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## Substation Automation Training

Contact us Today for a FREE quotation to deliver this course at your company's location.

<https://www.electricityforum.com/onsite-training-rfq>

In recent years, electric utilities have embraced substation automation as much as any T&D automation technology. A recent research report found that 84 per cent of utilities have active substation automation and integration programs under way. Part of substation automation's popularity undoubtedly has to do with the fact that a number of recent utility projects have shown that substation automation is a technology that can benefit the utility as a whole. Virtually any department that needs information mined at the substation can obtain benefits from a substation automation implementation.

Supervisory control and data acquisition systems -- or SCADA systems -- have been in place at electric utilities for decades. SCADA systems, old and new alike, are receiving more attention in recent times as "cybersecurity" of SCADA systems becomes an issue. The findings of a recent utility industry survey indicate that SCADA cybersecurity is a very real concern, as 20 per cent of utilities believe that their SCADA systems have already been subjected to outside threats. Compounding the problem of shoring up electric utility SCADA systems is the fact that different technologies and techniques may be required depending on whether the utility is working to secure a newly installed SCADA system or a legacy SCADA system.

The course will provide attendees a brief history of automation development in substations, the communications profiles and architectures used within and beyond the substations, and the related automation functions and associated FAT/SAT testing and system integration.

The course will be fuelled with practical projects applications internationally to demonstrate how a substation automation system is specified, designed, integrated and tested before substation energization.

### **COURSE BENEFITS**

- Gain knowledge of state-of-the-art Substation Automation Technologies
- Learn from practice: world applications with detailed case studies
- Learn the levels of integration and automation that can be incorporated into new or existing substations.
- Learn available system architectures, IED characteristics and protocols, and industry standards.
- Learn how SCADA can be designed for integration with other systems.

### **WHO SHOULD ATTEND**

This course is designed for engineering project managers, engineers, and technicians from utilities who have built or are considering building or retrofitting substations or distribution systems with SCADA and substation integration and automation equipment.

- Substation operation and planning Managers
- Transmission planning engineers
- Distribution planning engineers
- Substation Design Engineers
- Consulting Engineers
- Automation Engineers & technologists

- Substation network management engineers
- Substation operation/maintenance engineers & technologists
- Substation protection & control engineers & technologists

### **STUDENTS RECEIVE**

- **FREE** 100-Page Digital Electrical Testing And Maintenance Handbook (Value \$20)
- **\$100 Coupon** Toward Any Future Electricity Forum Event (Restrictions Apply)
- 1.4 Continuing Education Unit (CEU) Credits
- **FREE** Magazine Subscription (Value \$25.00)
- Course Materials In Paper Format

### **COURSE OUTLINE**

#### **DAY ONE**

##### **Introduction to ELSSI and SA**

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

##### **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

### **Protocol Standards Industry Activities**

- IEEE PES Substations Committee
- DNP User Group
- UCA and DNP Comparison

### **SCADA Systems Evolution and Overview**

- Evolution From 1830 to Present
- Uses of Supervisory Systems
- System Hardware
- System Software Functions

### **SCADA System Architectures**

- Data Acquisition, Supervisory Control and Data Exchange
- Historical Information System

- Power Applications (only those changed by RTOs/ISOs)
- User Interface
- Supporting Software
- Hardware Configurations

### **SCADA Integration with Other Systems**

- Functions Performed
- Interfacing Different Systems
- Principles of Systems Architecture

### **SCADA System Implementation and Maintenance**

- System Constraints
- Implementation Considerations

## **DAY TWO**

### **What Would Substation SCADA Look Like?**

- Distributed LAN Configuration
- Design Issues for Consideration
- Equipment Photographs
- SA Training Simulator (SATS)

### **Substation Functions**

- Automatic Load Restoration

- Adaptive Relaying
- Remote Controlled Fuse Saving
- Equipment Condition Monitoring

### **Feeder Automation Equipment**

- Fault Location, Isolation, and Service Restoration (FISR)
- Other Uses of Automated Switches
- System Components
- Communication Facilities
- Control Panels
- Feeder Automation Categories
- Manual
- Semi-Automatic
- Fully Automatic
- Feeder Automation Approaches
- Centralized
- Substation Centered
- Peer-to-Peer
- Training Simulator
- Practical Matters

### **Feeder Automation Functions**

- VAR Dispatch
- Voltage Control (Conservation Voltage Reduction)
- Integrated Volt VAR Control (IVVC) **Communications Issues**
- Communication Requirements
- Communication Technologies
- Future Trends
- Solution Providers

### **Building the Business Case for Integration and Automation**

- Evaluation Methodology
- Needs Analysis
- Benefit/Cost Analysis Methodology
- Sample Study Cases

### **Summary**

- Levels of Integration and Automation
- Communication Paths From Substation
- New Versus Existing Substations
- Protocol Fundamentals
- Protocol Considerations
- North American SA Projects
- Relevant Standards
- UCA International User Group (IEC 61850)

### **Review of expectations Questions and Answers**

### **COURSE TIMETABLE**

#### **Both days:**

Start: 8:00 a.m.

Coffee Break: 10:00 a.m.

Lunch: 12:00 noon

Restart: 1:15 p.m.

Finish: 4:30 p.m.

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