Contingency Analysis

DAY 1

MODULE 1: Single Time Phase Contingency Analysis

Presentation: Introduction to Contingency Analysis	$1/2$ h

Overview of *PowerFactory*'s contingency analysis functions. Contingency case definition. Contingency Analysis calculation command. Recording of result variables. Analysis and presentation of calculation results.

Exercise: Basic Steady-State Security Assessment	1 h

Using contingency cases with fault cases and fault groups from the operational library. Configuring and executing the Contingency Analysis command. Evaluating results using built-in tabular reports. Comparing contingencies. Using thermal rating to assess short-term loading of branches.

Coffee break

MODULE 2: Multiple Time Phase Contingency Analysis

Presentation: Time Phases in Contingency Analysis	$1/2$ h

Introduction of time phases, post-contingency times and post-fault actions through fault cases. Introduction to effectiveness calculation for quad boosters as well as for generators.

Exercise: Contingencies with Post-Fault Actions	1 h

Defining post contingency times and post-fault actions (e.g. load shedding, re-dispatch, switching operations). Executing the Contingency Analysis for different time phases. Using the generator effectiveness calculation to design post fault actions. Evaluating results by means of built-in reports and contingency trace functionalities.

Q&A session

Lunch break

MODULE 3: Remedial Action Schemes

Presentation: Introduction to Remedial Action Schemes	$1/4$ h

Introduction to the concept of remedial action schemes, triggers and events. Difference between post-fault actions of a fault case and a remedial action scheme.

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Exercise: Contingency Analysis with Remedial Action Schemes
$^3/_4$ h

Defining remedial action schemes to alleviate post-contingency overloads through generation redispatch. Exploring more advanced options within this functionality.

MODULE 4: Time Sweep Contingency Analysis

Presentation: Introduction to Time Sweep Calculation
$^1/_4$ h

Brief introduction to time sweep calculation in contingency analysis. The time sweep calculation in combination with planned outages or operation scenarios.

Exercise: Contingency Analysis with Time Sweep Calculation
$^1/_4$ h

Utilising time-sweep calculations to examine the effects of a defined set of credible contingencies on a system comprising both conventional and renewable generation over a user-defined time period.

Coffee break

MODULE 5: Contingency Analysis of Planned Outages

Presentation: Introduction to Outage Management
$^1/_2$ h

Presentation of the basic concepts and specific *PowerFactory* tools for the management of planned outages. Description of outaged and affected components, validity time, priority, recurrence. Remedial actions. Tabular report for scheduled outages.

Exercise: Contingency Analysis of Planned Outages
$^1/_2$ h

Defining and implementing planned outages within a transmission system. Performing contingency analysis to assess operational security. Establishing remedial actions to meet the N-1 criterion during scheduled unavailability of equipment.

Exercise: Time Sweep Contingency Analysis with Planned Outages
$^1/_2$ h

Using time-sweep contingency analysis to assess compliance with the N-1 criterion at specific points within a designated time period, while considering planned outages for construction, preventive maintenance, or repair activities in a transmission network.

Q&A session

Time Schedule (Central European Time)

	Time
First 90 minutes block	9:00
Coffee break	10:30
Second 90 minutes block	10:45
Q&A session	12:15
Lunch break	12:30
Third 90 minutes block	13:30
Coffee break	15:00
Fourth 90 minutes block	15:15
Q&A session	16:45
End of the training day	17:00