

Subregional RTEP Committee - Western FirstEnergy Supplemental Projects

May 17, 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-2024-039, APS-2024-041 to APS-2024-045,
APS-2024-047 to APS-2024-051

Process Stage: Need Meeting – 05/17/2024

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

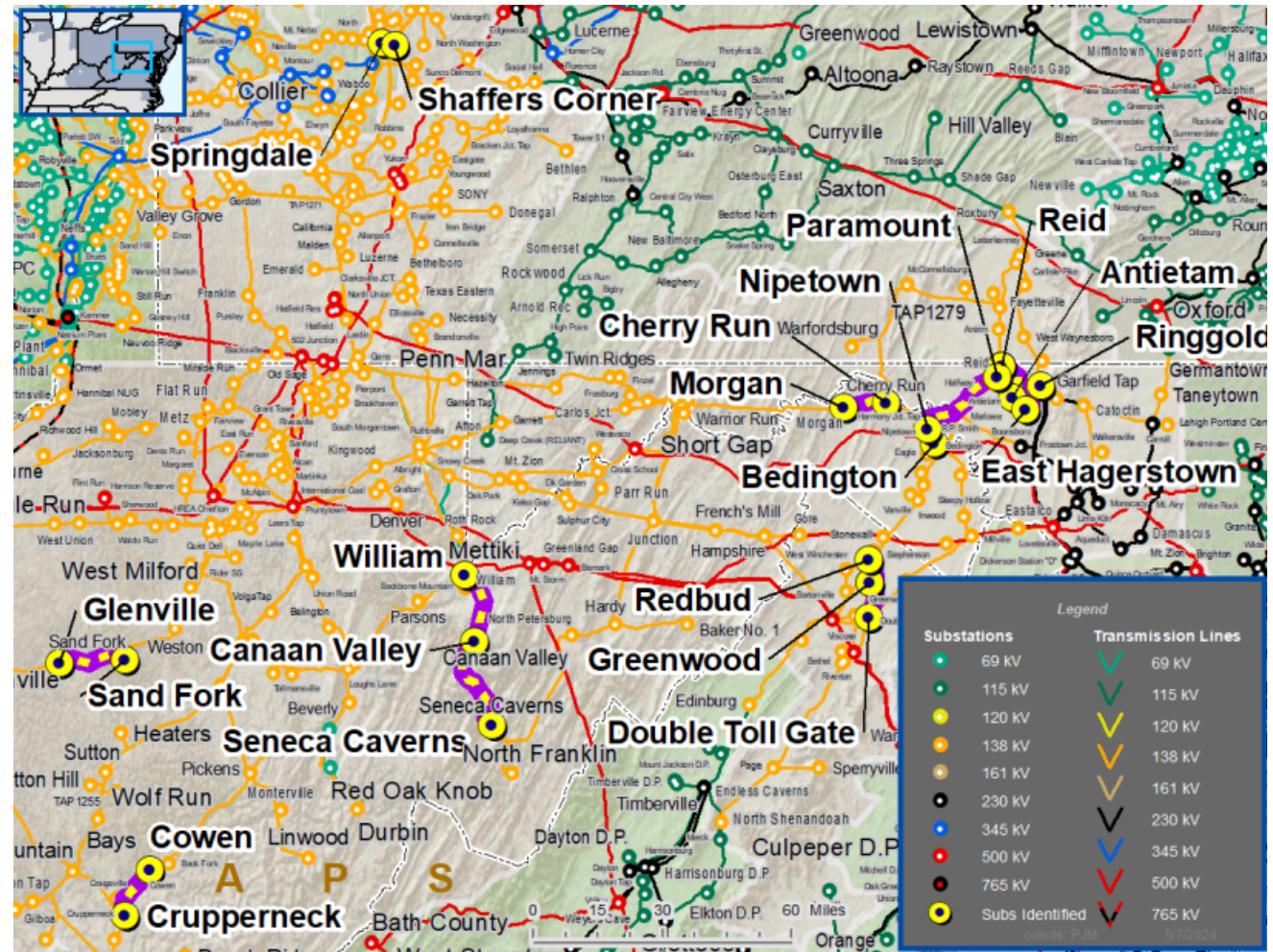
Upgrade Relay Schemes

- 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cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.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 (MVA SN / SE / WN / WE)	Existing Conductor Rating (MVA SN / SE / WN / WE)
APS-2024-039	Shaffers Corner – Springdale 138 kV Line	292 / 314 / 325 / 343	297 / 365 / 345 / 441
APS-2024-041	Antietam – Reid 138 kV Line	287 / 287 / 287 / 287	308 / 376 / 349 / 445
APS-2024-042	Bedington – Nipetown 138 kV Line	459 / 459 / 459 / 459	530 / 611 / 531 / 642
	Nipetown – Reid 138 kV Line	295 / 375 / 349 / 441	308 / 376 / 349 / 445
APS-2024-043	Double Toll Gate – Greenwood 138 kV Line	262 / 314 / 315 / 343	278 / 339 / 315 / 401
APS-2024-044	East Hagerstown – Ringgold 138 kV Line	229 / 229 / 229 / 229	308 / 376 / 349 / 445
APS-2024-045	Greenwood – Redbud 138 kV Line	210 / 250 / 250 / 286	221 / 268 / 250 / 317
APS-2024-047	Morgan – Cherry Run 138 kV Line	195 / 209 / 217 / 229	221 / 268 / 250 / 317
APS-2024-048	Paramount No. 1 – Reid 138 kV Line	295 / 375 / 349 / 441	308 / 376 / 349 / 445
APS-2024-049	Glenville – Sand Fork Tap 138 kV Line	195 / 209 / 217 / 229	221 / 268 / 250 / 317
APS-2024-050	William – Canaan Valley 138 kV Line	204 / 229 / 229 / 229	221 / 268 / 250 / 317
	Canaan Valley – Seneca Caverns 138 kV Line	172 / 172 / 172 / 172	221 / 268 / 250 / 317
APS-2024-051	Cowen – Crupperneck 138 kV Line	164 / 206 / 216 / 229	169 / 213 / 217 / 280

Armstrong – Burma – Karns City 138 kV (Kissinger Jct) Line

Need Number: APS-2024-053

Process Stage: Need Meeting – 05/17/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Global Factors

- System reliability/performance
- Substation/Line equipment limits

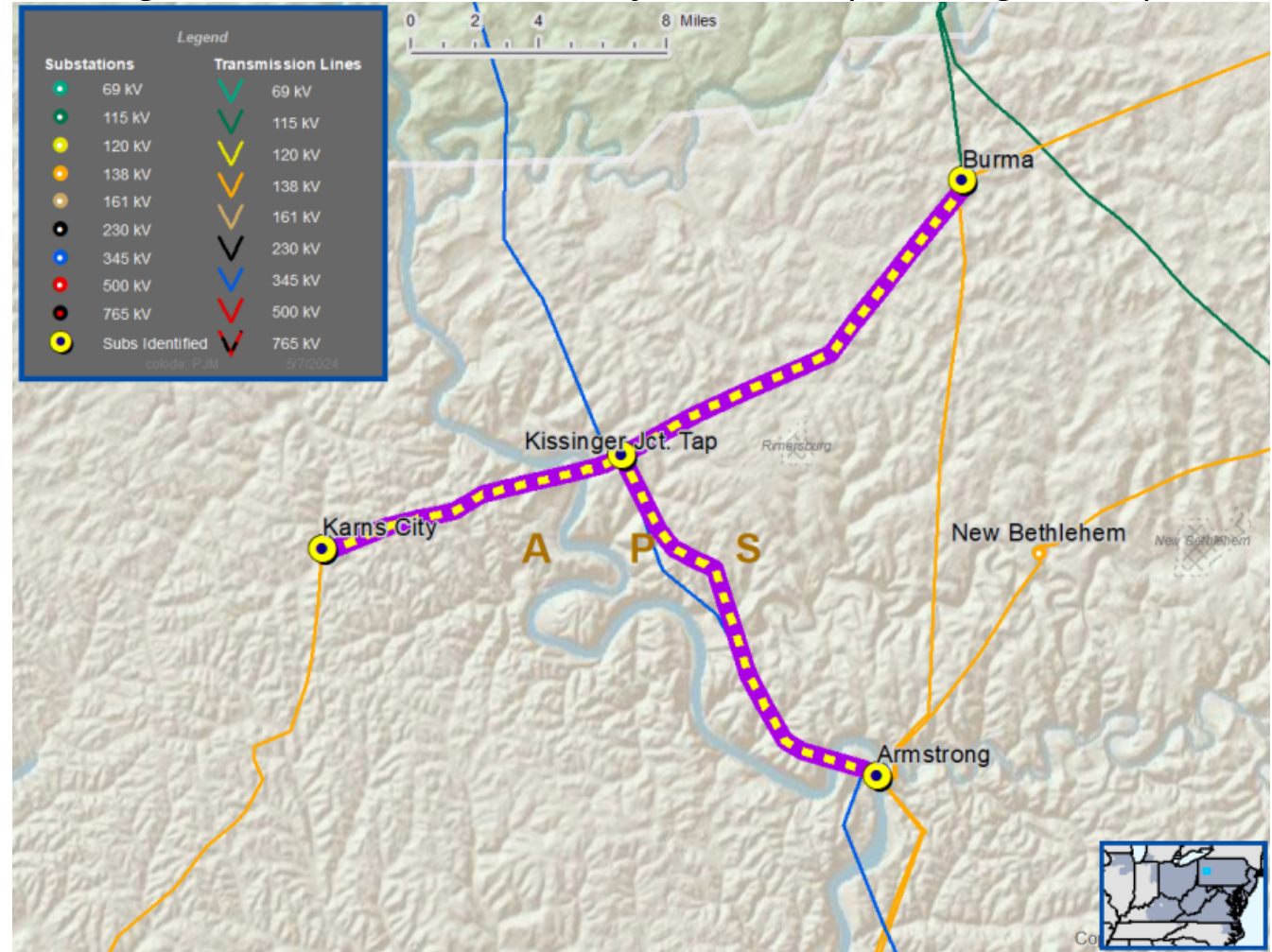
Line Condition Rebuild/Replacement

- Age/condition of wood transmission line structures

Problem Statement:

- The Armstrong – Burma – Karns City 138 kV (Kissinger Jct) Line was constructed approximately 59 years ago and is approaching end of life. A portion of the line was rebuilt in 1985. It is approximately 29 miles long with 174 wood pole, one steel pole and two steel lattice tower transmission line structures.
- Recent inspections show the line is exhibiting deterioration resulting in increased maintenance costs. Inspection findings include:
 - 20 structures require replacement due to deterioration.
 - Two structures have been recently replaced due to deteriorating conditions.
 - 67 structures failed recent inspection due to woodpecker damage, top rot, decay, cracking, and/or delamination of cross-arms.
- Since 2019, the line has had two unscheduled sustained outages.

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APS Transmission Zone M-3 Process Armstrong – Burma – Karns City 138 kV (Kissinger Jct) Line

Need #	Transmission Line / Substation Locations	Existing Line Rating (MVA SN / SE / WN / WE)	Existing Conductor Rating (MVA SN / SE / WN / WE)
APS-2024-053	Armstrong – Kissinger Jct 138 kV Line	221 / 268 / 250 / 317	221 / 268 / 250 / 317
	Burma – Kissinger Jct 138 kV Line	292 / 314 / 325 / 343	308 / 376 / 349 / 445
	Karns City – Kissinger Jct 138 kV Line	221 / 268 / 250 / 317	221 / 268 / 250 / 317

Need Number: APS-2024-054

Process Stage: Need Meeting – 05/17/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Global Factors

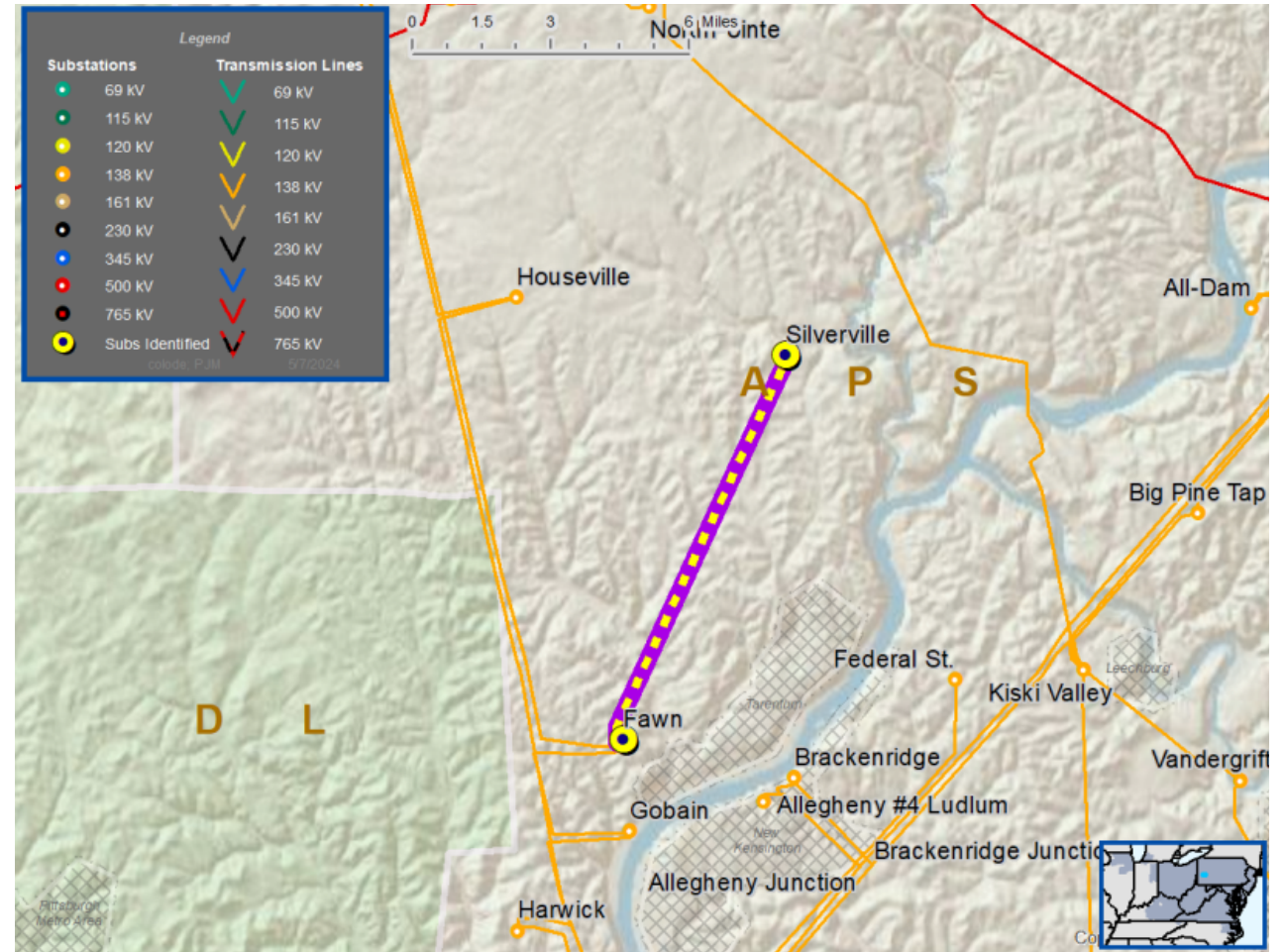
- System reliability/performance
- Substation/Line equipment limits

Line Condition Rebuild/Replacement

- Age/condition of wood transmission line structures

Problem Statement:

- The Fawn – Silverville 138 kV Line is a radial line that was constructed approximately 30 years ago and is approaching end of life. It is approximately six miles long with 25 wood and 20 steel transmission line structures.
- The line serves approximately 4,000 customers and 16 MW of load.
- Per recent inspections, the line is exhibiting deterioration. Inspection findings include:
 - 20 structures have required repairs due to deterioration.
 - Six structures failed inspection due to sound, woodpecker damage, top rot, decay, cracking, and/or delamination of cross-arms requiring replacement.
- The line is currently limited by terminal equipment.
- Existing Transmission Line Ratings:
 - 150 / 177 / 184 / 202 MVA (SN/SE/WN/WE)



Need Number: APS-2024-055

Process Stage: Need Meeting – 05/17/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Global Factors

- System reliability/performance
- Substation/Line equipment limits

Line Condition Rebuild/Replacement

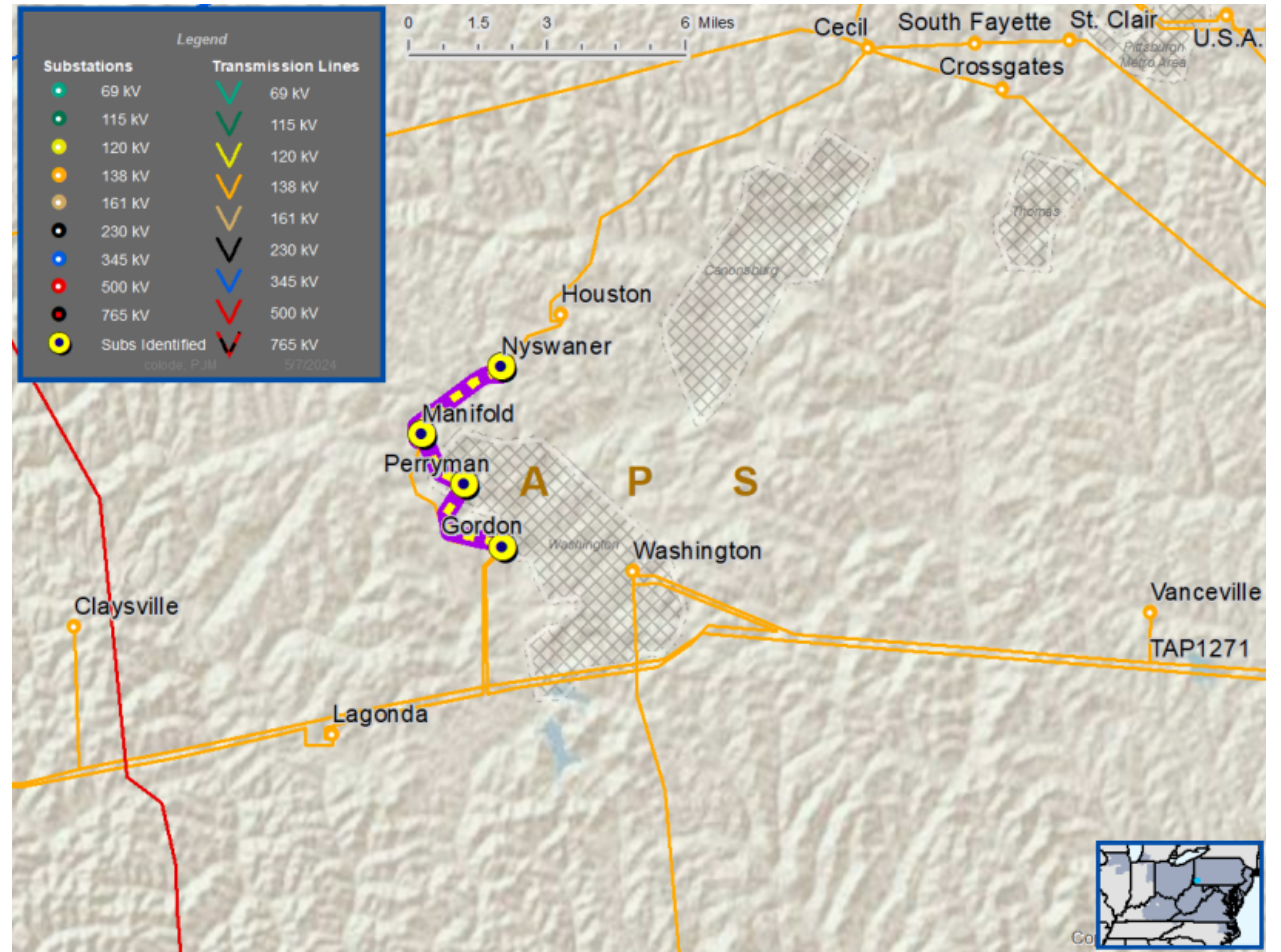
- Age/condition of wood transmission line structures

Problem Statement:

The Gordon – Nyswaner 138kV Line was constructed approximately 60 years ago and is approaching end of life. It is approximately 22 miles long with 53 wood and 53 steel transmission line structures.

- Per recent inspections, the line is exhibiting deterioration. Inspection findings include:
 - 34 structure have required repairs due to deterioration since 2019.
 - 38 structures failed inspection due to sound, woodpecker damage, top rot, decay, cracking, and/or delamination of cross-arms requiring replacement.

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Need #	Transmission Line / Substation Locations	Existing Line Rating (MVA SN / SE / WN / WE)	Existing Conductor Rating (MVA SN / SE / WN / WE)
APS-2024-055	Gordon – Perryman 138 kV Line	169 / 213 / 217 / 280	169 / 213 / 217 / 280
	Perryman – Manifold 138 kV Line	169 / 213 / 217 / 280	169 / 213 / 217 / 280
	Manifold – Nyswaner 138 kV Line	300 / 358 / 349 / 410	308 / 376 / 349 / 445

Need Number: APS-2024-056

Process Stage: Need Meeting – 05/17/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Global Factors

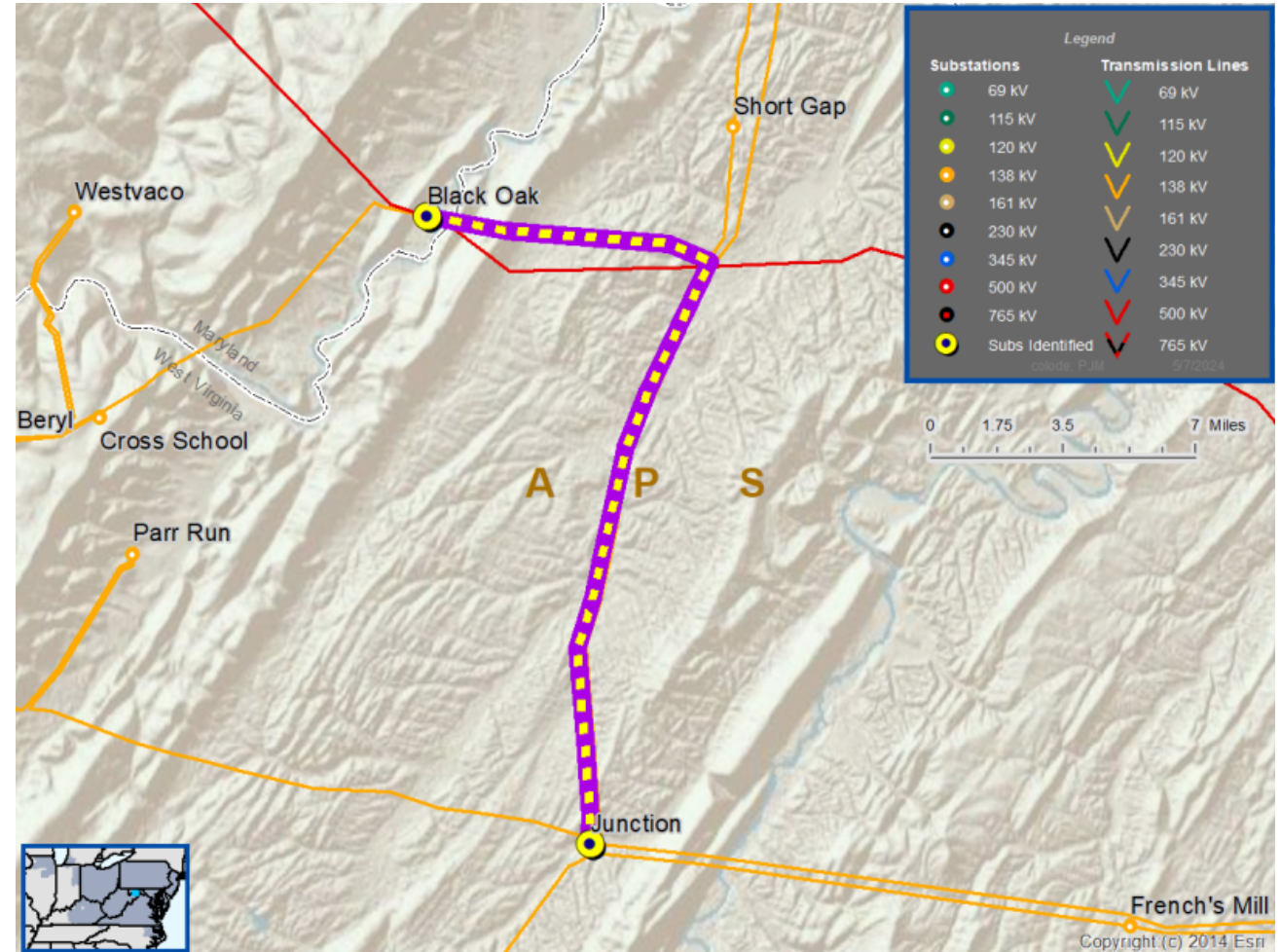
- System reliability/performance

Line Condition Rebuild/Replacement

- Age/condition of wood transmission line structures

Problem Statement:

- The Black Oak – Junction 138 kV Line was constructed approximately 58 years ago and is approaching end of life. It is approximately 22 miles long with 125 Wood H-Frame transmission line structures.
- Per recent inspections, the line is exhibiting deterioration. Inspection findings include:
 - 27 structures have been recently replaced due to deteriorating conditions.
 - 20 repairs have been made since 2019, 10 of which were made in 2023, indicating that components are reaching end of life.
 - 138 structures failed recent inspection due to woodpecker damage, top rot, decay, cracking, and/or delamination of cross-arms.
- Existing Transmission Line Ratings:
 - 221 / 268 / 250 / 317 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: APS-2024-008, APS-2024-011, APS-2024-013, APS-2024-015,
APS-2024-016, APS-2024-024, APS-2024-030 to APS-2024-034

Process Stage: Solution Meeting 5/17/2024

Previously Presented: Need Meeting 1/19/2024, 2/16/2024, 3/15/2024, 4/19/2024

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

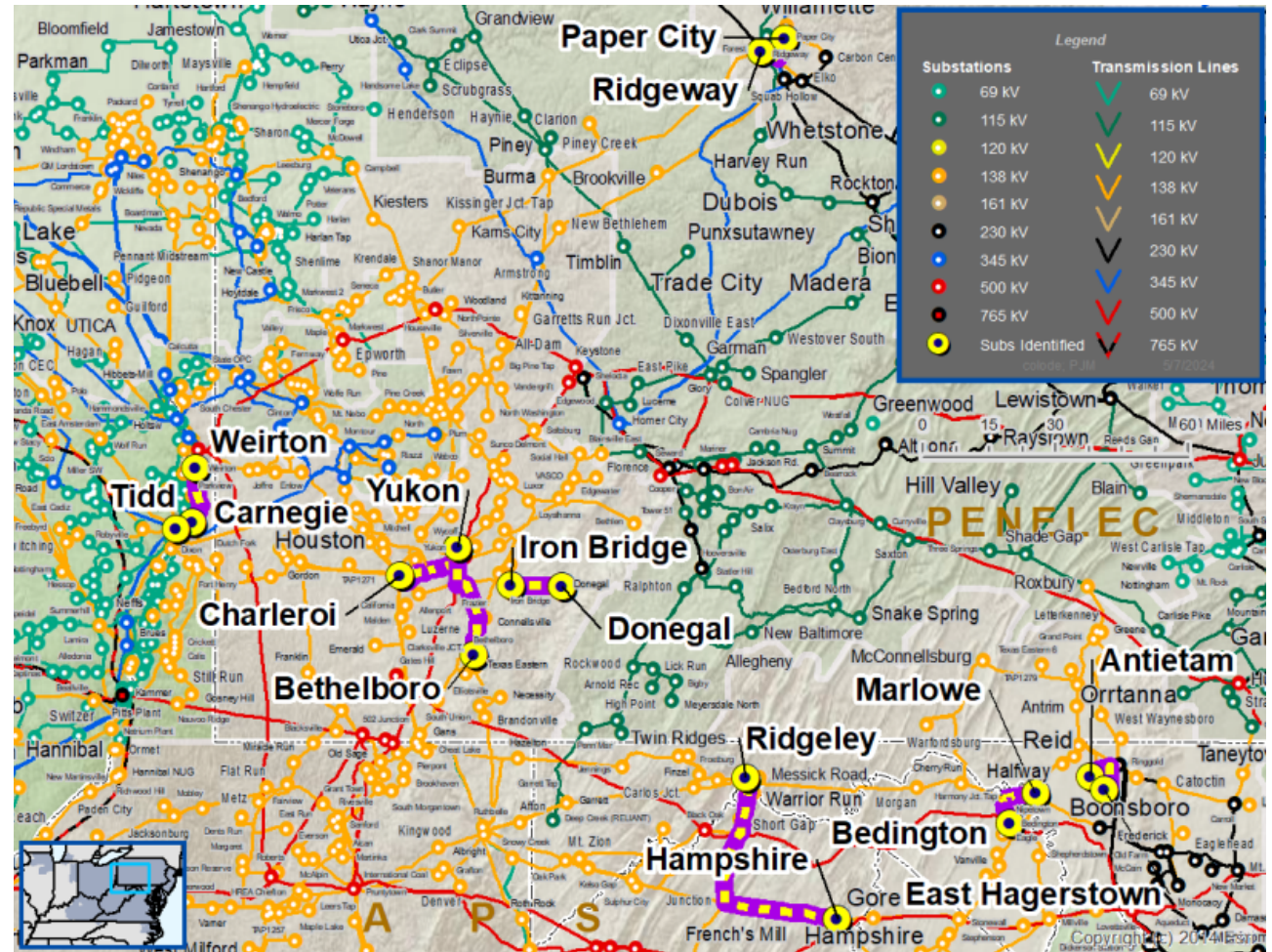
Upgrade Relay Schemes

- 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-2024-008	Charleroi – Yukon 138 kV No. 1 Line	292 / 314 / 325 / 343	297 / 365 / 345 / 441
APS-2024-011	Ridgway – Paper City 138 kV Line	169 / 213 / 217 / 229	169 / 213 / 217 / 280
APS-2024-013	Bethelboro – Yukon 138 kV Line	292 / 314 / 325 / 343	308 / 376 / 349 / 445
APS-2024-015	Antietam – East Hagerstown 138 kV Line	287 / 287 / 287 / 287	308 / 376 / 349 / 445
APS-2024-016	Bedington – Marlowe 138 kV Line	265 / 349 / 349 / 435	308 / 376 / 349 / 445
APS-2024-024	Hampshire – Ridgeley 138 kV Line	141 / 182 / 172 / 217	152 / 183 / 172 / 217
APS-2024-030	Donegal – Iron Bridge 138 kV Line	229 / 229 / 229 / 229	308 / 376 / 349 / 445
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 / 349 / 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

Proposed Solution:

Need #	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE / WN / WE)	Scope of Work	Estimated Cost (\$ M)	Target ISD
APS-2024-008	Charleroi – Yukon 138 kV No. 1 Line	297 / 365 / 345 / 441	<ul style="list-style-type: none"> At Charleroi, replace relaying At Yukon, replace relaying 	1.00	11/30/2025
APS-2024-011	Ridgway – Paper City 138 kV Line	169 / 213 / 217 / 280	<ul style="list-style-type: none"> At Ridgway, replace circuit breaker, disconnect switches, line trap and relaying At Paper City, replace circuit breaker, disconnect switches, line trap and relaying 	4.40	12/31/2027
APS-2024-013	Bethelboro – Yukon 138 kV Line	308 / 376 / 349 / 445	<ul style="list-style-type: none"> At Bethelboro, replace circuit breaker, disconnect switches, line trap, substation conductor and relaying At Yukon, replace line trap and relaying 	2.50	06/01/2027
APS-2024-015	Antietam – E. Hagerstown 138 kV Line	308 / 376 / 349 / 445	<ul style="list-style-type: none"> At Antietam, replace circuit breaker, disconnect switches, line trap, substation conductor and relaying At East Hagerstown, replace circuit breaker, disconnect switches, line trap, substation conductor and relaying 	4.73	04/30/2027

Proposed Solution:

Need #	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE / WN / WE)	Scope of Work	Estimated Cost (\$ M)	Target ISD
APS-2024-016	Bedington – Marlowe 138 kV BMA Line	308 / 376 / 349 / 445	<ul style="list-style-type: none"> At Bedington, replace circuit breaker, disconnect switches, line trap, substation conductor and relaying At Marlowe, replace disconnect switches, line trap, substation conductor and relaying 	3.34	04/30/2027
APS-2024-024	Hampshire – Ridgeley 138 kV Line	152 / 183 / 172 / 217	<ul style="list-style-type: none"> At Ridgeley, replace circuit breaker, disconnect switches, line trap, substation conductor and relaying 	5.20	10/31/2027
APS-2024-030	Donegal – Iron Bridge 138 kV Line	280 / 323 / 343 / 375	<ul style="list-style-type: none"> At Iron Bridge, replace circuit breaker, disconnect switches, substation conductor and relaying 	1.40	12/31/2026
APS-2024-031	Belmont – Trissler 138 kV 604 Line	186 / 231 / 227 / 292	<ul style="list-style-type: none"> At Belmont, replace circuit breaker, disconnect switches, line trap and relaying At Trissler, replace circuit breaker, disconnect switches, line trap, substation conductor and relaying 	3.40	12/31/2029

Proposed Solution:

Need #	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE / WN / WE)	Scope of Work	Estimated Cost (\$ M)	Target ISD
APS-2024-032	Belmont – Edgelawn 138 kV 628 Line	308 / 376 / 349 / 445	<ul style="list-style-type: none"> At Belmont, replace circuit breaker, disconnect switches, line trap and relaying At Edgelawn, replace circuit breaker, disconnect switches, line trap, substation conductor and relaying 	1.90	12/31/2032
APS-2024-033	Belmont – Reno Tap 138 kV Line	282 / 282 / 349 / 356	<ul style="list-style-type: none"> At Belmont, replace disconnect switches, line trap and relaying 	1.90	12/31/2033
APS-2024-034	Weirton – Carnegie 138 kV Line	221 / 268 / 250 / 317	<ul style="list-style-type: none"> At Weirton, replace line trap and relaying At Carnegie, replace disconnect switches 	0.75	12/31/2026
	Carnegie – Tidd 138 kV Line	187 / 240 / 247 / 285	<ul style="list-style-type: none"> At Carnegie, replace disconnect switches 		

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

Project Status: Conceptual

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

Need Number: APS-2024-035

Process Stage: Solution Meeting – 05/17/2024

Previously Presented: Need Meeting – 04/19/2024

Project Driver(s):

Customer Service

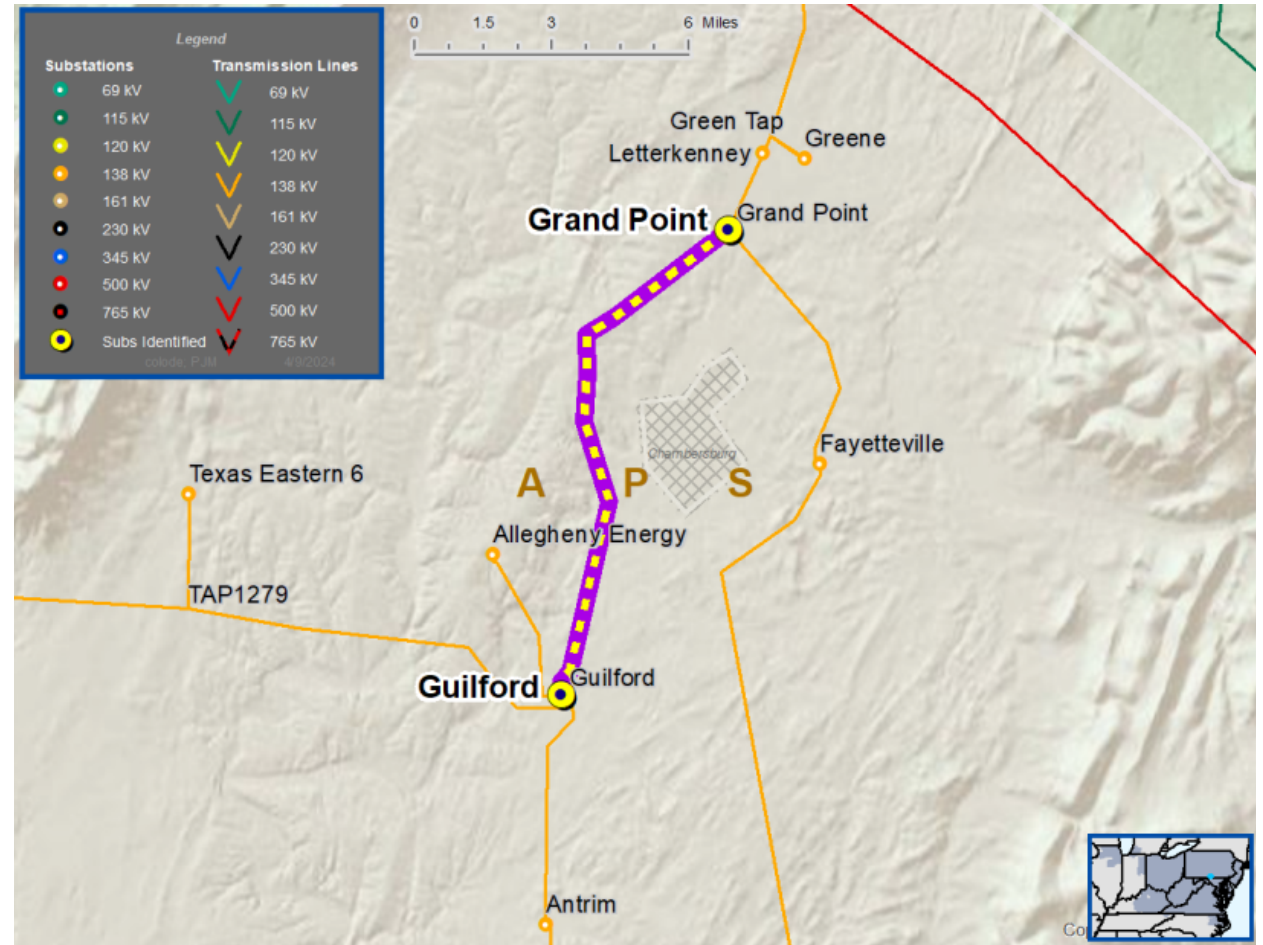
Specific Assumption Reference:

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 Grand Point – Guilford 138 kV Line Customer Connection

Need Number: APS-2024-035
Process Stage: Solution Meeting – 05/17/2024

Proposed Solution:

138 kV Transmission Line Tap

- Tap the Grandpoint – Guilford 138 kV and install two SCADA controlled switches
- Construct 500 ft of 138 kV line extension from the tap location to the Customer’s substation
- Install one SCADA controlled switch at POI between FE and Customer
- Install 138 kV revenue metering in Customer’s substation
- Modify line relay settings in Grandpoint and Guilford substations

Alternatives Considered:

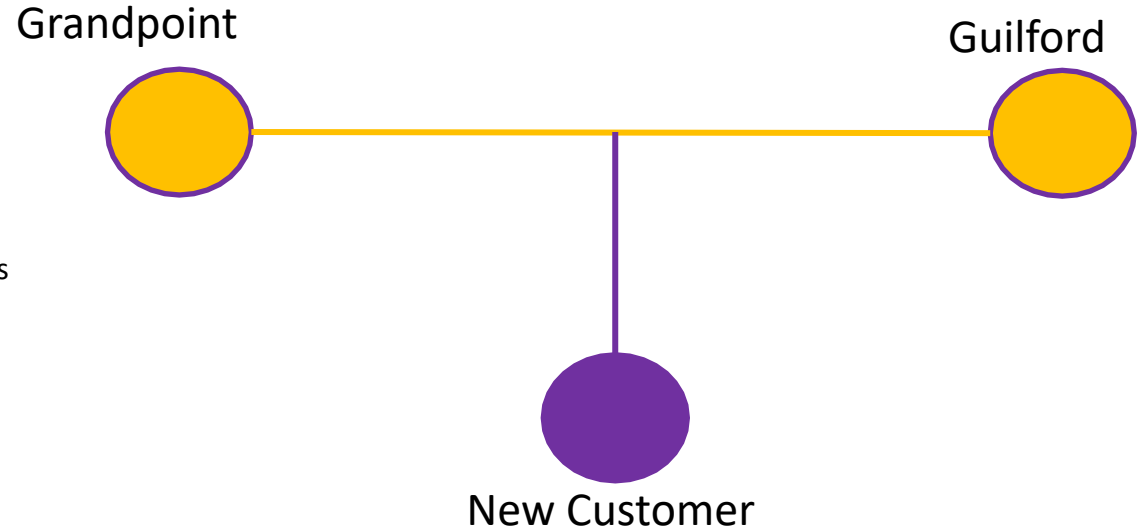
- No alternative solutions considered due to customer’s proximity to Grand Point – Guilford 138 kV Line.

Estimated Project Cost: \$1.75M

Projected In-Service: 10/31/2025

Status: Engineering

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



Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	

Need Number: APS-2024-036

Process Stage: Solution Meeting – 05/17/2024

Previously Presented: Need Meeting – 04/19/2024

Project Driver(s):

Customer Service

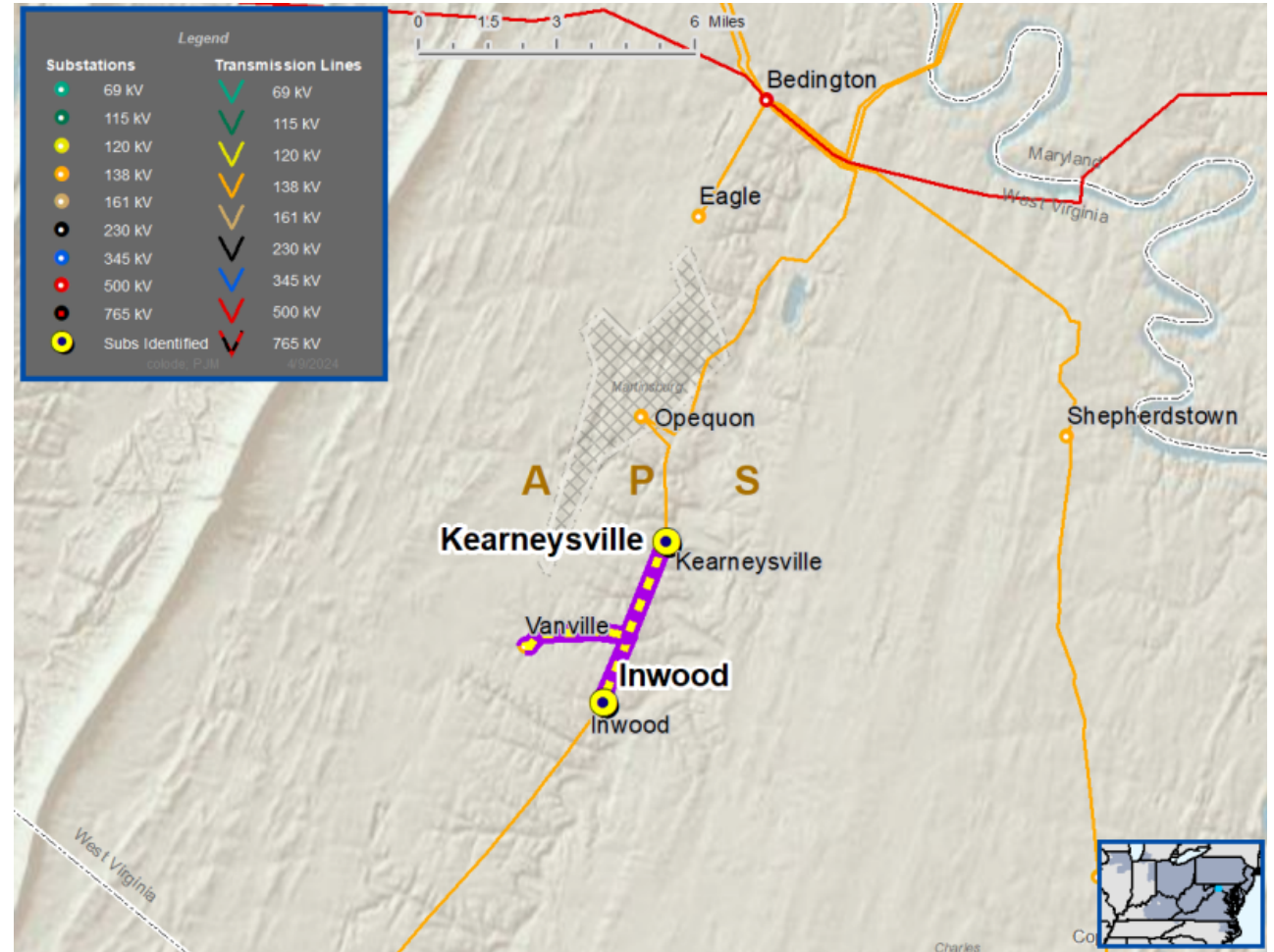
Specific Assumption Reference:

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.



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

Need Number: APS-2024-036
Process Stage: Solution Meeting – 05/17/2024

Proposed Solution:

138 kV Transmission Line Tap

- Install a three-switch tap along the Inwood – Kearneysville 138 kV Line with three SCADA load break switches
- Construct 0.1 miles of 138 kV line extension from the three-switch tap to the Customer’s substation
- Install 138 kV revenue metering in Customer’s substation
- Modify line relay settings in Inwood and Kearneysville substations

Alternatives Considered:

- No alternative solutions considered due to customer’s proximity to Inwood – Kearneysville 138 kV Line.

Estimated Project Cost: \$2.25M

Projected In-Service: 11/30/2027

Status: Engineering

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



Legend	
500 kV	
345 kV	
138 kV	
69 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

5/7/2024– V1 – Original version posted to pjm.com