



# Sub Regional RTEP Committee Mid-Atlantic First Energy MAAC Solution Meeting

October 29, 2018

Need Number: ME-2018-001  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

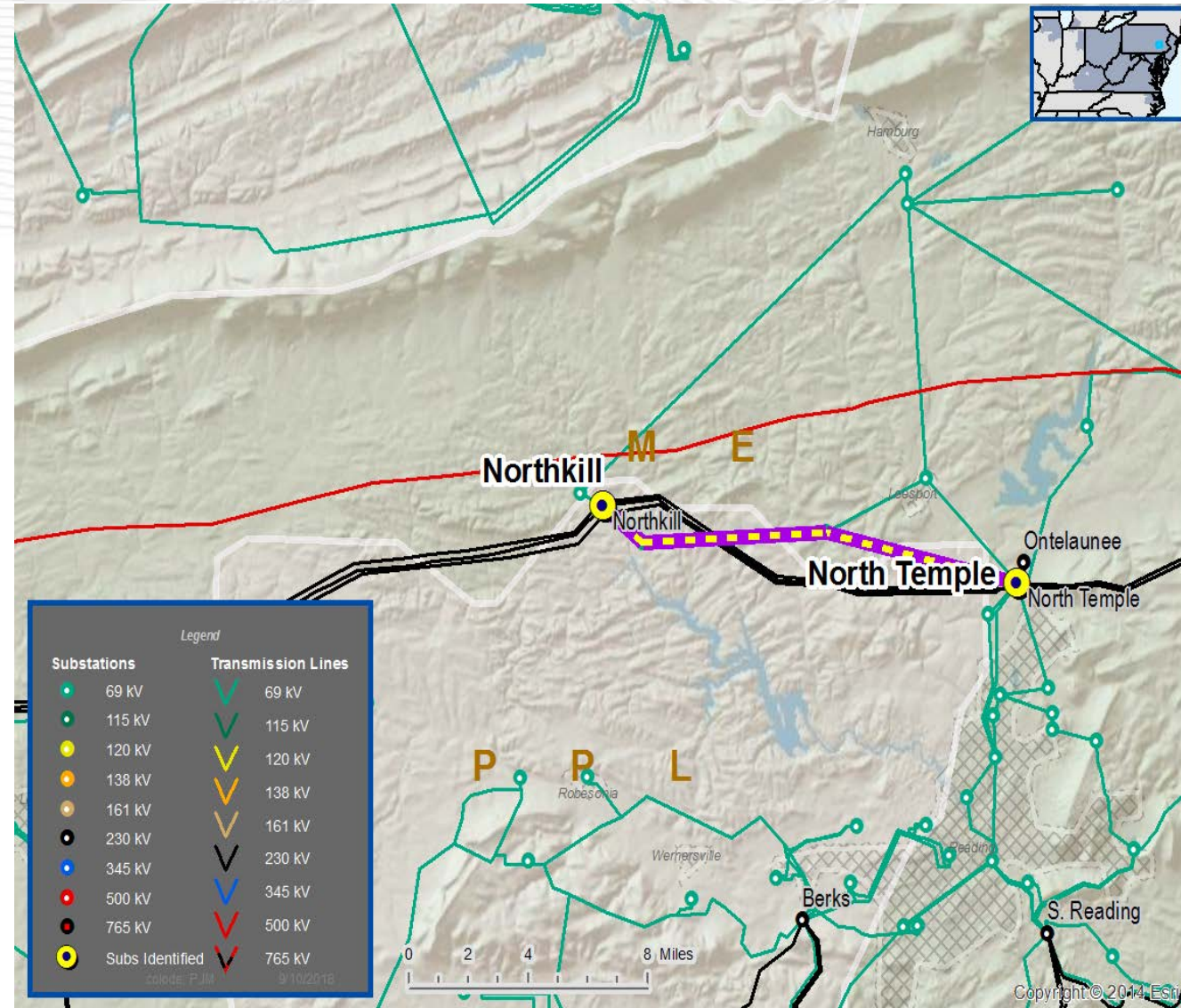
Project Driver(s):  
*Customer Service*

### Specific Assumption Reference(s)

- New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

### Problem Statement

- New Customer Connection - A customer requested 69 kV service for load of approximately 17 MVA near the North Temple – Northkill 69 kV line. Requested in-service date is 12/2019.



Need Number: ME-2018-001

**Proposed Solution:**

*Van Reed Substation*

- Construct new Van Reed 69 kV Ring Bus Substation
- Loop the Northkill - North Temple 69 kV line into Van Reed
- Provide new 69 kV delivery point for customer

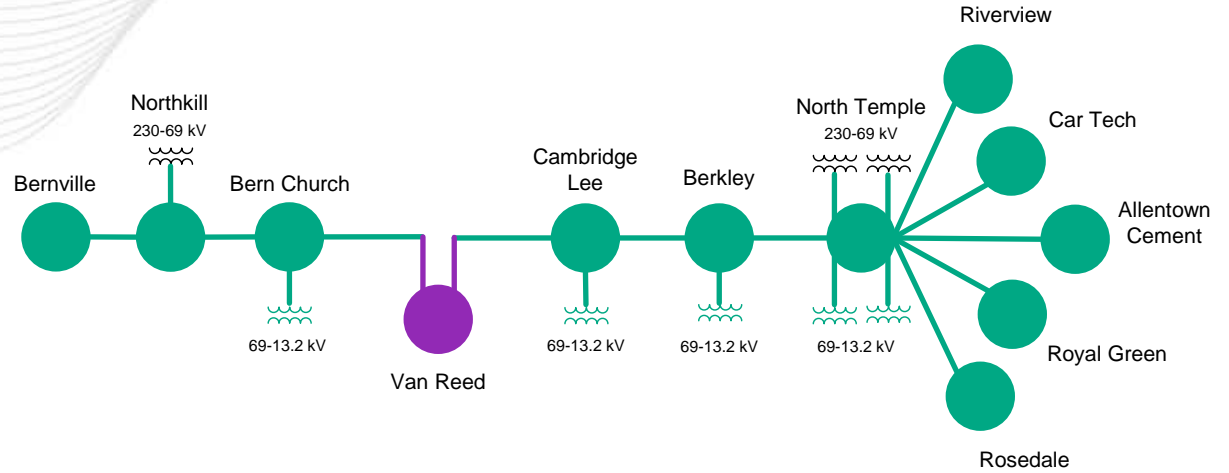
**Alternatives Considered:**

- None (obligation to serve)

Estimated Project Cost: \$3.6M

Projected IS Date: 12/31/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	



# Met-Ed Transmission Zone

Need Number: ME-2018-002  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

**Substation/Line Equipment Limits**

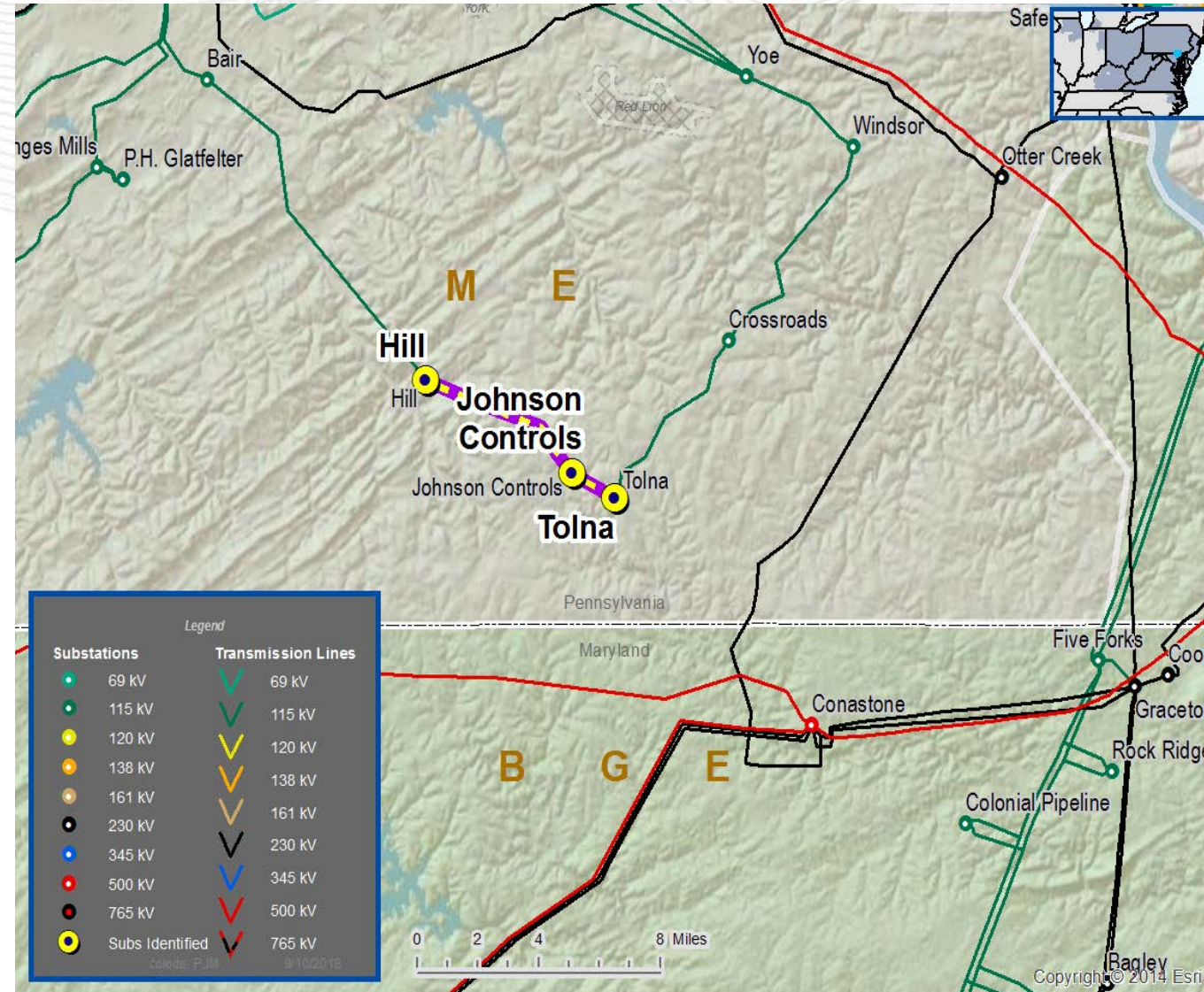
- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

Maintenance/rehab work will be performed on the Hill-Tolna 115 kV line.

Transmission line rating limited by terminal equipment.

- Hill – Johnson Controls 115 kV line: Existing emergency line rating is 150 MVA. Existing conductor emergency rating is 223 MVA.
- Johnson Controls – Tolna 115 kV line: Existing emergency line rating is 208 MVA. Existing conductor emergency rating is 223 MVA.



**Need Number:** ME-2018-002

**Proposed Solution:**

*Hill – Tolna 115 kV Line Rehab*

*Hill 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, line trap, CCVT, line tuner, coax, substation conductor

*Tolna 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, line trap, CCVT, line tuner, coax, substation conductor

**Transmission Line Ratings:**

- Hill – Tolna 115 kV Line
  - Before Proposed Solution: 175 MVA SN / 208 MVA SE
  - After Proposed Solution: 184 MVA SN / 223 MVA SE

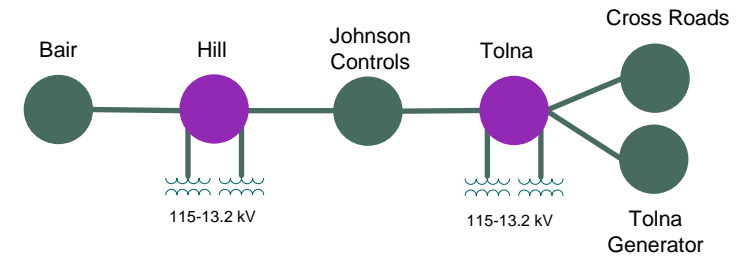
**Alternatives Considered:**

- Maintain existing condition and elevated risk of failure

**Estimated Project Cost:** \$3.0M

**Projected IS Date:** 12/31/2019

**Status:** Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: ME-2018-006

Process Stage: Solutions Meeting

Need Presented: 9/21/2018

**Project Driver(s):**

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

Upgrade Relay Schemes

- Upgrade relay schemes that have historically high percentage of misoperation.

Substation/Line Equipment Limits

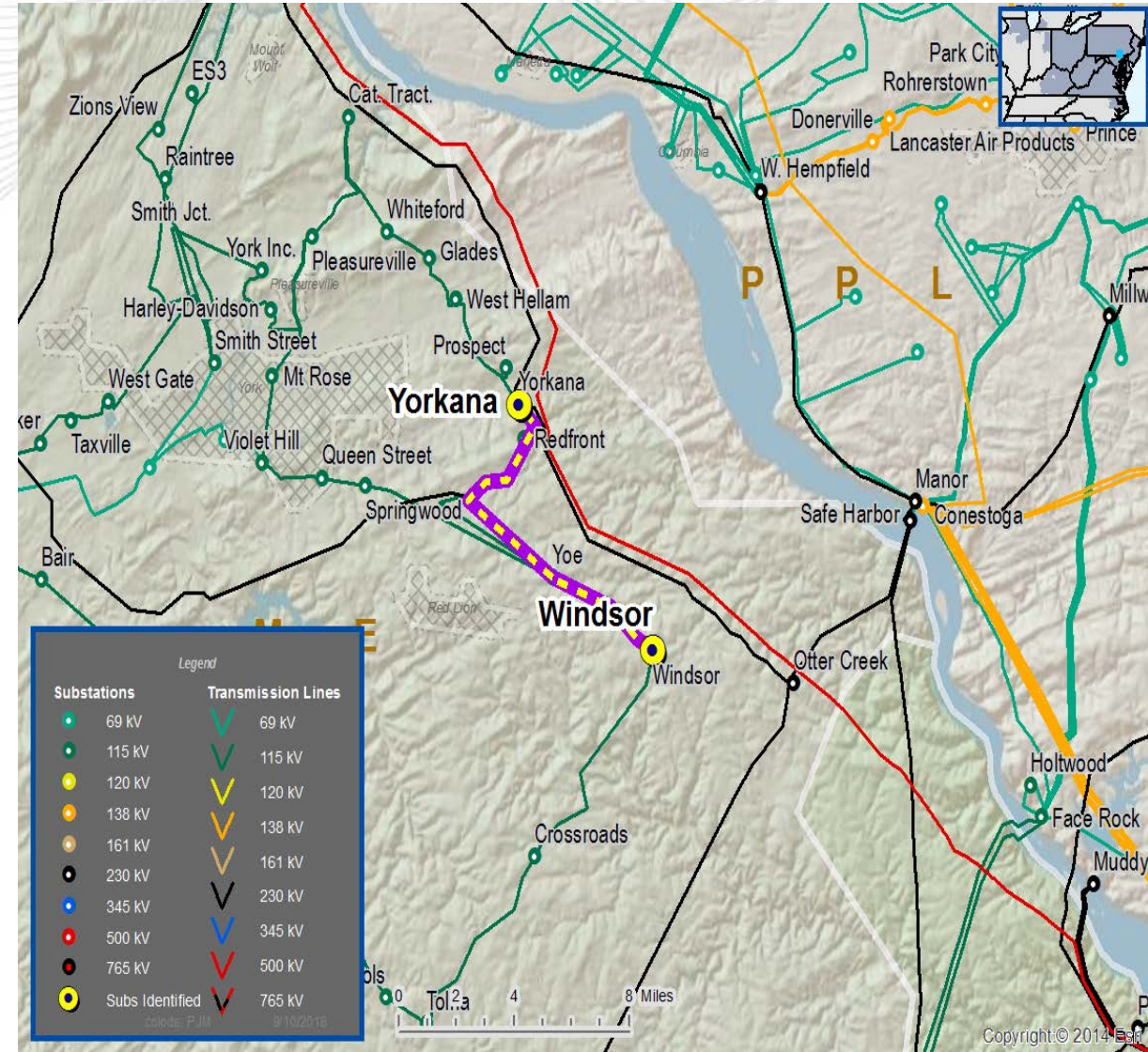
- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

Maintenance/rehab work will be performed on the Windsor-Yorkana Tap 115 kV line.

Relays on Windsor – Yorkana 115 kV line evaluated by Transmission Planning and Protection and determined to be obsolete and/or in a degraded condition.

Transmission line rating limited by terminal equipment. Existing emergency line rating is 277 MVA. Existing conductor emergency rating is 282 MVA.



Need Number: ME-2018-006

### Proposed Solution:

*Windsor – Yorkkana 115 kV line rehab & replace relays prone to misoperation*

*Windsor 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, CCVT, line trap, line tuner, arresters, breaker, and breaker disconnect switches

*Yorkkana 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, CCVT, line trap, line tuner, arresters, breaker, and breaker disconnect switch

### Transmission Line Ratings:

- Windsor – Yorkkana 115 kV Line
  - Before Proposed Solution: 232 MVA SN / 277 MVA SE
  - After Proposed Solution: 232 MVA SN / 282 MVA SE

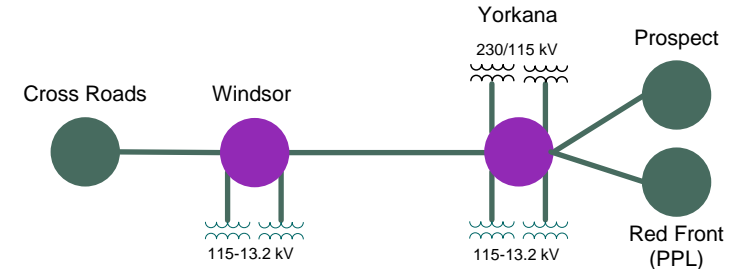
### Alternatives Considered:

- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$10.0 M

Projected IS Date: 6/1/2020

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: ME-2018-007  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

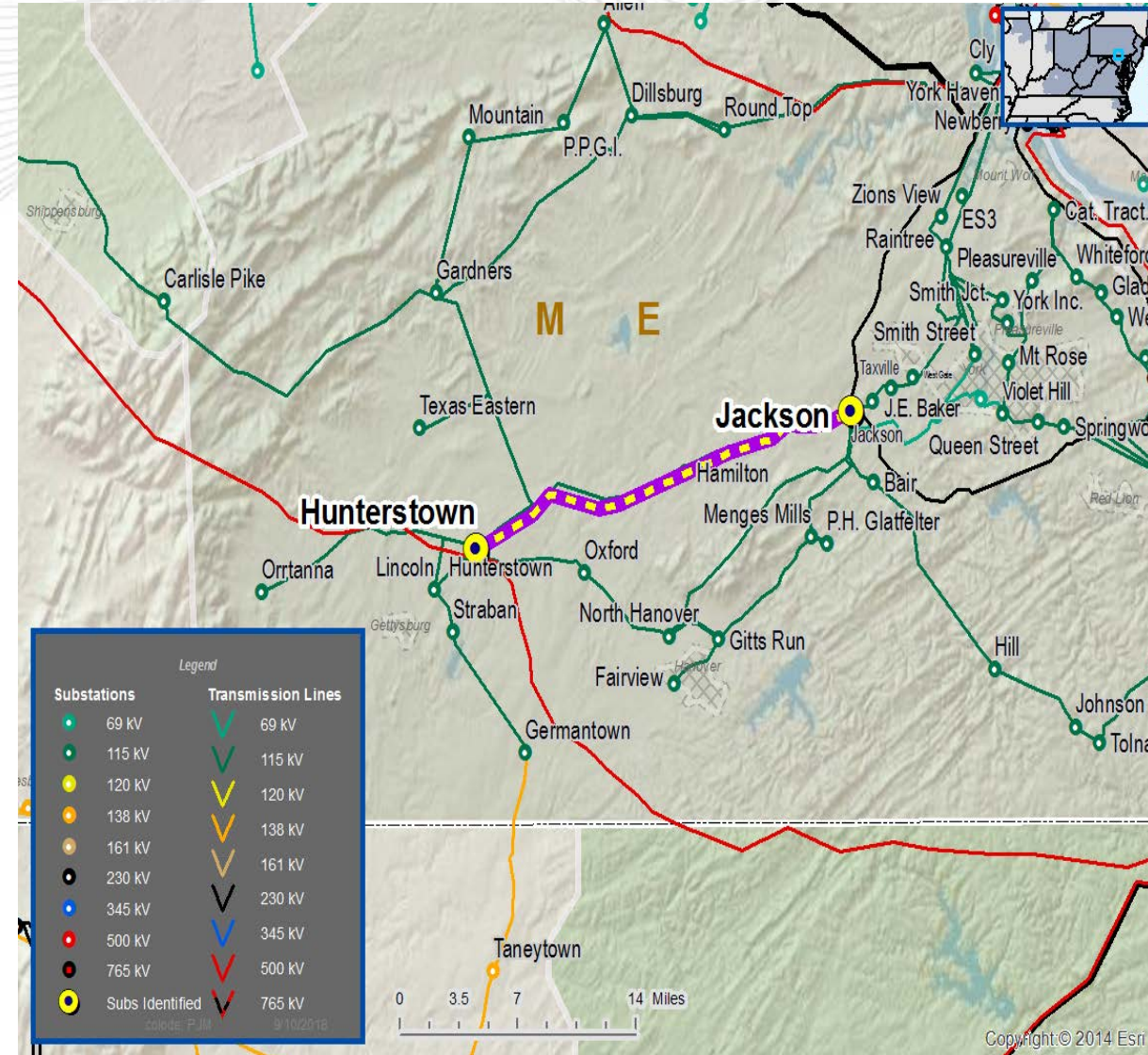
**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

- Upgrade Relay Schemes
- Upgrade relay schemes that have historically high percentage of misoperation.
- Substation/Line Equipment Limits
- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

- Relays on Hunterstown – Jackson 230 kV line evaluated by Transmission Planning and Protection and determined to be obsolete and/or degraded condition.
- Transmission line rating limited by terminal equipment. Existing normal line rating is 678 MVA. Conductor normal rating is 709 MVA.





Need Number: ME-2018-007

## Proposed Solution:

*Hunterstown – Jackson 230 kV replace relays prone to misoperation*

*Hunterstown 230 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, CCVT, coax, and line tuner

*Jackson 230 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, CCVT, coax, and line tuner

## Transmission Line Ratings:

- Hunterstown – Jackson 230 kV Line
  - Before Proposed Solution: 678 MVA SN / 797 MVA SE
  - After Proposed Solution: 709 MVA SN / 870 MVA SE

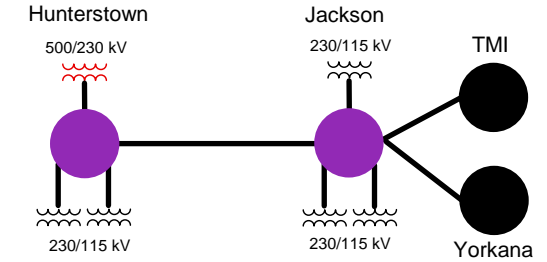
## Alternatives Considered:

- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$0.8M

Projected IS Date: 12/31/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: ME-2018-008

Process Stage: Solutions Meeting

Need Presented: 9/21/2018

**Project Driver(s):**

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

Upgrade Relay Schemes

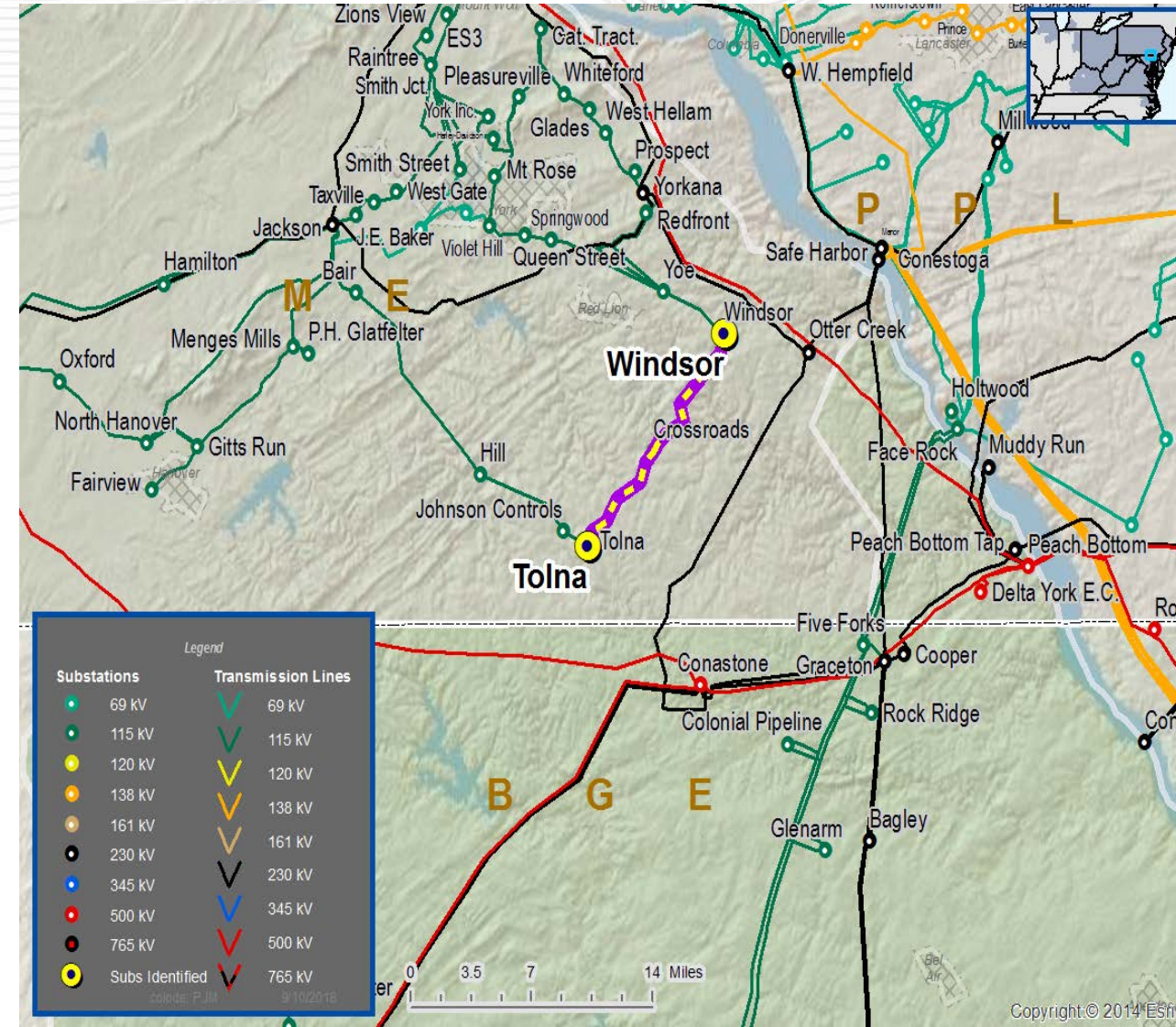
- Upgrade relay schemes that have historically high percentage of misoperation.

Substation/Line Equipment Limits

- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

- Relays on Tolna – Windsor 115 kV line evaluated by Transmission Planning and Protection and determined to be obsolete and/or degraded condition.
- Transmission line rating limited by terminal equipment. Existing emergency line rating is 277 MVA. Conductor emergency rating is 282 MVA.



Need Number: ME-2018-008

### Proposed Solution:

*Tolna – Windsor 115 kV replace relays prone to misoperation*

*Tolna 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, CCVT, line trap, line tuner, and arresters

*Windsor 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, CCVT, line trap, line tuner, and arresters

### Transmission Line Ratings:

- Tolna – Cross Roads 115 kV Line
  - Before Proposed Solution: 232 MVA SN / 277 MVA SE
  - After Proposed Solution: 232 MVA SN / 282 MVA SE

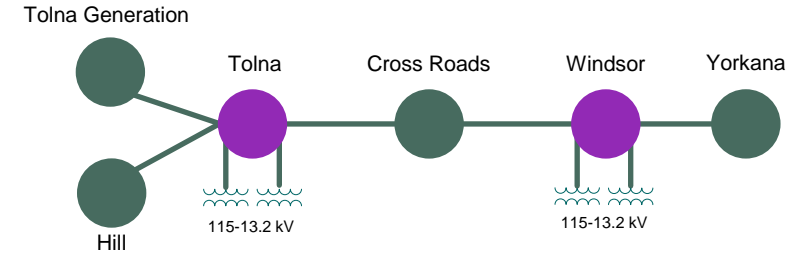
### Alternatives Considered:

- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$0.7M

Projected IS Date: 12/31/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: ME-2018-009  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

**Upgrade Relay Schemes**

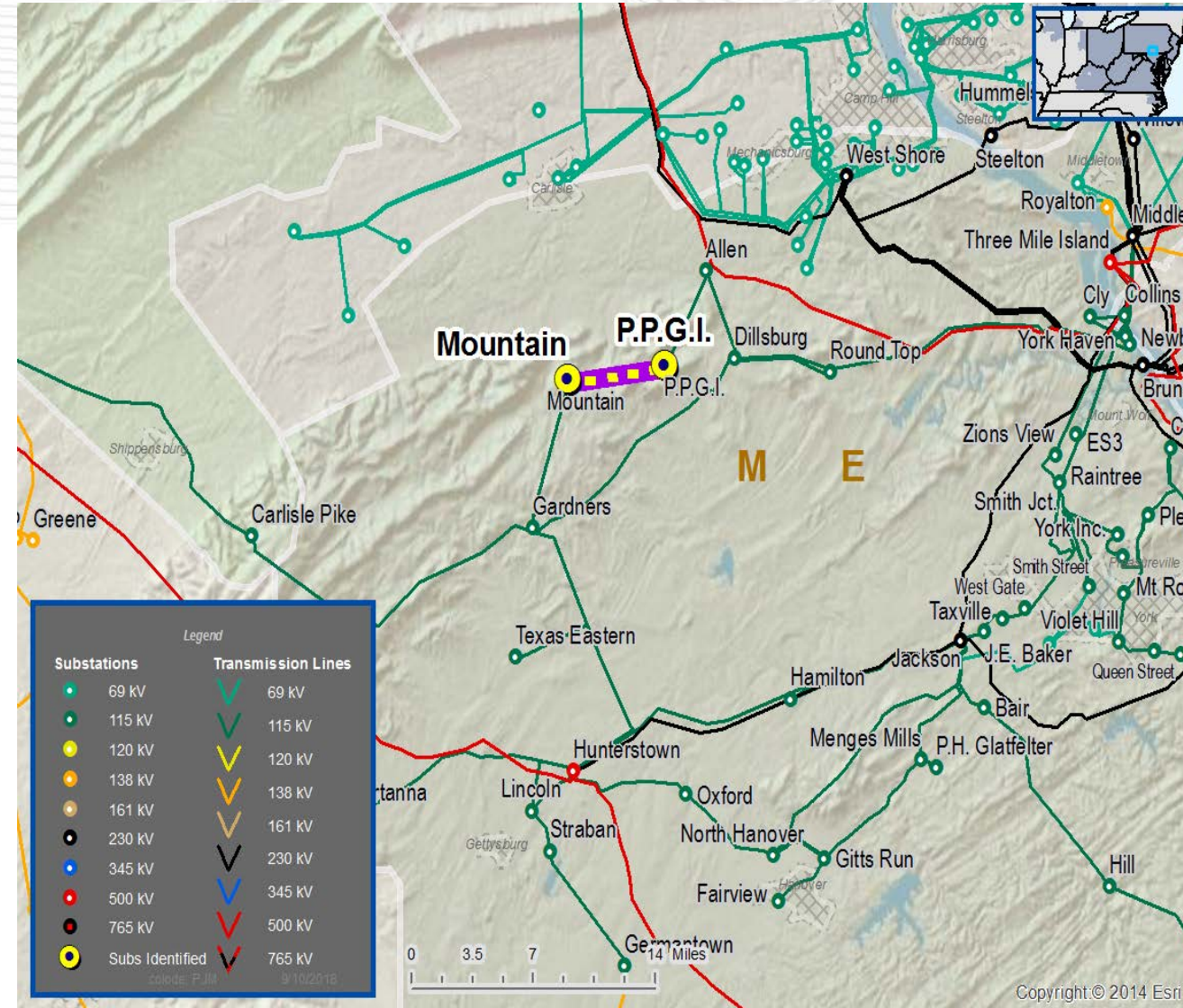
- Upgrade relay schemes that have historically high percentage of misoperation.

**Substation/Line Equipment Limits**

- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

- Relays on Mountain – P.P.G.I. 115 kV line evaluated by Transmission Planning and Protection and determined to be obsolete and/or degraded condition.
- Transmission line rating limited by terminal equipment. Existing normal line rating is 159 MVA. Conductor normal rating is 184 MVA.



Need Number: ME-2018-009

### Proposed Solution:

*Mountain – PPGI 115 kV replace relays prone to misoperation*

*Mountain 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, CCVT, line trap, line tuner, arresters and breaker disconnect switch

*PPGI 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, CCVT, line trap, line tuner, arresters, and breaker disconnect switch

### Transmission Line Ratings:

- Mountain – PPGI 115 kV Line
  - Before Proposed Solution: 159 MVA SN / 211 MVA SE
  - After Proposed Solution: 184 MVA SN / 223 MVA SE

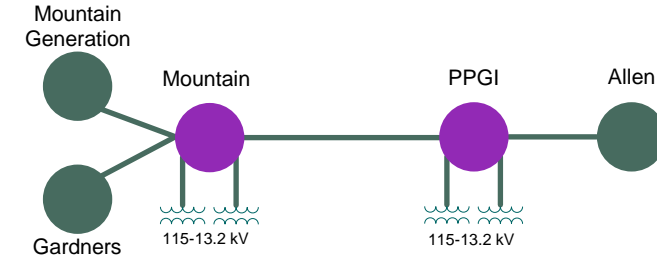
### Alternatives Considered:

- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$0.6M

Projected IS Date: 12/31/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: ME-2018-010  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

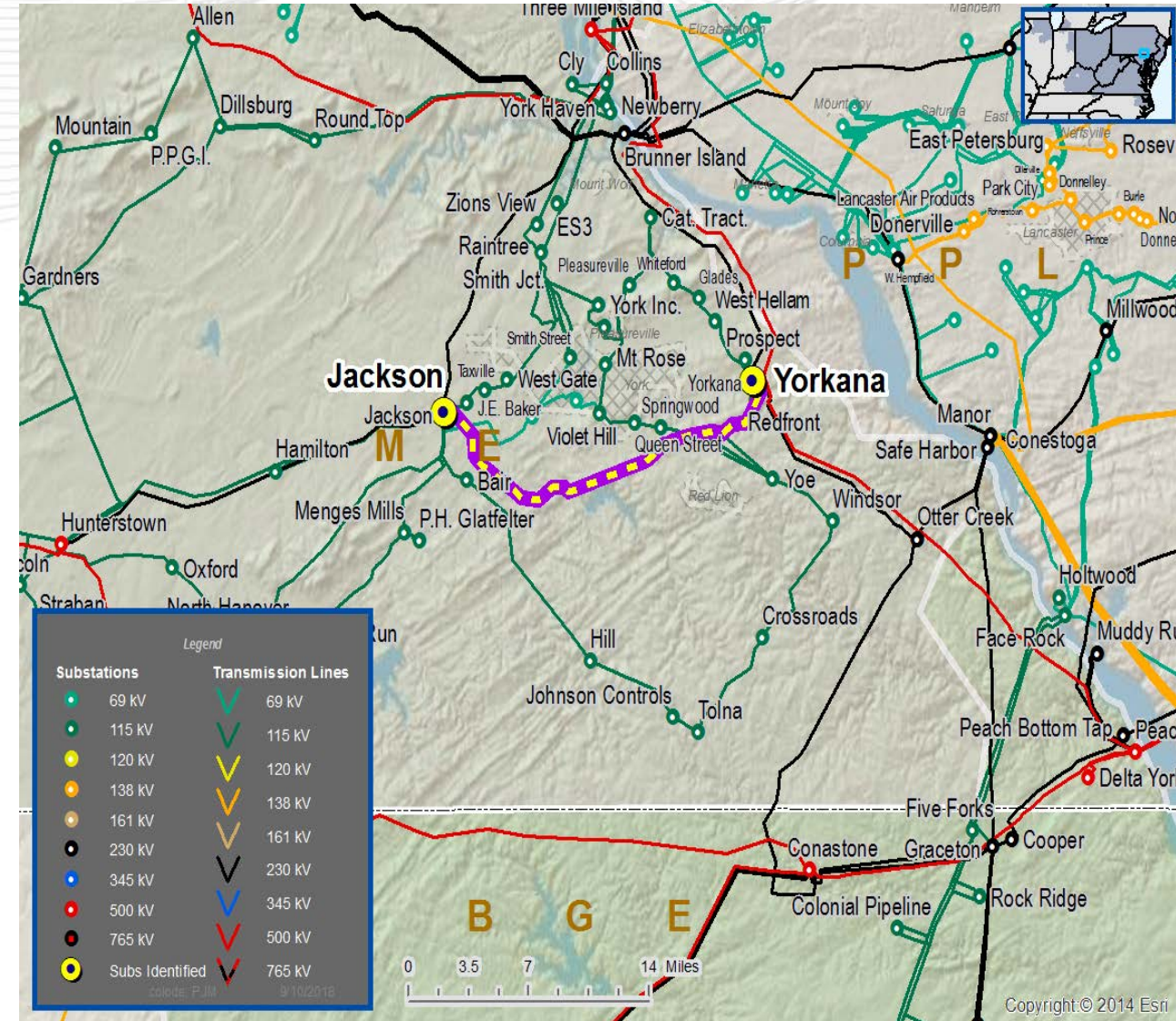
**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

- Upgrade Relay Schemes
- Upgrade relay schemes that have historically high percentage of misoperation.
- Substation/Line Equipment Limits
- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

- Relays on Jackson – Yorkkana 230 kV line evaluated by Transmission Planning and Protection and determined to be obsolete and/or degraded condition.
- Transmission line rating limited by terminal equipment. Existing normal line rating is 650 MVA. Conductor normal rating is 709 MVA.



Need Number: ME-2018-010

### Proposed Solution:

*Jackson – Yorkana 230 kV replace relays prone to misoperation*

*Jackson 230 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, CCVT, line trap, and line tuner

*Yorkana 230 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, CCVT, line trap, and line tuner

### Transmission Line Ratings:

- Jackson – Yorkana 230 kV Line
  - Before Proposed Solution: 650 MVA SN / 817 MVA SE
  - After Proposed Solution: 709 MVA SN / 869 MVA SE

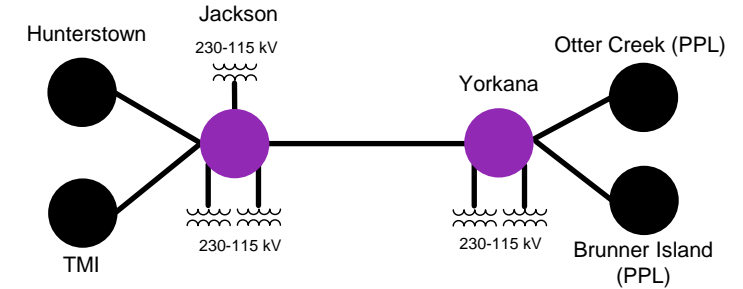
### Alternatives Considered:

- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$0.6M

Projected IS Date: 12/31/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: ME-2018-011  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

Project Driver(s):  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

Upgrade Relay Schemes

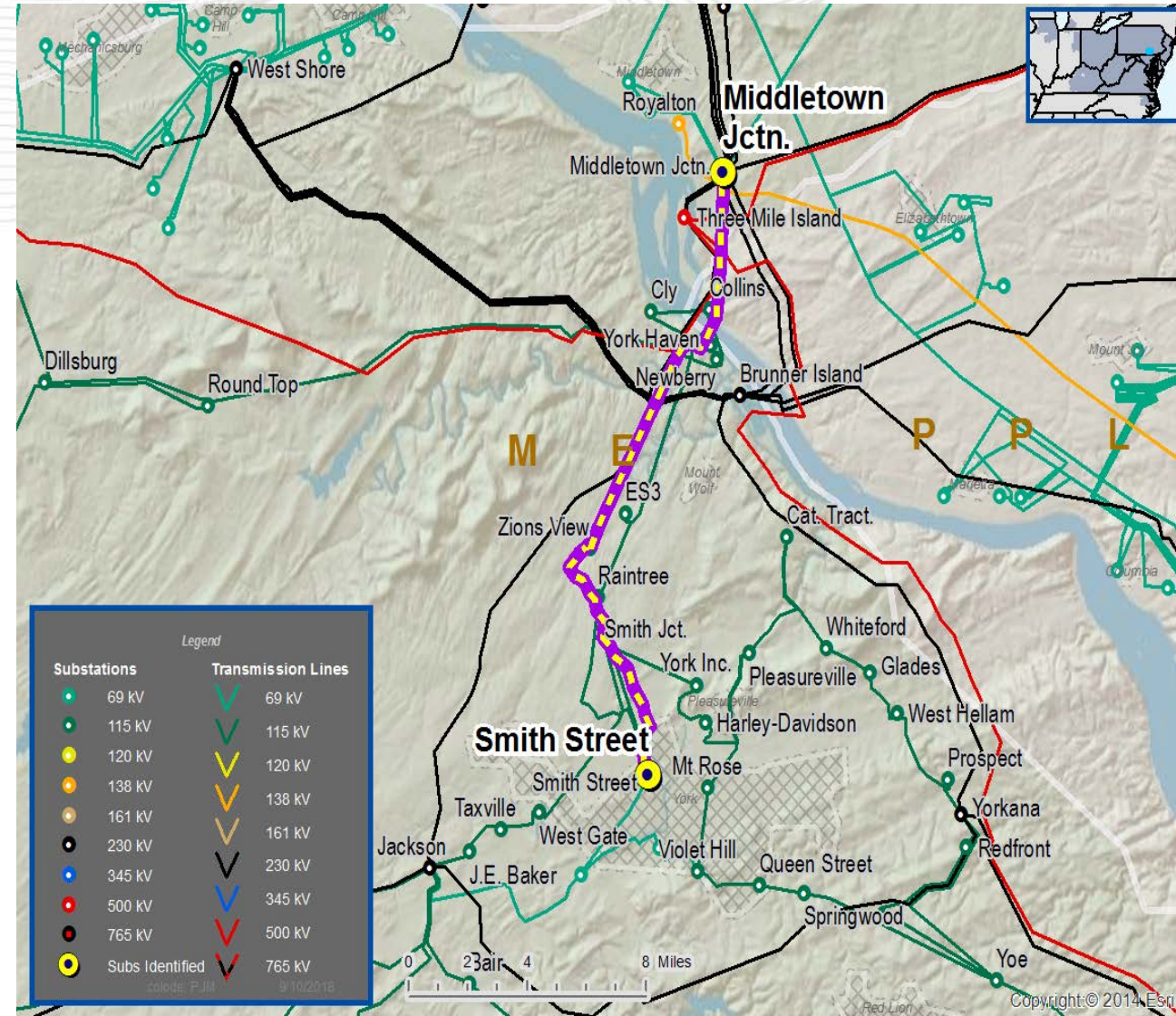
- Upgrade relay schemes that have historically high percentage of misoperation.

Substation/Line Equipment Limits

- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

- Relays on Middletown Junction – Smith Street (978) 230 kV line evaluated by Transmission Planning and Protection and determined to be obsolete and/or degraded condition.
- Transmission line rating limited by terminal equipment. Existing normal line rating is 103 MVA. Conductor normal rating is 129 MVA.





Need Number: ME-2018-011

## Proposed Solution:

*Middletown Junction – Smith Street (978) 115 kV replace relays prone to misoperation*

*Middletown Junction 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, CCVT, line trap and line tuner

*Smith Street 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, CCVT, line trap, line tuner, breaker and breaker disconnect switches

## Transmission Line Ratings:

- Raintree – Smith Street (978) 115 kV Line
  - Before Proposed Solution: 103 MVA SN / 129 MVA SE
  - After Proposed Solution: 129 MVA SN / 156 MVA SE

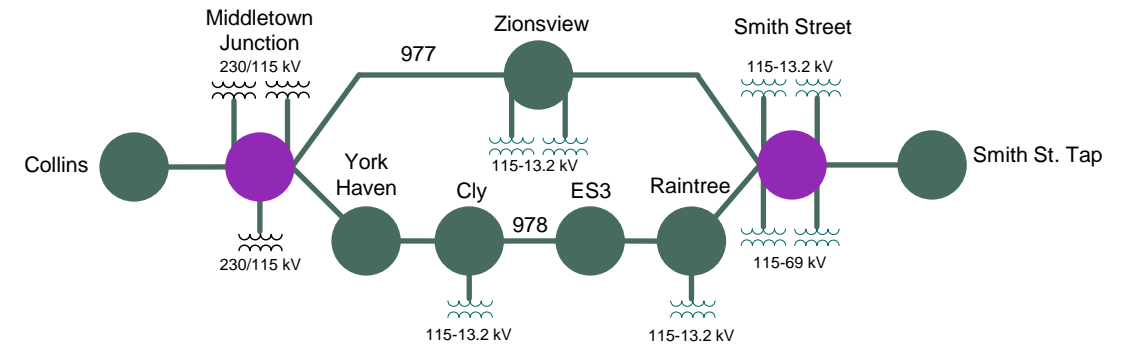
## Alternatives Considered:

- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$1.1M

Projected IS Date: 12/31/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: PN-2018-001  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

Project Driver(s):  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

Substation/Line Equipment Limits

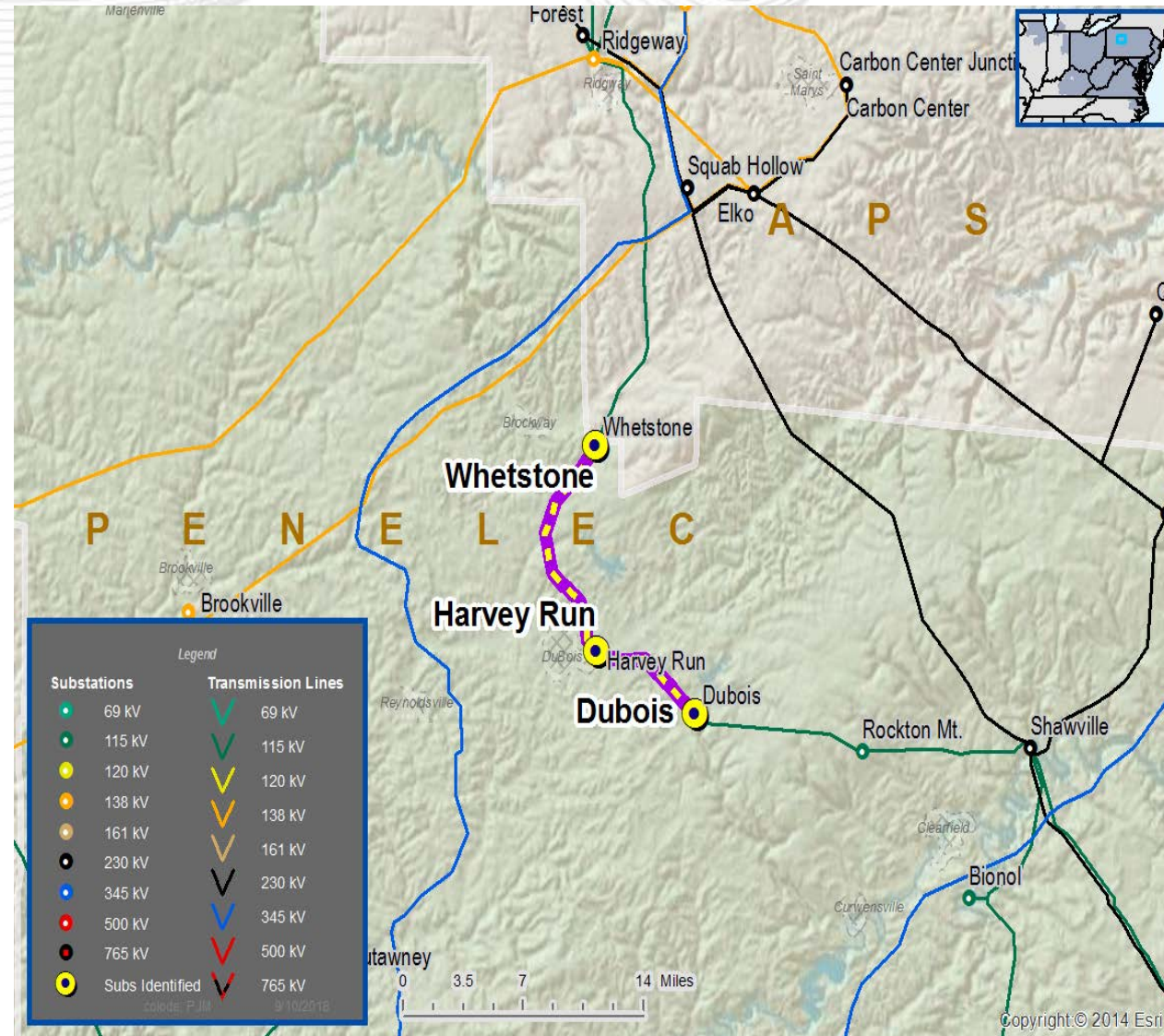
- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

- Maintenance/rehab work will be performed on the Dubois-Harvey Run-Whetstone 115 kV line.

Transmission line rating limited by terminal equipment.

- Dubois – Harvey Run 115 kV line: Existing emergency line rating is 179 MVA. Existing conductor emergency rating is 245 MVA.
- Harvey Run – Whetstone 115 kV line: Existing emergency line rating is 172 MVA. Existing conductor emergency rating is 245 MVA.





Need Number: PN-2018-001

**Proposed Solution:**

*Dubois – Harvey Run – Whetstone 115 kV Line Rehab*

- Rehab approximately 14.25 miles of wood pole construction

*Dubois 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line trap, substation conductor, line tuner, CCVT, circuit breaker and breaker disconnects

*Harvey Run 115 kV Substation – Terminal equipment to be replaced includes:*

- Substation conductor, disconnect switches and CVTs

*Whetstone 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line trap, substation conductor, line tuner, CCVT, circuit breaker and breaker disconnects

**Transmission Line Ratings:**

- Dubois – Harvey Run 115 kV Line
  - Before Proposed Solution: 164 MVA SN / 179 MVA SE
  - After Proposed Solution: 202 MVA SN / 245 MVA SE
- Harvey Run – Whetstone 115 kV Line
  - Before Proposed Solution: 137 MVA SN / 172 MVA SE
  - After Proposed Solution: 202 MVA SN / 245 MVA SE

**Alternatives Considered:**

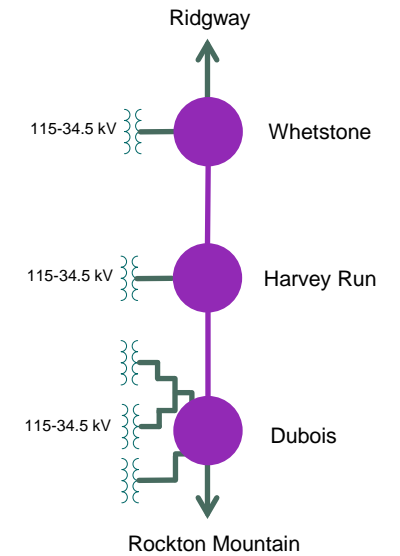
- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$5.3M

Projected IS Date: 12/31/2021

Status: Conceptual

Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	



Need Number: PN-2018-002  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

**Project Driver(s):**

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

Line Condition Rebuild/Replacement

- Equipment characteristics are near or beyond existing service life or contain components that are obsolete.

Substation/Line Equipment Limits

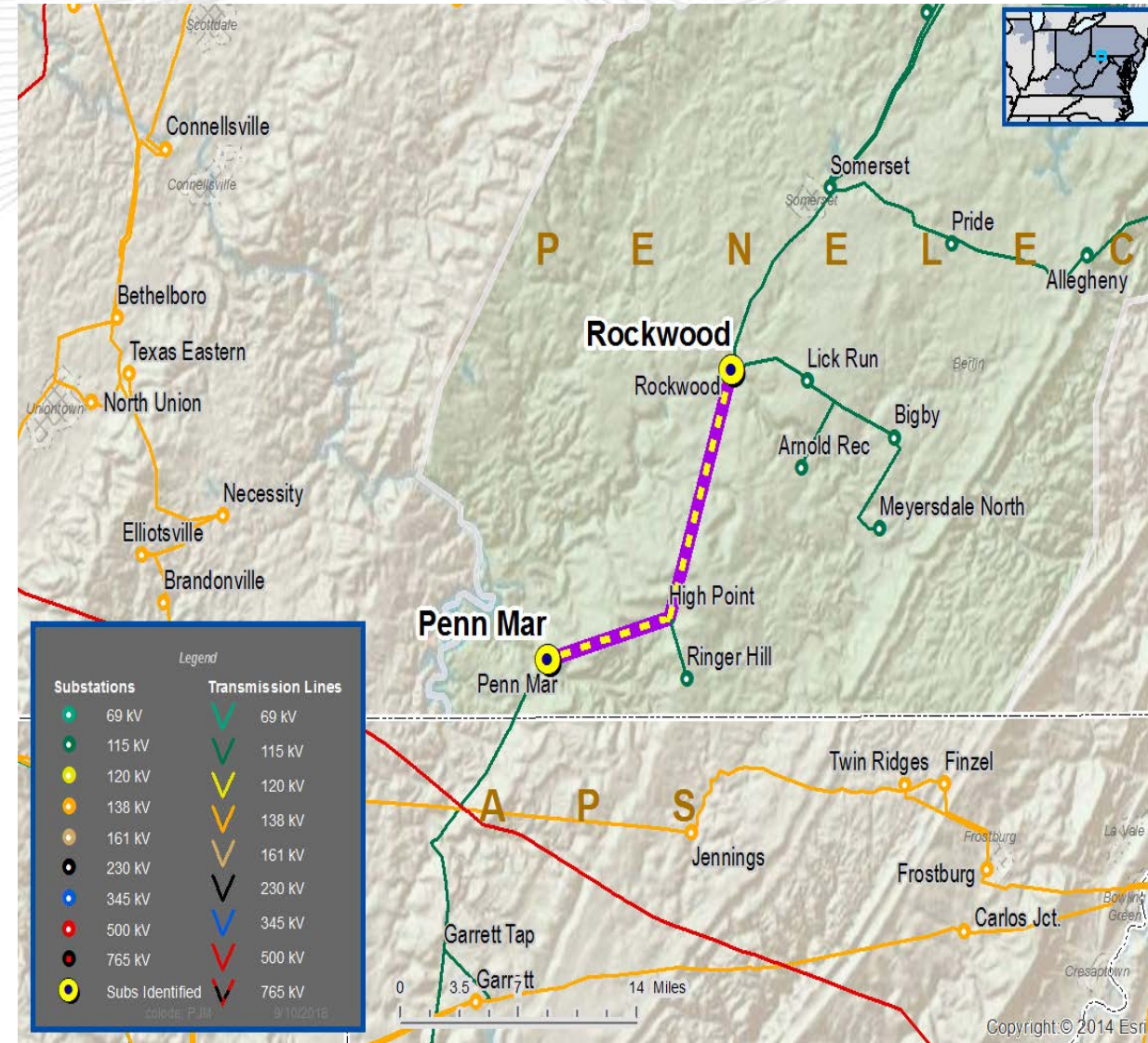
- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

Reconductor/Rebuild Transmission Lines

- Transmission lines with high loading while factoring in its overall condition assessment.

**Problem Statement**

- Entire Penn Mar-Rockwood 115 kV line is at or beyond service life. Transmission line loading exceeds 90% under N-1 contingency.
- Transmission line rating limited by terminal equipment.
- Penn Mar – High Point 115 kV line: Existing emergency line rating is 174 MVA. Existing conductor emergency rating is 179 MVA.
- High Point – Rockwood 115 kV line: Existing emergency line rating is the existing conductor emergency rating.



**Proposed Solution:**

*Penn Mar – High Point – Rockwood 115 kV Line Rebuild*

- Rebuild/reconductor approximately 14.8 miles of wood pole construction

*Rockwood 115 kV Substation*

- Adjust CT ratios and replace substation conductor and breaker disconnect

*Penn Mar 115 kV Substation*

- Adjust relaying and replace CTs, substation conductor, line drops, circuit breaker and disconnect switches

**Transmission Line Ratings:**

- Penn Mar – High Point 115 kV Line
  - Before Proposed Solution: 137 MVA SN / 174 MVA SE
  - After Proposed Solution: 273 MVA SN / 333 MVA SE
- High Point – Rockwood 115 kV Line
  - Before Proposed Solution: 148 MVA SN / 179 MVA SE
  - After Proposed Solution: 260 MVA SN / 311 MVA SE

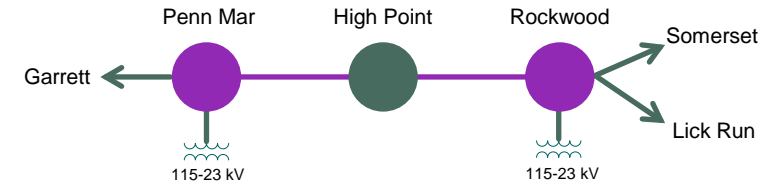
**Alternatives Considered:**








- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$29.3M

Projected IS Date: 6/1/2020

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: PN-2018-003  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

Upgrade Relay Schemes

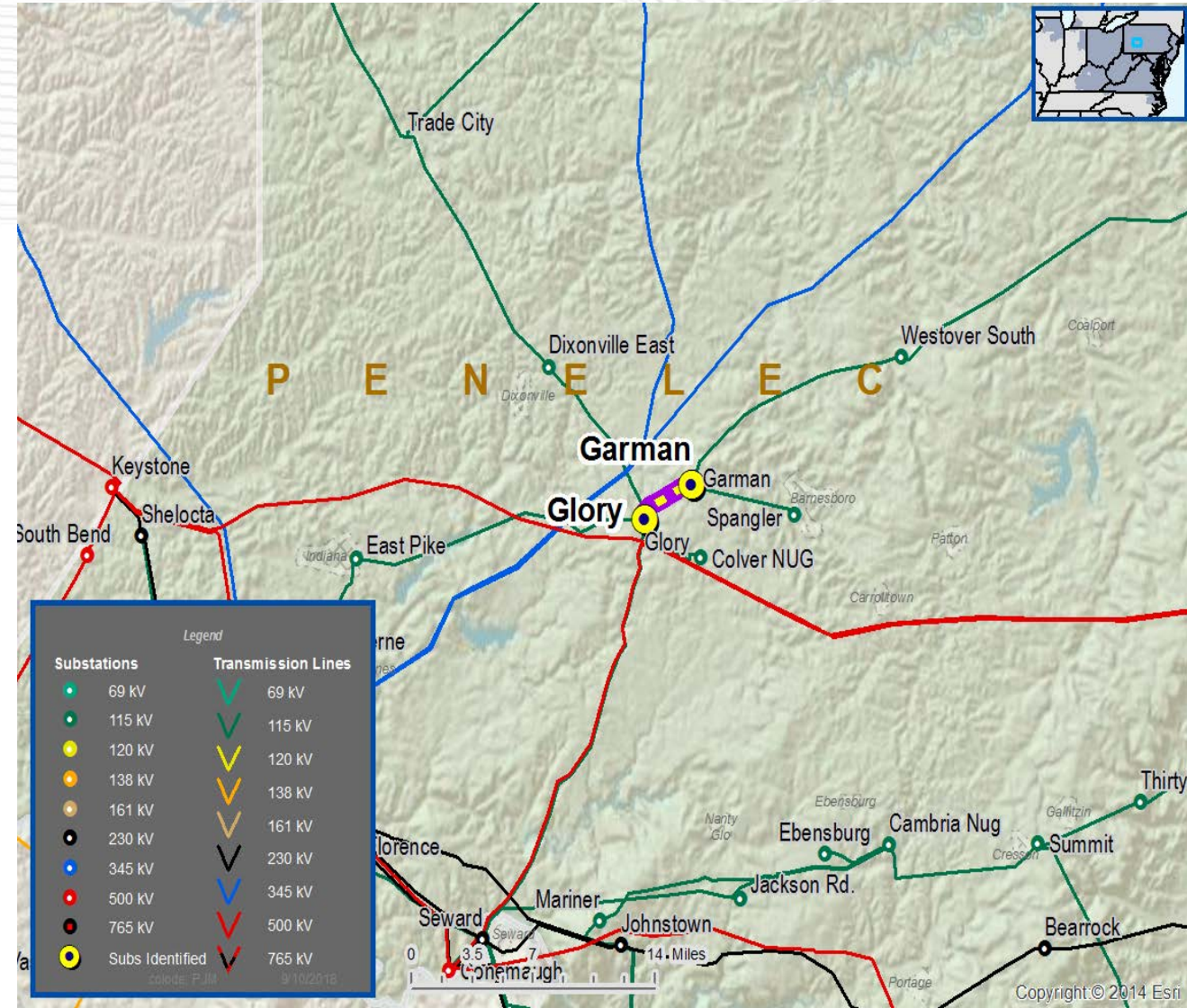
- Upgrade relay schemes that have historically high percentage of misoperation.

Substation/Line Equipment Limits

- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

- Relays on Garman – Glory 115 kV line evaluated by Transmission Planning and Protection and determined to be obsolete and/or degraded condition.
- Transmission line rating limited by terminal equipment. Existing emergency line rating is 233 MVA. Conductor emergency rating is 282 MVA.



Need Number: PN-2018-003

### Proposed Solution:

*Garman – Glory 115 kV replace relays prone to misoperations*

*Garman 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, line drops, CCVT, line trap, line tuner, coax, arresters and bus tie breaker

*Glory 115 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, DFR, CCVT, line trap, line tuner, coax, arresters and breaker

### Transmission Line Ratings:

- Garman – Glory 115 kV Line
  - Before Proposed Solution: 204 MVA SN / 233 MVA SE
  - After Proposed Solution: 232 MVA SN / 282 MVA SE

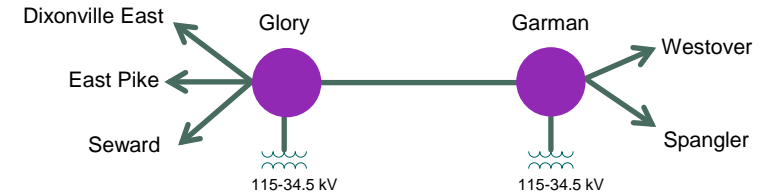
### Alternatives Considered:

- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$1.1M

Projected IS Date: 10/26/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	



# Penelec Transmission Zone

Need Number: PN-2018-004

Process Stage: Solutions Meeting

Need Presented: 9/21/2018

## Project Driver(s):

*Operational Flexibility and Efficiency*

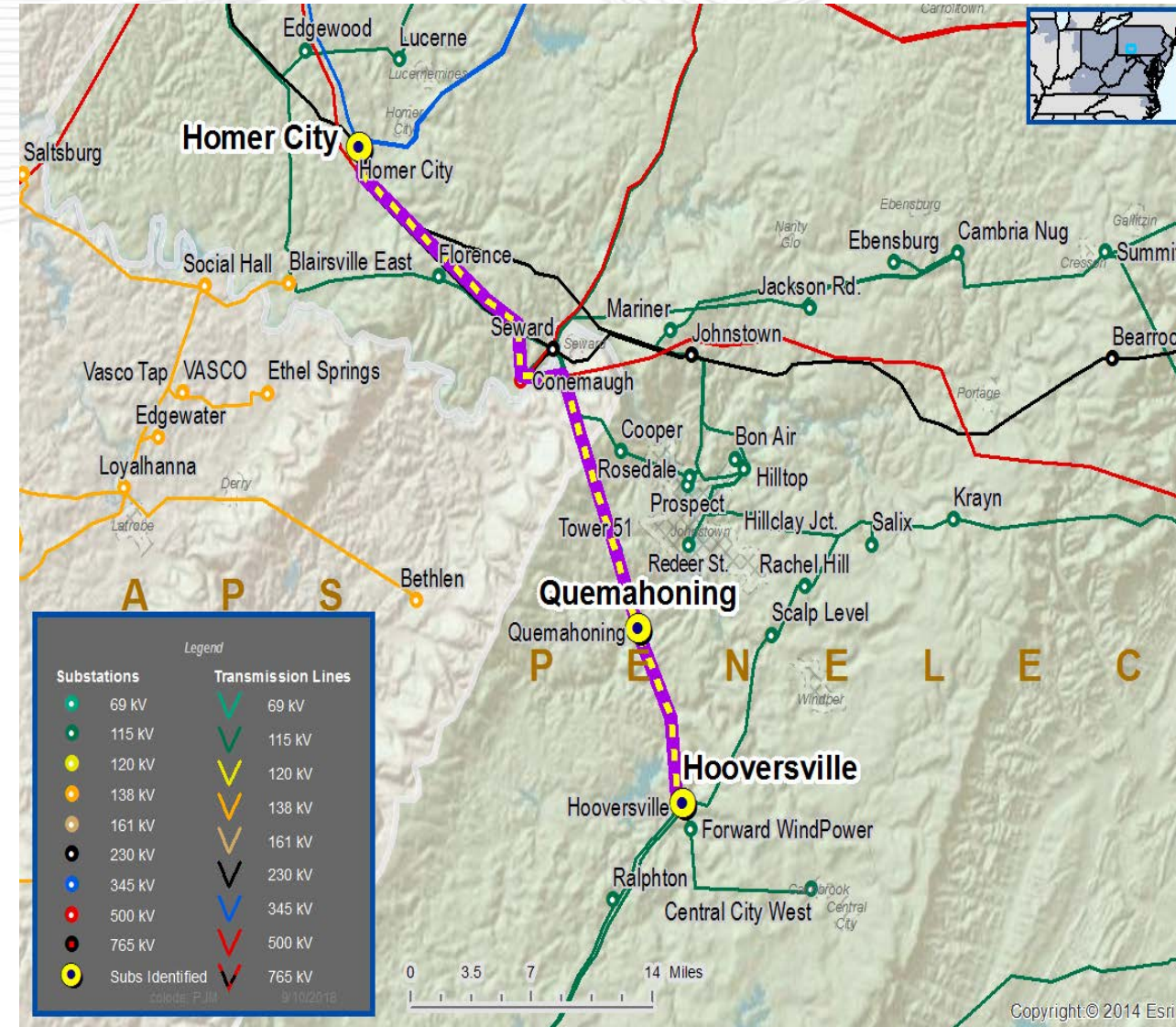
## Specific Assumption Reference(s)

### Critical Updates to Standards

- Elimination of Ground Switches – Where high-speed ground switches exist, a circuit breaker should be considered for installation to protect the transformer and not trip the line, thereby eliminating outages to customers on the transmission line.
- Line Switches – Switches should be considered for replacement to allow for desired operations (i.e. line charging, loop splitting, etc.).

## Problem Statement

- Planned maintenance on the Homer City – Hooversville 230 kV line results in the interruption of service for a large industrial customer served out of Quemahoning Substation. The line sectionalizing devices at Quemahoning are inadequate to interrupt charging current on the Homer City side of the substation. At Hooversville, the transformer breaker failure scheme utilizes a ground switch on the high side of the 230/115 kV transformer.







Need Number: PN-2018-004

**Proposed Solution:**

*Quemahoning 230 kV SF6 Interrupters*

- Install SF6 interrupters on 230 kV network switches

*Hooversville 230 kV Substation*

- Eliminate ground switch and install 230 kV breaker on high side of 230/115 kV transformer

*Homer City 230 kV Substation*

- Adjust relay settings

**Transmission Line Ratings:**

- Homer City – Quemahoning 230 kV Line
  - Before Proposed Solution: 548 MVA SN / 688 MVA SE
  - After Proposed Solution: 678 MVA SN / 813 MVA SE
- Quemahoning – Hooversville 230 kV Line
  - Before Proposed Solution: 488 MVA SN / 488 MVA SE
  - After Proposed Solution: 678 MVA SN / 813 MVA SE

**Alternatives Considered:**

- None

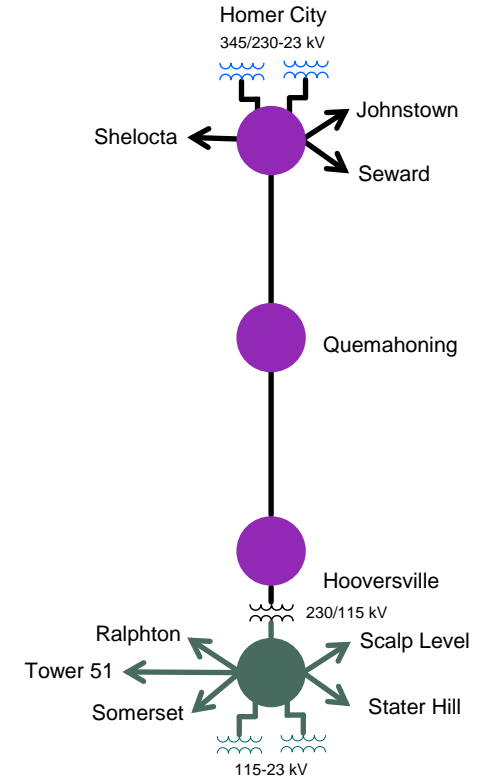
Estimated Project Cost: \$1.0M

Projected IS Date: 12/31/2019

Status: Conceptual

Penelec Transmission Zone

Legend	
500 kV	
345 kV	
230 kV	
115 kV	
69 kV	
46 kV	
New	



Need Number: PN-2018-005  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

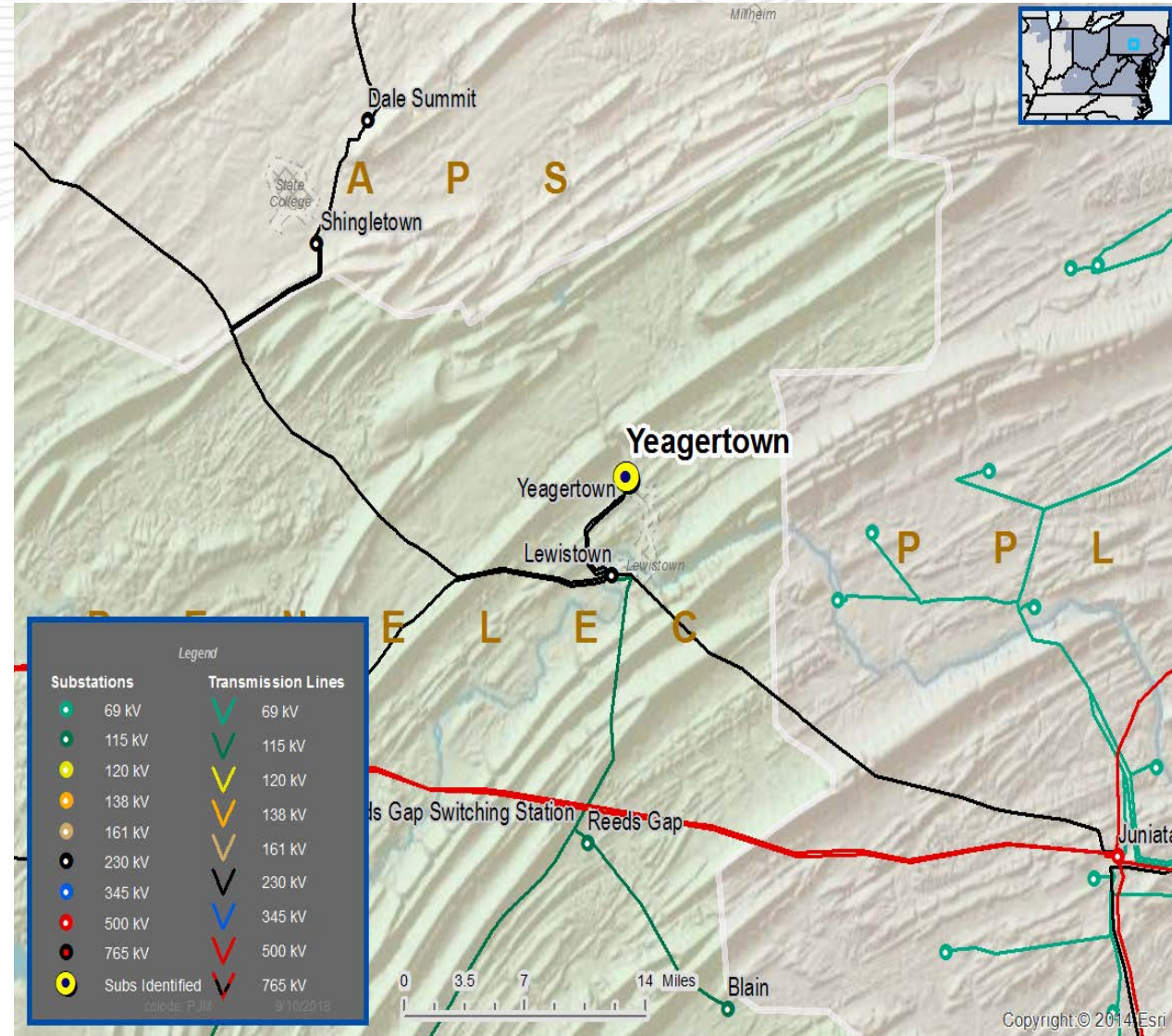
**Project Driver(s):**  
*Operational Flexibility and Efficiency*

**Specific Assumption Reference(s)**  
 Add/Expand Bus Configuration

- Loss of substation bus adversely impacts transmission system performance.
- Reduce the amount of exposed potential local load loss during contingency conditions.
- Eliminate simultaneous outages to multiple networked elements for stuck breakers, bus outages, N-2 events, etc.

**Problem Statement**

- At Yeagertown, in the event of a stuck 230 kV bus tie breaker, both 230 kV feeds from Lewistown are outaged, along with two 230-46 kV transformers feeding a large industrial customer and a 230/34.5 kV transformer.
- In the current configuration, the 230 kV feeds the 34.5 kV bus via a 230/34.5 kV transformer. The 34.5 kV bus then feeds the 46 kV system via a 46-34.5 kV transformer. This arrangement creates a transmission path through a distribution facility.





Need Number: PN-2018-005

**Proposed Solution:**

*Yeagertown 230 kV & 46 kV Ring Bus and 3<sup>rd</sup> 230-46 kV Transformer*

- Construct a new five breaker 46 kV ring bus
- Construct a new six breaker 230 kV ring bus
- Loop Lewistown – Logan 1LK line into the 46 kV ring bus
- Tap the Yeagertown – Logan 1YL line and connect to the 46 kV ring bus
- Install a new 230-46 kV 60/80/100 MVA transformer
- Install a 46 kV bus tie breaker to be operated as normally open
- Operate the 46-34.5 kV transformer high side circuit breaker as normally open

**Transformer Ratings:**

- New Yeagertown 230-46 kV Transformer
  - Before Proposed Solution: N/A
  - After Proposed Solution: 120 MVA SE / 130 MVA SN

**Transmission Line Ratings:**

- Yeagertown – Logan Tap (1YL) 46 kV Line
  - Before Proposed Solution: N/A
  - After Proposed Solution: 81 MVA SE / 98 MVA SN

**Alternatives Considered:**

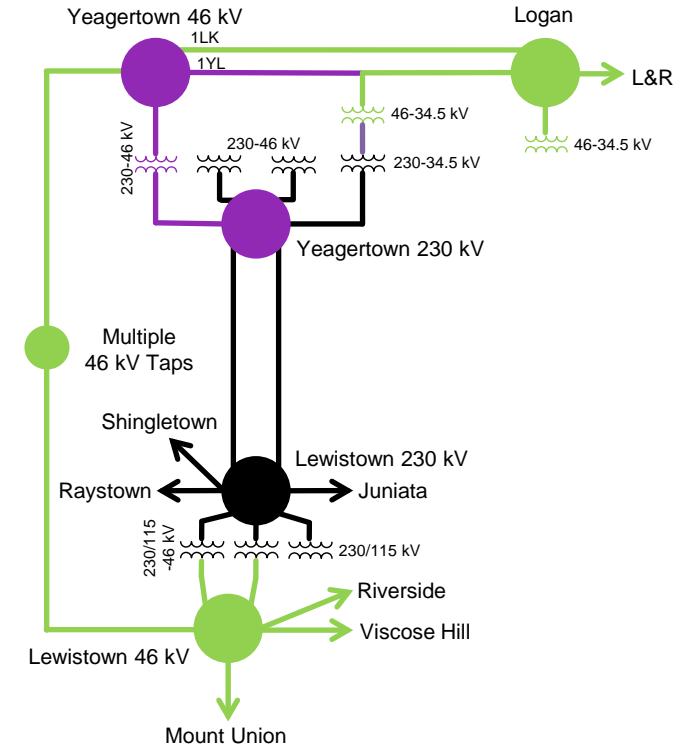
- None

Estimated Project Cost: \$20.4M

Projected IS Date: 12/31/2020

Status: Conceptual

Legend	
500 kV	
345 kV	
230 kV	
115 kV	
69 kV	
46 kV	
Other	
New	



Need Number: PN-2018-006  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

**Project Driver(s):**  
*Operational Flexibility and Efficiency*

**Specific Assumption Reference(s)**

Substation Condition Rebuild/Replacement

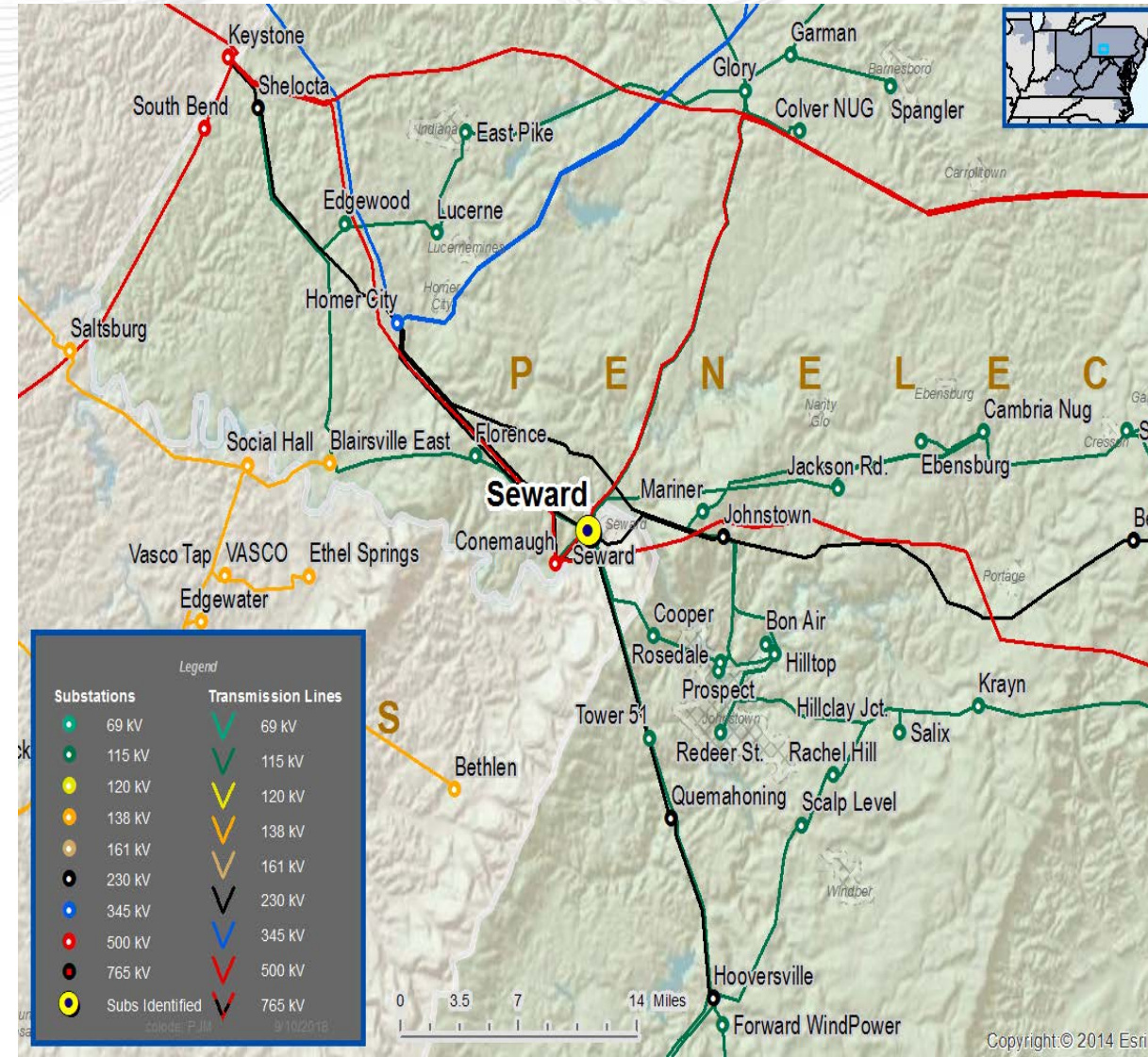
- Show an increasing negative trend in maintenance findings and/or costs.
- Are at a higher risk for failure based on asset design characteristics, or historical industry/company performance data, or application design error.
- Are near or beyond expected service life or obsolete.

Add/Expand Bus Configuration

- Eliminate simultaneous outages to multiple networked elements under N-1 analysis.

**Problem Statement**

- A fault on the Seward #9 230/115 kV transformer outages the Seward #11 230/115 kV transformer or a fault on the Seward #11 230/115 kV transformer outages the Seward #9 230/115 kV transformer.
- Seward #9 230/115 kV transformer has an increased failure probability due to aging/deteriorating bushings, components and fluid. The transformer was manufactured in 1971.



Need Number: PN-2018-006

## Proposed Solution:

*Seward #9 230/115 kV Transformer Replacement & 230 kV Ring Bus*

- Expand 230 kV ring bus to a six breaker ring bus
- Relocate the Homer City – Seward 230 kV and Johnstown – Seward 230 kV line terminals
- Replace the #9 230/115 kV with a 230/115 kV 180/240/300 MVA transformer
- Install a 115 kV reactor on the low side of the #11 230/115 kV transformer

Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

## Transformer Rating:

- Seward #9 230/115 kV Transformer
  - Before Proposed Solution: 241 MVA SN / 303 MVA SE
  - After Proposed Solution: 375 MVA SN / 438 MVA SE

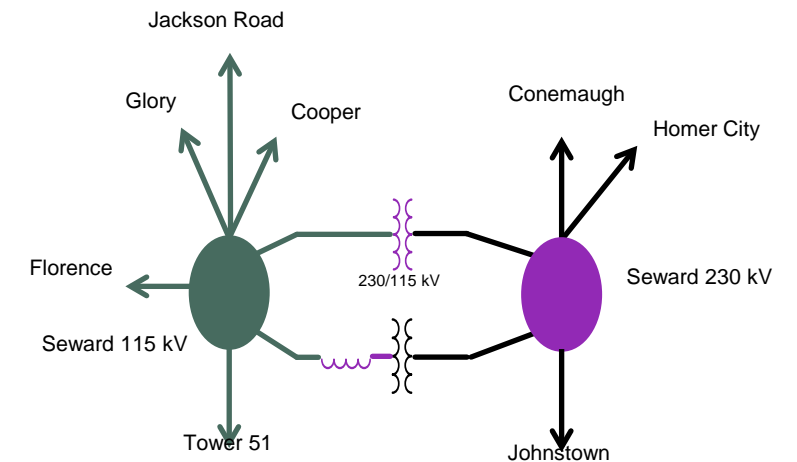
## Alternatives Considered:

- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$15.7M

Projected IS Date: 12/31/2020

Status: Conceptual



Need Number: PN-2018-007  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

**Project Driver(s):**  
*Operational Flexibility and Efficiency*  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**  
 Substation Condition Rebuild/Replacement

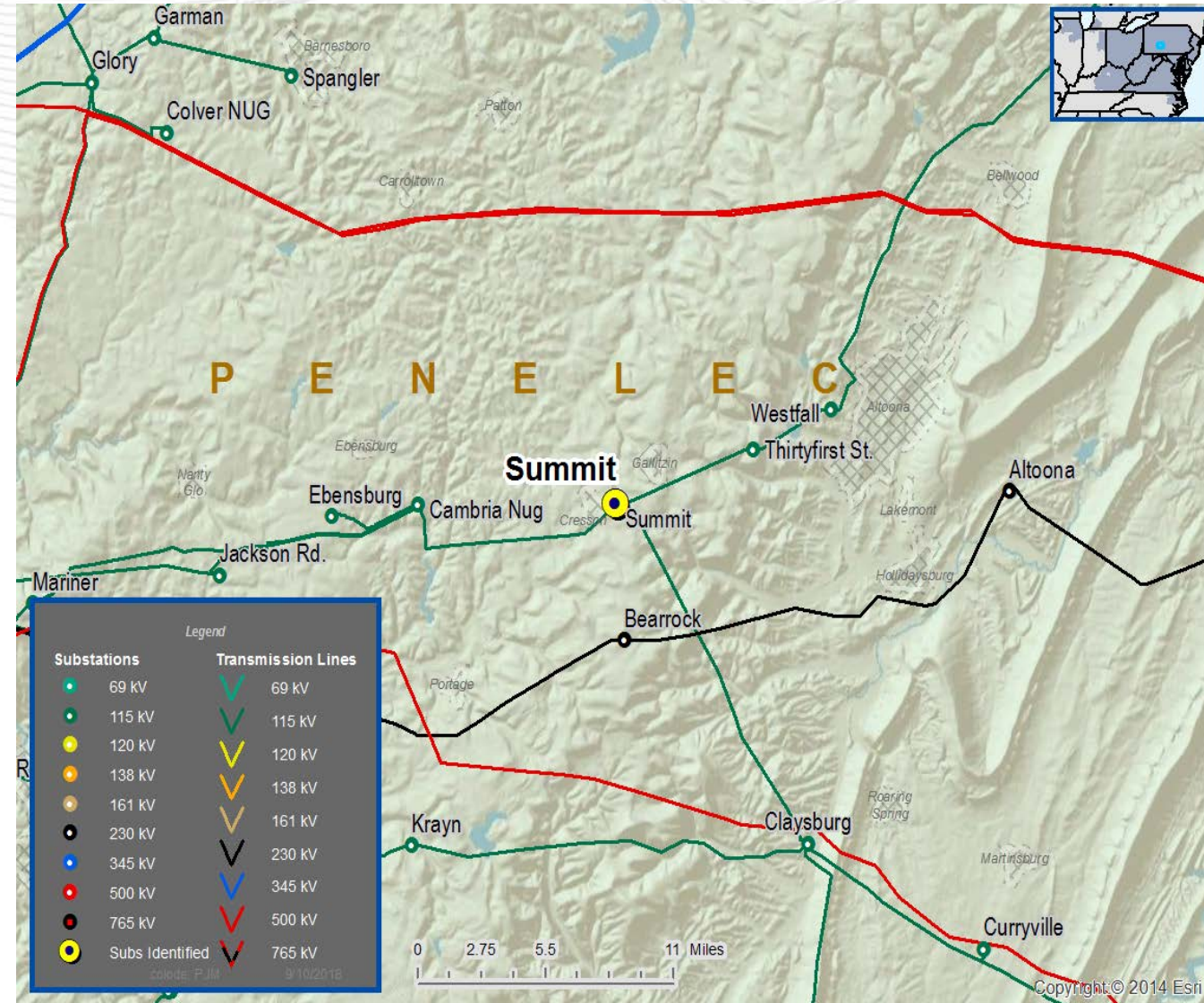
- Show an increasing negative trend in maintenance findings and/or costs.
- Are near or beyond expected service life or obsolete.

**Add/Expand Bus Configuration**

- Loss of substation bus adversely impacts transmission system performance.
- Eliminate simultaneous outages to multiple networked elements for stuck breakers, bus outages, N-2 events, etc.

**Problem Statement**

- In the event of a Summit #1 or #2 115-46 kV transformer fault, the line exit breakers and the bus tie breaker are relied upon to clear the fault. The corresponding section of the bus is cleared, creating transfer and thermal issues.
- A stuck 115 kV bus tie breaker at Summit will clear the entire 115 kV station.
- Summit #1 and #2 115-46 kV transformers have an increased failure probability due to aging/deteriorating bushings, components and fluid. The #1 transformer was manufactured in 1937. The #2 transformer was manufactured in 1971.



**Need Number:** PN-2018-007

**Proposed Solution:**

*Summit 115 kV & 46 kV Substation Reconfiguration & Transformer Replacement*

- Construct a five breaker 115 kV ring bus
- Construct a 46 kV breaker-and-a-half station with eight breakers
- Replace the #1 and #2 115/46 kV with 115/46 kV 45/60/75 MVA transformers
- Adjust relay settings at remote ends

*Eldorado 46 kV Substation – Terminal equipment to be replaced includes:*

- CTs, substation conductor, circuit breaker and disconnect switches

*Jackson Road 46 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, substation conductor, arresters, line and bus disconnect switches and circuit breaker

**Transmission Line Ratings:**

- Summit – Claysburg 115 kV Line
  - Before Proposed Solution: 175 MVA SN / 237 MVA SE
  - After Proposed Solution: 229 MVA SN / 278 MVA SE
- Summit – 31<sup>st</sup> Street 115 kV Line
  - Before Proposed Solution: 221 MVA SN / 263 MVA SE
  - After Proposed Solution: 232 MVA SN / 282 MVA SE
- Summit – Ashville (SGC Tap) 46 kV Line
  - Before Proposed Solution: 26 MVA SN / 28 MVA SE
  - After Proposed Solution: 37 MVA SN / 37 MVA SE
- Summit – Gallitzin Tap – Eldorado 46 kV Line
  - Before Proposed Solution (Summit – Gallitzin Tap): 54 MVA SN / 66 MVA SE
  - Before Proposed Solution (Gallitzin Tap – Eldorado): 55 MVA SN / 69 MVA SE
  - After Proposed Solution: 81 MVA SN / 98 MVA SE
- Summit – Kokomo Road 46 kV Line
  - Before Proposed Solution: 25 MVA SN / 25 MVA SE
  - After Proposed Solution: 32 MVA SN / 32 MVA SE
- Jackson Road – Ampfire Mining Tap 46 kV Line
  - Before Proposed Solution: 24 MVA SN / 24 MVA SE
  - After Proposed Solution: 67 MVA SN / 81 MVA SE

**Transformer Ratings:**

- Summit #1 115/46 kV Transformer
  - Before Proposed Solution: 32 MVA SN / 35 MVA SE
  - After Proposed Solution: 97 MVA SN / 97 MVA SE
- Summit #2 115/46 kV Transformer
  - Before Proposed Solution: 43 MVA SN / 44 MVA SE
  - After Proposed Solution: 97 MVA SN / 97 MVA SE

**Alternatives Considered:**

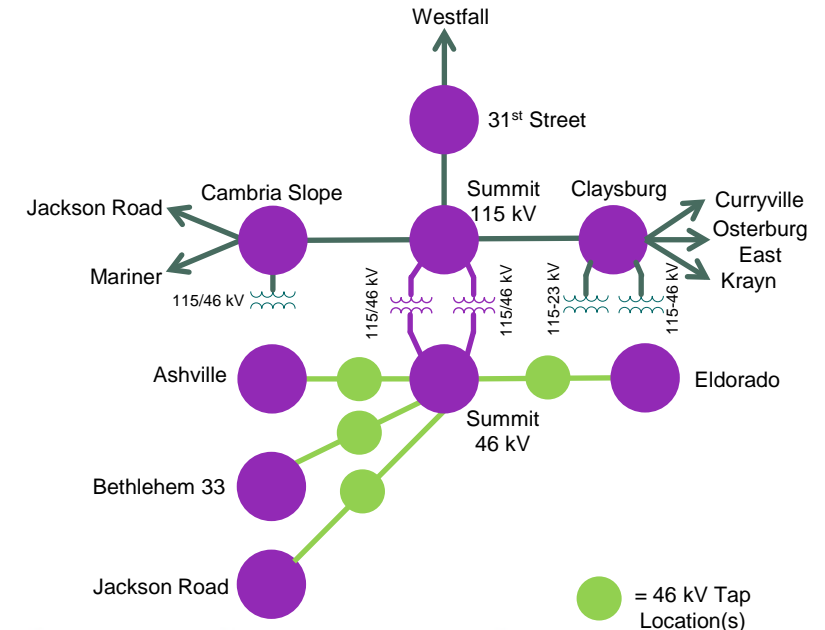
- Maintain existing condition and elevated risk of failure

**Estimated Project Cost:** \$26.3M

**Projected IS Date:** 12/31/2020

**Status:** Conceptual

Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	



Need Number: PN-2018-008

Process Stage: Solutions Meeting

Need Presented: 9/21/2018

Project Driver(s):

*Operational Flexibility and Efficiency*

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

Substation Condition Rebuild/Replacement

- Show an increasing negative trend in maintenance findings and/or costs.
- Are near or beyond expected service life or obsolete.

Add/Replace Transformers

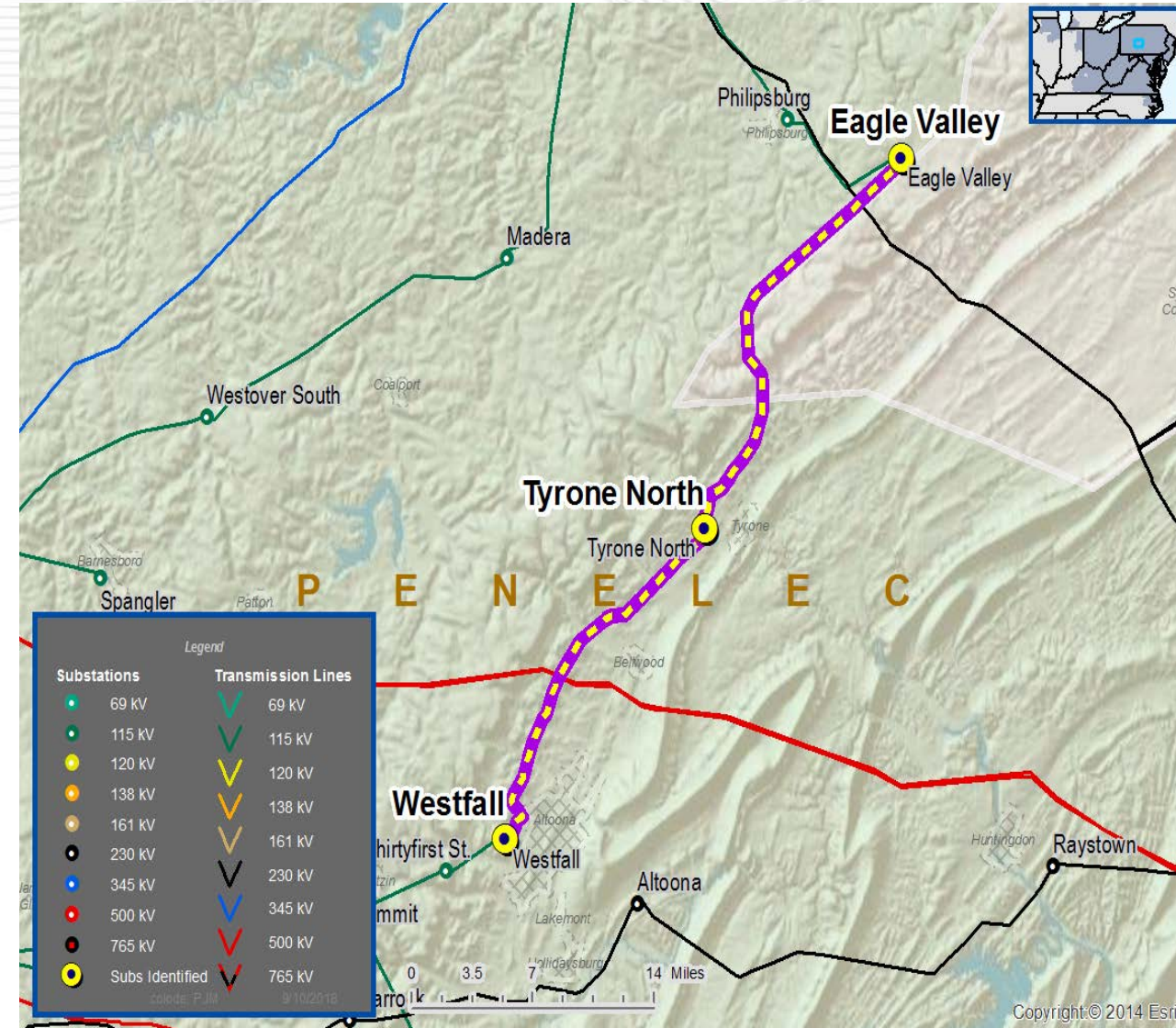
- Transformer that if added or replaced would alleviate loading conditions under contingency scenarios.

Add/Expand Bus Configuration

- Loss of substation bus adversely impacts transmission system performance.
- Reduce the amount of exposed potential local load loss during contingency conditions.
- Eliminate simultaneous outages to multiple networked elements under N-1 analysis.

**Problem Statement**

- Tyrone North 115 kV switching station serves ~50 MW of radial load and relies on breakers at Eagle Valley and Westfall 115 kV substations for remote clearing of fault conditions. Transformer or line faults result in interruption of the entire network path and interruption of service to both the #1 and #2 115-46 kV transformers with limited network transfer capability. In the event of a #1 115-46 kV transformer fault, all load cannot be served by the #2 115-46 kV transformer (the transformer loads to 123% of its 41 MVA summer emergency rating during restoration efforts under peak conditions).
- Tyrone North #2 115-46 kV transformer has an increased failure probability due to aging/deteriorating bushings, components and fluid. The transformer was manufactured in 1950.





Need Number: PN-2018-008

### Proposed Solution:

*Tyrone North 115 kV Ring Bus & #1 115/46 kV Transformer Replacement*

- Construct a four breaker 115 kV ring bus
- Replace the #2 115/46 kV 45/60/75 MVA transformer
- Install a 46 kV 1200 A bypass switch between the Tipton and Warrior Ridge 46 kV lines

### Transmission Line Ratings:

- Tyrone North – Westfall 115 kV Line
  - Before Proposed Solution: 175 MVA SN / 237 MVA SE
  - After Proposed Solution: 202 MVA SN / 245 MVA SE
- Tyrone North – Eagle Valley 115 kV Line
  - Before Proposed Solution: 147 MVA SN / 191 MVA SE
  - After Proposed Solution: 202 MVA SN / 245 MVA SE
- Tyrone North #2 115/46 kV Transformer
  - Before Proposed Solution: 38 MVA SN / 41 MVA SE
  - After Proposed Solution: 97 MVA SN / 97 MVA SE

### Alternatives Considered:

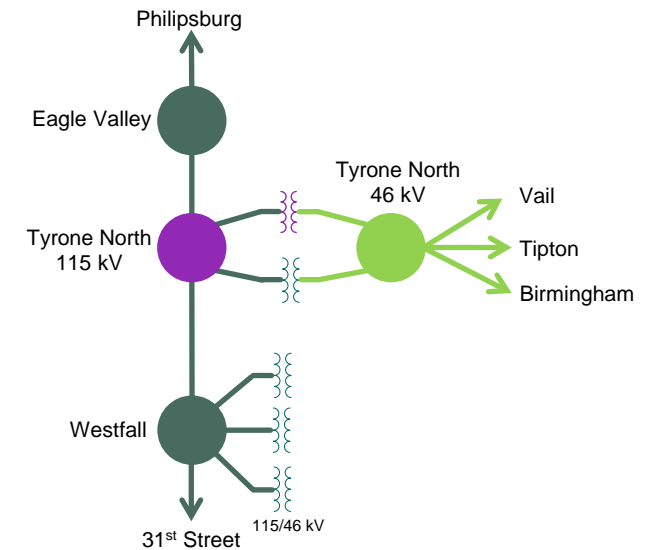
- Maintain existing condition and elevated risk of failure

Estimated Project Cost: \$4.8M

Projected IS Date: 12/31/2020

Status: Conceptual

Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	



Need Number: PN-2018-009  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

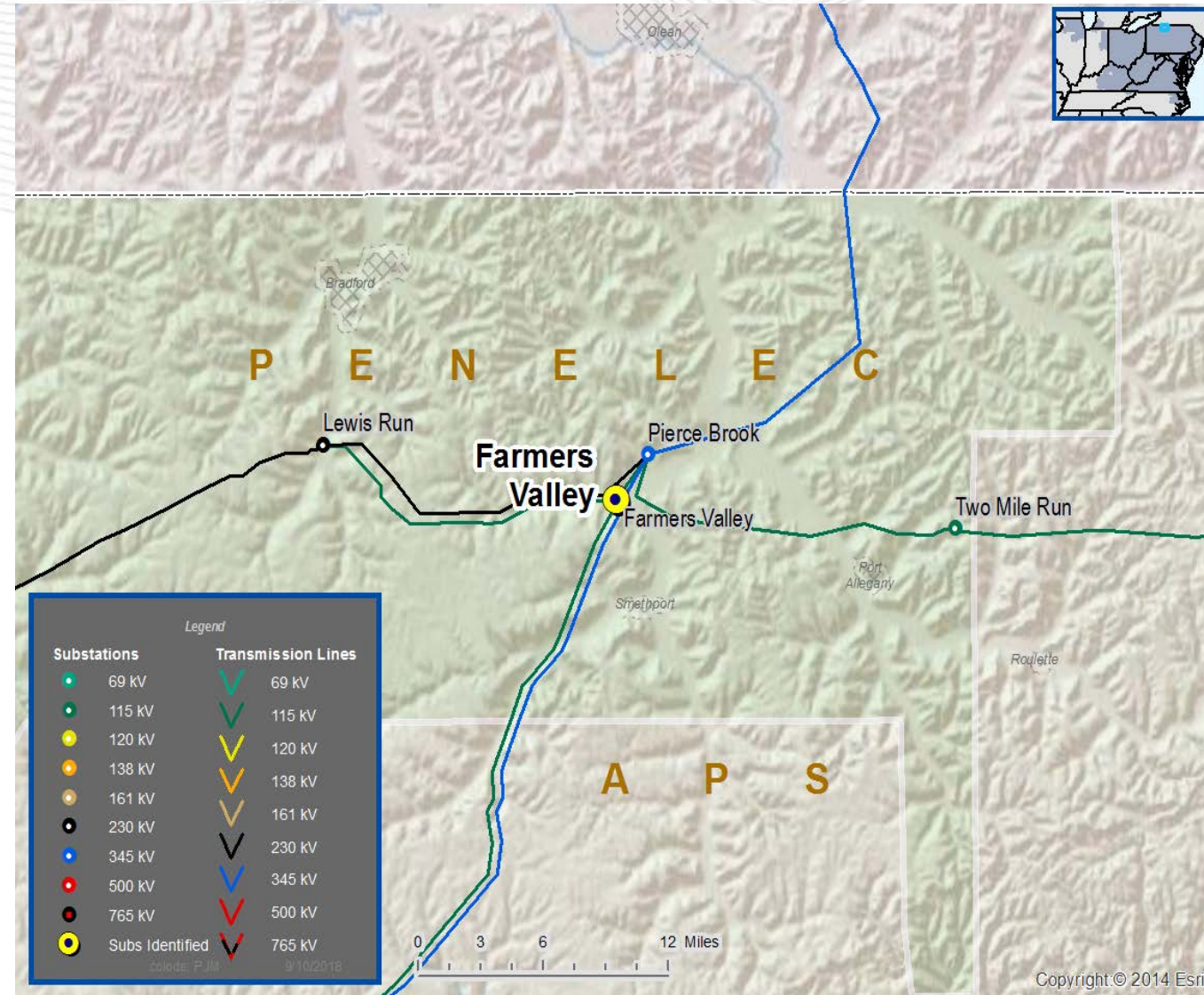
Project Driver(s):  
*Operational Flexibility and Efficiency*

Specific Assumption Reference(s)  
 Add/Expand Bus Configuration

- Reduce the amount of exposed potential local load loss during contingency conditions.
- Eliminate simultaneous outages to multiple networked elements (excluding capacitor banks) under N-1 analysis.
- If substation bus configurations limit the ability to perform substation maintenance, the substation and/or transmission lines should be evaluated for reconfiguration.

### Problem Statement

Farmers Valley 115 kV bus #1 does not have a transmission source, while Farmers Valley 115 kV bus #2 has two sources. Bus maintenance or outages result in loss of both 115-34.5 kV transformers impacting approximately 3,377 customers and approximately 10 MW of load.



Need Number: PN-2018-009

**Proposed Solution:**

*Farmers Valley 115 kV Substation: Relocate Ridgway Line to Lewis Run Terminal*

- Relocate the existing Ridgway line to the old Lewis Run terminal

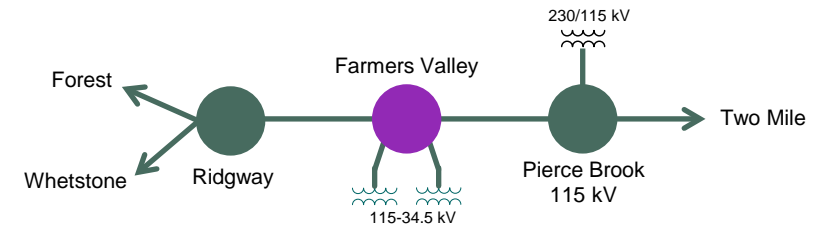
**Alternatives Considered:**








- Farmers Valley 115 kV Ring Bus

Estimated Project Cost: \$1.3M

Projected IS Date: 6/1/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: PN-2018-010  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

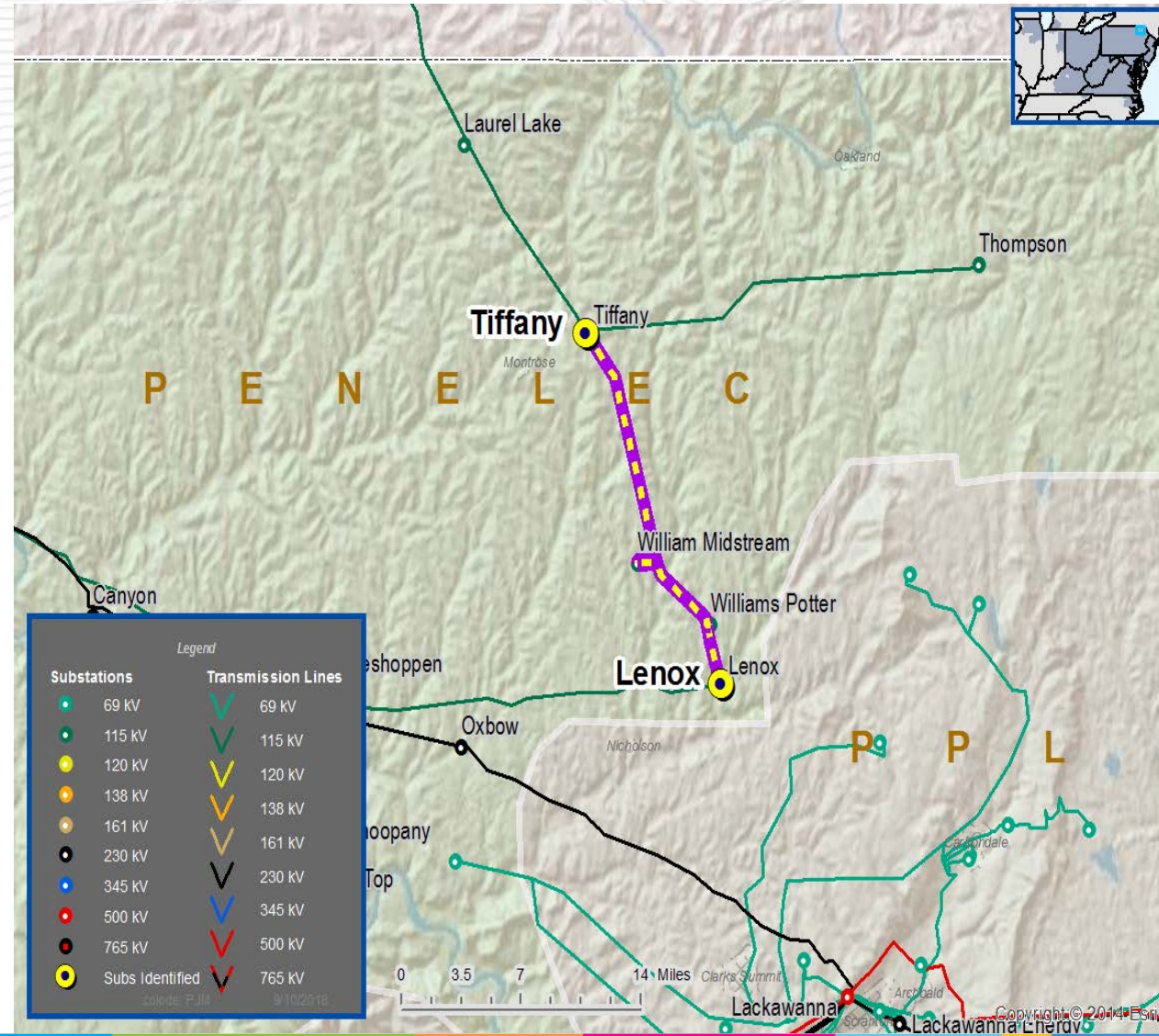
Project Driver(s):  
*Customer Service*

### Specific Assumption Reference(s)

- New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

### Problem Statement

- New Customer Connection – A customer requested 115 kV service for load of approximately 16 MW near the Lenox – Tiffany 115 kV line. Requested in-service date is 7/2019.



Need Number: PN-2018-010

**Proposed Solution:**

*Provide 115 kV Service*

- Tap the existing Lenox – Tiffany 115 kV line
- Install two 115 kV line switches
- Install 115 kV line trap at tap location
- Install 115 kV switch on tap
- Construct ~200 ft of 115 kV line to customer substation

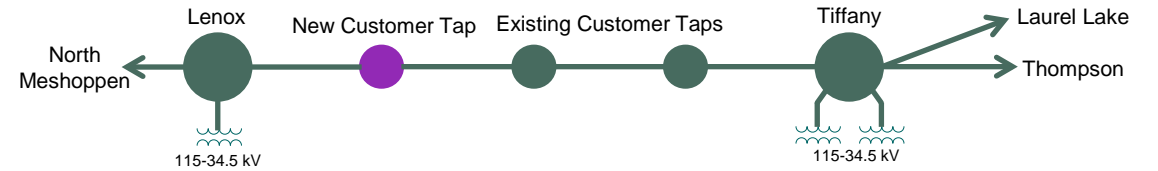
**Alternatives Considered:**

- None (obligation to serve)

Estimated Project Cost: \$1.2M

Projected IS Date: 4/1/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: PN-2018-011  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

**Project Driver(s):**  
*Operational Flexibility and Efficiency*

**Specific Assumption Reference(s)**

**Substation/Line Equipment Limits**

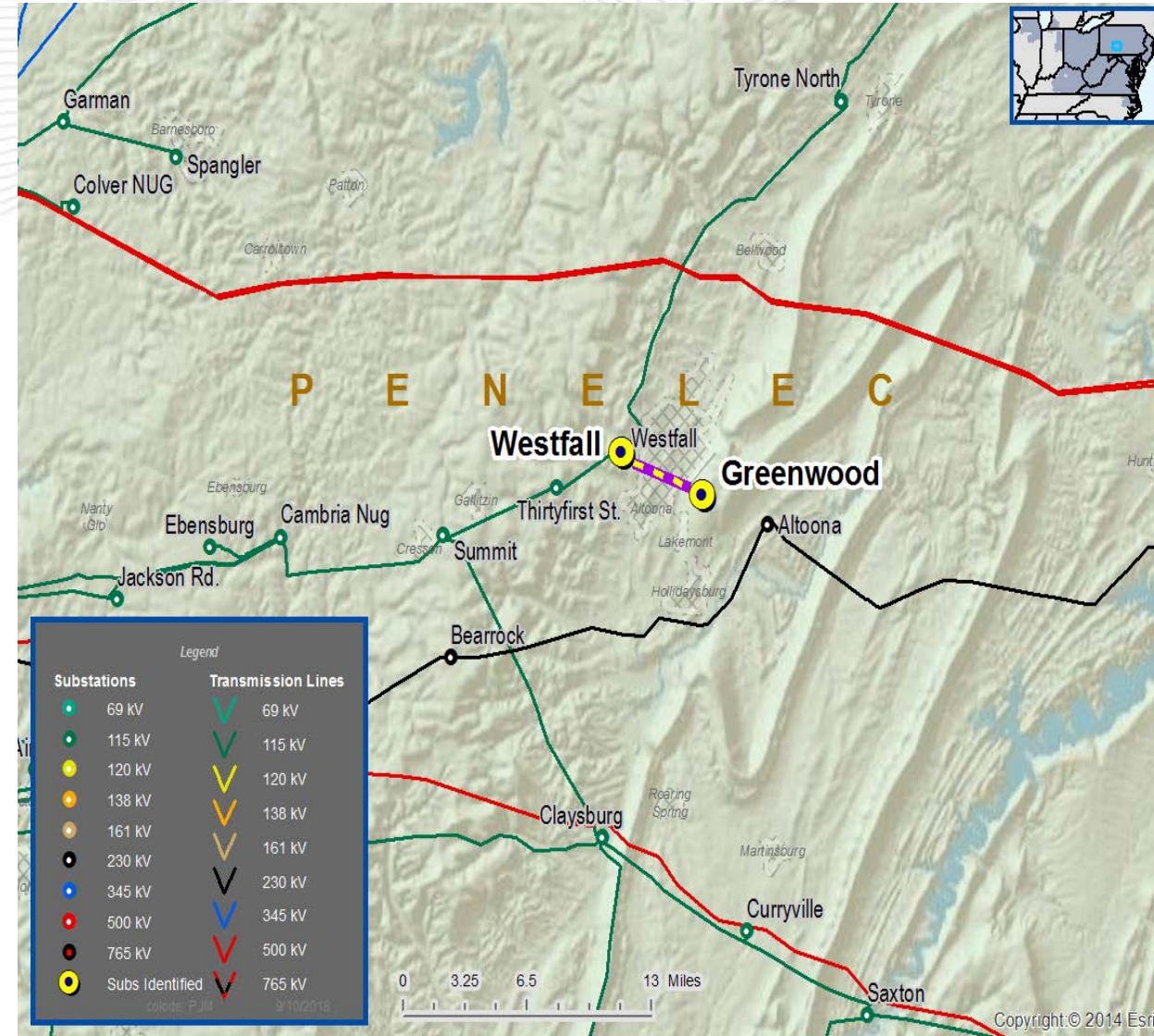
- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Critical Upgrade to Standards**

- Line Switches – Switches should be considered for replacement to allow for desired operations (i.e. line charging, loop splitting, etc.).

**Problem Statement**

- Existing terminal equipment significantly derate the thermal capability of the Greenwood – Westfall 46 kV line. The line sectionalizing devices at East Altoona and Fairview are not capable of loop splitting.
- Transmission line rating limited by terminal equipment.
- Westfall – Fairview 46 kV line: Existing emergency line rating is 69 MVA. Existing conductor emergency rating is 81 MVA
- Fairview – East Altoona 46 kV line: Existing emergency line rating is 69 MVA. Existing conductor emergency rating is 71 MVA.
- East Altoona – Greenwood 46 kV line: Existing emergency line rating is 33 MVA. Existing conductor emergency rating is 81 MVA.





Need Number: PN-2018-011

**Proposed Solution:**

*Greenwood – Westfall 46 kV: Upgrade Bus Conductor & Relay Panels*

*Greenwood 46 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, substation conductor and disconnect switches

*East Altoona 46 kV Substation – Terminal equipment to be replaced includes:*

- Disconnect switches

*Fairview 46 kV Substation – Terminal equipment to be replaced includes:*

- Disconnect switches

*Westfall 46 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, substation conductor and disconnect switches

**Transmission Line Ratings:**

- Greenwood – East Altoona 46 kV Line
  - Before Proposed Solution: 33 MVA SN / 33 MVA SE
  - After Proposed Solution: 67 MVA SN / 81 MVA SE
- Fairview – East Altoona 46 kV Line
  - Before Proposed Solution: 55 MVA SN / 69 MVA SE
  - After Proposed Solution: 59 MVA SN / 71 MVA SE
- Westfall – Fairview 46 kV Line
  - Before Proposed Solution: 55 MVA SN / 64 MVA SE
  - After Proposed Solution: 67 MVA SN / 81 MVA SE

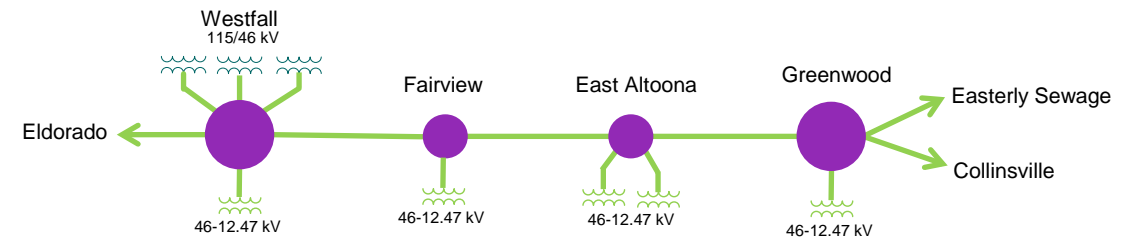
**Alternatives Considered:**

- None

**Estimated Project Cost: \$1.3M**

**Projected IS Date: 6/1/2019**

**Status: Conceptual**



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	

Need Number: PN-2018-012  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

**Project Driver(s):**  
*Operational Flexibility and Efficiency*

**Specific Assumption Reference(s)**

Global Consideration

- Assess the risk associated with bus, stuck breaker, and N-2 contingencies to improve FERC tariffed Transmission < 100 kV facilities.

Network Radial Lines

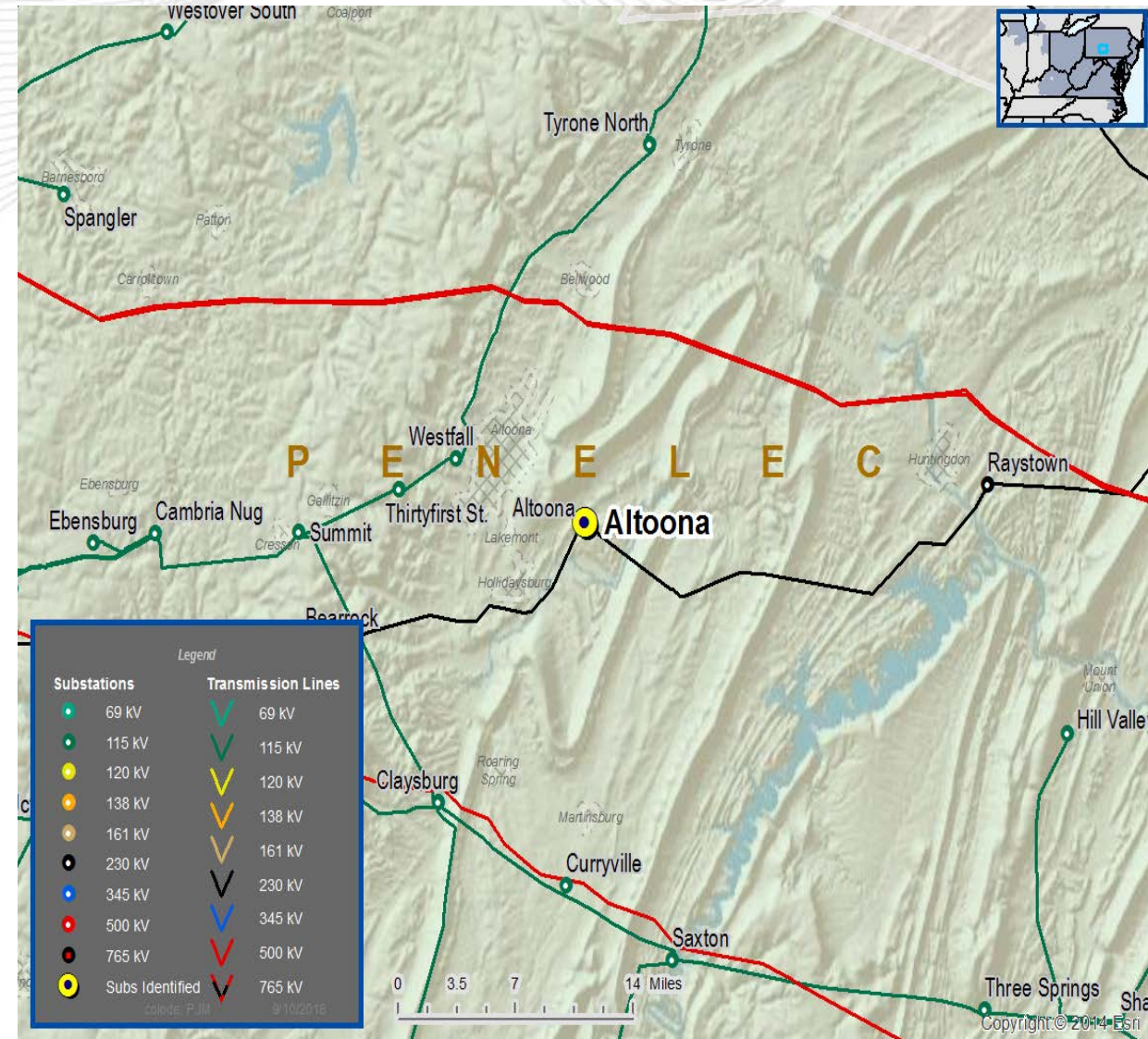
- Radial lines will be evaluated based on load at risk and/or customers impacted along with its proximity to other networked facilities.

Build New Transmission Line

- Network radial lines.

**Problem Statement**

- If **the Altoona – Bear Rock and Raystown – Lewistown 230 kV lines or Raystown – Lewistown and Bear Rock – Johnstown 230 kV lines or both Altoona 230/46 kV transformers are** out of service (N-1-1), voltage on the surrounding 46 kV system is less than 0.80 p.u.







Need Number: PN-2018-012

**Proposed Solutions:**

*Westfall – 20<sup>th</sup> Street – Collinsville 46 kV Line*

- Construct a new 46 kV line between Westfall and 20<sup>th</sup> Street (~0.82 miles) and reconductor the 20<sup>th</sup> Street – Collinsville 46 kV line (~1.46 miles)

*Westfall 46 kV Substation*

- Install one new 46 kV breaker and extend the bus to facilitate a new 46 kV terminal
- Install new standard panels for line relaying

*20<sup>th</sup> Street 46 kV Substation – Terminal equipment to be replaced includes:*

- Disconnect switches

*Collinsville 46 kV Substation – Terminal equipment to be replaced includes:*

- Line relaying, substation conductor and disconnect switches

*Collinsville 46 kV Capacitor*

- Install one 36 MVAR, 46 kV capacitor

*Hollidaysburg 46 kV Capacitor*

- Install one 26 MVAR, 46 kV capacitor

**Transmission Line Ratings:**

- Westfall – 20<sup>th</sup> Street 46 kV Line
  - Before Proposed Solution: N/A
  - After Proposed Solution: 91 MVA SN / 111 MVA SE
- 20<sup>th</sup> Street – Collinsville 46 kV Line
  - Before Proposed Solution: 38 MVA SN / 42 MVA SE
  - After Proposed Solution: 91 MVA SN / 111 MVA SE

**Alternatives Considered:**

- None

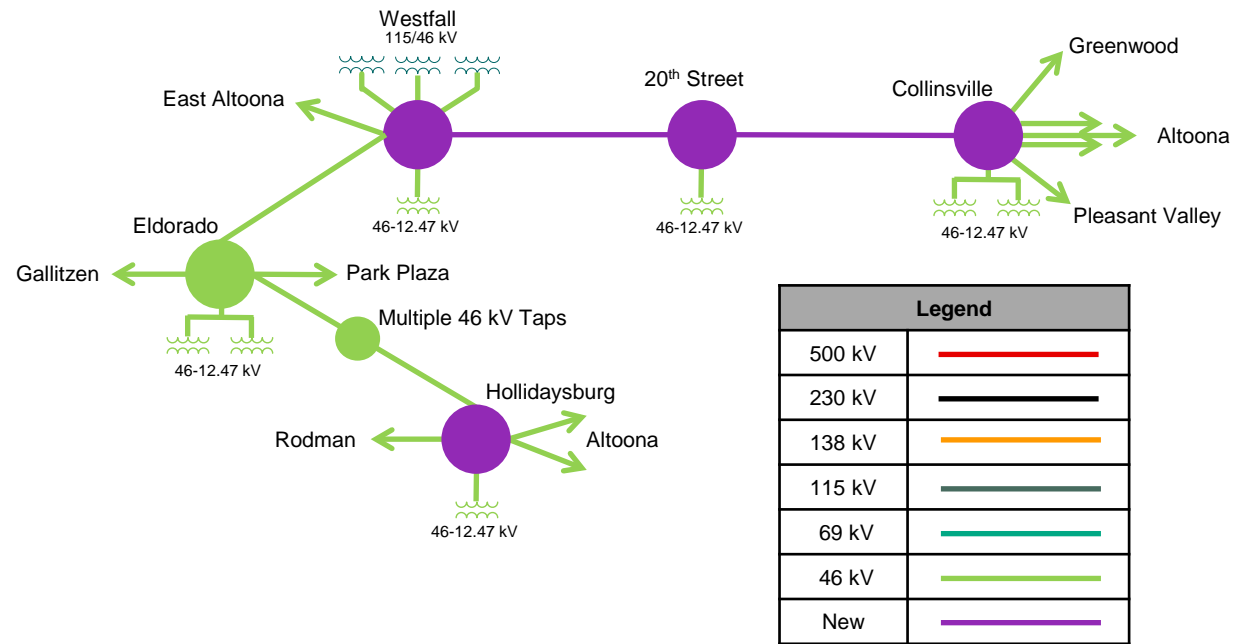
**Estimated Project Cost:** \$5.3M (Westfall – 20<sup>th</sup> Street – Collinsville)

\$0.9M (Collinsville 46 kV Capacitor)

\$0.9M (Hollidaysburg 46 kV Capacitor)

**Projected IS Date:** 6/1/2020

**Status:** Conceptual



Need Number: PN-2018-013  
 Process Stage: Solutions Meeting  
 Need Presented: 9/21/2018

**Project Driver(s):**  
*Operational Flexibility and Efficiency*

**Specific Assumption Reference(s)**  
 Global Consideration

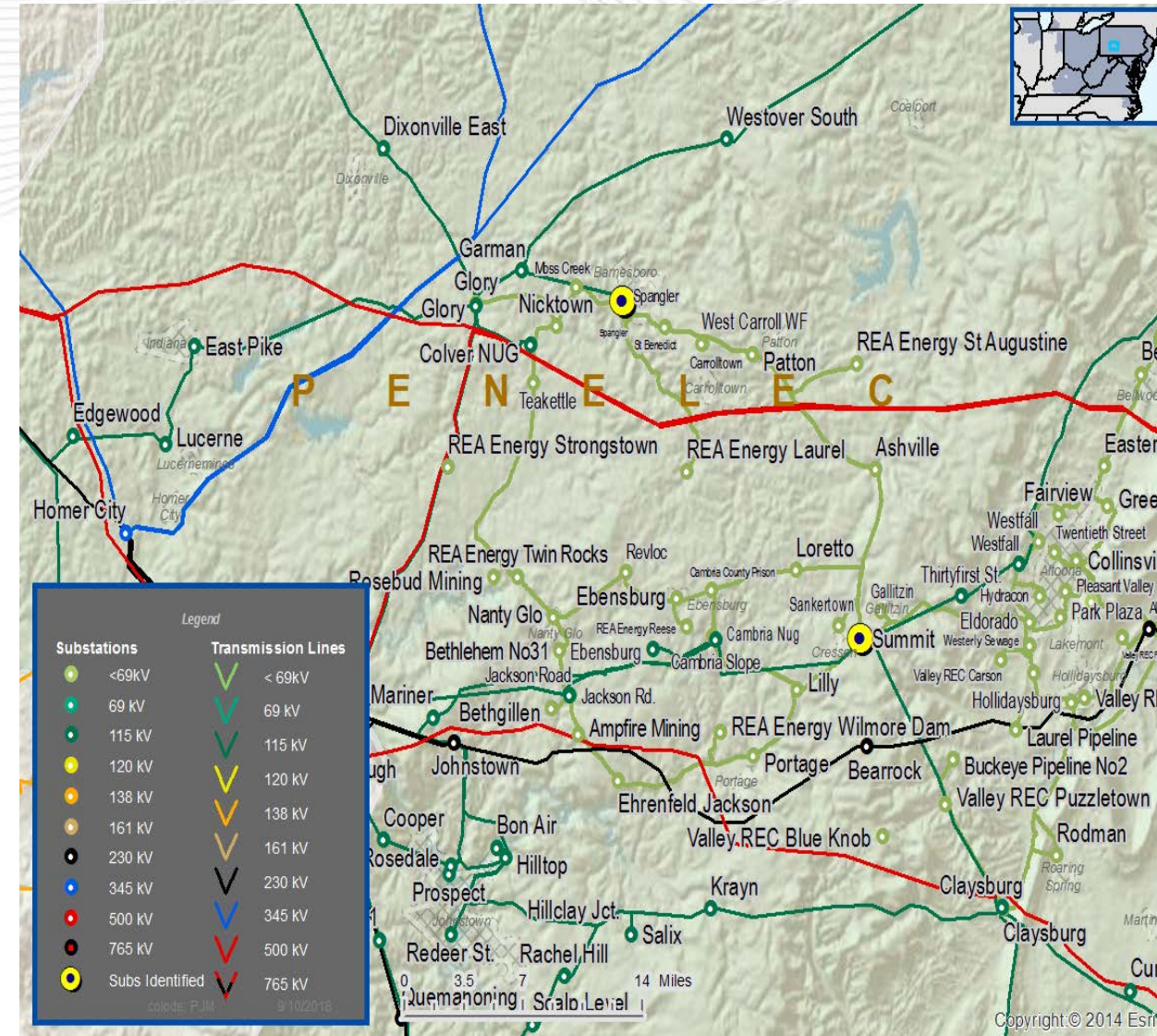
- Assess the risk associated with bus, stuck breaker, and N-2 contingencies to improve FERC tarified Transmission < 100 kV facilities.

**Substation/Line Equipment Limits**

- Consider upgrading transmission line equipment (switches, conductor, splices, etc.) as well as terminal and protection equipment to meet or exceed the transmission line conductor rating.

**Problem Statement**

- For the loss of Spangler 115-46 kV transformer and SGC Tap – Summit 46 kV line, the Nanty-Glo – Twin Rock 46 kV line loads to greater than 120% of its 44 MVA STE rating.
- Transmission line rating limited by terminal equipment. Existing emergency line rating is 44 MVA. Existing conductor emergency rating is 81 MVA.



Need Number: PN-2018-013

**Proposed Solution:**

*Nanty Glo 46 kV: Replace Bus Conductor*

- Replace substation conductor, circuit breaker and disconnect switches

**Transmission Line Ratings:**

- Nanty Glo – Twin Rock 46 kV Line
  - Before Proposed Solution: 34 MVA SN / 44 MVA SE
  - After Proposed Solution: 55 MVA SN / 69 MVA SE

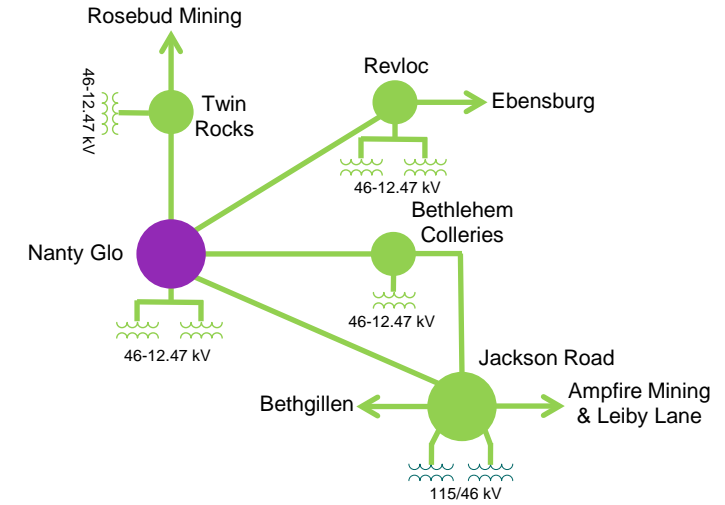
**Alternatives Considered:**

- None

Estimated Project Cost: \$0.4M

Projected IS Date: 12/31/2019

Status: Conceptual



Legend	
500 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
New	



# Sub Regional RTEP Committee Mid-Atlantic First Energy MAAC Need Meeting

October 29, 2018

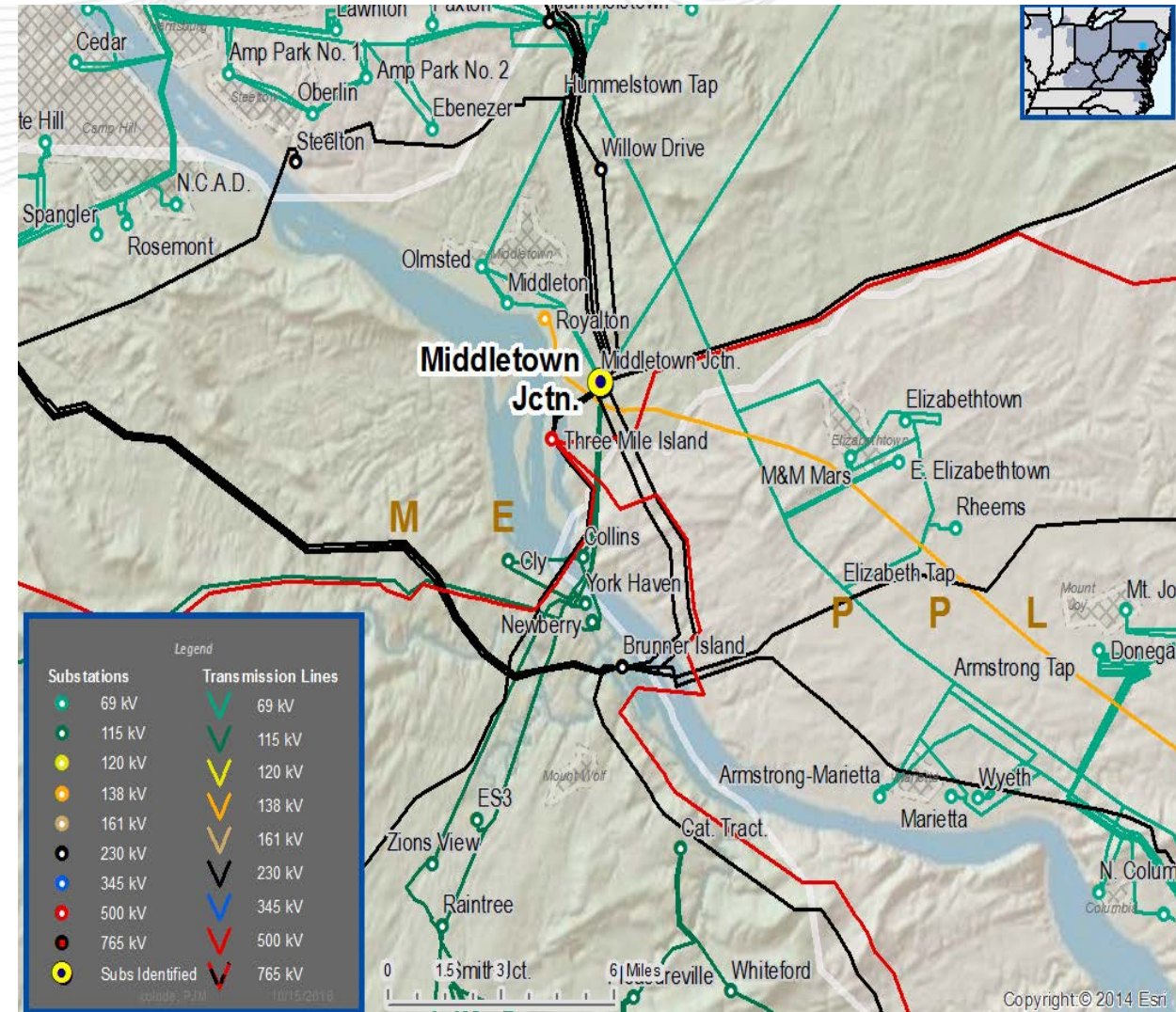
Need Number: ME-2018-013  
 Process Stage: Need Meeting  
 Date: 10/26/2018

Project Driver(s):  
*Equipment Material Condition, Performance, and Risk*

Specific Assumption Reference(s)  
 Substation Condition Rebuild/Replacement  
 System Performance Projects – Substation/Line Equipment Limits

### Problem Statement

- Middletown Junction #3 230-69 kV:
- Transformer is 55 years old
- There have been 44 maintenance orders since 2003
- Multiple oil leaks in load tap changer
- Combustible gasses found in load tap changer oil



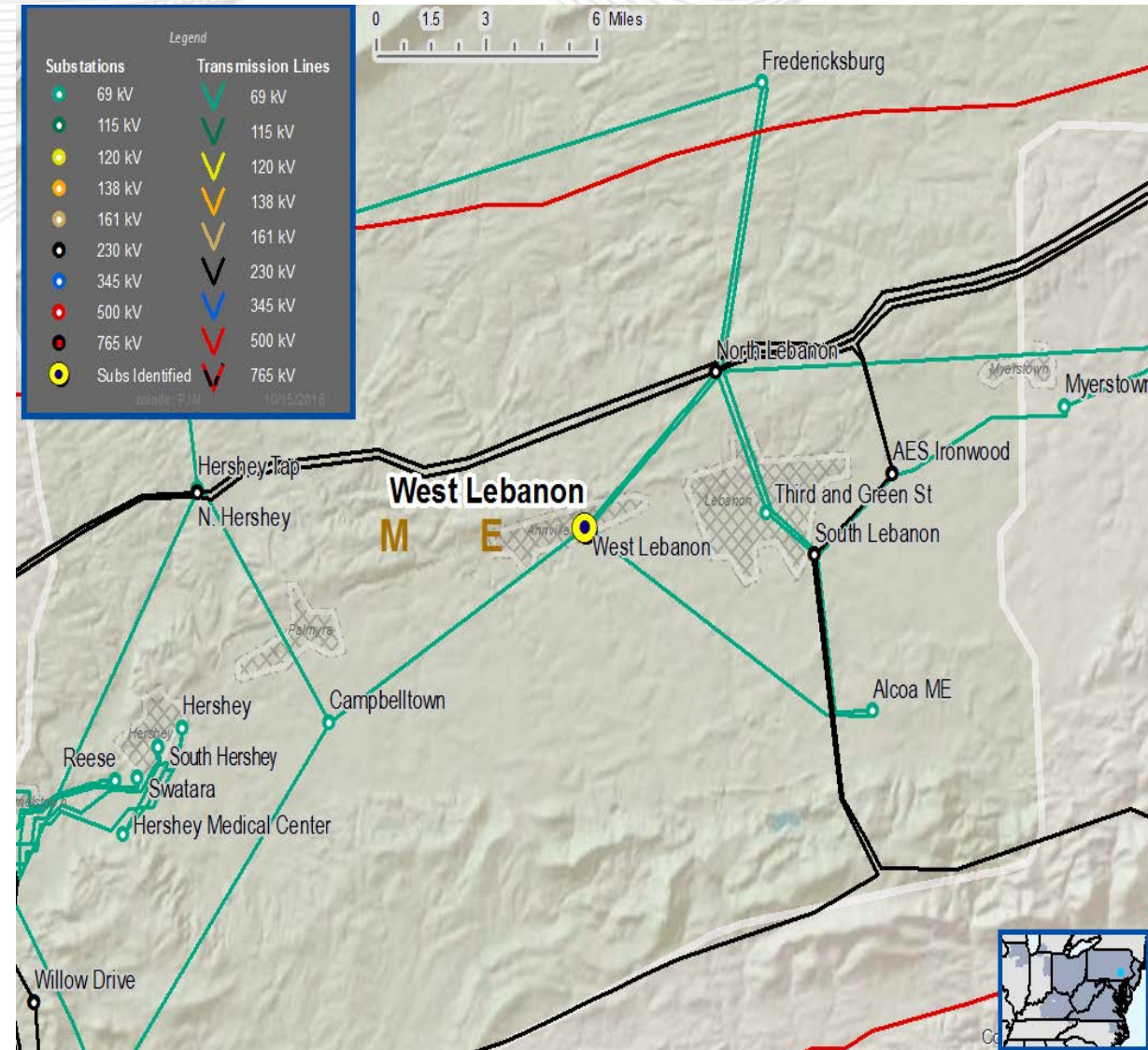
Need Number: ME-2018-014  
 Process Stage: Need Meeting  
 Date: 10/26/2018

Project Driver(s):  
*Equipment Material Condition, Performance and Risk*

Specific Assumption Reference(s)  
 Substation Condition Rebuild/Replacement – Station system protection and controls – Electromechanical relays  
 System Performance Projects – Substation/Line Equipment Limits  
 Upgrade Relay Schemes

Problem Statement  
 Relays on Broad Street – West Lebanon 69 kV line evaluated and determined to be obsolete and/or degraded condition.

Transmission line rating limited by terminal equipment. Existing line rating is 71 MVA SN / 91 MVA SE. Existing conductor rating is 111 MVA SN / 134 MVA SE.  
*(substation conductor and disconnect switches)*



**Need Number:** ME-2018-015

**Process Stage:** Need Meeting

**Date:** 10/26/2018

**Project Driver(s):**

*Equipment Material Condition, Performance and Risk*

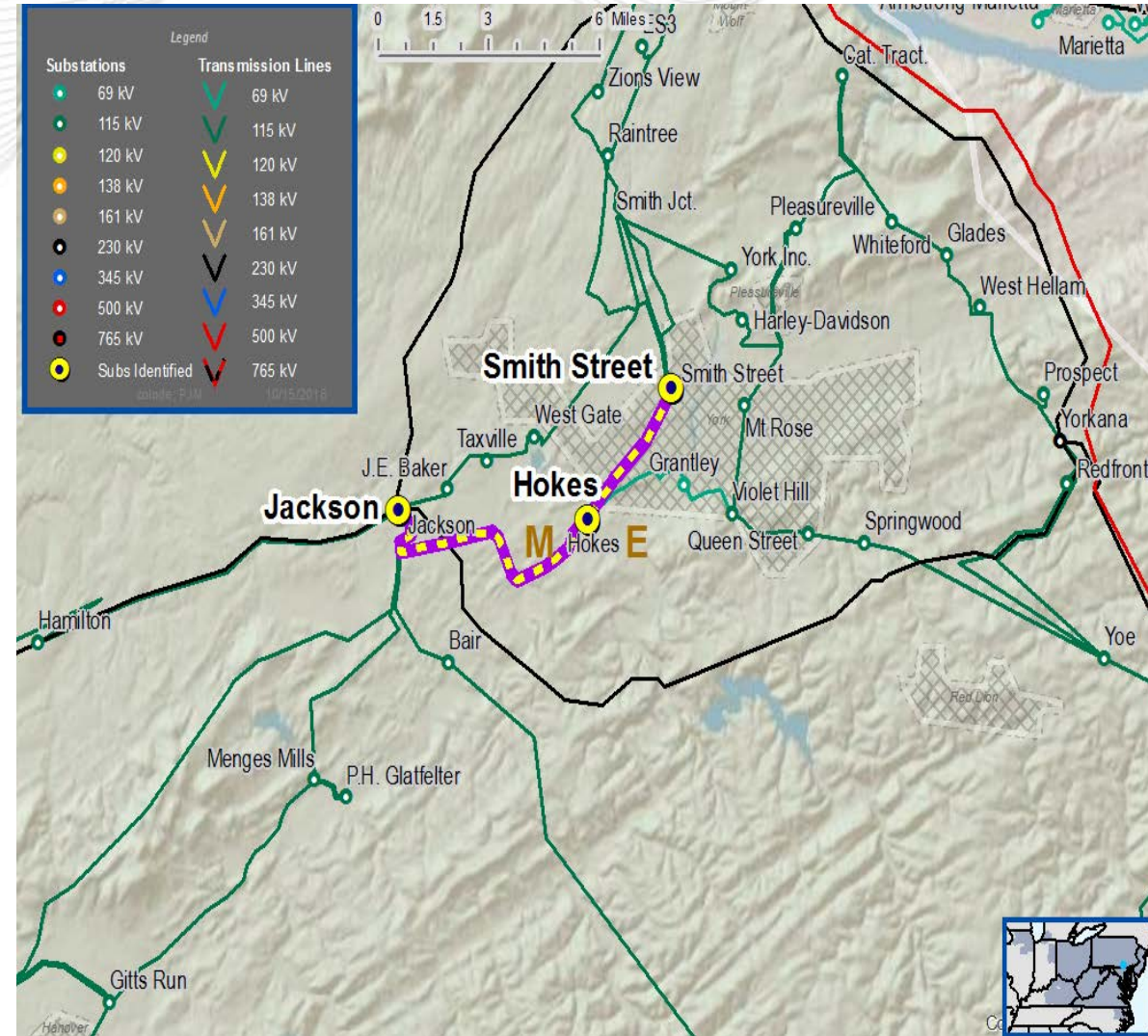
**Specific Assumption Reference(s)**

- Substation Condition Rebuild/Replacement – Station system protection and controls – Electromechanical relays
- System Performance Projects – Substation/Line Equipment Limits
- Upgrade Relay Schemes

**Problem Statement**

Relays on Hokes – Smith St, Hokes – Lehigh Cement, & Hokes – Jackson 69 kV lines evaluated and determined to be obsolete and/or degraded condition.

Transmission line rating limited by terminal equipment. Hokes – Jackson 69 kV line: Existing line rating is 51 MVA SN / 56 MVA SE. Existing conductor rating is 53 MVA SN / 56 MVA SE.  
*(substation conductor)*



**Need Number:** ME-2018-016  
**Process Stage:** Need Meeting  
**Date:** 10/26/2018

**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

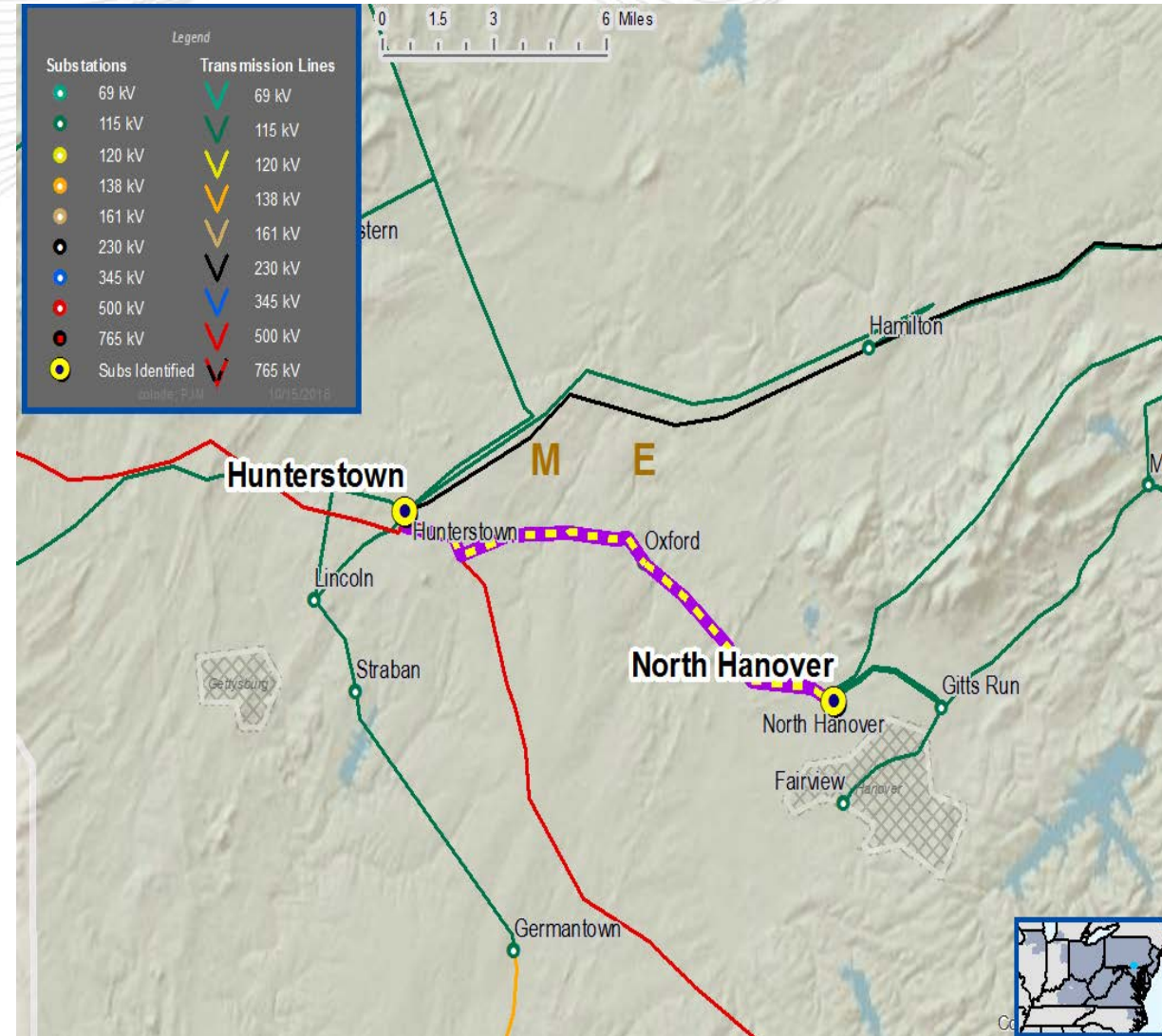
### Specific Assumption Reference(s)

- Substation Condition Rebuild/Replacement – Station system protection and controls – Electromechanical relays
- System Performance Projects – Substation/Line Equipment Limits
- Upgrade Relay Schemes

### Problem Statement

Relays on Hunterstown – North Hanover 115 kV line evaluated and determined to be obsolete and/or degraded condition.

Transmission line rating limited by terminal equipment. Existing line rating is 232 MVA SN / 277 MVA SE. Existing conductor rating is 232 SN / 282 MVA SE.  
*(line trap)*





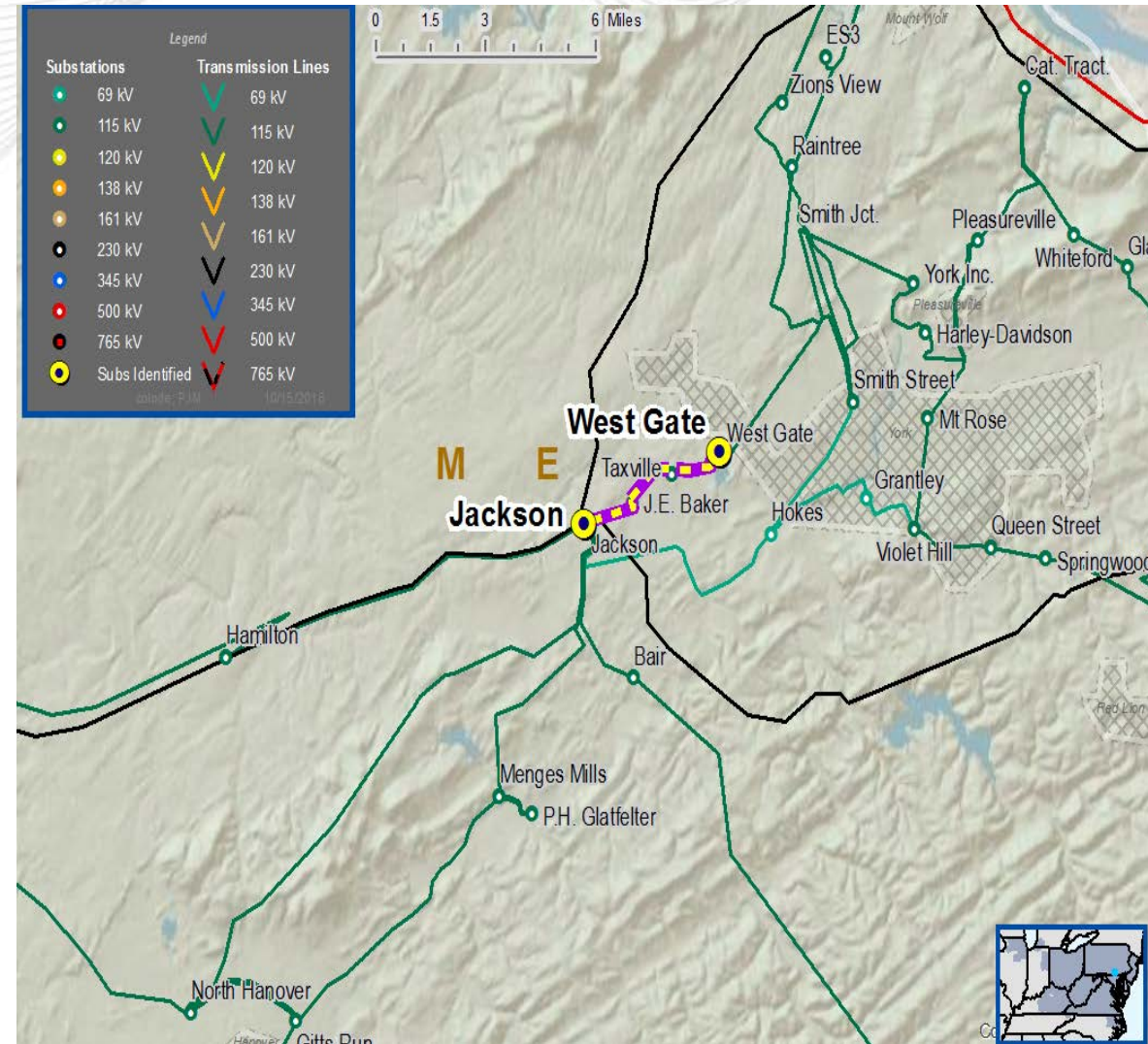
Need Number: ME-2018-017  
 Process Stage: Need Meeting  
 Date: 10/26/2018

**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**  
 Substation Condition Rebuild/Replacement – Station system protection and controls –  
 Electromechanical relays  
 System Performance Projects – Substation/Line Equipment Limits  
 Upgrade Relay Schemes

**Problem Statement**  
 Relays on Jackson – Westgate 115 kV line evaluated and determined to be obsolete and/or degraded condition.

Transmission line rating limited by terminal equipment:  
 Jackson - JE Baker 115 kV line: Existing line rating is 274 MVA SN / 344 MVA SE. Existing conductor rating is 373 MVA SN / 430 MVA SE.  
*(substation conductor and disconnect switches)*  
 JE Baker - Taxville 115 kV line: Existing line rating is 274 MVA SN / 344 MVA SE. Existing conductor rating is 373 MVA SN / 430 MVA SE.  
*(substation conductor and disconnect switch)*  
 Taxville - Westgate 115 kV line: Existing line rating is 232 MVA SN / 277 MVA SE. Existing conductor rating is 232 MVA SN / 282 MVA SE  
*(line trap)*



Need Number: ME-2018-018

Process Stage: Need Meeting

Date: 10/26/2018

**Project Driver(s):**

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**

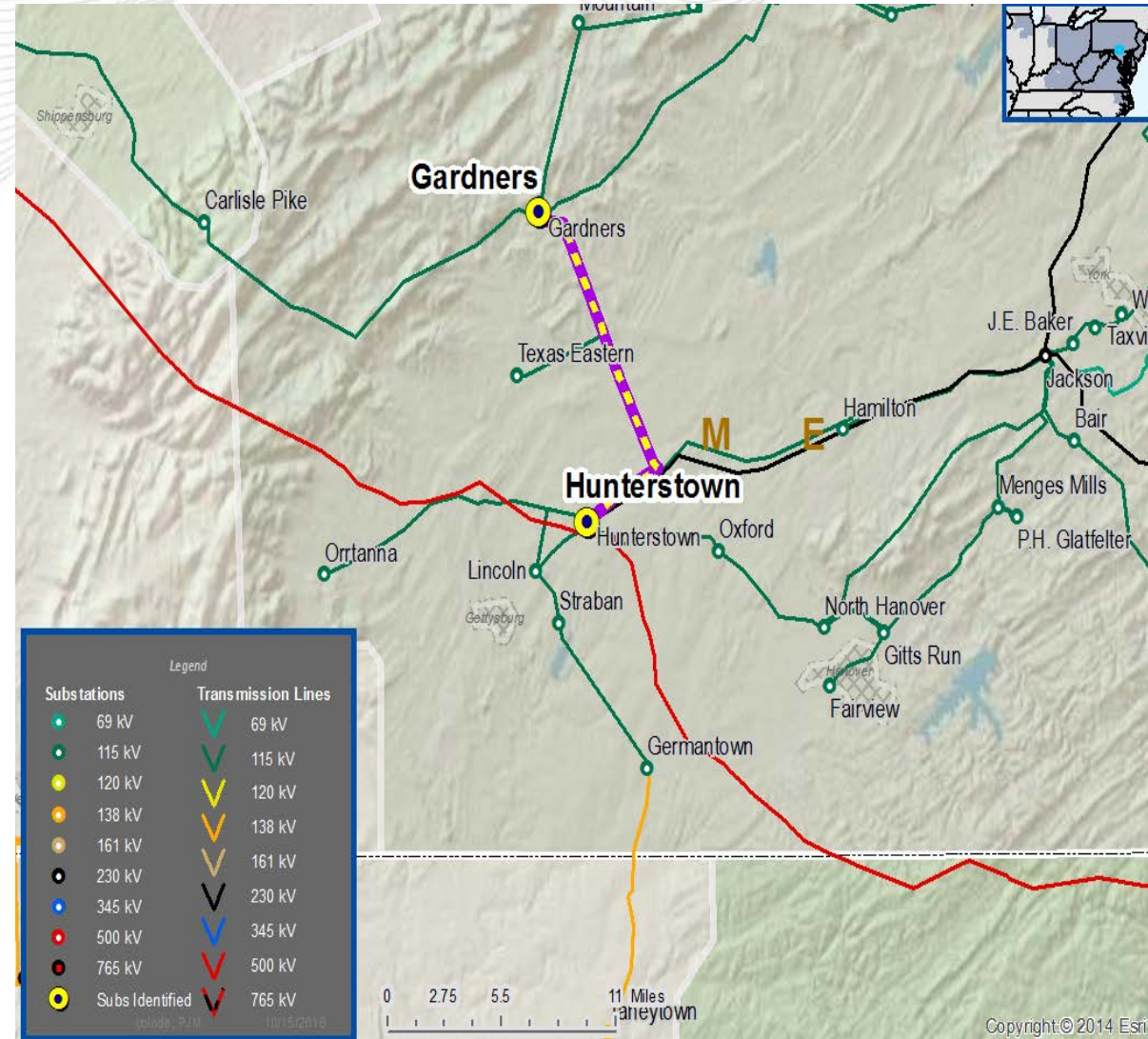
- Substation Condition Rebuild/Replacement – Station system protection and controls – Electromechanical relays
- System Performance Projects – Substation/Line Equipment Limits
- Upgrade Relay Schemes

**Problem Statement**

Relays on Hunterstown – Gardners 115 kV line evaluated and determined to be obsolete and/or degraded condition.

Transmission line rating limited by terminal equipment. Existing line rating is 163 MVA SN / 185 MVA SE. Existing conductor rating is 232 MVA SN / 282 MVA SE.

*(line trap, breaker, CTs, relay, and substation conductor)*



Need Number: PN-2018-014  
 Process Stage: Need Meeting  
 Date: 10/26/2018

**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**  
 Substation Condition Rebuild/Replacement – Circuit Breakers  
 System Performance Projects – Substation/line equipment limits

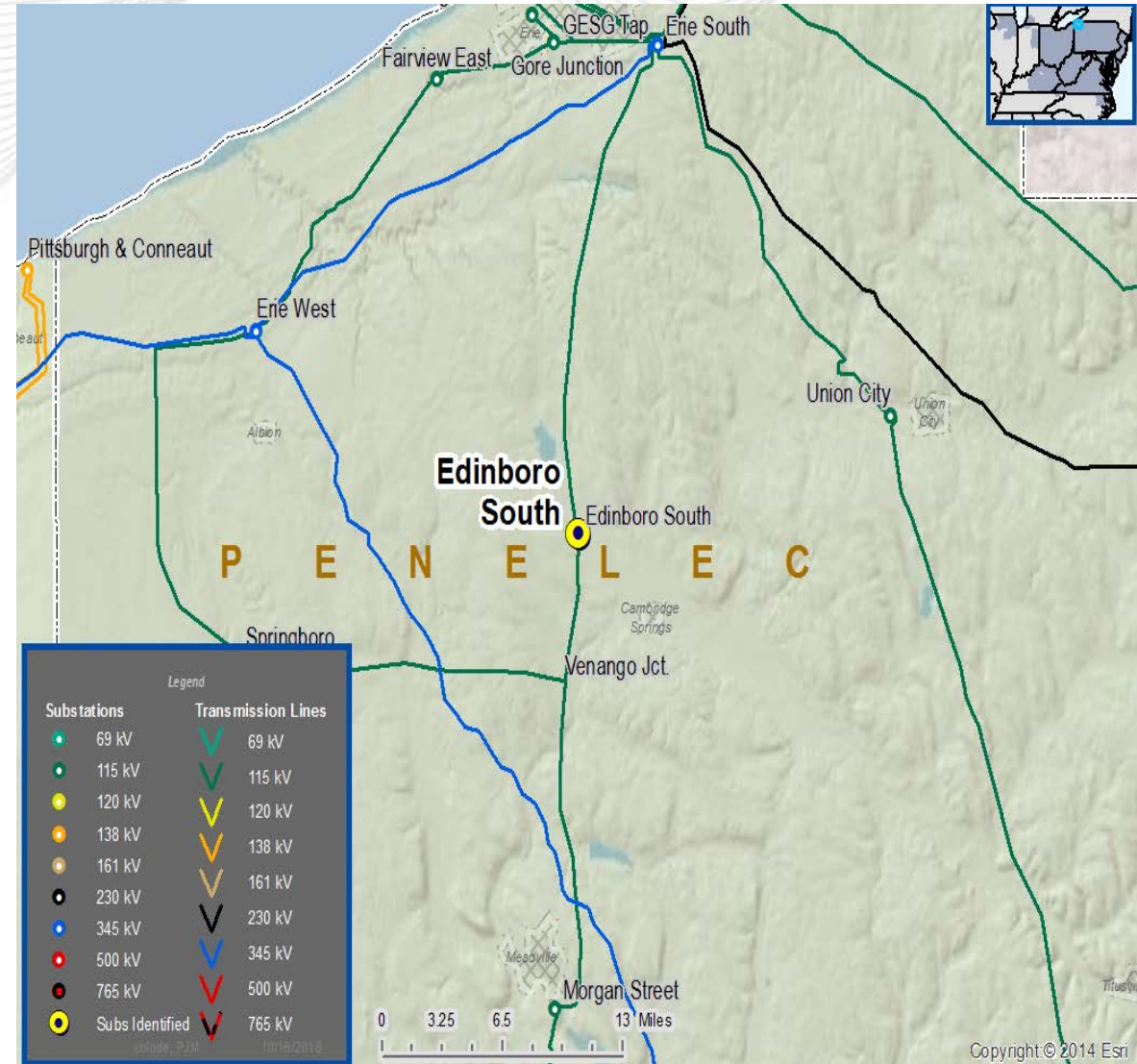
**Problem Statement**  
 Bus section circuit breaker at Edinboro South 115 kV evaluated and determined to be in degraded condition. Since 2006, there have been 10 maintenance orders on this breaker (interrupting media, compressor, and other issues)

Transmission line rating limited by terminal equipment.  
 Edinboro South – Erie South 115 kV line: Existing line rating is 163 MVA SN / 185 MVA SE. Existing conductor rating is 232 MVA SN / 282 MVA SE.

*(line trap, substation conductor, line relaying, CTs)*

Edinboro South – Venango Junction 115 kV line: Existing line rating is 163 MVA SN / 185 MVA SE. Existing conductor rating is 232 MVA SN / 282 MVA SE.

*(line trap, substation conductor, line relaying, CTs)*



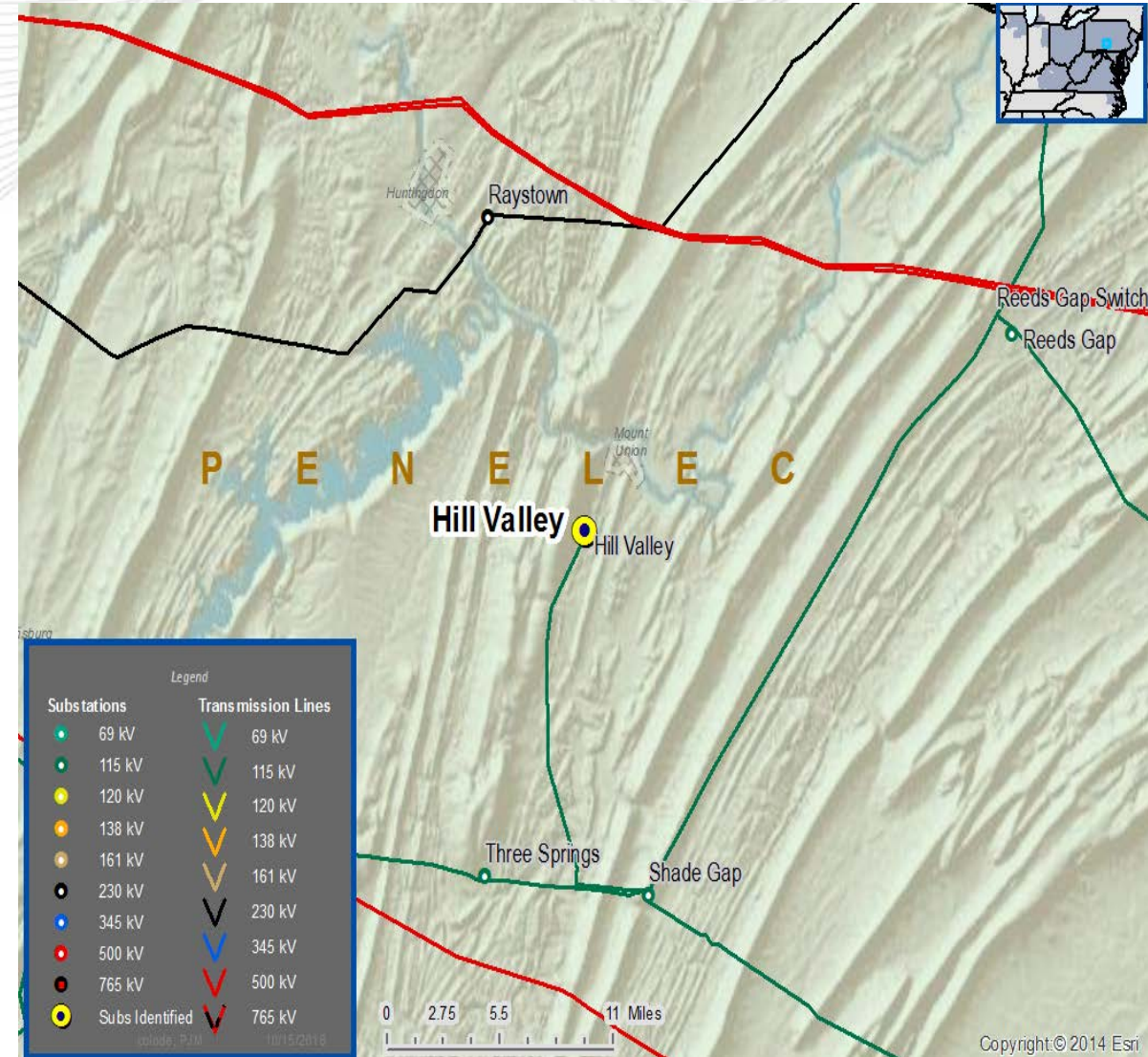
Need Number: PN-2018-015  
 Process Stage: Need Meeting  
 Date: 10/26/2018

**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**  
 Substation Condition Rebuild/Replacement

### Problem Statement

Hill Valley #1 115/46 kV Transformer  
 Transformer has Increased failure probability due to leaks, failed auxiliary equipment and damaged wiring.  
 Transformer is 57 years old.  
 Since 2004, there have been 25 maintenance orders on this transformer.

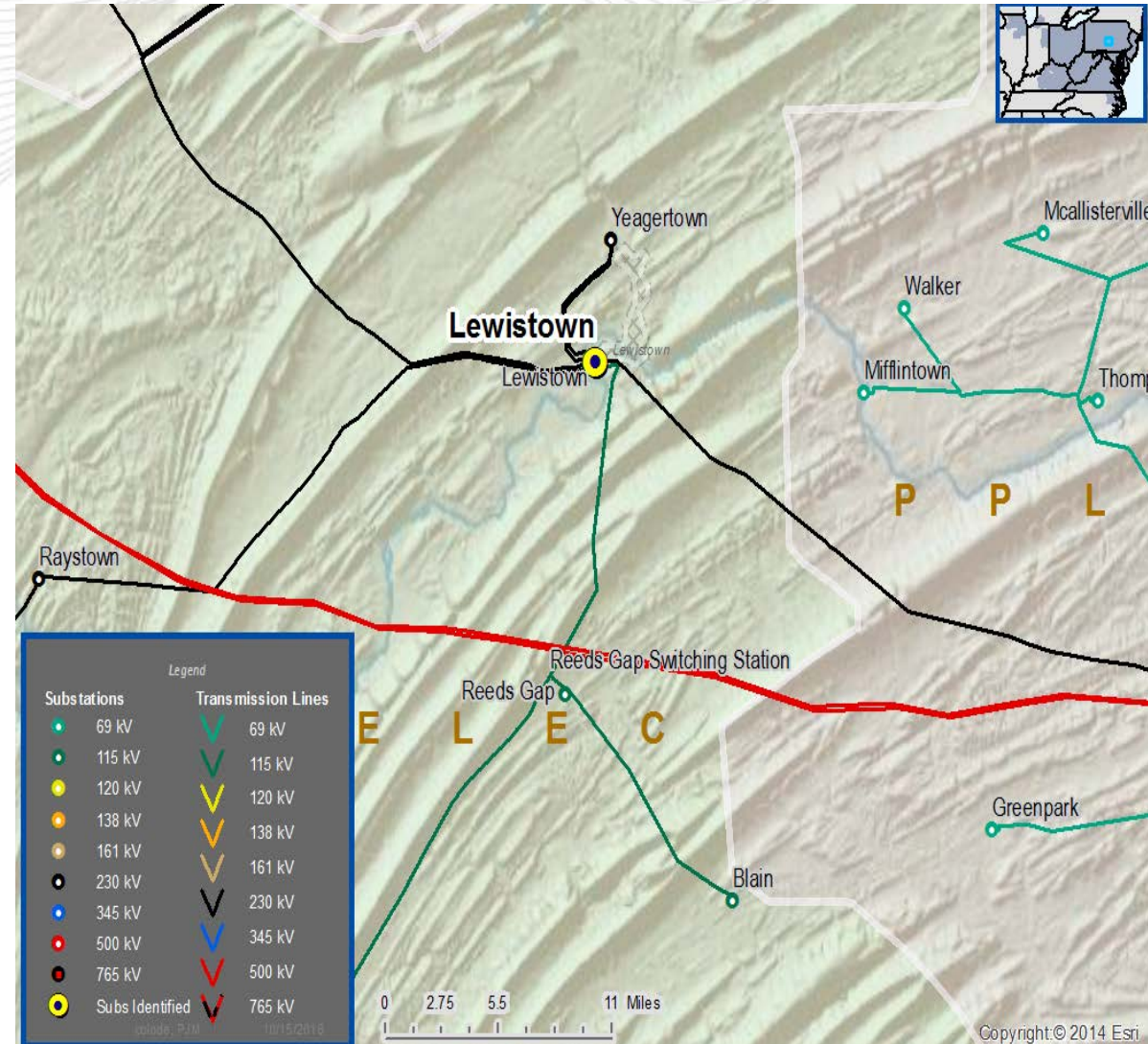


Need Number: PN-2018-016  
 Process Stage: Need Meeting  
 Date: 10/26/2018

**Project Driver(s):**  
*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference(s)**  
 Substation Condition Rebuild/Replacement

**Problem Statement**  
 Lewistown #2 230/115-46 kV Transformer  
 Transformer has an increased failure probability due to leaks and failed auxiliary equipment.  
 Transformer is 65 years old.  
 Since 2004, there have been 96 maintenance orders on this transformer.



## Revision History

10/16/2018 – V1 – Original version posted to pjm.com

10/16/2018 – V2 – Changed the 'Process stage' from Need to Solution for the projects at solution review

10/17/2018 – V3 – Replaced the 'Date' with 'Need Presented' for the projects at solution review

10/23/2018 – V4 – Changed rating on Slide #27 from winter rating to summer rating.

10/24/2018 – V5 – Revised slides to reflect change of meeting from 10/26/2018 to 10/29/2018