



## **PSS®CAPE UGM Training Outlines**

### **Breaker Duty Module**

Basic Concepts  
Computing Breaker Margin  
Performing Breaker Rating Studies in PSS®CAPE  
Special Breaker Duty Macros

### **PSS®CAPE for New Users Training**

Overview and Getting Started  
Interface  
OL & Data Entry  
Short Circuit  
Protection Data Entry  
Example Relays  
Coordination Graphics  
Protection Simulation  
Miscellaneous Topics

### **Coordination Graphics**

Getting Started Exercises for Coordination Graphics  
Special Displays, Commands and Macros in Coordination Graphics

- Fault Studies for Distance Protection
- Plot Resistive Faults
- Plot Maximum Reach of Sliding Fault
- Plot Reach
- Plot Dynamic characteristic
- Compute Zero-Sequence Compensation Factor
- Time-Distance Diagram
- Apparent Impedances from COMTRADE Files
- Dynamic TOC Displays

Guide to Coordination Graphics Macros

### **Using Detailed Bus Structures**

Introduction  
Single, Double, Triple and Quadruple Bus Structures  
Ring Bus Structures  
Breaker-and-a-Half Bus Structures  
Transfer Bus Structures  
Double (or more) Bus with Transfer Bus

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## **Line Constants**

Basic LC Data Concepts

Practical Exercise

- Library Data: soil resistivity, conductor constants, tower designs
- System data: rights of way, tower strings, line sections

## **Macros**

Overview of PSS®CAPE User Programming Language (CUPL)

CUPL Help – the online quick reference document

Exercises writing simple macros

Exercise writing a more complex macro

Using the Multi-Question Form in Macros

Guide to Shortcuts and Ready-to-use CAPE Macros

## **Managing and Merging Data**

The PSS®CAPE Database

- Sharing; Managing Accounts; Backup/Restore; Updating the Schema

Data Management Tools in DBE

- Library Import; Equipment Categories; DBE Tools

Merging Data

- Boundary Merge; Internal Merge; System Import; Comparisons

## **NERC PRC Compliance Reporting**

Introduction to NERC PRC Compliance Macros

Example Reporting using Macros

- PRC-019
- PRC-023
- PRC-024
- PRC-025
- PRC-027

## **NERC PRC 026 Compliance and PSS®CAPE-TS Link™**

- CAPE-TS Link Introduction
- CAPE-TS Link Installation
- PSS®E APIs used in PSS®CAPE-TS Link
- CUPL Commands used in PSS®CAPE-TS Link
- PRC-026 Macros

## **Relay Setting**

Running a Setting Macro

General Purpose Relay-Setting Algorithms

Important Setting Rules

Testing Settings in CG

Differential Relays; and others

Modifying Algorithms

## **SQL Training**

SQL Command Syntax (PPT)

Using SQL with PSS®CAPE

## **System Simulator and Relay Checking**

Overview of System Simulator and Relay Checking

Local Zone of Protection (LZOP) Explanation

Suggested Logic Codes

Wizards for Creating Teleprotection Schemes

An Automated Relay Coordination Study for General Use

Wide Area Coordination Study

Wide Area Sensitivity Study

## **Transformers and Neutral Buses**

Model examples that illustrate the following topics:

- Manufacturer's transformer test reports
- IEEE Standards for transformer measurements
- Library data: winding types, base kV; MVA for 3-phase and 1-phase transformers Percent leakage impedances and load loss
- Exciting current and percent impedance; no-load loss
- Phase angles for Y-D connection (reference angles) and angle taps
- One delta in 3-wdg YYD transformer closed or open for 0-seq tests
- Two-winding core-form transformer with phantom delta
- Short-circuit reports showing delta and auto-neutral currents.
- Zigzag windings as zero-sequence shunts
- Base voltages and off-nominal tap voltages
- Autotransformer with shared neutral group
- Neutral shunts on transformers and generators
- Initializing prefault voltages
- Transformer Details report to test the model in PSS®CAPE Short Circuit
- Converting Tee-model transformers to N-Circuit models in PSS®CAPE database