Disclaimer

• This training presentation is provided as a reference for preparing for the PJM Certification Exam.
• Note that the following information may not reflect current PJM rules and operating procedures.
• For current training material, please visit: http://pjm.com/training/training-material.aspx
“Cheat Sheet” Rules of Thumb for System Restoration

Transmission Restoration
- During restoration, keep voltages 90% - 105% of nominal
- Minimum Source Requirements
  - 600 MW of generation connected at 230 kV or higher
  - 30 MW/mile of generation of energized 500 / 765 kV line
  - 20 MW/mile of load of energized 500 / 765 kV line

Load Restoration
- Maintain frequency between 59.75 and 61.00
- Increase frequency to 60.00 – 60.50 prior to restoring a block of load
  - Restore large blocks of load only if the system frequency can be maintained at 59.90 or higher
- Manually shed load to keep frequency above 59.50
  - Shed 6 – 10% of load to restore frequency 1 Hz.
- Do not restore blocks of load that exceed 5% of the total synchronized generating capability
- Frequency change = (Load Change/Connected capacity) * Governor Droop %
- Generators trip on low frequency at 57.50 Hz or high frequency at 61.75 Hz

Dynamic Reserve
- Under-frequency load shedding relays set at 59.3 Hz, 58.9 Hz, and 58.5 Hz.
- Load pickup factors
  - Fossil steam = 5% of unit capacity
  - Hydro = 15 % of unit capacity
  - CT = 25 % of unit capacity
- Under-frequency relaying must be no more than 50% of dynamic reserve
- Must carry enough dynamic reserve to cover the largest energy contingency

Synchronized Reserve
- Composed of generation that can be loaded in 10 minutes or load that can be shed in 10 minutes
- Must carry enough spinning reserve to cover an area’s largest energy contingency

System Control
- Regulation requirement = 2% of load
- Frequency bias setting = 1% of load