Issues Tracking
Open Issues:

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<th>Owner</th>
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<th>Issue Title</th>
<th>Issue Description</th>
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<td>MAAC and EMAAC Reactive Analysis Details</td>
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New Issues:
2010 RTEP Sensitivity Analysis Update
Sensitivity Analysis Inputs

- **RPS Magnitude**: Determined by State mandates
- **DR/EE Magnitude**: Determined by State Mandates
- **Participation Factor**: Locational Distribution of individual RPS generation
- **Capacity Factor**: Locational Value of RPS generation
- **At-Risk Generation**: Sink for RPS generation
Sensitivity Analysis Outputs

Thermal Overload Year

RPS
- Generally increases loading on EHV facilities

DR/EE
- Reduces load and therefore loadings in the future
Table 1: Sensitivity Reliability Criteria Violation Year

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>CKT</th>
<th>KVs</th>
<th>Base</th>
<th>RPS to Existing</th>
<th>RPS to At-Risk*</th>
<th>RPS+DR+EE to At-Risk*</th>
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<td>Dooms</td>
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<td>500/500</td>
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<td>2016</td>
<td>2017</td>
<td>2016</td>
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<tr>
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<td>Juniata</td>
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<tr>
<td>Bath County</td>
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<td>500/500</td>
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<td>2018</td>
<td>2019</td>
<td>2020</td>
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<tr>
<td>Mt. Storm</td>
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* Note that the at-risk generation considered included only coal generation
Table 2: Reliability Criteria Violation Year Advancement due to Sensitivity (Years)

<table>
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<tr>
<th>From</th>
<th>To</th>
<th>CKT</th>
<th>KVs</th>
<th>Base</th>
<th>RPS to Existing</th>
<th>RPS to At-Risk*</th>
<th>RPS+DR+EE to At-Risk*</th>
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* Note that the at-risk generation considered included only coal generation
Preliminary Sensitivity Results

- Comparison of traditional 15 year criteria violation year vs. sensitivity violation year
- Data shown for RPS to at-risk generation scenario
- Example:
  - 15 year criteria overload year = 2023
  - Sensitivity overload year = 2018
  - 2023 / 2018
• Advancement of traditional 15 year criteria violation year due to sensitivity

• Data shown for RPS to at-risk generation scenario

• Example:
  – 15 year criteria overload year = 2023
  – Sensitivity overload year = 2017
  – 2018 – 2023 = -5 years (advancement)
2010 RTEP Analysis Update
- Several critical contingencies are non-convergent

  - Red Lion to Hope Creek 500 kV
  - New Freedom to East Windsor 500 kV
  - Conemaugh to Hunterstown 500 kV
  - Hunterstown to Conastone 500 kV
  - Susquehanna to Lackawanna 500 kV
  - Lackawanna to Hopatcong 500 kV
  - Hopatcong to Roseland 500 kV
  - Keeney to Rock Springs 500 kV
  - Rock Springs to Peach Bottom 500 kV
  - Peach Bottom to Limerick 500 kV
  - Alburtis to Branchburg 500 kV
  - Smithburg to Deans 500 kV
  - Keystone to Jacks Mt. 500 kV
  - Branchburg to Elroy 500 kV
  - Ford Mill 600 MW generator
  - Ford Mill 600 MW generator
  - Bergen 550 MW generator
  - Linden 750 MW generator
• BG&E proposal for a new 500 kV line from Kemptown to Peach Bottom with 500/230 kV substation at Emory Grove (near Northwest)
• Maryland OPC and DNR suggested that (C-PB-K) be reevaluated
• PSE&G suggested that (C-PB-K) be extended to Salem
• Additional alternatives under evaluation, including reactive upgrades
### 2015 – 2020 EMAAC Maximum Import for Base Conditions

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimated EMAAC CETO (MW)</th>
<th>Current EMAAC Import Limit (MW)</th>
<th>Reactive Support Only</th>
<th>Reactive Compensation To Maximize EMAAC Import Limit (MVAR)</th>
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<td>9579</td>
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## 2015 – 2020 EMAAC Maximum Import for Keeney – Rock Springs 500 kV Outage

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<th>Year</th>
<th>Estimated EMAAC CETO (MW)</th>
<th>Current EMAAC Import Limit (MW)</th>
<th>Reactive Support Only</th>
<th>Reactive Compensation To Maximize EMAAC Import Limit (MVAr)</th>
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<td>2019</td>
<td>9579</td>
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• Alternative Analysis for EMAAC will follow
  – Coordinating thermal and reactive solutions in EMAAC

• Coordinating solutions with 2015 local reactive issues in JCPL
Several critical contingencies are non-covergent

- Keystone - South Bend 500 kV
- Conemaugh - Keystone 500 kV
- Conemaugh - Jacks Mountain 500 kV
- Keystone - Jacks Mountain 500 kV
- Jacks Mountain - Juniata 1&2 500 kV
- Conemaugh - Hunterstown 500 kV
- Hunterstown - Conastone 500 kV
- Conastone - Brighton 500 kV
- Brighton - Doubs 500 kV
- Calvert Cliffs - Waugh Chapel 500 kV
- Burches Hill - Possum Point 500 kV
- Brister - Ox 500 kV
- Elmont - Cunningham 500 kV
- Elmont - Ladysmith 500 kV
- Ladysmith - Possum Point 500 kV
- Loudoun - Morrisville 500 kV
- Morrisville - North Anna 500 kV
- Loudoun - Pleasant View 500 kV

- Meadow Brook - Loudoun 500 kV
- Mount storm - Meadow Brook 500 kV
- Mount Storm - Greenland Gap 500 kV
- Mount Storm - T157 Tap 500 kV
- T157 Tap - Doubs 500 kV
- Hatfield - Black Oak 500 kV
- Hatfield - Ronco 500 kV
- Hatfield - Banyan Run 500 kV
- Bedington - Black Oak 500 kV
- Bedington - Doubs 500 kV
- Fort Martin - Ronco 500 kV
- Yukon - South Bend 500 kV
- Yukon - Banyan Run 500 kV
- Cabot - Cranberry 500 kV
- Cranberry - Wylie Ridge 500 kV
- Calvert Cliffs 1&2 500 kV
- P04 500 kV
- Susquehanna #2
**Alternative 1**
- 900 MVAR SVC at Loudoun 230 kV

**Alternative 2**
- Liberty / LS Power Proposal
- 502J – Hooversville – Hunterstown – TMI
- Meadow Brook - Doubs

**Alternative 3**
- PATH
- Description: Amos – Welton Spring – Kemptown
Alternative 4
- 900 MVAR SVC at Loudoun 230 kV
- 900 MVAR static caps
- 300 @ Meadow Brook 500 kV
- 300 @ Loudoun 500 kV
- 300 @ Doubs 500 kV

Alternative 5
- 900 MVAR SVC at Loudoun 230 kV
- 900 MVAR SVC at T157 Tap 500 kV

Alternative 6
- 900 MVAR SVC at Loudoun 230 kV
- 900 MVAR SVC at T157 Tap 500 kV
- 900 MVAR static caps
- 300 @ Meadow Brook 500 kV
- 300 @ Loudoun 500 kV
- 300 @ Doubs 500 kV
Alternative 7
Harrison – Pleasant View 2000 MW HVDC
Meadowbrook – Kemptown 500 kV
500 MVAR SVC at Meadow Brook 500 kV
500 MVAR switched shunts
- 250 MVAR @ Kemptown 500 kV
- 250 MVAR @ Pleasant View 500 kV
<table>
<thead>
<tr>
<th>From Bus</th>
<th>To Bus</th>
<th>Base</th>
<th>Reconductor Mt. Storm - Doubs</th>
<th>PATH</th>
<th>Liberty</th>
<th>Harrison - P. View &amp; Meadow Bk. - Kemptown</th>
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<tbody>
<tr>
<td>Lexington</td>
<td>Dooms</td>
<td>2017</td>
<td>2017</td>
<td>&gt;2025</td>
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<td>2024</td>
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<td>2025</td>
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</table>

- Reactive upgrades alone are not adequate to solve all violations through the 15 year horizon
• Continue MAAC voltage analysis

• Coordinate MAAC and EMAAC solutions
Baseline Reliability Update
• Generation Deliverability
• The Corson 138/69 kV transformer #2 is overloaded for the loss of the parallel transformer
• Proposed Solution: Upgrade the Corson Sub T2 terminal (B1195.1)
• Estimated Project Cost: $0.1M
• Expected IS Date: 5/31/2011
• Generation Deliverability
• The Corson 138/69 kV transformer # 1 is overloaded for the loss of the parallel transformer
• Proposed Solution: Upgrade the Corson Sub T1 terminal (B1195.2)
• Estimated Project Cost: $0.3M
• Expected IS Date: 5/31/2012
• Load Deliverability
• The Monroe 230/69 kV transformers # 2 and # 3 were overloaded and replaced in 2009 (B0267), as part of the project, a bus conductor will be upgraded to increase the rating of transformer # 2 (B0267.1)
• Estimated Project Cost: $0.25M
• Expected IS Date: 5/31/2011
• DLCO planning criteria requires that *Transmission Supply to Bulk Stations* have three transmission sources

• Proposed Solution: Create a second Collier-Elwyn 138kV circuit (Z-162) by utilizing both sets of bifurcated conductors on the existing Collier-Elwyn (Z-62) 138kV circuit (B1174)

• Estimated Project Cost: $3.88M

• Expected IS Date: 5/31/2011
• Common Mode Outage Procedure
• The Wescosville 500/138 kV transformer is overloaded for a fault on either Siegfried transformer #4 or #5 with the stuck breaker at Siegfried 230 kV East-West bus tie breaker
• Proposed Solution: Remove the Siegfried bus tie breaker and install a new breaker on the Martins Creek 230 kV line west bay to maintain two ties between the 230 kV buses (B1196)
• Estimated Project Cost: $1.0M
• Expected IS Date: 6/1/2013
• Generation Deliverability and Common Mode Outage procedure

• The Burlington – Croydon 230 kV is overloaded for several contingencies

• Proposed Solution: Reconductor the PECO portion of the Burlington – Croydon circuit (B1197)

• Estimated Project Cost: $1.0M

• Expected IS Date: 6/1/2015
• Generation Deliverability:
• Conowingo – Colora 230 kV is overloaded for the single contingency loss of either Conowingo – Nottingham 230 kV circuit
• Proposed Solution: Replace terminal equipment including station cable, disconnects, and relays at the Conowingo 230 kV station (B1198)
• Estimated Project Cost: $0.5 M
• Expected IS Date: 6/1/2015
• N-1-1 Voltage Violation
• In 2014, voltage drop violations in the vicinity of Ridgway and Farmers Valley 115 kV for the loss of the Dubois – Rockton Mt. and Ridgway – Farmers Valley 115 kV circuits.
• Proposed Solution: Increase the size of the capacitor at Ridgway (B0564) to 25 MVAR.
• Estimated Project Cost: $1.029 M
• Expected IS Date: 6/1/2013
Review Issues Tracking
• Continue MAAC voltage analysis, including alternatives
• Continue EMAAC voltage analysis, including alternatives
• Continue to develop proposed solutions for baseline reliability violations
• Coordinate MAAC and EMAAC solutions
• Sub-regional RTEP meetings scheduled
• Sensitivity analysis