

Transmission Expansion Advisory Committee FirstEnergy Supplemental Projects

April 2, 2024

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: APS-2024-001

Process Stage: Solution Meeting 04/02/2024

Previously Presented: Need Meeting 01/09/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

System Condition Projects

- Substation Condition Rebuild/Replacement

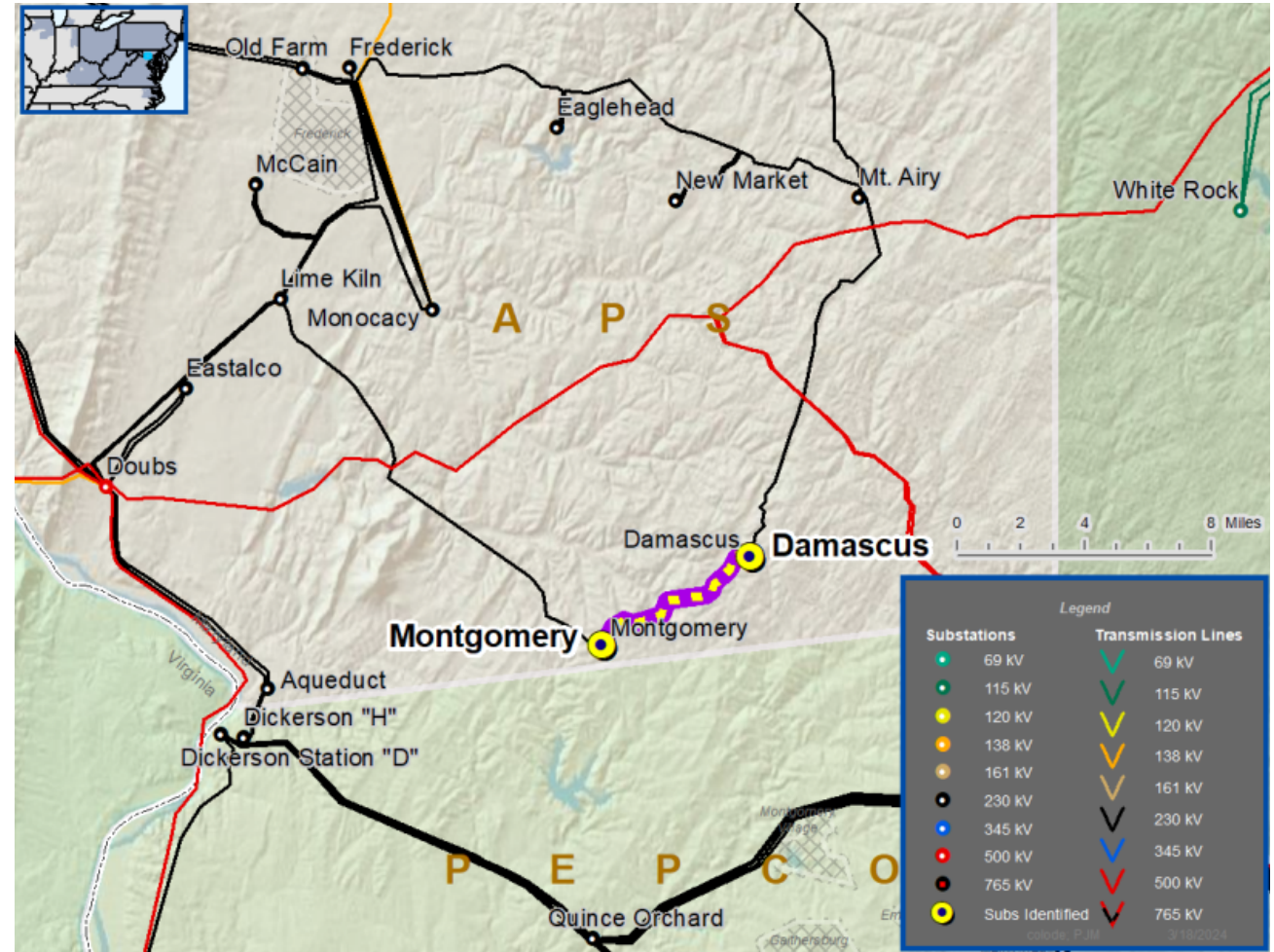
Upgrade Relay Schemes

- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

Continued on next slide...





APS Transmission Zone M-3 Process Damascus – Montgomery 230 kV Line Misoperation Relay Project

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN/ WE)
APS-2024-001	Damascus – Montgomery 230 kV Line	478 / 523 / 542 / 571	617 / 754 / 699 / 894

Need Number: APS-2024-001

Process Stage: Solution Meeting 04/02/2024

Proposed Solution:

- At Damascus Substation:
 - Replace circuit breakers, disconnect switches, line trap, substation conductor and relaying
- At Montgomery substation:
 - Replace disconnect switches, line trap, substation conductor and relaying

Anticipated Transmission Line Ratings:

- Damascus – Montgomery 230 kV Line:
 - Before Proposed Solution: 478 / 523 / 542 / 571 MVA (SN/SE/WN/WE)
 - After Proposed Solution: 617 / 754 / 699 / 894 MVA (SN/SE/WN/WE)

Alternatives Considered:

- Maintain line and vintage relay schemes in existing condition with elevated risk of misoperation.

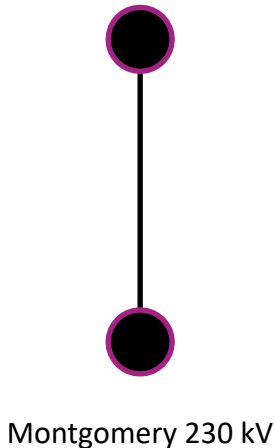
Estimated Project Cost: \$2.8M

Projected In-Service: 06/01/2027

Project Status: Pre-Engineering

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

Damascus 230 kV



Montgomery 230 kV

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

Need Numbers: APS-2024-027

Process Stage: Solution Meeting 04/02/2024

Previously Presented: Need Meeting 03/05/2024

Project Driver:

Equipment Material Condition, Performance and Risk

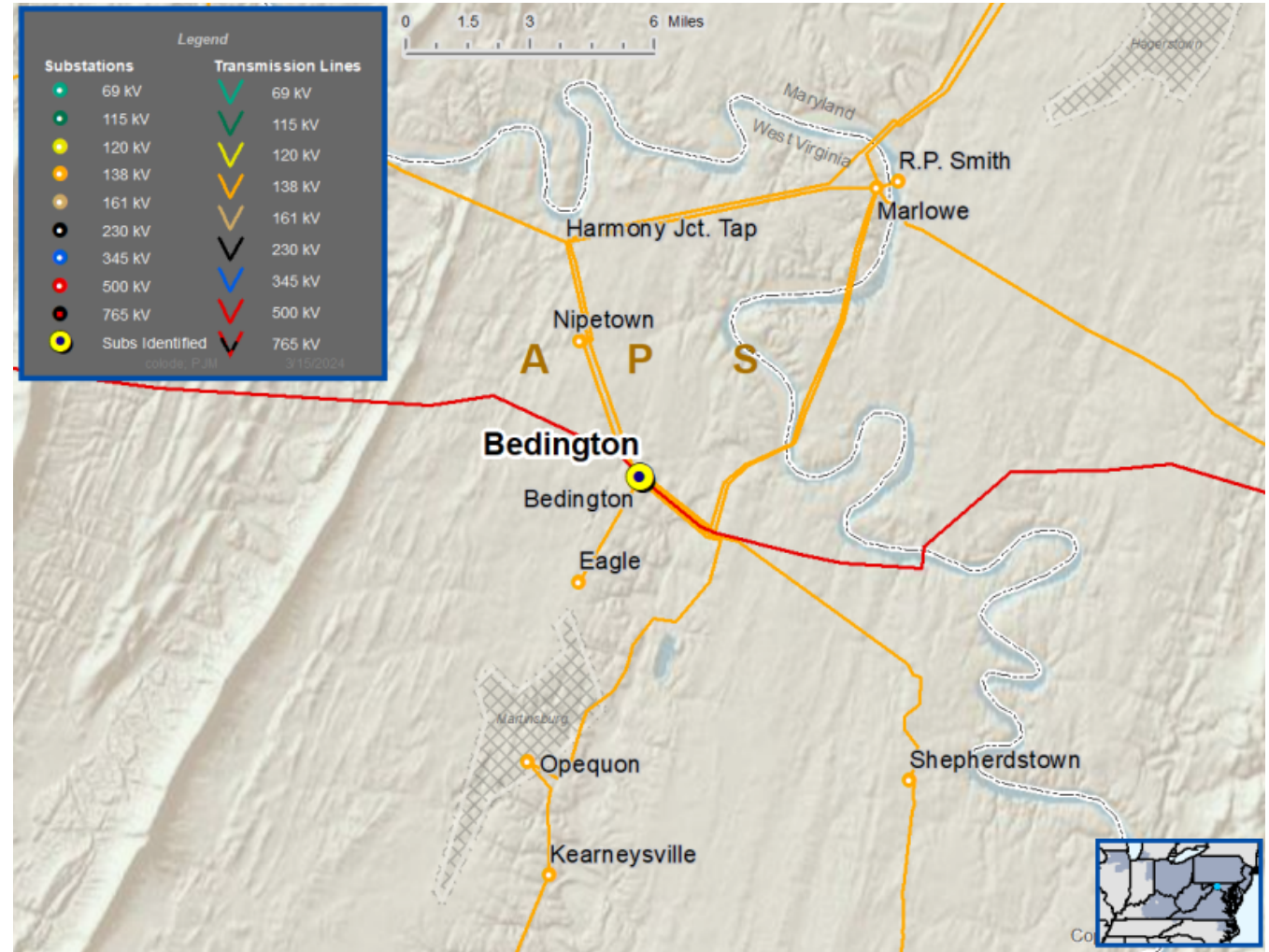
Specific Assumption Reference:

System Performance Projects Global Factors

- System Reliability and Performance
- Add/Replace Transformers

Problem Statement:

- The Bedington No. 3 500/138 kV transformer is approximately 47 years old and approaching end of life.
- The transformer is exhibiting multiple maintenance issues including:
 - History of nitrogen and oil leaks indicating moisture in oil due to paper breakdown.
 - Equipment degradation and obsolete replacement parts.
- Existing transformer ratings:
 - 486 / 620 / 570 / 655 MVA (SN/SLTE/WN/WLTE)



Need Number: APS-2024-027

Process Stage: Solution Meeting 04/02/2024

Proposed Solution:

- At Bedington Substation:
 - Replace No. 3 500/138 kV transformer with a new 500/138 kV transformer of the same size.
 - Replace circuit breakers, disconnect switches, and relaying.

Anticipated Transformer Circuit Ratings:

- Bedington No. 3 500/138 kV transformer:
 - Before Proposed Solution: 486 / 620 / 570 / 655 MVA (SN/SE/WN/WE)
 - After Proposed Solution: 486 / 620 / 570 / 655 MVA (SN/SE/WN/WE)

Alternatives Considered:

- Maintain the transformer in existing condition with increased risk of failure.

Estimated Project Cost: \$18.7M

Projected In-Service: 12/31/2027

Project Status: Pre-Engineering

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

Bedington



Bedington

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

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

03/21/2024– V1 – Original version posted to pjm.com