

Subregional RTEP Committee – Mid-Atlantic FirstEnergy Supplemental Projects

March 14, 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 Number: JCPL-2024-010

Process Stage: Need Meeting 03/14/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption References:

System Performance Global Factors

- System reliability and performance
- Substation / line equipment limits

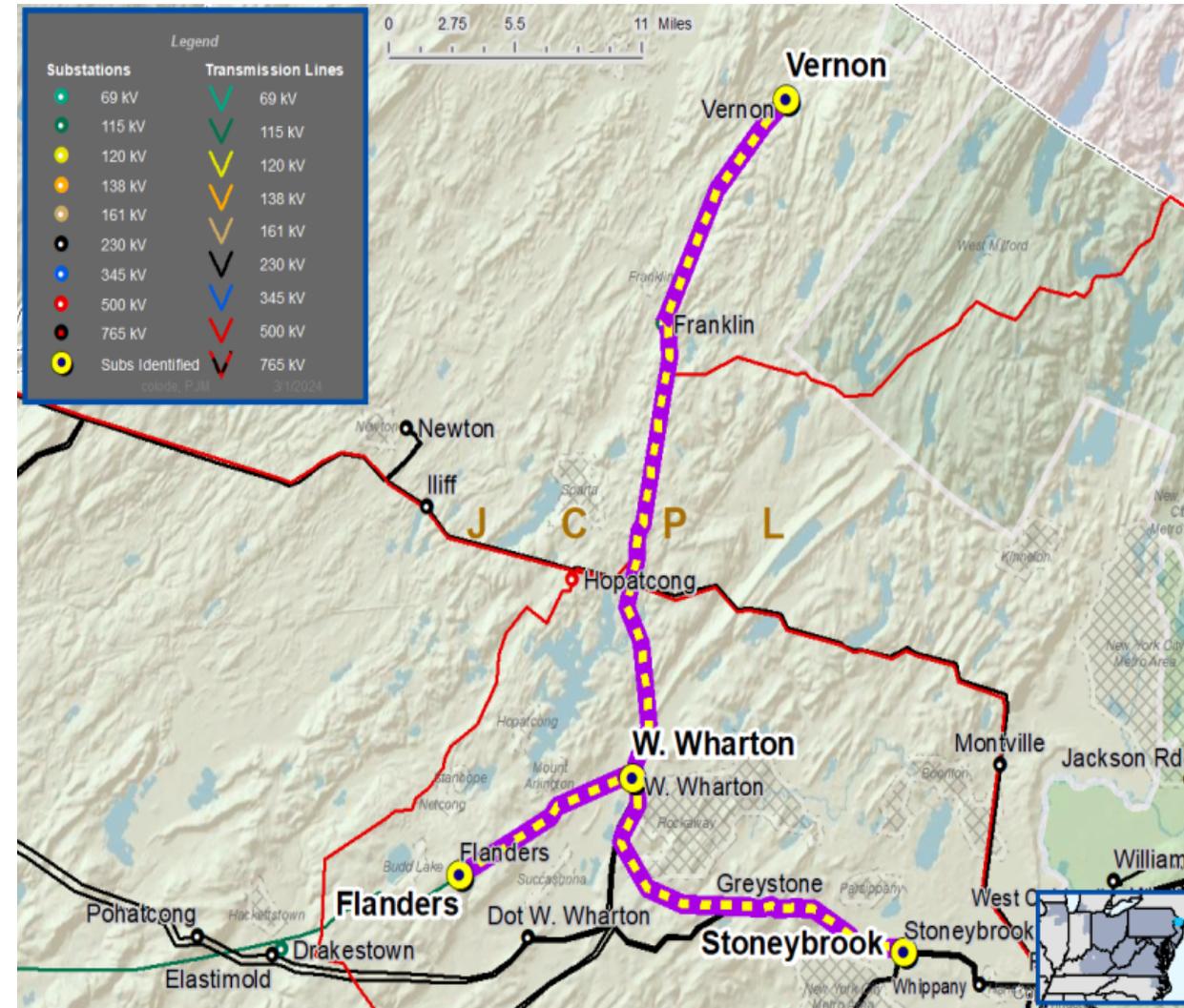
Upgrade Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Problem Statement:

- The existing control building at West Wharton Substation is congested. There is not sufficient space for relay panel upgrades.
- 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cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.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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JCPL Transmission Zone M-3 Process Misoperation Relay Projects

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Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
JCPL-2024-010	West Wharton – Stony Brook 115 kV G943 Line	239 / 239 / 239 / 239	355 / 435 / 403 / 515
	West Wharton – Flanders 115 kV R918 Line	147 / 191 / 208 / 219	184 / 223 / 208 / 264
	West Wharton – Vernon 115 kV J932 Line	147 / 148 / 148 / 148	148 / 179 / 167 / 212

Need Number: JCPL-2024-011

Process Stage: Need Meeting 03/14/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

Specific Assumption Reference:

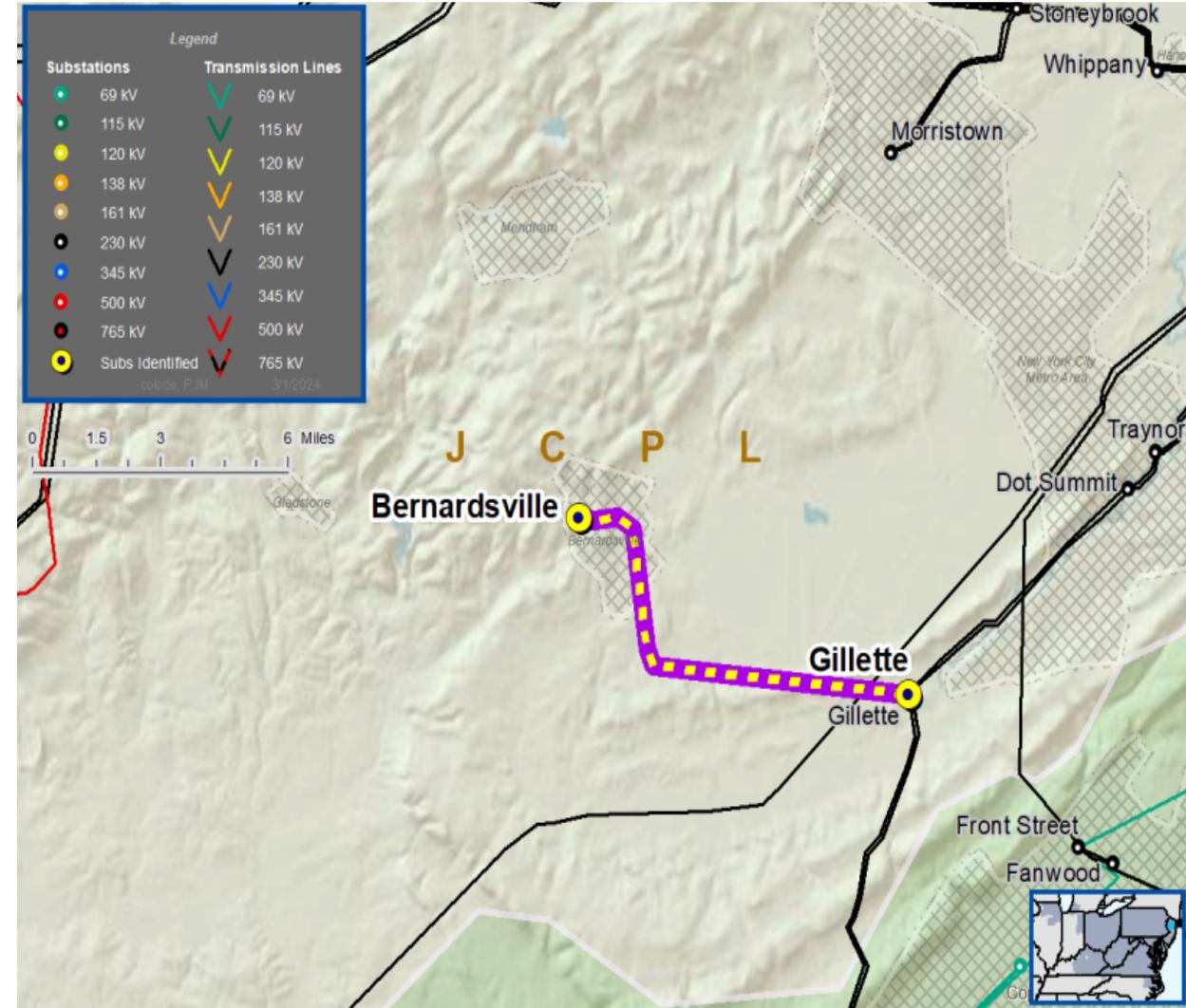
System Performance Projects Global Factors

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

Past System Reliability/Performance

Problem Statement:

- An N-1-1 contingency results in the Stirling – Lyons 34.5 kV B730 Line section loading to 120% of its summer emergency rating (38 MVA).
- The transmission line is currently limited by transmission line conductor.
- Existing Stirling – Lyons B730 34.5 kV Line Ratings:
 - 37 / 38 / 42 / 42 MVA (SN/SE/WN/WE)



JCPL Transmission Zones M-3 Process Gillette – Bernardsville 34.5 kV B730 Line

Need Number: JCPL-2024-011

Process Stage: Need Meeting 03/14/2024

Project Driver:

*Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency*

Specific Assumption Reference:

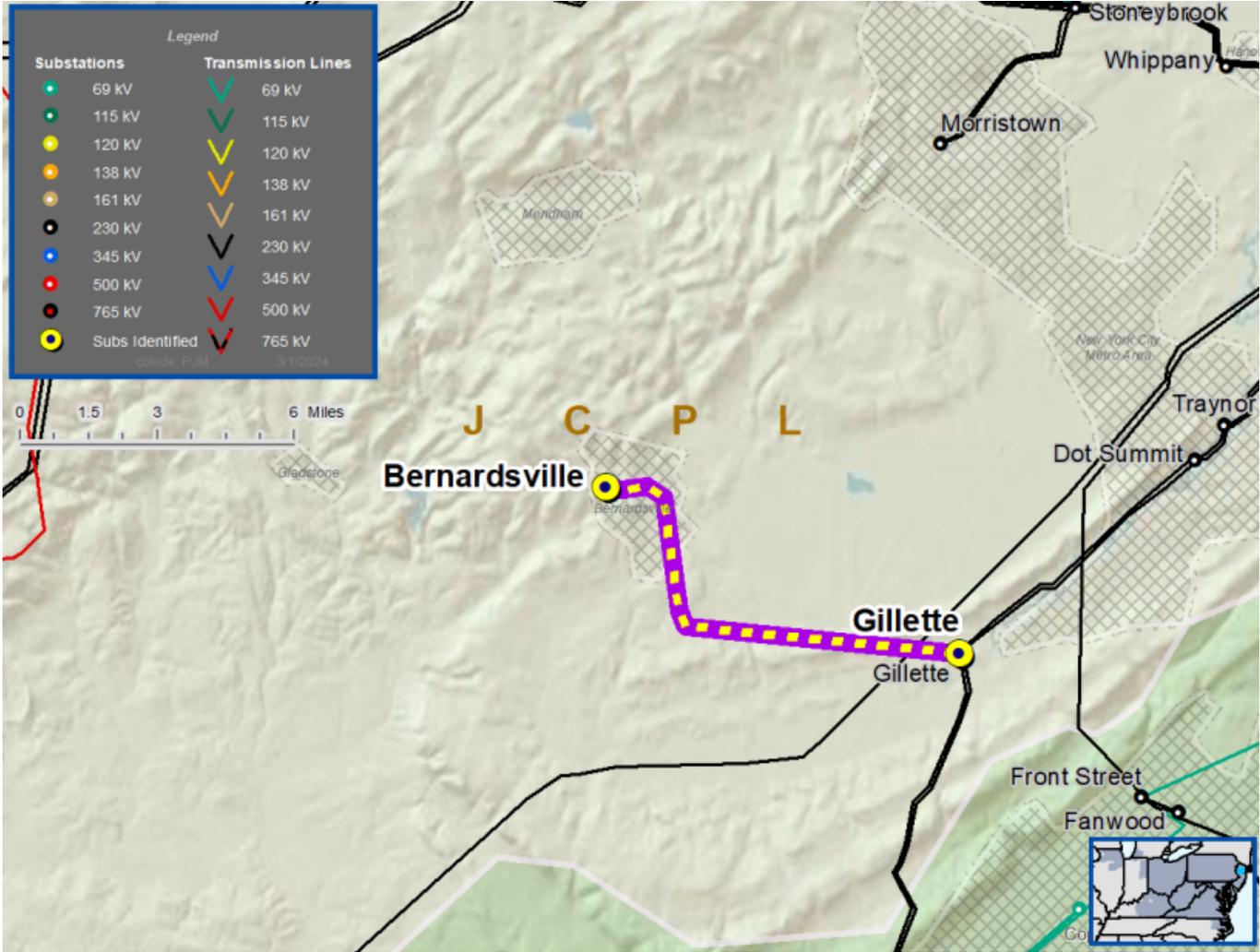
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 - 37 / 38 / 42 / 42 MVA (SN/SE/WN/WE)



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 Number: JCPL-2023-038

Process Stage: Solution Meeting 03/14/2024

Previously Presented: Need Meeting 10/19/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

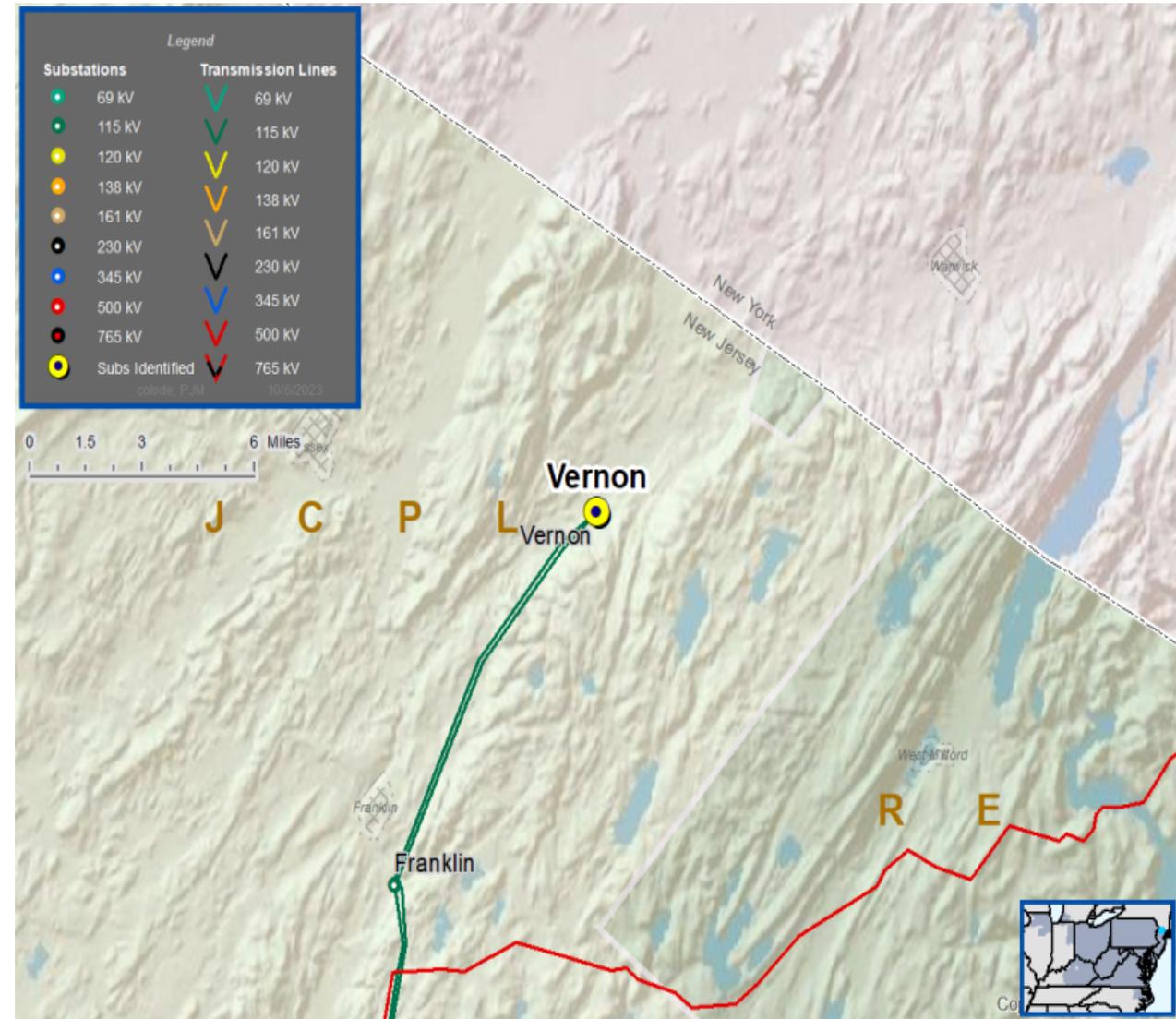
Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities
- Substation/line equipment limits

Problem Statement:

- The 115-34.5 kV No. 1 Transformer at Vernon Substation is approximately 50 years old and is approaching end of life. Most recent DGA results showed elevated methane and ethane gas levels compared with IEEE Standards.
- Existing Transformer Ratings:
 - 65 / 77 MVA (SN / SSTE)



Need Number: JCPL-2023-038

Process Stage: Solution Meeting 03/14/2024

Proposed Solution:

- Replace the 115-34.5 kV No. 1 Transformer at Vernon Substation.
- Replace 115 kV circuit switcher with a circuit breaker.
- Upgrade transformer relaying.

Transformer Ratings:

- Vernon 115-34.5 kV No. 1 Transformer:
 - Before Proposed solution: 65 / 77 / 80 / 88 MVA (SN/SSTE/WN/WSTE)
 - After Proposed Solution: 161 / 161 / 175 / 175 MVA (SN/SSTE/WN/WSTE)

Alternatives Considered:

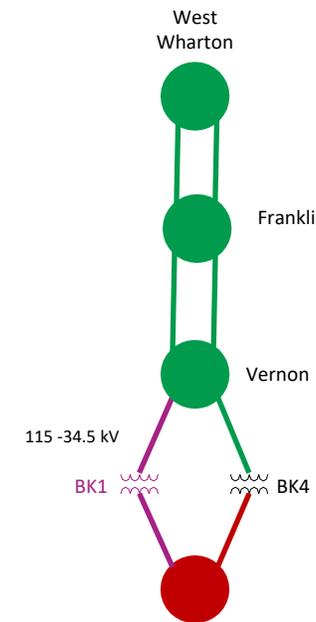
- Maintain transformer in existing condition with elevated risk of failure.

Estimated Project Cost: \$4.7 M

Projected In-Service: 12/15/2025

Project Status: Conceptual

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



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

3/04/2024 – V1 – Original version posted to pjm.com

3/07/2024 – V2 – Added FE Logo on slide deck