PJM/NYISO Wheel Replacement Protocol

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• Reference the August Operating Committee presentation:
Agenda

• Background
• Guidelines for New Protocol
• PAR Technical Considerations
• Current Protocol
• Preliminary Analysis
• Cost Allocation
• Transmission Planning Assumptions
• NYISO Whitepaper
• Future Meetings
• Appendix
  – A: Market Implementation Committee (MIC) Topics
  – B: Planning Committee (PC) Topics
• ConEd notified involved parties of intention to terminate non-conforming wheeling service on April 28, 2016.
• Current wheeling service will end on April 30, 2017.
• New protocol must be in place for use on May 1, 2017.
• PJM and NYISO are working on a replacement protocol.
• PJM Stakeholder approach:
  – Operational topics will be addressed in Operating Committee
  – Markets topics will be addressed in the Market Implementation Committee
  – Planning topics will be addressed in the Planning Committee
PSE&G/ConEd seam:

- 5018: Hopatcong – Ramapo 500 kV line
- J & K: Waldwick – South Mahwah – Ramapo 345 kV lines
- ABC:
  - A: Linden – Goethals 230 kV line
  - B: Hudson – Farragut 345 kV line
  - C: Marion – Farragut 345 kV line
Guidelines for New Protocol

- Supports reliable operation of the transmission system
- Effectively manages congestion across the region
- Provides for open access and utilization of the facilities to serve the public interest and provide benefit to consumers
- Does not hinder use of the facilities to respond to emergencies in real-time
- Preserves competitive market behaviors
- Minimize impacts to PJM and NYISO load
Guidelines for New Protocol

- Can be facilitated with the Phase Angle Regulator (PAR) technology at the ABC, JK, and 5018 interfaces (current equipment for May 1, 2017 implementation)
- Can be implemented in both PJM and NYISO market models
• Each PAR has tap ranges for adjustments
• PSE&G and ConEd owned PARs have tap adjustment limitations:
  – 20 tap adjustments per day, per PAR
  – 400 tap adjustments per month, per PAR
• Taps are left in reserve to allow adjustment options for actual overloads:
  – As an example, a PAR with a +/- 16 Tap range will not be adjusted beyond +/- 14.
• 61% of AC interchange and 80% of RECO load applied to the 5018 desired flow calculation

• 1,000 MW non-conforming wheel service
  – Imported on the J & K
  – Exported on the A, B, & C

• Assumptions:
  – Net AC Interchange schedule – 1,000 MW to NYISO
  – RECO load – 300 MW
• 5018 = 910 MW
  - 61% of AC Interchange + 80% RECO load
• JK = 1,000 MW to PSEG
• ABC = 1,000 MW to ConEd
Preliminary Analysis

- PJM and NYISO have agreed to leave RECO load treatment status quo
  - 80% of RECO load accounted for in the 5018 desired flow calculation.
  - 20% of RECO load assumed to flow over the Western PJM/NYISO ties.
- PJM conducting power flow analysis to determine appropriate percentage allocation of AC interchange on the 5018, JK, and ABC interfaces.
• Power flow results have identified limitations on flows to NYISO on the JK interface.
  – Forcing flow from 230 kV system to 345 kV system.
  – PAR tap adjustments exhausted prior to achieving desired flow.

• Will require one of two options:
  – Lower percentage applied to the JK interface (6 – 8%)
  – Allow natural flows based on neutral PAR tap setting and adjust PARs for congestion as part of the coordinated M2M process.

• Discussions with NYISO are ongoing.
Interface Percentage Example

- Assumptions:
  - Net AC interchange to NYISO = 1,000 MW
  - RECO load = 300 MW
  - RECO load treatment:
    - 80% applied to 5018
    - 20% flows over western PJM/NYISO ties
  - Applied Interface percentages:
    - 5018 – 32%
    - JK – 10%
    - ABC – 26%
  - Western Ties – 32% of net AC Interchange
• 5018 = 560 MW
  – 32% of AC Interchange + 80% RECO load
• JK = 100 MW
• ABC = 260 MW
• Western Ties = 320 MW
• All flows into NYISO
Cost Allocation Impact Due to Wheel Cancellation

- When the existing ConEd transmission service ends, the current PJM Tariff RTEP Schedule 12 cost allocations will be redistributed without ConEd
  - ConEd's cost allocations will be redistributed to remaining transmission customers
- If the ConEd transmission service is “duplicated” the new service will assume the same costs at the existing service
Transmission Planning assumptions will follow the operating protocol

- Controllable Interfaces (follow new protocol)
  - A/B/C
  - J/K
  - 5018 line

- Merchant Transmission Facilities (no change, modeled at existing rights)
  - Linden VFT
  - HTP HVDC
• NYISO created and posted a Whitepaper for the Wheel Replacement effort on their website:

• PJM reviewed the whitepaper and offered edits

• Second version of the whitepaper will be posted jointly in September with NYISO and will include PJM perspective
Future Meetings

- PJM OC – August 9, 2016
- PJM MIC – August 10, 2016
- PJM PC – August 11, 2016
- Joint PJM/NYISO Stakeholder meeting – August 15, 2016 at PJM
- September OC, MIC, and PC
- Second joint PJM/NYISO Stakeholder meeting on September 16, 2016 at NYISO