
Substation Automation in Electric Utilities Short Course

Edinburg, Texas

July 14, 2012

Course Agenda

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GE Energy - Digital Energy

8:00 a.m.

Welcome and Opening Remarks

- Course Overview
- Course Notes – PowerPoint Slides and Technical Reference Material

8:15 a.m.

Introduction to Enterprise Level Substation System Integration (ELSSI) and Substation Automation (SA)

- What is an IED?
- What is ELSSI?
- Substation Integration and Automation Levels
- Integration versus Automation
- Communication Paths From Substation
- Enterprise Interoperability
- IEC 61850

9:00 a.m.

Substation Integration and Automation Technical Issues

- System Responsibilities
- Open Systems
 - Substation Automation Applicability
 - Benefits of Open System Approach
- System Architecture
 - Data Acquisition and Control Level
 - Information Infrastructure Level
- Substation Host Processor
- Substation Local Area Network
- Control Devices / User Interface
- Communication Interfaces
- One/Common Data Repository
 - Reduction in databases

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- 10:00 a.m.** **Break**
- 10:15 a.m.** **Why Substation Automation?**
- Why Needed?
 - IED Level Benefits
 - Integration Level Benefits
 - Automation Functions
 - Enterprise Level Functions
 - Equipment Conditioning Monitoring
- 11:00 a.m.** **Acquiring Operational and Non-Operational Data from Substation IEDs**
- Operational Data
 - Non-Operational Data
 - Characteristics
 - Data Paths
 - Acquisition of Operational and Non-Operational Data Items
 - Enterprise Server for Non-Operational Data
- 11:15 a.m.** **Smart Grid Technology Roadmap**
- Software Services Infrastructure
 - Smart Meter System Optimization
 - Demand Optimization
 - Distribution Optimization
 - Transmission Optimization
 - Asset Optimization
 - Workforce & Engineering Design Optimization
- Noon** **Lunch**
- 12:30 p.m.** **What Would Substation SCADA Look Like?**
- Distributed LAN Configuration
 - Design Issues for Consideration
 - Equipment Photographs
 - SA Training Simulator (SATS)
- 1:30 p.m.** **Summary**
- Levels of Integration and Automation
 - Communication Paths From Substation

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- New Versus Existing Substations
 - Protocol Fundamentals
 - Protocol Considerations
 - North American SA Projects
 - Relevant Standards

2:00 p.m. Course Adjourns

Reference Material

Speaker Biography

Technical Papers and Articles

- McDonald, John, Editor and Substation Integration and Automation Chapter Author, *Electric Power Substations Engineering*, Second Edition, Taylor & Francis/CRC Press, 2007.
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- McDonald, John, “Substation Automation Basics – The Next Generation”, *Electric Energy T&D Magazine*, May-June 2007 Issue.
- McDonald, John, Daugherty, Robert, Ervin, Shawn, and Uluski, Robert, “On the Road to Intelligent Distribution”, *Transmission & Distribution World*, September 2006.
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- McDonald, John D., “Substation Automation – IED Integration and Availability of Information”, *IEEE Power & Energy*, March/April 2003.

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 - Nissen, Tim and Peterchuck, Doug, “Substation Integration Pilot Project”, *IEEE Power & Energy*, March/April 2003.
 - Uluski, Bob, Haacke, Steve, Border, Sam, and Stevens, Dehn, “Plan Ahead for Substation Automation”, *IEEE Power & Energy*, March/April 2003.