FMPA
SUBSTATION TRAINING SERIES
2015 - 2016

Substation Training Series Overview:

Session 1: Spring/Summer 2015
Substation Safety Awareness

Session 2: Fall 2015
Substation Inspection and Testing Basics

Session 3: TBD 2016
Substation Maintenance

Session 4: TBD 2016
Substation Protection and Theory

Participants can elect to attend the entire series or individual sessions.

Substation Training Series Overview

FMPA is pleased to offer a new series of training courses specifically designed for substation personnel and other crews who work in and around substations. The Substation Training Series will consist of two highly specialized sessions per year. Each two-day session will focus on different aspects of substation safety, inspection, testing and maintenance. Each two-day session will provide participants with in-depth instruction on substation-related topics and will be tailored to the specific equipment of the attendees’ utilities where possible.

About the Instructor

The course curriculum has been developed by Pam Tompkins and Scott Young with SET Solutions, LLC, a consulting company that has provided a range of training and consulting services to FMPA as well as several FMPA member utilities since 2005. Pam is the President and CEO of SET Solutions, and is a 34-year veteran of the electric utility industry.

The course will be taught by Scott Young, a Senior Consultant for SET Solutions. Scott has over 33 years of electrical substation experience and is a published substation safety author. He began his career as an Apprentice Substation Technician, worked through lead Substation Electrician and advanced to Substation Skills Training Supervisor. Scott presently works with utilities and contractors to provide electric utility technical and safety-specific training, specializing in high voltage electrical technical training, OSHA compliance training and electric power safety process evaluation and program development.
FMPA
SUBSTATION TRAINING SERIES
Course Outline
2015

Session 1 – Substation Safety Awareness

1. Substation Safety Awareness
   - General substation hazards, minimum approach distances, step and touch potentials, breaker safety, breaker racking, transformers, bus work, PTs, energized and non-energized work with gloves and sticks

2. Substation components – Overview of their function and operation
   - Transformers, batteries, fans, high side breaker/circuit switcher, switches, metering equipment, voltage regulators, load tap changers, relays, reclosers and breakers, capacitor systems, SCADA, lightning arresters, grounding equipment, automatic transfer switch, buss configurations

3. General NERC requirements for substations and transmission lines

4. Switching and tagging components
   - Switching procedures, equipment clearance, personal protective grounding, switching orders, electrical protective equipment

Session 2 – Substation Inspection and Testing Basics

1. Substation inspections
   - Substation inspection protocols, reading loads on feeders, record and reset relay target, electrical wiring diagrams

2. Electrical equipment testing
   - Doble testing, winding testing, bushing testing, oil tests, oil pressure charting, TTR test, insulation test, excitation and current test, step voltage test, digital low resistance Ohm meter, infrared testing

3. Battery testing, maintenance, and troubleshooting
4. Breaker testing, maintenance and troubleshooting
5. SF6 gas testing
6. Mobile substation

Registration Details:

Each session consists of two days of training from 8:30 a.m. -4:30 p.m. each day. Lunch will be provided.

Courses will be held at:
Orlando Utilities Commission (OUC) Engineering Building
6003 Pershing Avenue
Orlando, FL 32822.

Register at www.fmipa.com. Click on Menu and Events.
Session 3 – Substation Maintenance

1. Circuit switcher troubleshooting and review of maintenance procedures
   - Other high side switching components
2. Power transformer troubleshooting and review of maintenance procedures
   - High and low voltage of the unit
   - Relays, alarm settings & their purpose
   - Gauges
   - How to isolate and ground the transformer
   - Ratings
   - Cooling system
   - Inhibitor system
3. LTC controls and settings, troubleshooting and review of maintenance procedures
4. Regulator troubleshooting and review of maintenance procedures
5. Distribution level breaker troubleshooting and review of maintenance procedures
6. PT & CTs

Session 4 – Substation Protection and Theory

1. Substation protection equipment and theory to include the following:
   - Protective relay design fundamentals
   - General overview
   - Balanced and unbalanced faults
   - Overcurrent protection
   - Differential relay
   - Bus protection
   - Breaker failure relay
   - Zone protection relay
   - Carrier relay
   - Transfer trip scheme
   - Ground fault relay

Registration Details:

Each session consists of two days of training from 8:30 a.m. - 4:30 p.m. each day. Lunch will be provided. Registration will be available beginning in 2016.