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-IM017
Process Stage: Needs Meeting 05/12/2020
Supplemental Project Driver: Equipment Condition/Performance/Risk
Specific Assumptions Reference: AEP Guidelines for Transmission Owner
Identified Needs (AEP Assumptions Slide 8)

Problem Statement:

DC Cook 765/345 Station
- 345kV CB N1 Failure
  - The 345kV CB failed internally on phase 2 in March 2020
  - The DC Cook 345kV CB N1 is an HVB362 type SF6 breaker
  - Manufactured in 2002
  - Breaker N1 had 2 fault interruptions since install date of 2003
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-OH032

Process Stage: Solutions Meeting 05/12/2020 (2nd Review)

Previously Presented: Needs Meeting 1/11/2019, SRRTWP Solutions Meeting 02/21/2020, TEAC 3/10/2020

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-mile demand that exists today on the Wayman-Gosney Hill 138kV circuit is 313 without any new load additions. After additional DNH study by PJM, a generation deliverability overload was found at Gosney Hill 138kV station on the Gosney Hill-Nauvoo Ridge 138 kV line for loss of the Kammer-Panhandle 500 kV line and the Kammer 765/500 kV transformer ('AEP_P1-3_#8975_05KAMMER 765_200', 'AEP_P1-2_500-1').

Model: Summer RTEP 2024
**Need Number:** AEP-2018-OH032  
**Process Stage:** Solutions Meeting 02/21/2020  
**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. **Replace the 795 kcmil AAC risers and strain bus with 2000 kcmil AAC risers.** **Estimated Cost: $1.0 M $1.3 M**
**Need Number:** AEP-2018-OH032

**Process Stage:** Solutions Meeting 02/21/2020

**Proposed Solution Continued:**

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 $68.7 M
**Need Number:** AEP-2018-OH032  
**Process Stage:** TEAC Solutions Meeting 05/12/2020  
**Proposed Solution:**

**Existing:**

- Wayman Switch
- Stull Run Switch
- Gosney Hill Switch
- Wetzel Switch (S2097)
- AEP
- FirstEnergy (APS Zone)
- Kammer
- 502 Junction (FE / APS)

**Proposed:**

- Nauvoo Ridge
- Customer
- Wetzel Switch (S2097)
- Gosney Hill Switch
- Wayman Switch
- Stull Run Switch
- AEP
- FirstEnergy (APS Zone)
- Kammer
- Panhandle
- 502 Junction (FE / APS)
Need Number: AEP-2018-OH032

Process Stage: TEAC Solutions Meeting 05/12/2020

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)
Appendix
### High Level M-3 Meeting Schedule

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

4/29/2020 – V1 – Original version posted to pjm.com