DESIGN & INSTALLATION OF CABLE SYSTEMS IN SUBSTATIONS TUTORIAL

POWER ENGINEERING SOCIETY
SUBSTATIONS COMMITTEE
Sunday, April 15, 2007, 8:00 am – 12:00 noon
Bellevue, WA

This tutorial is a presentation and discussion of the newly created IEEE Standard 525, 'Design and Installation of Cable Systems in Substations'. It will be presented in 4 main parts:

I. Cable Construction, Specifications & Applications
- Conductors
- Insulation Types
- Shielding Methods
- Outer Coverings/Jackets
- Armor
- Cable Selection/Application
- Standards & Specifications

II. Cabling Shielding Requirements & Recommended Practices
- Layout of Shielding & Grounding Information in Std 525
- Concerns Related to Transients
- Sources of Transients
- General Protective Measures
- Protection of Special Circuits

III. Cable System Design & Installation Considerations in Substations
- Control & Instrumentation Cable
- Communication Cable
- Fiber Optic Cable
- Power Cable
- Service Conditions
- Cable Selection
- Raceways
- Cable Handling & Installation

IV. Sample Cable Selection & Calculation for Substation Installation

Part I, 'Cable Construction, Specifications & Application' is an overview of cable design, construction and specification for various applications. Included are the basic features of cable construction covering conductors, types of insulation, shields, jackets, and armor types required for the specific application. In dept look at the specification design requirements for all common types of cable materials and construction including advantages and disadvantages will be explored.

Part II, 'Cable Shielding Requirements & Recommendations' reviews the shielding and grounding requirements found in Std 525 which provides a summary and sources of electrical transients and the general recommendations for application of shielded cables for protection of the transients.

Part III, Cable System Design and Installation Considerations in Substations' considers the applications of various cable types for implementation into substation cable system design. Design considerations covering service conditions, cable selection and sizing for design factors such as temperature, ampacity & loading, fault level, voltage drop, and method of installation will be presented.

Part IV, Sample Cable Selection & Calculation for Substation Installation' presents an actual step through of cable selection and calculations for a sample substation utilizing the material discussed in Parts I - III.