

Subregional RTEP Committee - Western FirstEnergy Supplemental Projects

April 19, 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: APS-2024-031, APS-2024-032, APS-2024-033, APS-2024-034

Process Stage: Need Meeting – 04/19/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

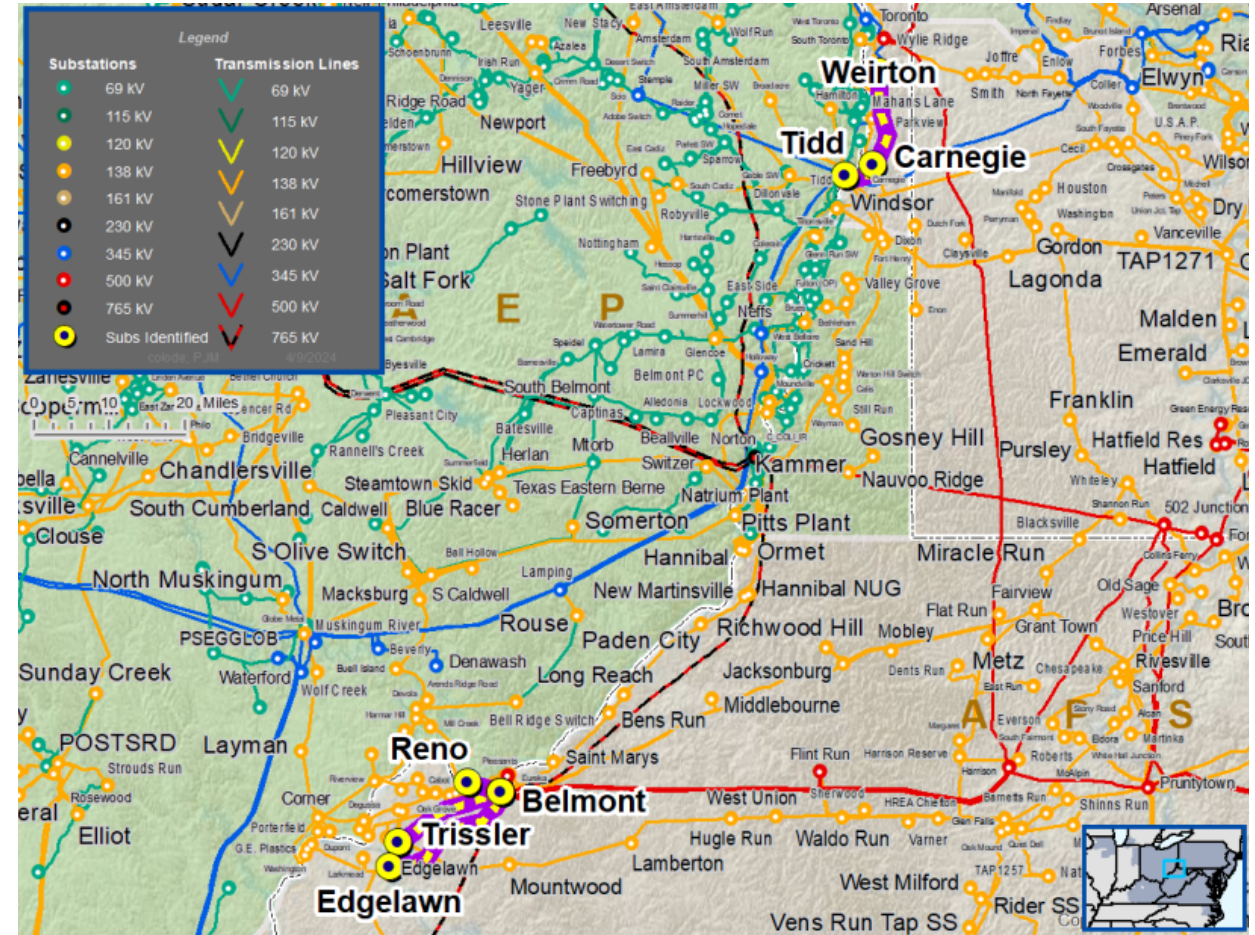
Upgrade Relay Schemes

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cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.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

| Need # | Transmission Line / Substation Locations | Existing Line Rating (MVA SN/SE/WN/WE) | Existing Conductor Rating (MVA SN/SE/WN/WE) |
|--------------|--|---|--|
| APS-2024-031 | Belmont – Trissler 138 kV 604 Line | 176 / 229 / 227 / 284 | 186 / 231 / 227 / 292 |
| APS-2024-032 | Belmont – Edgelawn 138 kV 628 Line | 292 / 314 / 325 / 343 | 308 / 376 / 349 / 445 |
| APS-2024-033 | Belmont – Reno Tap 138 kV Line | 282 / 282 / 325 / 343 | 282 / 282 / 356 / 356 |
| APS-2024-034 | Weirton – Carnegie 138 kV Line | 221 / 268 / 250 / 306 | 221 / 268 / 250 / 317 |
| | Carnegie – Tidd 138 kV Line | 187 / 240 / 247 / 270 | 187 / 240 / 247 / 285 |

APS Transmission Zone M-3 Process Grand Point – Guilford 138 kV Line Customer Connection

Need Number: APS-2024-035

Process Stage: Need Meeting – 04/19/2024

Project Driver(s):

Customer Service

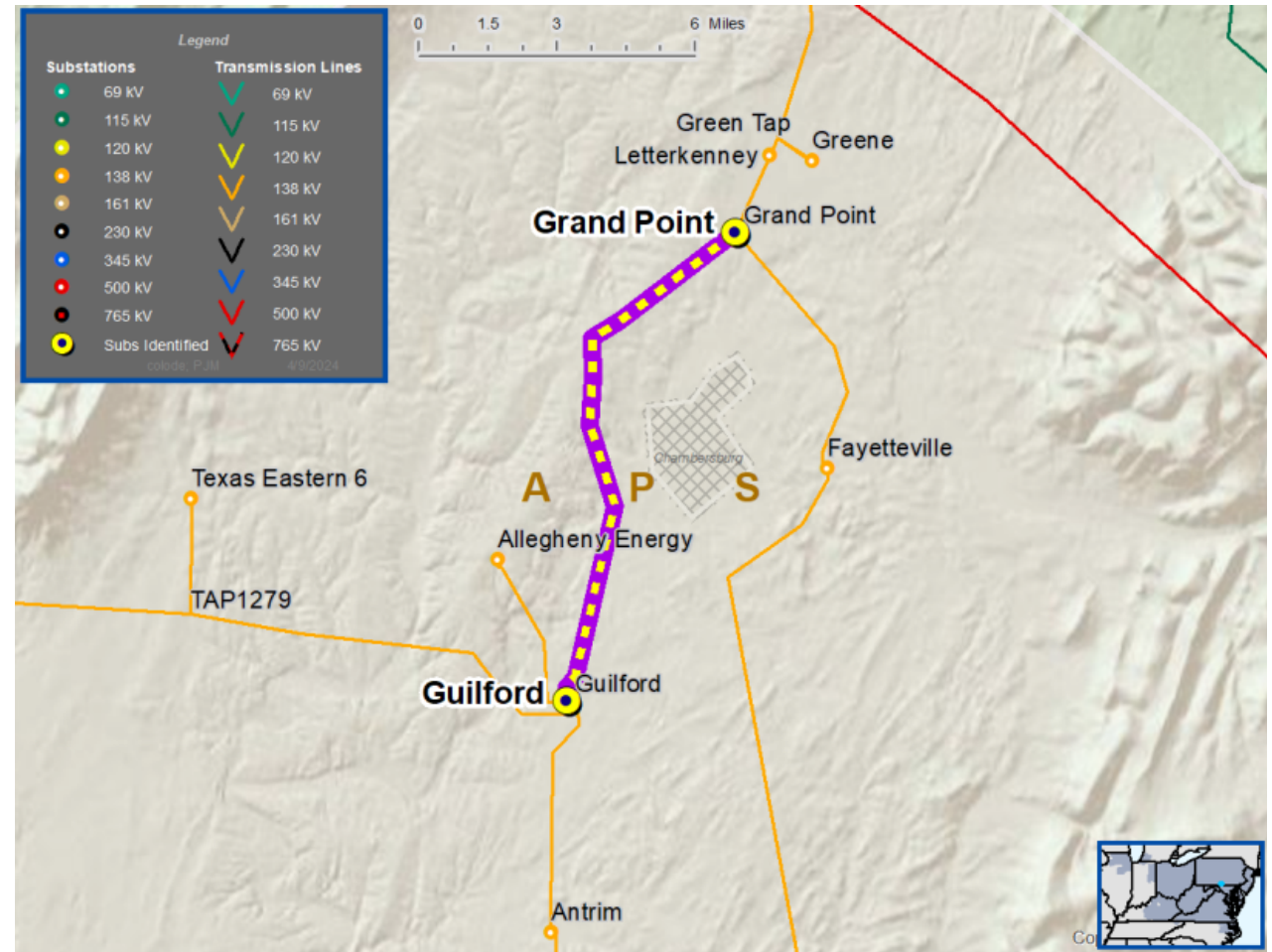
Specific Assumption Reference:

New customer connection request will be evaluated per FirstEnergy’s “Requirements for Transmission Connected Facilities” document and “Transmission Planning Criteria” document.

Problem Statement:

New Customer Connection – A retail customer requested 138 kV service for load of approximately 9 MW near the Grand Point – Guilford 138 kV Line. The request is approximately four miles from Guilford Substation.

Requested in-service date is 8/29/2025.



APS Transmission Zone M-3 Process Inwood – Kearneysville 138 kV Line Customer Connection

Need Number: APS-2024-036

Process Stage: Need Meeting – 04/19/2024

Project Driver(s):

Customer Service

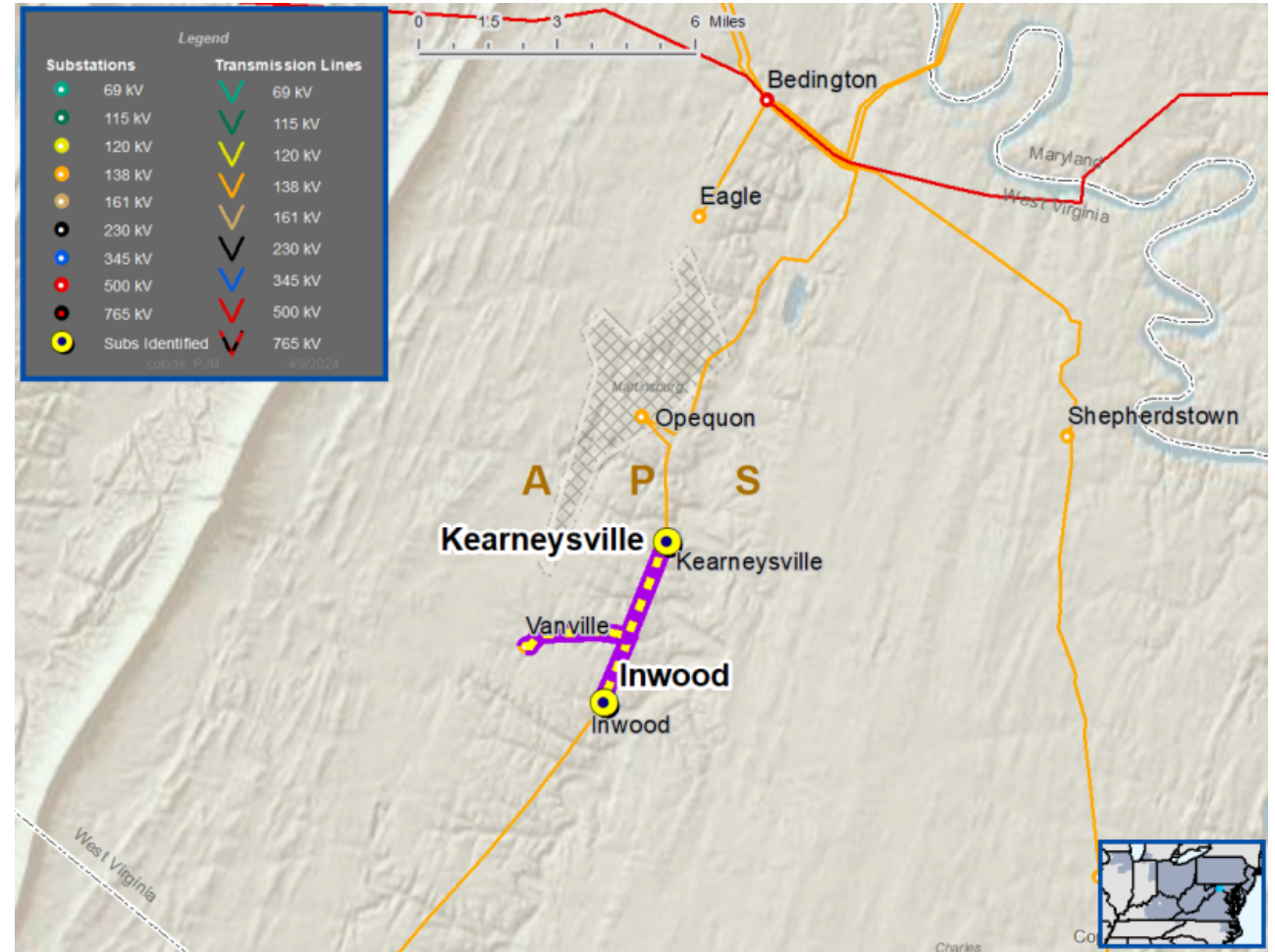
Specific Assumption Reference:

New customer connection request will be evaluated per FirstEnergy’s “Requirements for Transmission Connected Facilities” document and “Transmission Planning Criteria” document.

Problem Statement:

New Customer Connection – Potomac Edison distribution requested 138 kV service for load of approximately 25 MVA near the Inwood – Kearneysville 138 kV Line. The request is approximately four miles from Inwood Substation.

Requested in-service date is 4/1/2026.



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-2023-072, APS-2024-018

Process Stage: Solution Meeting – 04/19/2024

Previously Presented: Need Meeting – 12/15/2023, 01/19/2024

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

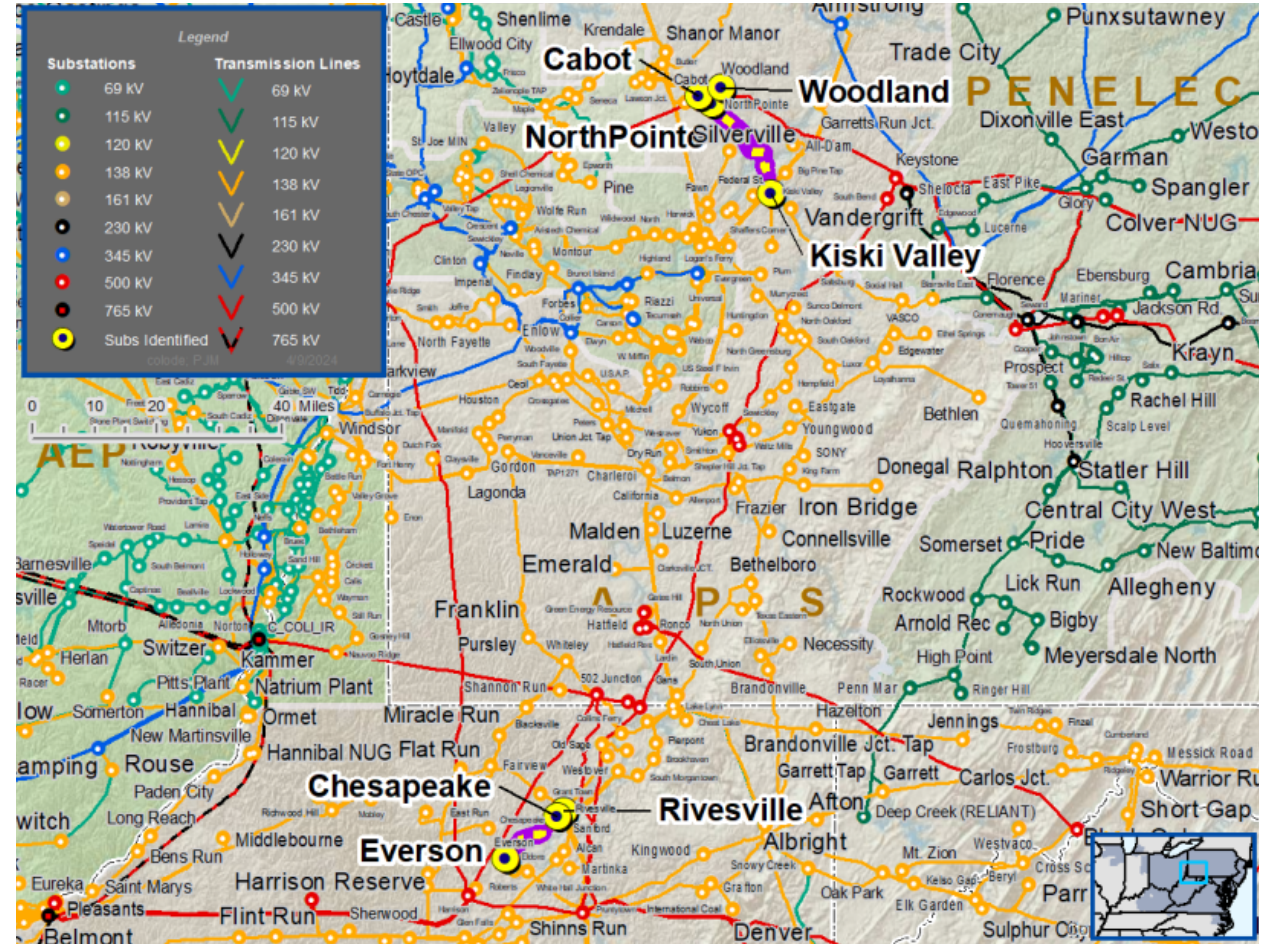
Upgrade Relay Schemes

- 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.

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APS Transmission Zone M-3 Process Misoperation Relay Projects

| Need # | Transmission Line / Substation Locations | Existing Line Rating (SN / SE / WN / WE) | Existing Conductor Rating (SN / SE / WN / WE) |
|--------------|--|--|---|
| APS-2023-072 | Cabot – Woodland 138 kV Line | 287 / 287 / 287 / 287 | 297 / 365 / 345 / 441 |
| | Northpointe – Kiski Valley 138 kV Line | 225 / 287 / 287 / 287 | 297 / 365 / 345 / 441 |
| APS-2024-018 | Everson – Chesapeake 138 kV Line | 292 / 306 / 306 / 306 | 308 / 376 / 349 / 445 |
| | Chesapeake – Rivesville 138 kV Line | 176 / 229 / 253 / 285 | 308 / 376 / 349 / 445 |

Proposed Solution:

| Need # | Transmission Line / Substation Locations | New MVA Line Rating (SN / SE / WN / WE) | Scope of Work | Estimated Cost (\$ M) | Target ISD |
|--------------|--|---|---|-----------------------|------------|
| APS-2023-072 | Cabot – Woodland 138 kV Line | 297 / 365 / 345 / 441 | <ul style="list-style-type: none"> At Cabot Substation, replace disconnect switches, line trap, substation conductor and relaying | \$2.45 | 12/31/2029 |
| | Northpointe – Kiski Valley 138 kV Line | 297 / 365 / 345 / 441 | <ul style="list-style-type: none"> At Kiski Valley Substation, replace circuit breaker, disconnect switches, line trap, substation conductor and relaying At Northpointe Substation, replace disconnect switches relaying | | |
| APS-2024-018 | Everson – Chesapeake 138 kV Line | 308 / 376 / 349 / 445 | <ul style="list-style-type: none"> At Everson Substation, replace circuit breaker, line trap, substation conductor and relaying | \$1.6 | 12/31/2027 |
| | Chesapeake – Rivesville 138 kV Line | 308 / 376 / 349 / 445 | <ul style="list-style-type: none"> At Chesapeake Substation, replace substation conductor and relaying At Rivesville Substation, replace circuit breaker, line trap, substation conductor and relaying | | |

Alternatives Considered: Maintain equipment in existing condition with elevated risk of equipment misoperation.

Project Status: Engineering

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

Need Numbers: APS-2024-009

Process State: Solution Meeting – 04/19/2024

Previously Presented: Need Meeting – 01/19/2024

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

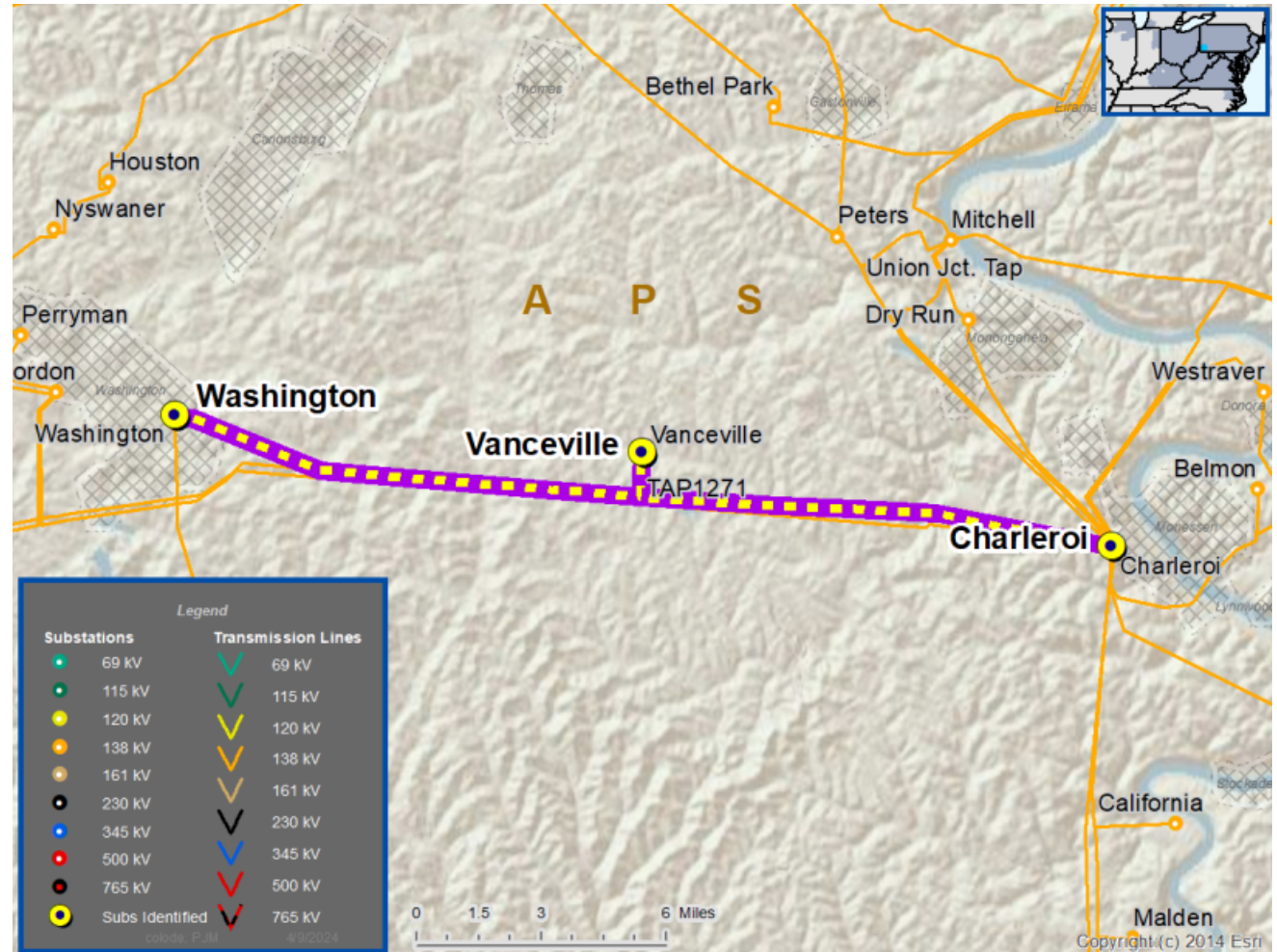
Upgrade Relay Schemes

- 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.

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APS Transmission Zone M-3 Process Charleroi – Washington 138 kV Line

| Need # | Transmission Line / Substation Locations | Existing Line Rating (SN / SE / WN / WE) | Existing Conductor Rating (SN / SE / WN / WE) |
|--------------|--|--|---|
| APS-2024-009 | Charleroi – Vanceville 138 kV | 287 / 287 / 287 / 287 | 297 / 365 / 345 / 441 |
| | Vanceville – Washington 138 kV | 292 / 314 / 325 / 343 | 297 / 365 / 345 / 441 |

Need Number: APS-2024-026

Process State: Solution Meeting – 04/19/2024

Previously Presented: Need Meeting – 02/16/2024

Project Driver:

Operational Flexibility and Efficiency

Infrastructure Resilience

Specific Assumption Reference:

Global factors

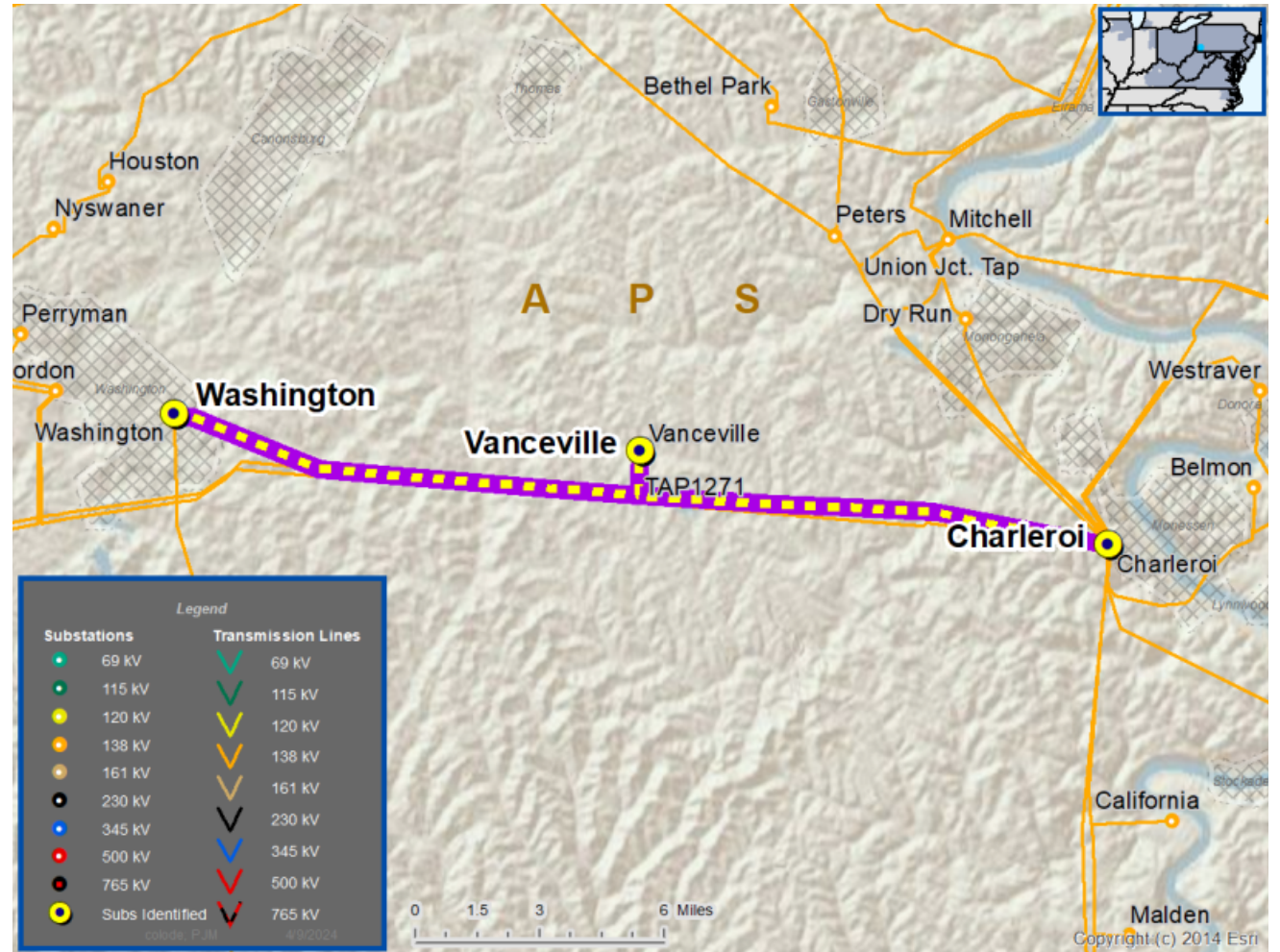
- System reliability and performance
- Substation and line equipment limits

Problem Statement:

Vanceville Substation is configured as a tap connection on the Charleroi – Washington 138 kV Line. Vanceville serves approximately 16.7 MW of load and 1,374 customers, which will be out of service with an outage on the Charleroi – Washington 138 kV Line.

Transmission line ratings are limited by terminal equipment:

- Charleroi – Vanceville 138 kV Line:
 - Existing line rating: 287 / 287 / 287 / 287 MVA (SN/SE/WN/WE)
 - Existing conductor rating: 297 / 365 / 345 / 441 MVA (SN/SE/WN/WE)
- Vanceville – Washington 138 kV Line:
 - Existing line rating: 292 / 314 / 325 / 343 MVA (SN/SE/WN/WE)
 - Existing conductor rating: 297 / 365 / 345 / 441 MVA (SN/SE/WN/WE)



Need Number: APS-2024-009, APS-2024-026

Process Stage: Solution Meeting – 04/19/2024

Proposed Solution:

- Install automatic sectionalizing switches outside Vanceville Substation.
- Replace limiting substation conductor and remove line trap at Charleroi Substation.
- Replace limiting substation conductor and remove line trap at Washington Substation.

Transmission Line Ratings:

- Charleroi – Vanceville 138 kV Line:
 - Existing line rating: 287 / 287 / 287 / 287 MVA (SN/SE/WN/WE)
 - New line rating: 297 / 365 / 345 / 441 MVA (SN/SE/WN/WE)
- Vanceville – Washington 138 kV Line:
 - Existing line rating: 292 / 314 / 325 / 343 MVA (SN/SE/WN/WE)
 - New line rating: 297 / 360 / 345 / 422 MVA (SN/SE/WN/WE)

Alternatives Considered:

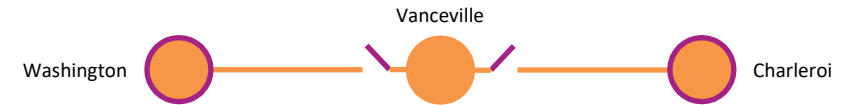
- Maintain line protection in existing condition and continued risk of misoperations on the transmission line, and risk equipment failure and/or loss of customers and load.

Estimated Project Cost: \$4.4M (\$1.6M for APS-2024-009 and \$2.8M for APS-2024-026)

Projected In-Service: 12/06/2024

Project Status: Engineering

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 | |

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

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