Western Sub Regional RTEP: AEP Supplemental Projects

March 14, 2025

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



AEP Transmission Zone M-3 Process Trail Fork, WV

Need Number: AEP-2025-AP003 Process Stage: Need Meeting 03/14/2025 Supplemental Project Driver: Customer Service

Specific Assumption Reference: AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 12).

Problem Statement:

A customer has requested new 138 kV service in Wolf Pen, WV. The requested in-service date is March 2026. Projected Peak Demand: 7MW.





Need Number: AEP-2025-OH005 Process Stage: Need Meeting 03/14/2025 Supplemental Project Driver: Customer Service

Specific Assumption Reference: AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 12).

Problem Statement:

An existing customer served out of AEP's Badger Station in Licking County, OH, has requested an incremental load increase of 154 MW as part of the second phase of their project build out. This will bring the total load for the customer's site to 279 MW. Customer has requested in-service date of July 1, 2026.

AEP Transmission Zone M-3 Process Badger, OH





AEP Transmission Zone M-3 Process Lazelle, OH/Bush, OH

Need Number: AEP-2025-OH006 Process Stage: Need Meeting 03/14/2025 Supplemental Project Driver: Customer Service

Specific Assumption Reference: AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 12)

Problem Statement:

Buckeye Power, Inc. (Buckeye), on behalf of The Energy Cooperative (Licking REC) has requested 25 MW of new capacity at their proposed 138 kV "Groves Corner" delivery point in New Albany Ohio. The new projected demand at this delivery point is 49 MW in Jan-2026 with an expected ultimate load of 103 MW by 2033. Customer has requested in-service date of Jan 31, 2026.



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



AEP Transmission Zone M-3 Process Ormet, OH

Ohio River

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Need Number: AEP-2024-OH040 Process Stage: Solution Meeting SRRTEP-W - 03/14/2025 Previously Presented: Need Meeting 07/19/2024

Project Driver: Customer Service

Specific Assumption References:

AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 12)

Problem Statement:

A customer has request new 138 kV service from Hannibal station. Their anticipated load is 266MW. They have requested service in 2026.



AEP Transmission Zone M-3 Process Ormet, OH

Need Number: AEP-2024-OH040 **Process Stage:** Solution Meeting SRRTEP-W - 03/14/2025

Proposed Solution:

Hannibal - Customer Site 138 kV: Hannibal – Customer 138kV radial Feed: A new radial feed of about 0.2 miles to feed the customer directly from Hannibal station. Estimated Cost: \$3.211 M.
Kammer - Ormet No.1 138 kV Relocation: Relocate Kammer - Ormet No.1 double circuit 138kV line (Hannibal - Kammer 138kV circuits) to enter the Hannibal substation from North Side. This will allow for the Hannibal substation expansion to the West side and which in turn will allow the new customer lines to exit from the South of Hannibal substation. Estimated Cost: \$0.917 M.

Hannibal Station Work: At Hannibal substation to provide service to the customer, expand station yard and both 138kV main bus runs to accommodate new CB strings. A new 138 kV breaker string will be required due to lack of open positions at Hannibal station. Three new 138 kV 63 kA breakers will be necessary allow for customer interconnection. Two 138kV breakers will be relocated to allow for line relocations. Estimated Cost: \$4.462 M.

Transmission Cost Estimate: \$8.59 M

Alternatives Considered:

Cut into Kammer - Hannibal #1 138 kV and Kammer - Hannibal #2 138 kV circuits to build new Stetson Run Substation. The customer will then be served directly from Stetson Run Substation which will be directly north of the customer site.

Projected In-Service: 06/01/2026

Project Status: Scoping









AEP Transmission Zone M-3 Process Kanawha County, WV

Need Number: AEP-2023-AP022

Process Stage: Solution Meeting SRRTEP-W - 03/14/2025

Previously Presented: Need Meeting 09/15/2023

Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Ward Hollow 46 kV Station

• The four 46kV transmission owned circuit breakers CB-D, CB-E, CB-B, and Bus Tie C are 72PM31-20 type, SF6 filled breakers. These breakers are of 1998 vintage. Circuit breakers of this type across the AEP system have had reports of moisture ingress into the breaker tank. This moisture ingress leads to increased maintenance requirements and a higher risk of failure. These breakers have documented issues with failures to close due to burned up coils. There have been five catastrophic failures involving this model type on the AEP system. There are also 98 malfunction records related to SF6 gas leaks across the AEP fleet. SF6 leaks impact the environment.





AEP Transmission Zone M-3 Process Kanawha County, WV

Need Number: AEP-2022-AP031 Process Stage: Solution Meeting SRRTEP-W - 03/14/2025 Previously Presented: Need Meeting 05/19/2022

Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8), AEP Presentation on Pre-1930s Lines

Problem Statement:

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Turner – Ward Hollow 46 kV Line (~5 miles). Line segments included in the need are from Str. 359-203 to Str. 1189-24 and from Str. 359-174A to Str. 718-2.

The sections described above were constructed in 1920 and consist of lattice type structures and wood pole structures, 4/0 CU conductor and 336 ACSR conductor

- Specific to this pre 1930s line lattice structures on the line are displaying the following:
 - Galvanized coating mostly worn off
 - Lattice steel rusting
 - Visible corrosion of shield wire
 - Ovalization at wire attachment points
 - Hardware & Insulator end fittings moderate deterioration
 - Significant below grade section loss & corrosion
- Wood poles display the following:
 - Woodpecker holes
 - Pole top weathering
 - Moderate deterioration & rusting of hardware
 - Crossarm & Crossarm block splitting
 - Pole cracking and weathering
- Circuit fails to meet 2017 NESC Grade B loading criteria, AEP structural strength requirements and fails to meet the current ASCE structural strength requirements.
- Legacy butt wrap grounding on the wood poles is inadequate for current AEP standards
- Since 2017 there have been 5 momentary outages and 8 permanent outage on the Turner/Chemical Ward Hollow 46 kV line
 - Momentary outages were due to wind, and lightning
 - Permanent outages were due to vegetation fall-in outside AEP ROW, lightning, and wind





AEP Transmission Zone M-3 Process Kanawha County, WV

Need Number: AEP-2022-AP031 Process Stage: Solution Meeting SRRTEP-W - 03/14/2025 Previously Presented: Need Meeting 05/19/2022

Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8), AEP Presentation on Pre-1930s Lines

Problem Statement:

Turner – Ward Hollow 46 kV Line (~5 miles). Line segments included in the need are from Str. 359-203 to Str. 1189-24 and from Str. 359-174A to Str. 718-2.

- Condition & Impacts of the Degraded pre-1930s Era System
 - These transmission line assets are clearly in the accelerated deterioration phase of their life.
 - Significant deterioration results in loss of strength and performance posing a significant risk of failure under conditions the assets should be able to withstand.
 - May cause frequent and extended outages
 - May create significant economic losses
 - May endanger public safety
- Conditions of System
 - Towers: Typical life of galvanizing is 70 years. The towers are all supported by steel grillage foundations buried in the ground. The tower leg is subject to significant risk of corrosion where it enters the ground. Lattice tower structures have little structural redundancy. A failure of one member of the structure will impact the integrity of the structure and may cause the entire tower to collapse.
 - Insulator & Hardware Corrosion: The connecting elements including the tower attachment hole and the insulator hook have experienced serious section loss due to corrosion and wear. This loss of metal cross-section significantly reduces the capacity of the connection. The insulator caps and connecting hardware have experienced heavy to complete loss of galvanizing. When the protective galvanized coating is gone or is significantly compromised, the bare steel corrodes at an accelerated rate.
 - Broken Insulators: Broken, cracked and otherwise damaged insulators lead to premature flashover causing permanent outages. When the insulator assembly breaks, the wire falls to the ground potentially damaging other conductors, and presents an increased public safety concern.
 - Conductor: Aluminum Conductor Steel Reinforced (ACSR) conductor consists of aluminum strands
 wrapped around a core of galvanized steel strands. The steel provides the structural strength. Like other
 steel elements, the strands of the core have also lost the galvanized coating and steel section. The
 degraded state results in significant loss of tensile strength and potential risk to the public if the
 conductor was to fail and fall to the ground. Conductor damage is usually not visible in a field inspection.
 Specific conductor samples, from the belly of the sag (lowest point) and/or inside the clamps at the
 insulators, have confirmed significant corrosion. During the restoration or construction activities,
 conductors often break at adjacent locations due to handling, introducing a potential safety risk and
 increase public safety concern.





Need Number: AEP-2022-AP031, AEP-2023-AP022 **Process Stage:** Solution Meeting SRRTEP-W - 03/14/2025

Proposed Solution:

Turner - Ward Hollow 46 kV Rebuild: Rebuild existing Turner – Ward Hollow 46 kV line sections from Turner Station to Str. 359-213 (0.8 mi) and from Str. 359-203 to Str. 1189-24 (3.3 mi) and from Str. 359-174 to Str. 718-2 (1.8 mi double circuit). Higher than normal costs are driven by a river crossing and limited route options in a heavily congested industrial corridor on the double circuit section. Estimated Cost: \$30.4 M

Ward Hollow Station: Replace existing 46 kV circuit breakers B, C and D with new 40 kA 3000 A circuit breakers. Estimated Cost: \$2.7 M

Transmission Cost Estimate: \$33.1 M

Alternatives Considered:

Approximately 2.2 miles of the total 8.1 miles on the Turner - Ward Hollow 46 kV line have previously been rebuilt. No viable alternative to address the remaining 5.9 miles to be rebuilt on the proposed project. Retirement of the line is not an option as multiple customer stations are served from the line and cannot be relocated to a different delivery point.

Projected In-Service: 08/01/2027 Project Status: Scoping





AEP Transmission Zone M-3 Process Horizon, OH

Need Number: AEP-2024-OH046 Process Stage: Solution Meeting SRRTEP-W - 03/14/2025 Previously Presented: Need Meeting 12/13/2024 Project Driver: Customer Service Specific Assumption References: AER Connection Paguiroments for the AER Transmission Systems

AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 12)

Problem Statement:

AEP Ohio has requested additional distribution deliveries at the proposed Horizon station (s3442.4) to complete the build out for the signed load connected to the station. The total anticipated peak load at Horizon station is approximately 300 MW. The requested in-service date for the distribution facilities is 7/15/2026.





AEP Transmission Zone M-3 Process Ormet, OH

Need Number: AEP-2024-OH046 Process Stage: Solution Meeting SRRTEP-W - 03/14/2025

Proposed Solution:

Horizon 138 kV Station: Due to the increased additional distribution capacity request, AEP Ohio would be adding three more distribution banks to the proposed (submitted under PJM s3442.4) Horizon station by adding (4) 80 kA, 4000 A 138 kV circuit breakers. Estimated Cost: \$3.67 M

Badger - Fiesta 138 kV Line: Construct a greenfield ~1.5 mile of single circuit line, utilizing 2-bundled ACSR Falcon 1590 (54/19) conductor, connecting Badger and Fiesta stations. This scope addresses the expected overload on the existing 450MVA-345/138 kV transformer at Jug St station under a N-1-1 contingency scenario with the increased load at Horizon station. Estimated Cost: \$11.39 M

Badger 138 kV Station: Install (1) 80 kA, 4000 A 138 kV circuit breaker to connect Badger – Fiesta line. Estimated Cost: \$1.475 M

Fiesta 138 kV Station: Install (1) 80 kA, 4000 A 138 kV circuit breaker to connect Badger – Fiesta line. Estimated Cost: \$1.519 M

Transmission Cost Estimate: \$18.054 M

Alternatives Considered:

No cost-effective alternatives were identified for the direct service to customer from Horizon station. An alternative to building the Badger - Fiesta line would be to replace the 450 MVA-345/138 kV transformer at Jug St with a larger unit. However, with more load growth expected in the area, it has been shown that the new transformer will also eventually be overloaded without this new line. Replacing the transformer also does not eliminate 300MW load drop concerns.

Projected In-Service: 07/15/2026 Project Status: Engineering





AEP Transmission Zone M-3 Process Greenbrier County, WV

Need Number: AEP-2023-AP017 Process Stage: Solution Meeting SRRTEP-W - 03/14/2025 Previously Presented: Need Meeting 07/21/2023

Project Driver:

Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Hinton Station

- 138 kV circuit breakers A, B, C
 - HVB145-4000 type, SF6 filled breakers
 - The HVB145 model family has the propensity to mechanically pump closed instead of locking open as it awaits an electrical close command from the relaying. This presents a high misoperation risk on the system. The HVB breakers have had some failures due to slow tripping with the breakers not reclosing faster than 20 cycles. Also, this model family has a high occurrence of SF6 gas leaks with 215 recorded malfunction records. This is an environmental concern since SF6 is a potent greenhouse gas with a high global warming potential, and its concentration in the earth's atmosphere is rapidly increasing. In addition, low SF6 causes operational issues with the breaker which can lead to excessive maintenance of closing contacts or failure. CBs A and C have active SF6 leaks.
- 37 of the 40 relays (93% of all station relays) at the station are in need of rehabilitation
 - 28 relays are electromechanical type which have significant limitations with regards to fault data collection and retention.
 - 4 static relays which have significant limitations with regards to spare part availability and fault data collection and retention.
 - 5 legacy MP relays with significant limitations regarding spare part availability and no vendor support and obsolete firmware.
- Hinton Station ties with Allegheny Power Services (APS), which is connected to the 138kV Bus at Hinton with no circuit breaker. This lack of sectionalizing creates a scenario where a fault on this tie outages the entire bus at Hinton and contains more than two zones of overlapping protection.





Need Number: AEP-2023-AP017 **Process Stage:** Solution Meeting SRRTEP-W - 03/14/2025

Proposed Solution:

Hinton Station: Replace existing 138 kV CBs A, B, C, with three new 3000 A, 40 kA 138 kV CBs. Replace switch "W" on the FE tie line with a new 3000 A, 40 kA 138 kV CB. 37 of the 40 relays are in need of replacement (28 EM, 4 static and 5 MP) Replace existing RTU. Install a new DICM. Upgrade existing metering on tie with First Energy.. Estimated Cost: \$6.3 M

Grandview Remote End: Remote end work at Grandview Station to accommodate the new breakers at Hinton Station. Estimated Cost: \$0.6 M

Glen Lyn Remote End: Remote end work at Glen Lyn Station to accommodate new breakers at Hinton Station.. Estimated Cost: \$0.9 M

Transmission Cost Estimate: \$7.8 M

Alternatives Considered:

Rebuild the station in a 4 breaker ring configuration. This configuration is not preferred by PCE or EDOPS. The existing capacitor bank would also need to share a breaker position with one of the 138 kV lines in the ring which is not ideal from a PCE coordination perspective. Additionally this would require a station expansion as well as extended outages and would likely be more expensive than the proposed. Estimated cost: \$10M

Projected In-Service: 11/05/2029

Project Status: Scoping

AEP Transmission Zone M-3 Process Ormet, OH



SRRTEP-Western – AEP Supplemental 3/14/2025

Appendix

High Level M-3 Meeting Schedule

Assumptions

Activity	Timing
Posting of TO Assumptions Meeting information	20 days before Assumptions Meeting
Stakeholder comments	10 days after Assumptions Meeting

Needs

Solutions

Submission of Supplemental Projects & Local Plan

Stakeholder comments	10 days after Needs Meeting
Activity	Timing
TOs and Stakeholders Post Solutions Meeting slides	10 days before Solutions Meeting
Stakeholder comments	10 days after Solutions Meeting

Timing

10 days before Needs Meeting

Activity	Timing
Do No Harm (DNH) analysis for selected solution	Prior to posting selected solution
Post selected solution(s)	Following completion of DNH analysis
Stakeholder comments	10 days prior to Local Plan Submission for integration into RTEP
Local Plan submitted to PJM for integration into RTEP	Following review and consideration of comments received after posting of selected solutions

Activity

TOs and Stakeholders Post Needs Meeting slides

Revision History

3/04/2025–V1 – Original version posted to pjm.com