



**PLANNED TUTORIALS FOR THE
2010 CLIENT COMMITTEE MEETINGS & CONFERENCE
UPDATED JUNE 3, 2010**

TUTORIAL: On-Line Monitoring Benefits and Justification

Sunday, October 10th, 1:00 pm - 5:30 pm

Many utilities are exploring the possibilities of on-line monitoring of equipment. Before an online monitoring program can begin, many factors must be considered and researched. This tutorial will cover some of the main considerations such as measuring the added benefits of an online program versus offline testing, what are the key parameters to be monitored, how to justify the cost of the program, training and more. User experiences will also be presented and will discuss the pitfalls as well as the success stories of online monitoring programs.

The tutorial will be presented by five speakers from three companies which include Progress Energy, Dynamic Ratings and National Grid U.S.

Andre Lux of Progress Energy will discuss the following topics regarding the benefits of on-line monitoring and how those benefits are calculated.

Calculating Benefits

- a. What goes into benefit calculation?
- b. Failure avoidance
 - How to calculate historical failure rates
 - Typical industry values to use
 - Environmental cleanup costs
- c. How to quantify the probability of a successful catch
- d. Key parameters to monitor
- e. Benefit of deferring capital investments
- f. Capital cost savings benefits
- g. O&M cost savings benefits
 - Reduction of off-line testing
 - Extending intervals: By how much? Fair cost for doing this?

Andre Lux is a Senior System Reliability Engineer at Progress Energy. In this role he is responsible for monitoring system performance parameters and the evaluation of system conditions to identify negative system and component trends that affect system availability, reliability, and maintainability. Andre has twenty-one years experience in the electric power industry in research, consulting, systems studies, and operations roles with General Electric, ABB and KEMA.



Mark Tostrud of Dynamic Ratings will present calculations and justification of associated costs with on-line monitoring activities. His discussion will include the following areas:

Calculating and Justifying Costs

- a. Cost of sensors and monitoring systems
- b. Cost of communication systems
- c. Cost of integrating communications, alarms and reporting
- d. Maintenance costs of monitoring systems
- e. Expected/observed failure rate of sensors, communications, etc.
- f. Replacement costs of sensors over the time period of the analysis

Mark Tostrud is the Product Manager for Dynamic Ratings, Inc. Prior to his present position, Mark was a Construction & Maintenance Supervisor at We Energies. During his 19 years at We Energies, Mark led the implementation of many of the condition based monitoring programs for We Energies' substation equipment. Mark is a past chair of the Doble Oil Committee, the 2004 and 2005 Tech Con Conferences and was an active member on various Doble Committees/Subcommittees including the Transformers, Insulating Materials, DGA of LTCs and others. Mark holds a BSEE degree from the University of Wisconsin – Milwaukee and is a registered professional engineer in the state of Wisconsin.

John Gavin, Don Angell and Tony McGrail from the National Grid U.S. will discuss issues related to analysis of on-line monitoring data. The presentation will include case studies and examples of their on-line monitoring experiences. Their presentation will cover the following topics:

Analysis Methodology

- a. Length of time of the analysis to observe benefits?
- b. How does the rate of build-out (number of units installed/yr.) impact benefits calculation?
- c. What is realistic?
- d. How to include escalation rates?
- e. Case studies

John Gavin is Director of Asset Strategy and Policy, covering both Station and Line equipment at the distribution and sub-transmission levels; the work includes identification of significant risks and the development of plans to address them, and the production detailed reports for state Rate Case submissions and testimony.

Don Angell is Director of Substation Engineering Services and is responsible for the identification, planning and delivery of substation related operations, maintenance and capital activity in National Grid substations; he has previously held positions at ComEd and Idaho Power where he was involved with the design and installation of condition monitoring systems



Tony McGrail is Manager of Asset Strategy, developing strategies and policies in conjunction with field staff, and identifying long term plans to address risk. He previously worked as a transformer and breaker product manager at Doble Engineering and spent several years as a condition monitoring and substation engineer with National Grid in the UK.

TUTORIAL: Basics of IEC 61850 Standard

Sunday, October 10th, 1:00 pm - 5:30 pm

IEC 61850 is a standard that is being used to make substation automation easier, save money by elimination of significant amount of substation wiring and make interoperability between relays manufactured by different vendors. The standard has its root in Europe and is spreading fast in other parts of the world. In USA the response has been cautious. American utilities are implementing this standard on specific stations to study the performance and savings impact. Hence there is an unclear understanding of this standard in the US.

The intent of this tutorial is to introduce this standard to the engineers, managers and technicians representing various utilities. This session assumes that the audience knowledge of this standard is minimal to none. The tutorial will start with background information and will explore the basics of the standard. It will provide a general overview of the various aspects of this standard including station bus details, GOOSE and GSE messaging, and a brief description of Process Bus implementation.

The implementation of this standard imposes new methods for testing relays that are compliant with this standard. Details of testing such relays and IEDs (Intelligent Electronic Devices) will be presented.

After attending this tutorial, the audience will take away a very good conceptual knowledge of the IEC 61850 standard with the advantages and challenges posed in its implementation.

This tutorial will be presented by three speakers: **Lars Frisk** from ABB, **Rich Hunt** from GE, and **Ralph Mackiewicz** from SISCO, Inc.

Ralph Mackiewicz of SISCO, Inc. will discuss the following topics dealing with a technical overview of IEC 61850 Standard. This will provide basic concepts of the standard needed by engineers, managers, etc. who are involved with substation equipment in general and automation in particular.



Technical Overview of IEC 61850

1. IEC 61850 Summary
2. IEC 61850 Logical Device Structure
3. IEC 61850 Services
4. Substation Configuration Language
5. Question/Answer

Ralph Mackiewicz is VP of Business Development for SISCO, a developer of communications and integration products for electric utility applications located in Sterling Heights, Michigan. Ralph has a BSEE from Michigan Technological University and was engineering manager for Westinghouse Electric Corporation prior to joining SISCO in 1985. Ralph has been an active participant in the MMS, UCA and ICCP-TASE.2 standards activities. Ralph has presented tutorials, papers, and seminars at events and in publications sponsored by IEEE, CIGRÉ, Pennwell, EPRI, UCA International Users Group, and others. Ralph holds two patents, is a member of IEEE and CIGRÉ, and is currently chair of the UCA International Users Group Marketing Oversight Subcommittee.

Rich Hunt of GE will discuss the Process Bus portion of the IEC 61850 standard. He will go into detailed discussion about GE implementation of the Process Bus. He will also discuss the business case for such an implementation and some thoughts of testing process bus installation.

IEC 61850 Process Bus—Business Case, Implementation and Testing

1. Definition of IEC 61850 Process Bus
2. The Business Case for Process Bus
3. Considerations for Process Bus Installations
4. Some thoughts on testing Process Bus installations
5. Question and Answer

Rich Hunt is presently a Market Development Leader for GE Digital Energy, responsible for HardFiber, the IEC 61850 Process Bus solution from GE. Between utilities and vendors, Rich has over 20 years experience in the electric utility industry. Rich earned the BSEE and MSEE degrees from Virginia Tech, is a Senior Member of IEEE, the past Chair of the Systems Protection Subcommittee of the IEEE PSRC, and is a registered Professional Engineer.

Lars Frisk of ABB will discuss field/practical examples of IEC 61850 Solutions. This will provide the audience with clear examples of various applications of this standard and how this has/will help substation automation, communication, cost savings and easy duplication of system design.



Field examples of IEC 61850 Solutions

1. Power distribution - Where can you start
2. Transmission substations - Copper wire, how to get rid of it
3. Large systems - How to go big
4. Process bus installations - A highway in your substation
5. Q&A

Lars Frisk is Application Specialist with the ABB Substation Automation Products team in Burlington, Ontario. Lars is the ABB North American expert on IEC 61850 and has been instrumental in implementing a number of projects in the United States, Canada and Mexico.

He has published papers that have been presented at numerous conferences throughout the United States. Lars has 15 years experience in hydro power, power distribution and substation automation in Sweden, India and Canada.

Mr. Frisk holds a patent on Automated Generation of Disturbance Reports. His studies focused on operations and maintenance in hydro power at Mid Sweden University.