Submission of Supplemental Projects for Inclusion in the Local Plan

APS Transmission Zone M-3 Process Misoperation Relay Projects

Need Numbers: APS-2024-057, APS-2024-058

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 3/7/2025

Previously Presented: Solution Meeting 08/06/2024

Need Meeting 06/04/2024

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cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.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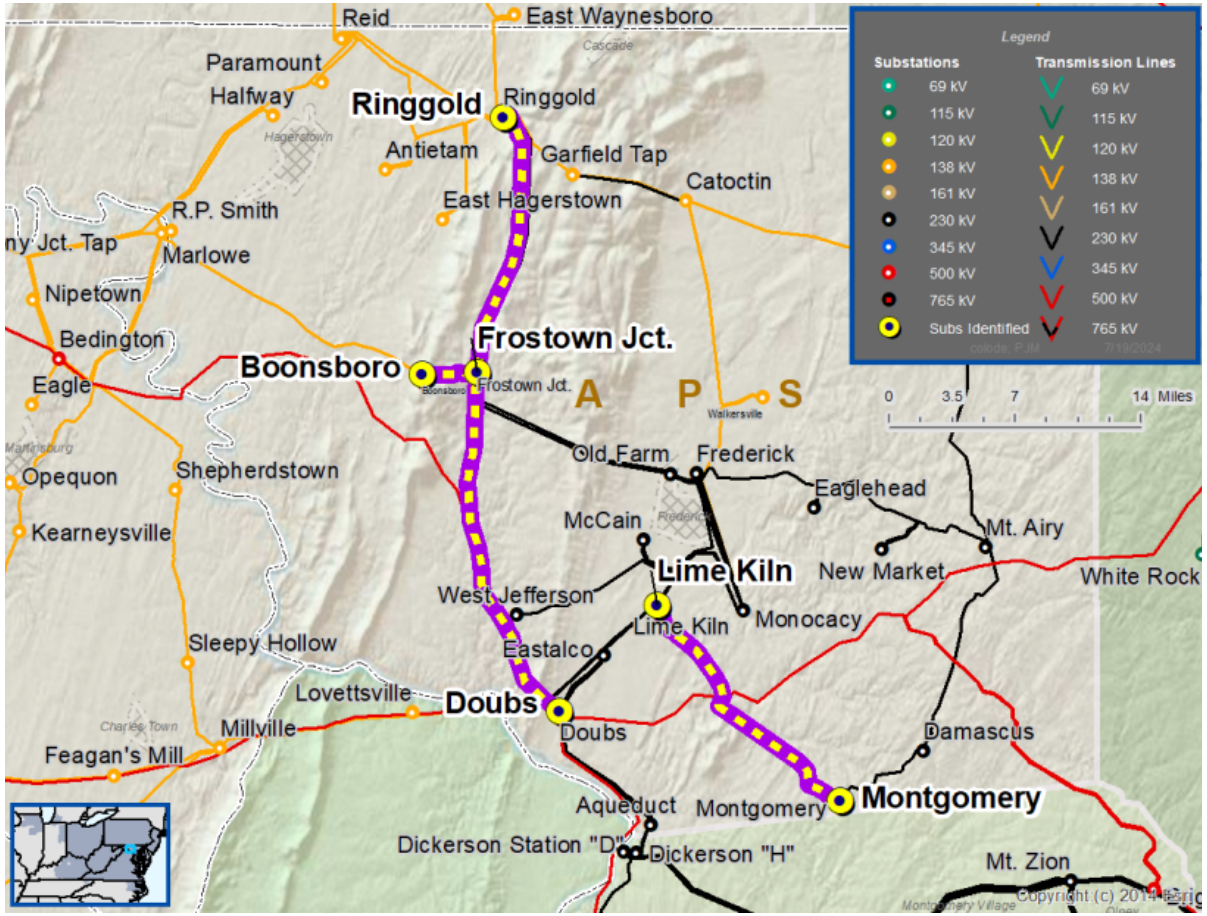

APS Transmission Zone M-3 Process
Misoperation Relay Projects

Need #	Transmission Line / Substation Locations	Existing Line Rating MVA (SN / SE / WN /WE)	Existing Conductor Rating MVA (SN / SE / WN / WE)
APS-2024-057	Doubs – Frostown Junction 230 kV Line	617 / 698 / 699 / 762	617 / 754 / 699 / 894
	Frostown Junction – Ringgold 230 kV Line	324 / 349 / 361 / 381	617 / 754 / 699 / 894
APS-2024-058	Lime Kiln – Montgomery 230 kV Line	548 / 688 / 699 / 804	617 / 754 / 699 / 894

APS Transmission Zone M-3 Process Misoperation Relay Projects

Selected Solution:

Need #	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE / WN / WE)	Scope of Work	Supplemental ID	Estimated Cost ($ M)	Target ISD
APS-2024-057	Doubs – Frostown Junction 230 kV Line	617 / 754 / 699 / 894	• At Doubs, replace line trap, substation conductor and relaying	s3540.1	$6.30	12/31/2026
	Frostown Junction – Ringgold 230 kV Line	617 / 754 / 699 / 894	• At Ringgold, replace line trap, disconnect switches, substation conductor and relaying			
APS-2024-058	Lime Kiln – Montgomery 230 kV Line	617 / 754 / 699 / 894	• At Lime Kiln, replace CVT on bus, substation conductor and relaying • At Montgomery, replace CVT on bus, disconnect switches, substation conductor and relaying	s3541.1	$9.20	10/31/2026

APS Transmission Zone M-3 Process
Misoperation Relay Projects

Need Number: APS-2020-003
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 3/7/2025
Previously Presented: Solution Meeting – 08/16/2024
Need Meeting – 04/16/2020

Project Driver:
Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency

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

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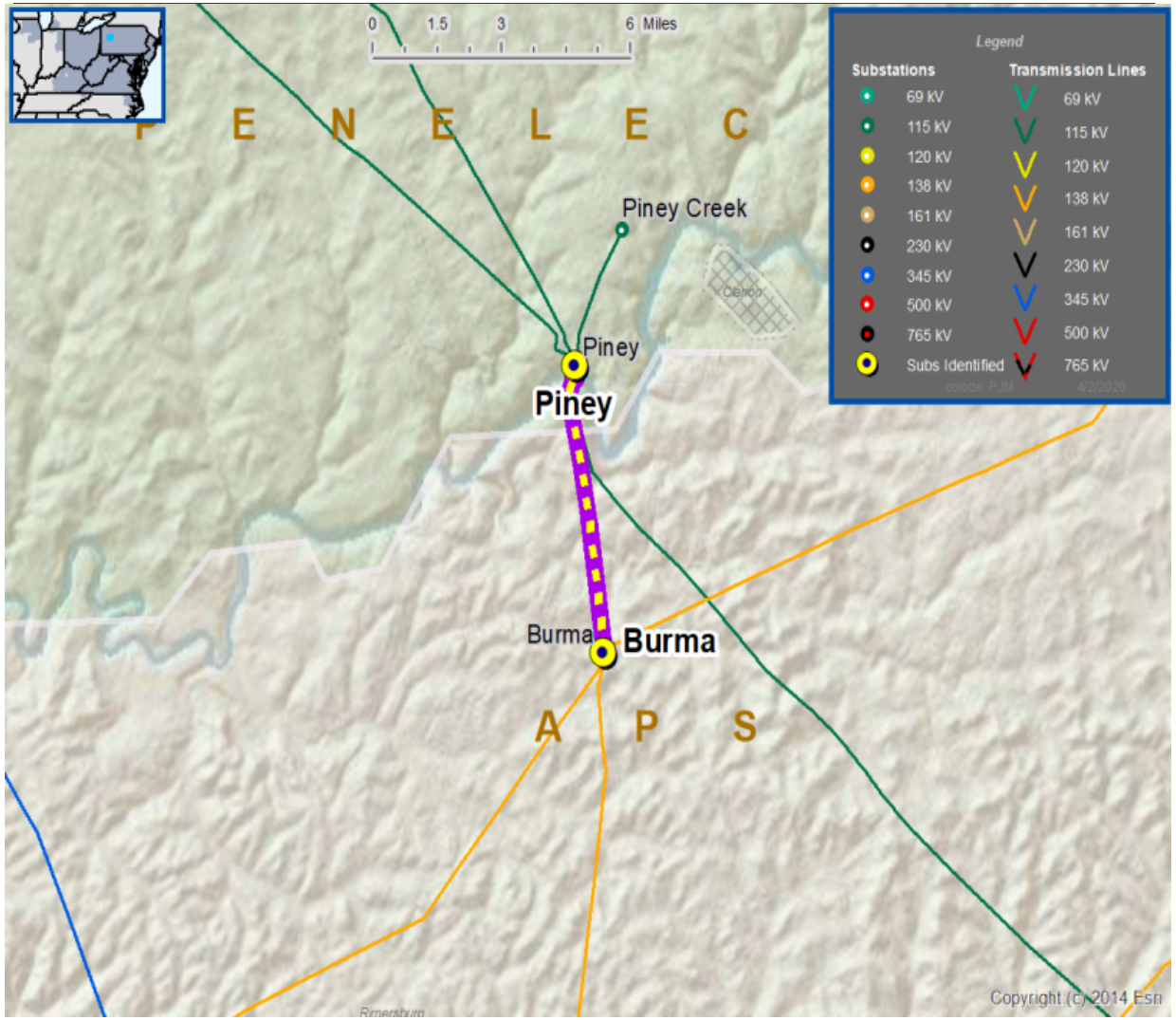


APS Transmission Zone M-3 Process Misoperation Relay Projects

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.

Need #	Transmission Line / Substation Locations	Existing Line Rating MVA (SN/SE/WN/WE)	Existing Conductor Rating MVA (SN/SE/WN/WE)
APS-2020-003 PN-2020-004	Burma – Piney 115 kV Line	221 / 262 / 263 / 286	232 / 282 / 263 / 334

APS Transmission Zone M-3 Process Misoperation Relay Project

Selected Solution:

Need #	Transmission Line / Substation Locations	New MVA Line Rating (SN/SE/WN/WE)	Scope of Work	Supplemental ID	Estimated Cost ($ M)	Target ISD
APS-2020-003 PN-2020-004	Burma – Piney 115 kV Line	232 / 282 / 263 / 334	• At Burma, replace line trap, substation conductor and relays.	s3542.1	$1.9	10/31/2025

APS Transmission Zone M-3 Process
Monocacy No. 4 230/138 kV Transformer

Need Number: APS-2024-061

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 4/7/2025

Previously Presented: Solution Meeting – 11/06/2024
Need Meeting – 06/04/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

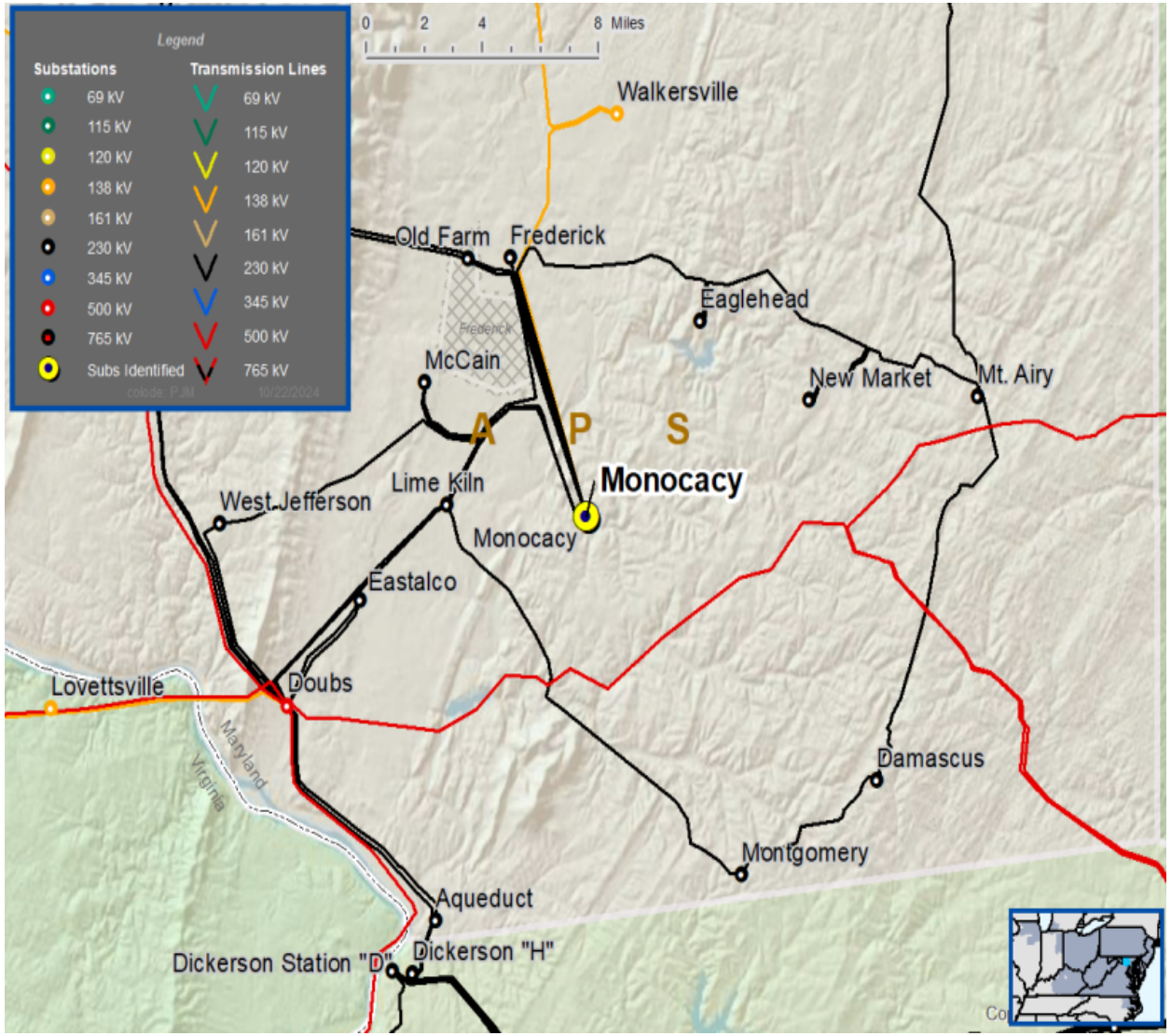
- System reliability and performance

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The Monocacy No. 4 230/138 kV Transformer is approximately 51 years old and is approaching end of life.
- The transformer has experienced an increase in the level of acetylene.
- The transformer relaying is obsolete.
- Existing transformer ratings:
  - 260 / 338 MVA (SN / SSTE)
  - 313 / 368 MVA (WN / WSTE)



APS Transmission Zone M-3 Process
Monocacy No. 4 230/138 kV Transformer

Need Number: APS-2024-061
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 3/28/2025 – 4/7/2025

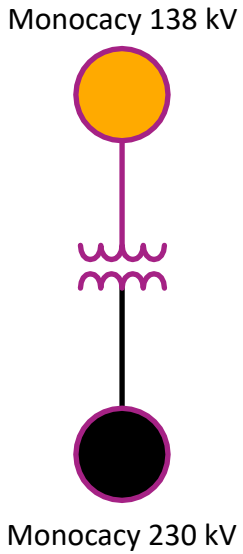
Selected Solution:

- At Monocacy Substation:
  - Replace No. 4 230/138 kV 224 MVA Transformer with a new 266 MVA unit
  - Replace transformer conductor, circuit breakers, disconnect switches and relaying

Anticipated Transformer Circuit Ratings:

- Monocacy No. 4 230/138 kV Transformer:
  - Before Proposed Solution: 260 / 338 / 313 / 368 MVA (SN/SSTE/WN/WSTE)
  - After Proposed Solution: 266 / 346 / 320 / 377 MVA (SN/SSTE/WN/WSTE)

Estimated Project Cost: $9.00 M
Projected In-Service: 12/31/2027
Supplemental Number: s3573.1



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

APS Transmission Zone M-3 Process
Pruntytown No. 3 500/138 kV Transformer

Need Number: APS-2024-071
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 4/7/2025
Previously Presented: Solution Meeting 01/07/2025
Need Meeting 08/06/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The Pruntytown No. 3 500/138 kV Transformer is approximately 48 years old and is approaching end of life.
- The transformer has experienced an increase in moisture content.
- The transformer parts and relaying are obsolete.
- The transformer and relaying equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Existing transformer ratings:
  - 430 / 552 MVA (SN / SSTE)
  - 505 / 585 MVA (WN / WSTE)

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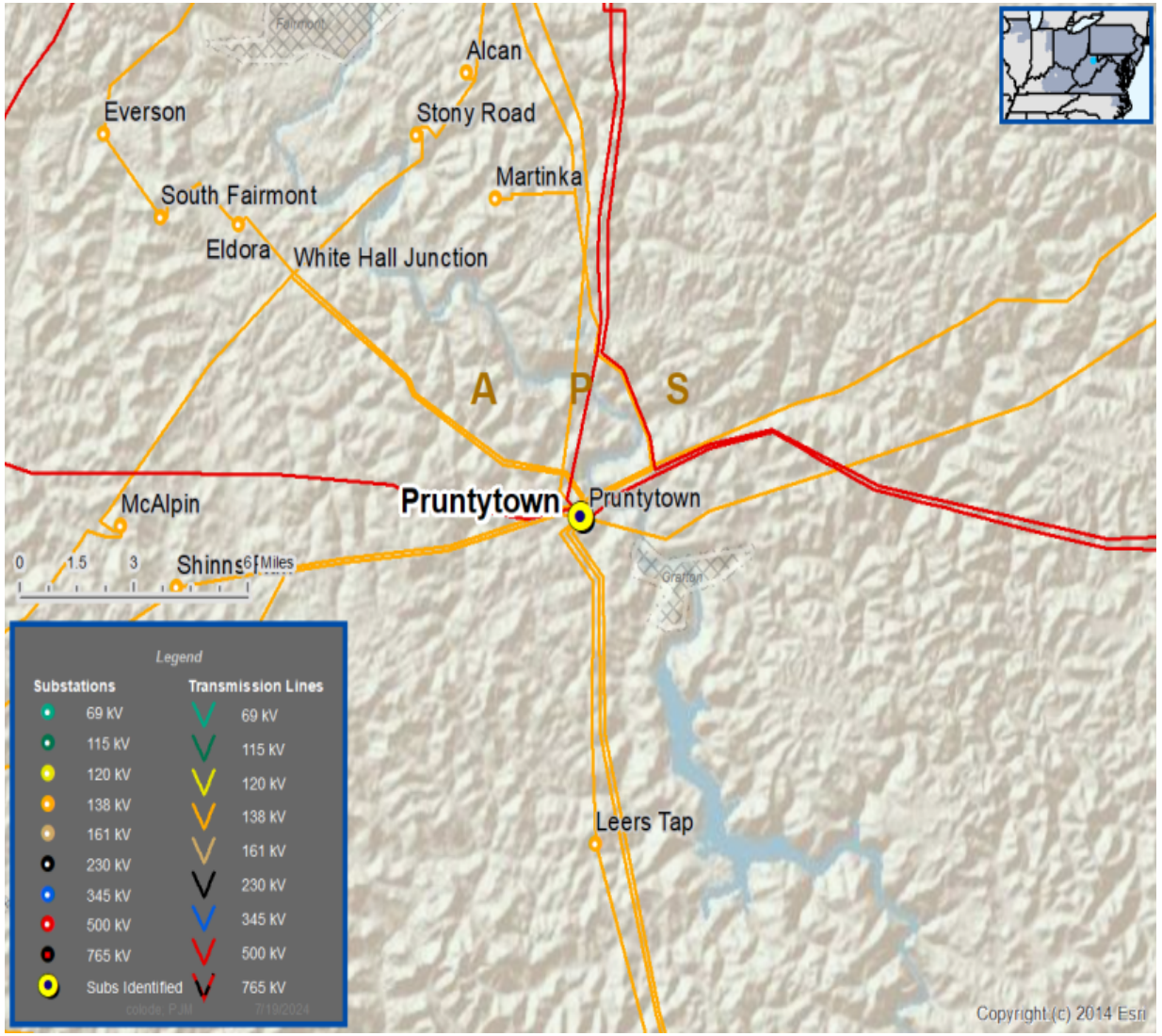


APS Transmission Zone M-3 Process
Pruntytown No. 3 500/138 kV Transformer

Need Number: APS-2024-071

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 4/7/2025

Selected Solution:

- At Pruntytown Substation:
  - Replace the existing 500/138 kV Transformer No. 3
  - Replace transformer conductor, circuit breakers, disconnect switches and relaying

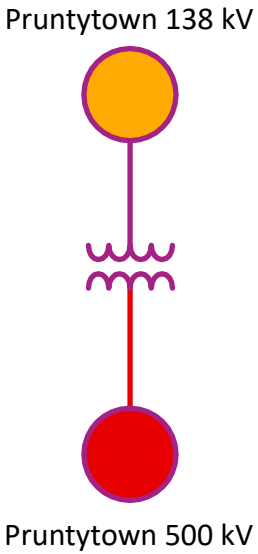
Anticipated Transformer Circuit Ratings:

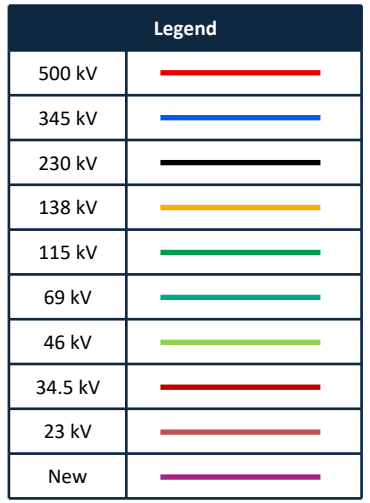
- 500/138 kV Transformer No. 3 :
  - Before Proposed Solution: 430 / 552 / 505 / 585 MVA (SN / SSTE / WN / WSTE)
  - After Proposed Solution (anticipated): 448 / 582 / 527 / 618 MVA (SN / SSTE / WN / WSTE)

Estimated Project Cost: $15.77 M

Projected In-Service: 6/30/2029

Supplemental Number: s3574.1





APS Transmission Zone M-3 Process
Stony Springs Junction Area

Need Number: APS-2023-022

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 4/7/2025

Previously Presented: Solution Meeting – 11/15/2024
Need Meeting – 07/21/2023

Project Driver:

Operational Flexibility and Efficiency

Specific Assumption Reference:

- System reliability and performance
- Load at risk in planning and operational scenarios
- Add/Expand Bus Configuration
- Upgrade Relay Schemes

Problem Statement:

- The Stony Springs Junction (Harrison City - Hempfield – Luxor) 138 kV Line is a three terminal line that provides direct service to over 25,000 customers and provides a transmission network path.
- The multi-terminal line creates difficulties for protective relaying.
- The tap stations on the line lack switches and SCADA.
- Terminals stations are equipped with antiquated relaying schemes and equipment that limits the use of the full capacity of the transmission line conductor.
- There is ~25 MW of load served directly from the line. Additionally, the line has 25 miles of exposure.

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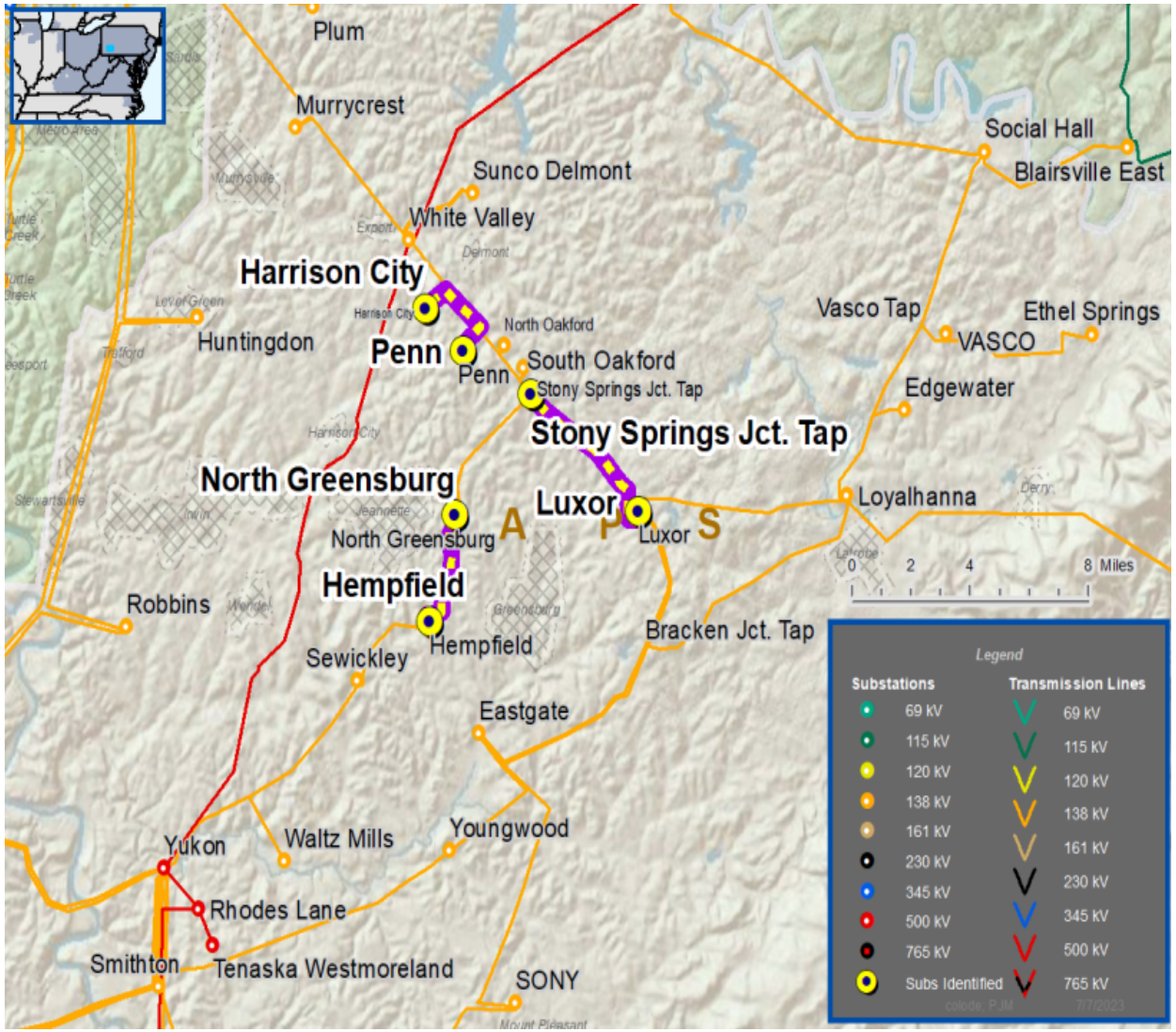


APS Transmission Zone M-3 Process
Stony Springs Junction Area

Need #	Transmission Line / Substation Locations	Existing Line Rating MVA (SN / SE / WN / WE)	Existing Conductor Rating MVA (SN / SE / WN / WE)
APS-2023-022	Harrison City – Penn 138 kV Line	242 / 297 / 310 / 351	308 / 376 / 349 / 445
	Penn – North Oakford Tap 138 kV Line	296 / 302 / 332 / 332	296 / 302 / 332 / 332
	North Oakford Tap – South Oakford Tap 138 kV Line	296 / 302 / 332 / 332	296 / 302 / 332 / 332
	North Oakford Tap – Delmont 138 kV Line	221 / 268 / 250 / 317	221 / 268 / 250 / 317
	South Oakford Tap – Stony Springs Junction 138 kV Line	296 / 302 / 332 / 322	296 / 302 / 332 / 322
	Stony Springs Junction – North Greensburg 138 kV Line	308 / 376 / 349 / 445	308 / 376 / 349 / 445
	North Greensburg – Hempfield 138 kV Line	294 / 350 / 349 / 401	308 / 376 / 349 / 445
	Stony Springs Junction – Luxor 138 kV Line	296 / 302 / 332 / 332	296 / 302 / 332 / 332

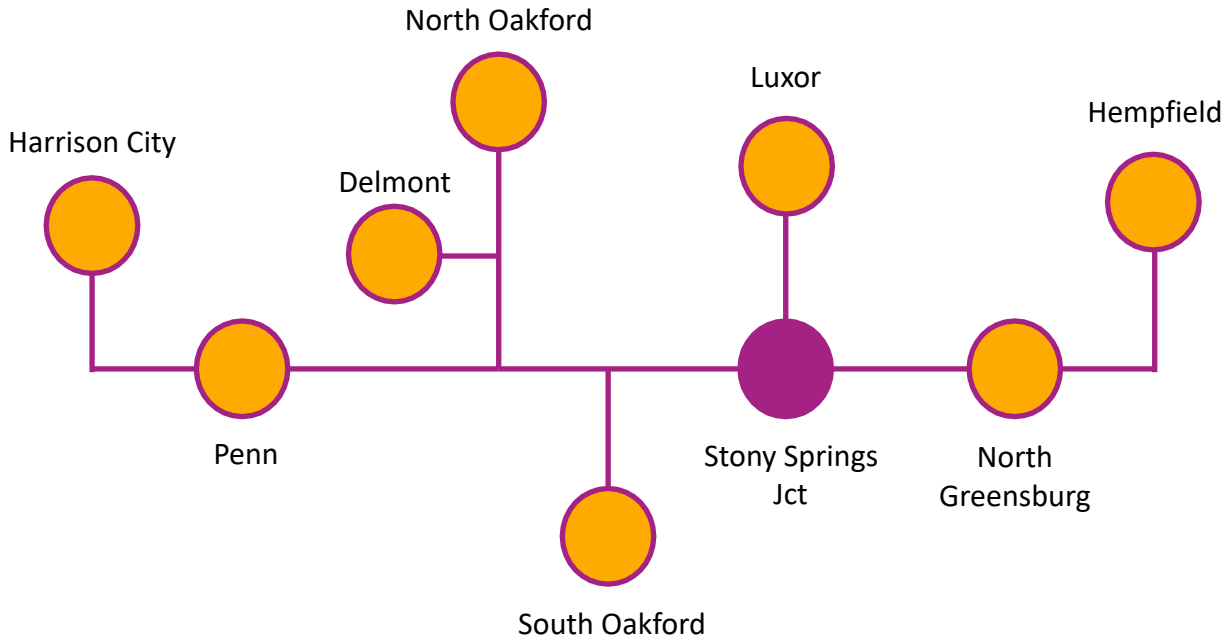
APS Transmission Zone M-3 Process
Stony Springs Junction Area

Selected Solution:

Need #	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE / WN / WE)	Scope of Work	Estimated Cost ($M)	Target ISD
APS-2023-022	Harrison City – Penn 138 kV Line	308 / 376 / 349 / 445	▪ At Harrison City Substation: Replace bus and line side breaker risers. ▪ At Penn Substation: Install one line breaker and one bus tie breaker.	$13.6	6/22/2027
	Penn – North Oakford Tap 138 kV Line	296 / 302 / 332 / 332	▪ At North Oakford Tap: Install new disconnect switches equipped with auto-sectionalizing.		
	North Oakford Tap – South Oakford Tap 138 kV Line	296 / 302 / 322 / 332	▪ At South Oakford Tap: Install three switches with SCADA.		
	North Oakford – Delmont 138 kV Line	221 / 268 / 250 / 317	▪ At North Oakford Substation: Install full SCADA control on the existing switch. ▪ At Delmont Substation: Install full SCADA control on the existing switch.		
	South Oakford Tap – Stony Springs Junction 138 kV Line	296 / 302 / 332 / 322	▪ At Stony Springs Junction: Install a three-breaker ring bus and associated relaying.		
	Stony Springs Junction – North Greensburg 138 kV Line	308 / 376 / 349 / 445	▪ At North Greensburg Substation: Replace circuit breaker.		
	North Greensburg – Hempfield 138 kV Line	308 / 376 / 349 / 445	▪ At Hempfield: Replace line circuit breaker, disconnect switches and associated relaying.		
	Stony Springs Junction – Luxor 138 kV Line	296 / 302 / 332 / 367	▪ At Luxor Substation: Replace circuit breaker, substation conductor, breaker risers on both sides of breaker and relaying.		

APS Transmission Zone M-3 Process
Stony Springs Junction Area

Selected Solution:



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

Estimated Project Cost: $13.6M

Projected In-Service: 6/22/2027

Supplemental Number: s3575.1

APS Transmission Zone M-3 Process
New Customer

Need Number: APS-2023-029 (s3150.1, s3150.2)

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 4/7/2025

Previously Presented: Re-Present Solutions Meeting – 01/07/2025

Solution Meeting – 02/06/2024

Need Meeting – 7/11/2023

Project Driver(s):

Customer Service

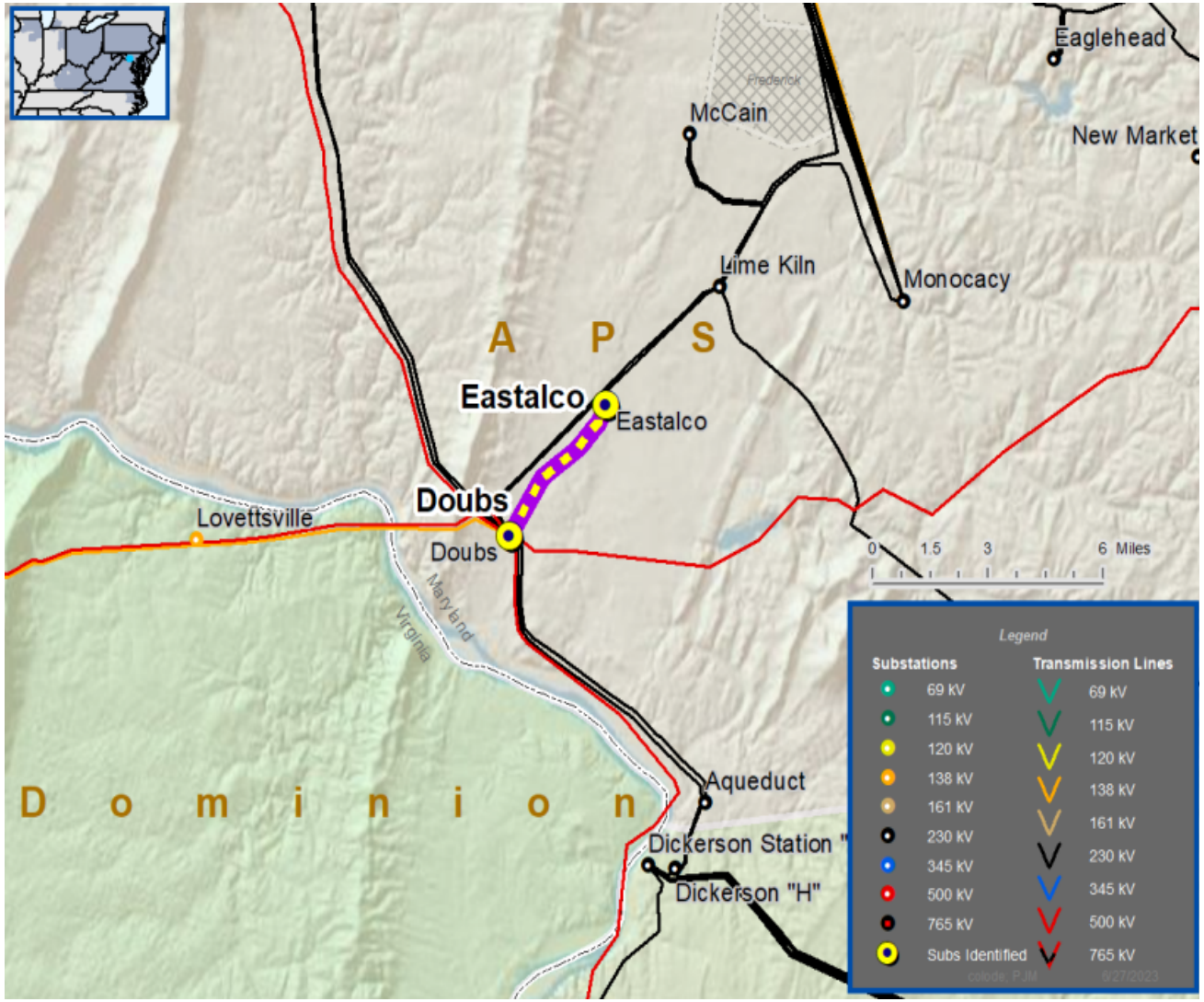
Specific Assumption Reference(s):

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 customer has requested 230 kV transmission service for approximately 300 MW of load near the Doubs-Sage #206 230 kV Line.

Requested In-Service Date: May 15, 2025



APS Transmission Zone M-3 Process
New Customer

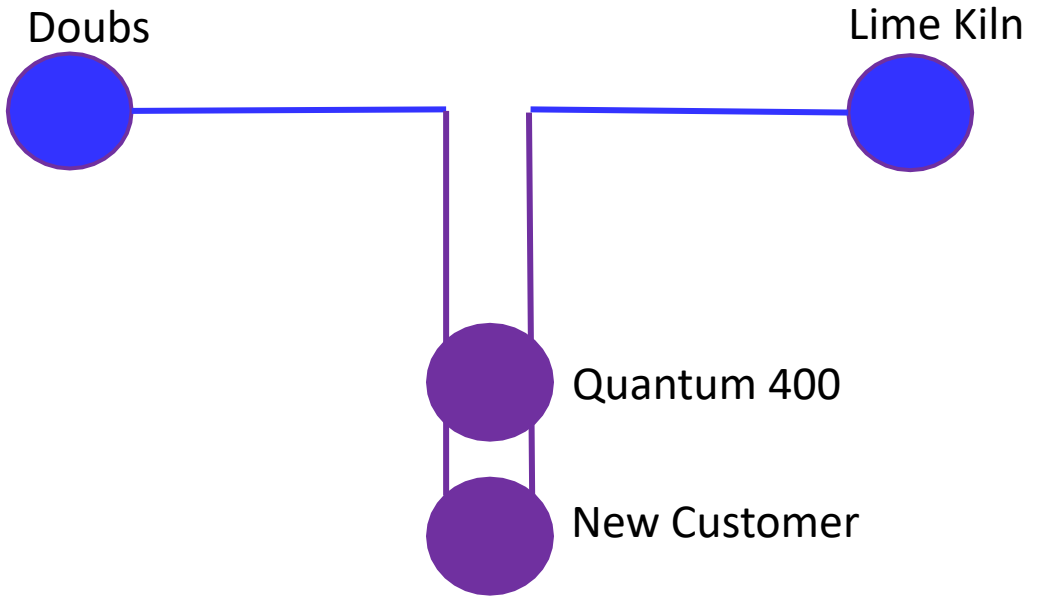
Need Number: APS-2023-029 (s3150.1, s3150.2)

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 4/7/2025

Selected Solution:

- Build a six breaker, three bay (expandable to four bays), breaker-and-a-half substation (Quantum 400)
- Loop the Doubs – Lime Kiln #231 230 kV Line in and out of the new substation
- Modify line relay settings at Doubs and Lime Kiln substations
- Provide two feeds to the customer facility

Estimated Project Cost: $23.2M
Projected In-Service: 12/31/2025
Supplemental Number: s3150.1, s3150.2



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

APS Transmission Zone M-3 Process
New Customer

Need Number: APS-2023-029

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 4/7/2025

Selected Solution:

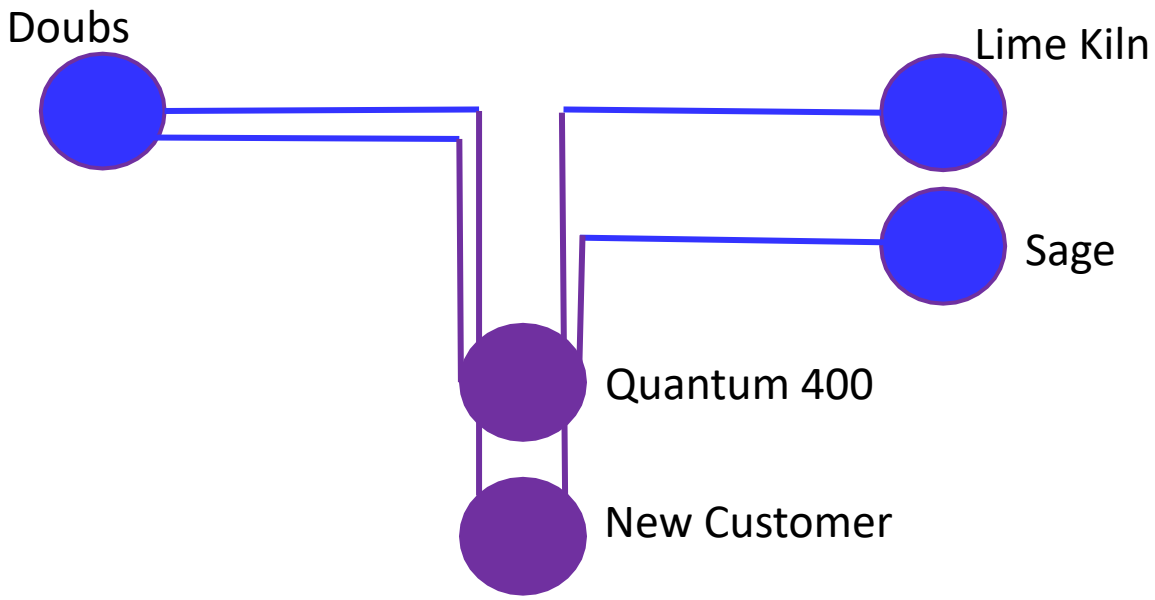
230 kV Transmission Substation (Quantum 400)

- Expand Quantum 400 station to a ten breaker, breaker-and-a-half substation
- Loop the Doubs – Sage #206 230 kV Line in and out of the new substation
- Modify line relay settings at Doubs and Sage substations

Estimated Project Cost: $8M

Projected In-Service: 12/31/2027

Supplemental Number: s3150.1, s3150.2



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

APS Transmission Zone M-3 Process
Huntingdon – Springdale 138 kV Line

Need Number: APS-2025-006

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan- 8/14/2025

Previously Presented: Need Meeting 03/14/2025
Solution Meeting 5/16/2025

Project Driver:

Equipment Material Condition, Performance & Risk

Specific Assumption References:

System Performance Projects Global Factors

- Substation/line equipment limits
- System reliability and performance

Substation Condition Rebuild/Replacement

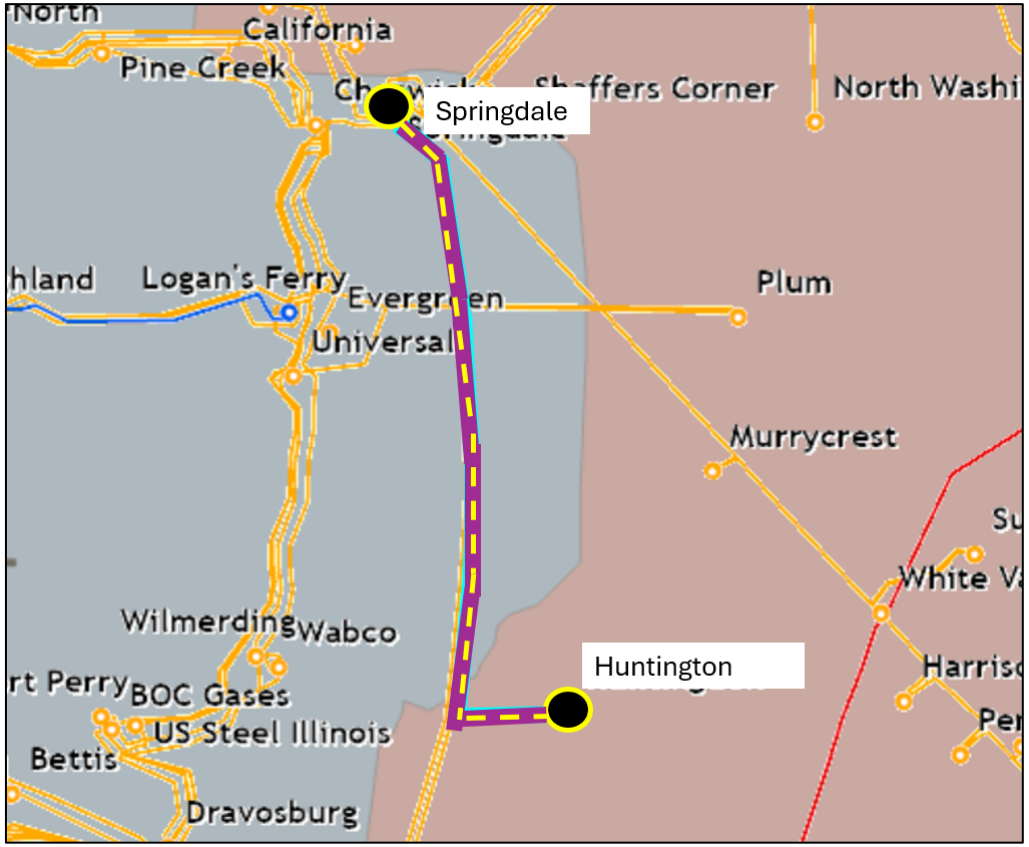
- Upgrade Relay Schemes
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation on the Huntingdon - Springdale 138 kV Line.
- 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.

Huntingdon - Springdale 138 kV Line:

- Existing line ratings: 267 / 287 / 287 / 287 MVA (SN/SE/WN/WE)
- Existing conductor ratings: 297 / 365 / 345 / 441 MVA (SN/SE/WN/WE)



APS Transmission Zone M-3 Process
Huntingdon – Springdale 138 kV Line

Need Number: APS-2025-006
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Selected Solution:

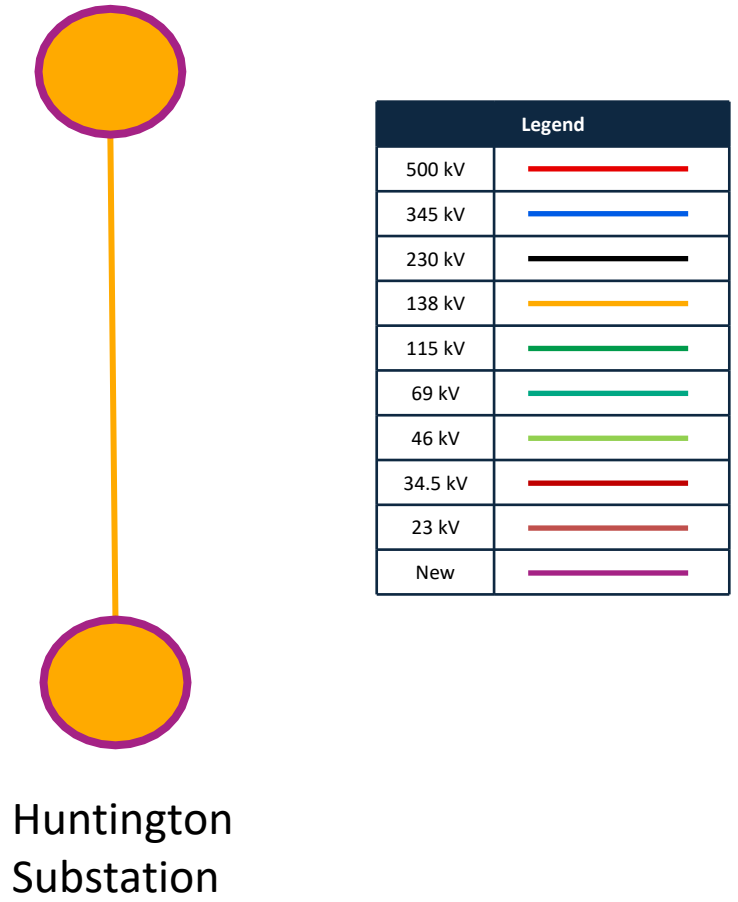
- At Huntingdon Substation, replace circuit breaker, disconnect switches, substation conductor, line trap, surge arresters, CVTs, and relaying.
- At Springdale Substation, replace disconnect switches, substation conductor, line trap, surge arresters, CVTs, and relaying.

Transmission Line Ratings:

Huntingdon – Springdale 138 kV Line:

- Existing Line Ratings: 267 / 287 / 287 /287 MVA (SN/SE/WN/WE)
- New Line Ratings: 297 / 365 / 345 / 441 MVA (SN/SE/WN/WE)

Estimated Project Cost: $4.71M
Projected In-Service: 5/1/2028
Supplemental ID: s3666.1



APS Transmission Zone M-3 Process
Bedington – Marlowe 138 kV Line

Need Number: APS-2025-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Previously Presented: Need Meeting 03/14/2025
Solution Meeting 5/16/2025

Project Driver:

Equipment Material Condition, Performance & Risk

Specific Assumption References:

System Performance Projects Global Factors

- Substation/line equipment limits
- System reliability and performance

Substation Condition Rebuild/Replacement

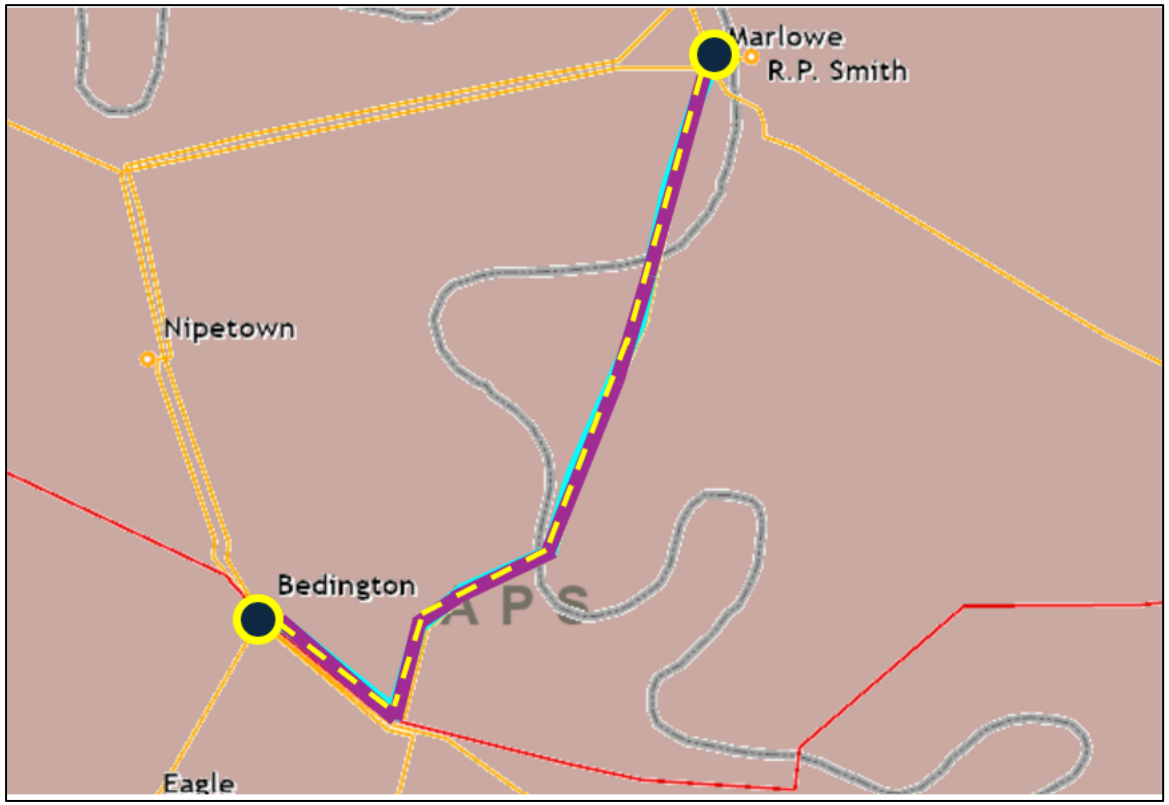
- Upgrade Relay Schemes
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation on the Bedington – Marlowe 138 kV BMR Line.
- 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.

Bedington – Marlowe 138 kV BMR Line:

- Existing line ratings: 265 / 314 / 325 / 343 MVA (SN/SE/WN/WE)
- Existing conductor ratings: 308 / 376 / 349 / 445 (MVA SN/SE/WN/WE)



APS Transmission Zone M-3 Process
Marlowe – Bedington 138 kV Line

Need Number: APS-2025-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Selected Solution:

- At Marlowe Substation, replace disconnect switches, substation conductor, line trap, surge arresters, and relaying.
- At Bedington Substation, replace circuit breakers, disconnect switches, substation conductor, line trap, surge arresters, CVT and relaying.

Transmission Line Ratings:

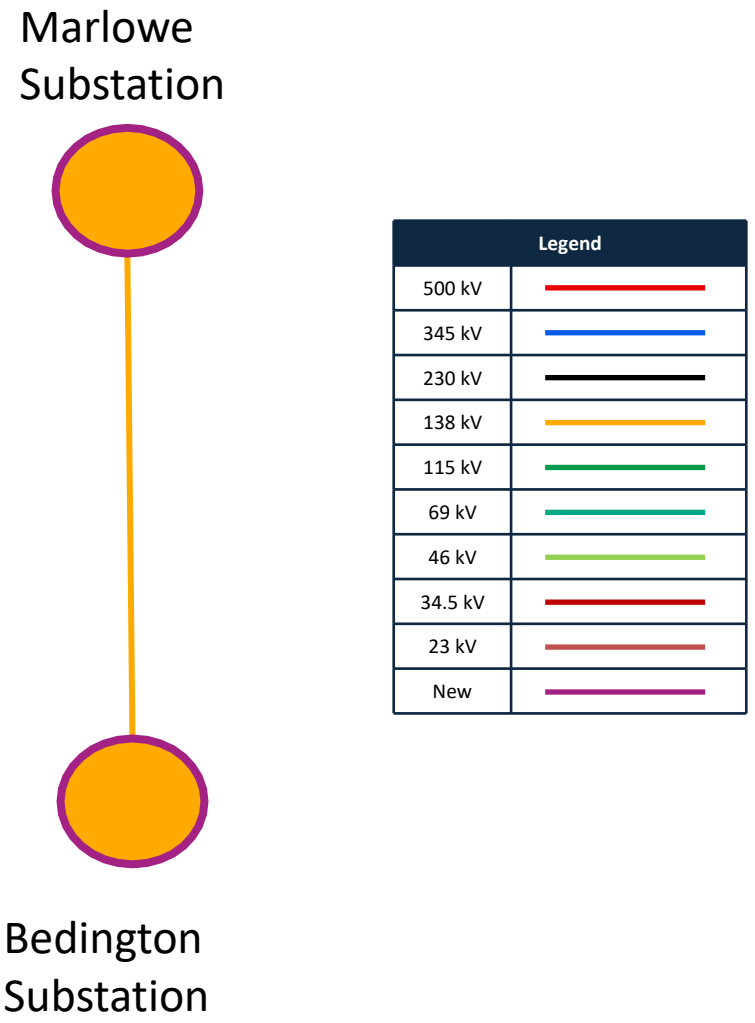
Marlowe – Bedington 138 kV Line:

- Existing Line Ratings: 265 / 314 / 325 / 343 MVA (SN/SE/WN/WE)
- New Line Ratings: 308 / 376 / 349 / 445 MVA (SN/SE/WN/WE)

Estimated Project Cost: $4.00M

Projected In-Service: 7/26/2029

Supplemental ID: s3667.1



APS Transmission Zone M-3 Process
Hardy – North Petersburg 138 kV Line

Need Number: APS-2025-008

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Previously Presented: Need Meeting 03/14/2025
Solution Meeting 5/16/2025

Project Driver:

Equipment Material Condition, Performance & Risk

Specific Assumption References:

System Performance Projects Global Factors

- Substation/line equipment limits
- System reliability and performance

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 on the Hardy - North Petersburg 138 kV Line.
- 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.

Hardy - North Petersburg 138 kV Line:

- Existing line ratings: 292 / 314 / 325 / 343 MVA SN/SE/WN/WE
- Existing conductor ratings: 309 / 376 / 349 / 445 MVA SN/SE/WN/WE

APS Transmission Zone M-3 Process
Hardy – North Petersburg 138 kV Line

Need Number: APS-2025-008

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Selected Solution:

- At Hardy Substation, replace circuit breaker, disconnect switches, substation conductor, line trap, surge arresters, CVT and relaying.
- At North Petersburg Substation, replace disconnect switches, substation conductor, line trap, surge arresters, CVT and relaying.

Transmission Line Ratings:

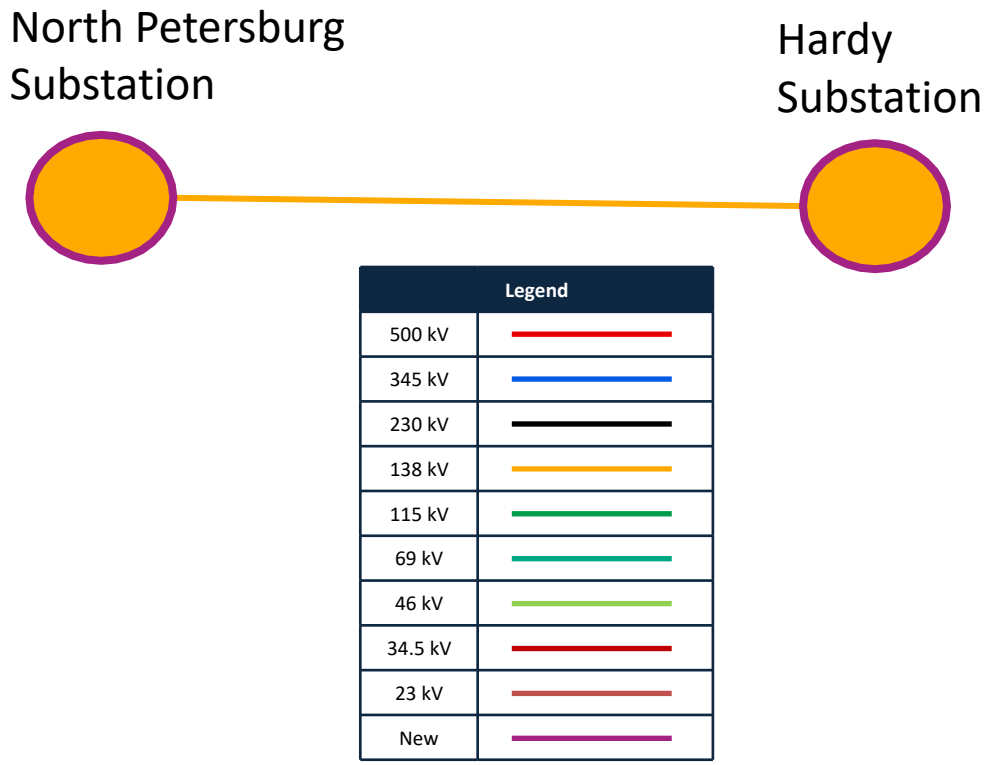
Hardy – North Petersburg 138 kV Line:

- Existing Line Ratings: 292 / 314 / 325 / 343 MVA (SN/SE/WN/WE)
- New Line Ratings: 309 / 376 / 349 / 445 MVA (SN/SE/WN/WE)

Estimated Project Cost: $5.20M

Projected In-Service: 7/26/2025

Supplemental ID: s3668.1



APS Transmission Zone M-3 Process Misoperation Relay Projects

Need Number: APS-2024-114, APS-2024-116

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Previously Presented: Needs Meeting - 12/13/2024
Solution Meeting - 02/14/2025

Supplemental Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

System Condition Projects

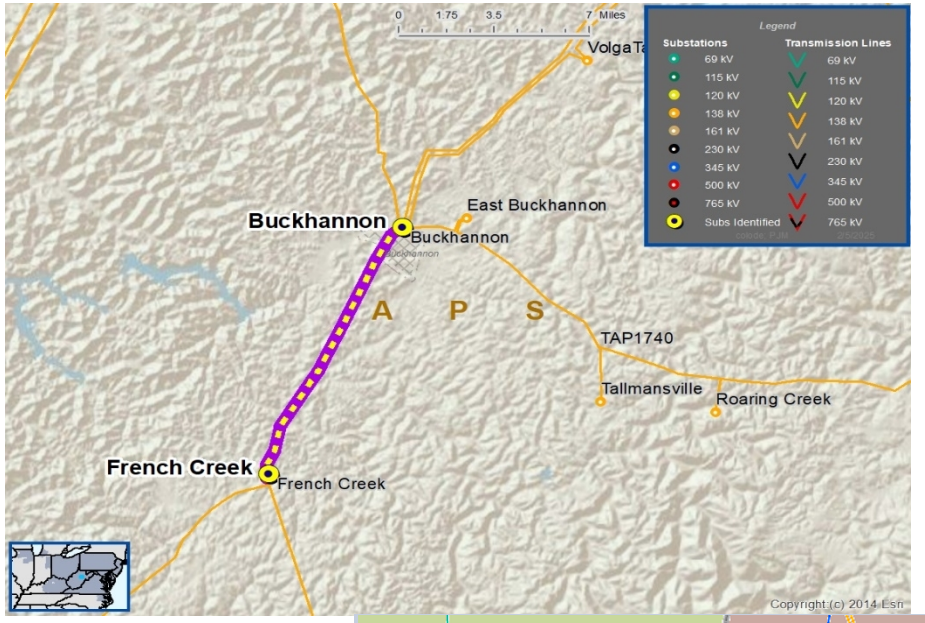
- Substation Condition Rebuild/Replacement

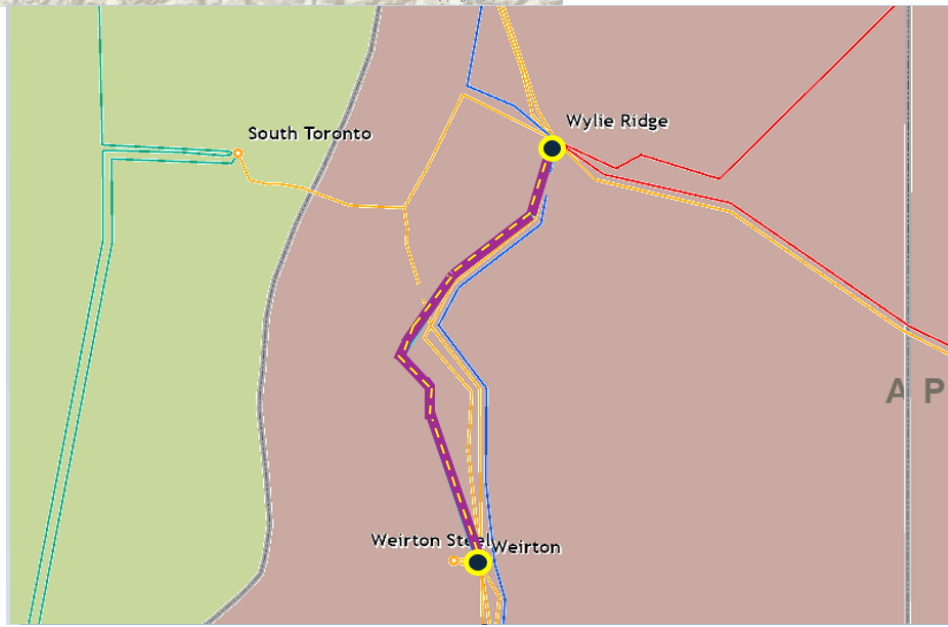
Upgrade Relay Schemes

- 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-2024-114	Buckhannon – French Creek 138 kV Line	229 / 229 / 229 / 229	308 / 376 / 349 / 445
APS-2024-116	Weirton – Wylie Ridge 138 kV No. 1 Line	225 / 292 / 306 / 306	308 / 376 / 349 / 445

APS Transmission Zone M-3 Process Misoperation Relay Projects

Need Number: APS-2024-114
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Selected Solution:

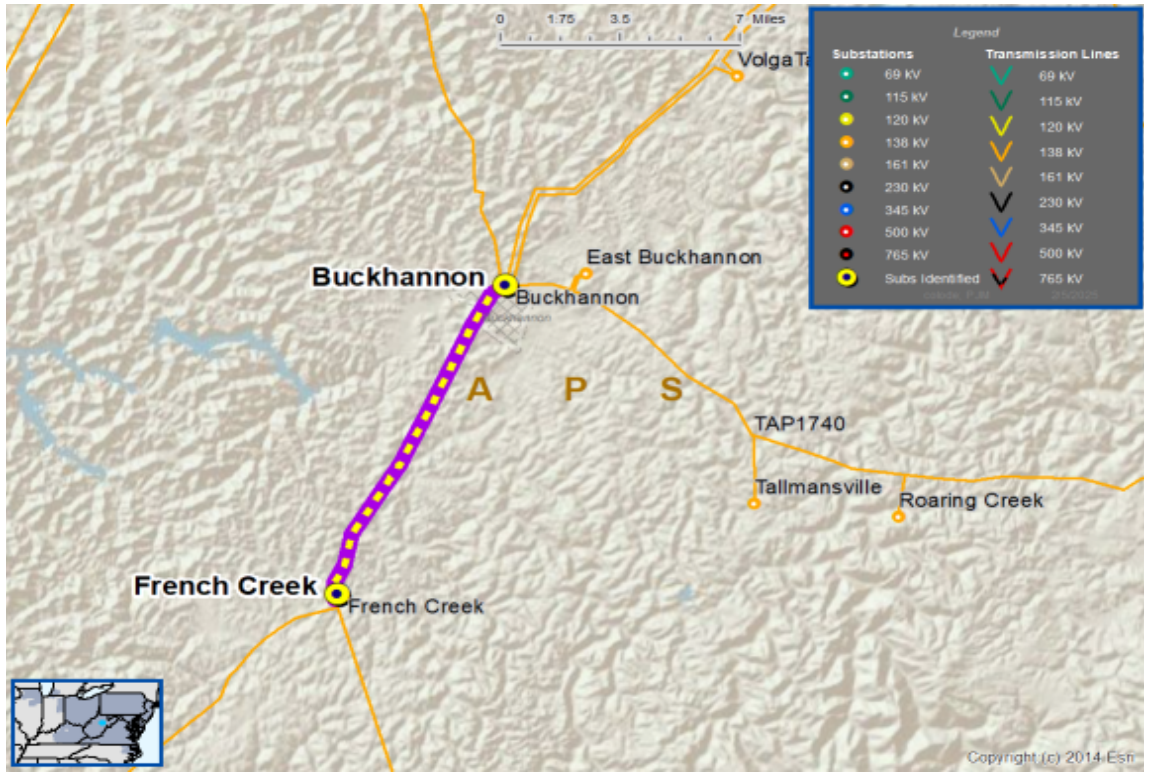
Buckhannon Substation: At Buckhannon, replace circuit breaker, disconnect switch, substation conductor, wave trap, line turner and coax, and relaying. Estimated Cost: $3.55 M

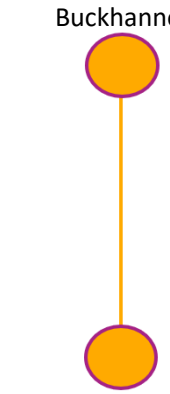
French Creek Substation: At French Creek, replace circuit breaker, disconnect switch, substation conductor, wave trap, line turner and coax, and relaying. Estimated Cost: $3.55 M

Transmission Cost Estimate: $7.1 M

Projected In-Service: 03/30/2029

Supplemental ID: s3642.1





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

APS Transmission Zone M-3 Process Misoperation Relay Projects

Need Number: APS-2024-116
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Selected Solution:

Weirton Substation: At Weirton, replace circuit breaker, disconnect switches, wave trap, substation conductor, line turner and coax, and relaying. Estimated Cost: $3.52 M

Wylie Ridge Substation: At Wylie Ridge, replace circuit breaker, disconnect switches, wave trap, substation conductor, line turner and coax, and relaying. Estimated Cost: $3.52 M

Transmission Cost Estimate: $7.04 M

Projected In-Service: 04/27/2029

Supplemental ID: s3643.1

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

APS Transmission Zone M-3 Process Misoperation Relay Projects

Need Number: APS-2024-090

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Previously Presented: Needs Meeting - 10/18/2024
Solution Meeting - 02/14/2025

Supplemental Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

System Condition Projects

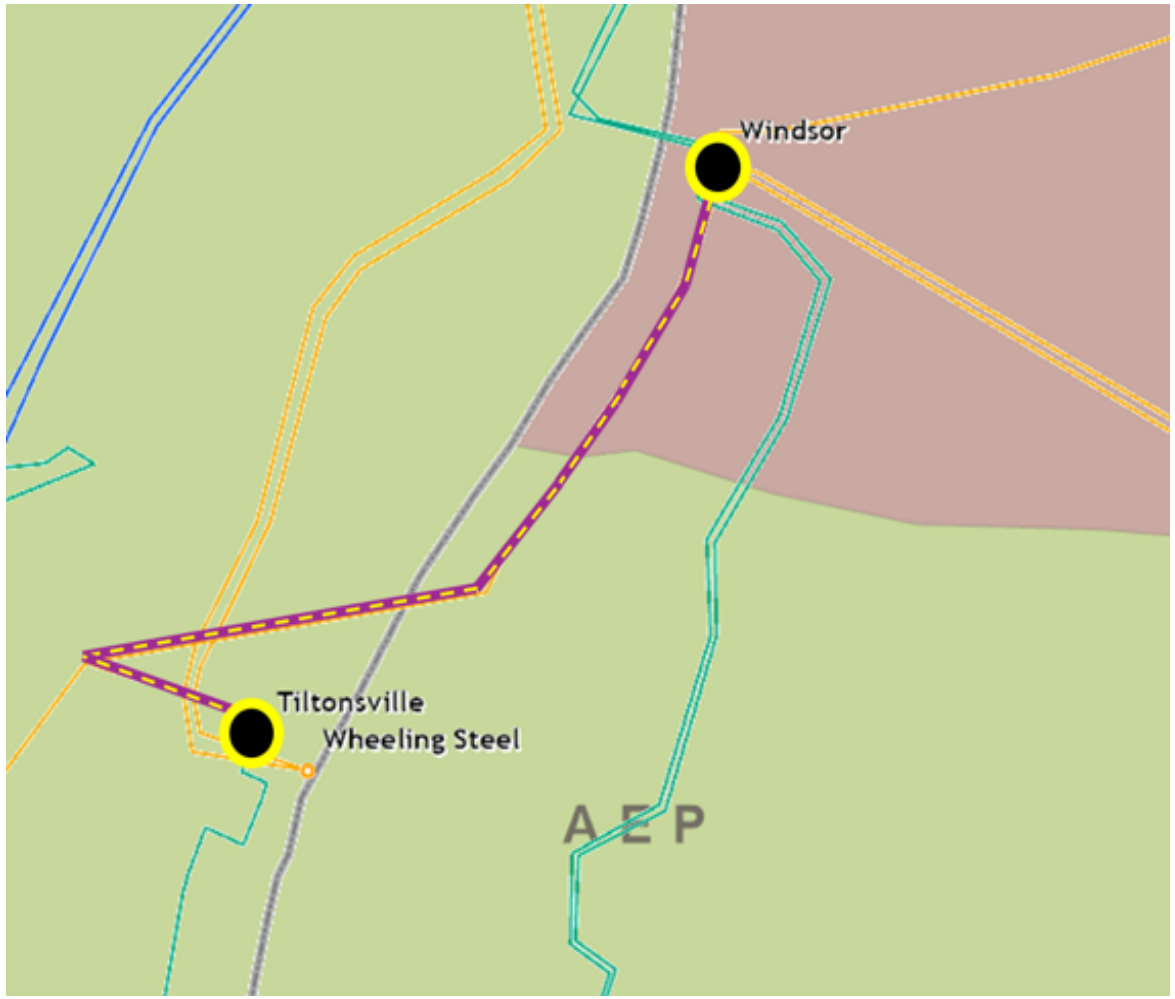
- Substation Condition Rebuild/Replacement

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-2024-090	Windsor – Tiltonsville (AEP) 138 kV Line	329 / 361 / 419 / 453	329 / 361 / 424 / 453

APS Transmission Zone M-3 Process Misoperation Relay Projects

Need Number: APS-2024-090
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

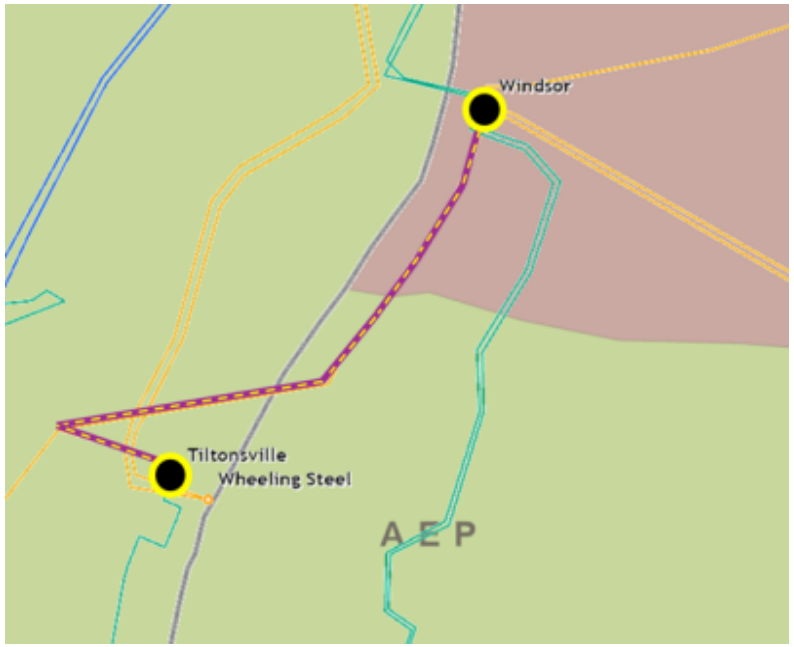
Selected Solution:

Windsor Substation: At Windsor, replace substation conductor, line turner and coax, and relaying. Estimated Cost: $1.05 M

Transmission Cost Estimate: $1.05 M

Projected In-Service: 11/20/2026

Supplemental ID: s3644.1



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

APS Transmission Zone M-3 Process
Albright Substation

Need Number: APS-2024-072

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Previously Presented: Needs Meeting - 8/16/2024
Solutions Meeting - 02/14/2025

Supplemental Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference:

System Performance Global Factors

- System reliability/performance
- Substation/Line equipment limits

Substation Condition Rebuild/Replacement

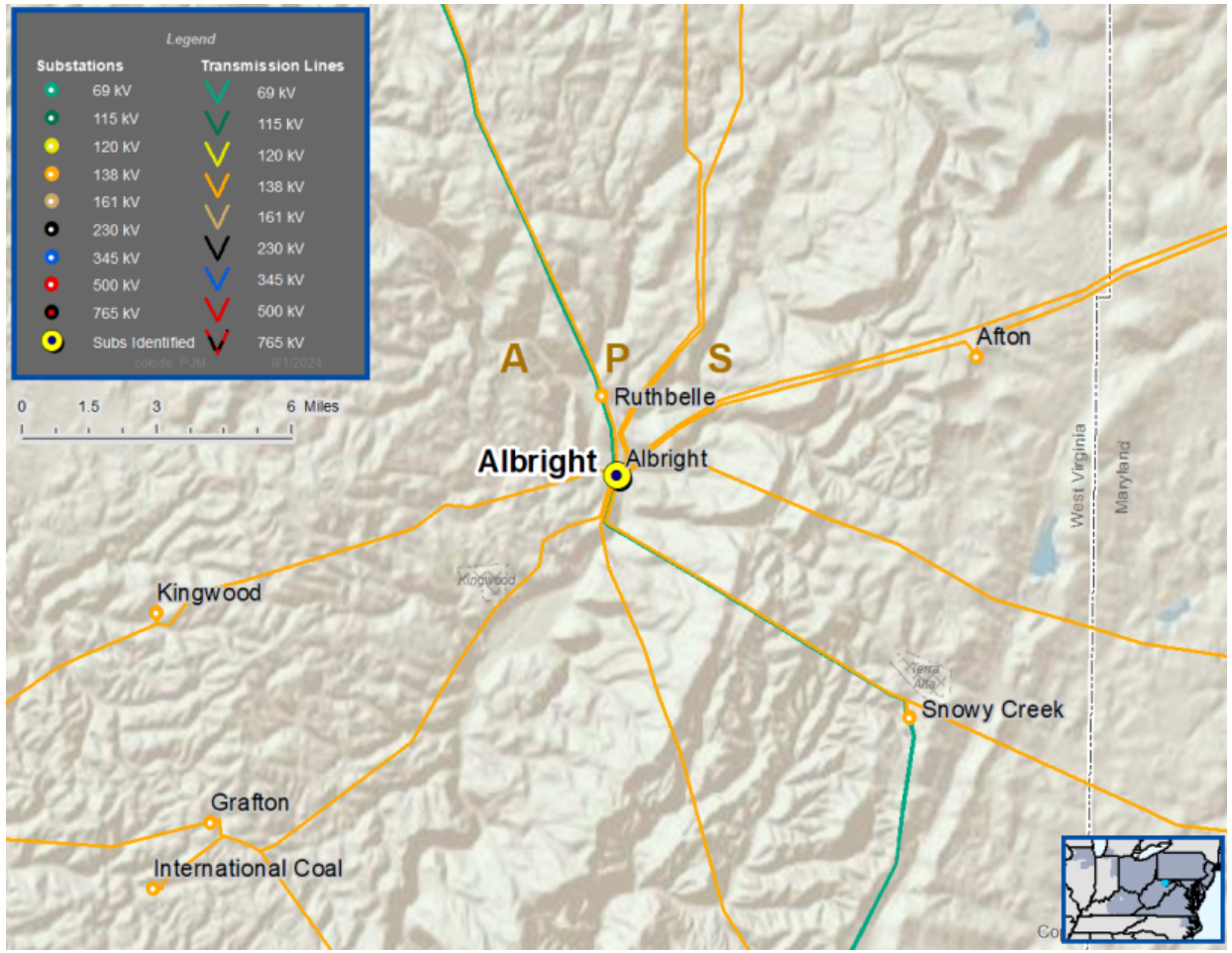
- Age/condition of substation equipment
- Circuit breakers and other fault interrupting devices

Problem Statement:

- The existing Albright 138 kV breaker AJ1 is 44 years old.
- Carrier sets, breakers and associated line trap on this terminal are beyond their useful life and are prone to failure.
- Replacement components are difficult to source in quantity leading to non-standard repairs.
- The line is currently limited by terminal equipment.

Albright – Snowy Creek Tap 138 kV Line

- Existing line rating: 195 / 209 / 217 / 229 MVA (SN/SE/WN/WE)
- Existing conductor rating: 221 / 268 / 250 / 317 MVA (SN/SE/WN/WE)



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APS Transmission Zone M-3 Process
Albright Substation

Need Number: APS-2024-072

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

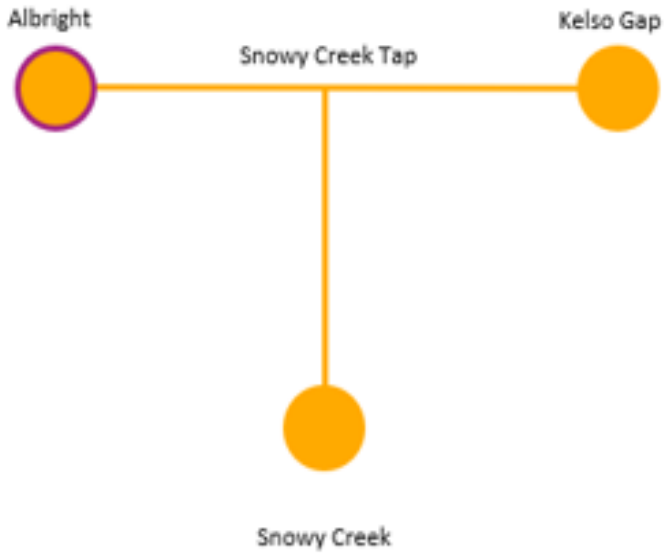
Selected Solution:

Albright Substation: At Albright, replace circuit breaker, disconnect switches, wave trap, and relaying. Estimated Cost: $1.69 M

Transmission Cost Estimate: $1.69 M

Projected In-Service: 08/20/2029

Supplemental ID: s3645.1



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

APS Transmission Zone M-3 Process
Black Oak – Junction 138 kV Line

Need Number: APS-2024-056
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025
Previously Presented: Need Meeting - 05/17/2024
Solution Meeting - 03/14/2025

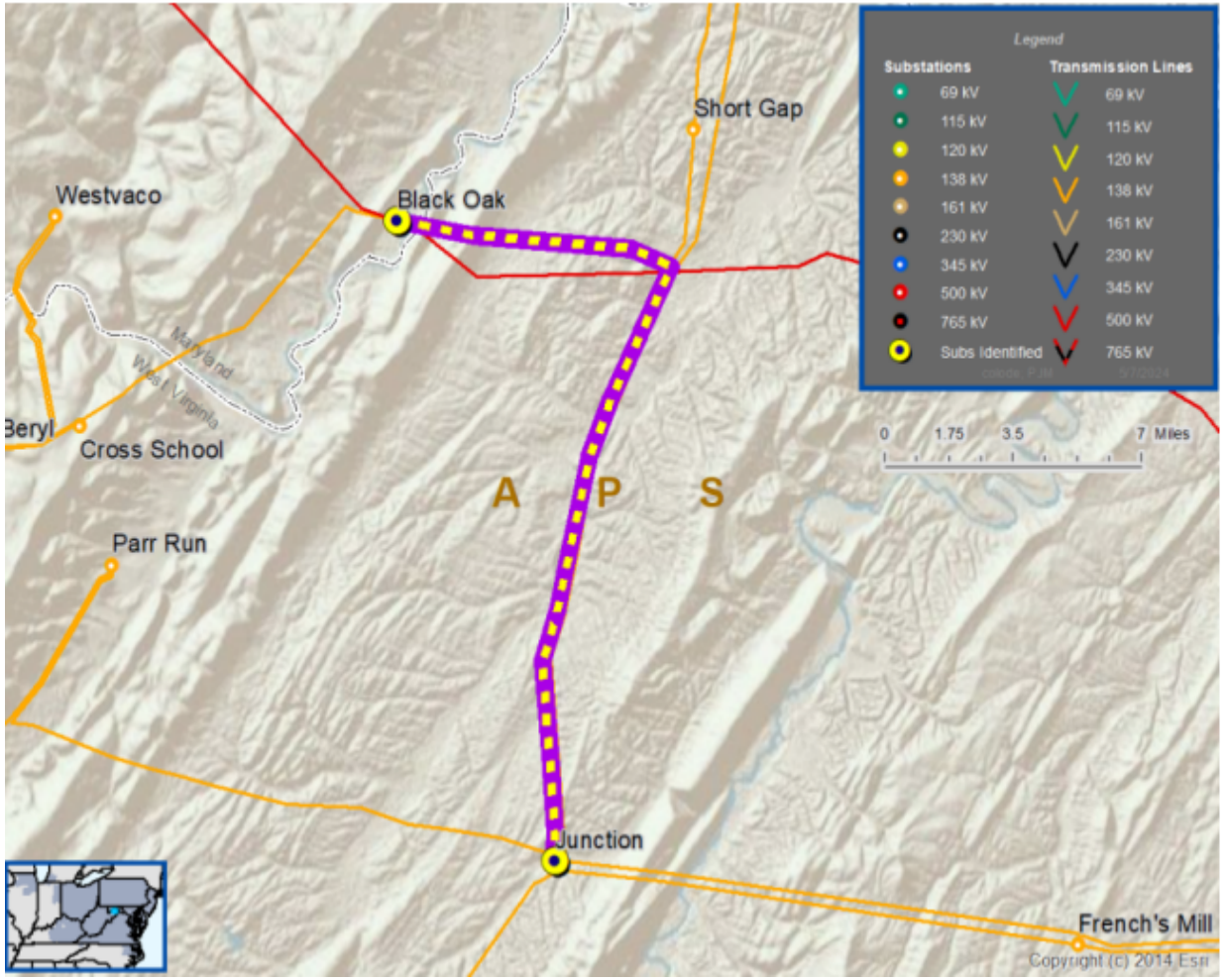
Project Driver: Equipment Material Condition, Performance & Risk

Specific Assumption References:
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)



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APS Transmission Zone M-3 Process
Black Oak – Junction 138 kV Line

Need Number: APS-2024-056

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

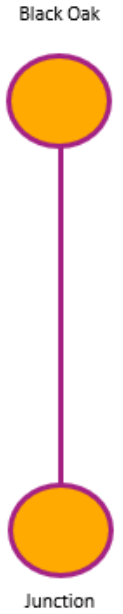
Selected Solution:

Black Oak - Junction 138 kV Line: Rebuild approximately 22 miles of the Black Oak - Junction 138 kV Line

At Black Oak Substation, replace circuit breaker, disconnect switches, substation conductor and relaying

At Junction Substation, replace circuit breaker, disconnect switches, line trap, substation conductor and relaying

Estimated Project Cost: $48.81 M
Projected In-Service: 12/14/2029
Supplemental ID: s3646.1



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

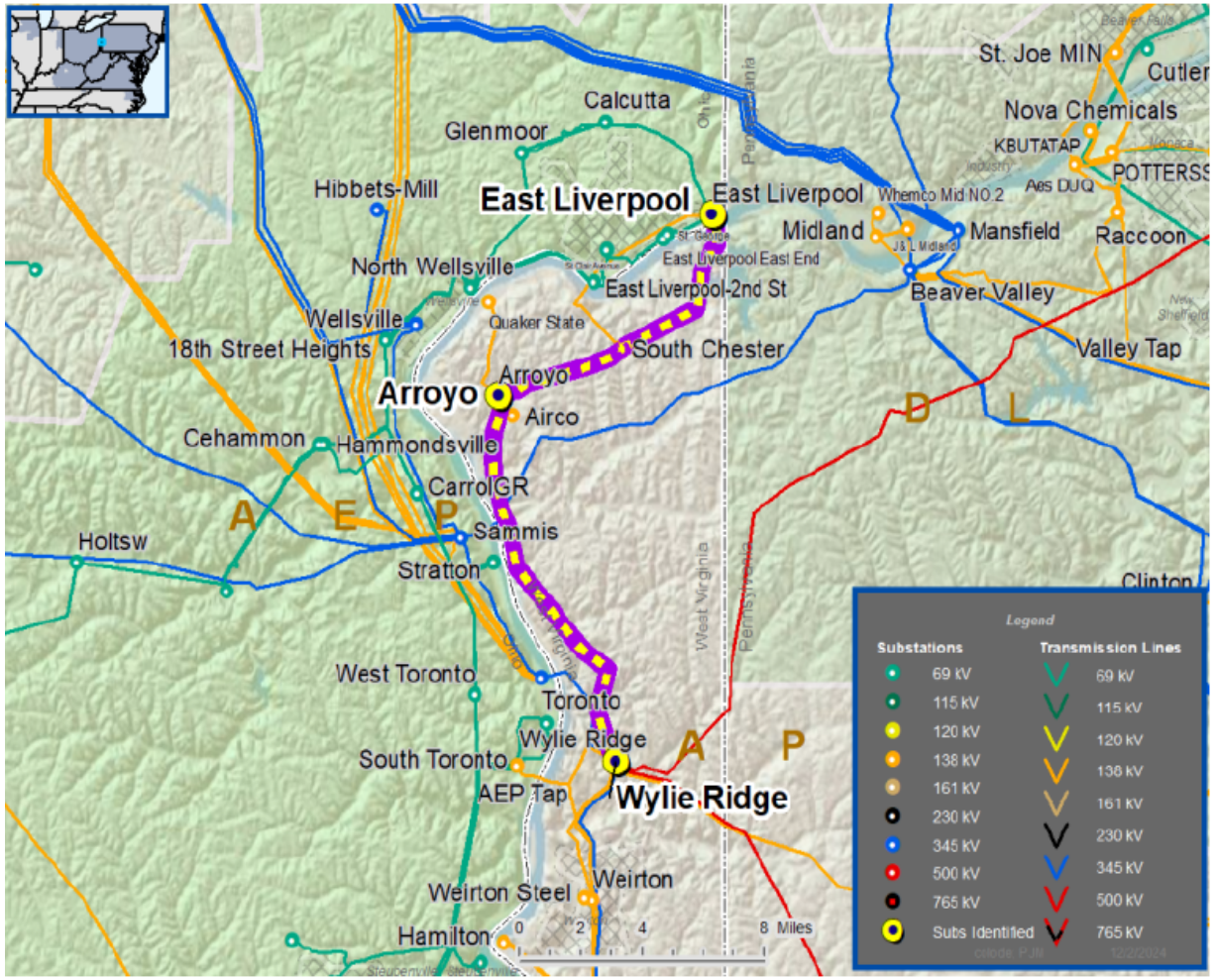
APS Transmission Zone M-3 Process
Arroyo – East Liverpool – Wylie Ridge 138 kV

Need Number: APS-2024-119
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025
Previously Presented: Need Meeting - 12/13/2024
Solution Meeting - 03/14/2025

Project Driver: Equipment Material Condition, Performance & Risk

Specific Assumption References:
- System Performance Global Factors
- System reliability/performance
- Substation/Line equipment limits Line Condition Rebuild/Replacement
- Transmission line switches
- Increasing negative trend in maintenance findings and/or costs
- Limited availability of spare parts and/or vendor technical support

Problem Statement:
Line air switch 1017 on the Arroyo – East Liverpool – Wylie Ridge 138 kV Line is obsolete and is no longer supported for repair parts.
The H-frame wood pole structure on which the switch is mounted was installed in 1966 and is reaching end of life. The switch is limiting the transmission line rating.
Arroyo Junction – South Chester Tap 138 kV Line
Existing Line Rating: 164 / 206 / 216 / 248 MVA (SN/SE/WN/WE)
Existing Conductor Rating: 221 / 268 / 250 / 317 MVA (SN/SE/WN/WE)



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APS Transmission Zone M-3 Process
Arroyo – East Liverpool – Wylie Ridge 138 kV

Need Number: APS-2024-119

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

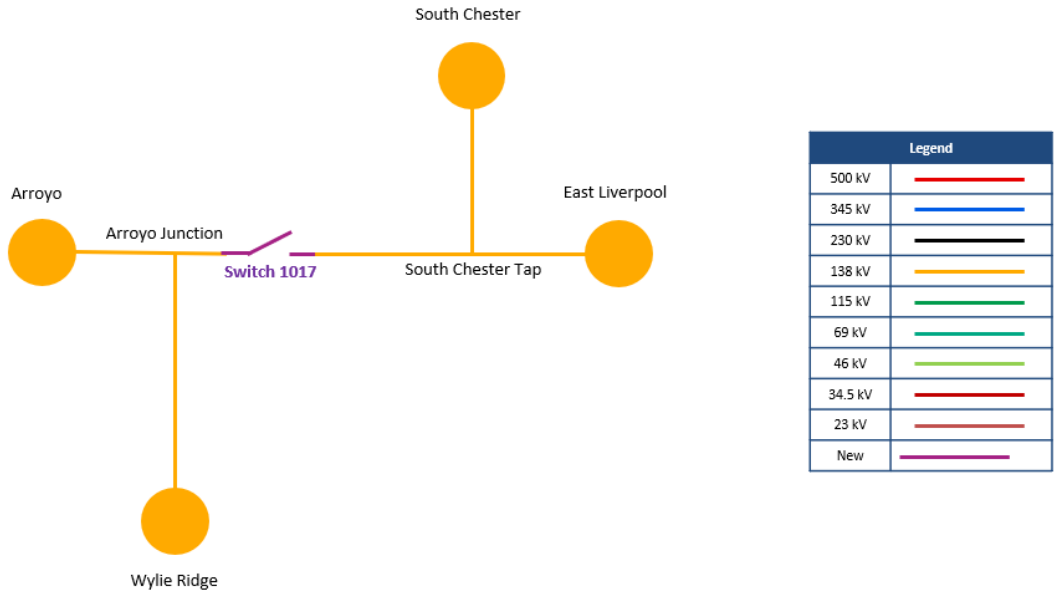
Selected Solution:

Replace the obsolete line switch 1017 with 1200 A rated switch and install motor operator. Replace 2-pole structure 212-81 at Arroyo Junction

Estimated Project Cost: $1.1 M

Projected In-Service: 05/09/2025

Supplemental ID: s3647.1



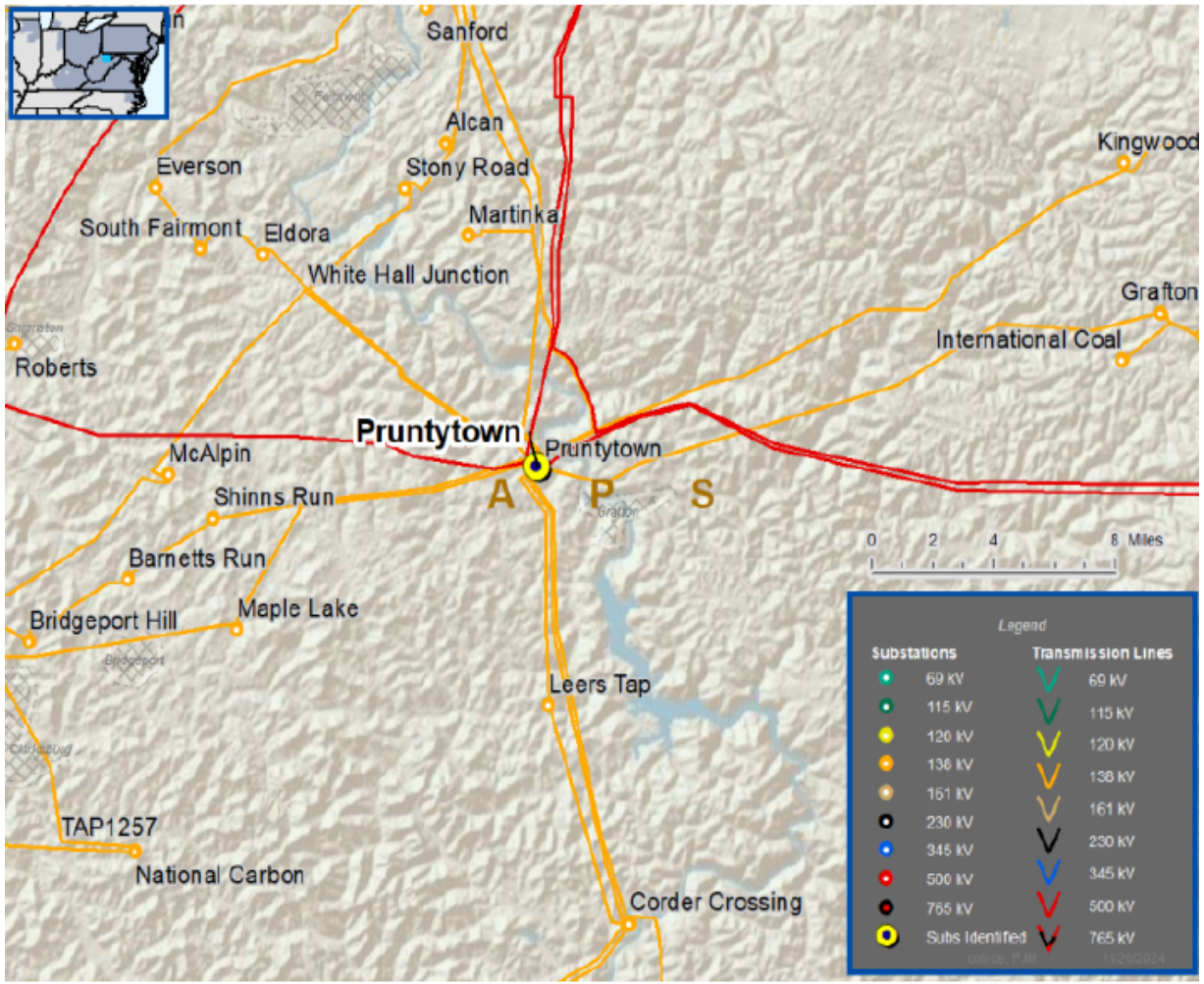
APS Transmission Zone M-3 Process
Pruntytown No. 1 500/138 kV Transformer

Need Number: APS-2024-077
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025
Previously Presented: Need Meeting - 12/03/2024
Solution Meeting - 04/01/2025

Project Driver: Equipment Material Condition, Performance & Risk

Specific Assumption References:
- System Performance Projects Global Factors
- System reliability and performance
- Add/Replace Transformers
- Past System Reliability/Performance

Problem Statement:
The Pruntytown No. 1 500/138 kV Transformer is approximately 54 years old and is approaching end of life.
The transformer has increased moisture content which indicates presence of polar contaminants.
Replacement components are difficult to source leading to non-standard repairs.
Existing transformer ratings:
467 / 484 MVA (SN/SSTE)
549 / 565 MVA (WN/WSTE)



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APS Transmission Zone M-3 Process
Pruntytown No. 1 500/138 kV Transformer

Need Number: APS-2024-077

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Selected Solution:

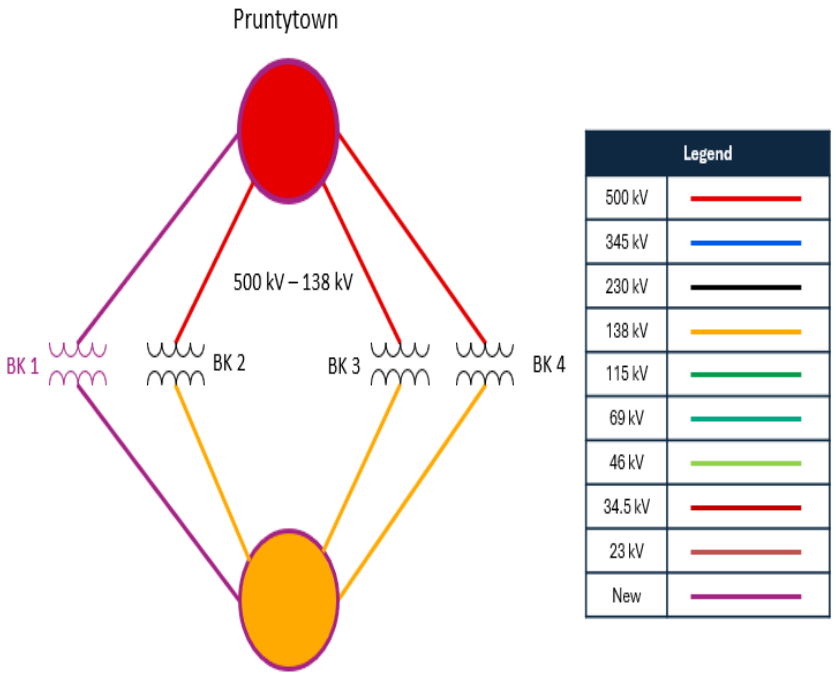
Replace No. 1 500/138 kV Transformer at Pruntytown Substation

Replace (1) - 500 kV Disconnect Switch

Estimated Project Cost: $ 18.8 M

Projected In-Service: 06/13/2031

Supplemental ID: S3655.1



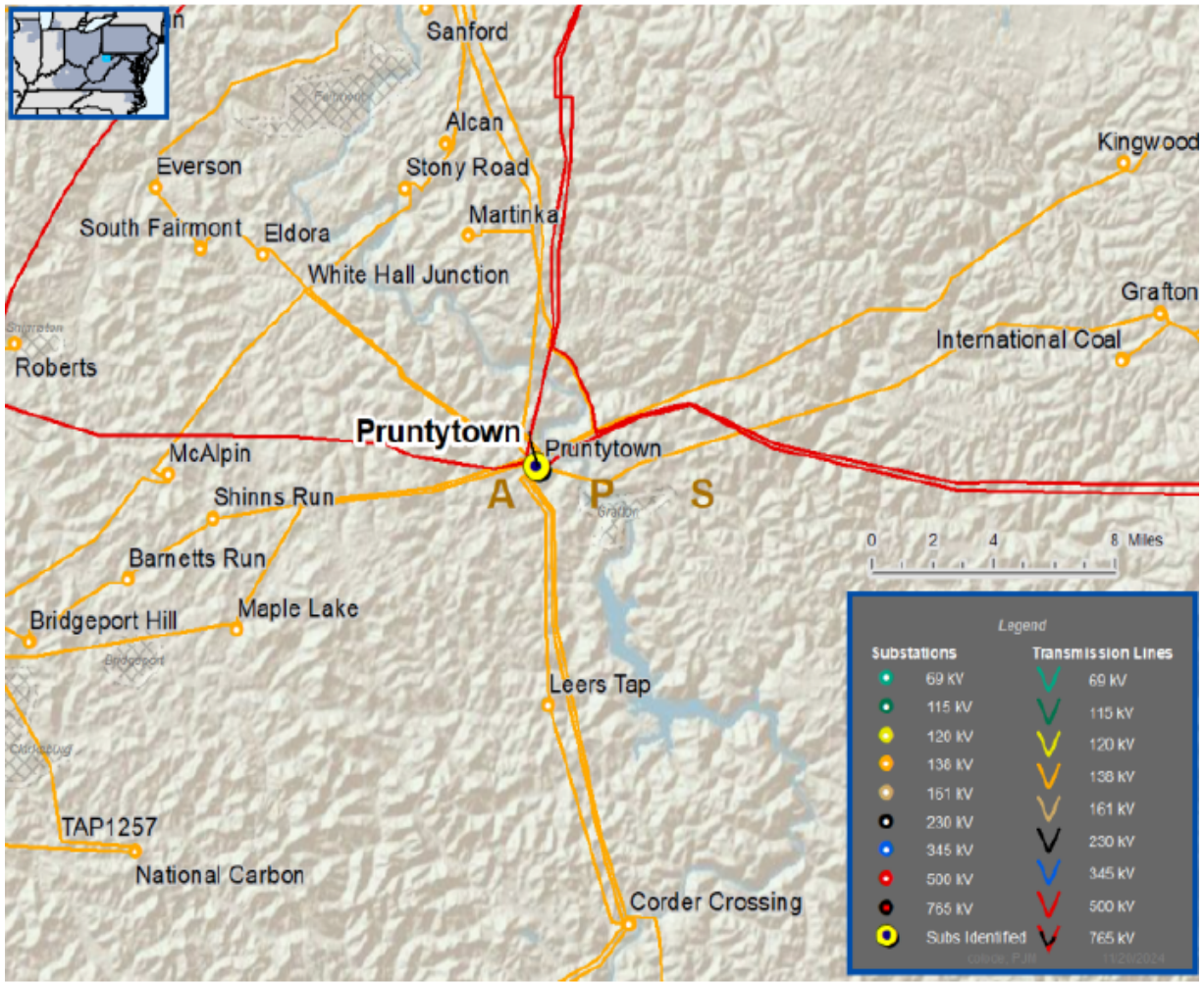
APS Transmission Zone M-3 Process
Pruntytown No. 2 500/138 kV Transformer

Need Number: APS-2024-078
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025
Previously Presented: Need Meeting - 12/03/2024
Solution Meeting - 04/01/2025

Project Driver: Equipment Material Condition, Performance & Risk

Specific Assumption References:
- System Performance Projects Global Factors
- System reliability and performance
- Add/Replace Transformers
- Past System Reliability/Performance

Problem Statement:
The Pruntytown No. 2 500/138 kV Transformer is approximately 56 years old and is approaching end of life.
The transformer has increased moisture content which indicates presence of polar contaminants.
Replacement components are difficult to source leading to non-standard repairs.
Existing transformer ratings:
469/ 486 MVA (SN/SSTE)
551 / 567 MVA (WN/WSTE)



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APS Transmission Zone M-3 Process
Pruntytown No. 2 500/138 kV Transformer

Need Number: APS-2024-078

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Selected Solution:

Replace No. 2 500/138 kV Transformer at Pruntytown Substation

Replace (2) - 138 kV Circuit Breakers

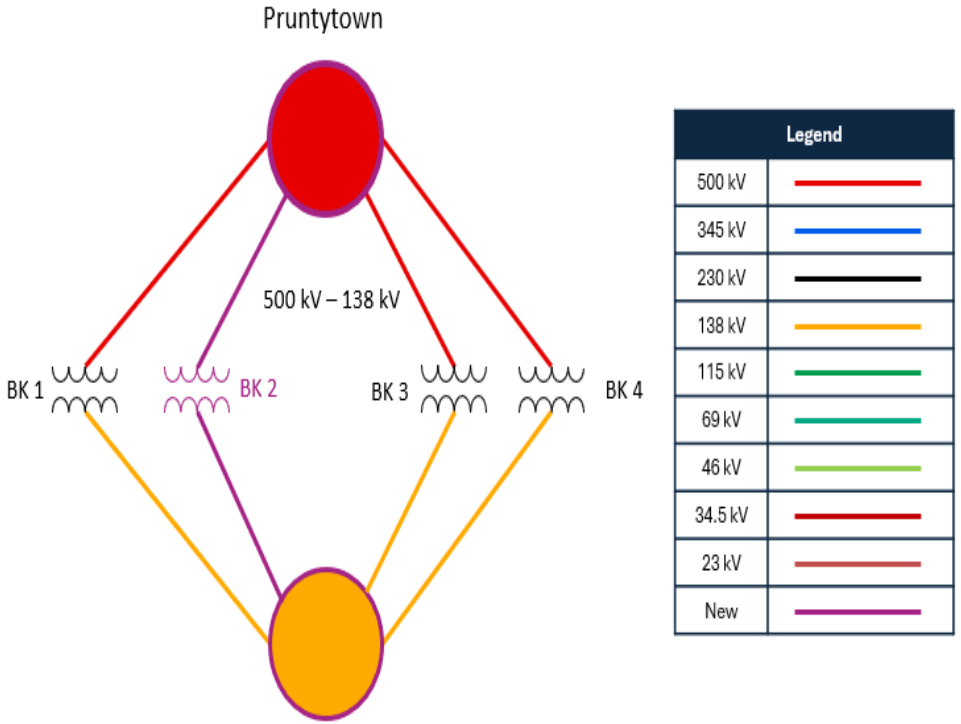
Replace (1) - 500 kV Disconnect Switch

Replace Substation Conductor

Estimated Project Cost: $ 18.8 M

Projected In-Service: 12/13/2030

Supplemental ID: S3653.1



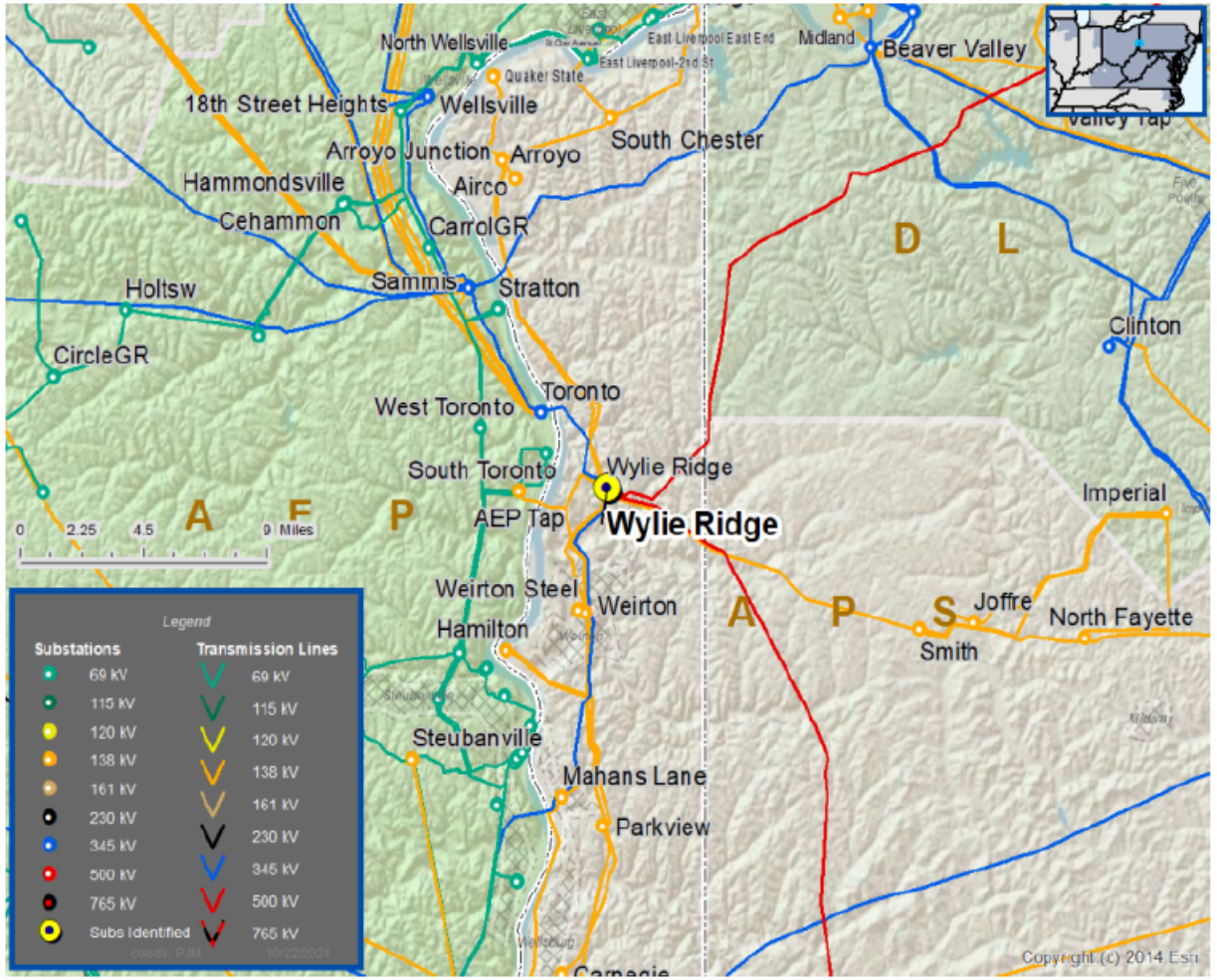
APS Transmission Zone M-3 Process
Wylie Ridge No. 7 500/345 kV Transformer

Need Number: APS-2024-080
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025
Previously Presented: Need Meeting - 11/06/2024
Solution Meeting - 04/01/2025

Project Driver: Equipment Material Condition, Performance & Risk, Operational Flexibility and Efficiency

Specific Assumption References:
- System Performance Projects Global Factors
- System reliability and performance
- Add/Replace Transformers
- Past System Reliability/Performance

Problem Statement:
The Wylie Ridge No. 7 500/345 kV Transformer is approximately 48 years old and is approaching end of life.
The transformer has increased hydrogen and ethylene readings and low dielectric strength.
The transformer has increased moisture content which indicates presence of polar contaminants.
Replacement components are difficult to source leading to non-standard repairs.
Existing transformer ratings:
881 / 883 MVA (SN/SSTE)
883 / 883 MVA (WN/WSTE)



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APS Transmission Zone M-3 Process
Wylie Ridge No. 7 500/345 kV Transformer

Need Number: APS-2024-080

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Selected Solution:

Replace No. 7 500/345 kV Transformer at Wylie Ridge Substation

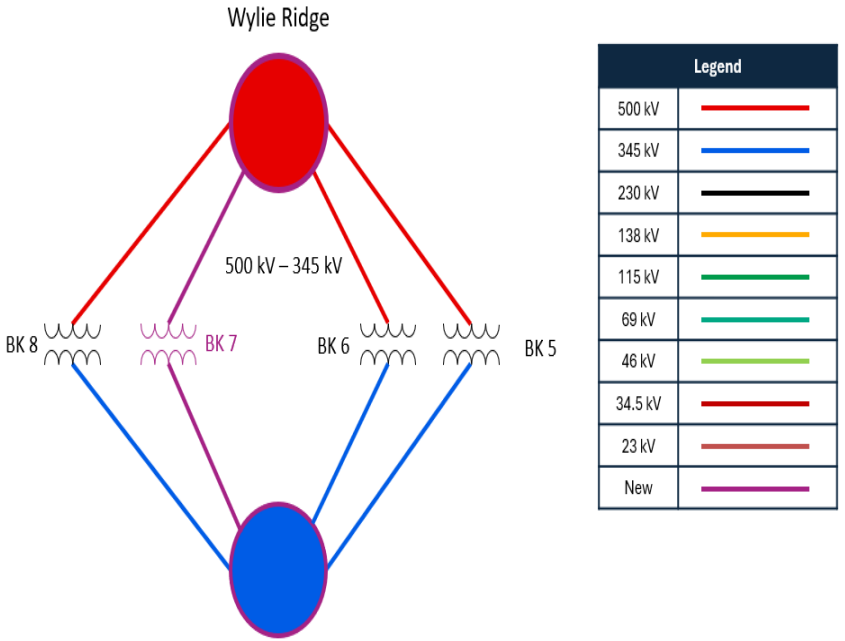
Replace (1) - 500 kV Disconnect Switch

Replace (1) - 345 kV Disconnect Switch

Estimated Project Cost: $ 20 M

Projected In-Service: 12/13/2030

Supplemental ID: S3654.1



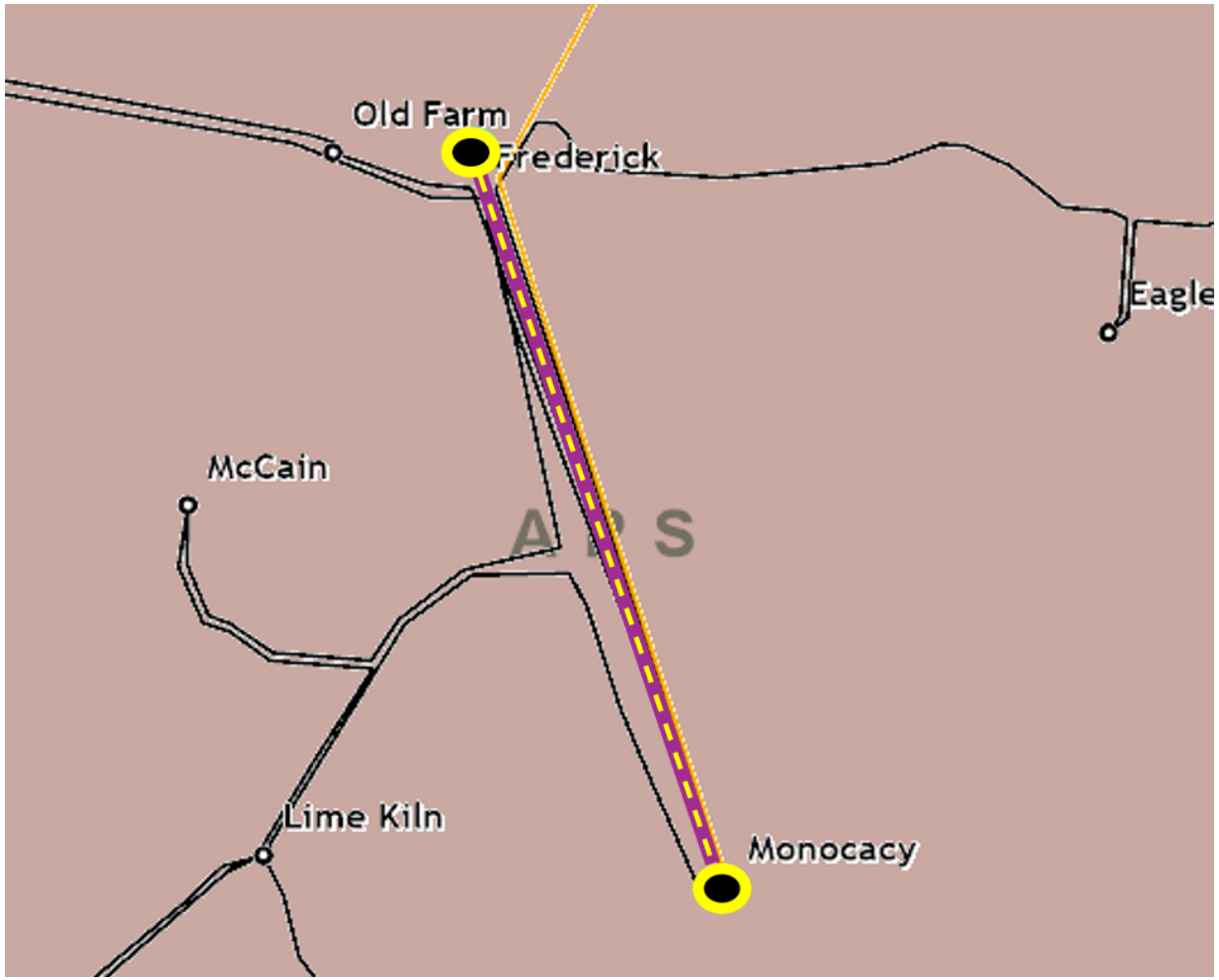
APS Transmission Zone M-3 Process
Frederick A – Monocacy 230 kV Line

Need Number: APS-2025-001
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025
Previously Presented: Need Meeting - 02/04/2025
Solution Meeting - 04/01/2025

Project Driver: Equipment Material Condition, Performance & Risk

Specific Assumption References:
- System Performance Projects Global Factors
- Substation/line equipment limits
- System reliability and performance
- Substation Condition Rebuild/Replacement
- Circuit breakers and other fault interrupting devices

Problem Statement:
The Frederick A – Monocacy 230 kV Line circuit breakers, circuit switchers, associated disconnect switches and protective relaying at Frederick A and Monocacy substations are aging with increasing maintenance concerns. The equipment is over 45 years old.
Transmission line ratings are limited by terminal equipment.
Existing line ratings: 548 / 688 / 699 / 797 MVA (SN/SE/WN/WE)
Existing conductor ratings: 617 / 754 / 699 / 894 (MVA SN/SE/WN/WE)



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APS Transmission Zone M-3 Process
Frederick A – Monocacy 230 kV Line

Need Number: APS-2025-001

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

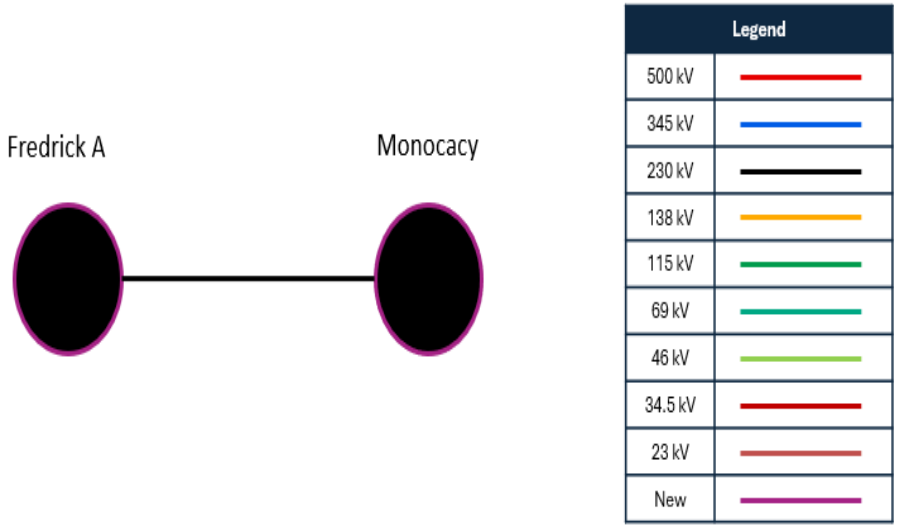
Selected Solution:

At Frederick A Substation:

- Replace existing Line Relaying, Replace (2) - 230 kV Disconnect Switches, Replace Substation Conductor

At Monocacy Substation:

- Replace (1) - 230 kV Circuit Breaker, Replace existing Line Relaying, Replace (2) - 230 kV Disconnect Switches , Replace Substation Conductor



Estimated Project Cost: $ 3.9 M

Projected In-Service: 11/24/2027

Supplemental ID: S3656.1

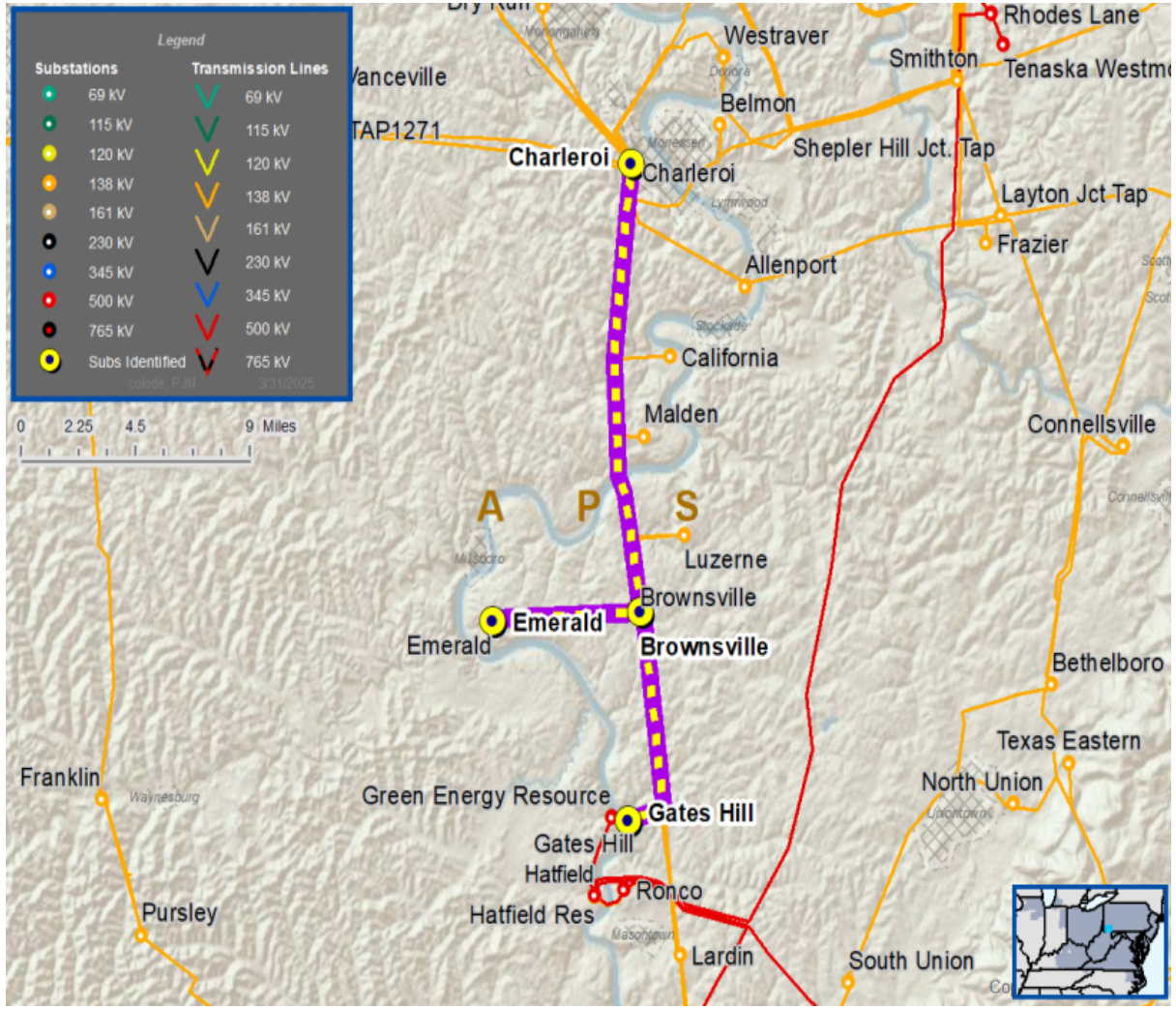
APS Transmission Zone M-3 Process
Misoperation Relays

Need Number: APS-2024-104
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025
Previously Presented: Need Meeting - 12/13/2024
Solution Meeting - 04/11/2025

Project Driver: Equipment Material Condition, Performance and Risk

Specific Assumption References:
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.



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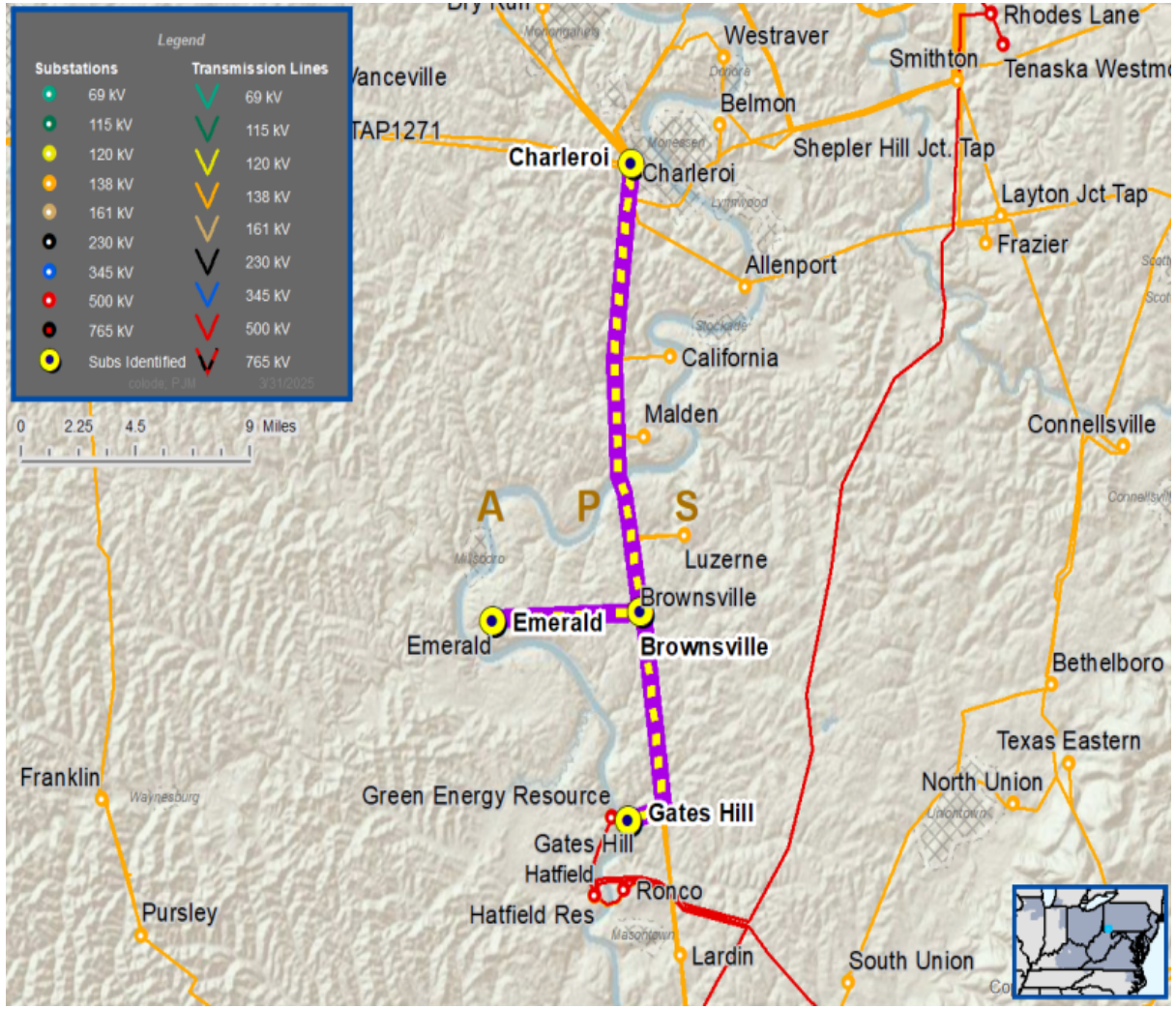
APS Transmission Zone M-3 Process Misoperation Relays

Need Number: APS-2024-104
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Problem Statement (cont):
Transmission line ratings are limited by terminal equipment.
Transmission Line / Substation Locations:

- Brownsville Jct – Charleroi 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)
- Brownsville Jct – Emerald 138 kV Line
  - Existing Line Rating: 115 / 115 / 115 / 115 MVA (SN/SE/WN/WE)
  - Existing Conductor Rating: 308 / 376 / 349 / 445 MVA (SN/SE/WN/WE)
- Brownsville Jct – Gates Hill 138 kV Line
  - Existing Line Rating: 148 / 151 / 166 / 166 MVA (SN/SE/WN/WE)
  - Existing Conductor Rating: 148 / 151 / 166 / 166 MVA (SN/SE/WN/WE)



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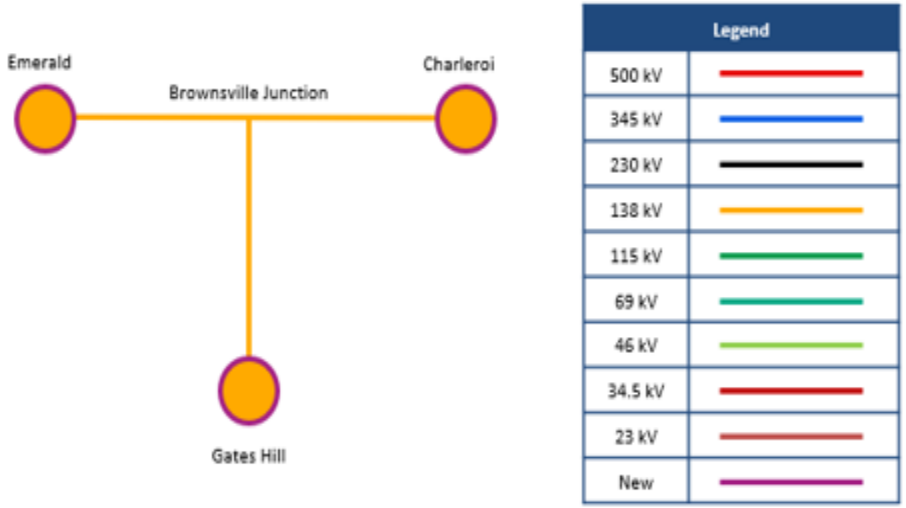
APS Transmission Zone M-3 Process Misoperation Relays

Need Number: APS-2024-104

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Selected Solution:

- **Charleroi Substation:**
  - At Charleroi Substation, replace substation conductor, line trap, surge arresters, CVT and line relaying. Estimated Cost: $2.057 M
- **Emerald Substation:**
  - At Emerald Substation, replace circuit switcher towards Brownsville Junction with a circuit breaker, replace bus tie circuit breaker, disconnect switches, substation conductor, line trap, CVTs and line relaying.. Estimated Cost: $2.057 M
- **Gates Hill Substation:**
  - At Gates Hill Substation, replace circuit switcher with circuit breaker, disconnect switches, line trap, line turner, COAX and line relaying. Estimated Cost: $2.057 M



Transmission Cost Estimate: $6.17 M

Projected In-Service: 07/02/2029

Supplemental ID: S3657.1

APS Transmission Zone M-3 Process
Fairview – Whiteley 138 kV

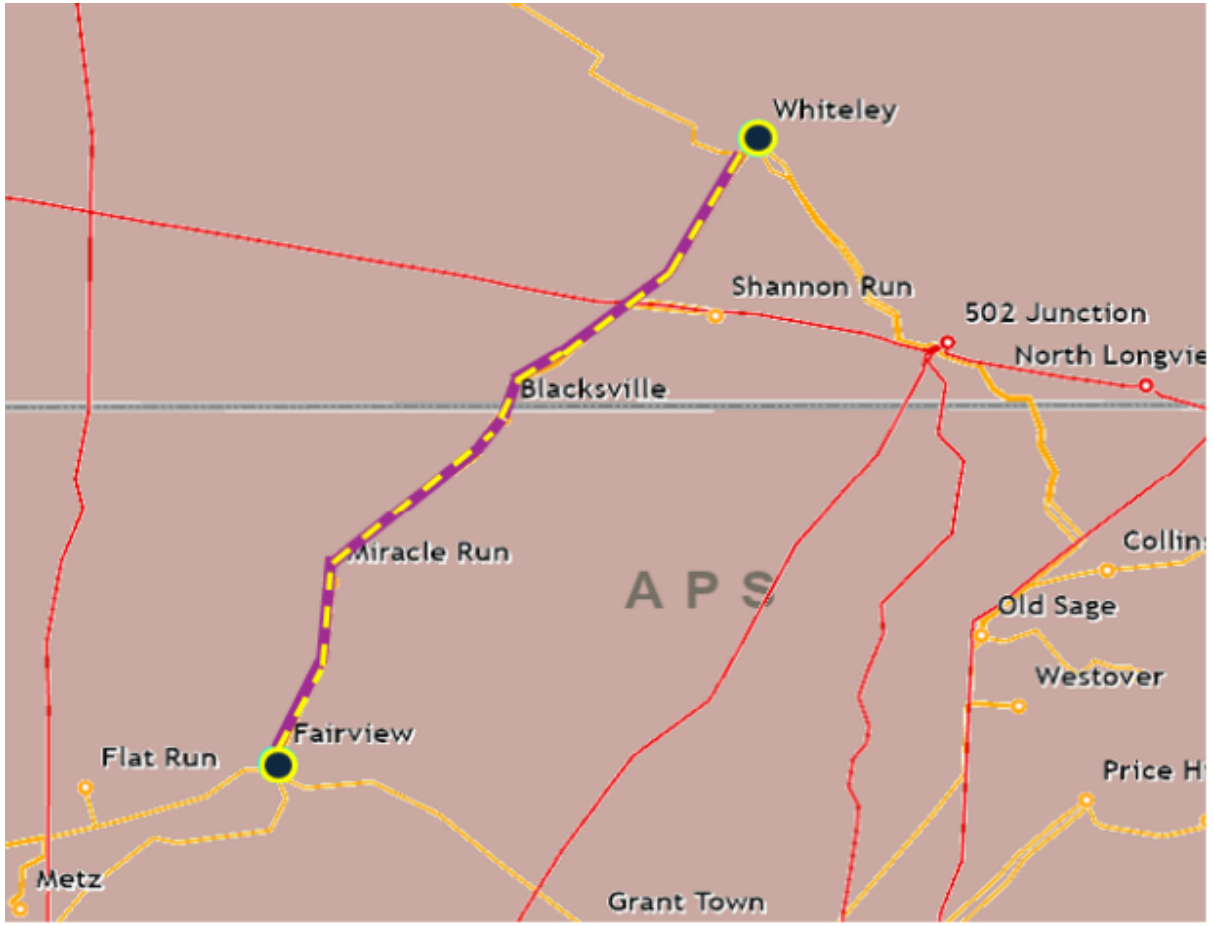
Need Number: APS-2025-010
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025
Previously Presented: Need Meeting - 03/14/2025
Solution Meeting - 04/11/2025

Project Driver: Equipment Material Condition, Performance and Risk

Specific Assumption References:
- System Performance Projects Global Factors
- Substation/line equipment limits
- System reliability and performance

Line Condition Rebuild/Replacement?
- Transmission line switches
- Increasing negative trend in maintenance findings and/or costs
- Limited availability of spare parts and/or vendor technical support

Problem Statement:
Line switch 1027 on the Fairview – Whiteley 138 kV Line at Blacksville No. 1 Tap is obsolete and no longer supported for repair parts.
The switch is limiting the transmission line rating. Transmission line ratings are limited by terminal equipment.



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APS Transmission Zone M-3 Process
Fairview – Whiteley 138 kV

Need Number: APS-2025-010

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 8/14/2025

Problem Statement (Cont):

Miracle Run Tap - Blacksville No. 1 Tap 138 kV Line:

- Existing line ratings: 164 / 206 / 216 / 248 MVA SN/SE/WN/WE
- Existing conductor ratings: 308 / 376 / 349 / 445 MVA SN/SE/WN/WE

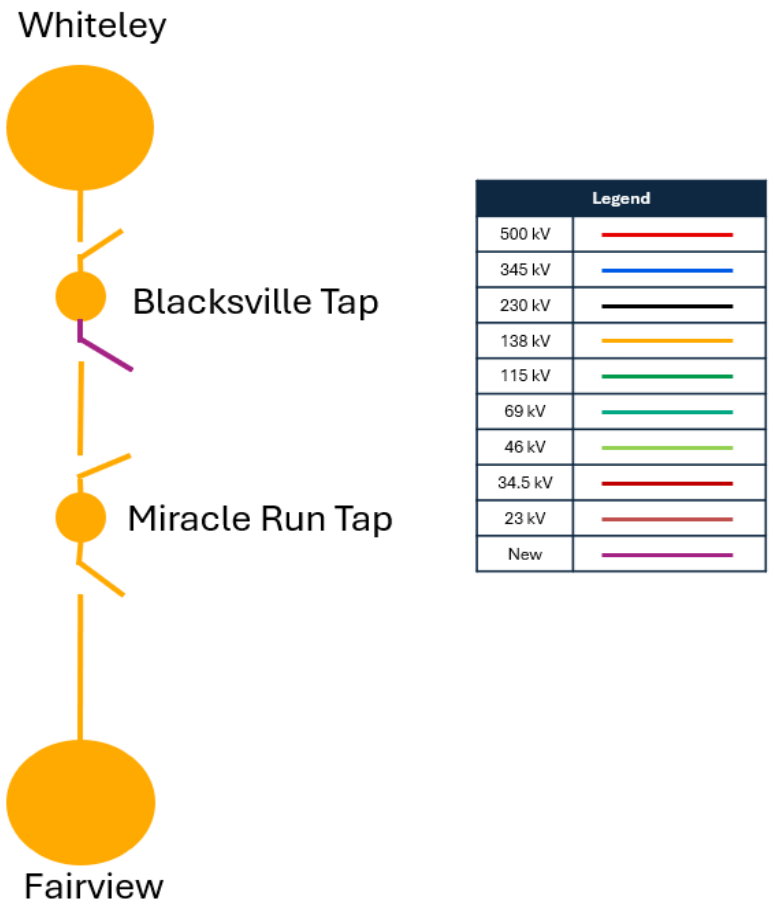
Selected Solution:

- Fairview - Whiteley 138 kV Line Switch:
  - Replace the switch 1027 at Blacksville No. 1 Tap with a motor-operated, SCADA-controlled switch

Transmission Cost Estimate: $1.3 M

Projected In-Service: 08/21/2026

Supplemental ID: S3658.1



APS Transmission Zone M-3 Process Misoperation Relay Projects

Need Numbers: APS-2024-098 to APS-2024-100, APS-2025-015

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/24/2025

Previously Presented: Need Meeting 12/13/2024, 4/11/2025

Solution Meeting 6/13/2025

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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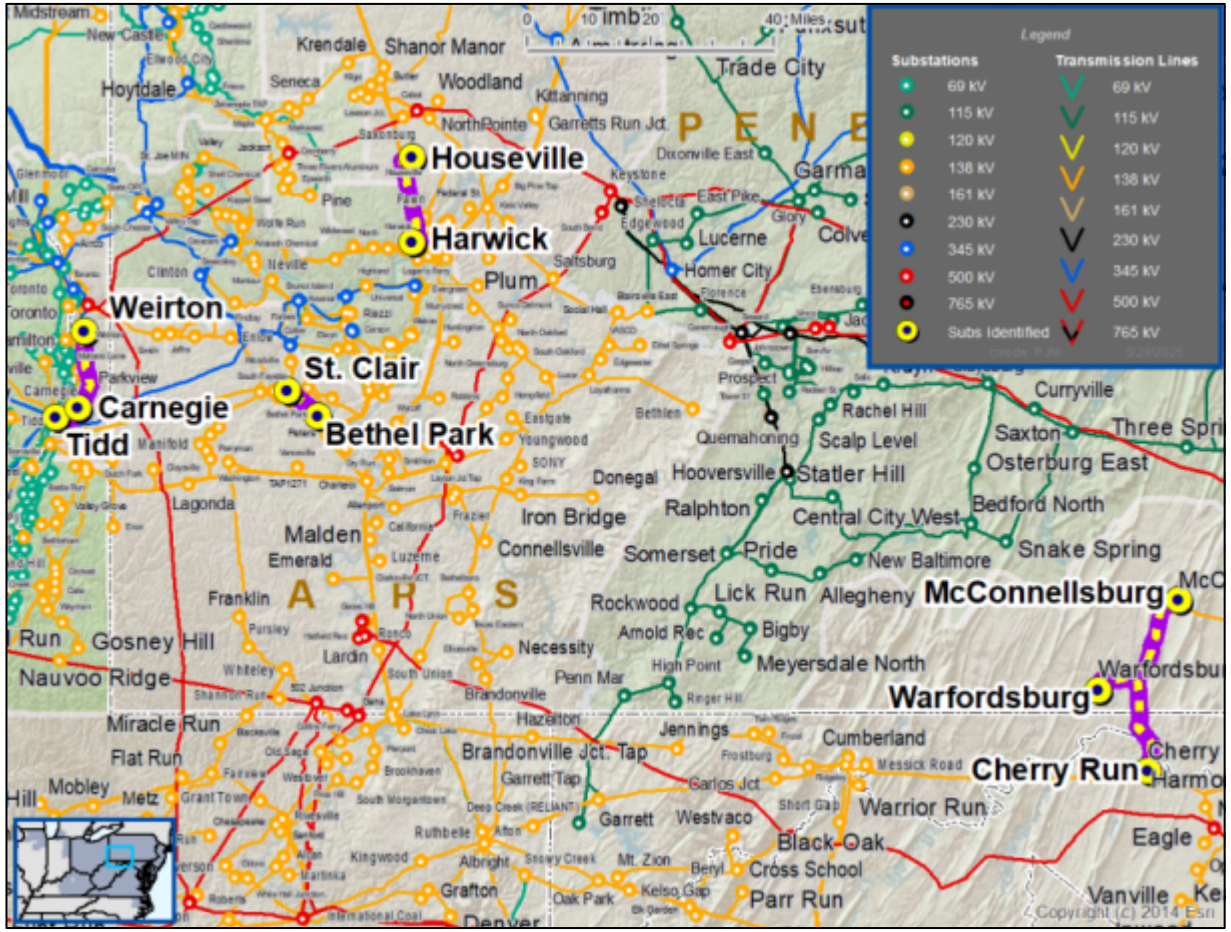

APS Transmission Zone M-3 Process Misoperation Relay Projects

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
APS-2024-098	Bethel Park – St Clair 138 kV Line	292 / 306 / 306 / 306	308 / 376 / 349 / 445
APS-2024-099	Cherry Run – Warfordsburg 138 kV Line	299 / 360 / 349 / 422	308 / 376 / 349 / 445
	Warfordsburg – McConnellsburg 138 kV Line	299 / 358 / 349 / 410	308 / 376 / 349 / 445
APS-2024-100	Harwick – Houseville 138 kV Line	284 / 287 / 287 / 287	284 / 351 / 336 / 432
APS-2025-015	Tidd - Carnegie 138 kV Line	187 / 240 / 247 / 270	221 / 268 / 250 / 317
	Carnegie - Weirton 138 kV Line	221 / 268 / 250 / 306	221 / 268 / 250 / 317

APS Transmission Zone M-3 Process Misoperation Relay Projects

Selected Solution:

Need #	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE / WN / WE)	Scope of Work	Estimated Cost ($ M)	Target ISD	Supplemental Number
APS-2024-098	Bethel Park – St Clair 138 kV Line	308 / 376 / 349 / 445	• At Bethel Park Substation, replace circuit breaker, disconnect switches, line turner and coax, CCVT, substation conductor, metering, line trap and relaying • At St Clair Substation, replace circuit breaker, disconnect switches, line turner and coax, CCVT, substation and bus conductors, line trap and relaying	$4.5	7/27/2029	s3707.1
APS-2024-099	Cherry Run – Warfordsburg 138 kV Line	308 / 376 / 349 / 445	• At Cherry Run Substation, replace circuit breaker, disconnect switches, line turner and coax, CVT, substation conductor and relaying	$2.5	7/13/2029	s3708.1
	Warfordsburg – McConnellsburg 138 kV Line	308 / 376 / 349 / 445	• At Warfordsburg Substation, replace disconnect switches, and relaying • At McConnellsburg Substation, replace circuit breaker, disconnect switches, line turner, CCVT, substation conductor and relaying			

APS Transmission Zone M-3 Process Misoperation Relay Projects

Selected Solution:

Need #	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE / WN / WE)	Scope of Work	Estimated Cost ($ M)	Target ISD	Supplemental Number
APS-2024-100	Harwick – Houseville 138 kV Line	284 / 351 / 336 / 432	• At Harwick Substation, replace circuit breaker, disconnect switches, line trap, line turner and coax, substation and bus conductors and relaying • At Houseville Substation, replace disconnect switches, line trap, line turner and coax, CVT, substation conductor and relaying	$3.4	12/31/2027	s3709.1
APS-2025-015	Tidd - Carnegie 138 kV Line*	221 / 268 / 250 / 317	• At Carnegie Substation, replace disconnect switches, CVTs and relaying	$1.9	12/31/2029	s3710.1
	Carnegie - Weirton 138 kV Line	221 / 268 / 250 / 317	• At Weirton Substation, replace wave trap, substation conductor, line turner and coax, CVT and relaying			

*This is a tie line with AEP. The ratings shown are reflective of FirstEnergy ratings only.

APS Transmission Zone M-3 Process Misoperation Relay Projects

Need Numbers: APS-2024-014, APS-2024-047, APS-2025-018

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/24/2025

Previously Presented: Need Meeting 1/19/2024, 5/17/2024, 5/16/2025

Solution Meeting 7/18/2025

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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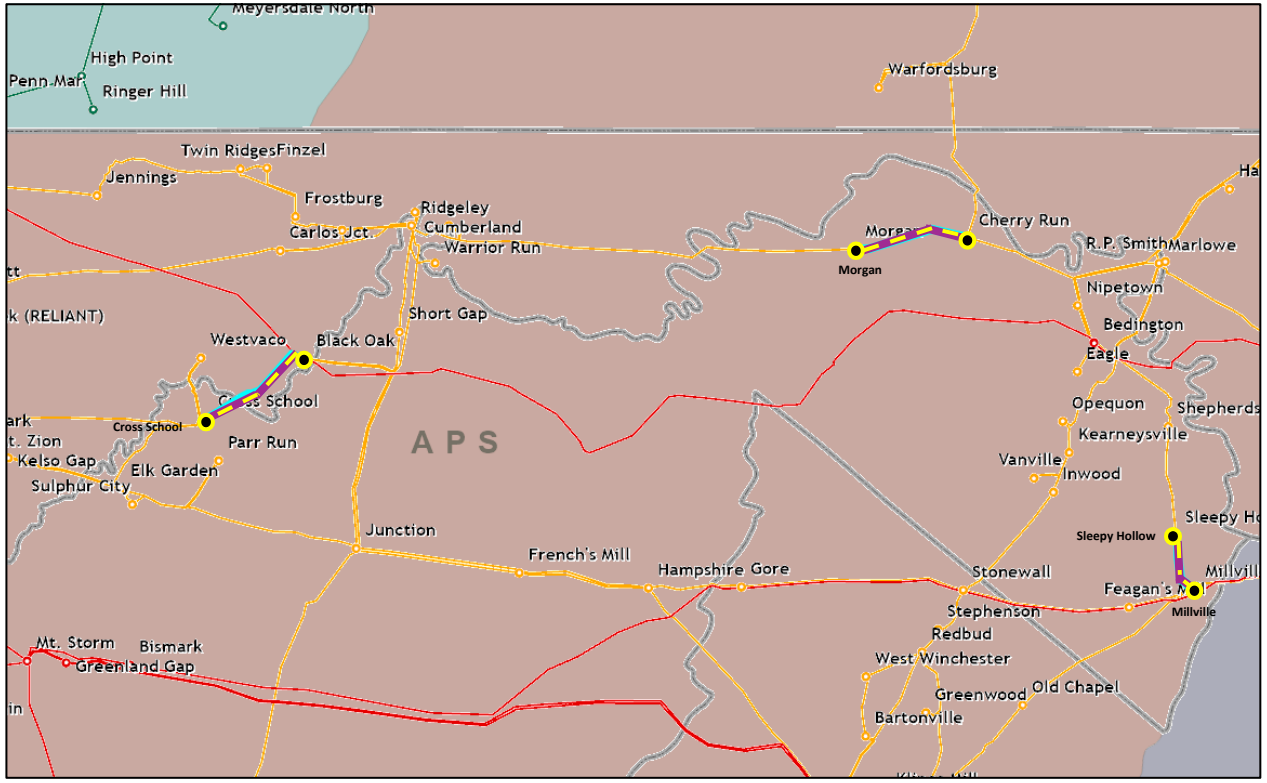

APS Transmission Zone M-3 Process Misoperation Relay Projects

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
APS-2024-014	Sleepy Hollow – Millville 138 kV Line	292 / 306 / 306 /306	353 / 406 / 353 / 428
APS-2024-047	Morgan – Cherry Run 138 kV Line	195 / 209 / 217 / 229	221 / 268 / 250 / 317
APS-2025-018	Black Oak - Cross School 138 kV Line	221 / 268 / 250 / 306	221 / 268 / 250 / 317

APS Transmission Zone M-3 Process Misoperation Relay Projects

Selected Solution:

Need #	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE / WN / WE)	Scope of Work	Estimated Cost ($ M)	Target ISD	Supplemental Number
APS-2024-014	Sleepy Hollow – Millville 138 kV Line	353 / 406 / 353 / 428	• At Sleepy Hollow, replace disconnect switches, line trap, line turner and coax, CCVT, metering, substation conductor and line relaying. • At Millville, replace disconnect switches, line trap, line turner and coax, CCVT, substation conductor and line relaying.	$2.00 M	01/31/2027	s3711.1
APS-2024-047	Morgan – Cherry Run 138 kV Line	221 / 268 / 250 / 317	• At Morgan, replace disconnect switches, line trap, substation conductor and line relaying. • At Cherry Run, replace circuit breaker, line trap, substation conductor and line relaying.	$2.30 M	07/21/2029	s3712.1
APS-2025-018	Black Oak - Cross School 138 kV Line	221 / 268 / 250 / 317	• At Black Oak, replace circuit breakers, disconnect switches, line trap, CCVT and line relaying. • At Cross School, replace line trap and line relaying.	$4.55 M	12/31/2026	s3713.1

Revision History

3/7/2025 – V1 – Original Slides posted.

4/7/2025 – V2- s3573.1 ,s3574.1, s3575.1 ,s3150.1 (represent) & s3150.2 (represent)

8/14/2025 – V3 - s3642.1, s3643.1, s3644.1, s3645.1, s3646.1, s3647.1, s3653.1, s3654.1, s3655.1, s3656.1, s3657.1, s3658.1, s3666.1, s3667.1 & s3668.1

9/24/2025 – V4 – s3707.1, s3708.1, s3709.1, s3710.1, s3711.1, s3712.1 & s3713.1