Generation Deactivation Notification
Update

Transmission Expansion Advisory Committee
June 7, 2018
### Deactivation Status

<table>
<thead>
<tr>
<th>Unit(s)</th>
<th>Transmission Zone</th>
<th>Requested Deactivation Date</th>
<th>PJM Reliability Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davis Besse Unit 1 (896 MW)</td>
<td>ATSI</td>
<td>5/31/2020</td>
<td>Reliability analysis complete. New and existing baselines resolve identified impacts. Units can retire as scheduled. Operational flexibility allows to bridge any delays with the transmission upgrades.</td>
</tr>
<tr>
<td>Perry Unit 1 (1247 MW)</td>
<td>ATSI</td>
<td>5/31/2021</td>
<td></td>
</tr>
<tr>
<td>Beaver Valley Unit 1 (909 MW)</td>
<td>DUQ</td>
<td>5/31/2021</td>
<td></td>
</tr>
<tr>
<td>Beaver Valley Unit 2 (902 MW)</td>
<td>DUQ</td>
<td>10/31/2021</td>
<td></td>
</tr>
<tr>
<td>Unit(s)</td>
<td>Transmission Zone</td>
<td>Requested Deactivation Date</td>
<td>PJM Reliability Status</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------</td>
<td>------------------------------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td>Cumberland County Landfill (1.6 MW)</td>
<td>ACE</td>
<td>1/1/2019</td>
<td>Reliability analysis complete. No impacts</td>
</tr>
<tr>
<td>Barbados AES Battery (2 MW)</td>
<td>PECO</td>
<td>7/29/2018</td>
<td>Reliability analysis complete. No impacts</td>
</tr>
<tr>
<td>Hurt NUG (83 MW)</td>
<td>Dominion</td>
<td>7/29/2018</td>
<td>Reliability analysis complete. No impacts</td>
</tr>
</tbody>
</table>
ATSI and Duquesne Transmission Zones

- Davis-Besse (5/31/2020)
  - Unit 1 896 MW
- Beaver Valley Unit 1 (5/31/2021)
  - Unit 1 909 MW
- Perry (5/31/2021)
  - Unit 1 (1247 MW)
- Beaver Valley Unit 2 (10/31/2021)
  - Unit 2 902 MW
Problem Statement: Generation Deliverability
• Allenport - Charleroi 138 kV line is overloaded for the following tower contingencies:

  - Loss of Yukon - Charleroi 138 kV and Yukon-Westraver 138 kV lines.

Recommended Solution:
• Existing baseline b2965 - Replace the Charleroi – Allenport 138 kV line with 954 ACSR, and replace breaker Risers at two ends.

Required IS Date: 06/01/2020
Projected IS Date: 06/01/2021
* Operating measures identified to mitigate reliability impacts in interim

Original Required IS Date: 06/01/2022
Original TEAC Date: 11/02/2017
Problem Statement: Generation Deliverability

- Shanor Manor - Krendale 138 kV and Butler – Shanor Manor 138 kV lines are overloaded for the single contingency tripping Cabot – Cranberry 500 kV line.

Recommended Solution:

- Existing baseline b2967 - Convert the existing 6 wire Butler - Shanor Manor - Krendale 138 kV Line into two separate 138 kV lines. New lines will be Butler - Keisters and Butler - Shanor Manor - Krendale 138 kV lines.

Required IS Date: 06/01/2020
Projected IS Date: 06/01/2021
* Operating measures identified to mitigate reliability impacts in interim

Original Required IS Date: 06/01/2022
Original TEAC Date: 11/02/2017
Problem Statement: Generation Deliverability

• Yukon-Smithton #62 138 kV and Smithton #62 - Shepler Hill Jct 138 kV lines are overloaded for the following tower contingencies:
  - Loss of Yukon - Charleroi 138 kV and Yukon-Westraver 138 kV lines.
  - Loss of Charleroi - Westraver 138 kV and Charleroi - Yukon 138 kV lines

Recommended Solution:

• Existing baseline b2966 – need to rescope with a larger conductor: Reconductor the Yukon-Smithton #62 - Shepler Hill Jct with 954 ACSS, and replace line disconnect switch at Yukon.

Estimated Project Cost: From $6.2M to $6.7M

Required IS Date: 06/01/2020

Projected IS Date: 06/01/2021

Project Status: Engineering

* Operating measures identified to mitigate reliability impacts in interim

Original Required IS Date: 06/01/2022
Original TEAC Date: 11/02/2017
Problem Statement: Generation Deliverability

- Seward - Florence 138 kV line is overloaded for the breaker failure contingency for loss of Shelocota - Keystone 230 kV, Homer CT - Shelocota 230 kV, Shelocota - Blairsville 115 kV, Shelocota - Edgewood 115 kV lines, Shelocota 115/23 kV and Shelocota 230/115 kV transformers.

Recommended Solution:

- Existing baseline b2951.1, b2951.2, and b2951.3 - Upgrade terminal equipment at Seward SS, replace line tuner, coax, relay and carrier set at Shelocota SS, replace Seward/Shelocota line CVT, tuner, coax, and line relaying at Blairsville East SS.

Required IS Date: 06/01/2020
Projected IS Date: 10/19/2018

Original Required IS Date: 06/01/2022
Original TEAC Date: 10/31/2017
Problem Statement: Generation Deliverability

- Wolf Hills - Keywood 138 kV line is overloaded for the following contingencies:
  - Breaker Failure: Loss of Broadford 765/500 kV transformer, Baker - Broadford 765 kV line, and Sullivan – Broadford 500 kV line.
  - Single: Loss of Broadford 765/500 kV transformer, and Sullivan – Broadford 500 kV line.

Recommended Solution:
- Existing baseline b2938 - Perform a sag mitigation on the Broadford – Wolf Hills 138kV circuit to allow the line to operate to a higher maximum temperature.

Required IS Date: 06/01/2021
Projected IS Date: 06/01/2022

* Operating measures identified to mitigate reliability impacts in interim

Original Required IS Date: 06/01/2022
Original TEAC Date: 09/11/2017
Problem Statement: Generation Deliverability

• Keystone - Cabot 500 kV line is overloaded for the single contingency for loss of the Yukon – South Bend 500 kV line.

Recommended Solution:

• Replace terminal equipment at both Keystone and Cabot 500kV ends (b3010: SN 3683 MVA / SE 4514 MVA)

Estimated Project Cost: $0.26M

Required IS Date: 06/01/2021
Projected IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Yukon 500/138 kV #2, #3 and #4 transformers are overloaded for the following bus (first two) and breaker failure contingencies:
  - Loss of the Yukon #1 and #3 transformers
  - Loss of the Yukon #2 and #4 transformers
  - Loss of the Yukon #1 and #3 transformers, and the Yukon - Rhodes Lane 500 kV line
  - Loss of the Yukon #1 and #3 transformers, and the Yukon - Rhodes Lane 500 kV line

Recommended Solution:

- Replace four Yukon 500/138 kV transformers with three transformers with higher ratings, and reconfigure 500 kV bus (b3006: SN 1096 MVA / SE 1376 MVA).

Estimated Project Cost: $55.65M
Required IS Date: 06/01/2021
Projected IS Date: 06/01/2021
Problem Statement: Generation Deliverability
- Cabot - Butler 138 kV line is overloaded for the single contingency for loss the Yukon – South Bend 500 kV line.

Recommended Solution:
- Reconductor 3.1 mile 556 ACSR portion of Cabot to Butler 138 kV with 556 ACSS and upgrade terminal equipment (b3005: SN 308 MVA / SE 376 MVA)

Estimated Project Cost: $4.5M
Required IS Date: 06/01/2021
Projected IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Vasco Tap - Edgewater Tap 138 kV line is overloaded for the single contingency for loss of the Yukon – South Bend 500 kV line.

Recommended Solution:

- Reconductor Vasco Tap - Edgewater Tap 138 kV line with 336 ACSS (b3013: SN 252 MVA / SE 291 MVA).

Estimated Project Cost: $5M
Required IS Date: 06/01/2021
Projected IS Date: 06/01/2021
Problem Statement: Generation Deliverability
- Blairsville - Social Hall 138 kV line, Blairsville 138/115 kV transformer, and Blairsville-Blairsville East 115 kV line are overloaded for the single contingency for the Keystone – Cabot 500 kV line

Recommended Solution:
- Reconductor Blairsville – Social Hall 138 kV line with 636 ACSS, and upgrade terminal equipment (b3007.1 and b3007.2: SN 387 MVA / SE 444 MVA).
- Upgrade transformer terminal equipment at Blairsville East 115 kV side (b3008: SN 291 MVA / SE 364 MVA).
- Upgrade terminal equipment at Blairsville East 115kV tap (b3009: SN 339 MVA / SE 406MVA).

Estimated Project Cost: $6.85M
Required IS Date: 06/01/2021
Projected IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Shelocta 230/115 kV transformer is overloaded for the breaker failure contingency for loss of the Glory - Seward 115 kV, Jackson RD - Seward 115 kV, Seward - Cooper 115 kV, Seward – Conemaugh 115 kV, Seward - Florence 115 kV, Seward - Tower 115 kV, Seward 230/115 kV transformer, and Seward 115/23 kV transformer.

Recommended Solution:

- Replace transformer with a larger unit and construct a 230 kV ring bus (b3014: SN 406 MVA / SE 456 MVA).

Estimated Project Cost: $4.8M
Required IS Date: 06/01/2021
Projected IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Glade - Warren 230 kV, Warren - Corry East 115 kV and Corry East - Four Mile 115 kV lines are overloaded for the single contingency for loss of the Erie South East - Warren 230 kV line.

Recommended Solution:

- Rebuild the Glade - Warren 230 kV line with 1033 ACSS (b3017.1, b3017.2, b3017.3: SN 855 MVA / SE 984 MVA).

- Replace terminal equipment on the Warren - Corry East 115 kV line (b3024: SN 202 MVA / SE 245 MVA).

- Replace terminal equipment on the Corry East - Four Mile 115 kV line (b3016 SN 202 MVA / SE 245 MVA).

Estimated Project Cost: $33.5M

Required IS Date: 06/01/2021

Projected IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Belmon - Charleroi 138 kV, Yukon - Smithton #61 138 kV lines are overloaded for the following tower contingencies:
  - Loss of Yukon - Charleroi 138 kV and Yukon - Westraver 138 kV lines.

Required IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Yukon - Westraver 138 kV, Westraver - Charleroi 138 kV, and Yukon - Charleroi 138 kV lines are overloaded for the following contingencies:

Required IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Charleroi - Dry Run 138 kV and Dry Run - Mitchell 138 kV lines are overloaded for the bus contingency for the following contingencies:

Required IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Shepler Hill Jct - Mitchell 138 kV line is overloaded for the following breaker failure contingencies:

Required IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Charleroi 138 kV - Union Jct 138 KV line is overloaded for the following tower contingencies:
  - Loss of Mitchell - Charleroi and Mitchell - Dry Run 138 KV lines
  - Loss of Mitchell - Charleroi and Charleroi - Dry Run 138 kV lines.

- Union Jct - Peters 138 KV line is overloaded for the single contingency for loss of Mitchell - Wilson 138 kV line.

Required IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Smithton #61 - Layton Jct 138 kV line is overloaded for the tower contingency for loss of Charloroi - Yukon 138 kV and Westraver - Yukon 138 kV lines.

Required IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Mitchell - Wilson 138 kV line is overloaded for the following single contingencies:
  - Loss of Keystone - Cabot 500 kV line
  - Loss of Cabot - Cranberry 500 kV line
  - Loss of Cheswick unit 1
  - Loss of Peters - Union Jct 138 kV

Required IS Date: 06/01/2021
Problem Statement: Generation Deliverability

- Wylie Ridge 500/345 kV transformer is overloaded for the breaker failure for loss of Wylie Ridge - AA2-121 Tap 138 kV, and Wylie Ridge #5, #6 500/345 kV transformers.

Required IS Date: 06/01/2022
Recommended Solution:

- Construct new Route 51 substation in APS and connect 10 138 kV lines to new substation (b3011.1).
- Upgrade terminal equipment at Yukon to increase rating on four Yukon to Route 51 138 kV lines
  - b3011.2: SN 308 MVA / SE 376 MVA
  - b3011.3: SN 297 MVA / SE 365 MVA
  - b3011.4: SN 297 MVA / SE 365 MVA
  - b3011.5: SN 308 MVA / SE 376 MVA
- Upgrade remote end relays for Yukon - Allenport - Iron Bridge 138 kV line (b3011.6: SN 234 MVA / SE 297 MVA).

Estimated Project Cost: $27.6M
Required IS Date: 06/01/2021
Projected IS Date: 06/01/2021
Recommended Solution:

- Construct new Elrama substation in Duquesne and connect 7 138 kV lines to new substation (b3015.1).
- Reconductor the Elrama - Wilson 138 kV line with 2x795 ACSS (b3015.2: SN 719 MVA SE 719 MVA).
- Reconductor the Dravosburg - West Mifflin 138 kV line with 795 ACSS (b3015.3: SN 382 MVA / SE 385 MVA).
- Run new conductor with 796 ACSS over existing tower to establish a new Dravosburg - Elrama 138 kV line (b3015.4: SN 395 MVA / SE 419 MVA).
Recommended Solution (continued):

- Reconductor the Elrama - Mitchell 138 kV line with 2x795 ACSS (b3015.5 and b3015.6: SN 498 MVA / SE 590 MVA).
- Reconductor the Wilson - West Mifflin 138 kV line with 795 ACSS (b3015.7: SN 395 MVA / SE 419 MVA).

Estimated Project Cost: $35.5M
Required IS Date: 06/01/2021
Projected IS Date: 06/01/2021
Recommended Solution:

- Construct two new 138 kV tie lines with 2x 954 ACSR between Route 51 and Elrama. (b3012.1 and b3012.2: SN 1002 MVA / SE 1154 MVA).

Estimated Project Cost: $9.2M
Required IS Date: 06/01/2021
Projected IS Date: 06/01/2021
• V1 – 6/1/2018 – Original Slides Posted.
• V2 – 6/5/2018 – Added the ratings for new baseline projects.
• V3 – 6/6/2018 – Added conductor types and contingencies, and fixed the cost and descriptions.
• V4 – 6/15/2018 – Fixed the projected IS date for b2951.1 and b2951.2
• V5 – 6/18/2018 – Fixed baseline upgrade ID numbers on Slide 15