Sub Regional RTEP Committee: Western
AEP Supplemental Projects

August 19, 2022

Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

AEP Transmission Zone M-3 Process
Sissonville, WV

Need Number: AEP-2022-AP035

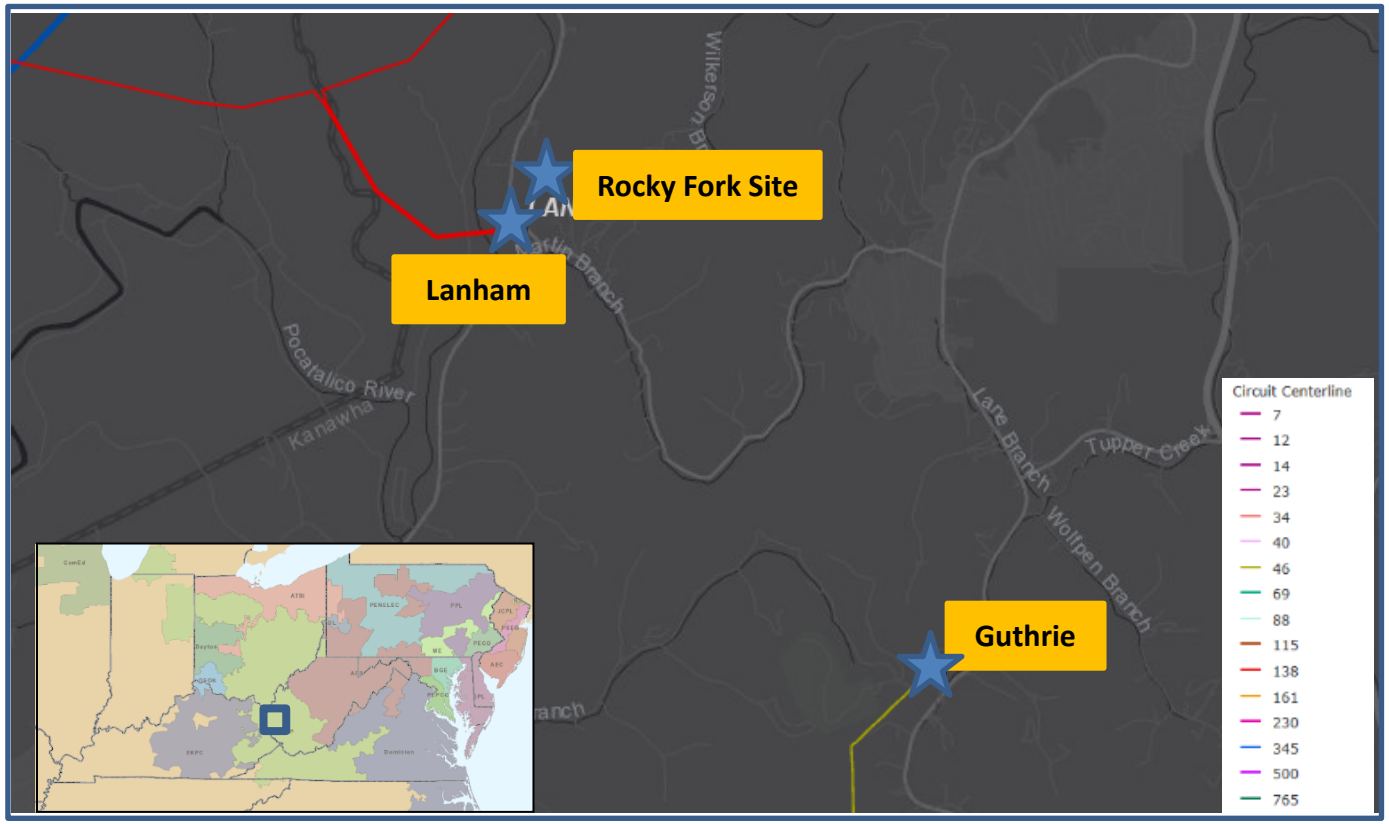
Process Stage: Need Meeting 8/19/2022

Project Driver: Customer Service

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

Problem Statement:

- AEP Distribution has requested new transmission service to a new delivery point in the Rocky Fork Area of West Virginia in order to relieve loading and exposure on various feeders serving the area out of Lanham and Guthrie stations.



AEP Transmission Zone M-3 Process
Muncie, IN

Need Number: AEP-2022-IM010

Process Stage: Need Meeting 8/19/2022

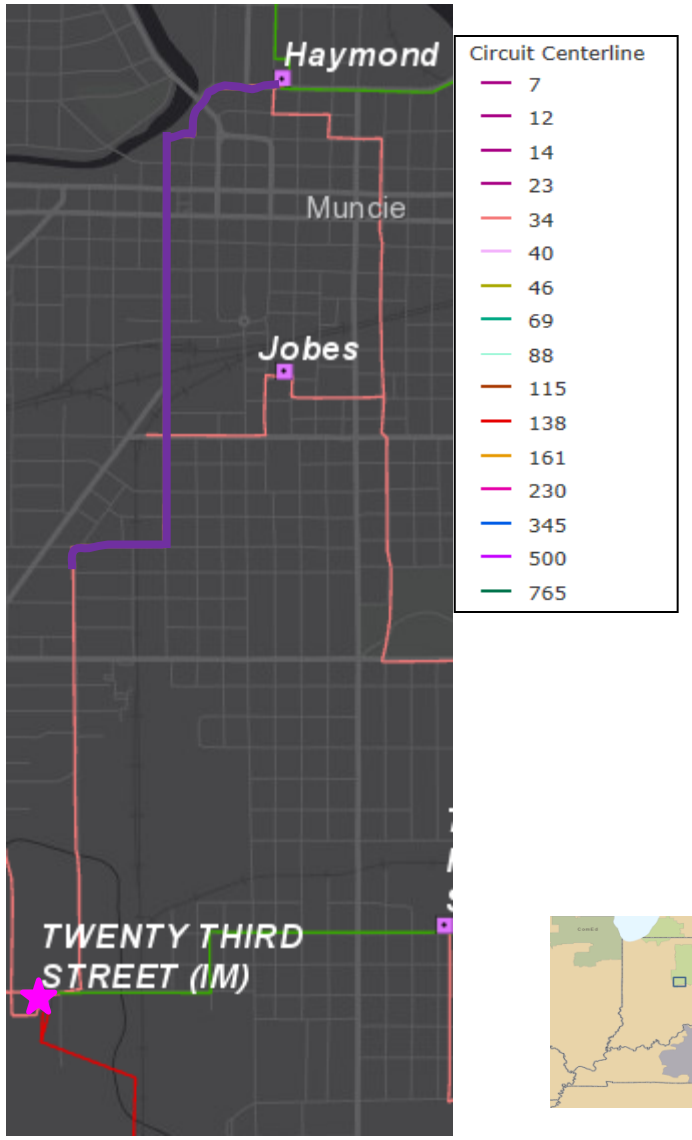
Project Driver: Equipment Material Condition, Performance and Risk

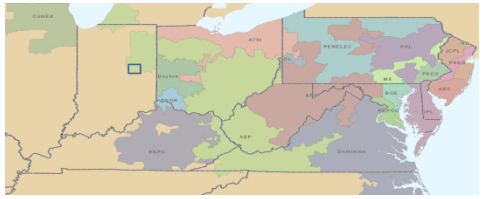
Specific Assumption Reference:
AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions slide 13)

Problem Statement:

Haymond – Twenty Third Street 34.5 kV (Vintage 1969)

- Length of line: 1.53 miles (Overhead and underground)
- Total structure count: 1 dating back to 1947 and 31 installed in 1969.
- Line construction Type:
  - Wood pole structures with porcelain horizontal post insulators
  - 1500 MCM AL cable at end of life expectancy
  - Fiber ducts are deteriorating and sometimes blocked.
  - Conductor Type:
    - 556,500 CM ALUM/1350 19 Dahlia (1969): 0.73 miles
    - 795,000 CM ALUM/1350 (1969): 0.30 miles
    - 1500 MCM AL (1969): 0.5 miles (Underground)
- Momentary/Permanent Outages: 2 (Permanent)
- 5 Year CMI: 90,574
  - Condition Summary:
    - Number of open conditions: 3 structure open conditions. However, additional ground crew assessment identified all assessed structures had some sort of decay beyond normal weather conditions. Based on the ground crew assessment of 5 structures:
      - All structures had 1-2” of decay on the top of the pole.
      - Three structures has ¼” of shell shrinkage.
      - Two structures had some cracking.
      - One structure had a big portion rotted out of the bottom of the pole.
      - The grounding method utilizes butt wraps on every other structure, providing reduced lightning protection for the line.
    - Structures fail NESC Grade B and AEP structural strength requirements.





AEP Transmission Zone M-3 Process
Muncie, IN

Need Number: AEP-2022-IM010

Process Stage: Need Meeting 8/19/2022

Project Driver: Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

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

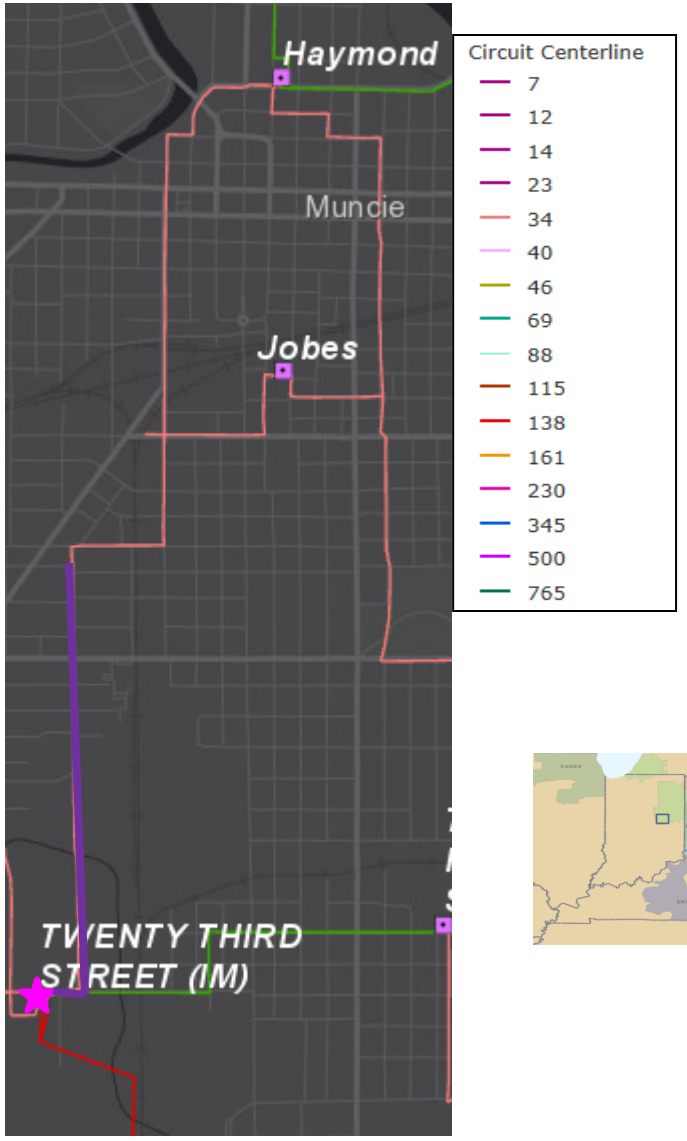
Problem Statement:

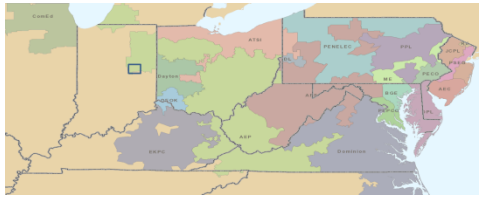
Twenty Third Street – Sampson – General Motors 34.5 kV (Vintage 1947)

- Length of line: 1.09 miles (Overhead and underground)
- Total structure count: 32 dating back to original installation.
- Line construction Type:
    - Wood pole double circuit cross arm configuration structures with one circuit permanently out of service.
    - Conductor Type:
        - 795,000 CM ALUM/1350 (1947)
- Momentary/Permanent Outages: 2 (Permanent)
- 5 Year CMI: 90,574

•Condition Summary:

- Number of open conditions: 10 structure open conditions
- Open conditions include knee/vee brace with a split, two conductor open conditions affecting the plp spice/ dead end (shield wire splice) with improper installation, broken ground lead wire and missing ground lead wire.
- Based on additional ground crew assessment of 6 structures:
    - Moderate decay found on wood poles and cross arms.
    - Pole top decay
    - Insect damage
    - Structure grounding in poor condition. Several broken pole grounds.
- Structures fail NESC Grade B and AEP structural strength requirements.





AEP Transmission Zone M-3 Process
New Albany, Ohio

Need Number: AEP-2022-OH062

Process Stage: Need Meeting 08/19/2022

Project Driver: Customer Service

Service Specific Assumption Reference: AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 12)

Problem Statement:

AEP Ohio has requested to add capacity at Jug Street station, due to continuous load growth in the area. The anticipated peak load is approximately 58 MVA. The requested in-service date is June 2024.

Model: 2026 RTEP

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
Edison Breaker Replacement

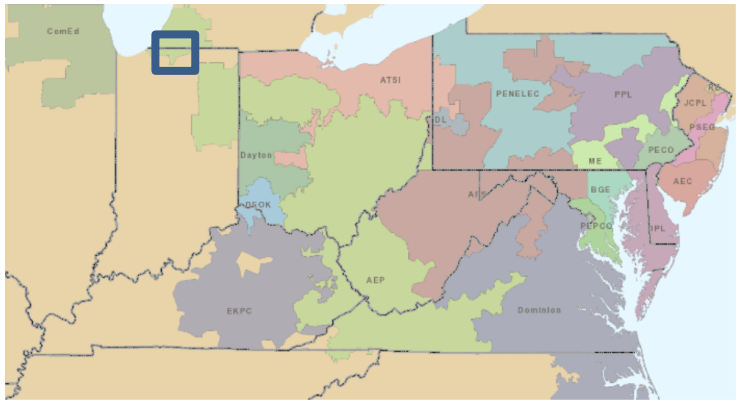
Need Number: AEP-2022-IM009
Process Stage: Solution Meeting 8/19/2022
Previously Presented: Needs Meeting 2/18/2022

Supplemental Project Driver: Equipment Material/Condition/Performance/Risk
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Edison 138kV

- Circuit breakers A, B, and C are 1988 138kV 145-PA type breakers.
  - The 145-PA Type breakers are experiencing marked increases in malfunctions. There have been 437 recorded malfunctions of this model type on the AEP system. The most common issues are related to loss of SF6 gas and mis-operations. The expected life of the bushing gaskets and door inspection port seals is 25 years. Seals that are no longer adequate can cause SF6 leaks to become more frequent. Low SF6 pressure in the breaker reduces the ability of the breaker to correctly interrupt a fault. Additionally, low pressure alarms and SF6 leaks lead to increased maintenance costs. The manufacturer provides no support or parts for this model of circuit breakers. Finally, SF6 leaks impact the environment.
  - Circuit breaker C has experienced 12 fault operations, which is over the manufacturer's recommendation of 10.



AEP Transmission Zone M-3 Process
Edison Breaker Replacement

Need Number: AEP-2021-IM009

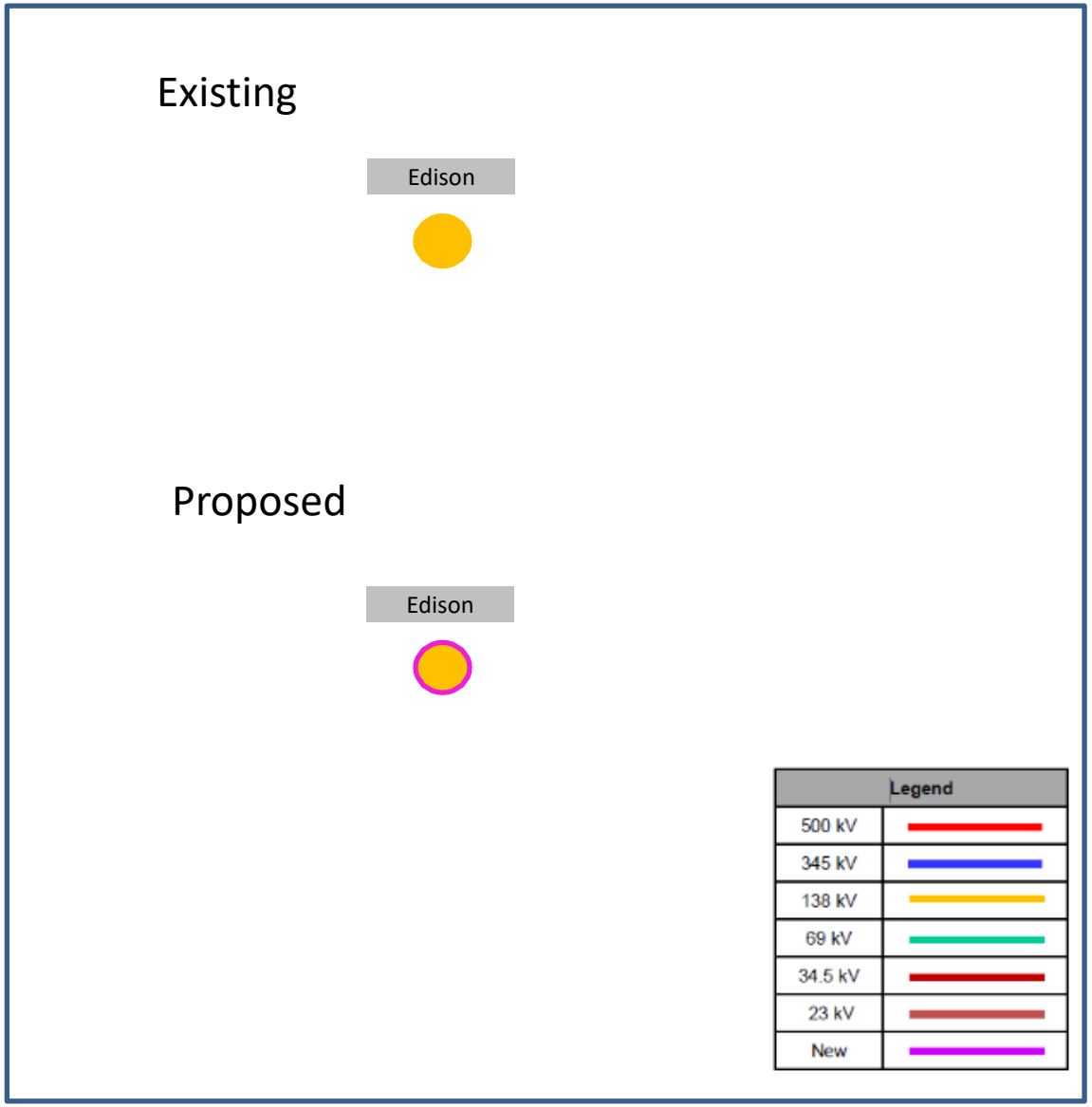
Process Stage: Solution Meeting 08/19/2022

Proposed Solution:

Replace 138kV circuit breakers A, B, and C with 3000A 40kA breakers at Edison station.
Estimated Cost: $1.18M

Projected In-Service: 3/31/2027

Project Status: Scoping



AEP Transmission Zone M-3 Process
Fremont, Ohio

Need Number: AEP-2021-OH021

Process Stage: Solutions Meeting 8/19/2022

Previously Presented: Needs Meeting 11/19/2021

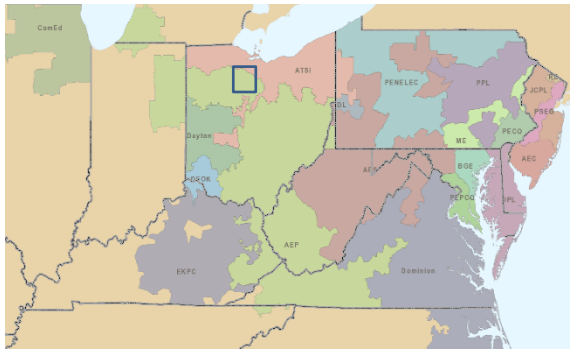
Supplemental Project Driver: Operational Flexibility, and Customer Service

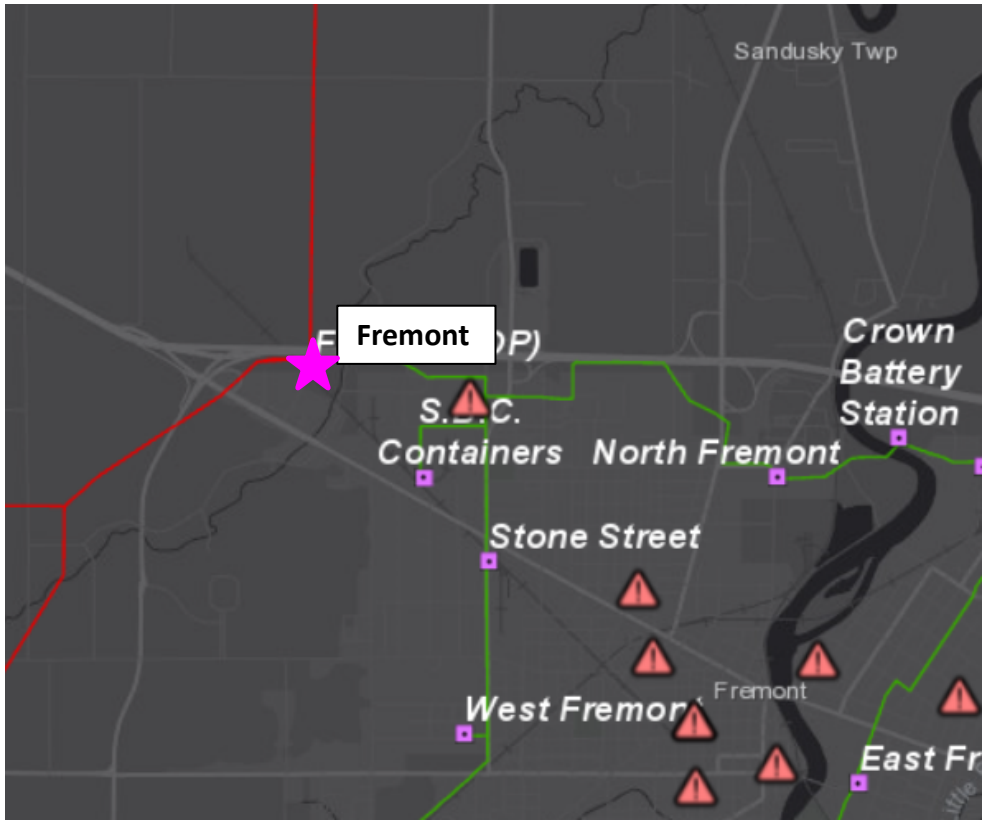
Specific Assumption Reference:
AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions slide 8)

Problem Statement:

Circuit Breaker: C

- Breaker Age:
  - 1988
- Interrupting Medium: (Oil)
- Fault Operations:
  - Number of Fault Operations: 43
  - Manufacturer recommended Number of Operations: 10
- Additional Breaker Information:
  - These breakers are oil filled without oil containment; oil filled breakers have much more maintenance required due to oil handling that their modern, SF6
  - The manufacturer provides no support for this family of circuit breakers and spare parts are increasingly more difficult to obtain. This model family has experienced major malfunctions associated with their hydraulic mechanism, including low-pressure readings, hydraulic leaks, pump lockouts, and failure to shut off. These mechanism malfunctions have led to several failures to close and other types of mis-operations across the AEP system.
- The 138kV line MOAB "W" toward West Fremont is in need of replacement due to obsolete contacts and a broken insulator.

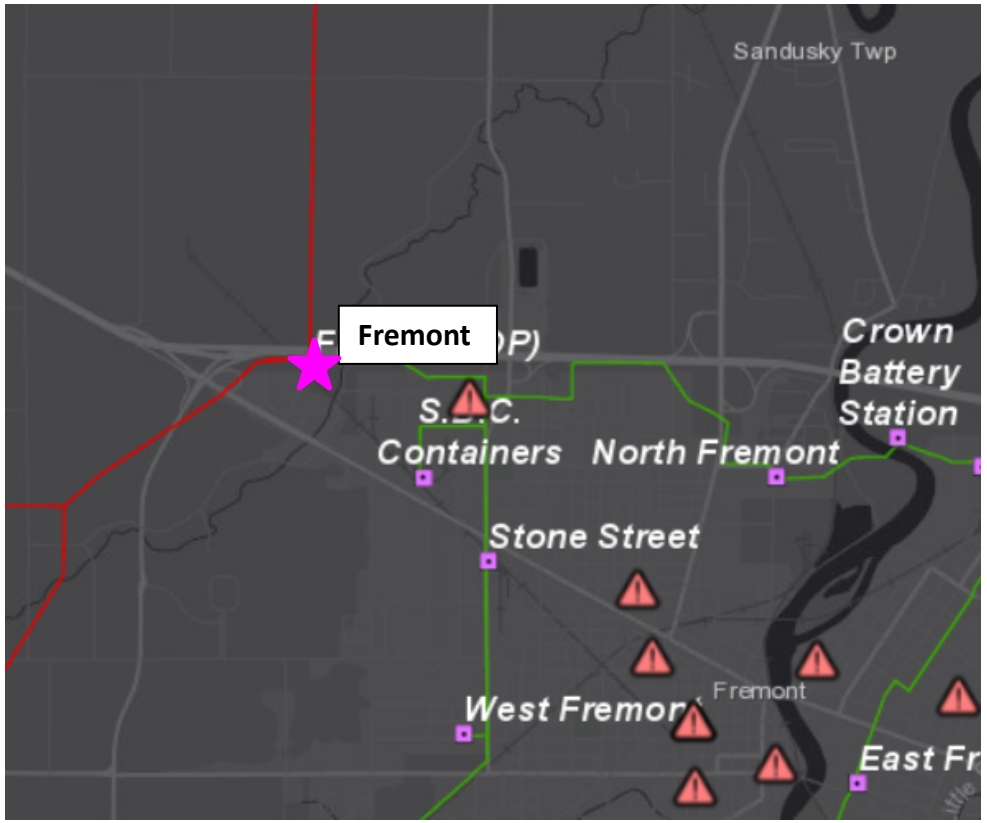




Problem Statement Continued:

Relays:

- 52 of the 60 relays (87% of all station relays) are in need of replacement. 42 of these are of the electromechanical type and 1 of the 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. There are 8 microprocessor based relays commissioned between 2004 and 2011 and one DPU unit with firmware that is no longer supported.



AEP Transmission Zone M-3 Process
Fremont, Ohio

Need Number: AEP-2021-OH021

Process Stage: Solutions Meeting 8/19/2022

Proposed Solution:

- Install a new 69 kV 3000A 40kA breaker to replace breaker C and associated terminal equipment at Fremont on the line towards the City of Clyde. Install a new 138kV 1200A MOAB switch to replace MOAB W toward West Fremont. Install new DICM. Station will need to be expanded to accomplish work. **$3.48 M**

Cost estimate: $3.48 M

Alternatives Considered:

This project is addressing additional needs at Fremont station that were not covered in the upgrades as part of Baseline upgrade B3271 in order to address all the station needs simultaneously. Considering the baseline project has been approved and is moving forward, no other cost effective alternates were identified.

Projected In-Service: 6/1/2025

Project Status: Engineering

Existing:

Proposed:

AEP Transmission Zone M-3 Process
Findlay, OH

Need Number: AEP-2021-OH030

Process Stage: Solution Meeting 08/19/2022

Previously presented: Need Meeting 05/21/2021

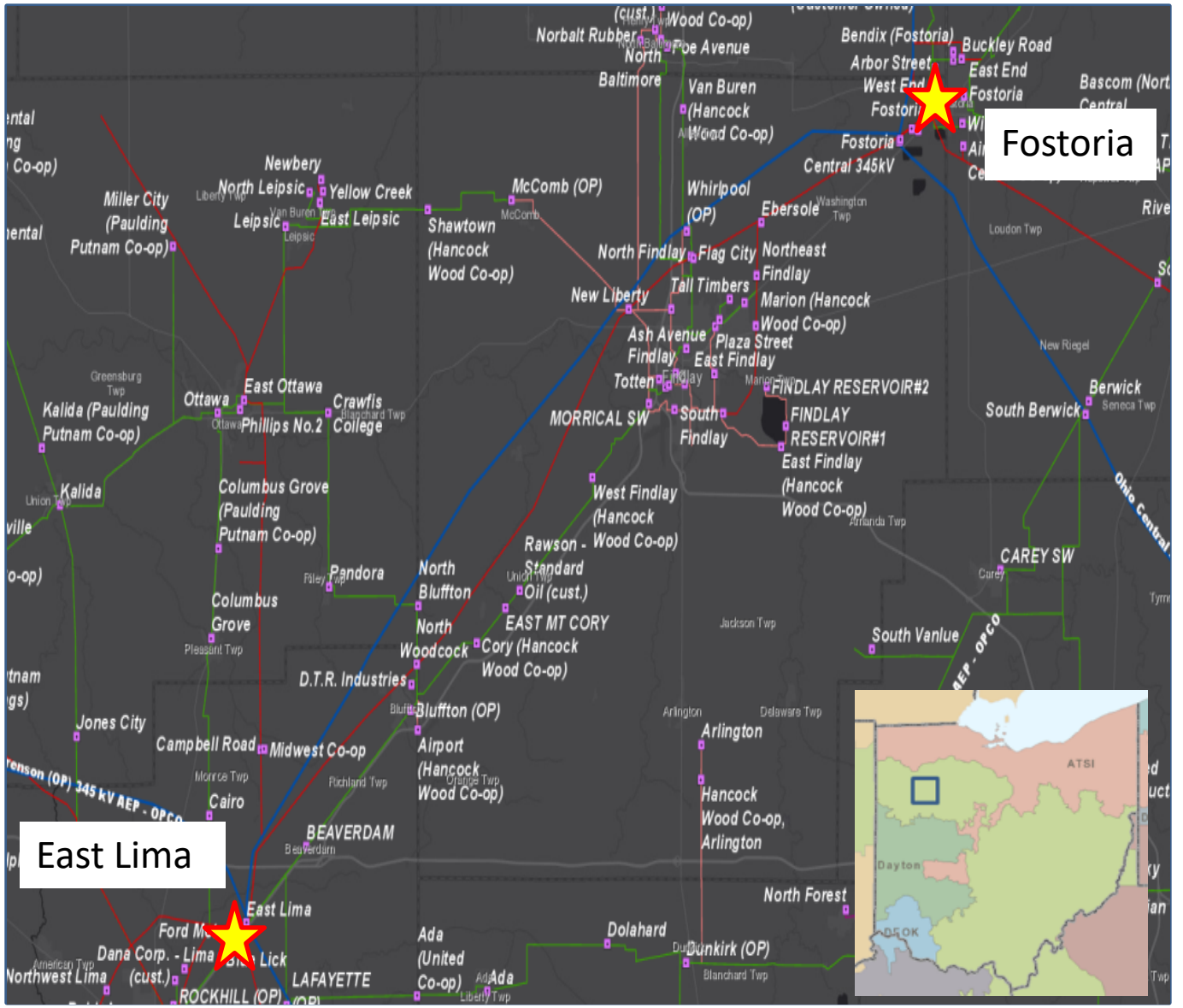
Project Driver: Equipment Material/Condition/Performance/Risk

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13), AEP Presentation on Pre-1930s Lines

Problem Statement:

Fostoria – East Lima 138kV

- **Original Construction Date:** 1924
- **Length:** 41.26 miles
- **Total structure count:** 205
- **Original Line Construction Type:** Double circuit steel lattice towers with vertical insulators
- **Conductor Types**: 397,500 CM ACSR 30/7 (Lark) & 336,400 CM ACSR 30/7 (Oriole)
- **Outage History:** Since 2015, there have been 2 permanent outages and 6 momentary outages. The Ebersole – New Liberty Circuit has accounted for 19,640 customer minutes of interruption for 326 distribution customers at the Flag City Substation.
- **Condition Summary**: Currently, there are 44 structures with at least one open condition, which relates to 22% of the structures on this line.



AEP Transmission Zone M-3 Process
Findlay, OH

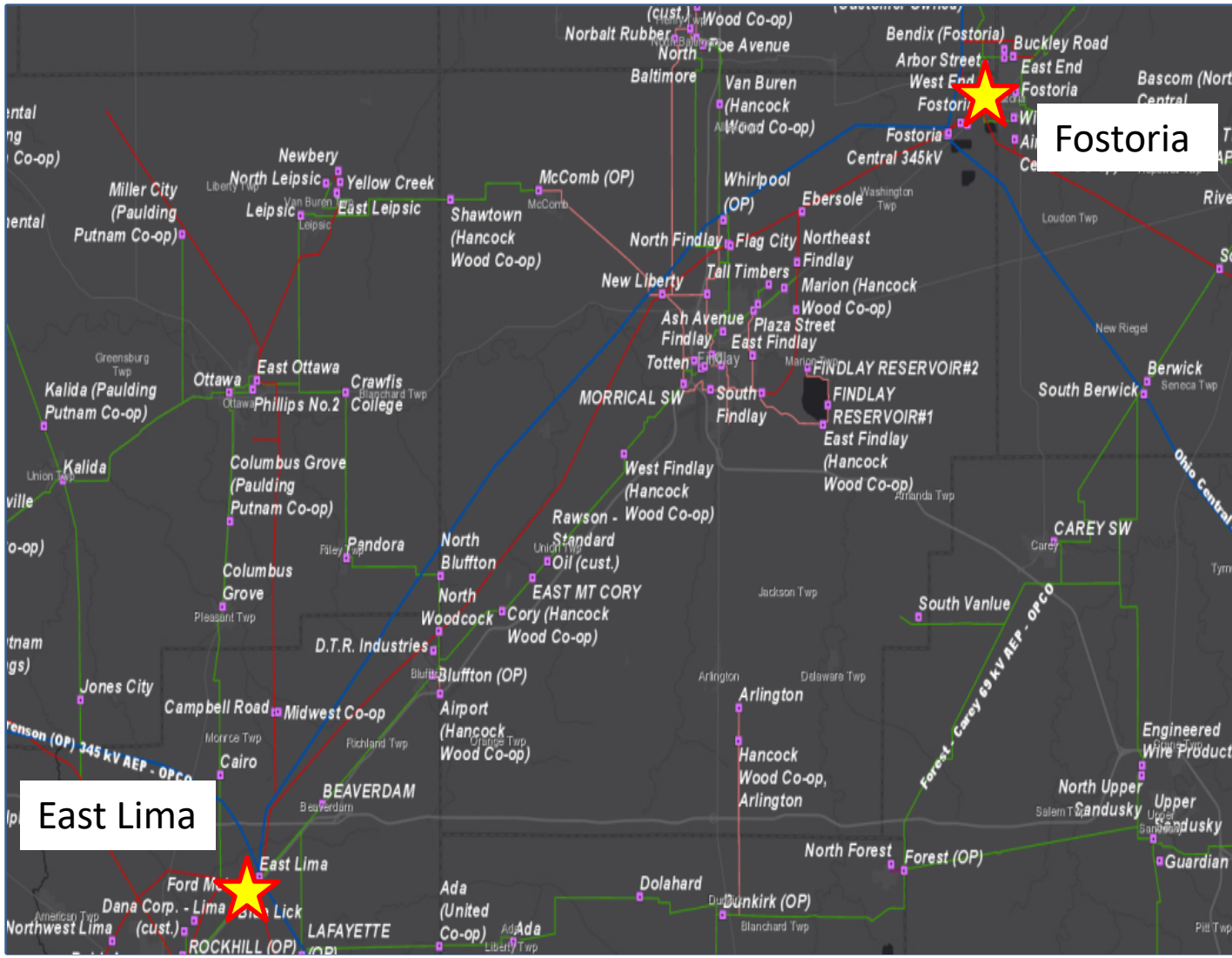
Problem Statement (contd.):

Additional Information: Multiple issues are starting to emerge on this line indicating accelerated deterioration phase of its life. Structures inspected either aerially or by ground crews showed heavy visible corrosion on conductors and shield wire, surface rust on towers, insulator end fittings and dampers.

Additional Info on Insulator & Hardware Corrosion:

- Section Loss: The connecting elements including the tower attachment hole and the insulator hook have experienced serious cross-section loss due to corrosion and wear. This loss of metal cross-section significantly reduces the capacity of the connection
- Corrosion: The insulator caps and connecting hardware have experienced heavy to complete loss of galvanizing. When the protective galvanized coating is gone or significantly compromised, the bare steel corrodes at an accelerated rate
- Tower members with corrosion and damage. Lattice tower structures have little structural redundancy. A failure of one member of the structure will impact the integrity of the structure and may cause the entire tower to collapse.

- **Customer Impact:** This double-circuit line provides significant support to the Findlay area 34.5 kV and 69 kV systems via transformers at North Woodcock, New Liberty, North Findlay, and Ebersole and Flag City. Simultaneous outages at both ends of the double-circuit line would likely lead to a major area-wide outage.
- **Risk:** Significant deterioration results in loss of strength and performance posing a significant risk of failure under conditions the assets should be able to withstand.
  - May cause frequent and extended outages
  - May create significant economic losses
  - May endanger public safety



AEP Transmission Zone M-3 Process
Fostoria - East Lima Rebuild Project

Need Number: AEP-2021-OHO30
Process Stage: Solutions Meeting 08/19/2022

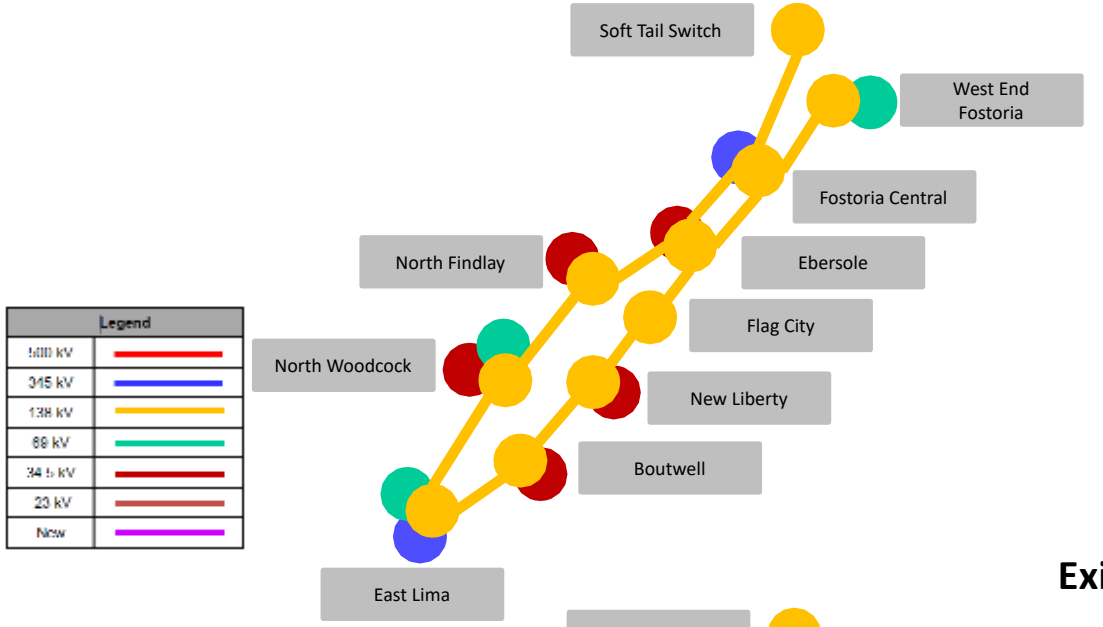
Proposed Solution:

- **Fostoria - East Lima 138:** The 41.3 mile long line will be rebuilt using double circuit 795 ACSR Drake conductor. OPGW shield wire will be installed. Approximately one mile of line is being considered for greenfield construction to avoid encroachments and ROW challenges. The Boutwell, Flag City and Ebersole stations were installed recently, these line cut-ins will not be rebuilt. **Estimated Cost: $95.9 M**
- **North Findlay - N Main & North Findlay - Findlay 69kV lines:** The North Findlay - N Main and North Findlay - Findlay 69kV lines will be modified for the Fostoria - East Lima 138kV line crossing. **Estimated Cost: $0.08M**

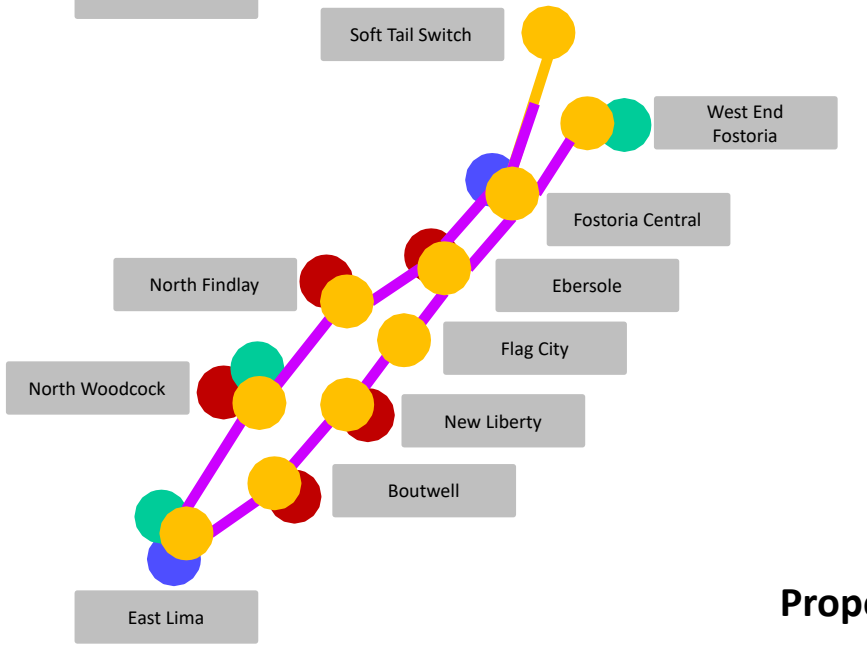
Total Estimated Transmission Cost:$95.98M

Alternatives Considered:
The Fostoria - East Lima line serves as an important source to the Woodcock, Lima, Findlay and Fostoria sub-transmission systems. The line has been selected as a POI for several IPPs. Retirement of the line is not a viable alternative.

Projected In-Service: 09/15/2026
Project Status: Scoping



Existing



Proposed

AEP Transmission Zone M-3 Process
Johnson County, Kentucky

Need Number: AEP-2022-AP004

Process Stage: Solutions Meeting 08/19/2022

Previously Presented: Needs Meeting 02/18/2022

Supplemental Project Driver: Equipment Condition/Performance/Risk

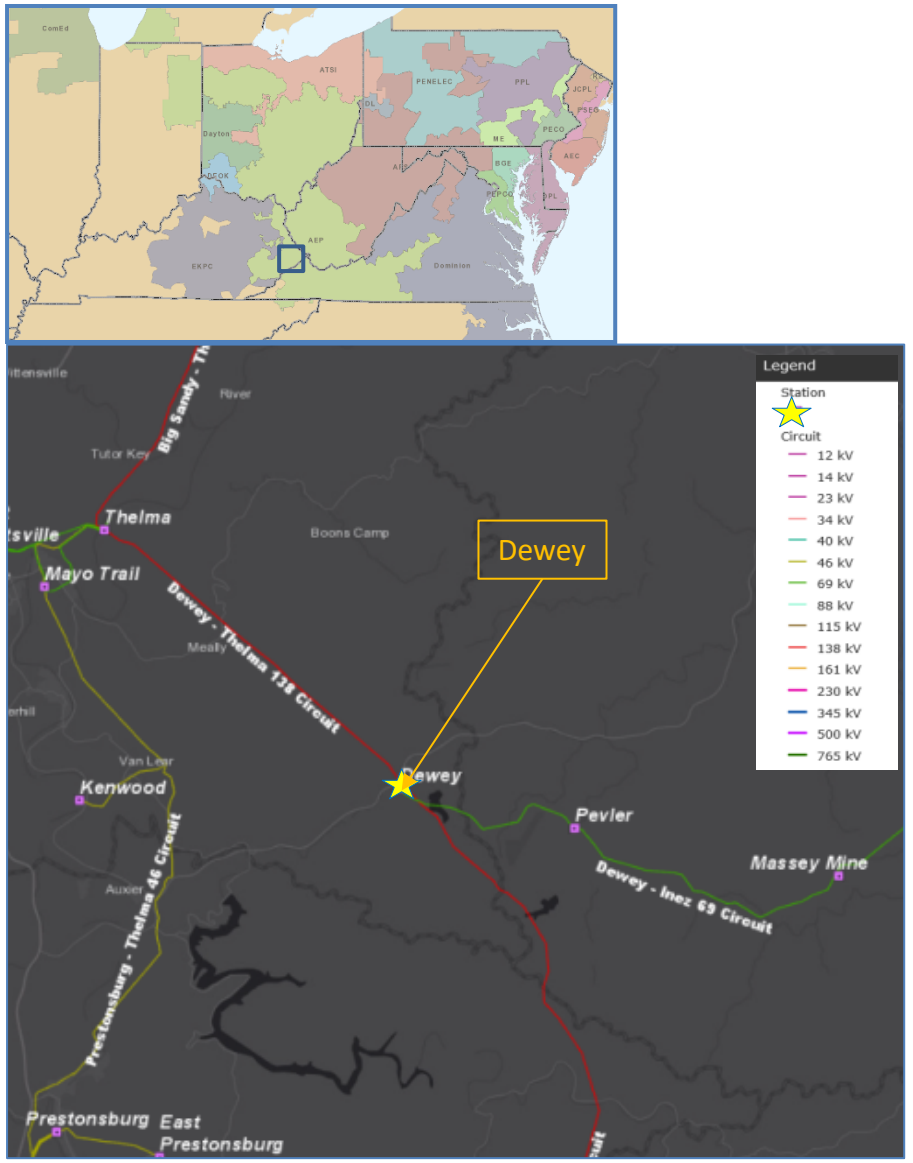
Specific Assumption Reference:

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

Problem Statement:

Dewey substation Needs:

- 138kV Circuit Breaker B:
  - 1992 Vintage, number of fault ops: 55
  - The 138kV transmission owned circuit breaker, CB-B, is a 145-PA-40-20B type, SF6 filled breaker. As of May 11, 2020, there have been 437 recorded malfunctions of this 145-PA model family on the AEP System. The most common issues are related to loss of SF6 gas and mis-operations. The expected life of the bushing gaskets and door inspection port seals is 25 years; this unit has reached this age. Seals that are no longer adequate cause SF6 leaks to become more frequent. SF6 leaks impact the environment. The manufacturer provides no support for this family of circuit breakers and spare parts are not available.
- Relaying
  - Currently, 21 of the 34 relays (62% of all station relays) are in need of replacement. 21 of these are of the electromechanical type which have significant limitations with regards to spare part availability and fault data collection and retention.



AEP Transmission Zone M-3 Process
Johnson County, Kentucky

Need Number: AEP-2022-AP004

Process Stage: Solutions Meeting 08/19/2022

Proposed Solution:

At Dewey substation:

- Replace 138kV CB B towards Thelma with new 138kV 40kA circuit breaker. Provide new DICM with new relays for all equipment at station so that existing control house can be removed. Upgrade station service. **Estimated Cost: $2.40 M**
- Provide Transition fiber via underground from the existing Control House to the new DICM at Dewey Station. Retire existing fiber. **Estimated Cost: $0.18 M**

At Thelma substation,

- Remote end relaying to replace line protection for Breaker A towards (Dewey) to match upgrade at Dewey Station. Provide MOS on existing 138kV HS of transformer XF #1 & #3 to provide additional control to stability system. **Estimated Cost: $0.40 M**

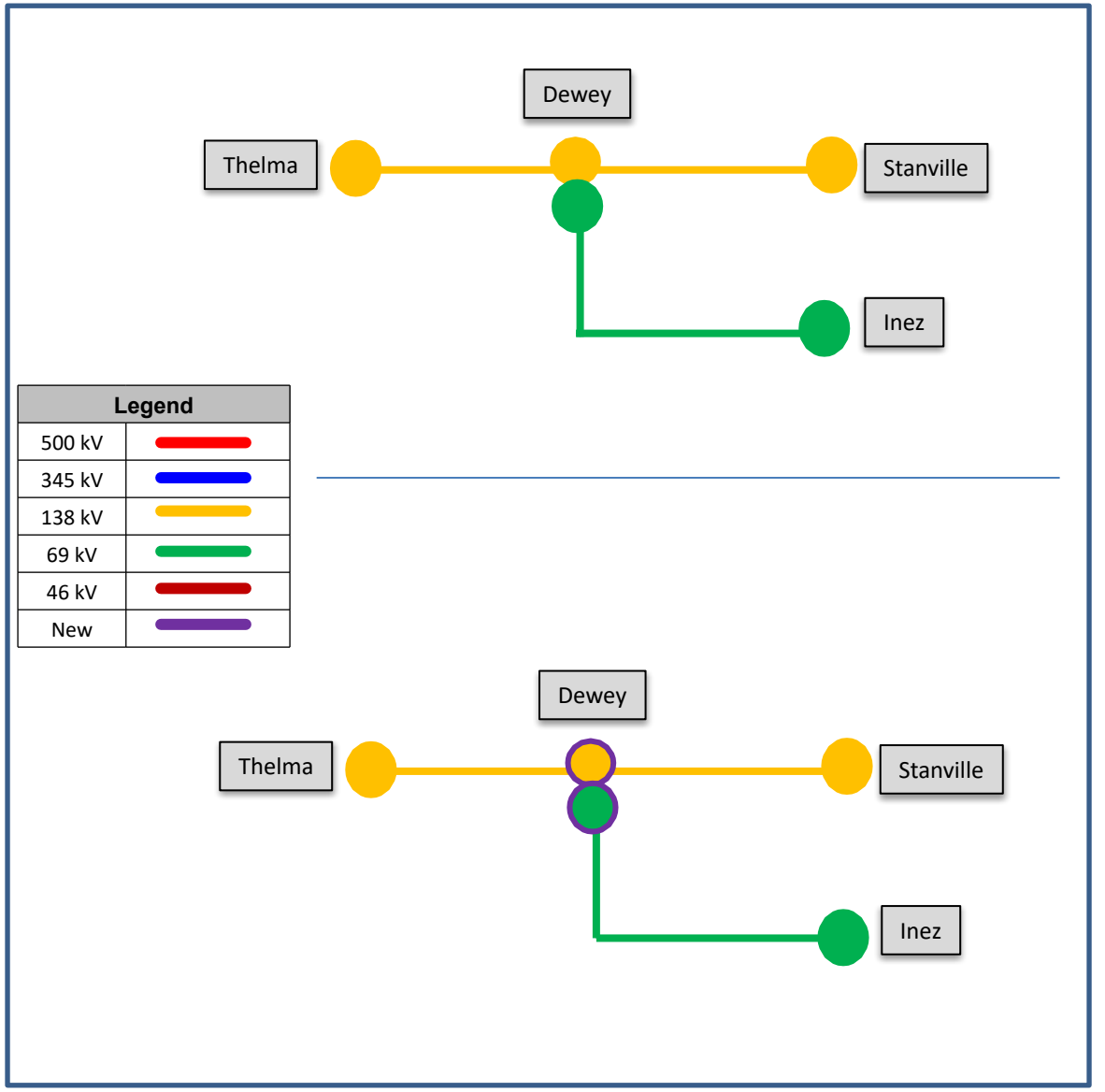
Total Estimated Transmission Cost: $2.98 M

Alternatives Considered:

- Rebuild Dewey substation in clear. Install a 4-138kV Ring bus in a source load source load configuration. Install new DICM. Re-route the transmission lines to the new substation site. Due to increased cost and space availability at the existing station location, this alternative was not chosen. Estimated Cost: $14 M

Projected In-Service: 12/01/2025

Project Status: Scoping



AEP Transmission Zone M-3 Process
Johnson County, Kentucky

Need Number: AEP-2022-AP005

Process Stage: Solution Meeting 08/19/2022

Previous Stage: Needs Meeting 02/18/2022

Supplemental Project Driver: Equipment Condition/Performance/Risk

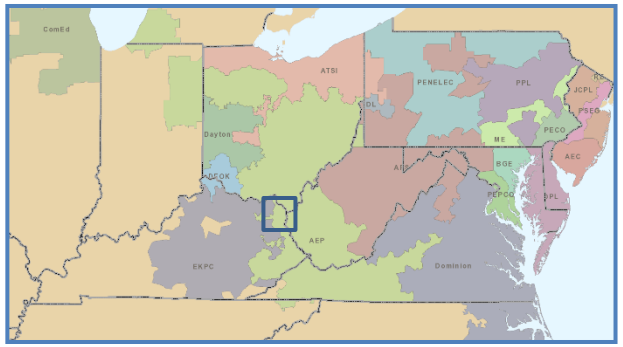
Specific Assumption Reference:

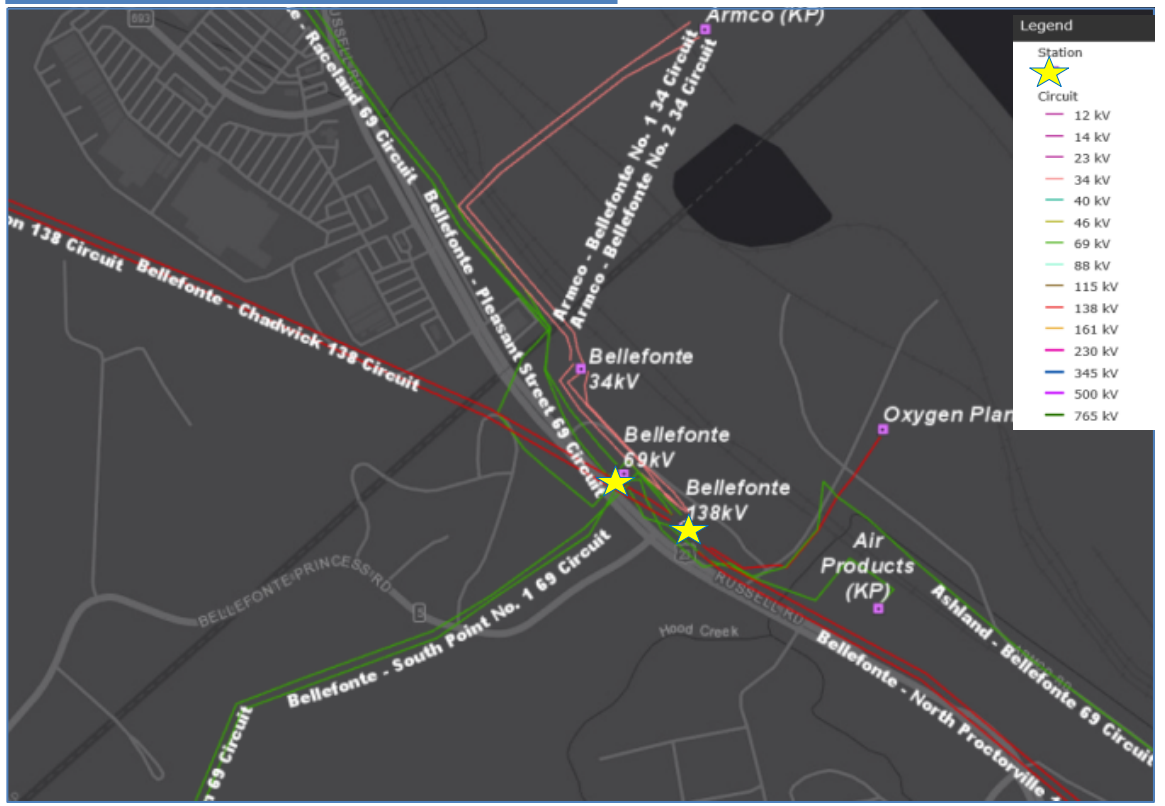
AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Bellefonte 138kV Yard:

- 138/34kV 45MVA Bank #1:
  - 1950s Vintage, originally manufactured in 1951,
  - The dielectric strength of the overall insulation system (oil and paper) is in poor condition, which impairs the unit's ability to withstand electrical faults.
  - The rising and elevated levels of carbon dioxide, indicate increased decomposition of the paper insulation materials. The presence of carbon dioxide indicates decomposition of the increasingly brittle, non-thermally upgraded paper insulation that impairs the unit's ability to withstand future short circuit or through fault events.
  - The high side bushings have seen increased capacitance, indicative of capacitive layer deterioration. The low side bushings lack sufficient dielectric testing data and were commissioned in 1996. The low side bushings are on the recommended replacement list due to the population being advanced in age and degradation, leading to high risk of violent failures from arcing through the ground sleeve.
  - The majority of this family of bushings were manufactured pre-1952. As a bushing ages, O-rings, gaskets, and seals may become more brittle, which may result in moisture ingress. The change in high side bushing dielectric data, the low side bushing type, and the age of all the bushings indicates these bushings are at a greater risk of failure. Failure of a bushing may cause a failure or loss of service of the transformer.
  - Active Oil leaks.
- 138/69-34kV 196 MVA Bank #2:
  - 1970s Vintage, originally manufactured in 1970,
  - Low side bushings have Capacitive layer deterioration.
  - This unit has severe nitrogen leaks. There are racks installed with manifolds in order to keep the nitrogen pressure on this transformer. This unit also has active oil leaks. One third of the fans on this unit have failed.

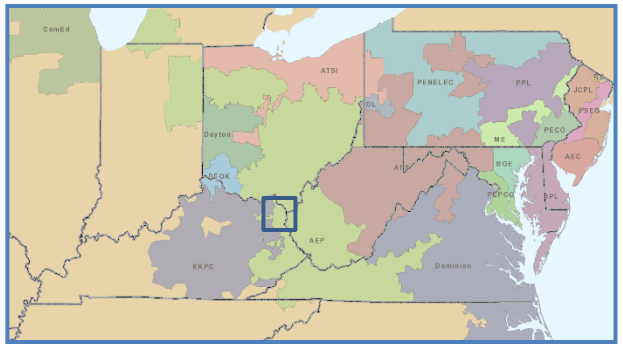


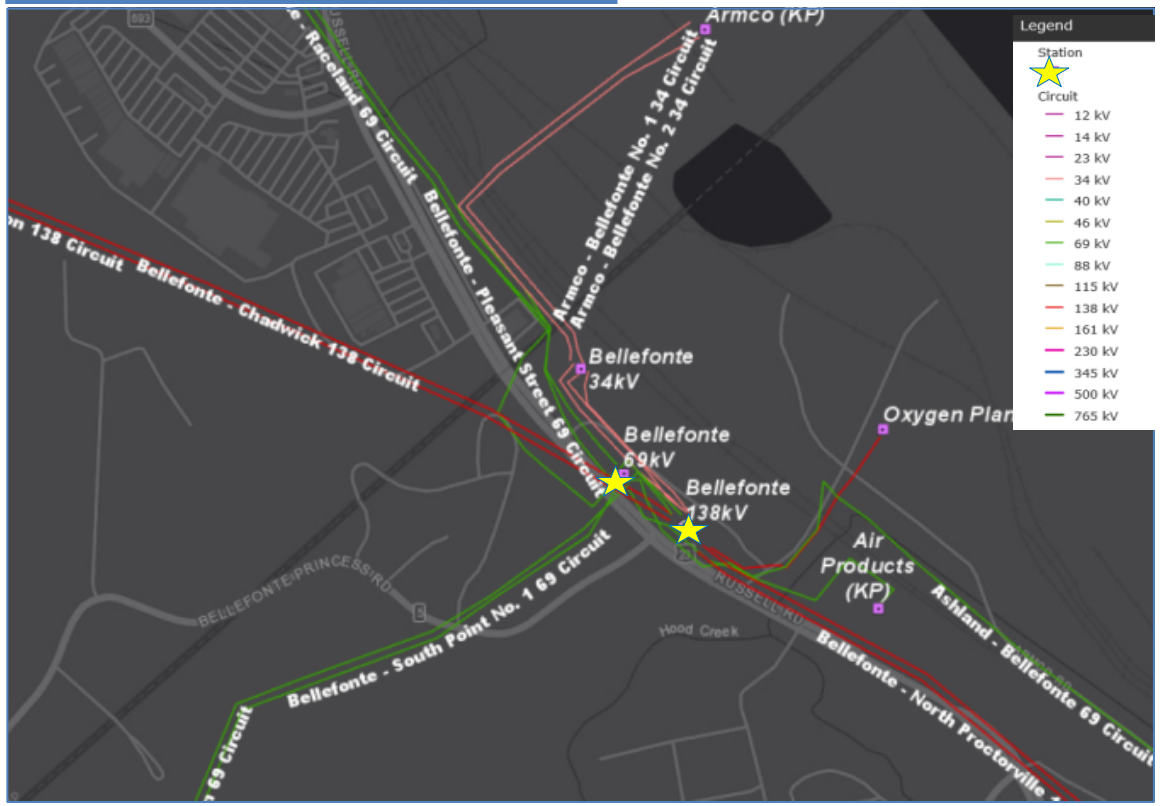


AEP Transmission Zone M-3 Process
Johnson County, Kentucky

Bellefonte 138kV Yard (cont):

- 138/69-34kV 115MVA Bank #5:
  - 1960s Vintage, originally manufactured in 1961,
  - Unit's paper insulation and lack of thermally upgraded paper insulation indicate higher Short circuit. As the insulating paper materials age, they become brittle. This increasingly brittle, non-thermally upgraded paper insulation impairs the unit's ability to withstand future short circuit or through fault events.
  - Elevated levels of acetylene indicates increased decomposition of the paper insulating materials. The presence of acetylene indicates electrical discharge faults of low energy have occurred within the main tank causing electrical breakdown of the unit.
  - This unit has severe nitrogen leaks. There are racks installed with manifolds in order to keep the nitrogen pressure on this transformer. This unit also has active oil leaks.
- 138/12kV 20MVA Bank #6:
  - 1970s Vintage, originally manufactured in 1971,
  - Unit's paper insulation and lack of thermally upgraded paper insulation indicate higher Short circuit. As the insulating paper materials age, they become brittle. This increasingly brittle, non-thermally upgraded paper insulation impairs the unit's ability to withstand future short circuit or through fault events.
  - There is an upward trend in the insulation power factor indicating an increase in particles within the oil. The overall dielectric strength of the insulation system (oil and paper) is in declining health, which impairs the unit's ability to withstand electrical faults.
  - This unit has active oil leaks. One quarter of the fans on this unit have failed.
- Relaying 138 kV Yard:
  - 97 of the 110 (88%) relays at the 138kV yard station are in need of replacement.
  - 76 are electromechanical, 3 are static and 18 relays are microprocessor type.
  - The electromechanical type and Static type relays that have significant limitations with regards to spare part availability and fault data collection and retention. In addition, these relays lack vendor support. Where as the microprocessor relays that are of legacy design and/or utilize legacy firmware





AEP Transmission Zone M-3 Process
Johnson County, Kentucky

Bellefonte 69kV Yard:

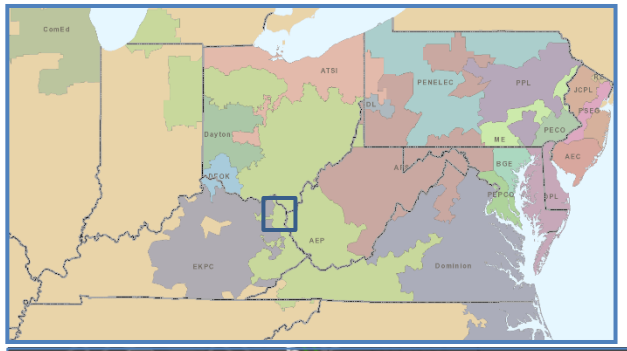
69kV circuit breakers AB, C, G, I, JJ and Z are FK type oil filled breaker, without oil containment.

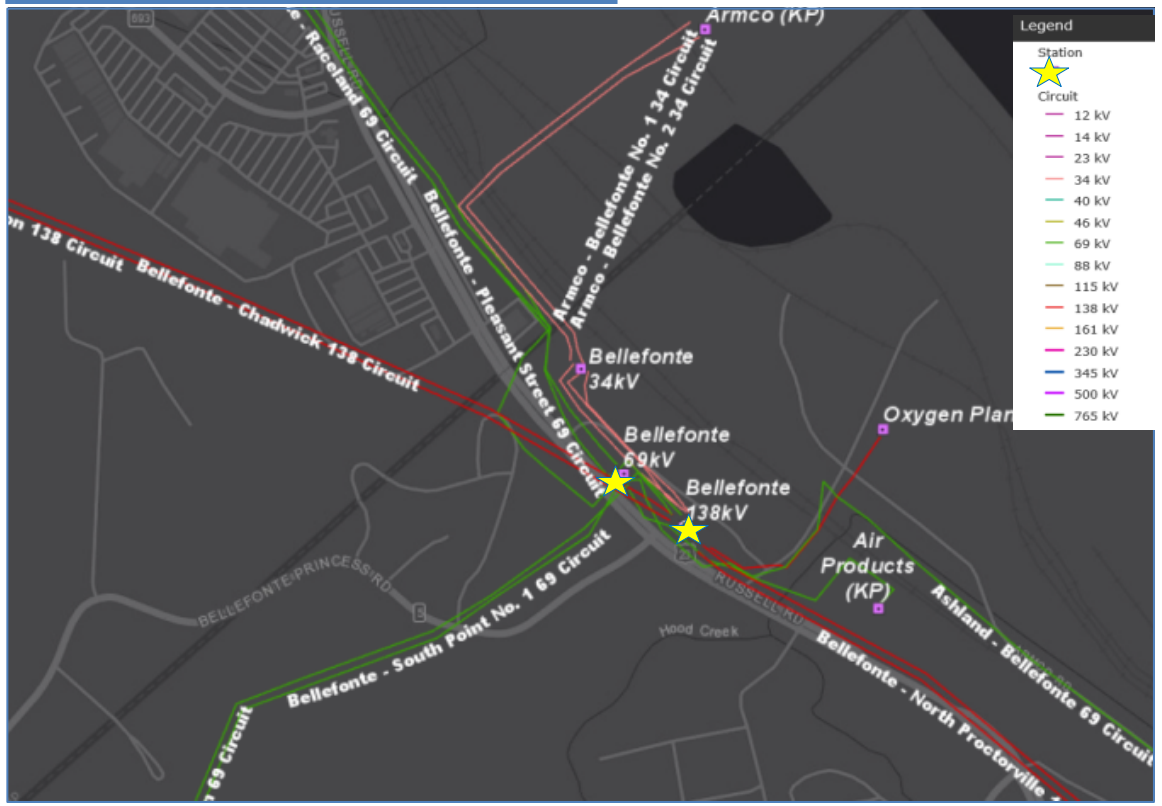
- As of May 25, 2021, there are 20 remaining FK-72.5-27000-10 circuit breakers on the AEP System, including the 6 at this station. GE provides no support for this fleet of circuit breakers and spare parts are increasingly more difficult to obtain; components are often taken from out of service units with remaining usable parts. Oil filled breakers need more maintenance due to the oil handling required.
- A common failure mode documented in AEP malfunction records are compressor failures and valve defects, which cause low pressure and oil leaks. Another failure mode includes trip or reclose failures, caused primarily by spring latching and charging motor component failures. In addition, these oil breakers have a lot of oil contamination from aging gaskets allowing moisture and other particle ingress.
- Circuit Breakers AB, C, G, I, JJ, and Z are 1970s vintage, manufactured in 1971, with Fault Ops: 1, 23, 8, 60, 57, 17 respectively

69kV circuit breakers H and T CF-48-69-2500 type oil filled breaker, without oil containment.

- Bus Tie Breaker H: 1960s vintage, Manufactured in 1965, Type: Oil , Fault Ops: 3,
- Circuit Breaker T: 1960s vintage, Manufactured in 1967, Type: Oil , Fault Ops: 1,
- There is no vendor support for this family of circuit breakers and spare parts are increasingly more difficult to obtain.
- This model family has experienced major malfunctions associated with their OA-3 hydraulic mechanism, which includes low-pressure readings, hydraulic leaks, pump lockouts, and failure to shut off. These mechanism malfunctions have led to several failures to close and other types of mis-operations across the AEP fleet.

69kV circuit switcher KK is a Mark V type , without gas monitor. The neutral shift device is heavily corroded.





AEP Transmission Zone M-3 Process
Johnson County, Kentucky

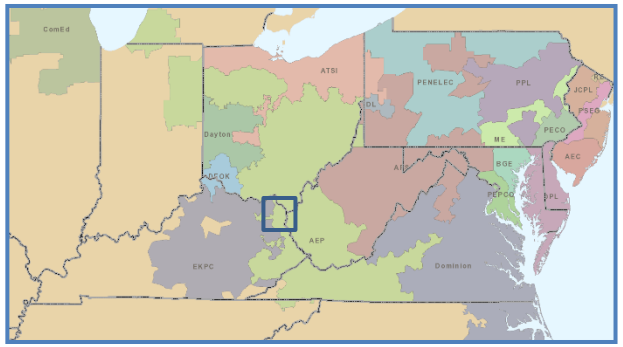
Bellefonte 69kV Yard (cont):

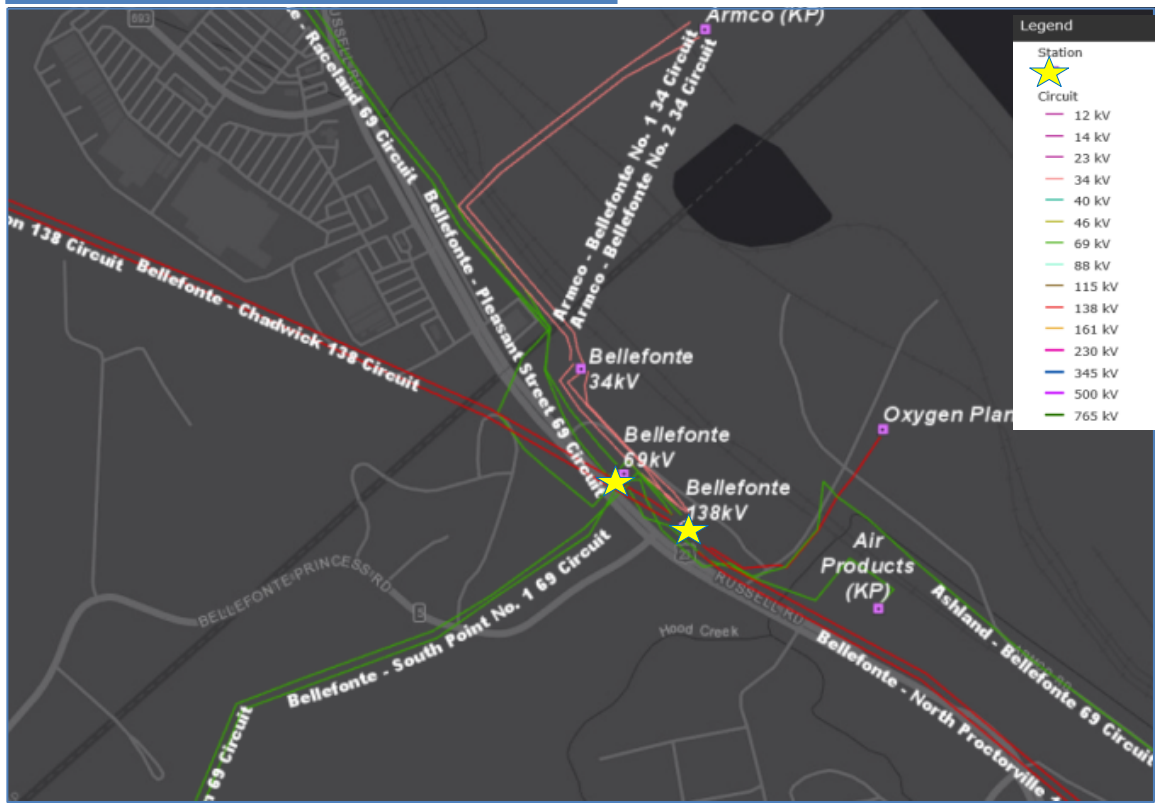
Relaying:

- 44 of the 52 (85%) relays at the 69kV yard station are in need of replacement.
- 41 are electromechanical, 2 are static and 1 relay is microprocessor type.
- The electromechanical type and Static type relays that have significant limitations with regards to spare part availability and fault data collection and retention. In addition, these relays lack vendor support. Where as the microprocessor relays that are of legacy design and/or utilize legacy firmware

Others:

- Flooding occurs frequently during heavy rains at the 138kV and 69kV control houses.
- Transite (asbestos) paneling is present on the interior walls of the control house.
- The HVAC Systems are inadequate for providing proper air circulation for the relays, batteries, and chargers inside the buildings. Free standing space heaters are used.
- Cable entrances are at full capacity.
- The perimeter fences and gates are in need of replacement due to excessive corrosion.
- The two legacy 138kV bus PTs for Buses #1 and #2 have elevated PCB concentrations. These PTs are leaking oil.
- The 69kV capacitor Bank KK is installed on the Raceland 69kV line instead of the 69kV Bus.

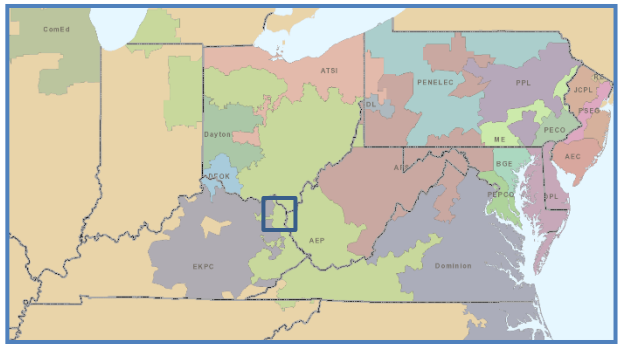


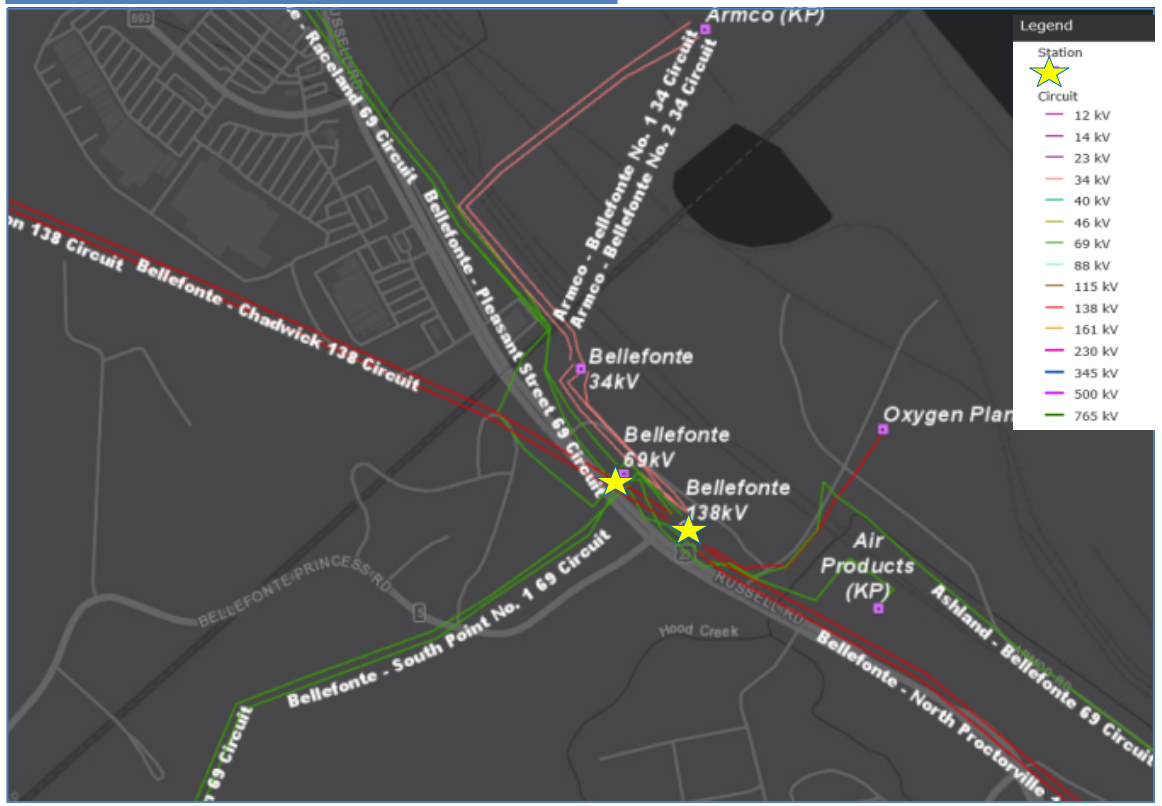


AEP Transmission Zone M-3 Process
Johnson County, Kentucky

Bellefonte 34kV Yard:

- 34.5kV Circuit Breakers E, F, K, M:
  - The four 34.5kV transmission owned circuit breakers E, F, K, and M are FK-family model type, oil filled breakers. These breakers are of 1950's and 1970's vintages. These breakers are oil filled without oil containment; oil filled breakers have much more maintenance required due to oil handling that their modern, vacuum counterparts do not require.
  - As of October 7, 2021, there are 13 remaining FK-339-34.5-2500 circuit breakers on the AEP System, including the 3 (E, F, & K) at this station. Also as of October 7, 2021, there are 8 remaining FKA-38-22000-5Y circuit breakers on the AEP System, including the 1 (M) at this station. There is no vendor support for this fleet of circuit breakers and spare parts are increasingly more difficult to obtain; components are often taken from out of service units with remaining usable parts.
  - A common failure mode documented in AEP malfunction records are compressor failures and valve defects, which cause low pressure and oil leaks. Another failure mode includes trip or reclose failures, caused primarily by spring latching and charging motor component failures. In addition, the oil breakers have a lot of oil contamination from aging gaskets allowing moisture and other particle ingress.
  - Circuit Breaker E: 1950s vintage, Manufactured in 1953, Type: Oil , Fault Ops: 3, Circuit Breaker F: 1950s vintage, Manufactured in 1953, Type: Oil , Fault Ops: 3, Bus Tie circuit Breaker K: 1950s vintage, Manufactured in 1952, Type: Oil , Fault Ops: 7, Bus Tie circuit Breaker M: 1970s vintage, Manufactured in 1971, Type: Oil , Fault Ops: 2,
- Relaying:
  - 34 of the 34 relays at the station are in need of replacement
  - All 34 relays are electromechanical type which have significant limitations with regards to fault data collection and retention.
  - The existing RTU installed at Bellefonte 34.5kV Metering Station is a legacy TLG DOS unit which has high failure and malfunction rates, lacks telecom infrastructure compatibility, lacks software compatibility, lacks vendor support, lacks spare parts availability, lacks vendor supplied training, lacks an active warranty, and has poor RTU resource utilization. This particular unit has experienced 5 recorded malfunction over its in-service life including loss of communication and being down.





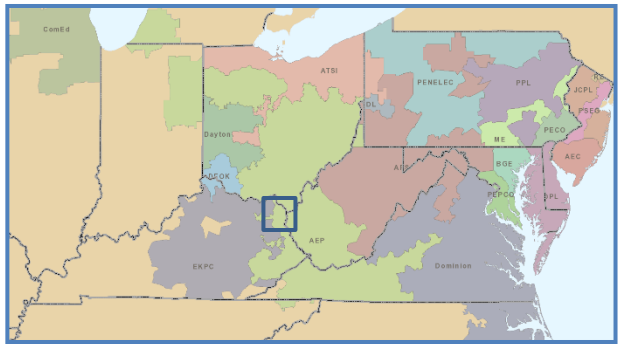
AEP Transmission Zone M-3 Process
Johnson County, Kentucky

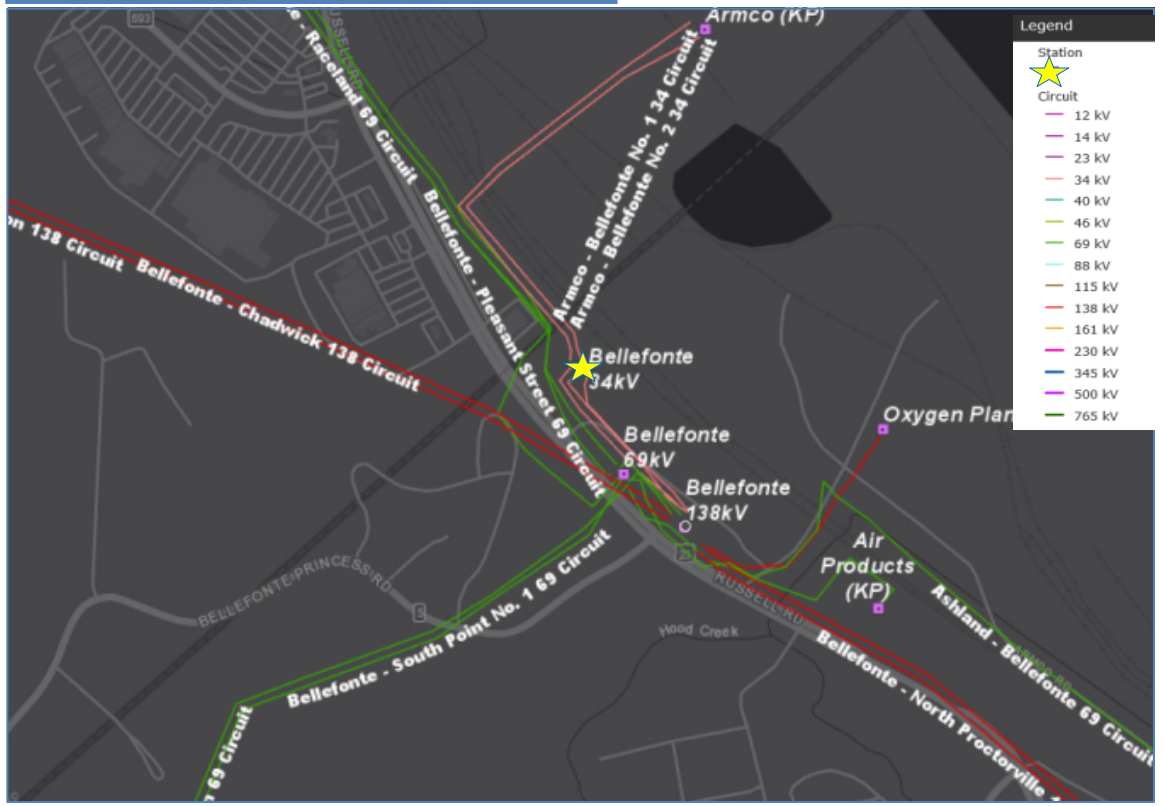
Bellefonte 34kV Yard (cont):

- 34.5/2.5kV kV Grounding Transformer #7:
  - 1950s Vintage, originally manufactured in 1951,
  - Increased decomposition of the paper insulation materials. Electrical discharges of high energy have occurred within the main tank. The low and declining levels of IFT (interfacial Tension) indicates that sludge has formed and is hardening and layering; in addition, this indicates that the insulation is shrinking and weakening.
  - Oil interfacial tension is strongly indicating an aged oil with polar contaminants and oxidation byproducts. This is a contaminated oil favoring accelerated aging of the insulation and formation of sludge which will impair proper oil circulation. Dielectric strength levels are also low and declining.
  - The presence of acetylene confirms the insulation system (oil and paper) is in poor condition and also indicates electrical discharge faults of high energy have occurred within the main tank causing electrical breakdown of the unit.

- 34.5/2.5kV kV Grounding Transformers #8 (three single phase units):
  - 1950s Vintage, originally manufactured in 1945,
  - The low and declining levels of IFT (interfacial Tension) indicates that sludge is dissolved in Oil (phase #1) or that the sludge is in the radiator, core and coil (for phase #2 & Phase #3).
  - Oil interfacial tension is strongly indicating an aged oil with polar contaminants and oxidation byproducts. This is a contaminated oil favoring accelerated aging of the insulation and formation of sludge which will impair proper oil circulation. Dielectric strength levels are also low and declining.
  - The presence of acetylene in GRD Bank-8 300 (phase #1) confirms the insulation system (oil and paper) of that unit is in poor condition and also indicates mixtures of electrical and thermal faults have occurred within the main tank causing electrical breakdown of the unit.
  - The presence of acetylene in GRD Bank-8 300 (phase #1) indicate increased decomposition of the paper insulation materials.
  - The lack of thermally upgraded paper insulation. As the insulating paper materials age, they become brittle. These characteristics of brittleness and lack of a thermal upgrade diminishes of the unit's ability to withstand future short circuit or through fault events due to the state of the paper insulation.

- 34.5/2.5kV kV Grounding Transformer #9:
  - 1980s Vintage, originally manufactured in 1984,
  - The elevated levels of carbon dioxide and carbon monoxide indicate excessive decomposition of the paper insulating materials. The presence of carbon dioxide and carbon monoxide indicate decomposition of the paper insulation that impairs the unit's ability to withstand future short circuit or through fault events.





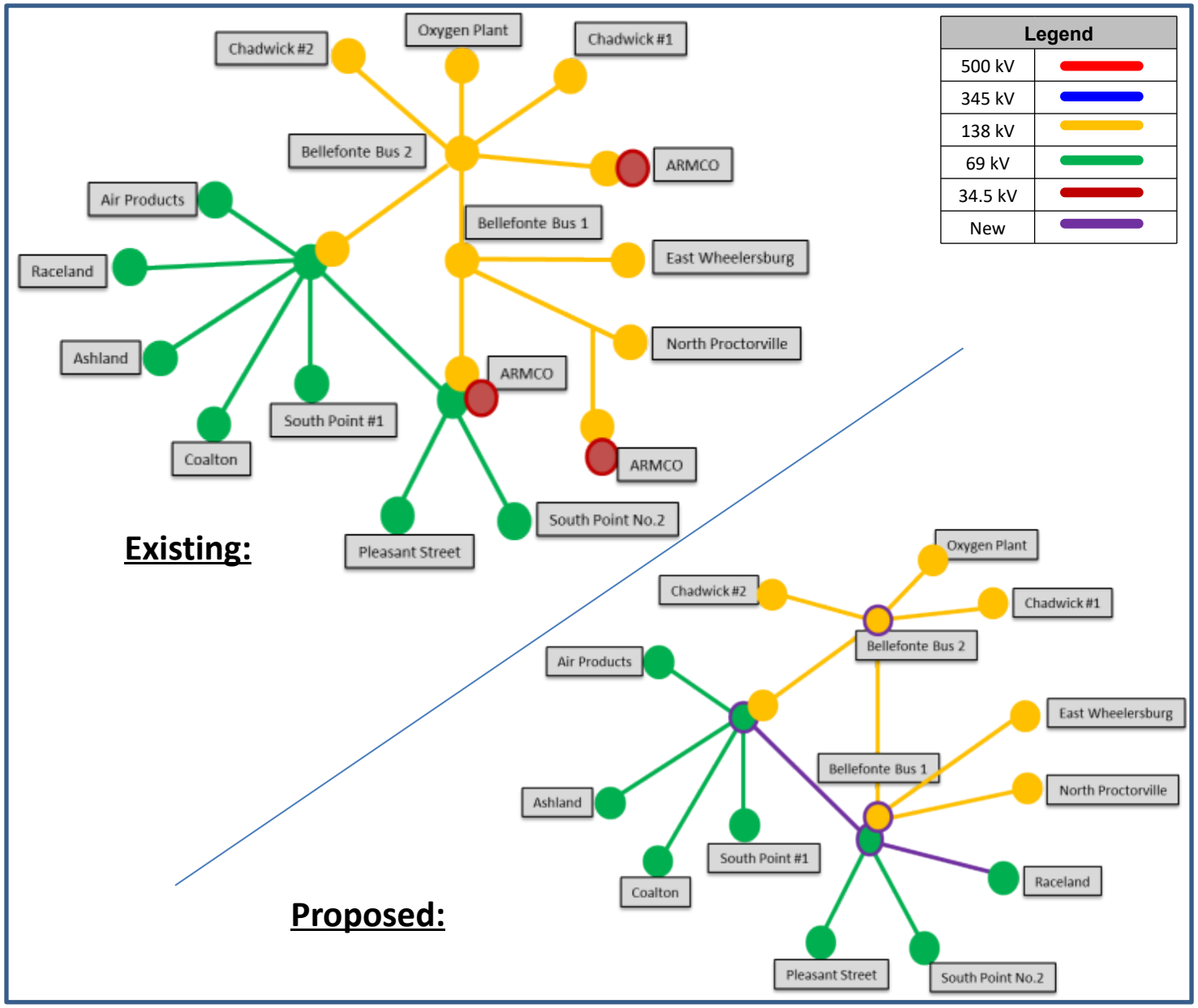
AEP Transmission Zone M-3 Process
Johnson County, Kentucky

Need Number: AEP-2022-AP005

Process Stage: Solution Meeting 08/19/2022

Proposed Solution:

- Replace XFR #2 with a 200MVA Auto unit and retire XFR #1 & #5. The U/G feeder for XFR #3 69kV riser is getting reconductored under B3349. Reconductor sections of 138kV Bus #1 and 138kV Bus #2. Replace remaining oil PTs connected to Bus #1 and Bus #2. Upgrade Primary and back up station service. Replace 69kV bus tie breaker H. Replace the hook stick disconnects switches for the tie breaker H and 69kV tie breaker location will be relocated one bay south of the existing location and 69kV buses will be reconfigured. Replace the hook stick disconnects switches for Raceland breaker D. Relocate the Raceland feeder to bus #1 after extending the 69kV bus #1. The cap bank switcher/moab Mark 5 combo unit will get replaced with 69kV breaker and set of breaker disconnects and relocated to bus #1. 69kV breaker is needed instead of circuit switcher due to the high fault current. Relocate the cap bank to bus #1 after extending the 69kV bus #1. 69kV Air Products line MOABs will be replaced with 2000A SW. Replace hook-stick switches for Oil CB – AB, JJ, I, G, Z, T and C. These Breakers are replaced as part of B3350. Install 16'x48' DICM for 69kV Yard and a 16'x48' DICM for the 138kV Yard. Replace cable trench, single phase AC system & cable work, entire fence replacement and ground grid extension for 100'X10' expansion toward the Northwest of the 69kV yard. Both 138kV and 69kV control house will be retired. **Estimated Cost: $12.59 M**

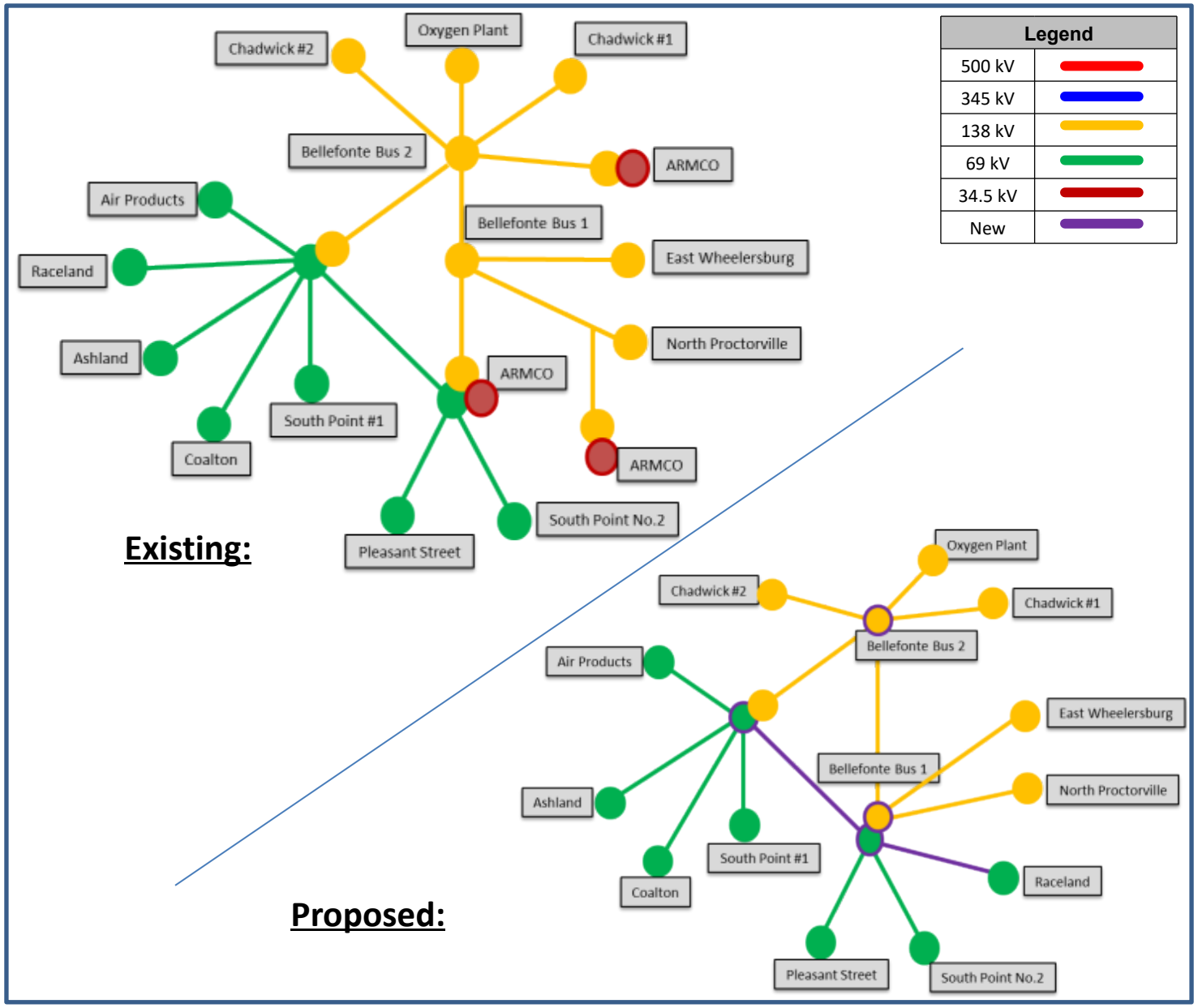


AEP Transmission Zone M-3 Process
Johnson County, Kentucky

Proposed Solution (Cont.):

- The customer served out of 34.5 kV Yard has plans for demolition of their facilities. Retire entire 34kV Yard, contingent on the timing of the customer being removed from service. **Estimated Cost: $2.67 M**
- Retirement of the Bellefonte 34.5kV Bus Tie Line that connects the Bellefonte 138kV Station to the Bellefonte 34kV Station. This removal involves removing 3- Double Circuit Lattice Towers, 1-Triple Circuit Lattice Towers, and 1 Single Wood Pole Structure. **Estimated Cost: $0.46 M**
- Retire the existing Bellefonte – Armco 34.5kV operated line. The major removal work involves removing 4 lattice steel towers, 1 H-Frame wood structure, and 2 single wood poles. The line being removed is approximately 0.55 miles long. **Estimated Cost: $1 M**
- Remote end relaying at Raceland substation to install 2 new CCVTs on a custom two-phase single column stand for the Bellefonte 69kV line exit. The existing CCVT mounted on a single phase CCVT stand will be reused and will remain as it is. **Estimated Cost: $0.37 M**
- Provide 0.2 miles of fiber from Distribution structures outside the station to the new DICMs. **Estimated Cost: $0.49 M**

Total Estimated Transmission Cost: $17.58 M



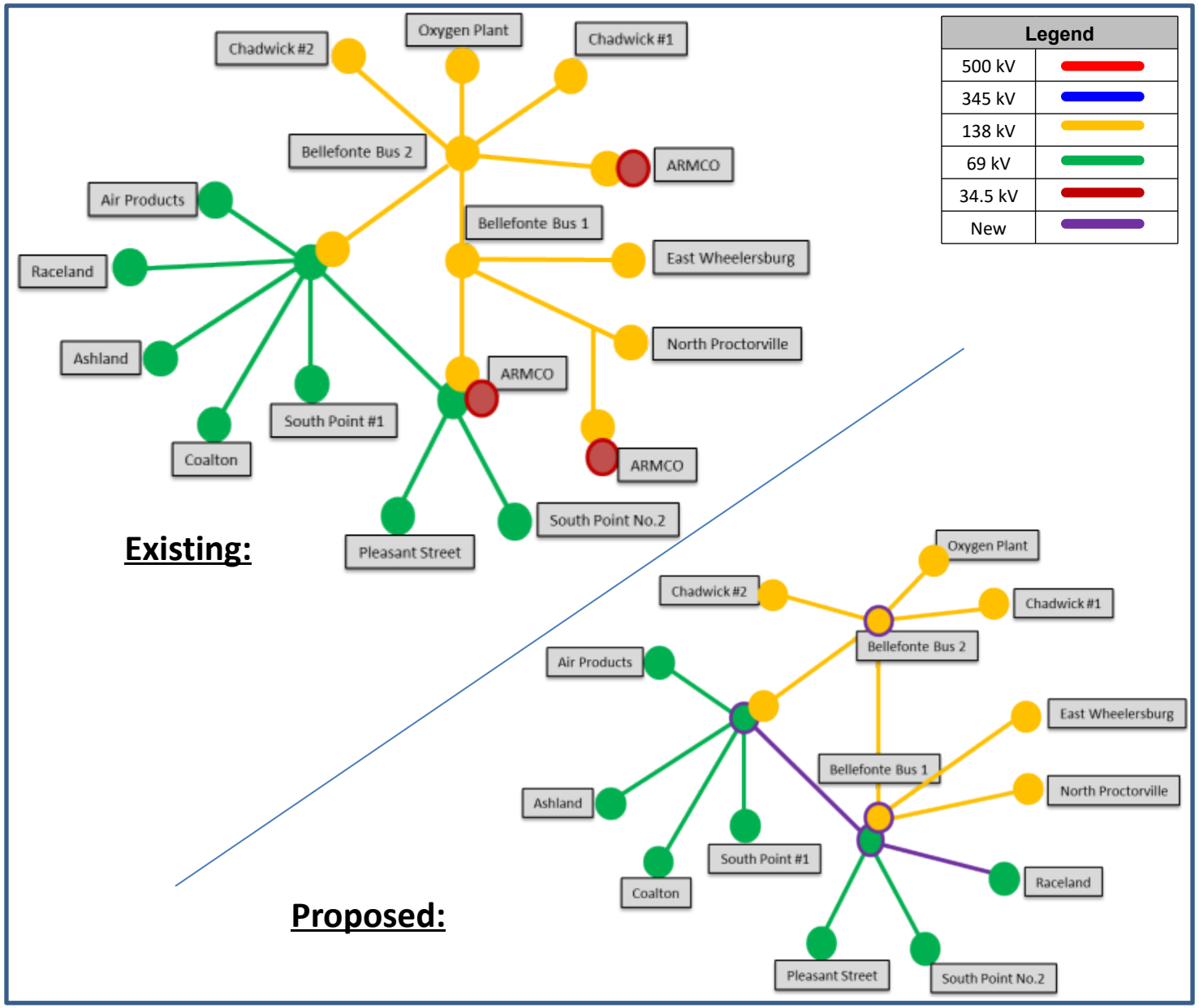
AEP Transmission Zone M-3 Process
Johnson County, Kentucky

Alternatives Considered:

- Consideration was given to building the 69kV equipment in a customized ring bus that will use 10 - 69kV breakers for 7- 69kV line feeds and 2 – 69kV Transformer feeds. However, due to complexity and cost of this configuration this option was not chosen because of the lack of space to fit the ring or breaker and a half station in the existing station footprint. **Estimated Cost: $30 M**

Projected In-Service: 12/01/2025

Project Status: Scoping



AEP Transmission Zone M-3 Process
Pike County, KY

Need Number: AEP-2021-AP031

Process Stage: Solutions Meeting 08/19/2022

Previously Presented: Needs Meeting 10/15/2021

Project Driver:

Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Problem Statement:

Hatfield Substation:

Transformer #2 (46/7.2kV 111 MVA):

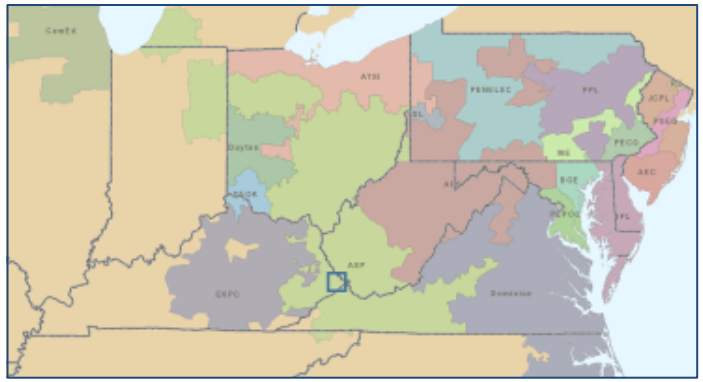
- Grounding Transformer for station service
- 1990 Vintage unit
- DGA indicates elevated levels of CO2 gas concentration
- Bushings are at a greater risk of failure due to capacitive layer deterioration and change in bushing power factor.
- High decomposition of the paper insulating materials.
- Wood tie foundations
- Worn down Oil containment

Transformer # (138/69/46kV):

- The high side MOAB/Ground Switch scheme on TR1 protection. Legacy electromechanical overcurrent protection is associated with TR-1 since this bank is tapped off the 138kV Bus without 138kV line breakers.

Additional information on Transformers:

- GND TR-2 is an artifact from the previous station setup that has been preserved as a source of station service. The grounding bank and associated bus work increases the exposure for failure in order to provide station service.



Circuit Breakers B:

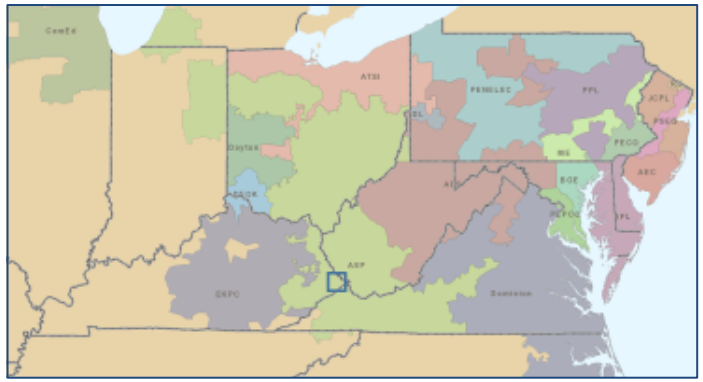
- Breaker Age: B 1990,
- Interrupting Medium: (SF6)
- Fault Operations:
  - Number of Fault Operations: B 65
- **Additional information on this breaker:** This particular breaker has had 35 reported malfunctions related to gas leaks. In addition, its CTs have previously been removed and dried.

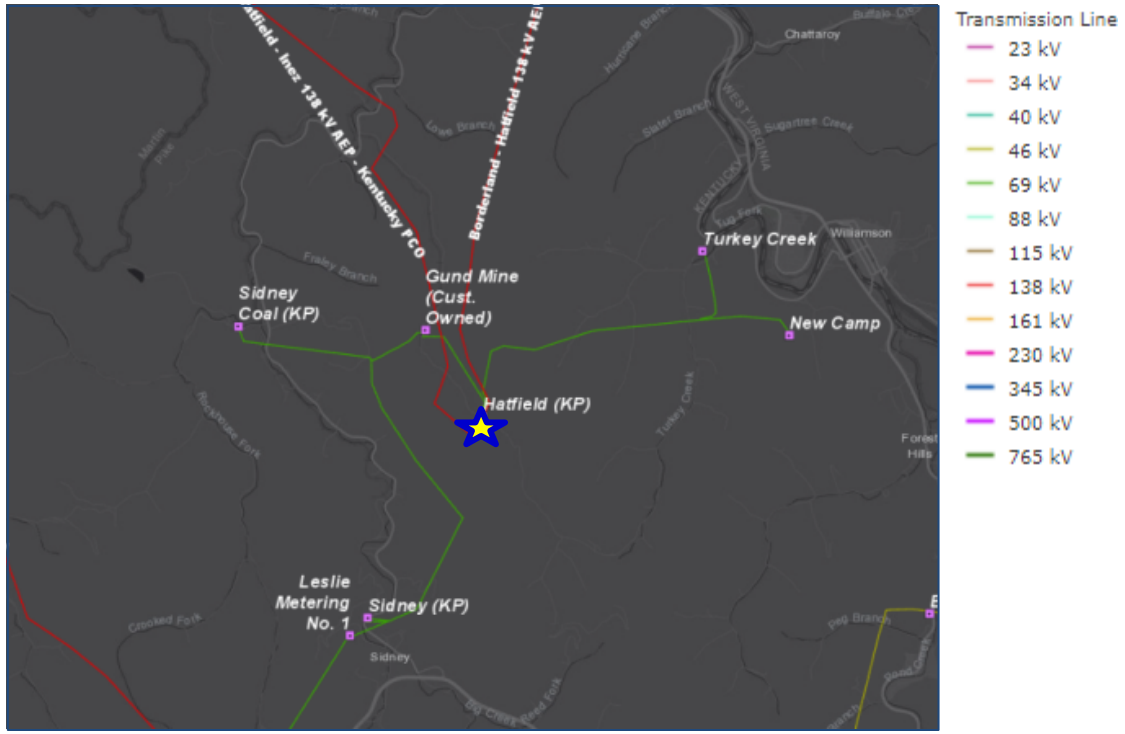
Relays:

- Currently, 41 of the 45 relays (91% of all station relays) are in need of replacement. There are 38 of the electromechanical type and 3 of the 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.

Station Physical considerations:

- The driveway is unsafe due to its short length and close proximity to the road. The 69kV Bus from TR-1 goes underground to circuit breaker B. Because of this configuration, the TR-1 low side breaker CB B is not in a “normal” position. This introduces opportunities for HP errors.
- the station service “transfer” cabinet is in poor condition the requires manual wiring or fuse changes to transfer to the alternate distribution source. The sources are out of phase and break-before-make action is entirely manually performed with normally open fuses. Arc flash hazards and HP error prone design complicate transferring between sources and making emergency settings.





Need Number: AEP-2021-AP031

Process Stage: Solution Meeting 08/19/2022

Proposed Solution:

- At Hatfield Substation, expand the substation yard. Relocate 138/69/46kV XF#1. Replace 138/69/46kV XF#1 Bushings, 138kV 3 phase Bus CCVTs, MOAB X1 and GND Switch Z1 with a new 138kV Circuit Switcher. Replace 138KV Sprigg Line metering, Line Switch "11" with a 138kV Circuit Breaker. Replace and relocate 69kV CB-B to standard Bay position. Replace 69KV CB-A and add 3 phase CCVTs to John's Creek 69kV line. Add 138kV Backup and 69kV Primary Station Service transformers and Station Service. Expand yard and install a 16' X 27' base DICM. Remove 111MVA 46/7.2KV Transformer #2 and associated equipment and 7.2KV 3 phase station service. Remove the control building. **Estimated Cost: $4.95 M**
- On the Leslie No.1 – Hatfield 69kV circuit, remove existing guyed dead-end structure K357-29 and install a new single pole, single circuit, custom dead-end to remove the guy wires conflicting with station footprint plans. The existing guy anchors would conflict with station expansion plans, and it is not feasible to span guy over top of proposed control house as the anchors would land in the proposed station drive path. The proposed custom dead-end structure will be placed 20' downhill from existing structure K357-29. **Estimated Cost: $0.5 M**

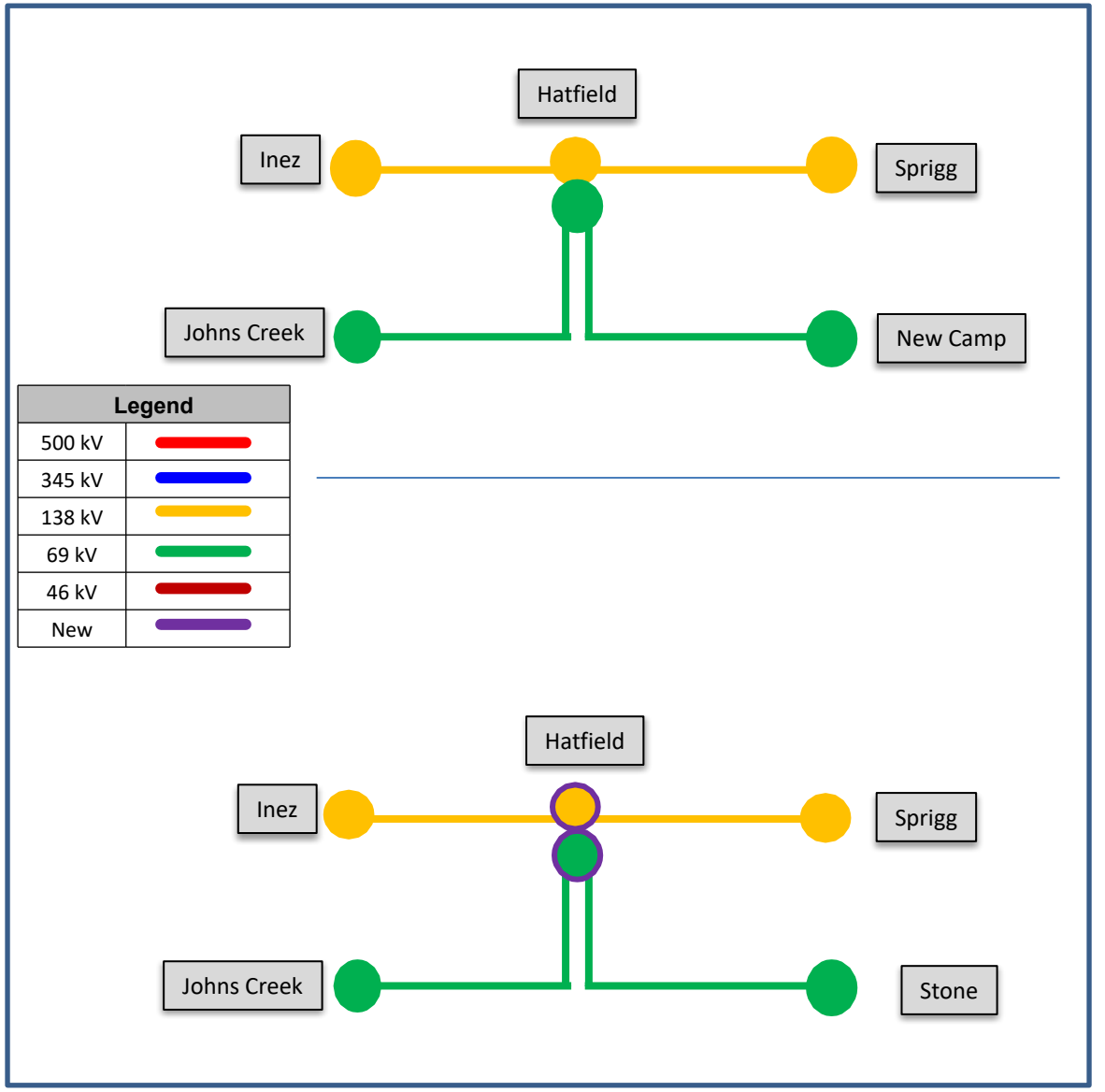
Total Estimated Transmission Cost: $5.45 M

Alternatives Considered:

- Rebuild Hatfield substation in clear. This would require relocation of all the four T- lines to the new site. The substation site would require significant civil work in hilly terrain. **Alternative Cost: $14 M**

Projected In-Service: 08/01/2024

Project Status: Scoping



AEP Transmission Zone M-3 Process
Logan and Mingo County, West Virginia

Need Number: AEP-2021-AP033

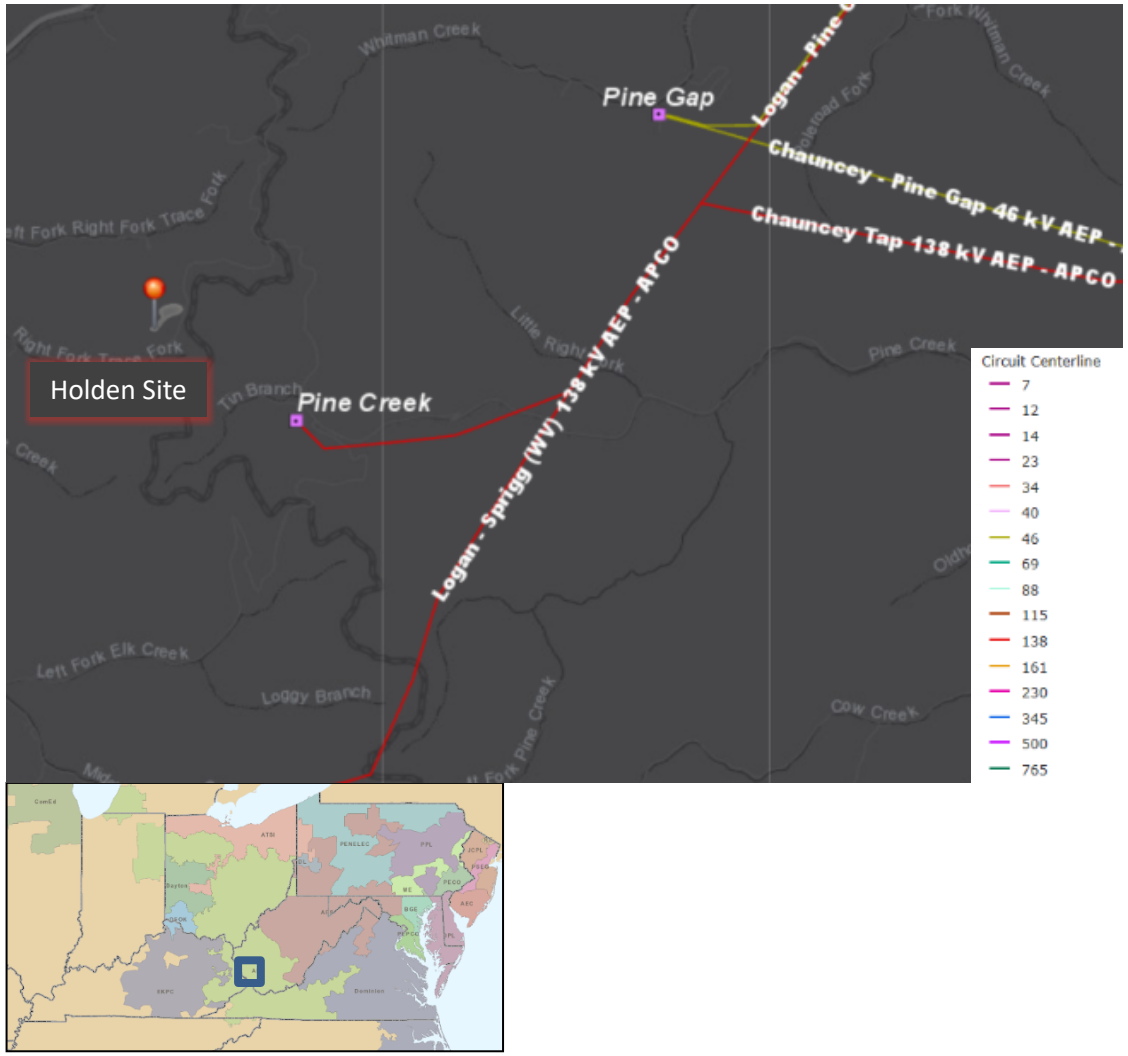
Process Stage: Solutions Meeting 08/19/2022
Previously Presented: Needs Meeting 11/19/2021

Supplemental Project Driver: Customer Service

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

Problem Statement:

- AEP Distribution has requested new transmission service to a new distribution station, Holden, supporting the Buck Harless Industrial Park site in Whitman, WV.
- This station is the result of West Virginia House Bill 144. The intent of the program is to support the development of Business Ready Sites in WV.
- Initial load at the Holden Site will transfer from the existing Pine Creek station site. Pine Creek Station is constructed using wood poles in an arrangement that is not expandable. There are also site constraints at Pine Creek preventing station expansion onto adjacent property. The site constraints prevent the industrial park site from being served by the existing Pine Creek station location. Adding new circuits for the industrial park would require replacement of the distribution structures and expansion of the station which is not feasible in the current location.
- At Pine Creek, 138 kV Circuit Breaker XT1 is an oil breaker that are difficult to maintain due to the required oil handling. There is an increased potential for oil spills during routine maintenance and failures with these types of breakers. There are 7 remaining AHE-54-138-5000 circuit breakers on the AEP system, including the 1 at this station. Spare parts are increasingly more difficult to obtain because the manufacturer no longer supports this model type.



AEP Transmission Zone M-3 Process
Logan and Mingo County, West Virginia

Need Number(s): AEP-2021-AP033

Process Stage: Solutions Meeting 08/19/2022

Proposed Solution:

- Construct a new greenfield station (Holden) with a 138/12 kV 25 MVA transformer and high side circuit switcher. There will be two 12 kV feeders from the station. The 138 kV side will be a straight bus with one 138kV circuit breaker facing Ragland and one 138kV MOAB switch facing Tin Branch. The intent of the greenfield station is to support the business ready site and the 138kV circuit breaker will provide added protection for sensitive industrial customers. The existing Pine Creek station will be retired. **Estimated Cost: $0 (Distribution cost)**
- Tap the Logan – Sprigg #2 138kV line and build 3.5 miles of greenfield double circuit 138kV line to serve Holden station. The higher estimated cost is due to a large amount of new access roads and environmental studies that are required for this greenfield line that will be built through mountainous terrain. **Estimated Cost: $12.18M**
- Build 0.6 miles of 96 ADSS Telecom underbuilt cable to connect Holden station to the existing fiber network. **Estimated Cost: $0.18M**
- Remove 1.85 mile long Pine Creek 138kV Tap. **Estimated Cost: $1.74M**

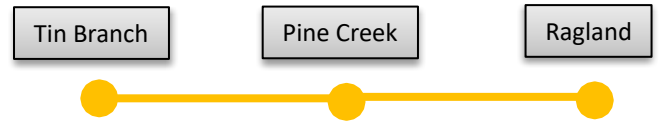
Total Estimated Transmission Cost: $14.1 M

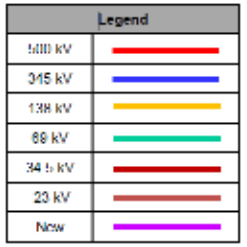
Ancillary Benefits: The existing Pine Creek Distribution customers will be served from the new Holden station improving their reliability due to receiving service from a Holden station that has looped Transmission service and a high side circuit breaker. This proposal also eliminates a hard tap on the existing 138 kV line currently serving Pine Creek station.

Alternatives Considered: Extend the existing Pine Creek 138kV tap to the greenfield Holden station to provide 138kV service and construct a new line back to the existing 138 kV corridor to provide looped service to the industrial park. This option was not used due to the exiting 138kV tap being a radial single circuit that is hard tapped to the Logan – Sprigg #2 circuit and would have resulted in additional work needed to eliminate the hard tap. Estimated Cost: $20M

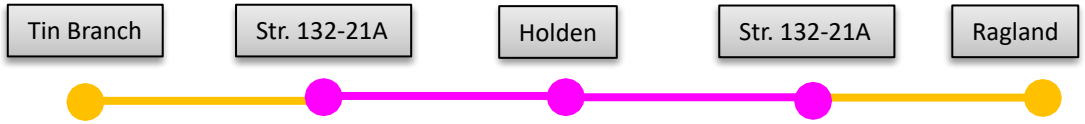
Projected In-Service: 6/1/2024
Project Status: Scoping

Existing





Proposed



AEP Transmission Zone M-3 Process
Montgomery County, VA

Need Number: AEP-2022-AP002
Process Stage: Solutions Meeting 08/19/2022
Previously Presented: Needs Meeting 1/21/2022

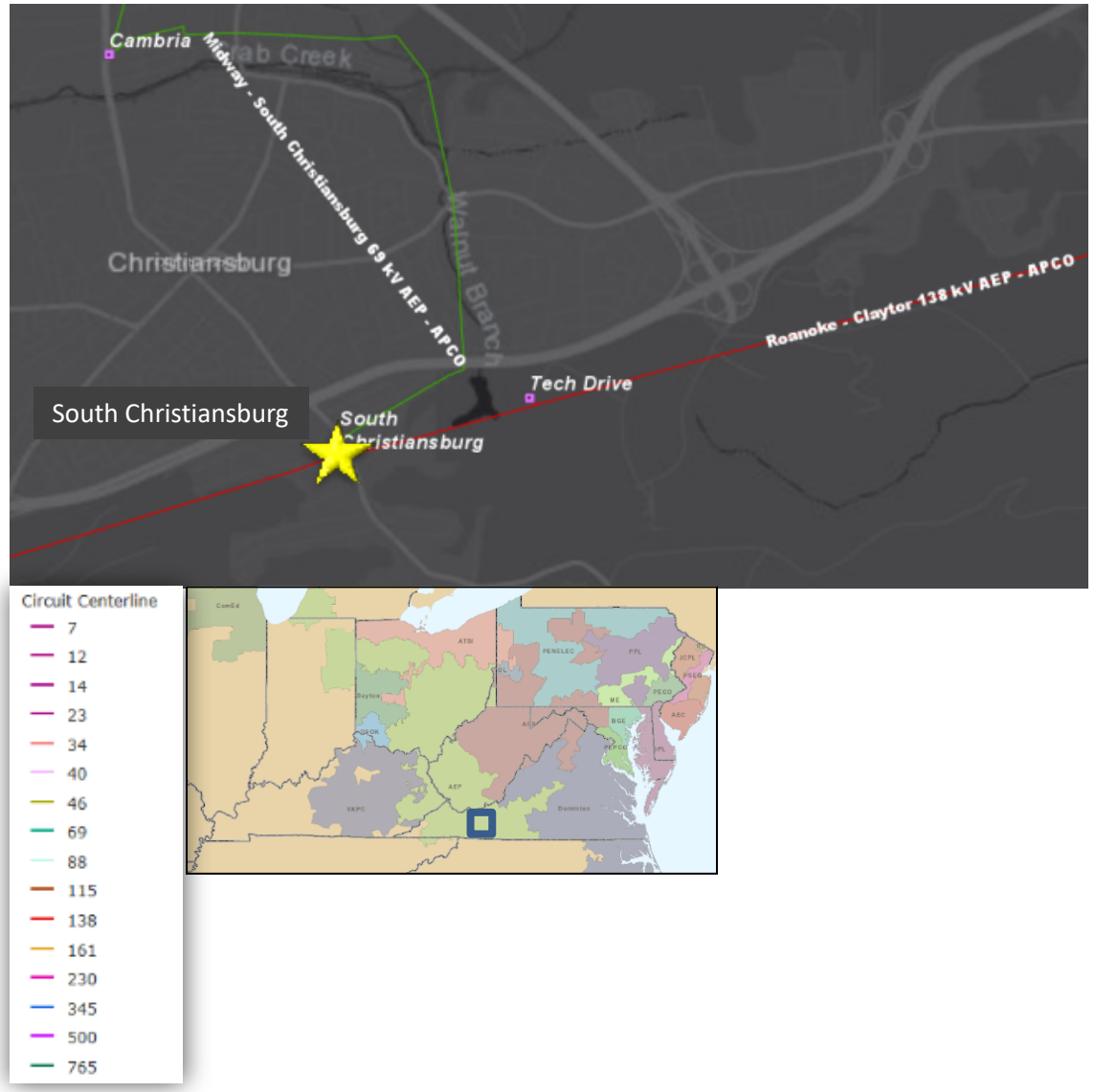
Supplemental Project Driver: Equipment Material/Condition/Performance/Risk

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

Problem Statement:

South Christiansburg Station:

- 138/69-12 kV Transformer #1
  - 1972 Vintage Transformer
  - Elevated levels of carbon dioxide in the DGA indicates decomposition of the increasingly brittle paper insulation that impairs the unit's ability to withstand future short circuit or through fault events.
  - Rising power factor and decreasing dielectric strength are both indications of an increase in particles within the oil. This decreases the ability of the oil to withstand fault events, which can further damage the paper insulation. The values of dielectric strength and power factor indicate the dielectric strength of the insulation system (oil and paper) is in declining condition, which impairs the unit's ability to withstand electrical faults.
  - The advanced age of this unit's insulation materials (49 years old) is of concern. As the insulating paper materials age, they become brittle.
  - This unit regularly leaks nitrogen. Loss of nitrogen is typically related to small leaks that are difficult to locate and repair.
  - There are oil leaks around the temperature wells.
- The 69kV circuit breaker at South Christiansburg station is 1965 vintage and is oil filled without oil containment. This circuit breaker has exceeded the manufacturer's designed number of full fault operations. The manufacturer provides no support for this type of breaker and spare parts are not available. As of March 24, 2021, there are 54 remaining FK-69-2500-5 circuit breakers on the AEP system, including the 1 at this station.
- The transformers use obsolete 138kV MOAB/ground-switch protection systems, which require remote-breaker tripping for isolating transformer faults



AEP Transmission Zone M-3 Process
Montgomery County, Virginia

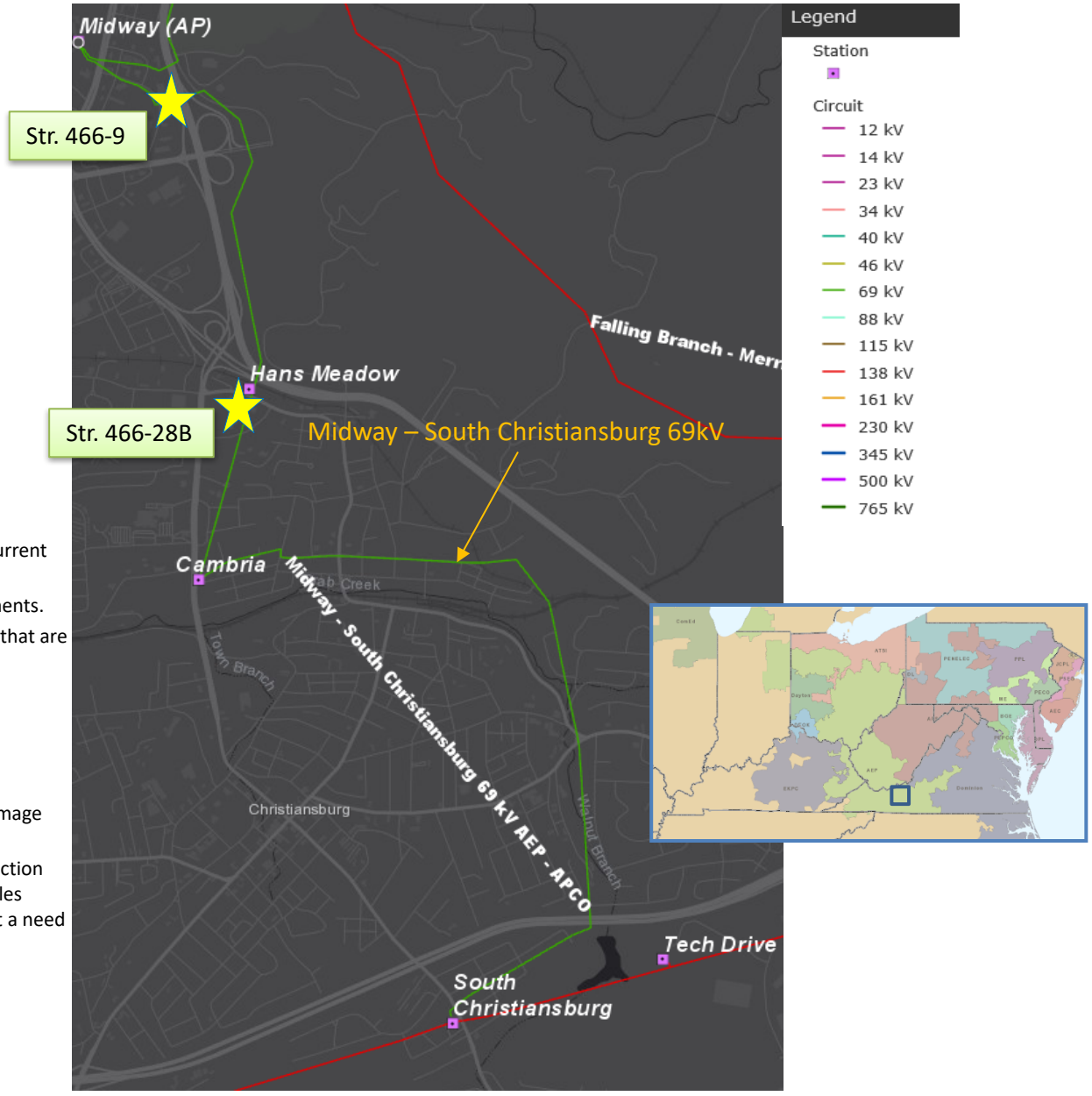
Need Number: AEP-2022-AP003
Process Stage: Solutions Meeting 08/19/2022
Previously Presented: Needs Meeting 1/21/2022

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: Midway – South Christiansburg 69kV Line
Original Install Date (Age): 1967
Length of Line: ~5.7 mi
Total structure count: 111
Original Line Construction Type: Wood
Conductor Type: 3/0 ACSR, 4/0 ACSR, 336,400 ACSR, 556,500 ACSR
Momentary/Permanent Outages: 4 Momentary and 0 Permanent
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.
- The vertical post insulators on the line do not meet current AEP standards for CIFO and minimum leakage distance requirements.
- Additional assessments were taken on a representative sample of the 1960s era structures, indicating numerous conditions that are expected to be present on the remainder of the line. The results showed:
    - Pole top weathering on multiple structures
    - Weathered/splitting/cracking crossarms
    - Woodpecker damage
    - Corroded hardware and insulator end fittings
- 19 structure related open conditions affecting the crossarm, knee/ vee brace, or pole including rot, damaged, and insect damage conditions.
- 80 of 111 structures are 1960s vintage. There is a 1.3 mile segment from Structure 466-9 to 466-28B of more recent construction associated with the previous widening of U.S. Route 460. This section utilizes 14 steel poles installed in 2007 and 7 wood poles installed in 1999 or 2007. In addition, the conductor on this section is 2007 vintage 556,500 CM ACSR 26/7 (Dove) and is not a need at this time.
- 16 independent structures with at least one open condition, 18% of the structures on this circuit, excluding the 21 structure segment from Structure 466-9 to 466-28B.



AEP Transmission Zone M-3 Process
Montgomery County, Virginia

Need Number: AEP-2022-AP003

Process Stage: Solutions Meeting 08/19/2022

Previously Presented: Needs Meeting 1/21/2022

Supplemental Project Driver: Equipment Condition/Performance/Risk

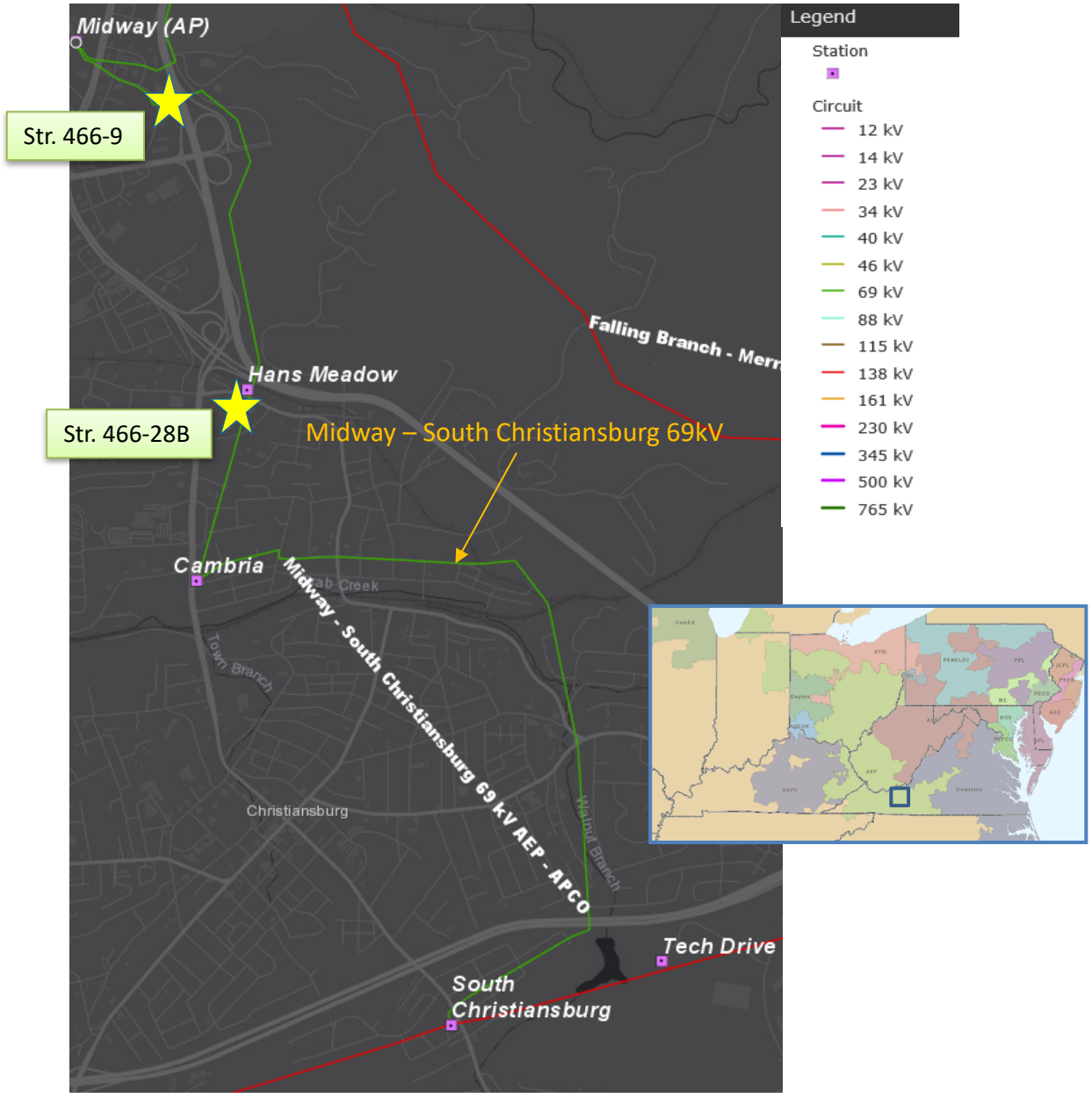
Specific Assumption Reference:

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

Problem Statement Continued:

Line Conditions Con't:

- 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 43 MVA at Cambria and Hans Meadow Substations.



Need Number(s): AEP-2022-AP002, AEP-2022-AP003

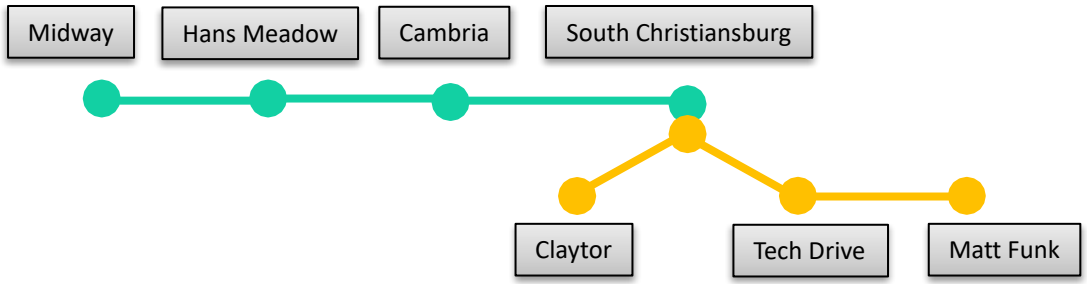
Process Stage: Solutions Meeting 08/19/2022

Proposed Solution:

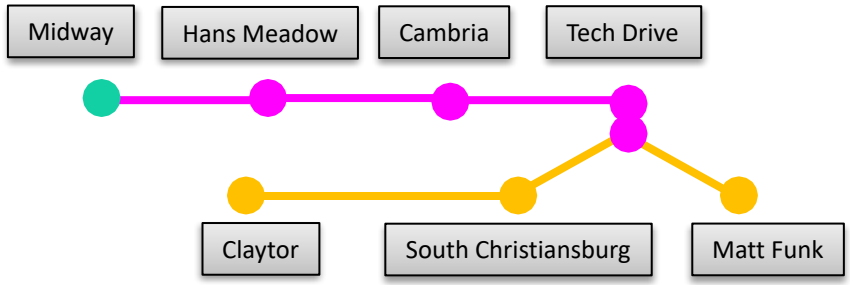
- Rebuild the Midway – South Christiansburg 69kV line from Midway station to Str. 466-9 (0.45 miles). Rebuild the Midway – South Christiansburg 69kV line from Str. 466-28B to Str. 466-98 (3.8 miles). At Str. 466-98 build new 69kV line to the existing Tech Drive station (0.35 miles). The cost per mile is due to the need for matted access roads to minimize property damage in the urban environment. 50 permanent encroachments have been identified within the existing ROW and require a greater number of line structures than normal to reroute the line. Also, due to numerous encroachments on the existing centerline, the rebuild will consist of 1.8 miles rebuilt on existing centerline and 2.8 miles near centerline or greenfield. **Estimated Cost: $21.33M**
- Remove the Midway – South Christiansburg 69kV circuit from Midway station to Str. 466-9 (0.45 miles). Remove the Midway – South Christiansburg 69kV circuit from Str. 466-28B to Str. 466-98 (3.4 miles). Retire the Midway – South Christiansburg 69kV circuit from South Christiansburg station to Str. 466-98 (0.7 miles). **Estimated Cost: $2.7M**
- At South Christiansburg station, remove the existing 138/69kV transformer and 69kV circuit breaker. **Estimated Cost: $1.29M**
- Build 4 fiber station transitions using OPGW at Midway, Hans Meadow, Tech Drive and South Christiansburg. Retire 4.3 miles of ADSS fiber currently on the Midway – South Christiansburg 69kV circuit. Build 4.6 miles of OPGW on the new Midway - Tech Drive 69kV Line. **Estimated Cost: $1.03M**
- At Hans Meadow station, replace the MOAB switch facing Cambria station with a 69kV circuit breaker. **Estimated Cost: $0 (Distribution cost)**
- At Cambria station, replace existing 69kV line CCVTs, bus conductors, and pass-through riser connectors on both line exits to match the 69kV line capacity. **Estimated Cost: $0 (Distribution cost)**
- At Midway station, replace existing risers to support the 69kV line rebuild. **Estimated Cost: $0 (Distribution cost)**
- At Tech Drive station, replace the manual switch facing South Christiansburg station with a 138kV circuit breaker and remove the 138kV bus tie switch. Install a 138kV circuit switcher and a 90 MVA 138/69 kV transformer. Add a 69kV circuit breaker to the 69kV side of the transformer. **Estimated Cost: $0 (Distribution cost)**

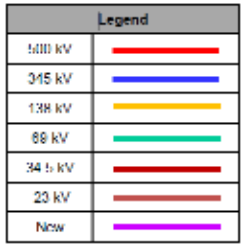
Total Estimated Transmission Cost: $26.35 M

Existing



Proposed





Proposed solution Continued:

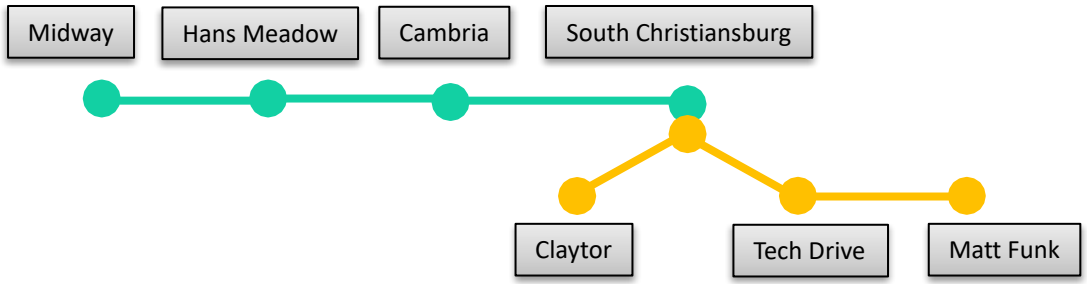
Ancillary Benefits: The new 69kV breaker at Hans Meadow will break up the current system configuration of 5 MOABs in series, providing greater protection for Distribution customers served from Hans Meadow and Cambria stations. Tech Drive station is newer and in an industrial park instead of South Christiansburg station that is older and in a residential neighborhood, reducing the need to expand the station footprint. Building the 69kV line to Tech drive instead of South Christiansburg will remove 0.7 miles of Transmission lines in a residential neighborhood and free up room at the already congested South Christiansburg station.

Alternatives Considered: Rebuild the Midway – South Christiansburg 69kV circuit from Midway station to Str. 466-9. Rebuild the Midway – South Christiansburg 69kV circuit from Str. 466-28B to South Christiansburg station. Replace the existing 138/69 kV transformer with a new 138/69kV transformer and replace the 69kV circuit breaker at South Christiansburg station. Two 138kV circuit breakers will be added at South Christiansburg station. One 69kV circuit breaker will be added at Hans Meadow station. This option was not preferred due to space constraints at South Christiansburg station and the existing ROW congestion in and around the existing line section. Estimated cost: $30M

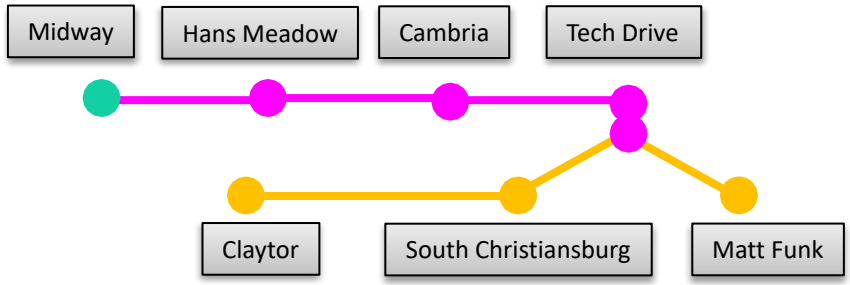
Projected In-Service: 6/1/2027

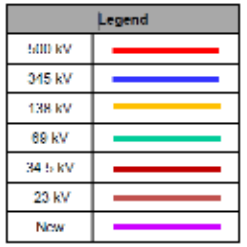
Project Status: Scoping

Existing



Proposed





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

Need Number: AEP-2022-AP033

Process Stage: Solutions Meeting 8/19/2022

Previously Presented: Need Meeting 06/15/2022

Supplemental Project Driver: Operational Flexibility and Efficiency

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 14)

Problem Statement:

Line Name: Chauncey Tap 138kV Line

Original Install Date (Age): 1949

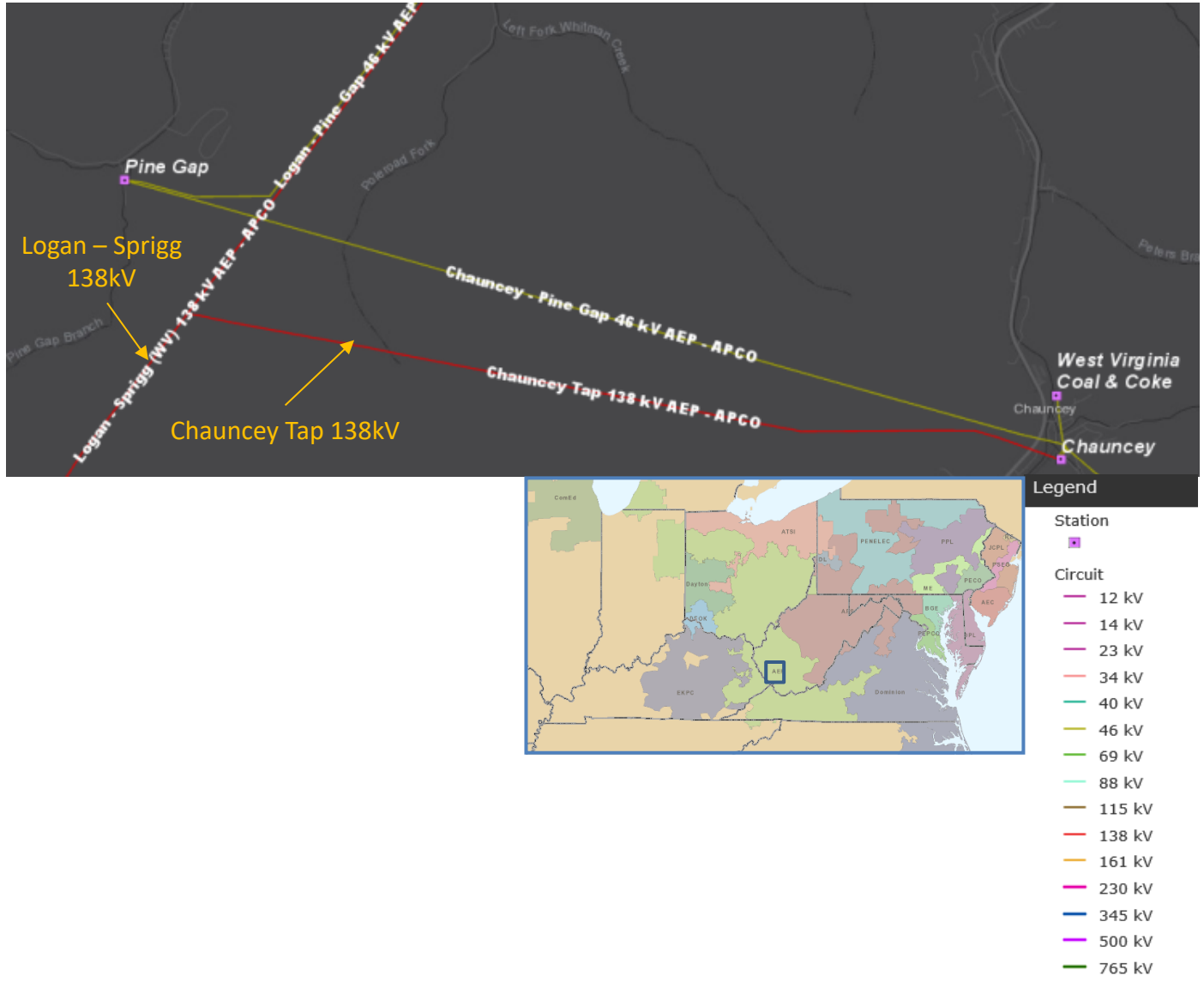
Length of Line: ~3.7 mi

Total structure count: 15

Conductor Type: 397,500 ACSR

Momentary/Permanent Outages: 11 Momentary and 1 Permanent (2017 – 2021)

- The outages include the Logan – Sprigg 138kV line because the Chauncey Tap is hard tapped to the Logan – Sprigg line and the outages travel onto the Chauncey Hard Tap and vice versa.
- Hard tapped lines are difficult when there is a line fault, the fault will take out the through line and leave no way for Transmission Operations to restore the tapped station. Requiring a Transmission Line crew to "open loops" means (1) finding a dead–end structure that is accessible with a bucket truck, (2) having an available and usable access road and (3) having a Transmission Line crew available.
- This consideration also extends to the tap line, where a fault on this section will outage the through–path with no readily available restoration procedure. While the primary consideration is forced outages, these considerations also apply to planned outages such that much more effort and planning is required to perform the above steps than if switches are available to be used to separate the line sections.



Need Number(s): AEP-2022-AP033

Process Stage: Solutions Meeting 08/19/2022

Proposed Solution:

- Add two additional 138kV circuit breakers to the already proposed and approved Tin Branch station (b3348), transforming the designed station from a 138kV two-breaker straight station to a four-breaker ring bus station. **Estimated Cost: $1.9M**
- Disconnect the Chauncey hard tap from the Logan – Sprigg circuit and build 1.5 miles of greenfield 138kV line to connect the Chauncey 138kV Tap into the new Tin Branch station. The higher estimated cost is due to the difficult mountainous terrain, expensive access roads and required environmental studies. **Estimated Cost: $5.6M**

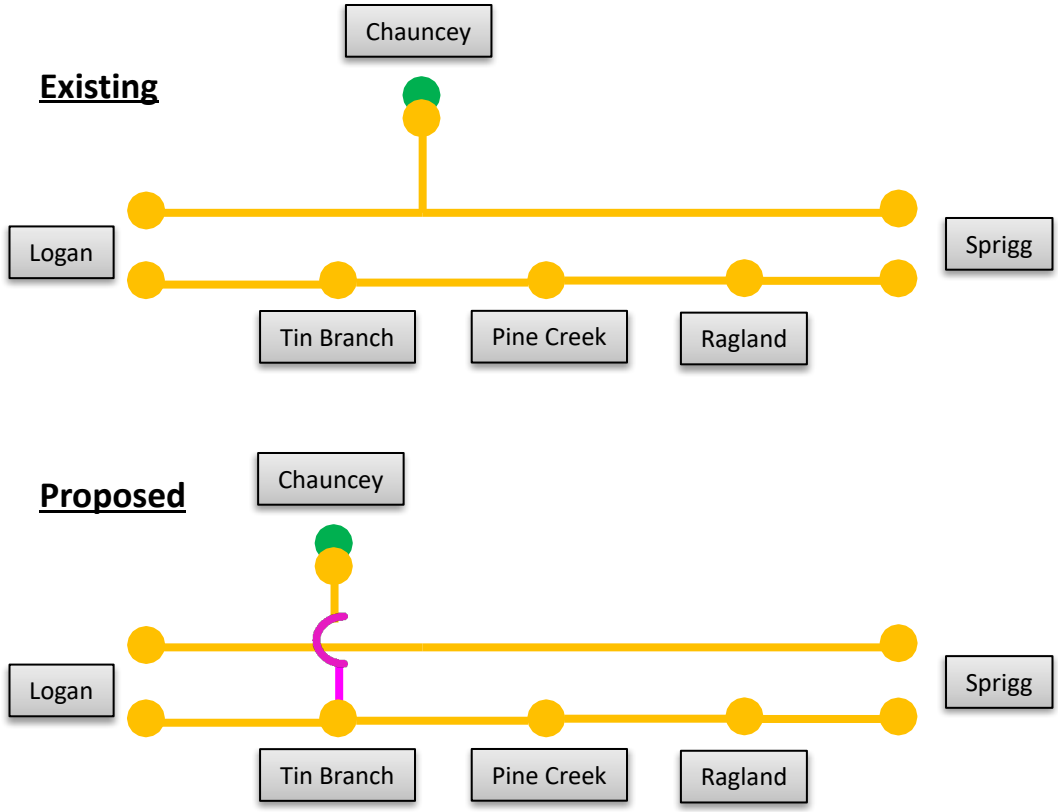
Estimated Total Transmission Cost: $7.5 M

Ancillary Benefits: Addressing the hard taps improves the overall system reliability and operational flexibility. There are also outage and cost efficiencies with completing this scope of work with the baseline work at Tin Branch (B3348).

Alternatives Considered: Continue to use the Chauncey hard tap in the current set up. This set up would continue to expose Distribution customers to outages on 18 additional miles of exposure on the 138 kV Logan – Sprigg circuit.

Projected In-Service: 3/1/2027

Project Status: Scoping



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

8/8/2022 – V1 – Original version posted to pjm.com