

Western Sub Regional RTEP: AEP Supplemental Projects

January 19, 2024

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

AEP Transmission Zone M-3 Process Buchanan County, Virginia

Need Number: AEP-2022-AP040

Process Stage: Solution Meeting 01/19/24

Previously Presented: Need Meeting 11/18/2022

Supplemental Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Line Name: Big Rock - Grundy 34.5kV Circuit

Original Install Date (Age): 1932

Length of Line: ~6.4 mi

Total structure count: 70

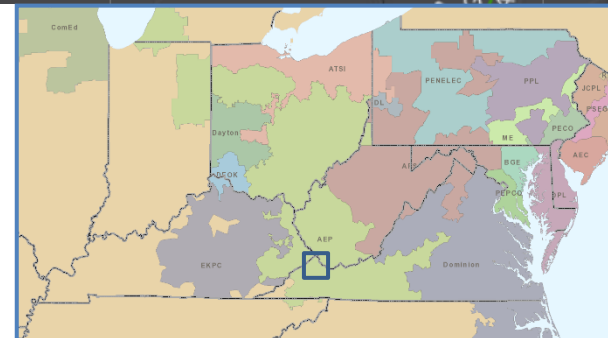
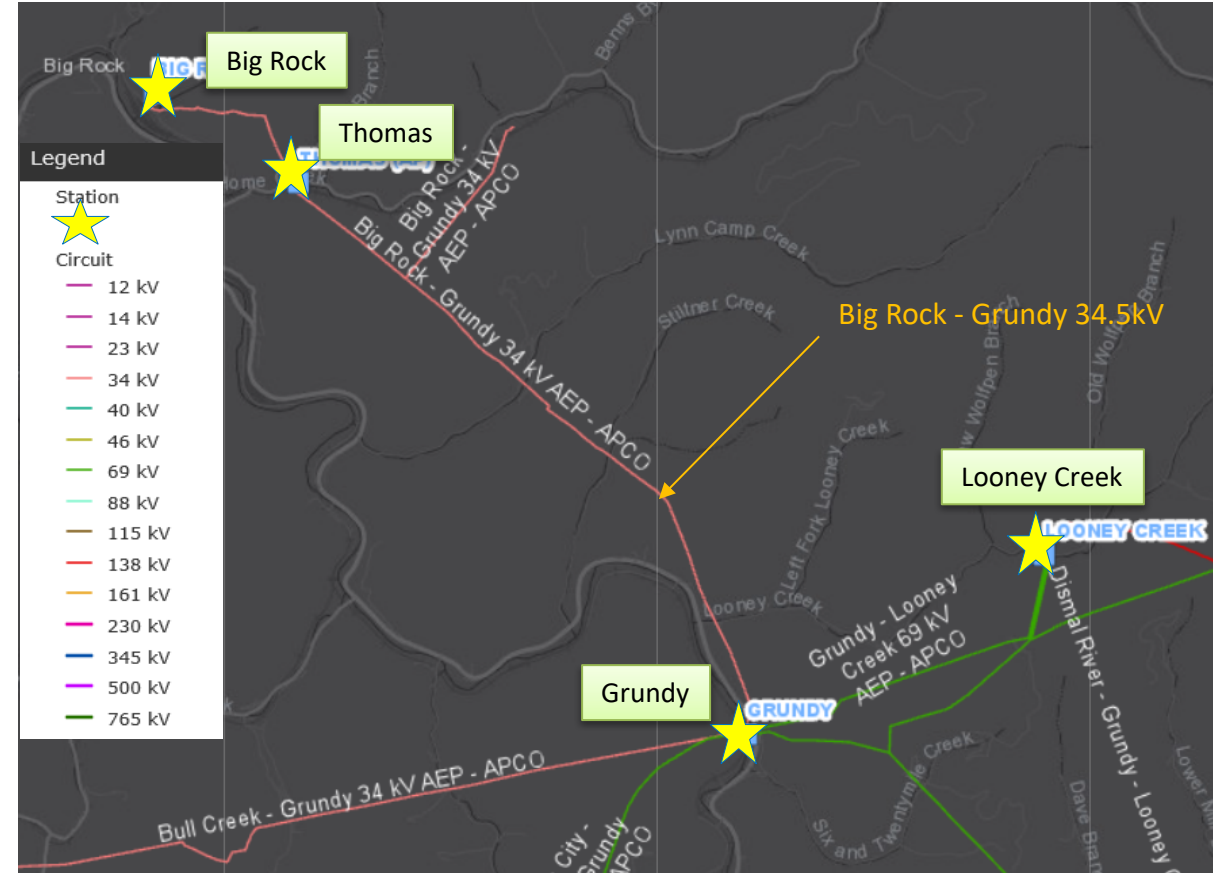
Original Line Construction Type: Wood

Conductor Type: 1/0 Copper, 1/0 AAAC, 4/0 ACSR, 336,000 ACSR, 556,000 ACSR

Momentary/Permanent Outages: 2 Permanent causing 856k CMI since 2017

Line Conditions:

- The line structures fail to meet 2017 NESC Grade B loading criteria, current AEP structural strength requirements, and the current ASCE structural strength requirements.
- 67 of the 70 structures are 1930s vintage accounting for 96% of the structures.
- The line is insulated in some segments with Distribution class cap and pin insulators which do not meet current AEP standards for CIFO and minimum leakage distance requirements. Shield wire is not present on significant segments of this line.
- The line is radial and serves a peak nontransferable load of 2.63 MVA at Thomas and 1.8 MVA at Big Rock substations.



Need Number(s): AEP-2022-AP040

Process Stage: Solutions Meeting 01/19/24

Proposed Solution:

- Construct a new 69 kV line from the existing Looney Creek station to the greenfield Conaway station, approximately 6.1 miles long. New right of way is needed from Looney Creek to Conaway station. The line cost is driven by very steep terrain and the miles of access roads required and access road restoration cost, which is a requirement in Virginia. Estimated Cost: \$30.2M
- Construct a greenfield station (Conaway) to replace Big Rock and Thomas stations. Conaway will contain a 69/12 kV 20 MVA transformer with high side circuit switcher. There will be two 12 kV feeders from the station. The 69 kV side will be a straight bus with 69 kV MOABs. Distribution work is required to reconnect the Distribution system to the new Conaway station. Estimated Cost: \$0.0 (Distribution cost)
- At the existing Looney Creek station, a new 69 kV circuit breaker will be installed to connect the Conaway – Looney Creek 69 kV line. Replace the high side 138kV MOAB ground switch with a 138 kV circuit breaker due to protection and control at the station. Estimated Cost: \$2.44M
- Remove the ~6.4 mile long Big Rock – Grundy 34.5 kV line. Estimated cost: \$5.08M
- Remove 34.5 kV circuit breaker “D” and 34.5 KV circuit breaker “C” at Grundy station. Estimated cost: \$0.4M
- Remove the Big Rock station and equipment. Estimated cost: \$0.0 (Distribution cost)
- Remove the Thomas station and equipment. Estimated cost: \$0.0 (Distribution cost)

Total Estimated Transmission Cost: \$38.12 M

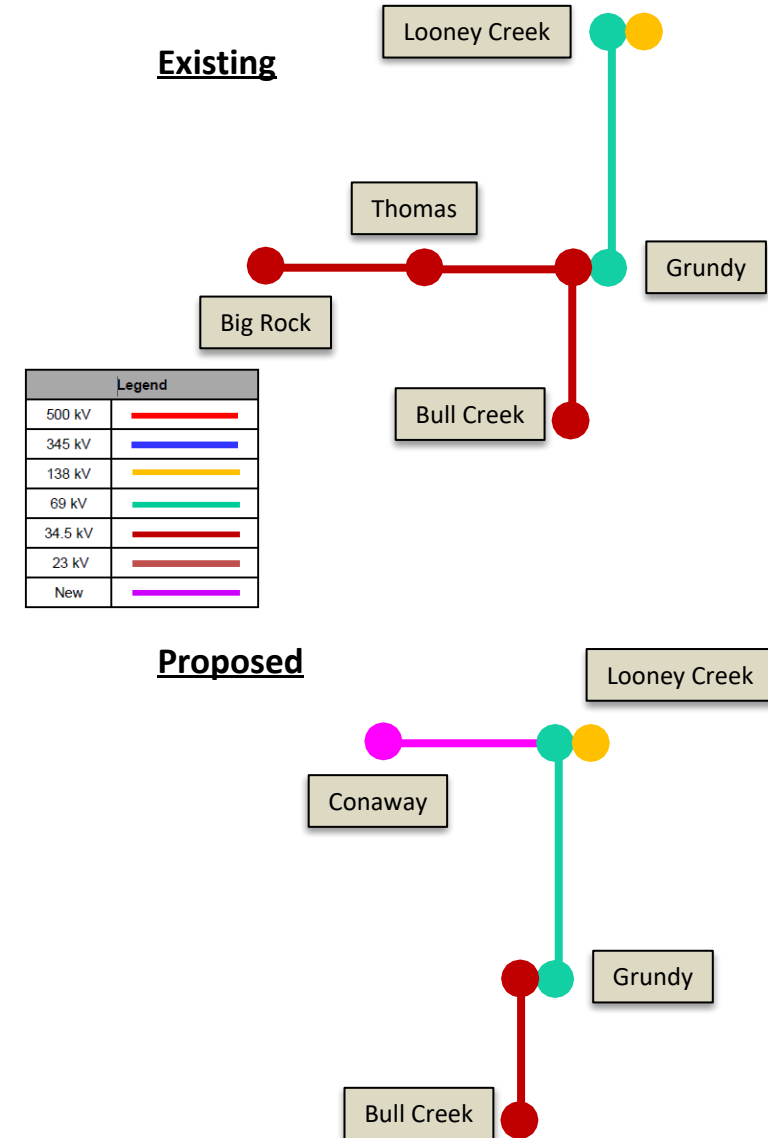
Ancillary Benefits: Consolidation of two Distribution stations into one. The current Big Rock station is next to a coal mine that is expanding their land refuge towards Big Rock station which would require significant work in the future if Big Rock was not being retired.

Alternatives Considered: Rebuild the ~5.25 miles of 34.5kV line from Grundy station to Big Rock station at 69kV instead of a new line from Looney Creek. This option is not preferred because Grundy station is not in an ideal location for the source to this area. A bridge is needed to get to the station and the station is in the flood plain.

Projected In-Service: 5/1/2028

Project Status: Scoping

AEP Transmission Zone M-3 Process Buchanan County, Virginia



Need Number: AEP-2021-OH050

Process Stage: Solutions Meeting 01/19/2024

Previously Presented : Needs Meeting 09/17/2021

Project Driver:
Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:
AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Marion Road 138 kV

138 kV CB-2, CB-3, CB-4, & CB-5

- Breaker Age: 1972
- Interrupting Medium: Oil
- Fault Operations: 10 (CB-2), 16 (CB-3), 4 (CB-4), 5 (CB-5)
- Additional: CB-2, 3, 4, 5, are 138 kV BZO oil filled type breakers. These breakers are oil filled without oil containment; oil filled breakers have much more maintenance required due to oil handling. CB-2 & CB-3 has exceeded the manufacturer's recommended (10) number of full fault operations.

138 kV CB-6 & CB-7 and 40 kV CB-17

- Breaker Age: 2006 CB 6 & 7 and 1996 CB 17
- Interrupting Medium: SF6
- Fault Operations: 11 (CB-6), 10 (CB-7), and 7 (CB-17)
- Additional: CB 6 & 7 have meet or exceeded the manufacturer's recommended (10) number of full fault operations. CB-17 has exceeded the manufacturer's recommended (6) number of full fault operations

40 kV CB-10

- Breaker Age: 1964
- Interrupting Medium: Oil
- Fault Operations: 0
- Additional: CB-10, is a 40kV FKA oil filled type breaker. This breaker is oil filled without oil containment; oil filled breakers have much more maintenance required due to oil handling. GE provides no support for this circuit breaker and spare parts are increasingly more difficult to obtain; components are often taken from out of service units with remaining usable parts.



Need Number: AEP-2021-OH050

Process Stage: Solutions Meeting 01/19/2024

Previously Presented : Needs Meeting 09/17/2021

Problem Statement (continued):

138 kV CS-AA

- Breaker Age: 1990
- Interrupting Medium: SF6
- Fault Operations: 0
- Additional: CS-AA, is a 138kV SF6 type switcher. This type of circuit switchers have no gas monitor and currently in-service units on the AEP system have experienced 110 malfunctions from May 2000 to August 2019. Failed operational components including high contact resistance, gas loss, and interrupter failure represent half of these malfunctions. Two malfunctions of note were catastrophic equipment failures involving failures to trip. Parts are expensive, especially because interrupters can only be replaced, not repaired, as they are hermetically sealed.

138/40/13 kV Transformers 4

- Transformer age: 1969
- Transmission owned
- Additional: Transformer 4, the asset health score is low driven primarily by short circuit causes. The Short Circuit portion of the score is driven by the age of this unit's insulation materials. As the insulating paper materials age, they become brittle.

138/40/13 kV Transformers 5 & 6

- Transformer age: 1961
- Transmission owned
- Additional: Transformers 5 & 6, the asset health scores are low driven primarily by short circuit and accessory causes. The Short Circuit portion of the score is driven by the elevated levels of Carbon Dioxide which is currently at IEEE Level 3. This level indicates high decomposition of the paper insulating materials. The Accessory portion of the score is driven by the LTC. The Ethylene levels currently exceed Acetylene within the LTC. This is an early indicator of deteriorated internal components

Relaying:
Currently, 277 of the 293 relays (95% of all station relays) are in need of replacement. All 277 of these are of the electromechanical and static type which have significant limitations with regards to spare part availability and fault data collection and retention. In addition, these relays lack of vendor support.



AEP Transmission Zone M-3 Process Marion Station Rehab, Ohio

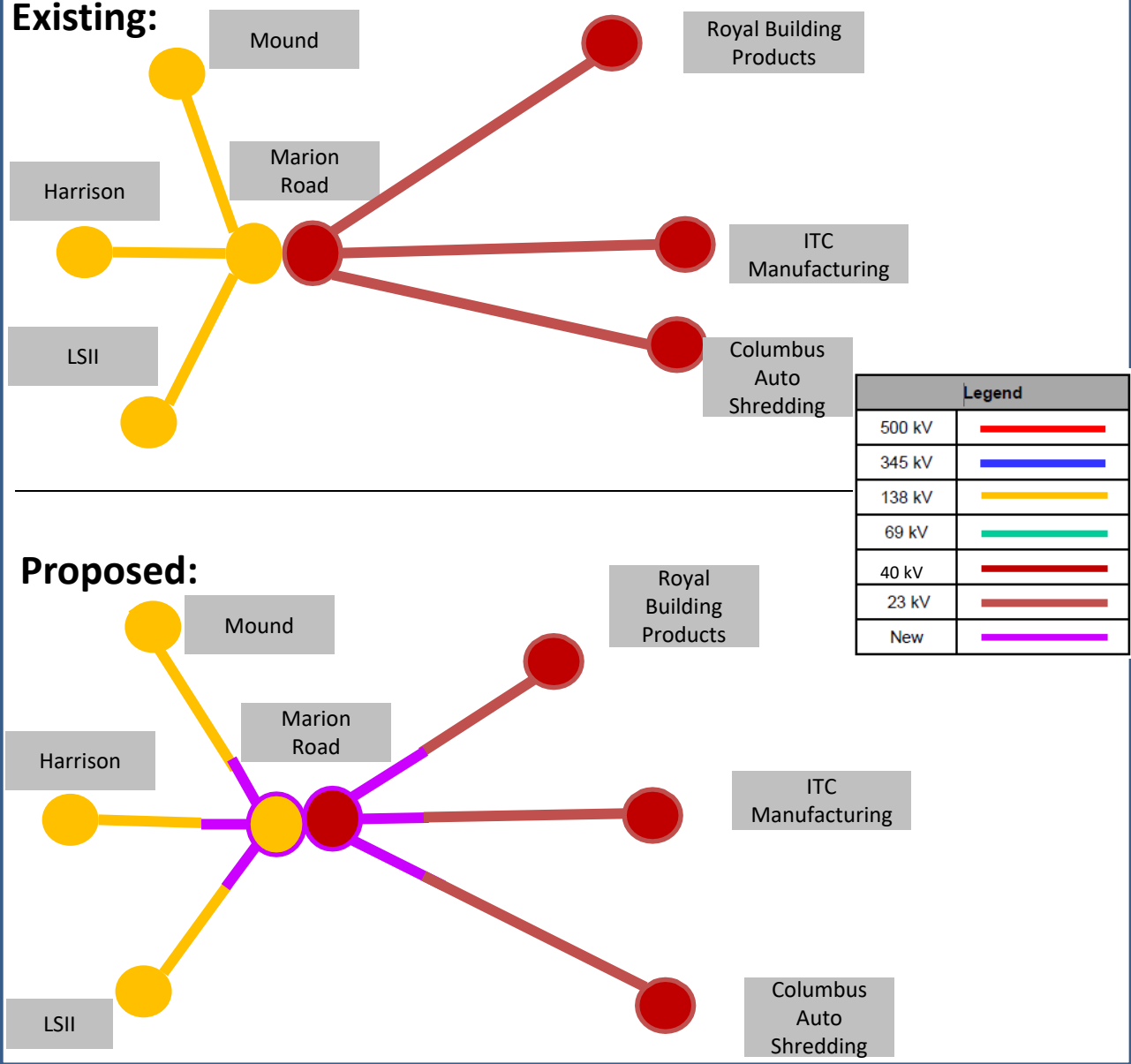
Need Number: AEP-2021-OH050

Process Stage: Solutions Meeting 01/19/2024

Proposed Solution:

- Marion Road station:** Rebuild on the existing site with 9- 138kV 63kA 3000A breakers and utilizing one of the original breakers that is in good health to create a ten-breaker ring bus. Add a 28.8 MVAR 138kV Cap Bank. Construct a greenfield 40kV yard with two new 50MVA 138/40kV transformers to support the three 40kV customers served from the station. Use existing breaker 16 and 22 on the low-side of the transformers. Replace breakers 17 and 10 with existing breakers 15 and 21 which are in good health. Install a new DICM and remove the existing control house. **Estimated Cost: \$35.38M**
- Bixby - Marion Rd 138kV:** As part of the station reconfiguration the double circuit 138 kV line from Marion to LSII and Harrison will be rerouted into the new 138kV yard with a new 0.15-mile extension using ACSR Drake 795 (26/7) conductor (SE 360 MVA). **Estimated Cost: \$1.14M.**
- Marion Road – Universal 40 kV:** reroute the existing 40 kV service (Royal Building Products) T-line into the new 40 kV yard with a new 0.24 miles extension using ACSR Dove 556.5 (26/7) conductor (SE 142 MVA). **Estimated Cost: \$0.90M**
- Marion Road – Champion Avenue 40 kV:** reroute the existing 40 kV service (ITC Manufacturing) T line into the new 40 kV yard with a new 0.19-mile extension using ACSR Dove 556.5 (26/7) conductor (SE 142 MVA). **Estimated Cost: \$0.93M**
- Marion Road – Columbus Auto Shredding 40 kV:** Construct a greenfield ~0.15-mile single circuit line to Columbus Auto Shredding POI using ACSR Dove 556.5 (26/7) conductor (SE 142 MVA). **Estimated Cost: \$0.92M**
- Mound Street, Harrison, LSII:** Remote end work will be performed at Mound, Harrison, and LSII stations to coordinate with the work at Marion Road. **Estimated Cost: \$0.89M**

Total Estimated Transmission Cost: \$40.16 M



AEP Transmission Zone M-3 Process Marion Station Rehab, Ohio

Need Number: AEP-2021-OH050

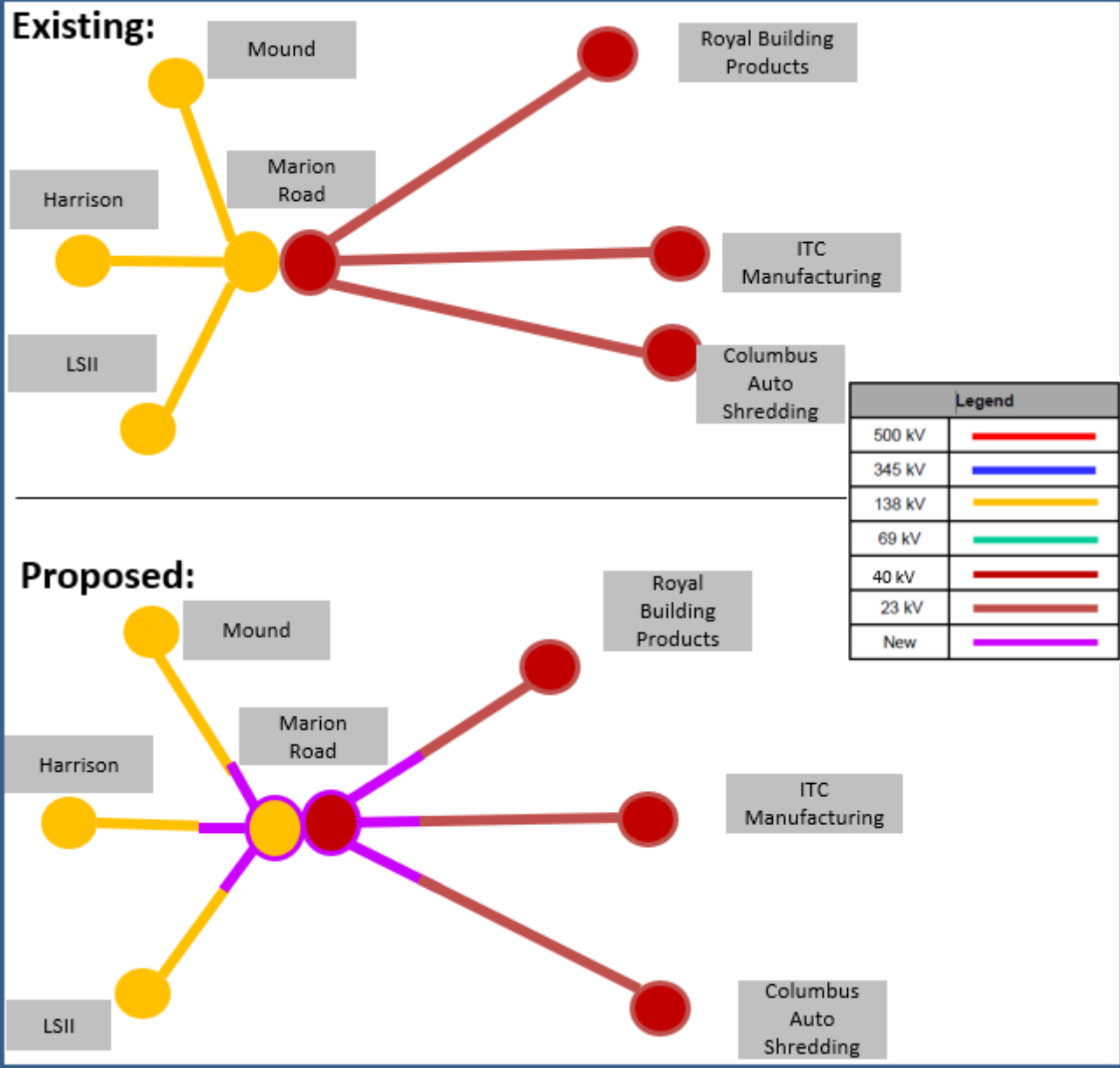
Process Stage: Solutions Meeting 01/19/2024

Alternatives Considered:

- Marion Road is one of the primary distribution stations near the downtown Columbus area. Constructability and outage challenges required the station to be rebuilt adjacent to the existing station on AEP owned property.
- Converting the existing 40 kV customers served out of Marion Road to 34.5 kV or 69 kV versus going back with 40 kV equipment was considered. The nature of the customer operations served from the station requires that two of the customers be kept electrically separate from the other customer in most instances due to potential flicker concerns. Going to 34.5 kV would only increase these flicker concerns. Factoring in the cost to convert the customers to 34.5 kV by replacing their transformers made the 34.5 kV option not cost effective. Similarly, the 69 kV option would have required significant rebuilds of the customer owned stations. Neither option was deemed cost effective in comparison to just replacing the existing 138/40 kV transformers.

Projected In-Service: 03/2027

Project Status: Scoping



Need Number: AEP-2023-OH043

Process Stage: Solutions Meeting 1/19/2024

Process Stage: Need Meeting 03/17/2023

Project Driver:

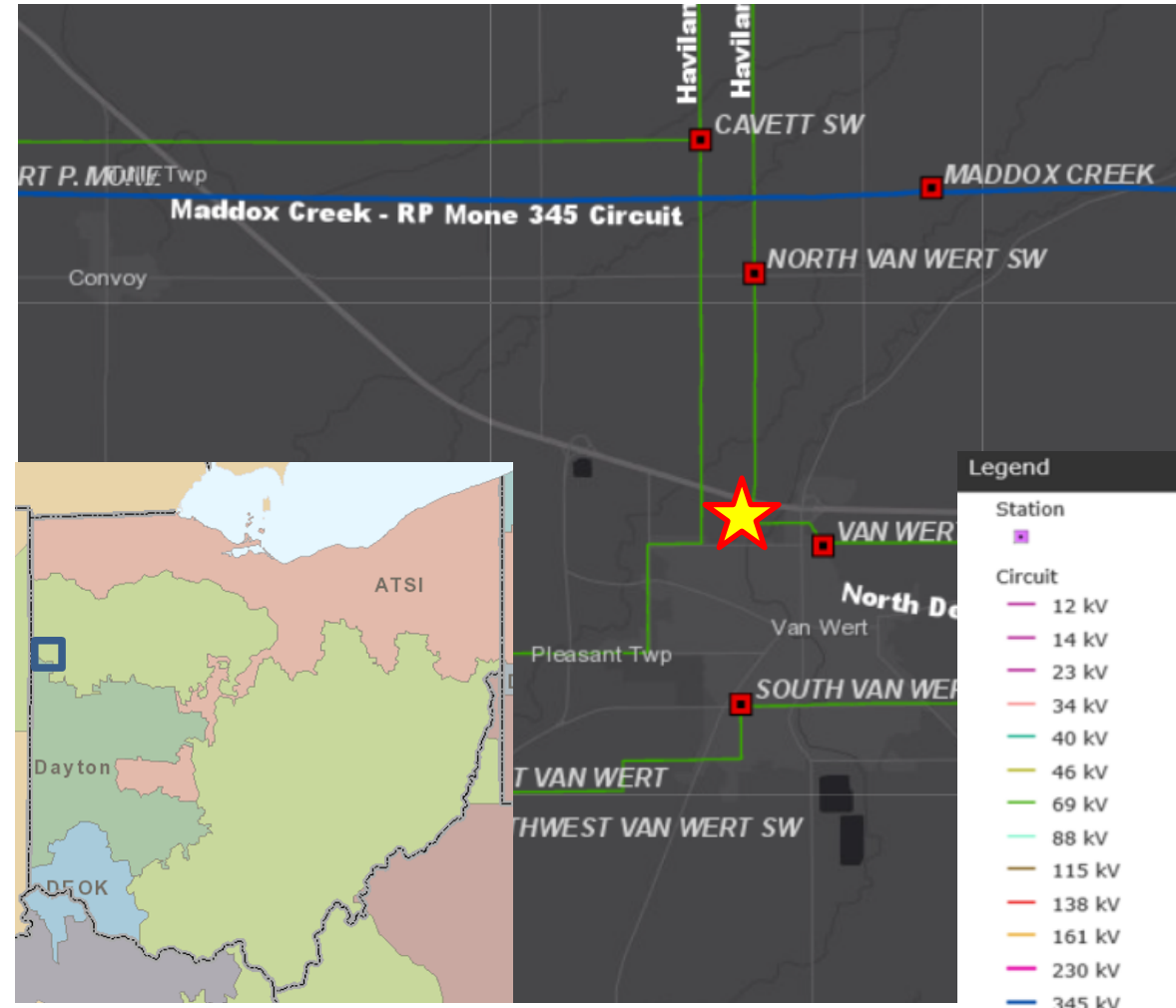
Customer Service

Specific Assumption Reference:

AEP Connection Requirements for the AEP Transmission System
(AEP Assumptions Slide 12)

Problem Statement:

- AEP Ohio has requested a 69kV delivery near Northern Van Wert.
- The anticipated load is 15MVA
- AEP Ohio has requested an in-service date of 12/31/2024



Need Number: AEP-2023-OH043

Process Stage: Solutions Meeting 1/19/2024

Proposed Solution:

Vision Station: A new 69/12 kV distribution station (Vision) will be constructed. The station will be an in and out design utilizing in line MOAB's. Estimated Cost: 1.12M

West Van Wert – Cavett 69 kV: Work will be performed on the West Van Wert – Cavett 69 kV circuit to cut in the newly proposed Vision station . Estimated Cost: 2.99M

Total Estimated Transmission Cost: 4.11M

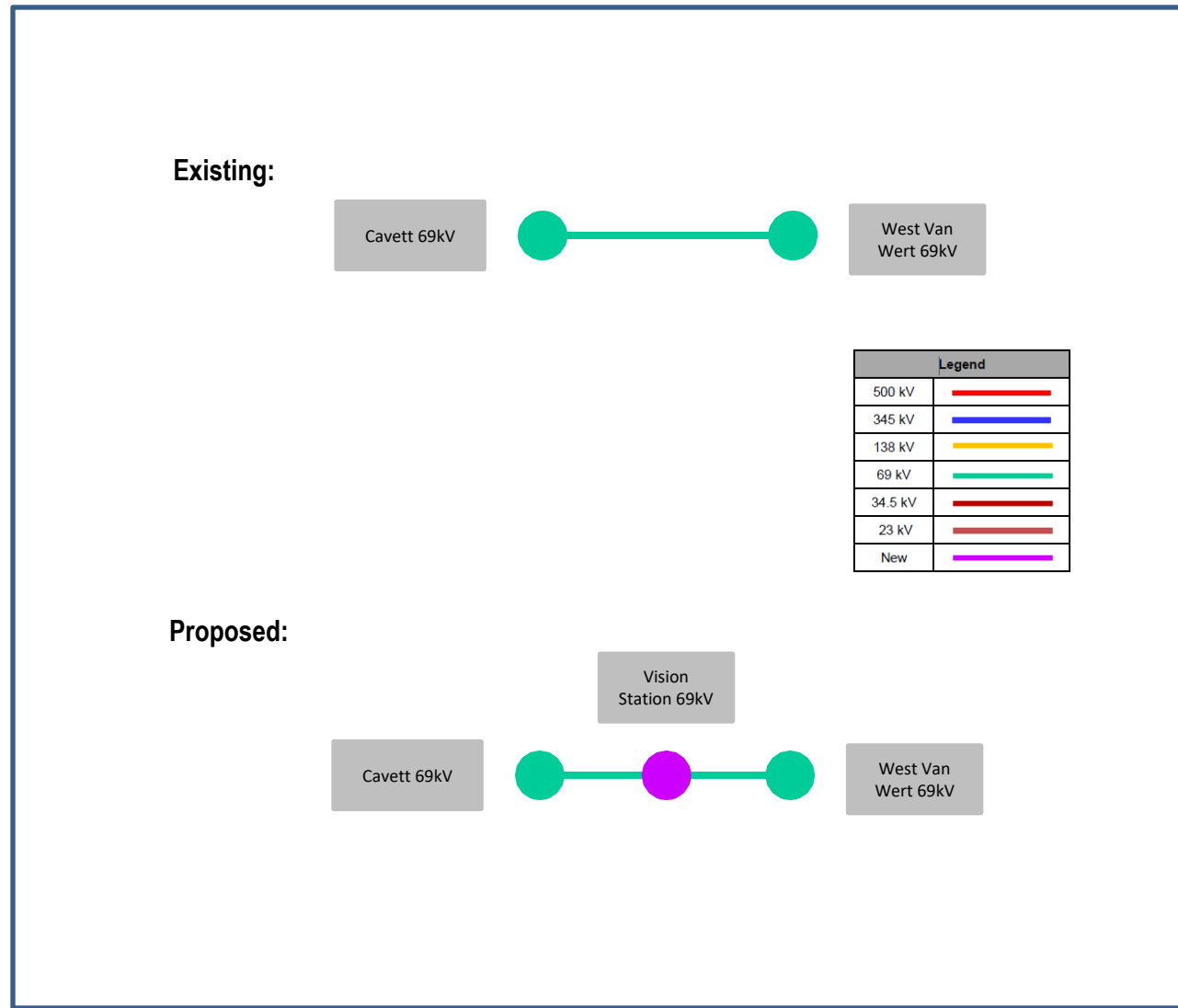
Alternatives Considered:

Consideration was given to expanding existing stations to accommodate the new distribution source in the area, but determined to be infeasible due to space constraints and/or exposure concerns on the distribution system.

Projected In-Service: 12/01/2024

Project Status: Engineering

Model: 2028 RTEP



Need Number: AEP-2023-OH047

Process Stage: Solution Meeting 1/19/2024

Previously Presented: Needs Meeting 3/17/2023

Project Driver: Customer Service

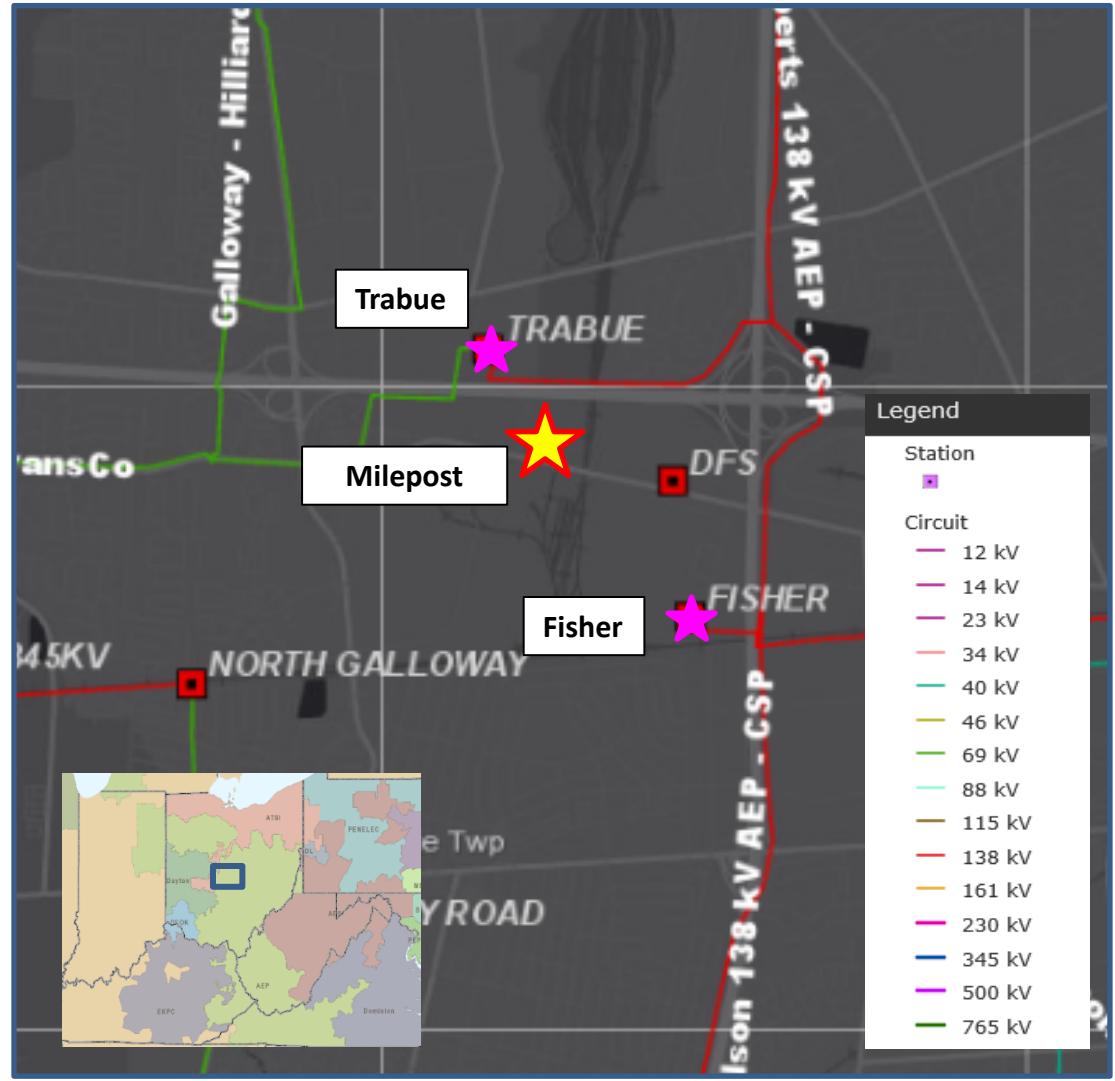
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Customer Service:

- Four customers have requested distribution service at a site South of AEP’s existing Trabue station in Columbus, OH.
- The customers have indicated a total peak demand of 33.5 MVA of new capacity and 5.5 MVA of alternate capacity at the site.
- The customer has a requested an in-service date of 2/29/2024.



AEP Transmission Zone M-3 Process Columbus, OH

Existing:



Need Number: AEP-2023-OH047

Process Stage: Solutions Meeting 1/19/2024

Proposed Solution:

- Construct a greenfield station “Milepost”, utilizing three 138kV 63kA 3000A circuit breakers configured in a ring to serve new customer loads. Estimated Cost: \$4.54 M
- Cut into the Roberts - Trabue 138 kV circuit and construct a new 0.14-mile double circuit 138kV in and out line to the new Milepost station utilizing 795 ACSR conductor SE: 360 MVA. Estimated Cost: \$2.79 M
- Remote end work to accommodate the above work at Cole, Roberts, & Trabue. Estimated Cost: \$0.17 M

To accommodate the 33.5 MVA customer at Milepost the following work will be completed to resolve overloads on the 138/69 kV transformer at Bethel and station equipment at Blaine due to the new bulk load addition:

- Retire 3.3 miles of the Bethel Rd – Hilliard 69 kV line from Bethel Rd to the structure adjacent to Davidson 69 kV. Build a 0.3-mile extension connecting the line from Hilliard to Davidson using 795 ACSR conductor creating the Hilliard – Davidson 69 kV circuit. Estimated Cost: \$2.92 M
- Retire Bethel Road 138/69/13.8 kV Transformer #3 and associated breakers. Install a new 138/69 kV transformer at Davidson station with a high side MOAB and a single 69kV 3000A 40kA breaker on the low side connecting to the reconfigured Davidson - Hilliard 69 kV circuit. Estimated Cost: \$1.58 M
- Upgrade Sub Cond 477 AAC 19 Str. at Blaire 69 kV. Estimated Cost: \$.05 M

Total Estimated Cost: \$12.05 M

Ancillary Benefits:

- The proposed project will address needs on a 1963 vintage transformer and two oil breakers manufactured in 1967 at Bethel Road station identified as part of AEP need # AEP-2023-OH053.
- In addition, the project will allow for the retirement of ~3.3 miles of a 1960s vintage wood pole line located in a densely populated suburb of Dublin, OH with a river crossing.

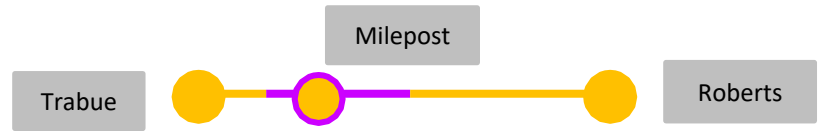
Alternatives Considered:

- Serve the customer from existing Distribution stations. This option was not viable as the surrounding stations and circuits are not capable of serving all of this new load.
- Replacing the equipment at Bethel Road was considered, but not chosen given the fact that it would not allow for the retirement of the 3.3 miles of 1960s 69 kV line between Bethel and Davidson. In the end this would have been a more costly alternative.

Projected In-Service: 04/15/2024

Project Status: Engineering

Proposed:



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

AEP Transmission Zone M-3 Process Jackson County, Ohio

Need Number: AEP-2023-OH057

Process Stage: Solutions Meeting 1/19/2024

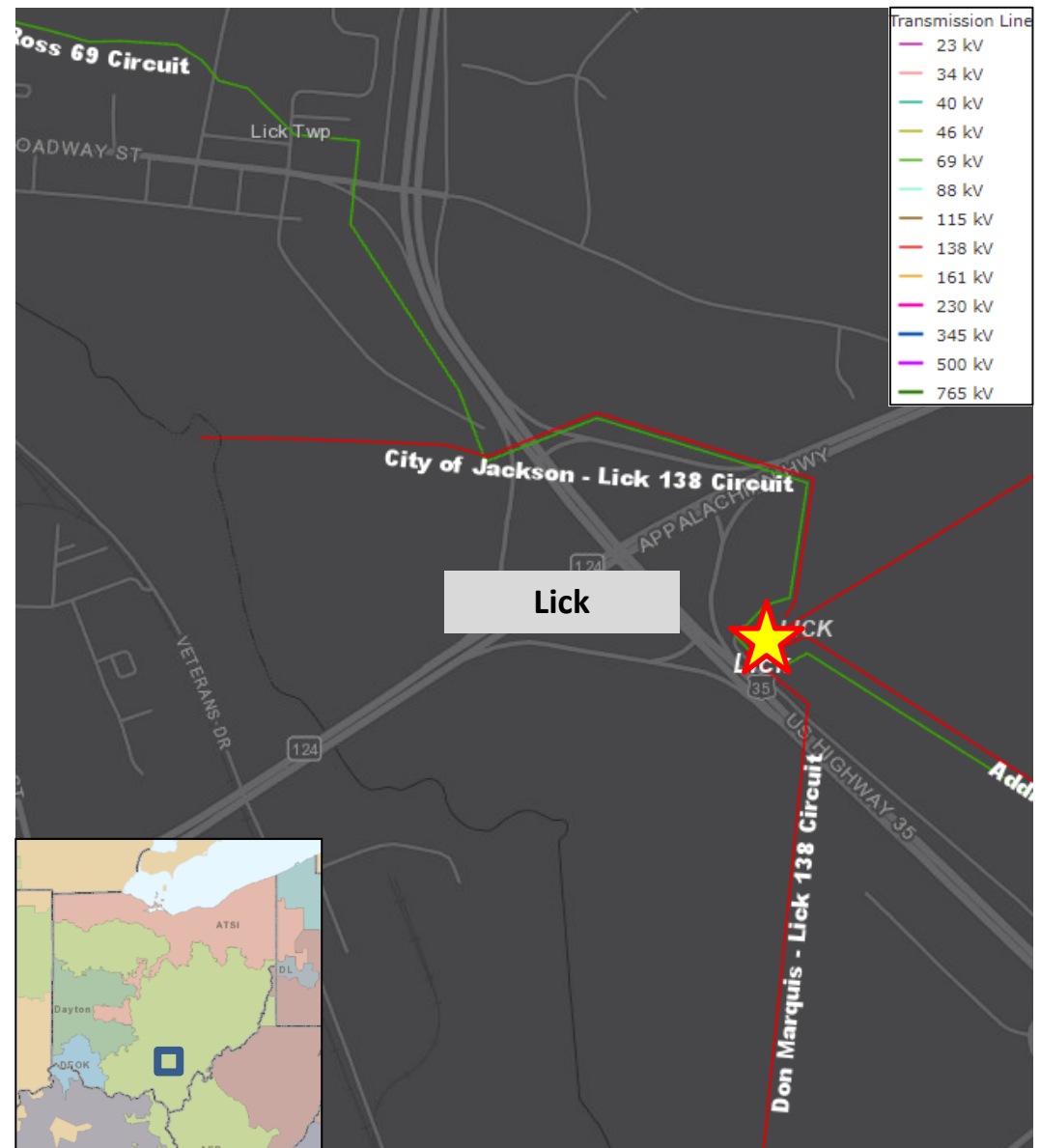
Previously Presented: Need Meeting 07/21/2023

Project Driver: Customer Service

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 12)

Problem Statement:

The City of Jackson has requested a new transmission feed for their Veterans station separate from their existing 138 kV feed from AEP’s Lick station. The city of Jackson currently serves approximately 25 MW of load via Lick station.

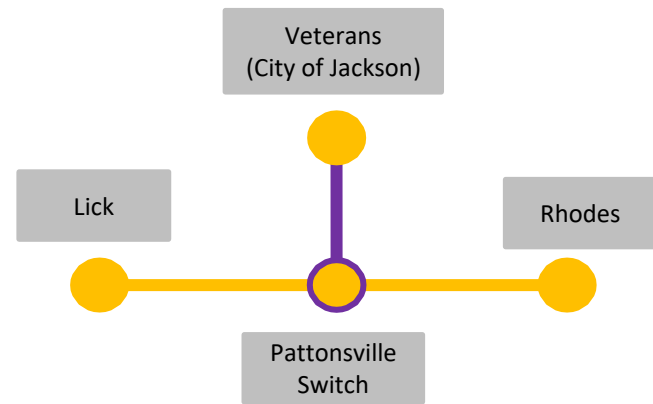


AEP Transmission Zone M-3 Process Jackson County, Ohio

Existing:



Proposed:



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

Need Number: AEP-2023-OH057

Process Stage: Solutions Meeting 1/19/2024

Proposed Solution:

- Pattonsville Switch: Install new 138kV phase-over-phase switch on the Corwin-Lick 138kV circuit. Install metering towards Veterans. **Estimated Cost: \$0.67 M**
- Pattonsville Switch Extension: Install ~0.3 miles of line from Pattonsville Switch to Veterans. **Estimated Cost: \$0.45 M**
- Poston-Lick 138 kV: Modify existing line to accommodate switch installation. **Estimated cost: \$0.32 M**
- Heppner-Lick 138 kV: Remove span of line from City of Jackson’s Lick station toward Veterans. **Estimated cost: \$0.1M**

Estimated Total Transmission Cost: \$1.53 M

Projected In-Service: 12/31/2024

Project Status: Scoping

AEP Transmission Zone M-3 Process McDowell County, West Virginia

Need Number: AEP-2022-AP022

Process Stage: Solution Meeting 1/19/2024

Previously Presented: Need Meeting 4/22/2022

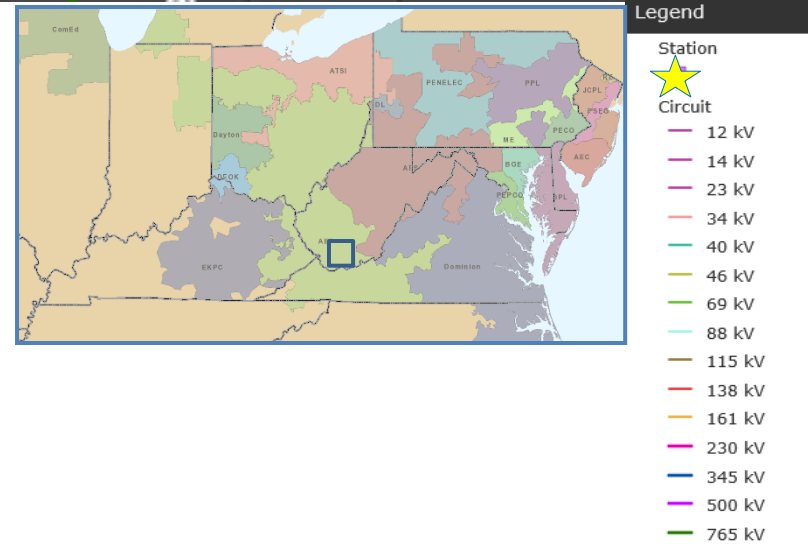
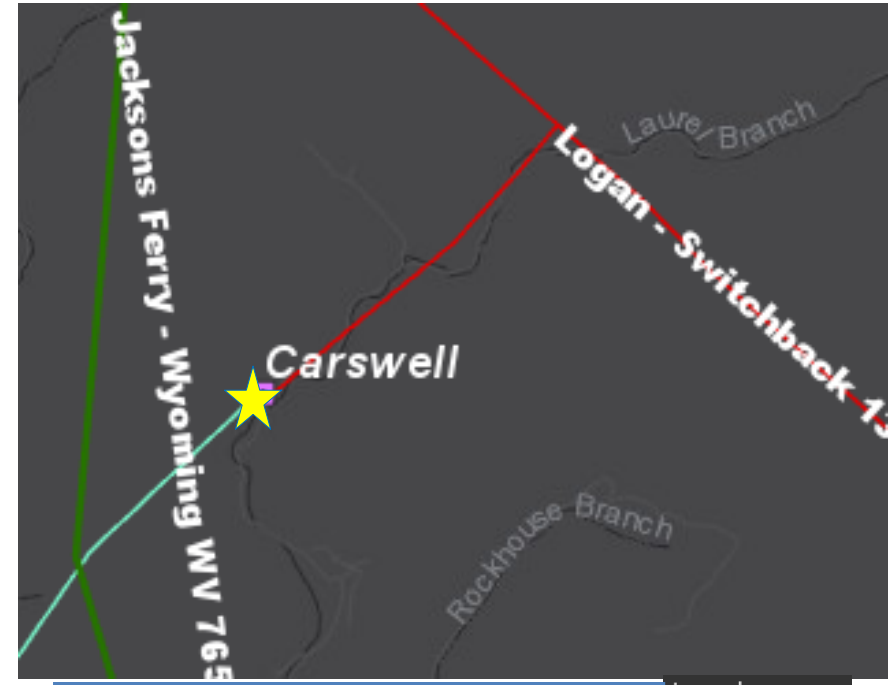
Supplemental Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement Carswell Station:

- The 138/88-8kV transmission transformers Phase A, B, C and Spare are of 1949 vintage. The insulating paper material has become brittle and this puts the unit's ability to withstand future short circuit or through fault events at greater risk. There have been multiple malfunction reports regarding active oil leaks on bank Phase C. The presence of Ethane, along with the indication of overheating faults, indicates that decomposition of the non-thermally upgraded and increasingly brittle paper insulation is impairing the units' ability to withstand future short circuit or through fault events.
- The 88kV circuit breaker C is an FK-439-1500 type, oil filled breaker. This breaker is of 1949 vintage and is without oil containment. This circuit breaker has exceeded the manufacturer's designed number of full fault operations and General Electric does not provide support for this breaker.
- Currently, 21 of the 23 relays (91% of all station relays) are in need of replacement. There are 19 of the electromechanical type which have no spare part availability and fault data collection and retention. In addition, these relays lack vendor support.
- The Northwest corner of the station has had significant washouts in the past and has damaged the perimeter fence. The washouts have exposed the control cables for the 88kV circuit breaker.
- Carswell is the one of the last two stations that have an operating voltage of 88kV.



AEP Transmission Zone M-3 Process McDowell County, West Virginia

Need Number: AEP-2022-AP023

Process Stage: Solution Meeting 1/19/2024

Previously Presented: Need Meeting 4/22/2022

Supplemental Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13), AEP's Pre-1930s Era Lattice Tower and Transmission Line System Report

Problem Statement:

Line Name: Carswell Loop 138kV Line

Original Install Date (Age): All the structures and conductor are from 1927

Length of Line: ~1.4 mi

Total structure count: 5

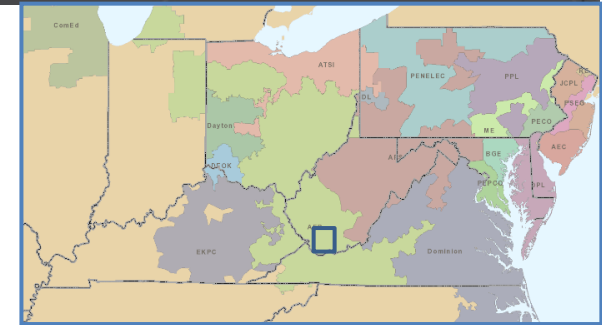
Original Line Construction Type: Lattice Steel

Conductor Type: 397,500 ACSR

Momentary/Permanent Outages: 25 Momentary and 3 Permanent

Line Conditions:

- The Carswell Loop line asset is hard tapped to the adjacent Logan – Switchback 138kV Line. The associated Tazewell - Trail Fork 138kV Circuit serves 13 MVA of peak load at Belcher Mountain, Carswell, & Clark Branch. Though Belcher Mountain is served at 88kV, it has a radial service from Carswell Substation that is impacted by outages on the Tazewell - Trail Fork 138kV Circuit.
- Since 2017, there have been 25 momentary and 3 permanent outages on the Tazewell – Trail Fork 138kV Circuit. The momentary outages were due to lightning (18), unknown (3), ice/snow (1), wind (1), test shot (1), and other (1) causes. The permanent outages were due to vegetation grow-in (2) and vegetation fall-in from outside of the AEP ROW (1) causes. These permanent outages caused 293k minutes of customer interruption.
- The inadequate shielding angle on this line asset leads to potential poor lightning performance.
- The porcelain insulators on the line do not meet current AEP standards for CIFO and minimum leakage distance requirements.
- Access for this line is extremely difficult due to the steep, mountainous terrain.



AEP Transmission Zone M-3 Process McDowell County, West Virginia

Need Number: AEP-2022-AP024

Process Stage: Solution Meeting 01/19/2024

Previously Presented: Need Meeting 4/22/2022

Supplemental Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Line Name: Carswell - Gary 88kV Line

Original Install Date (Age): All the structures and conductor are from 1948

Length of Line: ~2 mi

Total structure count: 12

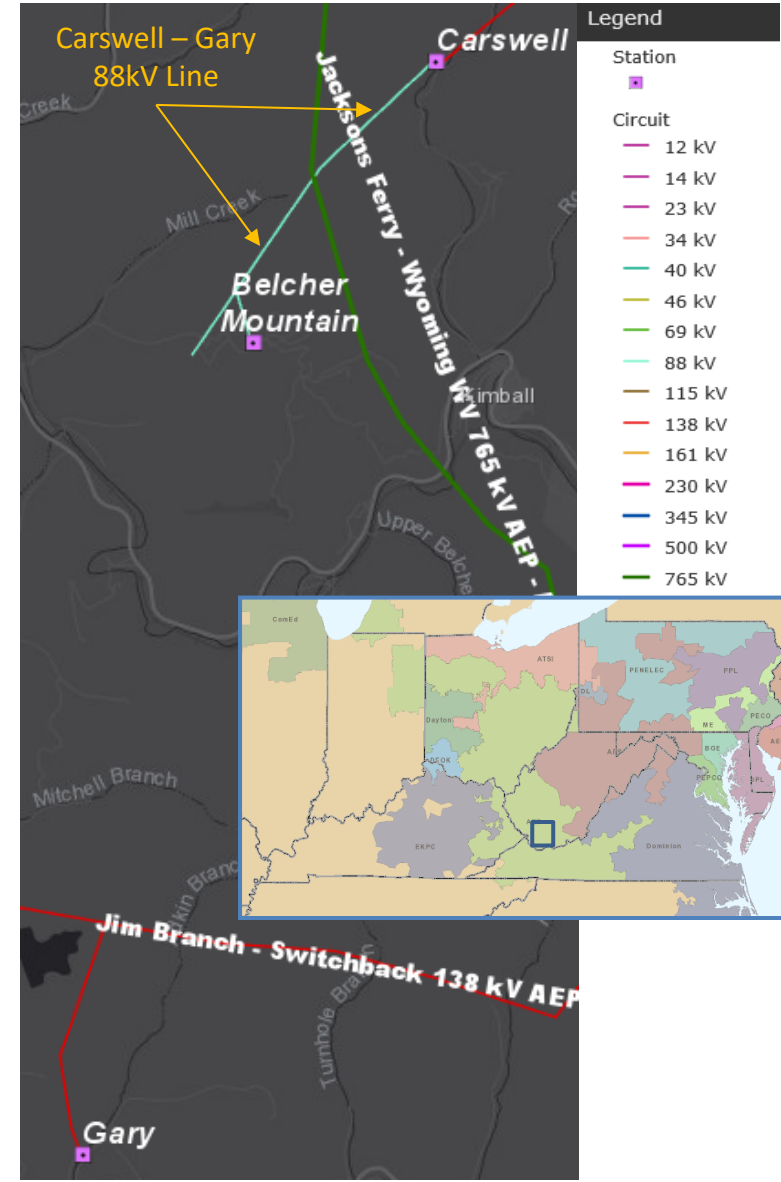
Original Line Construction Type: Wood

Conductor Type: 336,400 ACSR

Momentary/Permanent Outages: 8 Momentary and 5 Permanent

Line Conditions:

- The associated Carswell - Gary 88kV Circuit was retired when the segment from Belcher Mountain to Gary Substations was removed in 2018.
- From January 1, 2015, to November 11, 2018, there were 8 momentary and 4 permanent outages on the Carswell – Gary 88kV Circuit. The momentary outages were due to lightning (7) and station breaker (1) causes. The permanent outages were due to station breaker (2), lightning (1), and vegetation fall-in from outside of AEP ROW (1) causes. These outages caused 969k minutes of customer interruption.
- Since November 11, 2018, there has been 1 permanent outage on the Belcher Mountain – Carswell 88kV Circuit. This outage caused 105k minutes of customer interruption.
- Currently, there are 5 structures with at least one open structural condition, which relates to 42% of the structures on the line. There are currently 8 open structural conditions specifically affecting the crossarms and poles including rot top, insect damage, woodpecker damage, and broken conditions.
- The structures on the Carswell – Gary 88kV Line fail to meet 2017 NESC Grade B loading criteria, fail to meet current AEP structural strength requirements, and fail to meet the current ASCE structural strength requirements.
- The porcelain insulators on the line do not meet current AEP standards for CIFO and minimum leakage distance requirements.



AEP Transmission Zone M-3 Process McDowell County, West Virginia

Need Number: AEP-2022-AP024

Process Stage: Solution Meeting 01/19/2024

Previously Presented: Need Meeting 4/22/2022

Supplemental Project Driver: Equipment Condition/Performance/Risk

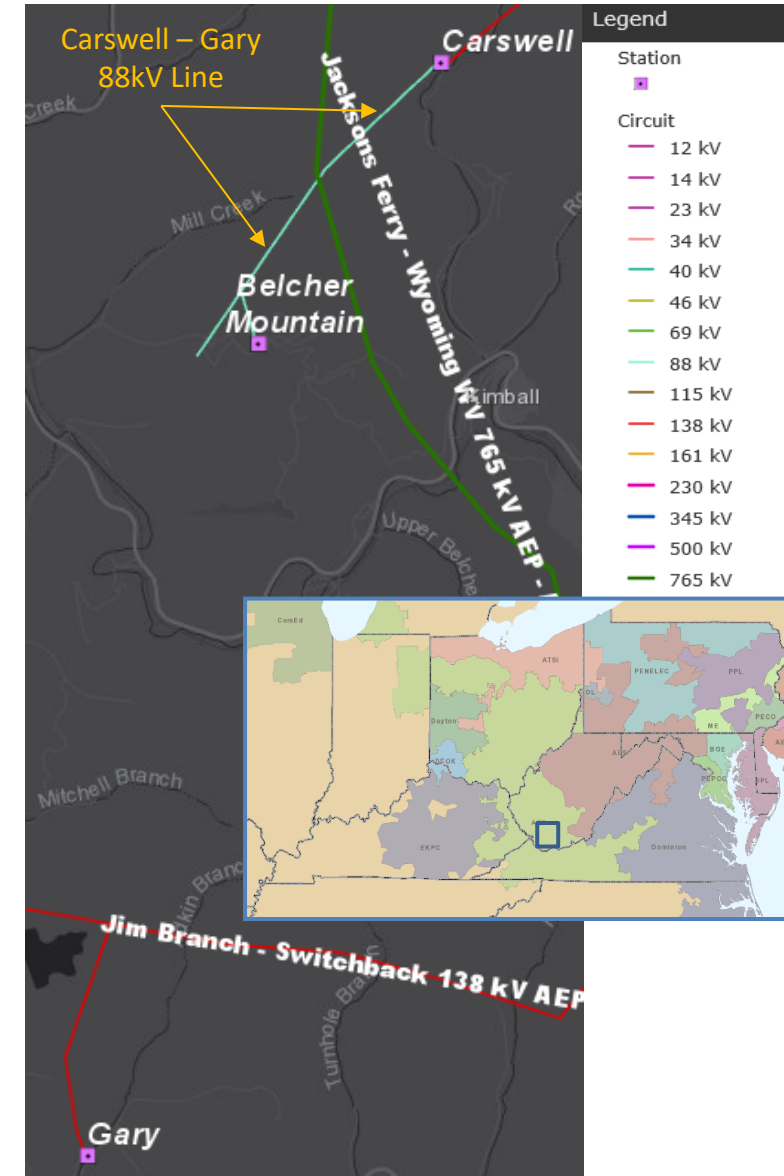
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement Continued:

Line Conditions Con't:

- Customers are radially served at Belcher Mountain by this line from Carswell.
- The butt wrap grounding and typical shield angle is inadequate per current AEP Standards and can cause poor lightning performance. The current grounding system, poor shielding angle, and the electrical strength of the insulators do not meet current AEP and industry accepted criteria, making the line susceptible momentary and permanent outages, affecting customer reliability.
 - The inadequate grounding limits the available path to ground during any type of line fault, increasing the intensity the conductor and related hardware have to withstand during the fault. The reduced electrical strength of the insulators could lead to electrical damage to structures and hardware during a fault if the insulator were to fail from elevated electrical stresses.
 - The line serves a peak load of 4.5 MVA at Belcher Mt. station.



AEP Transmission Zone M-3 Process McDowell County, West Virginia

Need Number: AEP-2022-AP025

Process Stage: Solution Meeting 01/19/2024

Previously Presented: Need Meeting 4/22/2022

Supplemental Project Driver: Equipment Condition/Performance/Risk

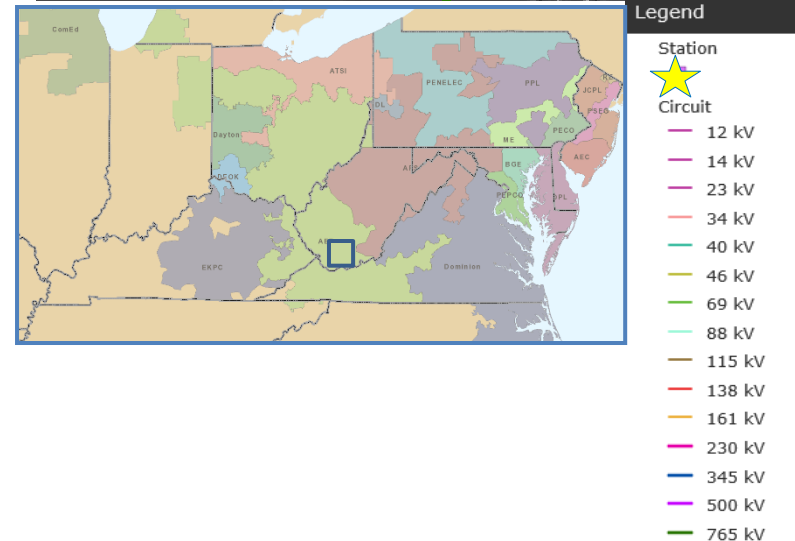
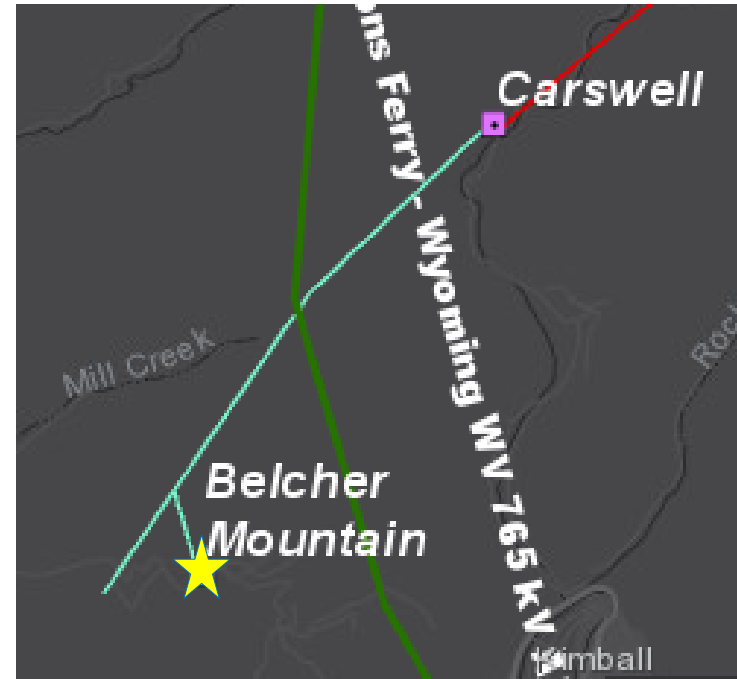
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Belcher Mountain Station:

- The 88/13kV Distribution transformers are 1949 vintage and have low dielectric strength which indicates an increase in particles within the oil, decreasing the ability of the oil to withstand fault events, which can damage the paper insulation. The transformers have poor values of moisture, dielectric strength, and IFT that indicate the dielectric strengths of the insulation systems (oil and paper) are in poor condition, which impairs the units' ability to withstand electrical faults. The transformers have presence of Ethane, Carbon Dioxide, and Carbon Monoxide, along with the indication of overheating faults indicate decomposition of the increasingly brittle and non-thermally upgraded paper insulation.
- The 13kV 1969 vintage circuit breaker A is a PR type, oil filled breaker. This breaker is of 1969 vintage and is without oil containment. This circuit breaker has exceeded the manufacturer's designed number of full fault operations.
- Currently, all 10 relays (100% of all station relays) are in need of replacement. All 10 of these are of the electromechanical type which have no spare part availability and fault data collection and retention. In addition, these relays lack vendor support.
- A small sink hole is developing near the 13kV Bay.
- No remote monitoring of assets is available due to the lack of an RTU.
- Belcher Mountain is the last of two stations that have an operating voltage of 88kV.



AEP Transmission Zone M-3 Process McDowell County, West Virginia

Need Number(s): AEP-2022-AP022, AEP-2022-AP023, AEP-2022-AP024, AEP-2022-AP025

Process Stage: Solutions Meeting 01/19/2024

Proposed Solution:

- A new 138 kV double circuit line extension will be built from the existing Jim Branch – Switchback line between Gary and Thorpe stations to the greenfield Coalfields stations, approximately 2.0 miles, creating an in and out. New right of way is needed from the new tap structure to Coalfields station. The line cost is driven by very steep terrain and the miles of access roads required. The line will require marker balls and helicopter installation due to the valleys and terrain. Estimated Cost: \$13.0M
- The 138kV high side of Coalfields station will be a 138kV straight bus with two automatic MOAB switches. The greenfield station will contain a 138/12 kV 20 MVA transformer with high side circuit switcher. There will be three 12 kV feeders from the station. Distribution work will be required to reconnect the Distribution system to the new Coalfields station. Estimated Cost: \$1.65M
- Work required to tap the existing Jim Branch – Switchback 138kV line asset. Estimated Cost: \$1.8M
- Remote end work required at Trail Fork, Tazewell, Clark Branch and Baileysville stations. Estimated Cost: \$0.38M
- Remove the Transmission station and equipment at Carswell station. Estimated Cost: \$2.86M
- Remove the Carswell 138kV Loop at ~1.4 miles and the Carswell – Gary 88kV Line at ~2.5 miles. Estimated Cost: \$5.15M
- Remove the Distribution station and equipment at Belcher Mountain station. Estimated Cost: \$0.0 (Distribution cost)

Total Estimated Transmission Cost: \$24.84 M

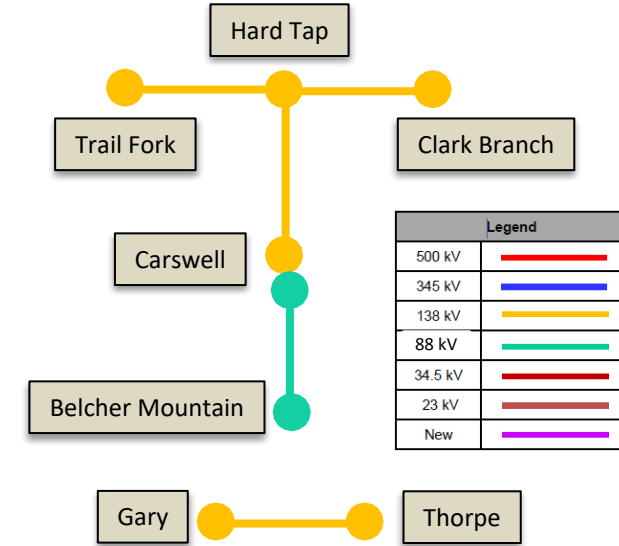
Ancillary Benefits: Consolidation of two Distribution stations into one. Retirement of some of the last 88kV on the AEP system. The Distribution customers will be served from a station that has looped Transmission service. This project also removes a hard tap on the 138 kV system which limits outage response options and presents outage and maintenance challenges.

Alternatives Considered: Rebuild Belcher Mountain station as a brownfield station and retire Carswell station. Rebuild the line assets as 138kV double circuit in and out from the Trail Fork – Clark Branch 138kV line asset to the brownfield Belcher Mountain station to eliminate the hard tap. The cost of investment is similar; however, more line miles would be required to get to the Distribution Station. The solution was chosen based on feedback from Distribution and the benefits offered from a project constructability standpoint. Estimated cost: \$27M

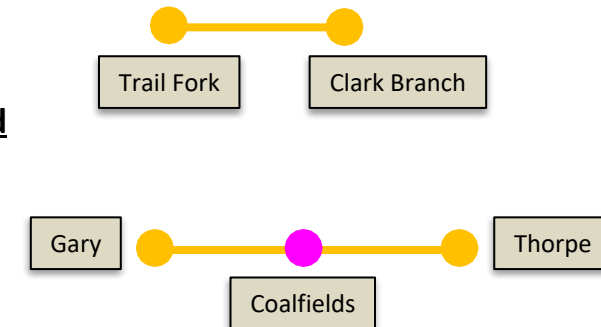
Projected In-Service: 11/1/2028

Project Status: Scoping

Existing



Proposed



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

1/5/2024– V1 – Original version posted to pjm.com

1/8/2024– V2 – Slides #7,# 8, #10, updated bubble diagrams