Issues Tracking
Open Issues: None

New Issues:
Baseline Reliability Update
2012 Retool Update
2012 Baseline Retool Update

- Update to September 2010 TEAC
- Reliability analysis performed without Susquehanna – Roseland
- 2012 Common Mode Outage procedure violations identified

<table>
<thead>
<tr>
<th>Facility Overloaded</th>
<th>Contingency Type</th>
<th>% Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Wharton - Greystone &quot;J&quot; 230 kV</td>
<td>Double circuit towerline</td>
<td>111.6%*</td>
</tr>
<tr>
<td>Newton - Lake Iliff 230 kV</td>
<td></td>
<td>106.5%*</td>
</tr>
<tr>
<td>Lake Iliff - Montville 230 kV</td>
<td></td>
<td>105.7%*</td>
</tr>
<tr>
<td>Kittatinny - Newton 230 kV</td>
<td></td>
<td>105.3%*</td>
</tr>
<tr>
<td>Portland - Greystone &quot;Q&quot; 230 kV</td>
<td></td>
<td>100.4%</td>
</tr>
<tr>
<td>Greystone - Whippany 230 kV</td>
<td></td>
<td>99.4%</td>
</tr>
<tr>
<td>Kittatinny - Pohatcong 230 kV</td>
<td></td>
<td>98.0%</td>
</tr>
<tr>
<td>Glen Gardner - Chester 230 kV</td>
<td></td>
<td>95.4%</td>
</tr>
</tbody>
</table>

* Conductor limited
• Incremental upgrades not practical given a number of the violations exceed conductor limits

• PJM evaluated the effectiveness of retaining Hudson 1 on RMR into 2012

• PJM performed preliminary market efficiency analysis of 2012 and 2013 to determine the impact of operating to double-circuit tower line contingencies due to the delay in Susquehanna – Roseland 500 kV
• Market efficiency analysis assumed Hudson 1 remained in-service in 2012 and 2013

• Study results
  – net increase in gross congestion in each year primarily in New Jersey
    • ~ $160 Million in 2012 and ~ $ 280 Million in 2013
  – Increase use of demand response to control constraints
  – Constraints could be controlled with the addition of Hudson 1 and the implementation of demand response
• PJM will develop plans to operate to the double-circuit tower line outages in real-time operation

• PJM will request the Hudson 1 unit be retained on RMR through at least 2012

• PJM will complete additional reliability and market efficiency analyses based on queued generation
Remaining 2010 RTEP Analysis
• 2014 Retool Analysis is in-progress

• Potential for voltage violations

• Core SVC locations (from MAAC alternative analysis)
  – Jacks Mountain, Doubs, Meadow Brook, Loudoun 230 kV
  – Welton Spring

• SVC Optimization
  – Juniata, T157, Mt Storm
Outstanding 2015 Work

- 2015 N-1-1 Voltage Studies
  - In-progress

- Continuing to test upgrade alternatives in the ComED zone
MAAC Alternative Analysis Update
Revised Liberty / LS Power
- 502J – Hunterstown 500 kV (includes 50% series compensation)
- Hunterstown – TMI 500 kV
- Hunterstown – Kemptown 500 kV
- Lexington – Dooms 500 kV

PATH
- Amos – Welton Spring – Kemptown
- Includes baseline reactive upgrades of 1000 MVAR shunt and 500 MVAR SVC at Welton Spring and a 250 MVAR shunt at Kemptown 500kV
Dominion Alternative #1
- Rebuild Mt. Storm – Doubs
- 50% series compensation on Meadow Brook end of Trail
- Rebuild Mt. Storm – Pruntytown

Dominion Alternative #2
- Rebuild Mt. Storm – Doubs
- 50% series compensation on Meadow Brook end of Trail
- Build a portion of PATH stopping at Mt. Storm (requires a new 765/500 kV transformer)

Dominion Alternative #3
- Rebuild Mt. Storm – Doubs
- 50% series compensation on Meadow Brook end of Trail
- Build a portion of PATH stopping at Welton Spring (requires new 765/500 kV transformer)

Dominion Alternative #4
- Rebuild Mt. Storm – Doubs
- Build PATH proposal

* All Dominion alternatives include 900 MVAR SVC’s at Loudoun 230 kV and T157 Tap 500 kV and 900 MVAR of static capacitors at other locations
Harrison – Dickerson Alternative
- Harrison – Dickerson New 500kV AC Line
- New Dickerson 500/230 kV Station
- Series Comp on Meadow Brook – Loudoun
- Lexington – Dooms 500 kV
• PATH, Revised Liberty, Harrison Dickerson and Dominion Alternative 4 (which includes the full PATH project) all resolve the thermal violations through the 15 year planning horizon

• FCITC analysis showed PATH to be the most robust alternative for transfers between various areas
  – Harrison to Dickerson was significantly less than PATH or Liberty considering transfers between various areas

• PATH reduces real power losses on the system more than any of the alternatives
  – Harrison – Dickerson losses were at least 100 MW greater than PATH (190 MW for MAAC load deliverability scenario)
Alternative Comparison - Reactive

• Reactive only alternatives not effective beyond 2016

• Harrison – Dickerson and partial Liberty (502 Junction – Hunterstown) not as effective as full Liberty project or PATH project

• PATH project and Liberty project comparable from a reactive perspective

• For MAAC load deliverability scenario, PATH project reduces reactive losses by more than 1000 MVAR compared to Liberty.
Liberty Construction Feasibility Study
• Full report posted with the materials for today’s meeting

• Study evaluated multiple potential routes for each line based on criteria such as:
  – length, state and federal land crossed, potentially displaced residences and businesses, road, railway, streams, and transmission line crossings, and proximity to sites listed on the National Register of Historic Places (NRHP)

• A single route for each segment was selected and cost estimates and overall project schedule were developed
• Line Segments
  – 502 Junction to Hunterstown
    • 169 miles
    • Selected route located in Pennsylvania and Maryland
  – Hunterstown to Three Mile Island
    • 35 miles
    • Located in Pennsylvania
  – Hunterstown to Kemptown
    • 39 miles
    • Located in Pennsylvania and Maryland
  – Lexington to Dooms
    • 40.4 miles
    • Located in Virginia
• Total line length for all segments – 283.4 miles
• Estimated cost - $ 2.01 Billion to $2.53 Billion
  – Includes substation engineering and construction for 7 substations, transmission line engineering and construction, land acquisition, routing, siting, permitting, wetland mitigation, construction management and contingency
• Estimated project duration – 7 years
  – Critical path items include routing, siting, NEPA approval, land acquisition, line and substation construction
Other Considerations

- **PATH** total line length approximately 277 miles
  - 121 miles existing ROW adjacent other facilities
  - 156 miles new ROW

- **Liberty** total line length approximately 283 miles
  - All new ROW (some segments may parallel existing facilities)

- **Cost estimates**
  - PATH cost estimate (by PATH) = $2.10 Billion
  - Liberty cost estimate (by LS Power) = $1.336 Billion
  - Liberty cost estimate (by PJM consultant) = $2.01 - $2.53 Billion

- **Schedule**
  - PATH has been working on siting, permitting and engineering since 2007 and can be placed in-service by June 1, 2015
  - Liberty estimated project duration is 7 years
• PJM staff will be recommending to the PJM Board of Managers to continue with the PATH project as the preferred alternative

• The required in-service date for the project is June 1, 2015
Supplemental Projects
At Bergen, existing distribution transformers currently fed from the 138 kV system will be moved to the 230 kV system.

Expected IS Date: 6/1/2013
• Sewaren 230/138 kV transformer oil leakage

• Proposed Solution: Replace the Sewaren 230/138 kV transformer, add two 230 kV and one 138 kV breakers at Sewaren

• Expected IS Date: 6/1/2013
• Waldwick 345 kV breakers have gas leakage problems and the circuit switchers are defective due to age and are no longer produced

• Proposed Solution: Replace the four existing Waldwick 345 kV breakers and reconfigure the substation to breaker and half scheme by adding four new 345 kV breakers

• Expected IS Date: 6/1/2011
• Hoboken 230 kV substation has reliability issue due to circuit switcher performance leading to frequent outages

• Proposed Solution: Replace the existing Hoboken circuit switchers with GIS bus due to space limitation

• Expected IS Date: 6/1/2013
Market Efficiency Update
• Projects being evaluated in COMED area to address future congestion.
  – BCP Transmission Project submitted by LS Power for new single 345 kV line from Byron to Cherry Valley to Pleasant Valley.
    • Variations being considered to maximize Benefit/Cost
    • Variations of BCP project currently include Cherry Valley-Pleasant Valley 345 kV, Byron-Pleasant Valley 345 kV, and Byron-Wayne 345 kV.
  – LaSalle Transmission Project submitted by LS Power for new single or double 345 kV line from Pontiac Midpoint to Reynolds to Dumont (V4-026) with ISD of 6/1/2014.
  – La Fayette Transmission Project submitted by LS Power for new single or double 345 kV line from Quad Cities to Kewanee to Pontiac Midpoint to Reynolds to Dumont along with 345/138 kV transformers at Kewanee station with ISD of 6/1/2015.
  – Various configurations of LaSalle and LA Fayette Projects
• The 10-year analysis on 2010/11 Stage 1A ARRs resulted in infeasibility on the following facilities. Upgrades will be evaluated for inclusion into the PJM RTEP.
  – 155 Nelson 345 KV 15502 Line (Nelson to Electric Junction 345 KV line)
  – 12204 138 KV 12204 2 Line (Marengo to Pleasant Valley 138 KV line)
  – 151 Wood 138 KV 12205 2 (Woodstock to Marengo 138 KV line)

• The final Market Efficiency Upgrades will be evaluated against the 10-year ARR analysis to see if upgrades fix future ARR infeasibility.
Review Issues Tracking
Email RTEP@pjm.com with any comments