

# Transmission Expansion Advisory Committee FirstEnergy Supplemental Projects

March 05, 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

**Need Numbers:** PN-2024-009

**Process Stage:** Need Meeting 03/05/2024

**Project Driver:**

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference:**

System Performance Global Factors

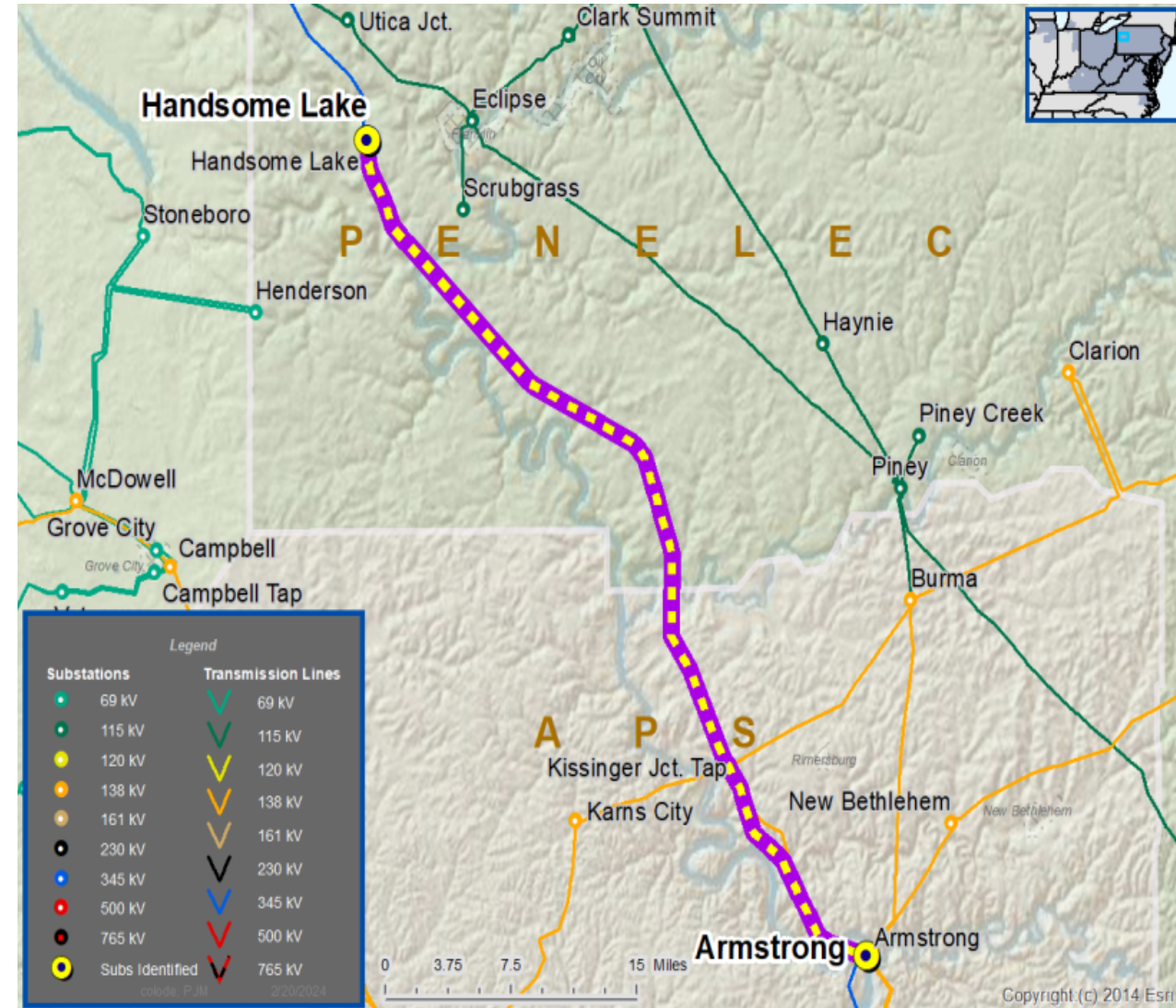
- Past system reliability/performance
- Substation/Line equipment limits

Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures

**Problem Statement:**

- The Armstrong – Handsome Lake 345 kV ARHL Line was constructed 57 years ago. The line is approximately 34 miles long with 176 wooden H-frame structures.
- Recent inspections have indicated that the line is exhibiting deterioration. Inspection findings include woodpecker damage, top rot, groundline decay, cracking and delamination of cross-arms. These findings have resulted in increased maintenance costs.
  - 65 structures are phase-raised.
  - 49 structures require repairs due to deterioration.
  - 81 structures require repairs to insulators and related hardware due to deterioration, indicating that the components are approaching end of life.
- Since 2015, the line has had six unscheduled outages. Two outages were due to failure of line equipment.
- Existing Transmission Line Rating:
  - 1269 / 1566 / 1471 / 1898 MVA (SN/SE/WN/WE)



**Need Numbers:** PN-2024-010

**Process Stage:** Need Meeting 03/05/2024

**Project Driver:**

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference:**

System Performance Global Factors

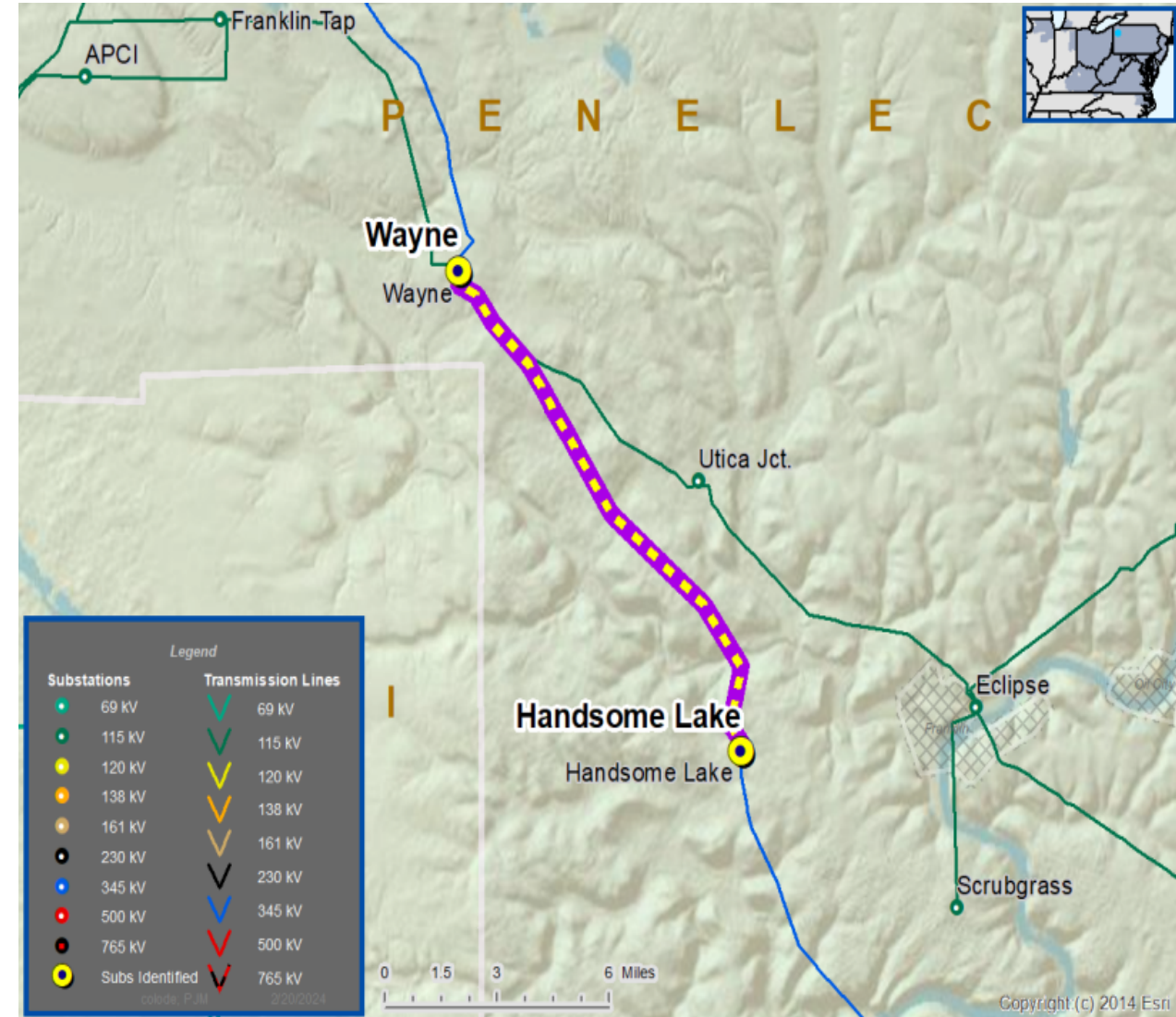
- Past system reliability/performance
- Substation/Line equipment limits

Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures

**Problem Statement:**

- The Handsome Lake – Wayne 345 kV WHL Line was constructed 57 years ago. The line is approximately 19 miles long with 100 wooden H-frame structures.
- Recent inspections have indicated that the line is exhibiting deterioration.
  - 71 structures failed inspection due to sound, woodpecker damage, top rot, decay, cracking, and/or delamination of cross-arms. These findings have resulted in increased maintenance costs.
  - 57 structures are phase-raised.
- Since 2017, the line has had two unscheduled outages.
- Existing Transmission Line Rating:
  - 1269 / 1566 / 1471 / 1898 MVA (SN/SE/WN/WE)



**Need Numbers:** PN-2024-011

**Process Stage:** Need Meeting 03/05/2024

**Project Driver:**

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference:**

System Performance Global Factors

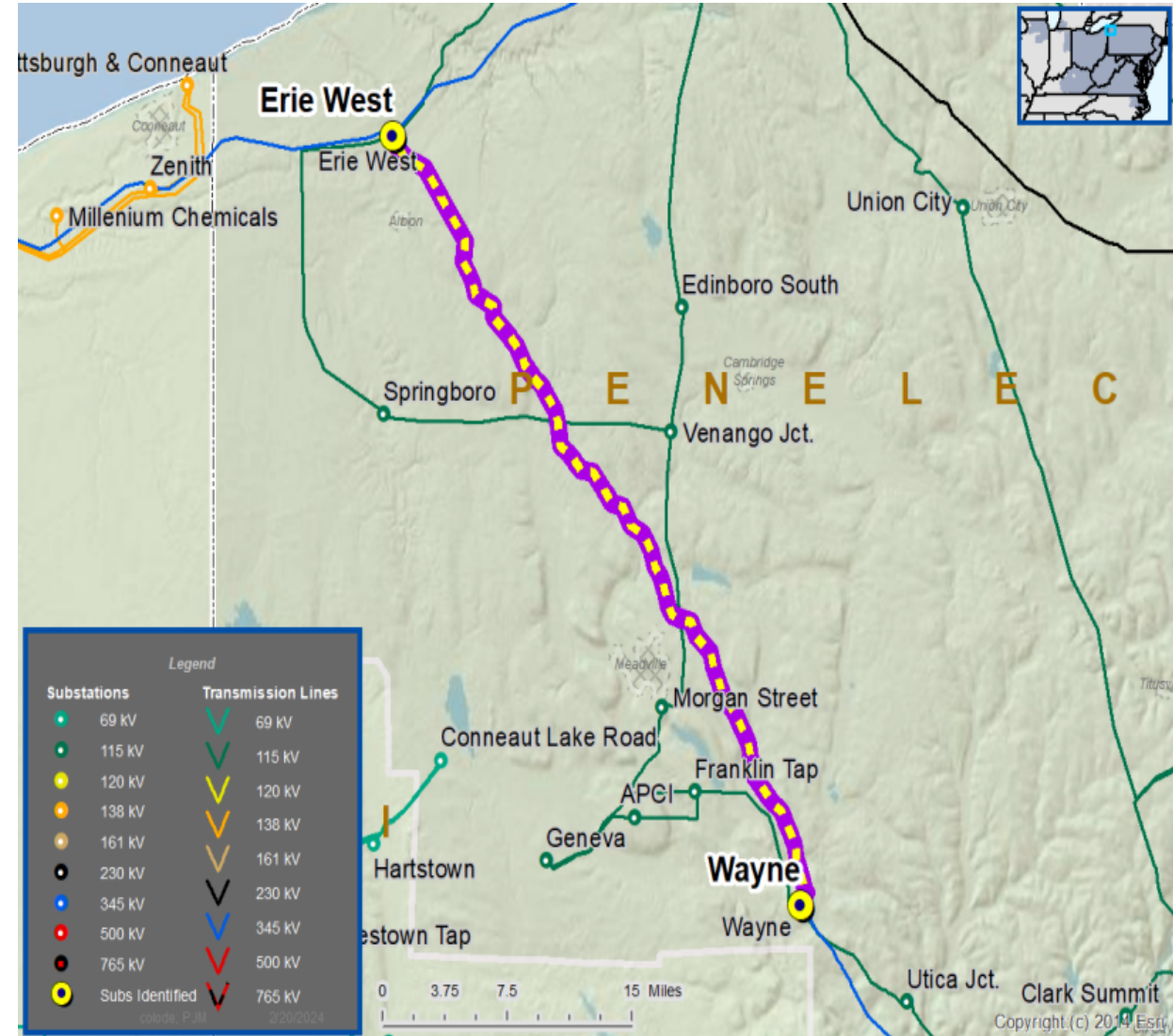
- Past system reliability/performance
- Substation/Line equipment limits

Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures

**Problem Statement:**

- The Erie West – Wayne 345 kV WEW Line was constructed 57 years ago. The line is approximately 36 miles long with 192 wooden H-frame structures.
- Recent inspections have indicated that the line is exhibiting deterioration. Inspection findings include woodpecker damage, top rot, decay and delamination of cross-arms. These findings have resulted in increased maintenance costs
  - 59 structures require repairs due to deterioration.
  - 6 structures require replacement due to deterioration.
  - 126 structures are phase-raised.
  - 44 structures require repairs to insulators and related hardware deterioration, indicating that the components are reaching end of life.
- Since 2016, the line has had five unscheduled outages. Two outages were due to failure of line equipment.
- Existing Transmission Line Rating:
  - 1269 / 1566 / 1471 / 1898 MVA (SN/SE/WN/WE)



# 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 Numbers:** PN-2023-019

**Process Stage:** Solution Meeting 03/05/2024

**Previously Presented:** Need Meeting 12/05/2023

**Project Driver:**

*Equipment Material Condition, Performance and Risk*

*Operational Flexibility and Efficiency*

**Specific Assumption Reference:**

System Performance Projects Global Factors

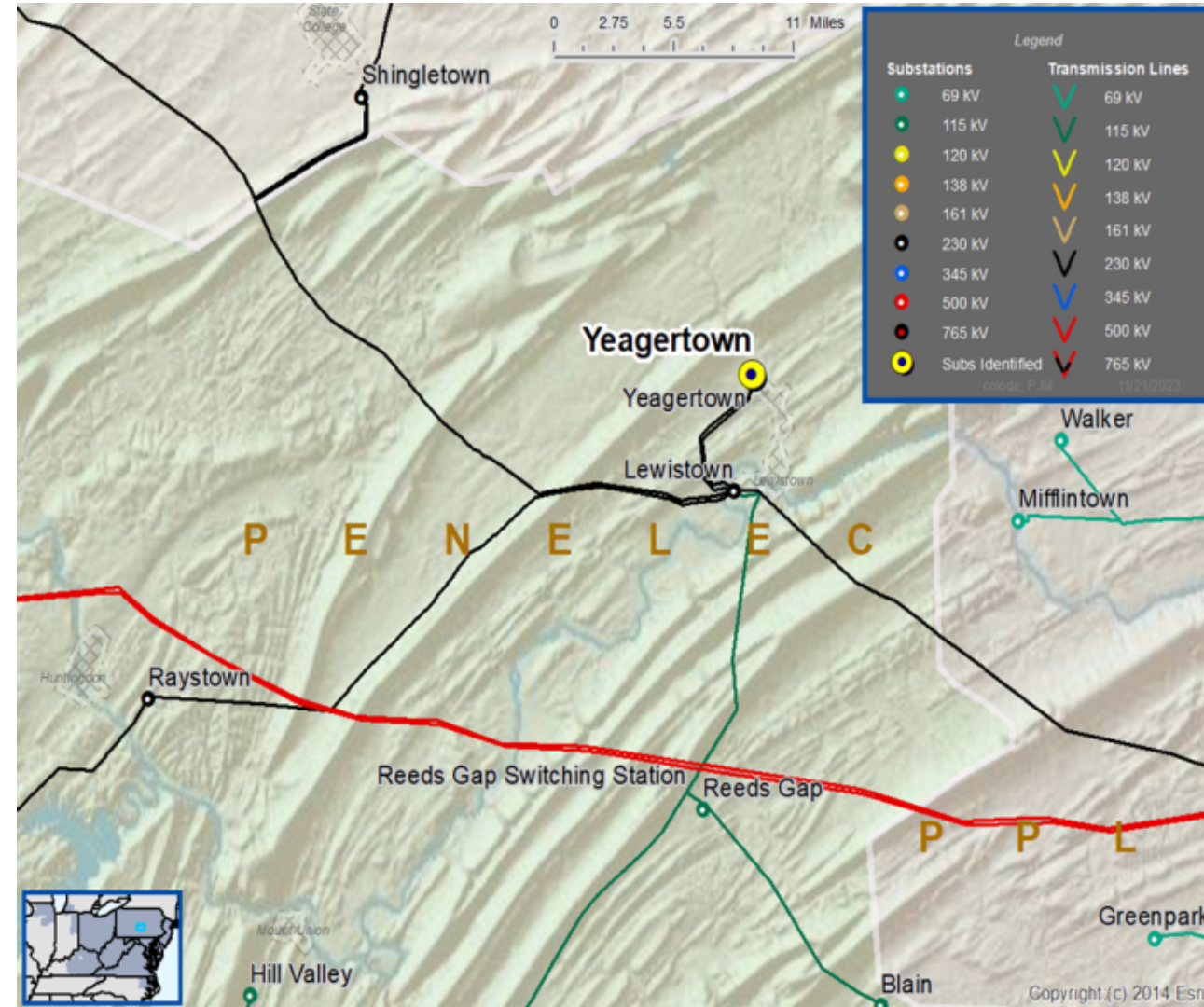
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

**Problem Statement:**

- The existing Yeagertown No. 1 230-46 kV Transformer is approximately 51 years old and is reaching end of life.
- The transformer is constructed with Type U bushings.
  - Type U bushing designs have been documented to dramatically increase the risk of bushing failures.
- Existing transformer ratings:
  - 83/83/83/83 MVA (SN/SLTE/WN/WLTE)



**Need Number:** PN-2023-019

**Process Stage:** Solution Meeting 3/5/2024

**Proposed Solution:**

At Yeagertown Substation:

- Replace the Yeagertown No. 1 230-46 kV Transformer.
- Replace transformer relaying.

**Transformer Ratings:**

Yeagertown No. 1 230-46 kV Transformer:

- Before Proposed Solution: 83 / 83 / 83 / 83 MVA (SN/SSTE/WN/WSTE)
- After Proposed Solution: 91 / 109 / 112 / 134 (SN/SSTE/WN/WSTE)

**Alternatives Considered:**

Maintain existing condition with elevated risk of failure.

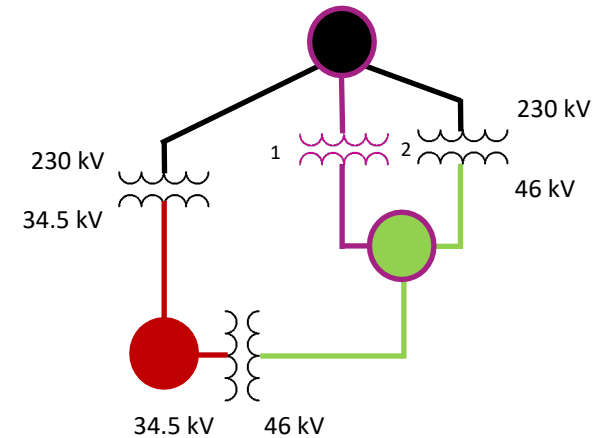
**Estimated Project Cost:** \$3.50M

**Projected In-Service:** 10/17/2025

**Project Status:** Pre-Engineering

**Model:** 2023 RTEP model for 2028 Summer (50/50)

**Yeagertown Substation**



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	



**Need Numbers:** PN-2023-020

**Process Stage:** Solution Meeting 03/05/2024

**Previously Presented:** Need Meeting 12/05/2023

**Project Driver:**

*Equipment Material Condition, Performance and Risk*

*Operational Flexibility and Efficiency*

**Specific Assumption Reference:**

System Performance Projects Global Factors

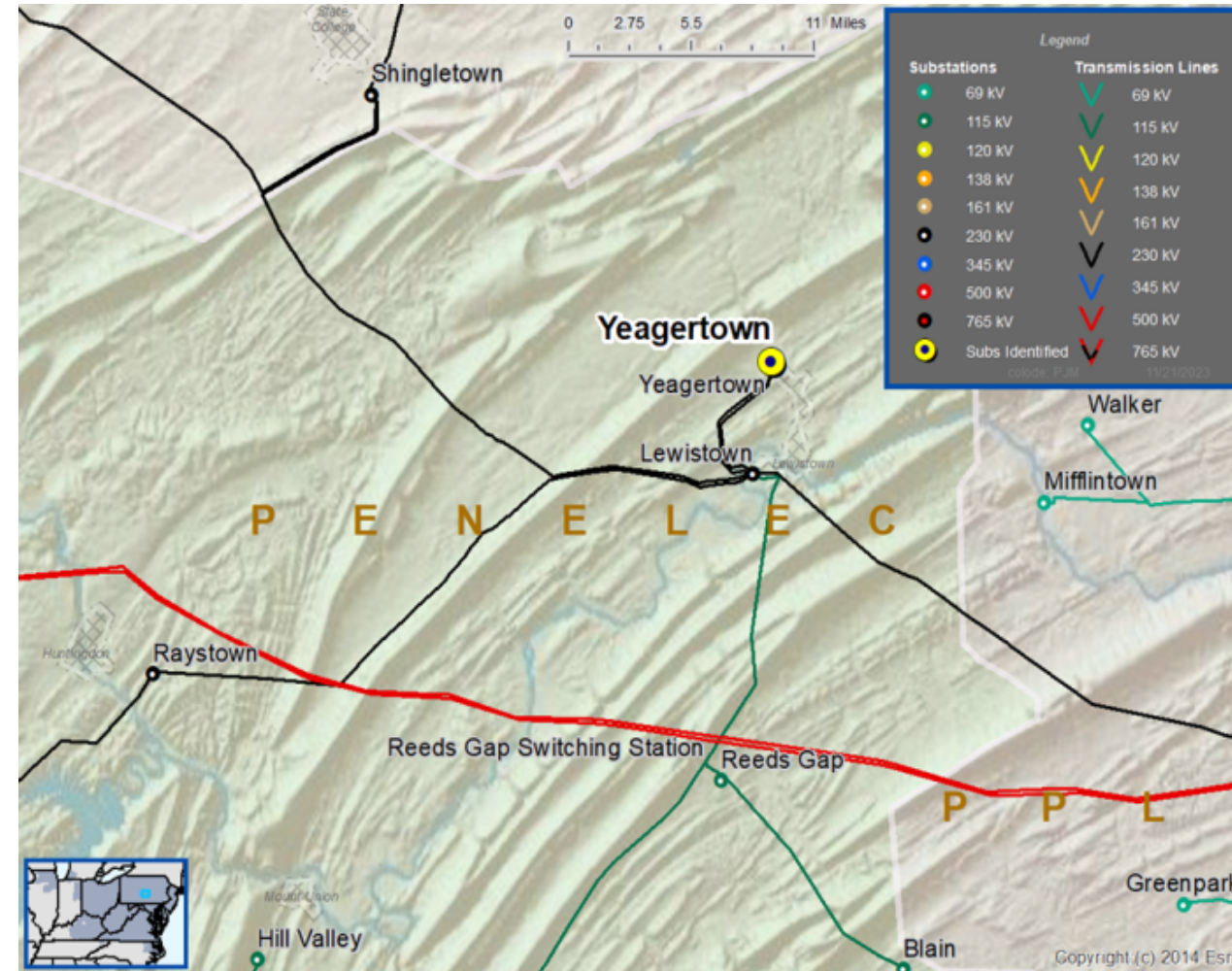
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

**Problem Statement:**

- The existing Yeagertown No. 2 230-46 kV Transformer is approximately 51 years old and is reaching end of life.
- The transformer is constructed with Type U bushings.
  - Type U bushing designs have been documented to dramatically increase the risk of bushing failures.
- Existing transformer ratings:
  - 69/75/83/83 MVA (SN/SLTE/WN/WLTE)



**Need Number:** PN-2023-020

**Process Stage:** Solution Meeting 3/5/2024

**Proposed Solution:**

At Yeagertown Substation:

- Replace the Yeagertown No. 2 230-46 kV Transformer.
- Replace transformer relaying.

Transformer Ratings:

Yeagertown No. 2 230-46 kV Transformer:

- Before Proposed Solution: 69 / 75 / 83 / 83 MVA (SN/SSTE/WN/WSTE)
- After Proposed Solution: 91 / 109 / 112 / 134 (SN/SSTE/WN/WSTE)

**Alternatives Considered:**

Maintain existing condition with elevated risk of failure.

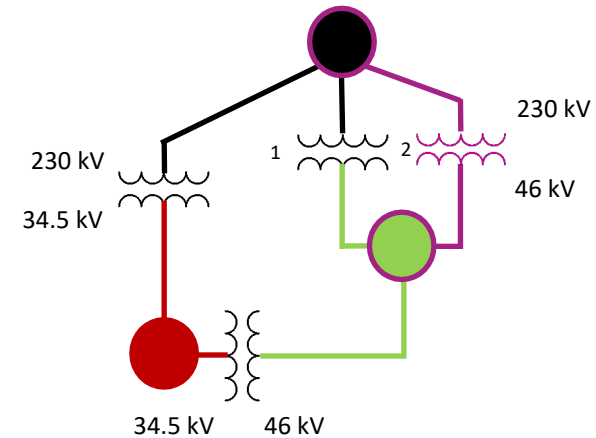
**Estimated Project Cost:** \$4.00M

**Projected In-Service:** 05/16/2025

**Project Status:** Pre-Engineering

**Model:** 2023 RTEP model for 2028 Summer (50/50)

**Yeagertown Substation**



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

# Questions?



# 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

2/23/2024 - V1 – Original version posted to pjm.com