Short Circuit Breaker Replacement Upgrades in RTEP

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April 7, 2016
• Purpose of today’s discussion
  – Review of FERC Order 1000 Activity
  – Discuss opportunities to improve process efficiency
    • Exclude specific types of Transmission Owner Upgrades from the FERC Order 1000
• PJM Operating Agreement
• Allows baseline system upgrades to follow a few tracks
  – Immediate Need Baseline reliability
  – All other Baseline reliability
• Applicability of PJM RTEP Window Process
• **Issues to address:**

1. Transmission Owner Upgrades
   A. Short Circuit breaker upgrades and replacements
   B. Substation terminal equipment

2. Transmission Owner Criteria (future)
Short Circuit Breaker Upgrades or Replacements

• Historical look at circuit breakers in the RTEP

• Typical solution to an overdutied breaker is to upgrade it or replace it with a higher rated breaker

• Few short circuit fault current driven baseline projects have resulted in Greenfield Projects. If the analysis shows that a greenfield project is possible, PJM would Open a window.

• Otherwise and by default, a typical short circuit violation would be excluded from the FERC Order 1000 Window Process
• Similar in relative cost range to circuit breakers

• Located inside existing stations

• By their nature, these meet the definition of Transmission Owner Upgrades
  – Designated to the local Transmission Owner

• Availability of Substation Terminal Equipment upgrades is already provided as part of the default window technical information
Other Transmission Owner Upgrades

• Create list of exclusions from FERC Order 1000 by enumerating a list or otherwise defining a subset of Transmission Owner Upgrades to exclude
  – circuit breakers
  – substation terminal and other equipment
    • E.g. wavetrap, current transformer, protection sensing, disconnects, capacitors, reactors etc.
Next Steps

• Short Circuit breaker upgrades and replacements
  – Recommend that short circuit issues that can be solved by short circuit breaker upgrades or replacements be excluded from FERC Order 1000 competitive window process

• Substation terminal equipment
  – Approach similar to Short Circuit Breakers

• Transmission Owner Criteria
  – Continue to evaluate a next step
- March 2016
  - Conceptual discussion at PC and MRC
- April 2016
  - First read of recommendation at PC and MRC
Appendix
Appendix: Transmission Owner Equipment Types in RTEP

- Breaker Bay
- Breaker Disconnects
- Breaker Drops
- Capacitor
- Circuit Breaker
- Control Building
- Current Transformer
- Digital Microwave
- Disconnect Switch
- Entrance Conductor
- Exit Conductor
- Fiber Optic Terminal Equipment
- Fuse
- Ground Grid
- Lightning Arrestors
- Line Trap
- Microwave Communications
- Motor Operated Disconnect (MOD) Switch
- Protection Relays
- Protection Scheme
- Reactor
- Relay
- Riser
- RTU
- SCADA control
- Shunt Reactor
- Station Equipment
- Switch
- Termination
- Tie Breaker
- Transformer