Subregional RTEP Committee – Western
FirstEnergy Supplemental Projects

APS Transmission Zone

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

APS Transmission Zone M-3 Process
Misoperation Relays: Armstrong - Kittanning 138 kV Line

Need Number: APS-2024-010

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Previously Presented: Need Meeting - SRRTEP-W - 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

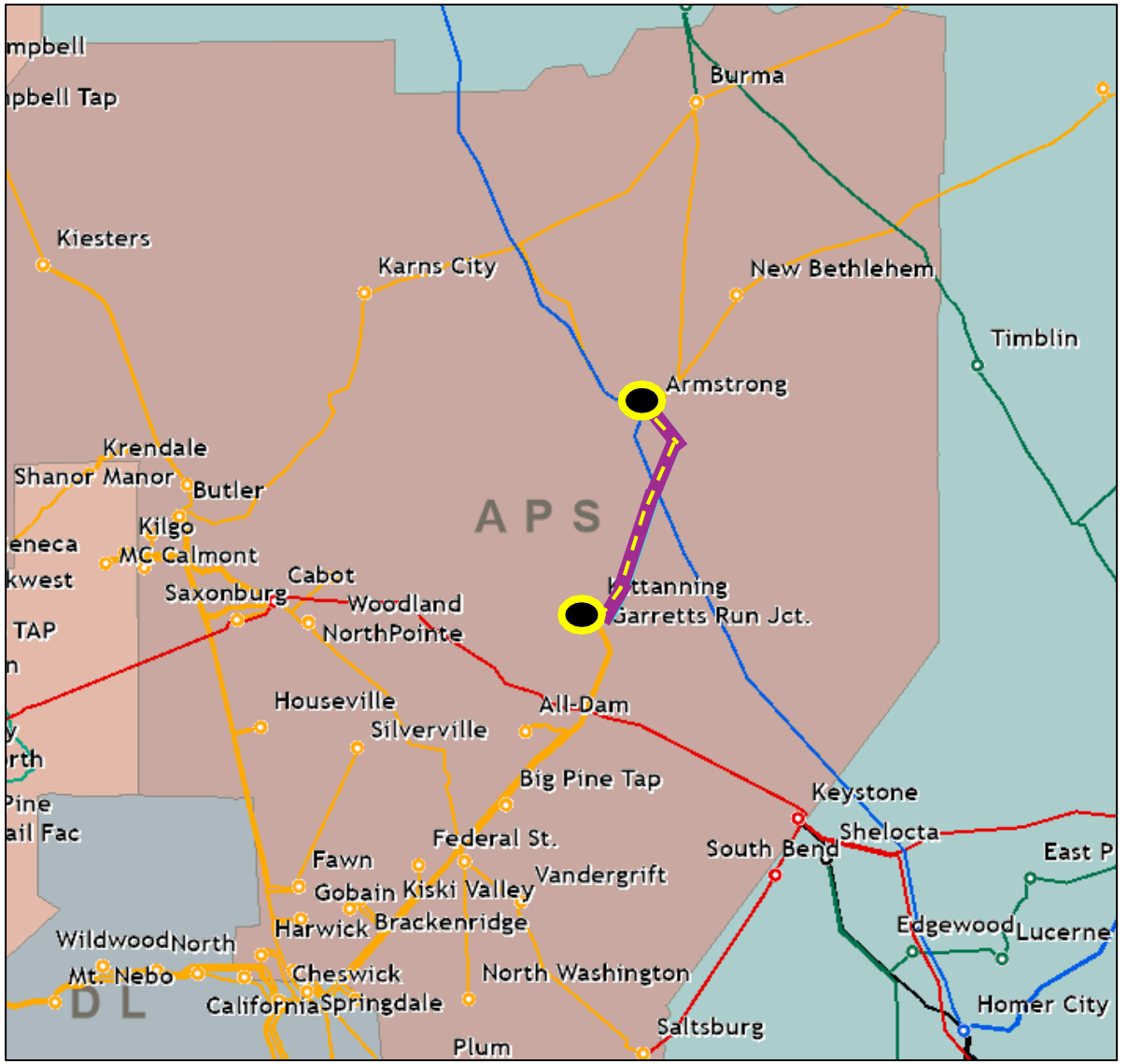
Problem Statement:

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cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.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



APS Transmission Zone M-3 Process
Misoperation Relays: Armstrong - Kittanning 138 kV Line

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
APS-2024-010	Armstrong – Kittanning 138 kV	195 / 209 / 217 / 229	221 / 268 / 250 / 317

APS Transmission Zone M-3 Process
Misoperation Relays: Armstrong - Kittanning 138 kV Line

Need Number: APS-2024-010

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Proposed Solution:

Armstrong - Kittanning 138 kV Line

- At Armstrong Substation, replace disconnect switches, line trap, line turner and coax, CVT and relaying.
- At Kittanning Substation, replace circuit breaker, disconnect switches, line trap, line turner and coax, CVT and relaying.

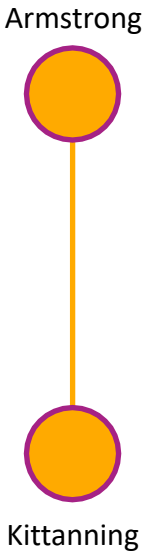
Ratings:

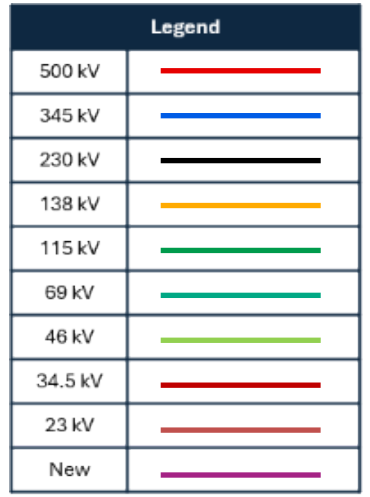
Armstrong - Kittanning 138 kV Line:

- Before Proposed Solution: 195 / 209 / 217 / 229 MVA (SN/SE/WN/WE)
- After Proposed Solution: 221 / 268 / 250 / 317 MVA (SN/SE/WN/WE)

Alternatives Considered:

Maintain equipment in existing condition with elevated risk of misoperations.





Estimated Project Cost: $3.44M

Projected In-Service: 09/10/2029

Project Status: Conceptual

Model: 2024 RTEP model for 2029 Summer (50/50)

APS Transmission Zone M-3 Process
Misoperation Relays: Shepler Hill Junction (Charleroi - Mitchell - Yukon) 138 kV Line

Need Number: APS-2024-102

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Previously Presented: Need Meeting - SRRTEP-W - 12/13/2024

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

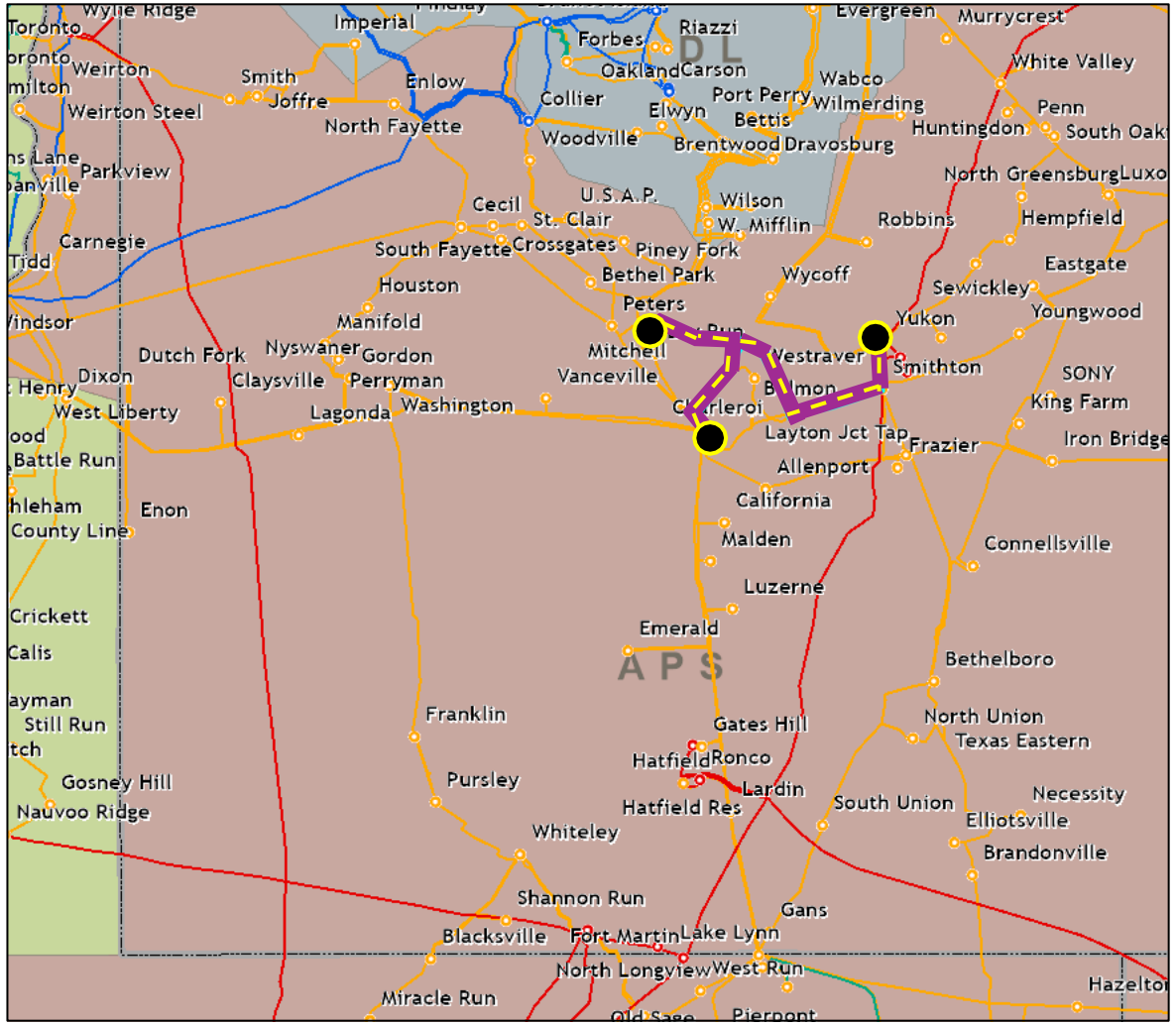
Problem Statement:

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.



Misoperation Relays: Shepler Hill Junction (Charleroi - Mitchell - Yukon) 138 kV Line

Need #	Transmission Line / Substation Locations	Existing Line Rating MVA (SN / SE / WN / WE)	Existing Conductor Rating MVA (SN / SE / WN / WE)
APS-2024-102	Charleroi – Belmon 138 kV Line	274 / 345 / 345 / 405	297 / 365 / 345 / 441
	Belmon – Shepler Hill Jct 138 kV Line	269 / 335 / 326 / 380	269 / 335 / 326 / 421
	Shepler Hill Jct – Mitchell 138 kV Line	295 / 375 / 349 / 441	308 / 376 / 349 / 445
	Shepler Hill Jct – Smithton Tap 138 kV Line	501 / 577 / 501 / 607	501 / 577 / 501 / 607
	Smithton Tap – Yukon 138 kV Line	501 / 577 / 501 / 607	501 / 577 / 501 / 607

APS Transmission Zone M-3 Process
Misoperation Relays: Shepler Hill Junction (Charleroi - Mitchell - Yukon) 138 kV Line

Need Number: APS-2024-102

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Proposed Solution:

Shepler Hill Junction (Charleroi - Mitchell - Yukon) 138 kV Line

- At Belmon Substation, replace line and disconnect switches, substation conductor, and relaying.
- At Charleroi Substation, replace substation conductor, and relaying.
- At Mitchell Substation, replace substation conductor, and relaying.
- At Smithton Substation, replace disconnect switches, and relaying.
- At Yukon, replace relaying

Ratings:

Charleroi – Belmon 138 kV Line:

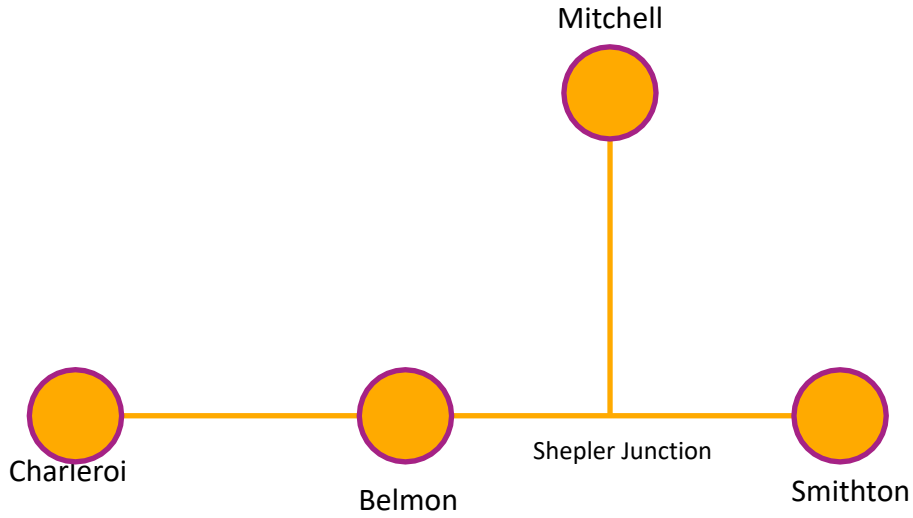
- Before Proposed Solution: 274 / 345 / 345 / 405 MVA (SN/SE/WN/WE)
- After Proposed Solution: 297 / 365 / 345 / 441 MVA (SN/SE/WN/WE)

Belmon – Shepler Hill Jct 138 kV Line:

- Before Proposed Solution: 269 / 335 / 326 / 380 MVA (SN/SE/WN/WE)
- After Proposed Solution: 269 / 335 / 326 / 421 MVA (SN/SE/WN/WE)

Shepler Hill Jct – Mitchell 138 kV Line:

- Before Proposed Solution: 295 / 375 / 349 / 441 MVA (SN/SE/WN/WE)
- After Proposed Solution: 308 / 376 / 349 / 445 MVA (SN/SE/WN/WE)



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 Relays: Shepler Hill Junction (Charleroi - Mitchell - Yukon) 138 kV Line

Need Number: APS-2024-102

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Alternatives Considered:

Maintain equipment in existing condition with elevated risk of misoperations.

Estimated Project Cost: $3.71M

Projected In-Service: 10/31/2028

Project Status: Conceptual

Model: 2024 RTEP model for 2029 Summer (50/50)

APS Transmission Zone M-3 Process
Misoperation Relays: Cecil – Enlow 138 kV Line

Need Number: APS-2024-105

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Previously Presented: Need Meeting - SRRTEP-W - 12/13/2024

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

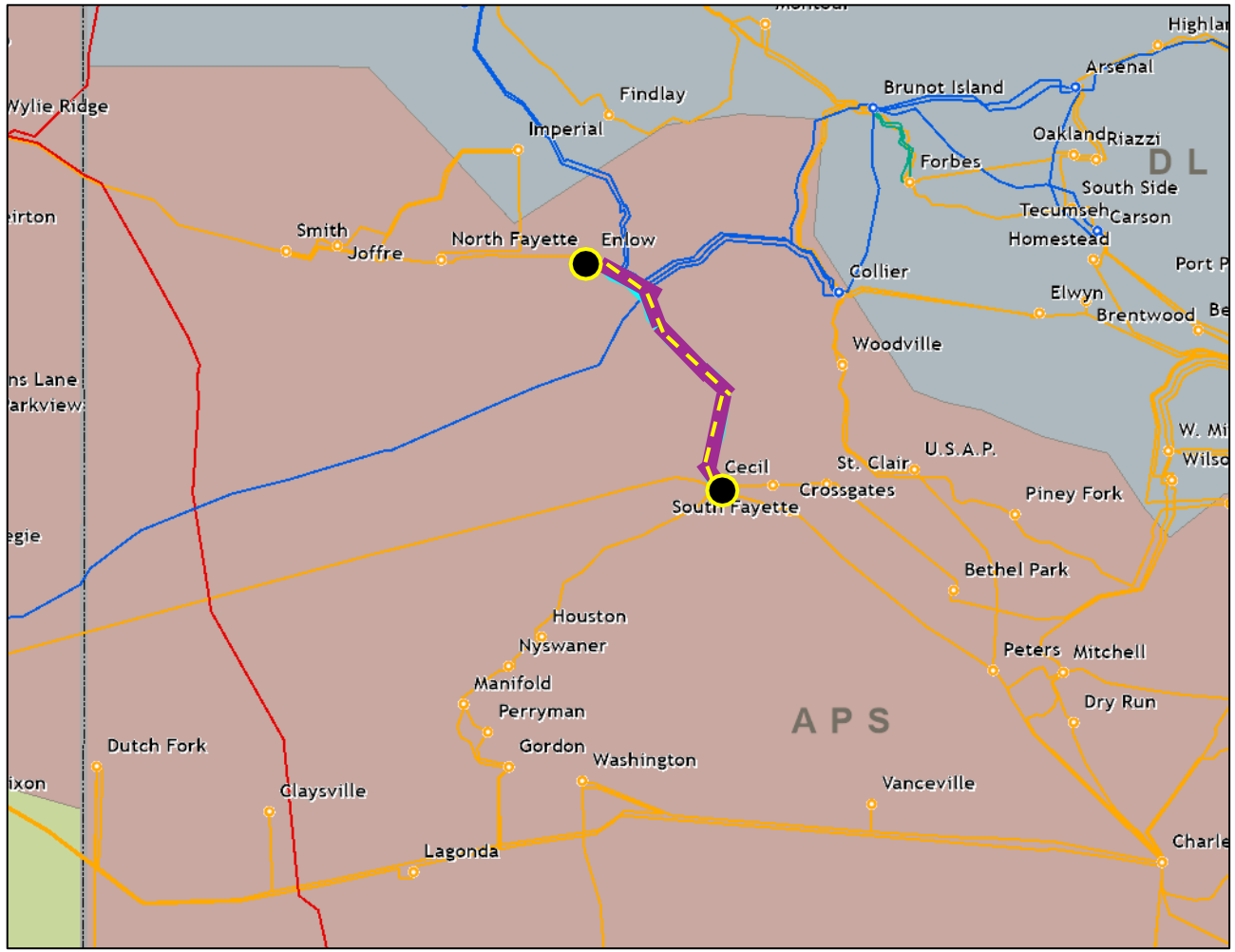
Problem Statement:

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.



APS Transmission Zone M-3 Process
Misoperation Relays: Cecil – Enlow 138 kV Line

Need #	Transmission Line / Substation Locations	Existing Line Rating MVA (SN / SE / WN / WE)	Existing Conductor Rating MVA (SN / SE / WN / WE)
APS-2024-105	Cecil – Enlow 138 kV Line	292 / 314 / 325 / 343	308 / 376 / 349 / 445

APS Transmission Zone M-3 Process
Misoperation Relays: Cecil – Enlow 138 kV Line

Need Number: APS-2024-105

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Proposed Solution:

Cecil – Enlow 138 kV Line

- At Cecil Substation, replace substation conductor, line trap, line tuner and coax, CVTs and relaying.
- At Enlow Substation, replace circuit breaker, disconnect switches, line trap, line tuner and coax, CVT and relaying.

Ratings:

Cecil – Enlow 138 kV Line:

- Before Proposed Solution: 292 / 314 / 325 / 343 MVA (SN/SE/WN/WE)
- After Proposed Solution: 308 / 376 / 349 / 445 MVA (SN/SE/WN/WE)

Alternatives Considered:

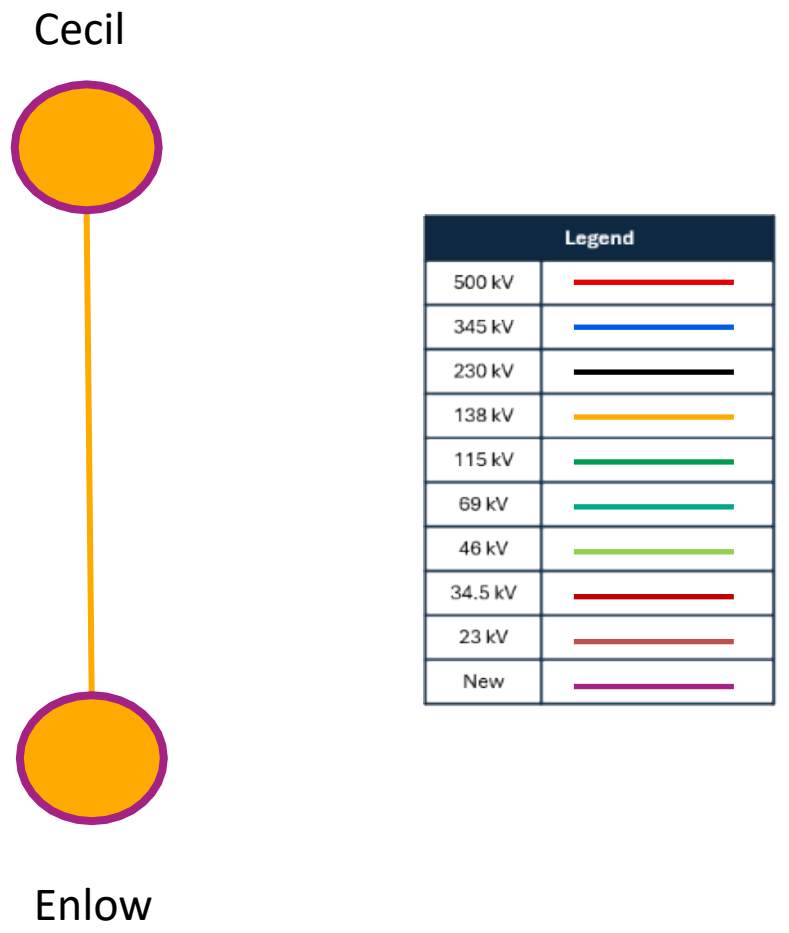
Maintain equipment in existing condition with elevated risk of misoperations.

Estimated Project Cost: $4.0M

Projected In-Service: 06/11/2029

Project Status: Conceptual

Model: 2024 RTEP model for 2029 Summer (50/50)



APS Transmission Zone M-3 Process
Kiski Valley - North Washington 138 kV Line

Need Number: APS-2025-027

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Previously Presented: Need Meeting - SRRTEP-W - 09/19/2024

Project Driver:

Customer Service, Other

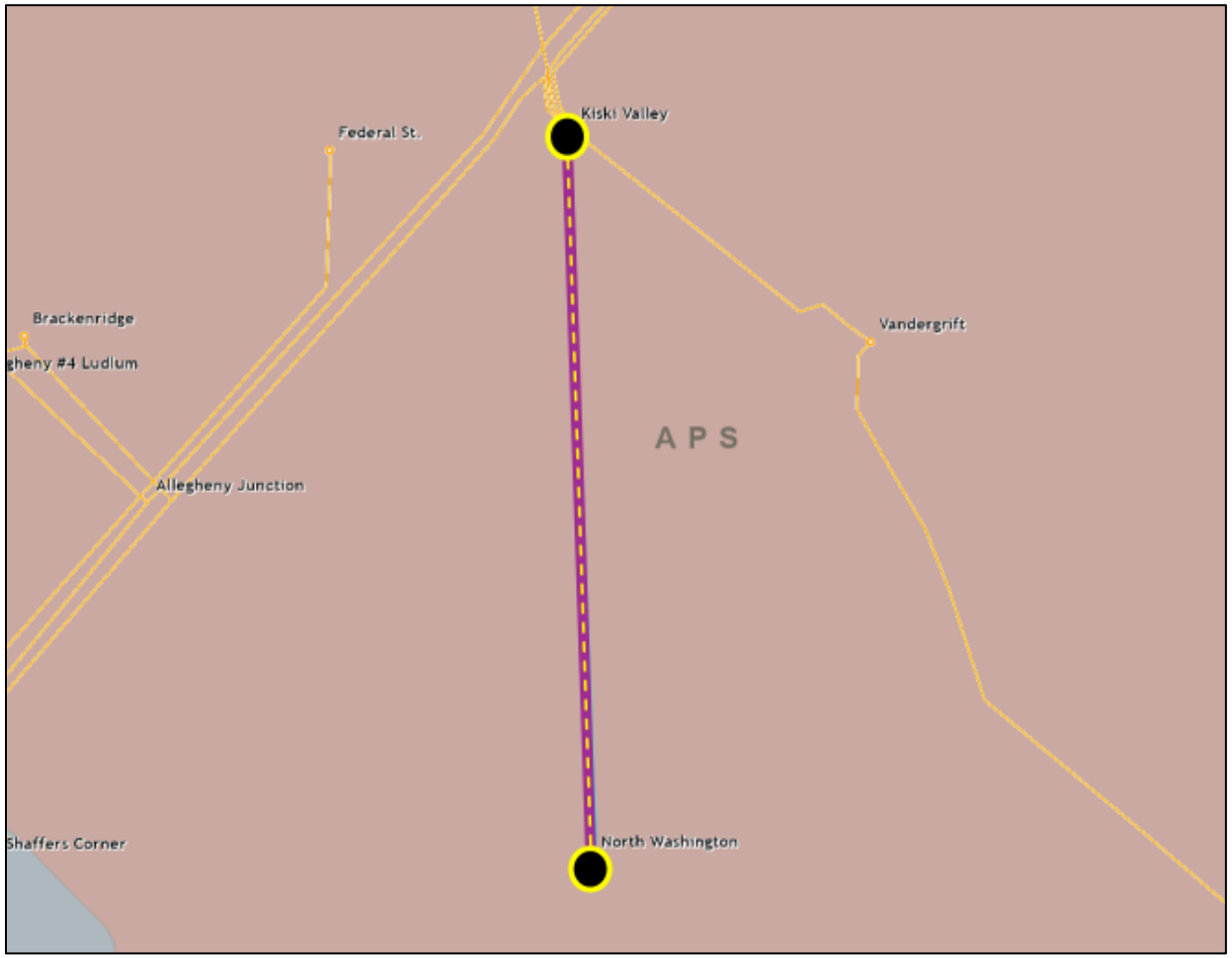
Specific Assumption Reference:

FE's Requirements for Transmission Connected Facilities and FE's Transmission Planning Criteria documents

Problem Statement:

New Customer Connection: A new customer has requested a 138 kV delivery point near the existing Kiski Valley - North Washington 138 kV Line.

The requested load is 9.9 MW with a requested in-service date of 6/9/2027. The delivery point is adjacent to North Washington Substation.



APS Transmission Zone M-3 Process
Kiski Valley - North Washington 138 kV Line

Need Number: APS-2025-027

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Proposed Solution:

Kiski Valley - North Washington 138 kV Line

- Tap the Kiski Valley-North Washington 138 kV Line
- Install three SCADA controlled switches at tap location
- Construct 1-2 spans of transmission line conductor from tap location to customer POI
- Install 138 kV revenue metering within customer substation
- Adjust relay settings at Kiski Valley and North Washington substations

Ratings:

Kiski Valley - Customer Tap 138 kV Line

- After Proposed Solution: 153 / 1 53 / 153 / 153 MVA (SN/SE/WN/WE)

Customer Tap - North Washington 138 kV Line

- After Proposed Solution: 308 / 376 / 349 / 445 MVA (SN/SE/WN/WE))

Alternatives Considered:

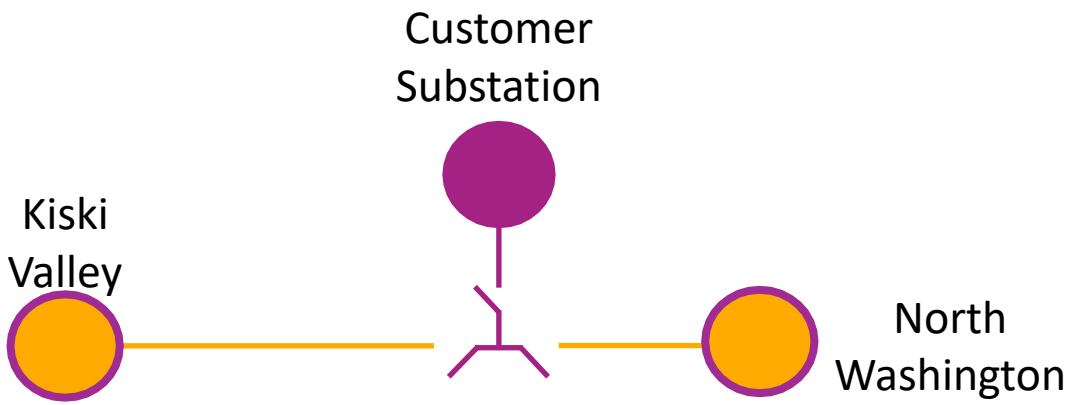
No reasonable alternatives were considered due to the customer's proximity to the Kiski Valley - North Washington 138 kV Line.

Estimated Project Cost: $2.79M

Projected In-Service: 03/27/2030

Project Status: Conceptual

Model: 2024 RTEP - 2029 Summer 50/50 Case



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
Price Hill Substation

Need Number: APS-2025-028

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Previously Presented: Need Meeting - SRRTEP-W - 09/19/2024

Project Driver:

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Global Factors

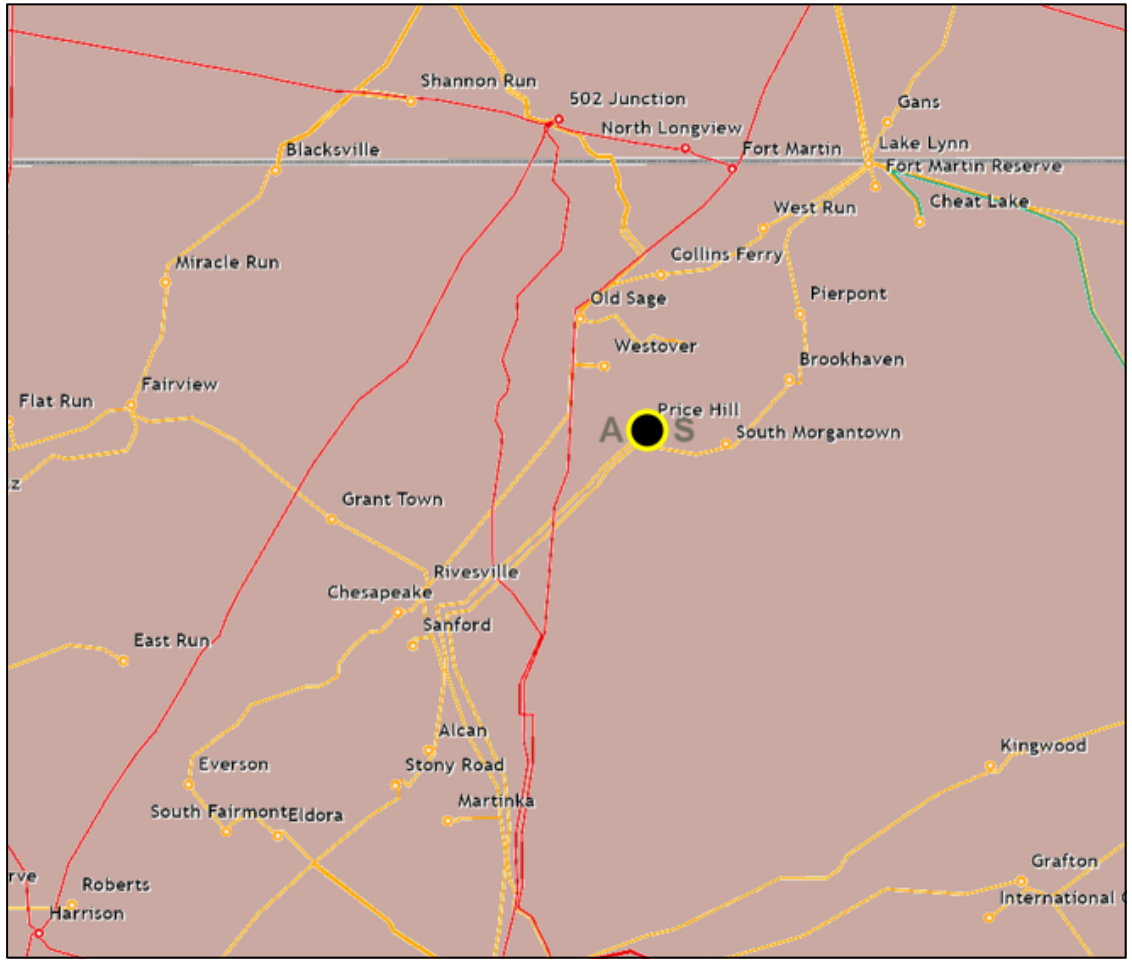
- Substation/line equipment limits

Problem Statement:

During a field inspection, a limiting substation conductor was identified on the South Morgantown - Price Hill 138 kV Line at Price Hill Substation. The substation conductor limits the capacity of the transmission line.

Existing Ratings: 224/293/323/343 MVA (SN/SE/WN/WE)

Transmission Line Ratings: 308/376/349/445 MVA (SN/SE/WN/WE)



APS Transmission Zone M-3 Process
Price Hill Substation

Need Number: APS-2025-028

Process Stage: Solution Meeting - SRRTEP-W - 10/17/2025

Proposed Solution:

Price Hill Substation

- Replace limiting substation conductor at Price Hill Substation on the South Morgantown terminal.

Ratings:

Price Hill - South Morgantown 138 kV Line:

- Before Proposed Solution: 224 / 293 / 323 / 343 MVA (SN/SE/WN/WE)
- After Proposed Solution: 262 / 314 / 325 / 343 MVA (SN/SE/WN/WE)

Alternatives Considered:

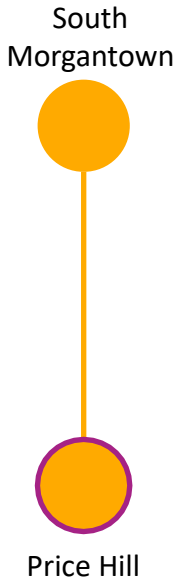
Maintain existing condition with reduced circuit ratings.

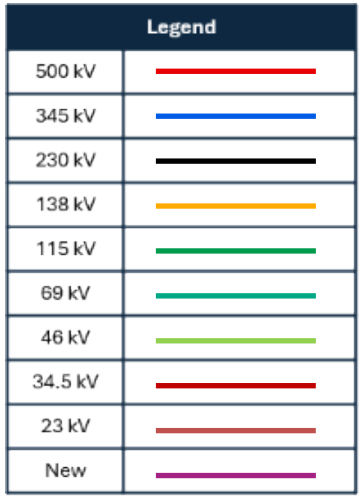
Estimated Project Cost: $0.10M

Projected In-Service: 04/03/2026

Project Status: Conceptual

Model: 2024 RTEP - 2029 Summer 50/50 Case





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

10/07/2025– V1 – Original version posted to pjm.com