

TEAC: AEP Supplemental Projects

December 3rd, 2024

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 Fall Creek, IN

Need Number: AEP-2024-IM013

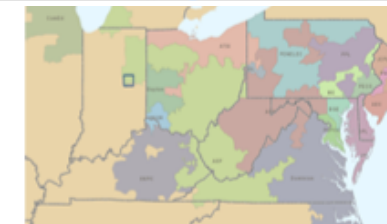
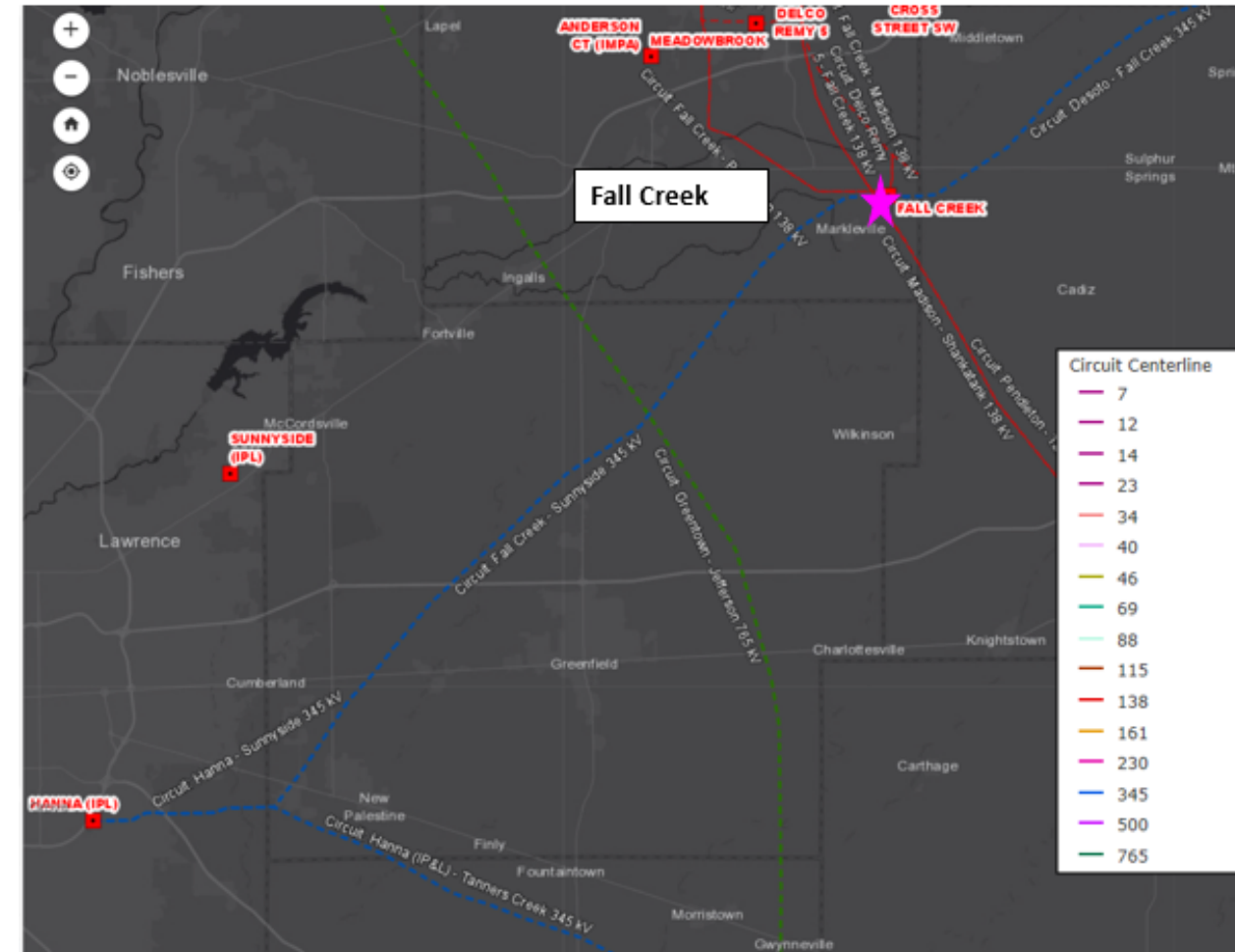
Process Stage: Need Meeting – 12/03/2024

Supplemental Project Driver: Operational Flexibility and Efficiency

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions slide 14)

Problem Statement:

AES-Indiana (a MISO member) will be removing and retiring their Fall Creek 345 kV circuit breakers “L” and “K2” which have reached their end of life. These are the only AES-Indiana owned assets at AEP’s Fall Creek 345 kV station. This removal will affect the operational reliability of the system by creating a three-terminal line, an operating configuration that presents protection challenges and could result in mis-operations or over-tripping of the remaining AEP breakers in the station.



AEP Transmission Zone M-3 Process Greentown, IN

Need Number: AEP-2024-IM018

Process Stage: Need Meeting – 12/03/2024

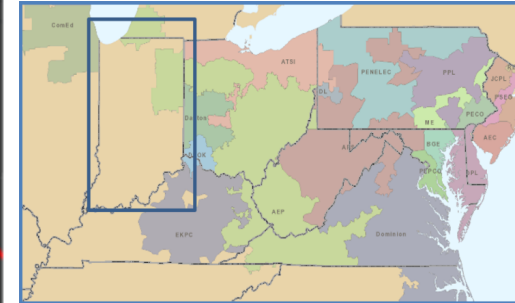
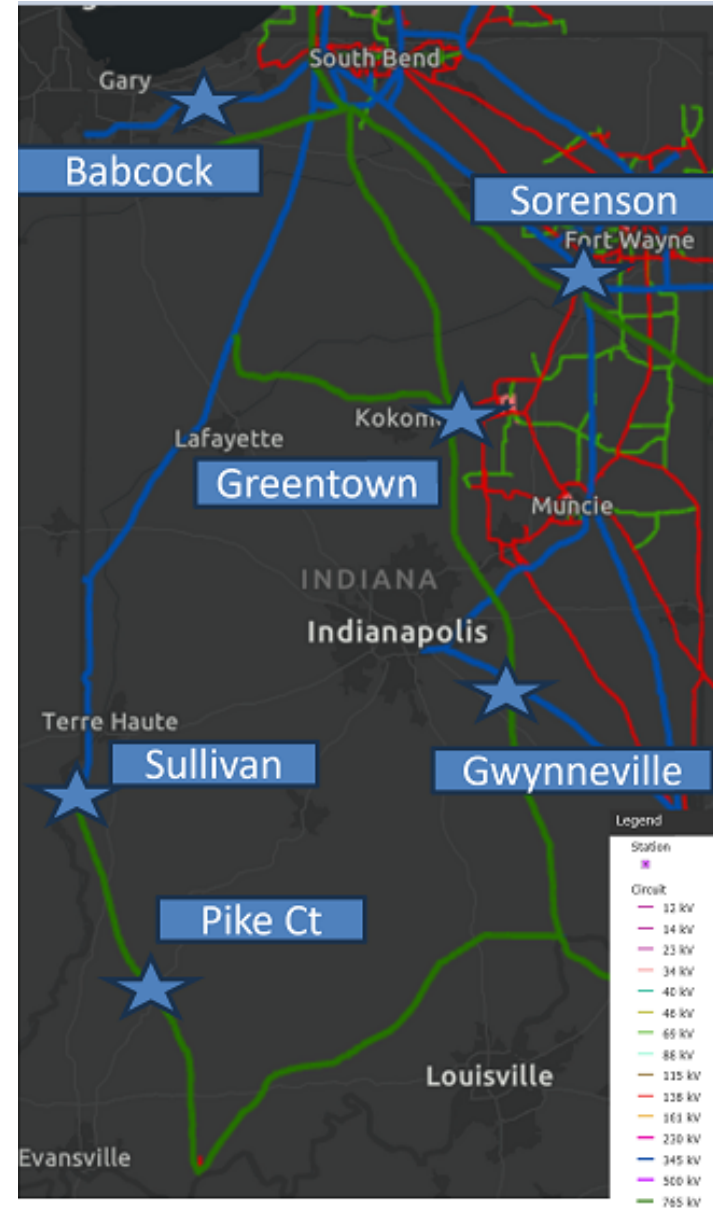
Supplemental Project Driver: Other

Specific Assumption Reference: Other Requests - AEP Assumptions Slide 16

Problem Statement:

The following needs are the result of MISO's request to connect certain portions of their Tranche 2 projects to the PJM transmission system via several AEP locations. Because these MISO requests may result in potential PJM system impacts, AEP is bringing these through the M-3 process to allow PJM to conduct do-no-harm analysis and identify potential planning criteria violations caused by the MISO requests. AEP at this point has not identified any large-scale issues resulting from the MISO proposals.

- MISO has requested two new 345kV line interconnections into AEP's Sullivan station from Fairbanks 345kV and Dresser 345kV. To facilitate this, work will be needed at the PJM Sullivan 765/345kV station.
- MISO has requested two new 765kV line interconnections into AEP's Sorenson station from Greentown 765kV and Lulu 765kV. To facilitate this, work will be needed at the PJM Sorenson 765/345/138kV station.
- MISO has requested a new 765KV substation on the Rockport – Sullivan 765kV line. To facilitate this station, work will be needed on the Rockport – Sullivan 765kV PJM asset.
- MISO has requested a new station to be constructed to tie the Jefferson – Greentown 765 and the Hanna – Tanners Creek 345kV lines together into a new "Gwynneville" 345kV substation. To facilitate this, work will be needed on the Jefferson – Greentown 765kV PJM asset and the Hanna – Tanners Creek 345kV PJM asset.
- MISO has requested cutting the Olive – University Park 345kV and Olive – Green Acres 345 kV lines into the existing Babcock 345kV substation. To facilitate this, work will be needed on the Olive – University Park/Green Acres double circuit 345kV line.
- MISO requested an in-service date of 06/01/2032.



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 Western Indiana and Central Ohio

Need Number: AEP-2023-IM015

Process Stage: Solutions Meeting 12/03/2024

Previously Presented: Needs Meeting 5/9/2023

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

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

Problem Statement:

Paper Expanded/Air Expanded (PE/AE) Lines in AEP

- The specific conductors of concern are as follows:
 - 1,275,000 CM ACSR/PE 54/19
 - 1,414,000 CM ACSR/AE 62/19
 - 1,414,000 CM ACSR/PE 62/19 (Falbo)
 - 1,708,000 CM ACSR/AE 66/19
 - 1.75 ACSR AE
- There are approximately 570 miles of PE/AE lines throughout AEP's 345kV footprint. Many of the PE/AE lines are built on double circuit towers making the conductor miles approximately 1,114 miles on the AEP system
- The Centre for Energy Advancement through Technological Innovation (CEATI) Report No. T144700-3257: Statistical Data and Methodology for Estimating the Expected Life of Transmission Line Components provides a timeframe of anticipated useful life of the various transmission line equipment as guided by industry experience. The CEATI estimated expected life of conductor is 40-80 years. AEP focuses on evaluating the condition and performance of each asset and the risk that the failure of each poses to the system, connected customers, personnel, and the public.
- The PE/AE conductor types are no longer standard conductor types used by AEP and the general utility industry.
 - Vendors do not have this conductor type readily available for purchase. This conductor type requires specialized splices and assemblies, which are not readily available for purchase from vendors. Special orders are required to obtain this equipment, causing long lead times for materials.
- AEP has concerns of increased core corrosion on the PE/AE conductor fleet. These concerns are based on the review of conductor samples following recovery events.

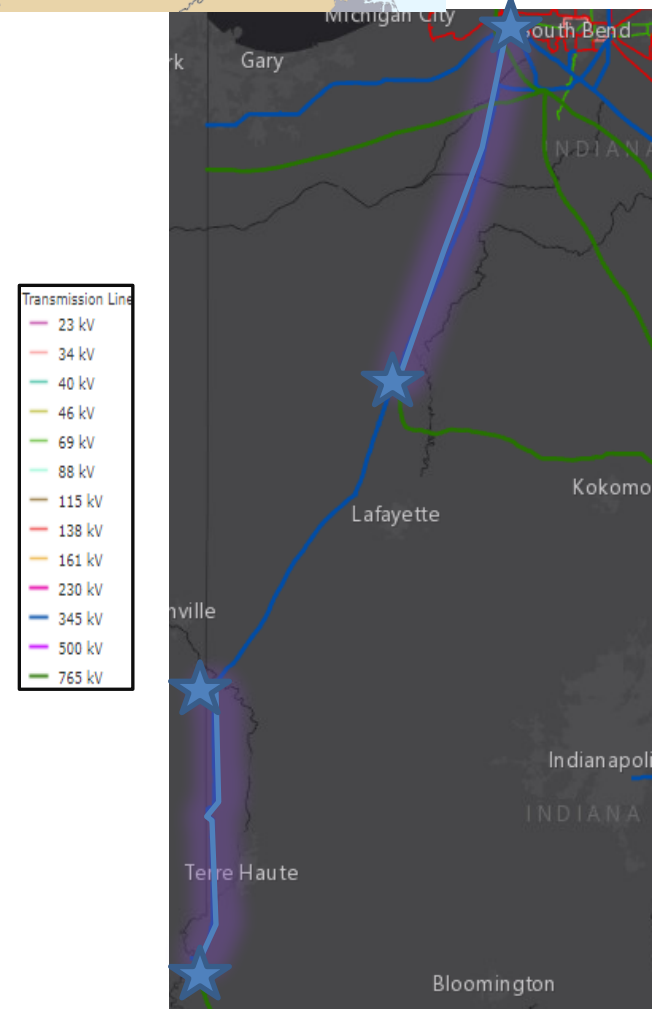
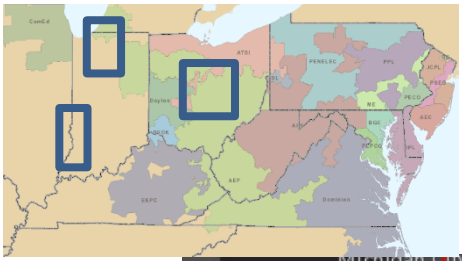


Figure 1: Western Indiana

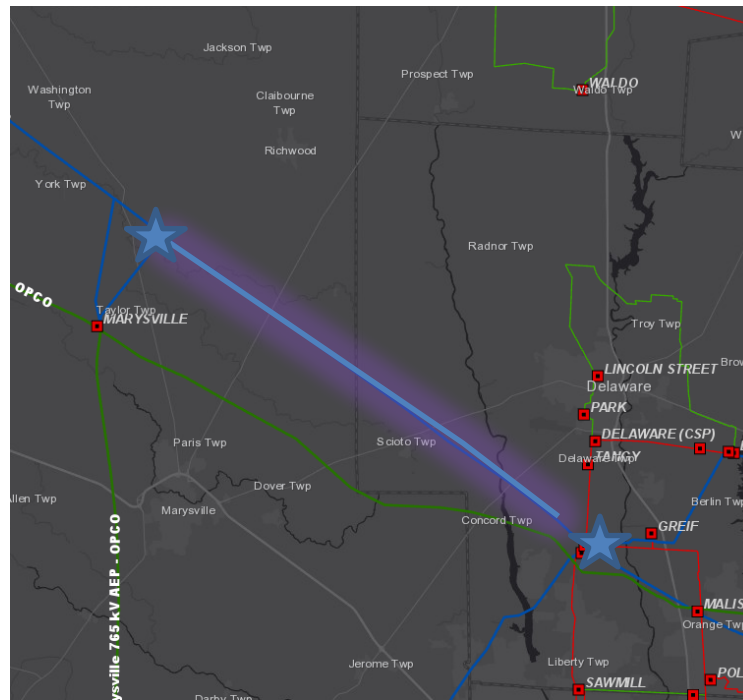


Figure 2: Central Ohio

Need Number: AEP-2023-IM015

Process Stage: Solutions Meeting 12/03/2024

Previously Presented: Needs Meeting 5/9/2023

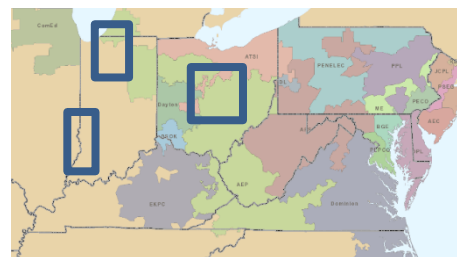
Supplemental Project Driver: Equipment Material/Condition/Performance/Risk

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

Problem Statement:

Paper Expanded/Air Expanded (PE/AE) Lines in AEP

- Corrosion related conditions are an indicator of the elevated risk of conductor or equipment failure.
- The degraded state of corroded conductor cores result in significant loss of tensile strength and potential risk to the public if the conductor were to fail and fall to the ground. This can also lead to unplanned outages on the 345kV circuits.
- Due to the lack of conductor availability, standard conductor is spliced in when needed. Each conductor type has different weights, which can affect ratings and structure overloads. When the weight of the wire is increased, the existing structures can be overloaded.
- AEP anticipates a timeline of over 20 years to address the imminent needs of the 570 line miles of 345kV. This timeline was created assuming best scenario and could be impacted if there are any ROW concerns, material acquisition concerns or operational limitations. Limitations of 345kV outages in the summers are expected
 - If AEP addresses 2 of these lines at a time this could impact 4x 345kV circuits. Taking several outages on the 345kV system at once could have operational challenges
- In order to address these needs within the next 20+ years, AEP needs to begin planning solutions for PE/AE lines today
- Even though the conductor needs to be evaluated for each line, it is possible that we will be able to use existing structures where feasible. Each of these circuits will need to be evaluated individually and recommended solutions will be shared with stakeholders in accordance with M-3 provisions



AEP Transmission Zone M-3 Process Western Indiana and Central Ohio

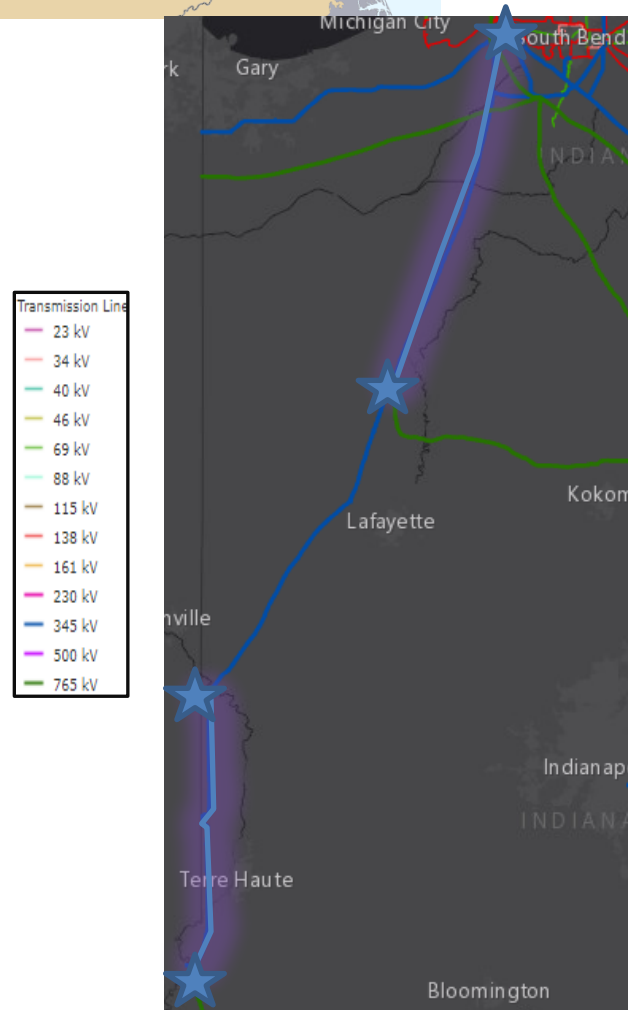


Figure 1: Western Indiana

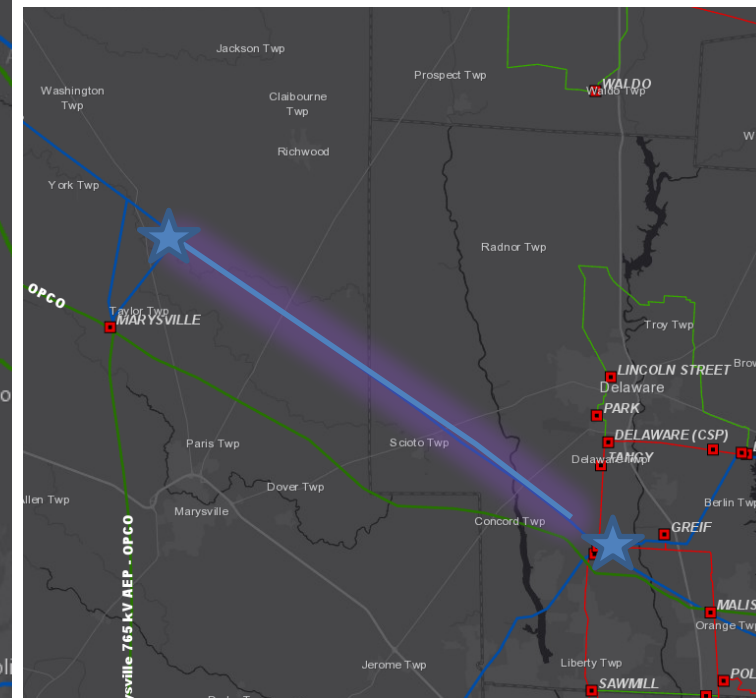


Figure 2: Central Ohio

Paper Expanded conductor samples were observed following the 2019 Memorial Day Tornadoes in the Indiana and Michigan footprint. Corrosion of the cores can be seen in the pictures below.



AEP Transmission Zone M-3 Process Western Indiana and Central Ohio

- Need Number:** AEP-2023-IM015
- Process Stage:** Solutions Meeting 12/03/2024
- Previously Presented:** Needs Meeting 5/9/2023
- Supplemental Project Driver:** Equipment Material/Condition/Performance/Risk
- Specific Assumption Reference:** AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)
- Problem Statement:**
- Paper Expanded/Air Expanded (PE/AE) Lines in AEP**
- Olive Reynolds 345kV Line Need
- Majority of the 68.1 miles long (299/306 structures) is constructed from 1957 double circuit steel lattice towers
 - On the Olive-Reynolds #1 and #2 Circuits:
 - 135 miles of the 136 miles of conductor is 1,414,000 CM ACSR/PE Conductor
 - There were at least 30 structures throughout the line that were assessed. Every assessed structure was showing signs of corrosion. Several of the assessed structures were showing hardware needs such as a bent conductor damper rubbing on the wire and flashed or broken insulators.
 - Currently, there are 168 structures with at least one open condition (excluding forestry concerns), which relates to 55% of the structures on the line segment. These open conditions include, but are not limited to the following:
 - Galvanizing loss, loose, or missing lacing, broken conductor or shield wire strands, broken or loose conductor hardware, broken burnt or chipped insulators, damaged insulator assembly hardware, and broken shield sirc hardware.

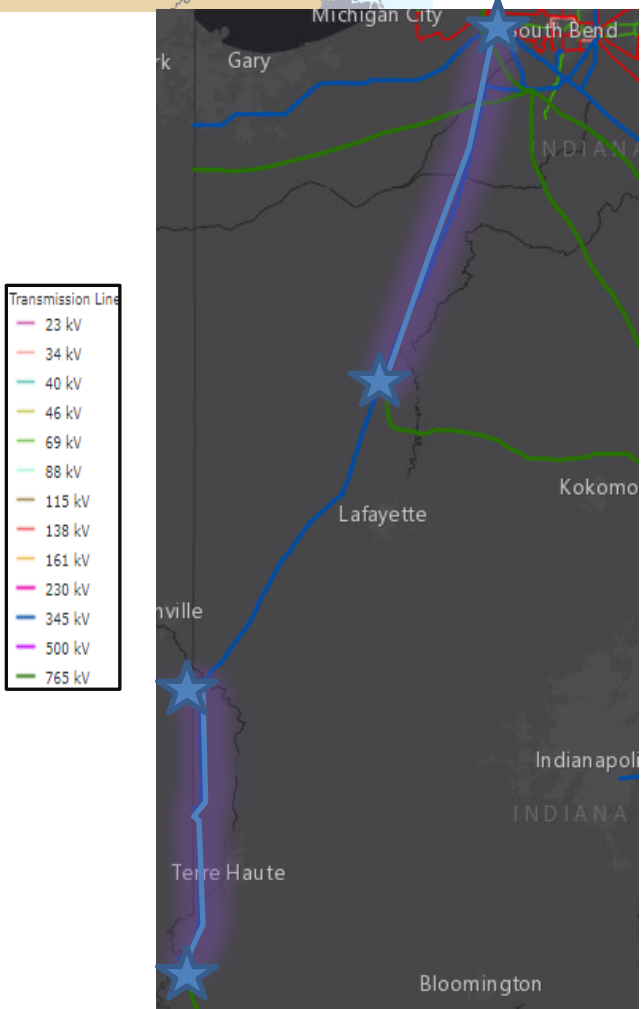
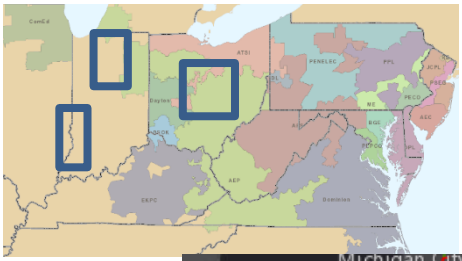


Figure 1: Western Indiana

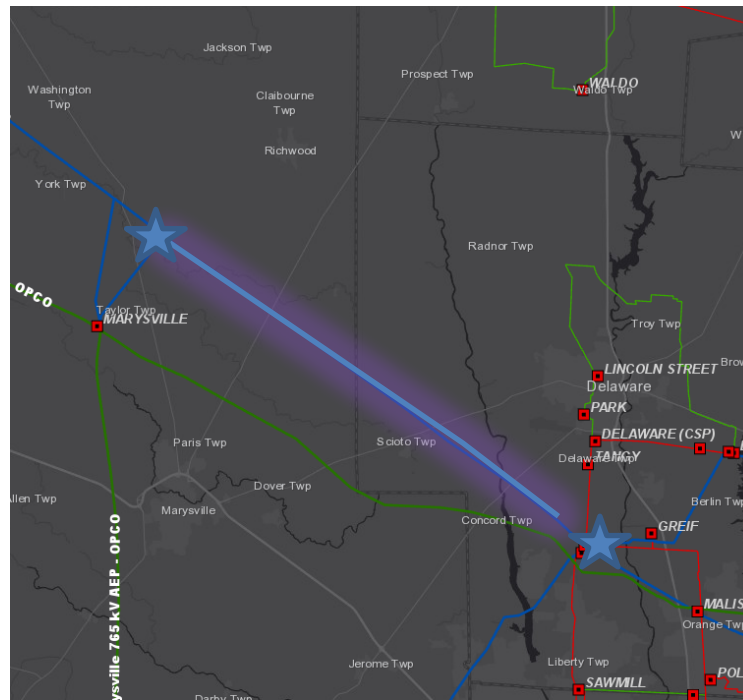


Figure 2: Central Ohio

AEP Transmission Zone M-3 Process Western Indiana and Central Ohio

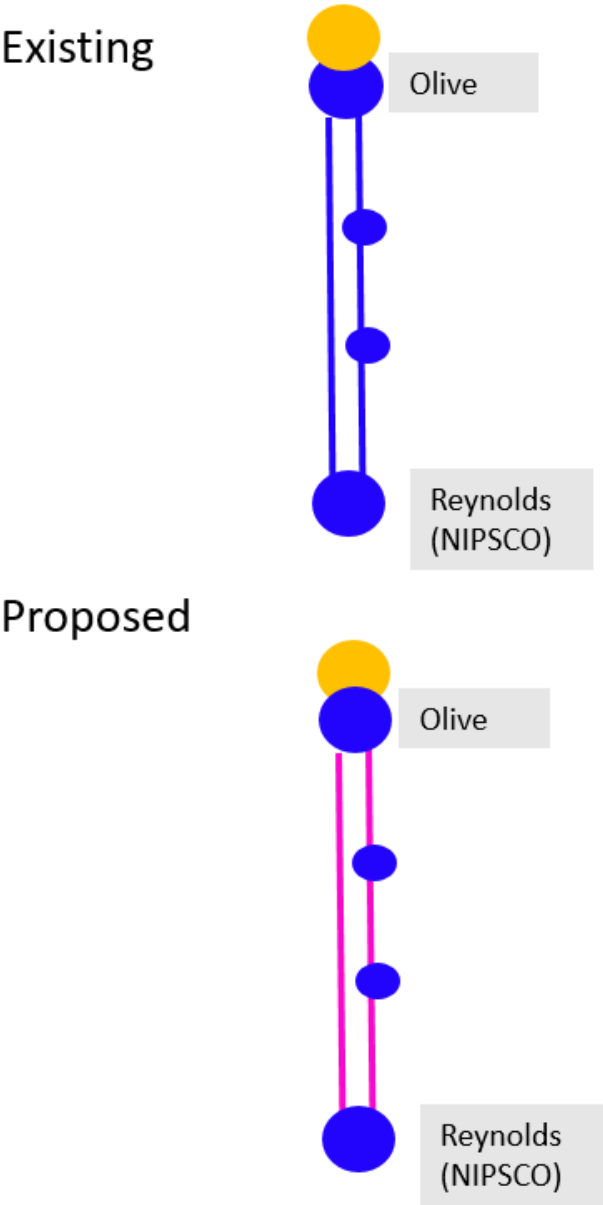
Need Number: AEP-2023-IM015
Process Stage: Solutions Meeting 12/03/2024

Proposed Solution:
Olive - Reynolds 345kV: Rebuild ~68.1 miles of double circuit 345kV on centerline. Costs include transmission line removal, OPGW, and Right of Way. Estimated Cost: \$452.64

Transmission Cost Estimate: \$452.64 M

Alternatives Considered:
Due to the large amount of IPP connections on both sides of the circuit (~28x projects in queue) on this line, no alternative to retire the Olive-Reynolds 345kV double circuit is a viable option.
Alternate to reconductor the 68.1 miles of 345kV line was considered. Due to tower conditions noted in needs slide, this alternate was not selected.

Projected In-Service: 05/30/2031



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

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

Solutions

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

Submission of Supplemental Projects & Local Plan

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

Revision History

11/22/2024 – V1 – Original version posted to pjm.com