He restores old Porsches and race cars in his spare time, and expects to drive one of these classics to Boston for the 2010 DCC.



**Abel J. Pereira**

***Bonneville Power Administration, United States***

Abel J. Pereira is the manager for Substation Maintenance and High Voltage Engineering at Bonneville Power Administration. This department is responsible for all substation equipment application, maintenance and proper operation. Before assuming this position Abel was a Technical Specialist on Substation Equipment for mainly power transformers, reactors and capacitors. Equipment related issues were resolved in this office from installation to disposal. After graduation Abel became a Design Engineer for protection and control of the power system at BPA. Abel earned a B.S. degree in Electrical Engineering from the University of Portland, Oregon in 1985.

**Harry A. Ruggles**

***American Electric Power Service Corp, United States***

Harry Ruggles is a graduate of Michigan Technological University. He is a member of the Doble Engineering Company Client Committees on Transformers, Bushings, Insulators and Instrument Transformers, and a past chair of the Transformer Committee. Harry has written papers and presented seminars to the Doble Client Conferences.

Harry has worked for American Electric Power and its subsidiary companies throughout his utility career. He has been a Station Engineer, Electrical Station Projects Engineer, and Transformer Specialist. Harry has ongoing responsibility for investigation of transformer failures in the field and in factories and repair shops for the AEP system; contracts for remanufacture of failed equipment and follows the redesigns through manufacture and factory test. Experience includes High Voltage, Extra High Voltage and Ultra High Voltage equipment. Harry's other duties include transformer problem solutions on in-service equipment and technical instruction and support of AEP employees and specialists.

**Simon Ryder**

***Doble PowerTest, United Kingdom***

Simon Ryder was born in England in 1973. He studied engineering science at St John's College Oxford, graduating in 1996. He joined GEC Alstom the following year working in transformer design, development and eventually research. He left to join Doble PowerTest in 2003, where he has worked on transformer condition assessment and failure investigations. More recently he has also become involved with transformer procurement for various utilities. He is a fellow of IET, a member of IEEE-PES and a member of CIGRE working group A2.36 on transformer procurement".

**Bill Griesacker**

***Doble Global Power Services, United States***

Bill Griesacker is a member of Doble Global Power Services as a transformer engineer working on projects that include forensic analysis, factory inspections, condition assessment, design reviews and general consulting. He previously worked for Pennsylvania Transformer Technology Inc., where he held various positions including Engineering Manager. His work included high voltage insulation design, transient voltage modeling of power transformer windings and various LTC and DETC switch development projects. Prior to this, he was employed by the Westinghouse Electric Company, working on synchronous generator projects as a member of the Generator Engineering Department. Bill started his career with Cooper Power Systems in large power transformers and later worked in the Kyle Switchgear, Vacuum Interrupter Department. He has earned a M.S. degree in electric power engineering from the Rensselaer Polytechnic Institute and a B.S. degree in electrical engineering from Gannon University. Bill is an active member of the IEEE, PES Transformers Committee where he holds positions in several working groups and subcommittees.



## **ROTATING MACHINERY TUTORIAL SESSION**

### **PHYSICAL INSPECTION OF GENERATORS**

*Wednesday, March 24, 2010*

*1:30 PM - 5:30 PM*

*America Center & South Ballroom*

To ensure reliable operation and to reduce the possibility of forced outage of a generator requires periodic evaluation. This involves conducting various tests, i.e. electrical, mechanical and thermal evaluations. However, some types of deterioration and failure modes are best detected and confirmed with a physical inspection. An example of such a failure mode is shown in the photograph below of a core failure in the step iron of a turbine-generator.



**Failure due to Loose Step Iron**

This tutorial will help define the various stator failure modes common to hydro-generators and turbine-generators. Both air-cooled and hydrogen-cooled turbine-generators will be discussed.

It is the intent of this tutorial to also help identify test and inspection evidence that substantiates the presence of deterioration that may progress to failure modes versus acceptable conditions that will not result in failure.

#### **Session 1 – Physical Inspection of Turbine-Generators**

Failures Modes of Turbine-Generators

*Clyde Maughan, Maughan Engineering Consultants*

Physical Inspection of Turbine-Generators

*James Timperley, Doble*

#### **Session 2 – Physical Inspection of Hydro-Generators**

Failures Modes of Hydro-Generators

*Eric Eastment, U.S. Bureau of Reclamation*

Physical Inspection of Hydro-Generators

*John Linn, Portland General Electric*

*James Timperley, Doble*