SynerGEE® Electric

Switching and Contingency

Your switching configuration is an important and dynamic part of your distribution system. Proper switching is essential for safe system operation and maintenance, as well as recovery during outage situations. With Contingency Analysis and Optimal Switching Analysis, SynerGEE can help you achieve both.

Contingency Analysis

Contingency Analysis is a comprehensive tool for developing and validating contingency switching plans. By simulating an outage, Contingency can perform a comprehensive evaluation of the model, searching for a switching recovery plan based on a selected objective. Afterwards, the extensive results include remaining outage details, load-flow findings and even pre- and post-contingency map diagrams.

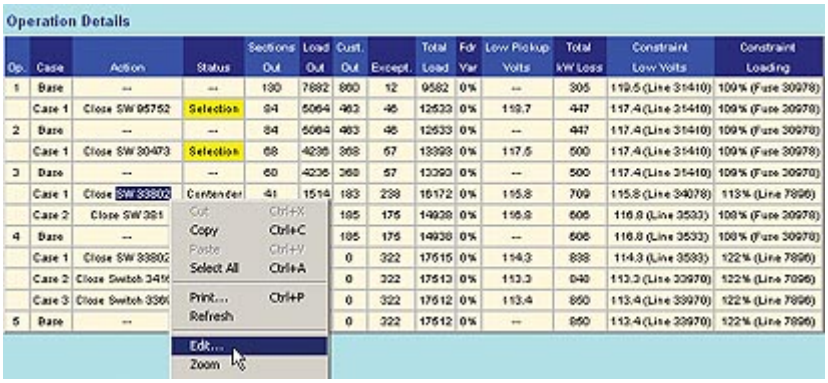
Contingency is flexible, allowing you to:

Run single or multiple contingencies, including single contingencies “one-at-a-time” in a batchmode
Select the pickup objective for restoring service, along with voltage and loading constraints
Specify how SynerGEE treats different types of switchable devices, including normal switches, automatic switches, and protective devices
Simulate a sustained fault condition by initially opening switches necessary to isolate the outage
Save the suggested recovery plan as an external Switch Position file, which you can load intoyour model at a later time for a more detailed study. Switch Position files automatically configure switches and protective devices as specified in the file, making it easier to evaluate the effects of plan implementation

Contingency reporting is comprehensive, allowing you a clear view of the order in which devices should be operated. You can also examine the effect that the device operations will have on system voltages and loading, step by step.

Like all SynerGEE reports, the Contingency report is a dynamic interface that provides quick zooming and editing tools. In fact, you can operate each device presented in a report without having to return to the map. If you do want to look at the map, SynerGEE can zoom straight to the switch in question with just a click.

For an overall view of the contingency situation, contingency reports also provide convenient “before and after” maps of the simulation.



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Optimal Switching Analysis

Optimal Switching Analysis allows you to find the best possible switching configuration for your system,

using the three-phase switches currently modeled. You can select any combination of feeders and/or substations, and SynerGEE combs the model for possible switching actions that would satisfy the selected objective.

Optimal Switching provides a variety of powerful options for customizing the analysis, allowing you to:

- Select the optimization objective, such as to improve losses, or maybe to improve the lowest voltage
- Set voltage and loading constraints, so that switching operations do not violate your system standards
- Save the suggested switching plan as an external Switch Position file, which you can load into your model at a later time for a more detailed study

Optimal Switching provides realistic switching plans because it relies on a local optimization technique, rather than a global approach. Global methods, which open every switch and then attempt to close them in an optimal topology, may produce unfeasible plans requiring dozens of switching operations. SynerGEE, however, assumes the system is already close to an optimal state and tries to fine-tune based on available switching pairs.

Depending on your requirements, you may find that objectives such as “minimize substation transformer loading” and “equate loading” are particularly useful when you are trying to balance the loading among feeders and transformers. The results may not include loss improvement, but may provide for a system that is better prepared to handle system outages.

The optimal switching report presents a comprehensive view of the suggested switching plan. You can clearly see the progress towards your selected objective with each switching operation. You can also carefully monitor other system parameters with each step.

Like all SynerGEE reports, the Optimal Switching report provides a host of powerful, built-in tools for zooming and editing. These tools make it easy to implement and evaluate the suggestions on your model.