Switching and Clearances

Overview:

This course is intended to provide system operators with a basic understanding of concepts related to transmission switching of the Bulk Electric System. This course is delivered over a 2-day period and includes various topics related to switching which includes: Transmission Equipment, Relays, MVA Calculation, Surge Impedance Loading, Ferranti Effect, Make before Break, Flow Calculations, and various Scenarios utilizing the EPRI Power Simulator. The course covers the basics of transmission switching from the daily routine (i.e. prearranged clearances) to the emergency situations that system operators may encounter. The students will be expected to work thru basic clearances and switching procedures and also will be required to calculate MVA flows across sectionalizing switches to determine if the switches can be operated safely for various reasons. In addition, the aspects of communications prior to and during switching activities will be discussed to stress the importance of providing clear and concise directives.

Target Audience

The target audience includes:

- Transmission that have the responsibility of transmission operations and related switching activities
- Generation control operators who want to expand their knowledge of transmission operations
- Individuals who desire background knowledge on transmission facilities, their operation, and good practices related to switching

NERC Continuing Education Hours

16.0 CEHs – Total
0.0 CEHs – Standards
16.0 CEHs – Ops Topics
6.0 CEHs – Sim

NERC Emergency Training Requirement

16.0 hours of Emergency Operations

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Course Delivery:

The class activities will include lecture, related exercises, group discussions, simulation demonstrations, and other content related activities. Assessments will be performed to measure the students' progress and effectiveness of the course delivery.

Course Content:

The Basics of Switching curriculum includes:

- Overview to Transmission System equipment utilized and considered during switching activities
- Relay operations and considerations during switching and isolation
- Calculation of MVA and its significance to switching activities
- Surge Impedance Loading and Ferranti Effect and their impacts on switching
- Concept of make before break and its impacts on reliability
- One-line diagrams and utilization in developing switching orders
- Scenarios and exercises utilizing the EPRI Power Simulator

Classroom Schedule:

Day 1 - 8:00 AM to 5:00 PM (Lunch provided)
Day 2 - 8:00 AM to 5:00 PM (Lunch provided)

Attendee Requirements

Attendees must sign-in for the training activity in accordance with the attendance verification process stated:

- Attendees are required to sign-in on the course sign-in sheet
- Attendees are required to provide their NERC SO Certification # on the sign-in sheet, if applicable
- Attendees are required to provide a photo ID as proof of identity
- Attendees must participate in all course activities
- Attendees must successfully complete the activity assessment and obtain a minimum passing grade on the assessment. If the attendee is unsuccessful in the initial assessment, a second opportunity to successfully complete the assessment following remedial instruction will be given.
- Attendees must submit a course evaluation form

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