Market Efficiency Proposal Window
2016-2017 Long Term Proposal Window 1A
2016-2017 Long Term Proposal Window 1A

• Addendum 2016-2017 Long Term Proposal Window 1A
  – Opened on September 14, 2017
  – Closed on September 28, 2017.
  – Solicited proposals to address the Tanners Creek - Dearborn 345 kV thermal constraint, which is a Reliability Pricing Model (RPM) constraint.

• Target facility Tanners Creek - Dearborn 345 kV is the next limiting element in the 2020/2021 RPM Base Residual Auction CETL study for the DEOK LDA*

• Data posted on the PJM website:

*After RTEP baseline upgrade b2831 (Upgrade the Tanner Creek - Miami Fort 345 kV circuit) is constructed
Projects Received

- 3 Market Efficiency Proposals
  - 1 Greenfield
    - $12.7M
  - 2 Upgrades
    - $0.6 - $4.9M

- 2 proposing entities
  - LS Power
  - AEP
RPM Evaluation

• PJM Analysis Completed
  • Determined CETL impact of proposed projects (see next slide)
  • Completed 2020/2021 RPM Base Residual Auction model for multiple study years
  • Determined RPM and Energy estimated benefits for proposed projects

• Market Efficiency Status
  – Project 201617_1A-2A proposed by AEP to be recommended for board approval:
    • Upgrade terminal equipment at Tanners Creek 345kV station. Upgrade 345kV Bus and Risers at Tanners Creek for the Dearborn circuit.
    • Cost $0.6 million

• Additional Projects provide no incremental benefit
• Base Case was updated with the portion of the reliability project 2017_1-6A to be recommended in the Reliability Window 1 (see Appendix A)

<table>
<thead>
<tr>
<th>CETL Analysis</th>
<th>Proposer</th>
<th>Project In-Service Year</th>
<th>Project Cost ($M)</th>
<th>DEOK Price Separation?</th>
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<tr>
<td>Base</td>
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<td>201617_1-1A</td>
<td>NTD</td>
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<td>AEP</td>
<td>2021</td>
<td>$4.90</td>
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Project ID: 201617_1A-1A

Proposed by: Northeast Transmission Development (NTD)

Proposed Solution: Greenfield.
New 345 kV switching station ("Twelvemile"). Build a 345 kV switching station ("Twelvemile") interconnecting the existing Silver Grove - Zimmer 345 kV transmission line and the Pierce - Buffington 345 kV transmission line.

kV Level: 345 kV
In-Service Cost ($M): $12.7, B/C Ratio = 8.88
In-Service Date: 6/1/2021
Target Zone: DEOK LDA
ME Constraints:
TANNERS CREEK - MIAMI FORT 345 kV

Notes:
• Same project was submitted as 2017_1-2E to the reliability window, PJM 2017 Proposal Window 1, to address reliability violations.
• This RPM project is not currently recommended.
Project ID: 201617_1A-2A
Proposed by: American Electric Power (AEP)

Proposed Solution: Upgrade
Upgrade terminal equipment at Tanners Creek 345kV station
Upgrade 345kV Bus and Risers at Tanners Creek for the Dearborn circuit.

kV Level: 345 kV
In-Service Cost ($M): $0.6, B/C Ratio = 151.61
In-Service Date: 6/1/2021
Target Zone: DEOK LDA
ME Constraints:
TANNERS CREEK - MIAMI FORT 345 kV

Notes:
• Very low cost
• Anticipate recommendation for Board approval in December 2017
• Designated Entity: AEP (the local TO)
Project ID: 201617_1A-2B

Proposed by: American Electric Power (AEP)

Proposed Solution: Upgrade
Establish Tanners Creek - Dearborn 345kV Circuit #2
Install two 345kV CB at Dearborn station for Tanners Creek Circuits #1 and #2 and one 345kV CB at Tanners Creek for Dearborn Circuit #2.

kV Level: 345 kV
In-Service Cost ($M): $4.9, B/C Ratio = 18.6
In-Service Date: 6/1/2021
Target Zone: DEOK LDA
ME Constraints:
TANNERS CREEK - MIAMI FORT 345 kV

Notes:
• Cost higher and B/C ratio lower than 201617_1A-2A proposal
• This RPM project is not currently recommended.
• PJM anticipates that the Market Efficiency baseline solution 201617_1A-2A proposed by AEP will be presented to the PJM Board in December and recommended for inclusion in the RTEP.
Appendix A
Portion of 2017_1-6A
(Preliminary Reliability Recommendation
DEOK Transmission Zone)
Preliminary Recommendation: (Portion of 2017_1-6A)
Install a new 345kV breaker “1422” so Pierce 345/138KV transformer #18 is now fed in a double breaker, double bus configuration.
Remove X-533 No. 2 to the first tower outside the station. Install a new first tower for X-533 No.2.
Install new 345KV breaker B and move the Buffington-Pierce 345kV feeder to the B-C junction. Install a new tower at the first tower outside the station for Buffington-Pierce 345kV line.
Remove breaker A and move the Pierce 345/138kV transformer #17 feed to the C-D junction.
Replace breaker 822 at Beckjord 138kV substation to increase the rating from Pierce to Beckjord 138kV to 603MVA.

Estimated Project Cost: $9.17 M

Required IS date: 6/1/2021

Project Status: Conceptual
Revision History

- V1 – 10/30/2017 – Original Slides Posted