Transmission Expansion Advisory Committee – AEP Supplemental Projects

March 10, 2020
Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process.
**Need Number:** AEP-2020-AP010

**Process Stage:** Needs Meeting 003/10/2020

**Supplemental Project Driver:** Equipment Material/Condition/Performance/Risk

**Specific Assumptions Reference:** AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

**Problem Statement:**

- The 765/138 kV phase 1 transformer at Axton failed. The on-site spare unit was switched in. There is currently no spare at site to deal with any future failures.

- **Model:** N/A
Solutions

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process.
Need Number: AEP-2018-OH003

Process Stage: Solutions Meeting 03/10/2020

Previously Presented: Needs Meeting 10/26/18

Supplemental Project Driver: Customer Service


Problem Statement:
The Ohio Valley Electric Corporation (OVEC) and the US Department of Energy (DOE) are in the process of terminating their connection at Don Marquis. The DOE has informed AEP of its intention to retire its X-530 Substation, adjacent to AEP’s Don Marquis Substation and has requested a new delivery point from AEP at the same location. The new load is anticipated to peak near 38MW.
**Need Number:** AEP-2018-OH003  
**Process Stage:** Solutions Meeting 03/10/2020  

**Proposed Solution:**

- Install a new transmission switching station (Arboles) to connect 138 kV lines to Don Marquis, Waverly, and Wakefield as well as four radial lines to serve the two new loads. The station will have 11 CBs (3000A, 40kA) in a breaker-and-a-half configuration. DOE requires 3 feeds and has requested 138 kV service.  
  **Estimated Cost: $13.4M (AEP)**

- 6-wire the existing Don Marquis extension for 0.4-miles and rebuild 0.7 miles of the existing Marquis-Wakefield line as double circuit for two feeds from Waverly and Don Marquis. **Estimated Cost: $1.7M (AEP)**

- Construct ~0.3 miles of new line to terminate the South Lucasville circuit into Arboles. **Estimated Cost: $1.3M (AEP)**

- Construct two independent lines to serve the X-555 substation (DP #1). The lines will be ~0.4 miles long each. **Estimated Cost: $1.7M (AEP)**

- Construct two independent lines to serve the X-5001 substation (DP #2). The lines will be ~0.8 miles long each. **Estimated Cost: $3.5M (AEP)**
• At Don Marquis 345 kV, install 3-345kV 4000A 63kA circuit breakers to terminate the OVEC lines from Pierce and Kyger Creek. Install intertie metering. Estimated Cost: $8.8M (AEP), $0.8M (OVEC)

• At Kyger Creek station, remove X-530 No.1 Exit and associated equipment. Update remote end relaying towards Don Marquis. Estimated Cost: $1.1M (OVEC)

• At Pierce station, remove X-530 No.1 Exit and associated equipment. Update the remote end relaying towards Don Marquis. Estimated Cost: $0.8M (OVEC)

• Six-wire 71.5 miles of the Pierce-Don Marquis line. Construct 0.13 miles of line to tie into Don Marquis station. Estimated Cost: $0.8M (OVEC)

• Six-wire 50.4 miles of the Kyger Creek-Don Marquis line. Construct 0.5 miles of line to tie into Don Marquis station. Estimated Cost: $0.9M (OVEC)

Total Cost AEP: $30.4M
Total Cost OVEC: $4.4M

Alternatives Considered:
Expand Don Marquis Substation and bring all four customer lines out of Don Marquis to the two new DPs: two 2.1-mile lines extending to DP#2 and two 1.5-mile lines to DP#1. This option has a higher cost due to the increased length of the four independent lines and because the terrain at Don Marquis is such that, any station expansion will require extensive civil work and environmental concerns. The 345kV scope would be the same. Estimated Cost: $50.4M

Projected In-Service: 11/01/2021
Project Status: Scoping
Need Number: AEP-2019-IM041
Process Stage: Solution Meeting 03/10/2020
Previously Reviewed: Needs Meeting 11/14/2019
Supplemental Project Driver: Equipment Condition/Performance/Risk
Specific Assumptions Reference: AEP Guidelines for Transmission Owner
Identified Needs (AEP Assumptions Slide 8)
Problem Statement:

Sullivan 765/345kV Station
765kV CB A2
• The Sullivan CB A2 is an ELF-SL8-4 Type SF6 breaker.
• As of September 2019 there are 9 of these breakers remaining in AEP’s system including CB A at this station which just recently failed under AEP-2019-IM036.
• Since 2002, there have been 16 documented issues with the 9 remaining breakers dealing primarily with compressor failures and failure to open/reclose.
Need Number: AEP-2019-IM041
Process Stage: Solutions Meeting 03/10/2020

Proposed Solution:

Sullivan 765/345kV Station:
Replace Sullivan CB A2 765kV CB and associated equipment.

Total Estimated Transmission Cost: $7.1M

Alternatives Considered:
There is no viable alternative solution.

Projected ISD: 2/1/2023
Project Status: Scoping
**Need Number:** AEP-2018-OH032  
**Process Stage:** Solutions Meeting 3/10/2020  
**Previously Presented:**  
Needs Meeting 1/11/2019  
Solutions Meeting 02/21/2020  
**Supplemental Project Driver:**  
Customer Service  
**Specific Assumption Reference:**  
AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 7)  
**Problem Statement:**  
A customer has requested new service west of Cameron, West Virginia. The forecasted peak demand is 30 MW initially, with long-term prospects of 90 MW.  
With the addition of this customer load, plus the new customer load on S2097 (AEP-2019-OH006), the Wayman-Gosney-Nauvoo Ridge 138kV radial line has an MVA-mile demand of 1142.896, far exceeding AEP’s guideline of 75 MVA-miles. The MVA-mi demand that exists today on the Wayman – Gosney Hill 138 kV circuit is 313 without any new load additions.  
**Model:** Summer RTEP 2024
Need Number: AEP-2018-OH032
Process Stage: Solutions Meeting 3/10/2020

Proposed Solution:
Construct a new 500-138kV station (Panhandle), connecting to the Kammer-502 Junction 500kV circuit (~10.3 miles from Kammer, 31.7 miles from 502 Junction). Install a 3-breaker 500kV ring bus; 450 MVA 500-138kV transformer; 3-breaker 138kV ring bus. **Estimated Cost**: $25.0 M

Construct a new 138kV switching station (Nauvoo Ridge) with 8- 138kV breakers in a breaker-and-a-half design. The station will have 1 circuit to Gosney Hill, 2 circuits to the customer’s facility, 2 circuits to Panhandle, and a 23 MVAR 138kV cap bank. **Estimated Cost**: $16.4 M

At Gosney Hill, install a new 138kV breaker toward Nauvoo Ridge. Update station protection. **Estimated Cost**: $1.0 M

Construct a new 4.7-mile 138kV line south of Gosney Hill station to Nauvoo Ridge. Utilize 1033 ACSR conductor. Acquire new right-of-way. **Estimated Cost**: $14.7 M

Construct a new 1.3 mile double-circuit 138kV line from Nauvoo Ridge to the customer’s substation. Acquire new right-of-way. **Estimated Cost**: $4.8 M

Construct a new 1.5 mile double-circuit 138kV line from Panhandle to Nauvoo Ridge. Utilize 1033 ACSR conductor for each circuit. Acquire new right-of-way. **Estimated Cost**: $5.0 M

Extend the Kammer-502 Junction 500kV transmission line 0.1-mile into Panhandle station (0.2 mile total). **Estimated Cost**: $1.5 M

**Total Estimated Transmission Cost**: $68.4 M
Need Number: AEP-2018-OH032
Process Stage: Solutions Meeting 3/10/2020
Proposed Solution:

Existing:

Wayman Switch
Stull Run Switch
Gosney Hill Switch
Wetzel Switch (S2097)

AEP
FirstEnergy (APS Zone)

Proposed:

Wayman Switch
Stull Run Switch
Gosney Hill Switch
Wetzel Switch (S2097)

Customer
Nauvoo Ridge
FirstEnergy (APS Zone)

Kammer
Panhandle
502 Junction (FE / APS)

AEP
FirstEnergy (APS Zone)
Need Number: AEP-2018-OH032
Process Stage: Solutions Meeting 03/10/2020
Alternatives Considered:
Construct a new 9-breaker switching station (Nixon Ridge, breaker-and-a-half) at the crossing of the Kammer-502 Junction 500kV line & 138kV double-circuit corridor (3 miles east of Kammer), looping in the Aston-Kammer 138kV & George Washington-Natrium 138kV circuits, plus 2 new circuits to Nauvoo Ridge. Remote-end 138kV protection & RTU updates at Aston, Kammer, George Washington & Natrium stations. Build a 9-mile 138kV double-circuit line from Nixon Ridge east to Nauvoo Ridge. Keep the remaining scope between Gosney-Nauvoo-New Customer 138kV. This solution resulted in several violations, as it strains the local 138kV system, as the only EHV sources in the region are at Kammer & West Bellaire. Overloads on Kammer-Nixon Ridge 138kV, near-overload on Kammer-Natrium 138kV (would overload with a pending customer project). In addition, N-1-1 voltage violations of 0.90-0.92 pu in the area; to rectify this, more cap banks could be placed, but due to 6 in the region already, switching conflicts (hunting) would likely arise. To mitigate these violations, this alternate would require a reconductor or rebuild 18 miles of 138kV lines and install a 138kV +/- 75 MVAR Statcom system in the area, for dynamic voltage support. Total Cost of $120 Million
Projected In-Service: 7/21/2020 (for initial 138kV service to the customer). 3/1/2022 (for the 2nd phase to construct Panhandle station and complete the 138kV loop).
Project Status: Engineering (for initial customer service project); Scoping (for 2nd phase)
## High Level M-3 Meeting Schedule

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Activity</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Posting of TO Assumptions Meeting information</td>
<td>20 days before Assumptions Meeting</td>
</tr>
<tr>
<td></td>
<td>Stakeholder comments</td>
<td>10 days after Assumptions Meeting</td>
</tr>
<tr>
<td>Needs</td>
<td>TOs and Stakeholders Post Needs Meeting slides</td>
<td>10 days before Needs Meeting</td>
</tr>
<tr>
<td></td>
<td>Stakeholder comments</td>
<td>10 days after Needs Meeting</td>
</tr>
<tr>
<td>Solutions</td>
<td>TOs and Stakeholders Post Solutions Meeting slides</td>
<td>10 days before Solutions Meeting</td>
</tr>
<tr>
<td></td>
<td>Stakeholder comments</td>
<td>10 days after Solutions Meeting</td>
</tr>
<tr>
<td>Submission of Supplemental Projects &amp; Local Plan</td>
<td>Do No Harm (DNH) analysis for selected solution</td>
<td>Prior to posting selected solution</td>
</tr>
<tr>
<td></td>
<td>Post selected solution(s)</td>
<td>Following completion of DNH analysis</td>
</tr>
<tr>
<td></td>
<td>Stakeholder comments</td>
<td>10 days prior to Local Plan Submission for integration into RTEP</td>
</tr>
<tr>
<td></td>
<td>Local Plan submitted to PJM for integration into RTEP</td>
<td>Following review and consideration of comments received after posting of selected solutions</td>
</tr>
</tbody>
</table>
Revision History

2/27/2020 – V1 – Original version posted to pjm.com
3/10/2020 – V2 – Slide #13, add alternatives considered
  – Slide #9, update Alternative Considered statement
3/12/2020 – V3 – Slide #10, Changes reflected in the slide
3/31/2020 – V4 – Slide #8, Corrected Needs meeting date