

Transmission Expansion Advisory Committee FirstEnergy Supplemental Projects

October 3, 2023

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: APS-2023-038

Process State: Need Meeting 10/3/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

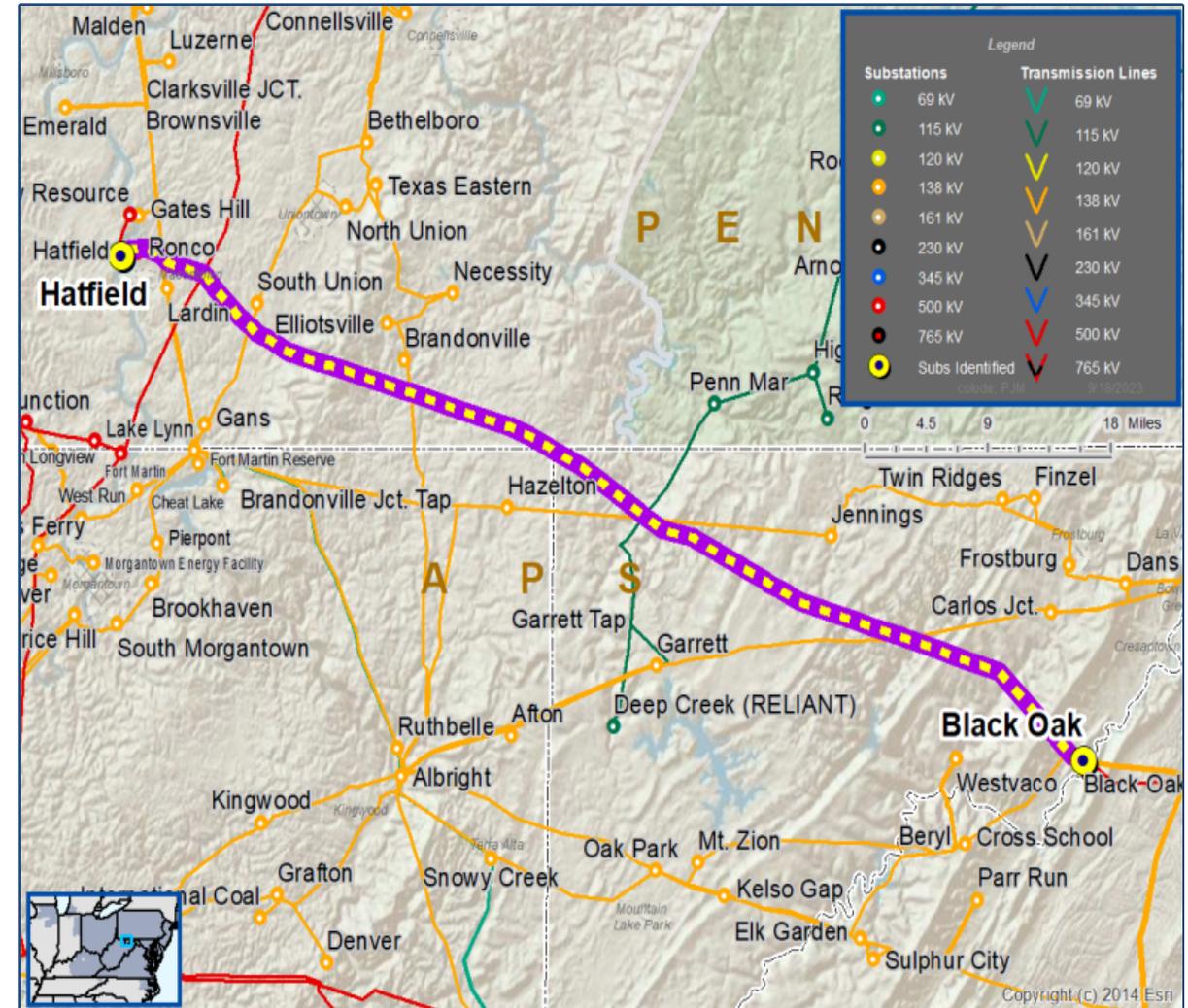
Upgrade Relay Schemes

- 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cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.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.

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APS Transmission Zone M-3 Process Black Oak-Hatfield 500 kV Misoperation Relays

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
APS-2023-038	Black Oak – Hatfield 500 kV	3526 / 3792	3573 / 4379

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-2023-037

Previously Presented: Need Meeting 09/05/2023

Process Stage: Solution Meeting 10/03/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

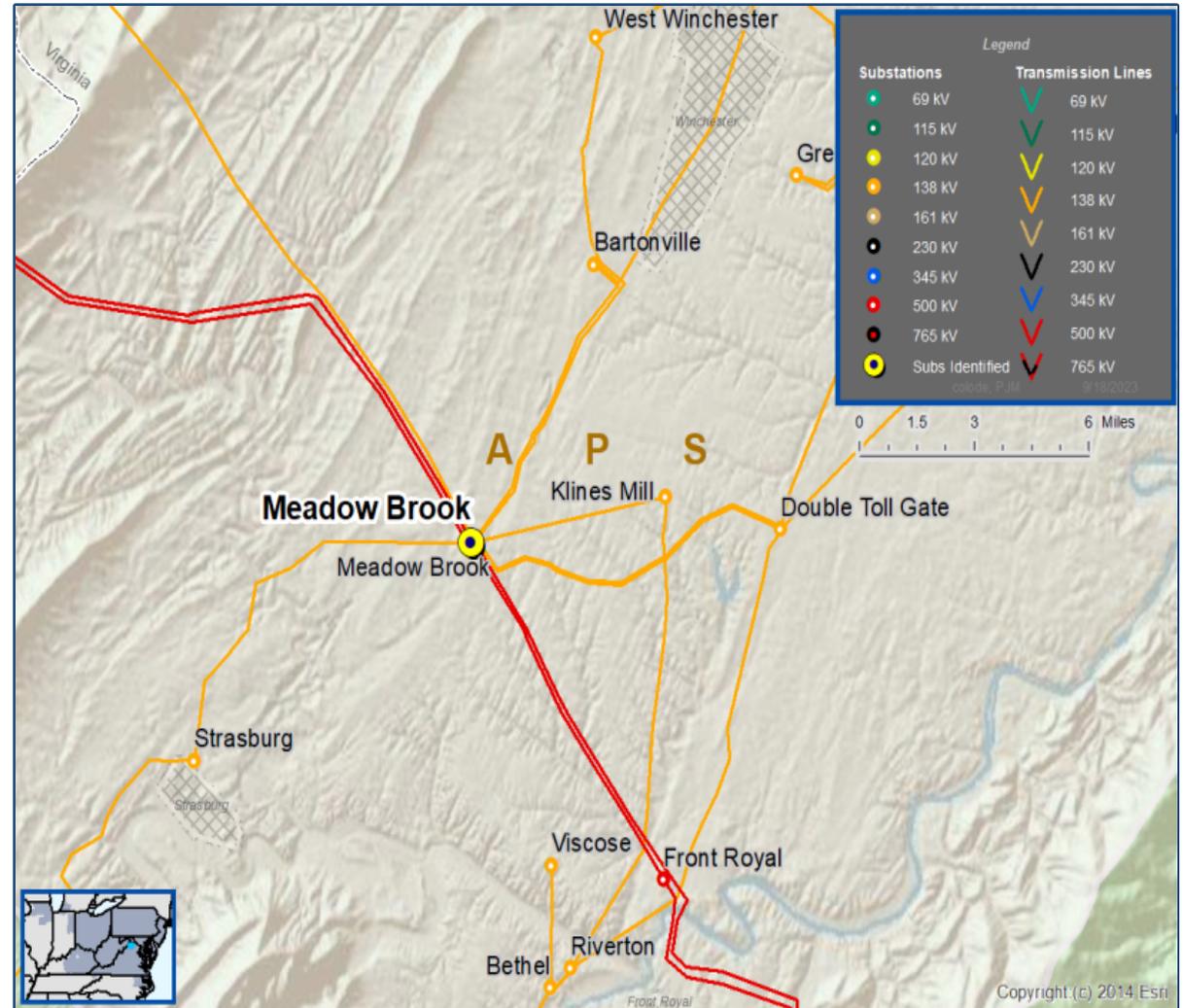
Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits
- Upgrade Relay Schemes

Problem Statement:

- The protective equipment on the Meadow Brook No. 1 500/138 kV and Meadow Brook No. 4 500/138 kV transformers are electro-mechanical and vintage.
 - The protective equipment cannot be easily repaired due to a lack of replacement parts and available expertise in the outdated technology.
- FirstEnergy has identified operational constraints when a single breaker is out of service for maintenance.
- The Meadow Brook No. 1 500/138 kV transformer is limited by terminal equipment:
 - Normal Ratings: 470/567/579/612 MVA (SN/SSTE/WN/WSTE)
 - Single Breaker Outage: 306/306/306/306 MVA (SN/SSTE/WN/WSTE)
- The Meadow Brook No. 4 500/138 kV transformer is limited by terminal equipment:
 - Normal Ratings: 461/567/539/611 MVA (SN/SSTE/WN/WSTE)
 - Single Breaker Outage: 306/306/306/306 MVA (SN/SSTE/WN/WSTE)



Need Number: APS-2023-037

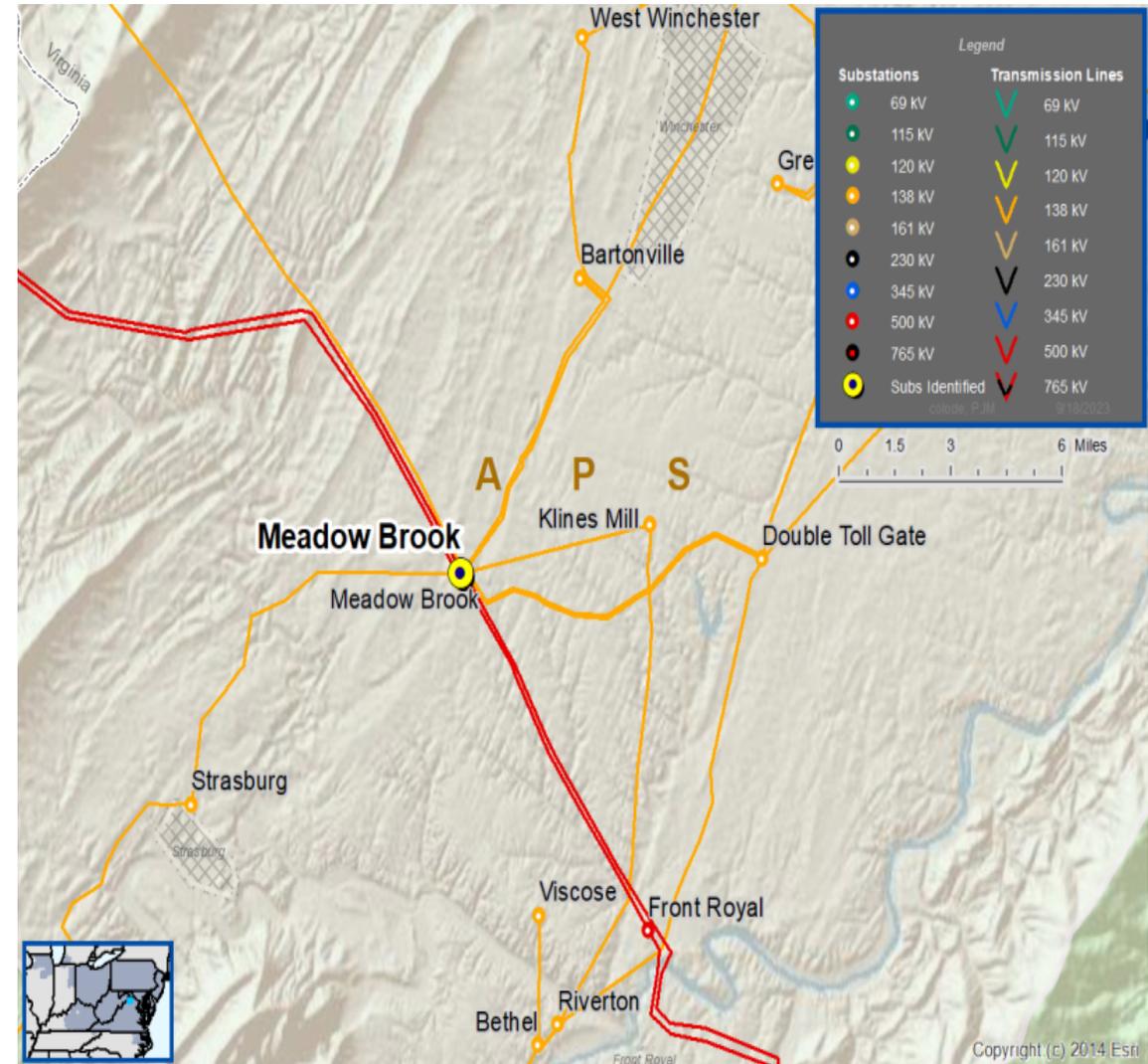
Process Stage: Solution Meeting 10/03/2023

Proposed Solution:

- At Meadow Brook Substation:
 - On the No. 1 500/138 kV Transformer Circuit, replace:
 - Circuit Breakers
 - Relaying
 - Limiting substation conductor
 - On the No. 4 500/138 kV Transformer Circuit, replace:
 - Relaying
 - Limiting substation conductor

Transformer Ratings:

- No. 1 500/138 kV Transformer
 - Before Proposed Solution:
 - Normal Ratings: 470/567/579/612 MVA (SN/SSTE/WN/WSTE)
 - Single Breaker Outage: 306/306/306/306 MVA (SN/SSTE/WN/WSTE)
 - After Proposed Solution:
 - Normal Ratings: 519/592/621/702 MVA (SN/SSTE/WN/WSTE)
 - Single Breaker Outage: 519/592/621/702 MVA (SN/SSTE/WN/WSTE)
- No. 4 500/138 kV Transformer
 - Before Proposed Solution:
 - Normal Ratings: 461/567/539/611 MVA (SN/SSTE/WN/WSTE)
 - Single Breaker Outage: 306/306/306/306 MVA (SN/SSTE/WN/WSTE)
 - After Proposed Solution:
 - Normal Ratings: 461/571/539/611 MVA (SN/SSTE/WN/WSTE)
 - Single Breaker Outage: 461/571/539/611 MVA (SN/SSTE/WN/WSTE)



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Alternatives Considered:

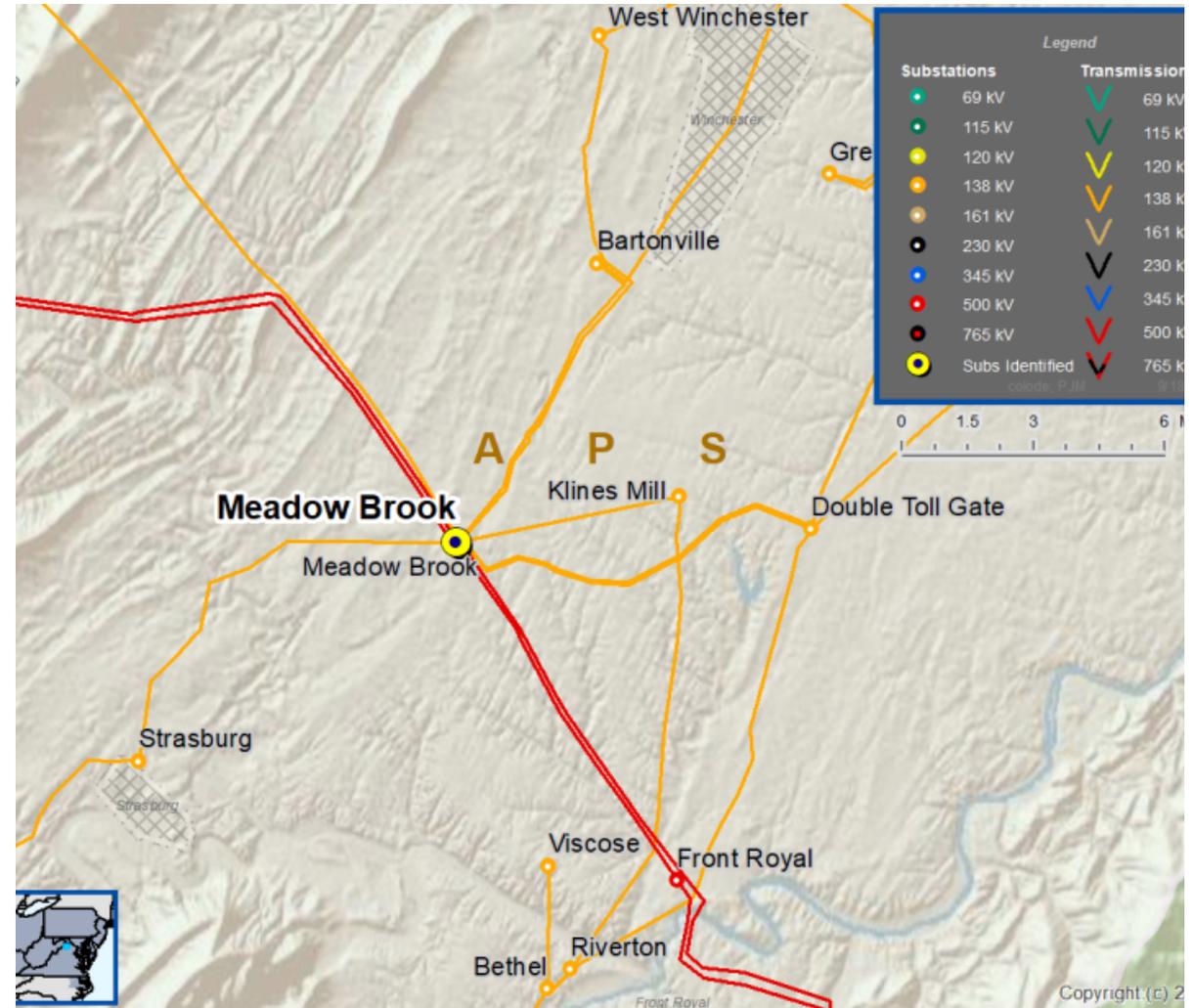
- Maintain equipment in existing condition.

Estimated Project Cost: \$ 2.3 M

Projected In-Service: 12/20/2024

Project Status: Engineering

Model: 2022 RTEP model for 2027 Summer (50/50)



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

9/22/2023 – V1 – Original version posted to pjm.com