N-1-1

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Meeting #6 (October 2014)

- Problem of outage combinations
  - Combinatorial explosion
  - For L lines with k outages the number of combinations is given by

$$\binom{L}{k} = \frac{L!}{k!\,(L-k)!}$$

- Existing tools
  - LODF Screening
  - Join Active Contingencies
- Future
  - Directly combine two different lists of contingencies within Simulator

What do we need?

- Combination of two lists in contingency analysis tool
  - What does “N-1-1” mean?
    - Could mean different things for different people
    - Is it really “N-2”?
    - How to we get from one outage to another outage?

Combination of Contingency Lists

- Basic idea is to
  - Allow for two lists of contingencies (primary, secondary) in the contingency analysis tool
  - Generate combinations of contingencies from these lists
  - Still a lot of contingencies, but having separate lists allows for finer control

Questions: N-1-1 Details?

- Separate solution options for primary and secondary
  - Power flow solutions at a minimum
  - What about Generator Post-Contingency AGC, Generator Maximum MW Response, Generator Line Drop, etc.?
- Distinguish violations caused by the primary and secondary contingencies
  - Do Limit Monitoring Settings need to be different for each?
- Make Up Power
  - Does this need to be different for each?
- When should RAS be included
  - Add new field “available to each RAS (primary only, secondary, both)”
- DC screening before AC analysis
  - For DC portion, both contingencies are assumed to occur at the same time
  - At a minimum ability to set different Limit Monitoring Settings percentages
- Advanced Limit Monitoring
  - What is the change relative to when detecting change violations?
- Anything else???

“N-0” Education

- This appears in many users’ contingency lists
- Contingency defined with no actions report violations in the reference state
- This is treated as a contingency and Limit Monitoring Settings relevant for “Contingency Rating Set” are used