



WECC System Operator Training Voltage Control

Emphasis on this class is on the following aspects of Voltage Control. **Voltage Control** is a week-long class (Monday 1:00 pm – Friday 12:00 pm) that offers each student a total of **30 NERC Continuing Education (CE) Hours**, including six (6) NERC CE hours of NERC Standards and 15 NERC CE hours of simulation. Each student will also receive six (6) Emergency Operation (EOP) hours.

Primary Topics include:

- Power Transmission
 - Components & Interconnections
 - Electrical Model
 - Operating Considerations
 - Operating Limits (Stability/Thermal)
 - Stability Operating Limits (SOL's)

- Active & Reactive Power
 - Introduction to Active and Reactive Power
 - Review of Active & Reactive Power
 - Equations for Power Transfer
 - Power Transfer Limits
 - Distribution Factors

- Voltage Control
 - Introduction to Voltage Control
 - Causes of Low Voltage
 - Causes of High Voltage
 - Effects of Low Voltage
 - Effects of High Voltage
 - Use of Voltage Control Equipment
 - Role of the System Operator

- NERC Standards addressing Transmission Operation & Voltage Control

The following simulation modules, using the PALCO* system, are included in the class. Additional Modules may be added as they are developed to enhance understanding of the covered topics.

- Introduction to the PALCO System (how to use the simulator)
- Transmission Lines with Radial Loads
- Shunt Capacitors & Reactors
- Underground Cable Energization
- Voltage & Var Characteristics of Transmission Lines
- Voltage Collapse Scenario
- Voltage & Mvar Control
- Ferranti Rise
- Surge Impedance Loading (SIL)
- Tap Changers Module

*PALCO is a fictional 29-station power system