Subregional RTEP Committee - Western
FirstEnergy Supplemental Projects

May 22, 2020

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

Need Number: APS-2020-004, APS-2020-005, APS-2020-006, APS-2020-008, PN-2020-015, and APS-2020-009

Process Stage: Need Meeting 5/22/2020

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

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

Upgrade Relay Schemes
- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

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See Geographic Maps in the next three slides

Need Number: APS-2020-004 and APS-2020-009

Process Stage: Need Meeting 5/22/2020

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

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

Upgrade Relay Schemes
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- Bus protection schemes

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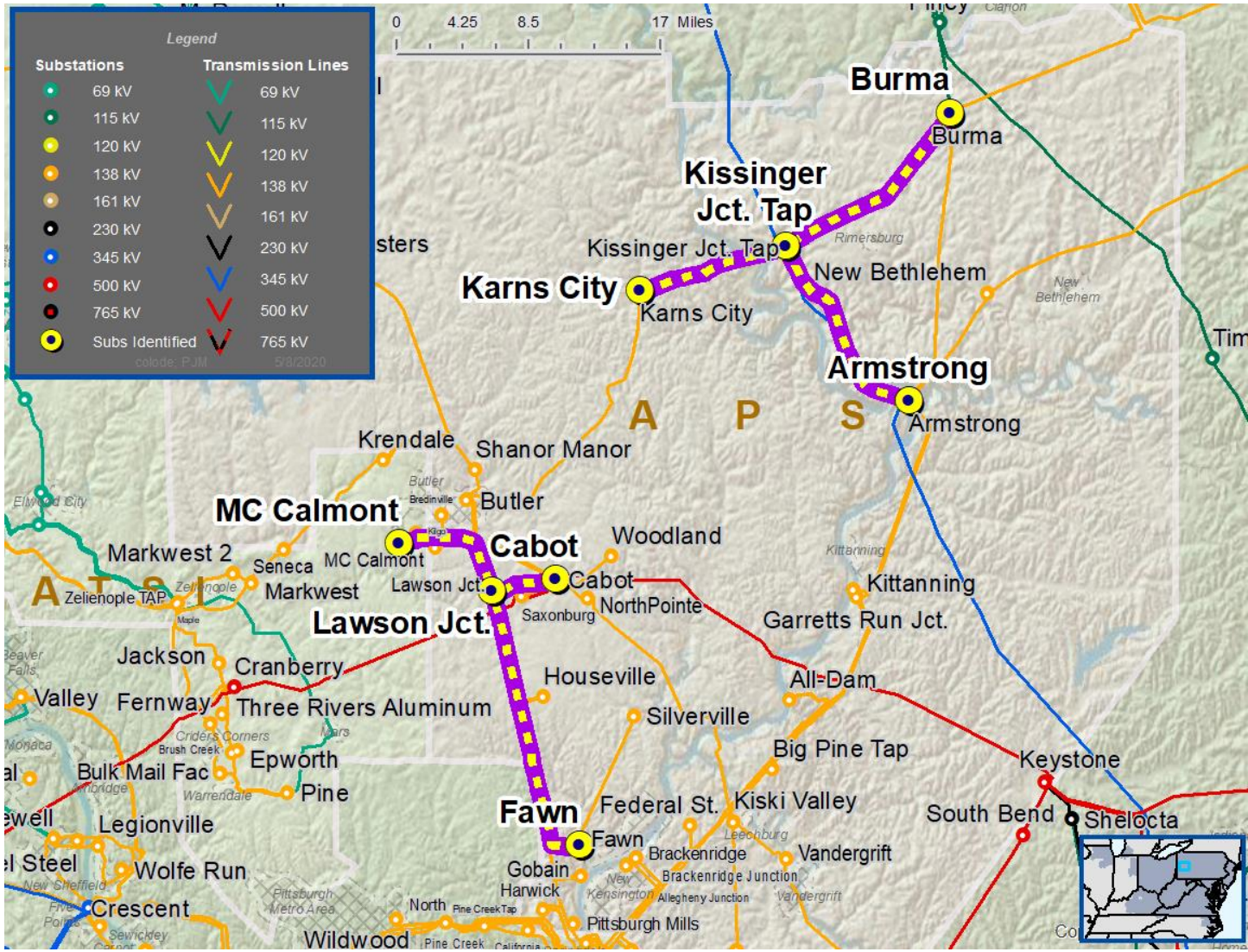

Need Number: APS-2020-005 and APS-2020-006

Process Stage: Need Meeting 5/22/2020

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

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

Upgrade Relay Schemes
- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

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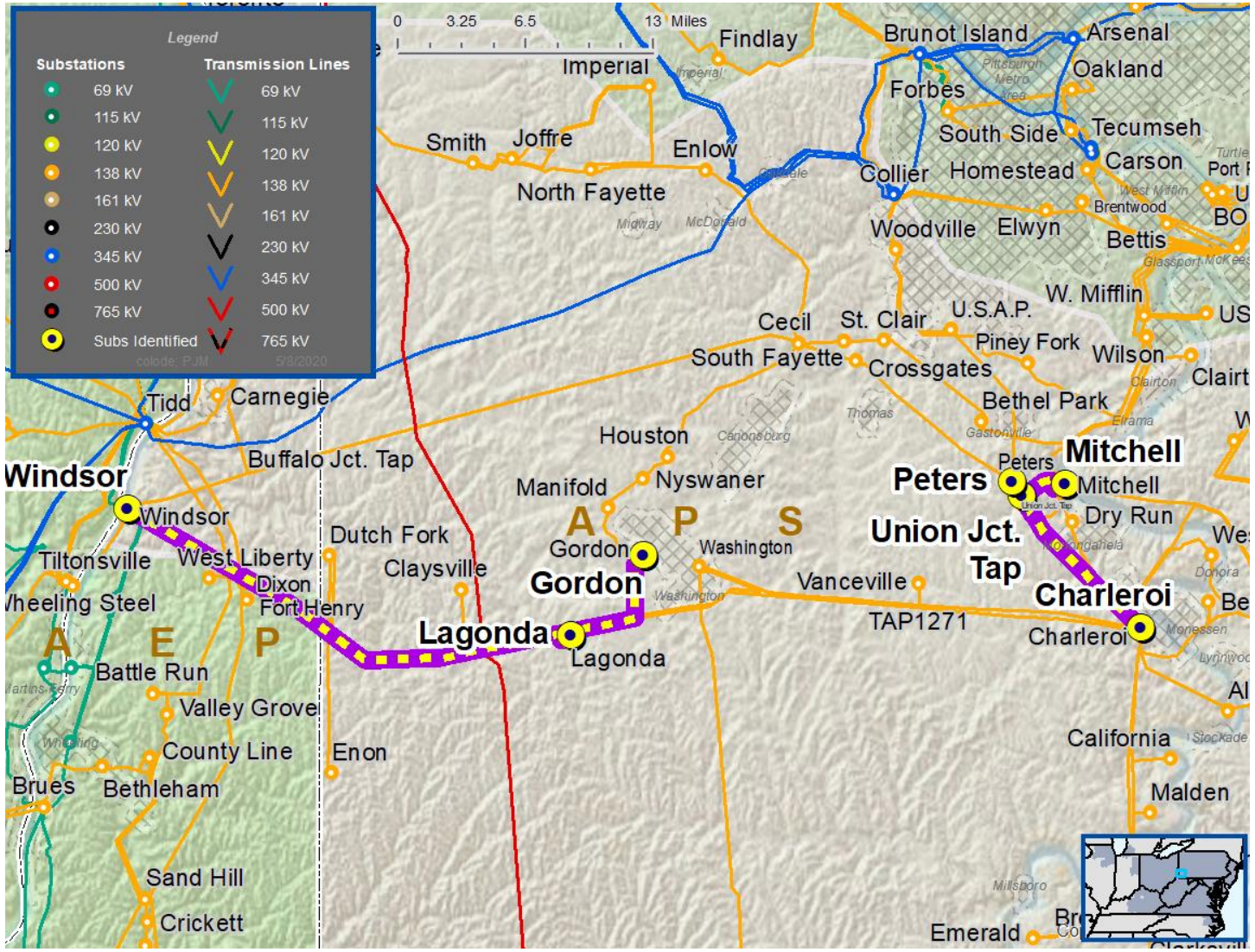

Need Number: APS-2020-008 and PN-2020-015

Process Stage: Need Meeting 5/22/2020

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

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

Upgrade Relay Schemes
- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

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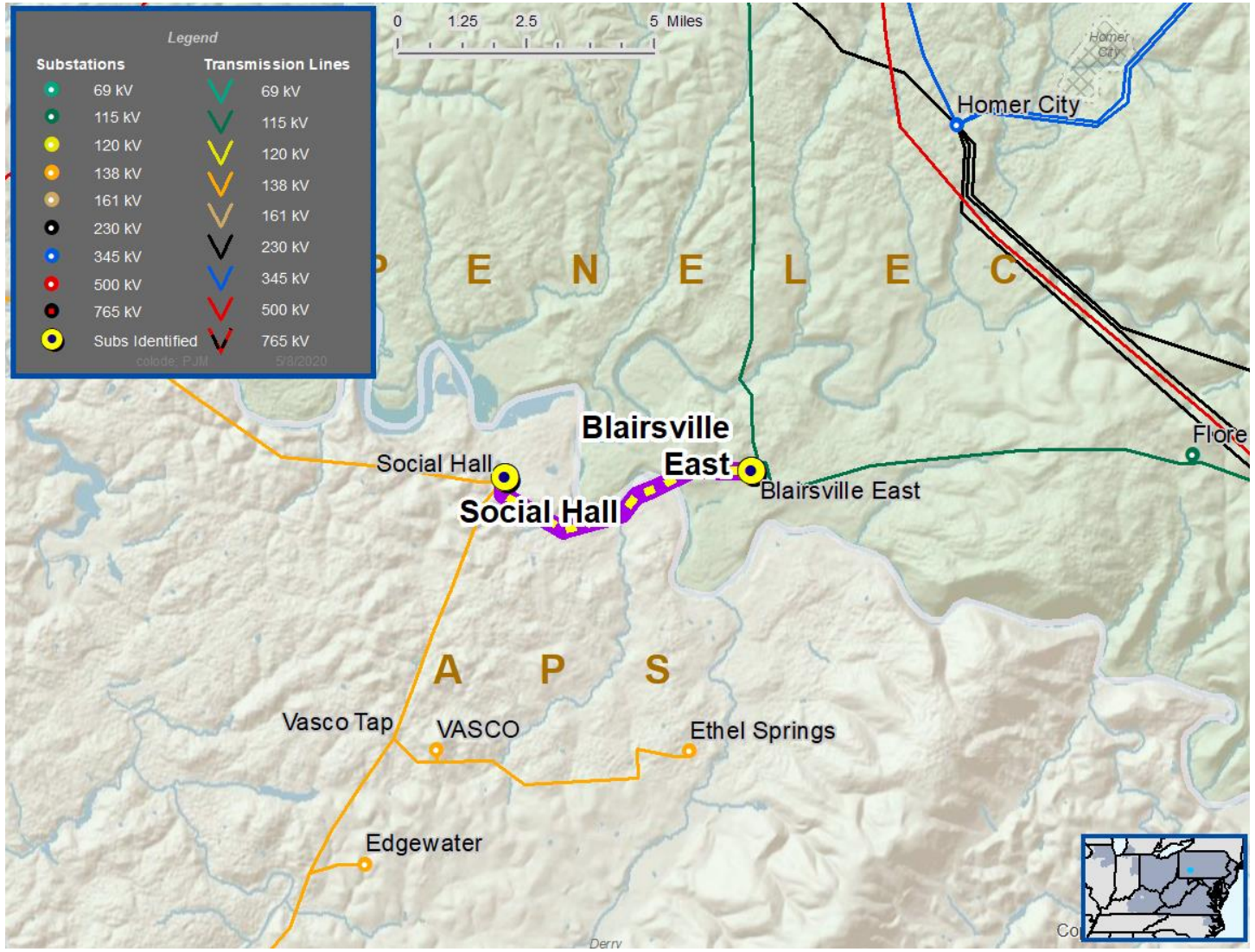


APS Transmission Zone M-3 Process
West Penn Power

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
APS-2020-004	Cabot – Lawson Junction 138 kV Line	287 / 287	297 / 365	Line Relaying, Line Trap
	McCalmont – Lawson Junction 138 kV Line	267 /287	297 / 365	Substation Conductor, Line Relaying, Line Trap
	Fawn – Lawson Junction 138 kV Line	294 / 342	308 / 376	Substation Conductor, Line Trap
APS-2020-005	Charleroi – Union Junction 138 kV Line	274 / 302	296 / 302	Substation Conductor, Line Trap
	Mitchell – Union Junction 138 kV Line	295 / 342	308 / 376	Substation Conductor, Line Trap
	Peters – Union Junction 138 kV Line	294 / 342	308 / 376	Substation Conductor, Line Trap
APS-2020-006	Gordon – Lagonda 138 kV Line	293 / 343	309 / 376	Substation Conductor, Line Relaying, Line Trap
	Lagona – Windsor 138 kV Line	261 / 311	~~308 / 376~~ 297 / 365	Substation Conductor, Line Relaying, Line Trap
PN-2020-015 APS-2020-008	Blairsville East – Social Hall 138 kV Line	225 / 287	243 / 294	Substation Conductor, CTs, Line Relaying, Line Trap
APS-2020-009	Karns City – Kissinger Junction 138 kV Line	221 / 268	221 / 268	Line Relaying (existing rating 306 MVA (WE) conductor rating 317 MVA (WE)
	Armstrong – Kissinger Junction 138 kV Line	221 / 268	221 / 268	N/A
	Burma – Kissinger Junction 138 kV Line	293 / 332	308 / 376	Substation Conductor, Line Relaying, Line Trap, Circuit Breaker

APS Transmission Zone M-3 Process
West Penn Power

Need Number: APS-2020-007

Process State: Need Meeting 05/22/2020

Project Driver:
Operational Flexibility and Efficiency

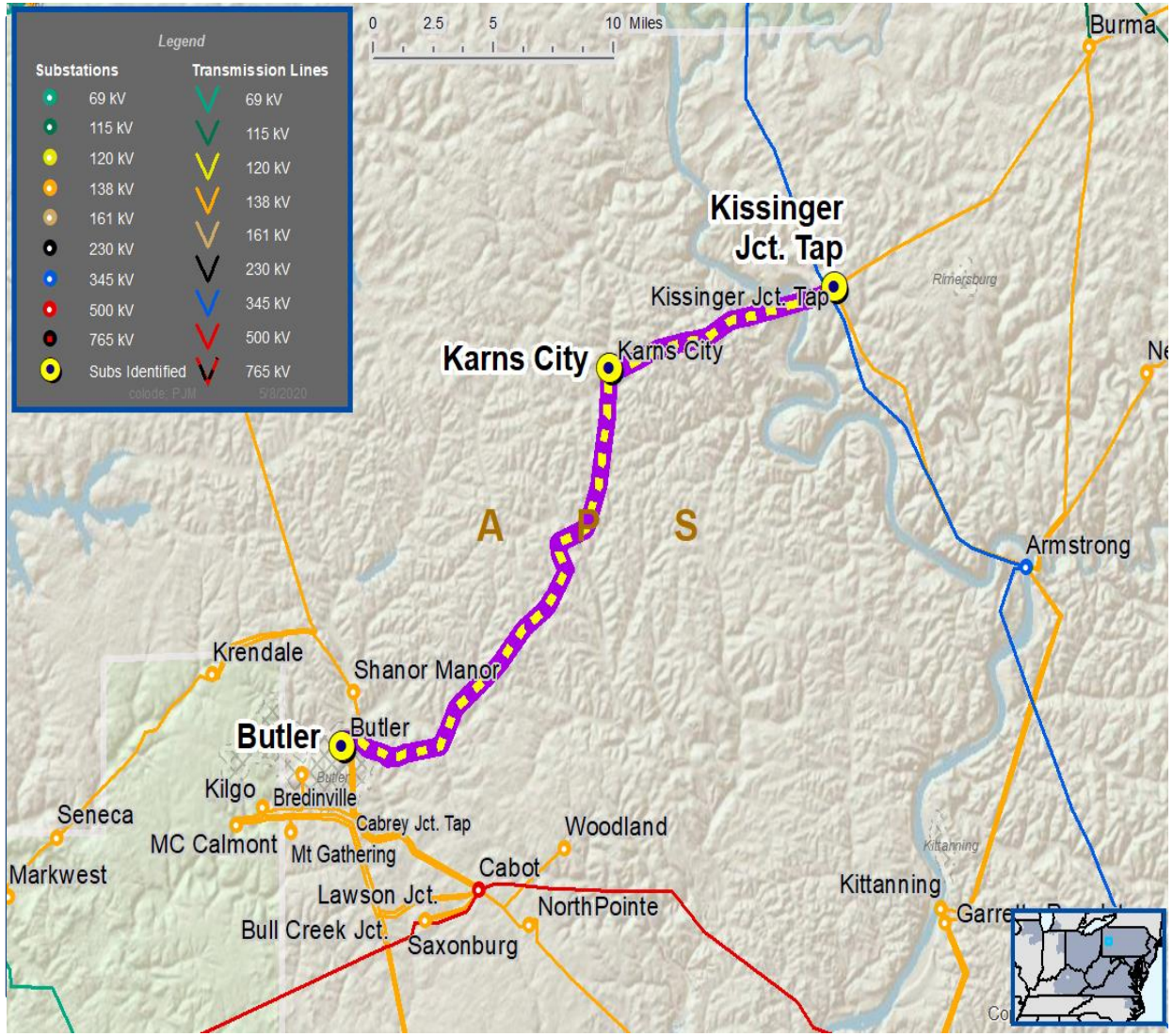
Specific Assumption Reference:
System Performance Projects
- Load at risk in planning and operational scenarios

Add/Expand Bus Configuration
- Reduce the amount of exposed potential local load loss during contingency conditions
- Eliminate simultaneous outages to multiple networked elements

Problem Statement:
Loss of the Karns City #1 or #2 138-25 kV transformer results in significant voltage drop on the 25 kV system. Karns City substation consists of:
- Two distribution transformers connected to transmission with switches
- Two networked 138 kV transmission lines

Transmission lines are limited by terminal equipment.
- Karns City – Butler 138 kV existing line rating is 141 / 179 MVA (SN/SE). The existing transmission line conductor rating is 160 /192 MVA (SN/SE). (substation conductor) Refer to APS-2019-015.
- Karns City – Kissinger Junction 138 kV existing line rating is the existing transmission line conductor rating of 221 / 268 MVA (SN/SE). The winter emergency line rating is limited to 306 MVA from 317 MVA. (line relaying) Refer to APS-2020-009.

Model: 2020 RTEP model for 2025 Summer (50/50)



Need Number: APS-2020-010

Process Stage: Need Meeting 05/22/2020

Project Driver:

Customer Service

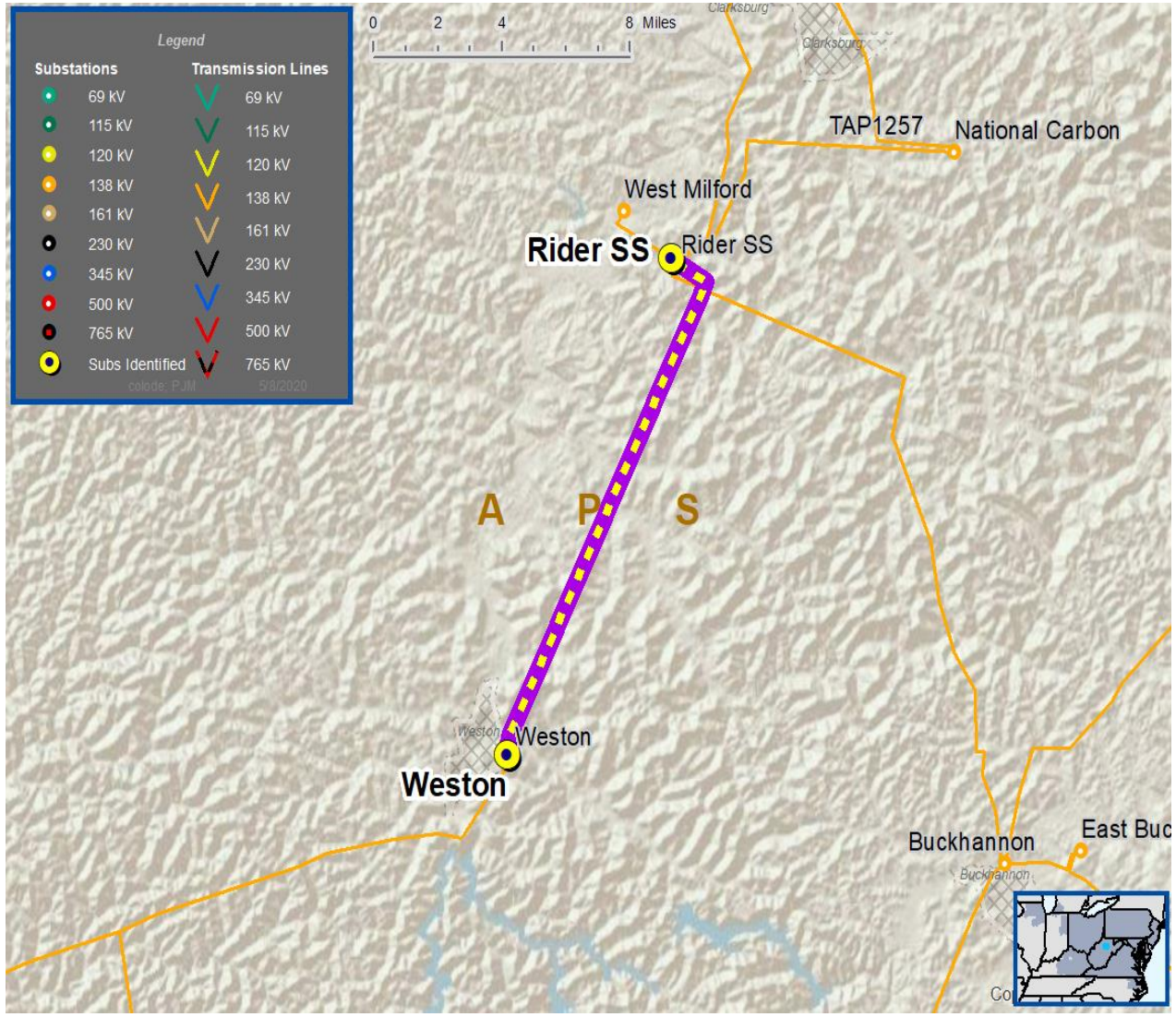
Specific Assumption Reference:

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 138 kV service, anticipated load is 10 MW, location is near the Rider – Weston 138 kV line.

Requested in-service date is December 2020.



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

Need Number: APS-2019-012

Process Stage: Solutions Meeting 05/22/2020

Previously Presented:

Needs Meeting 04/20/2020

Project Driver:

Customer Service

Specific Assumption Reference:

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 138 kV service, anticipated load is 27 MW, location is near the Buckhannon – Corder Crossing (Pruntytown) 138 kV line.

Requested in-service date is December 2020.

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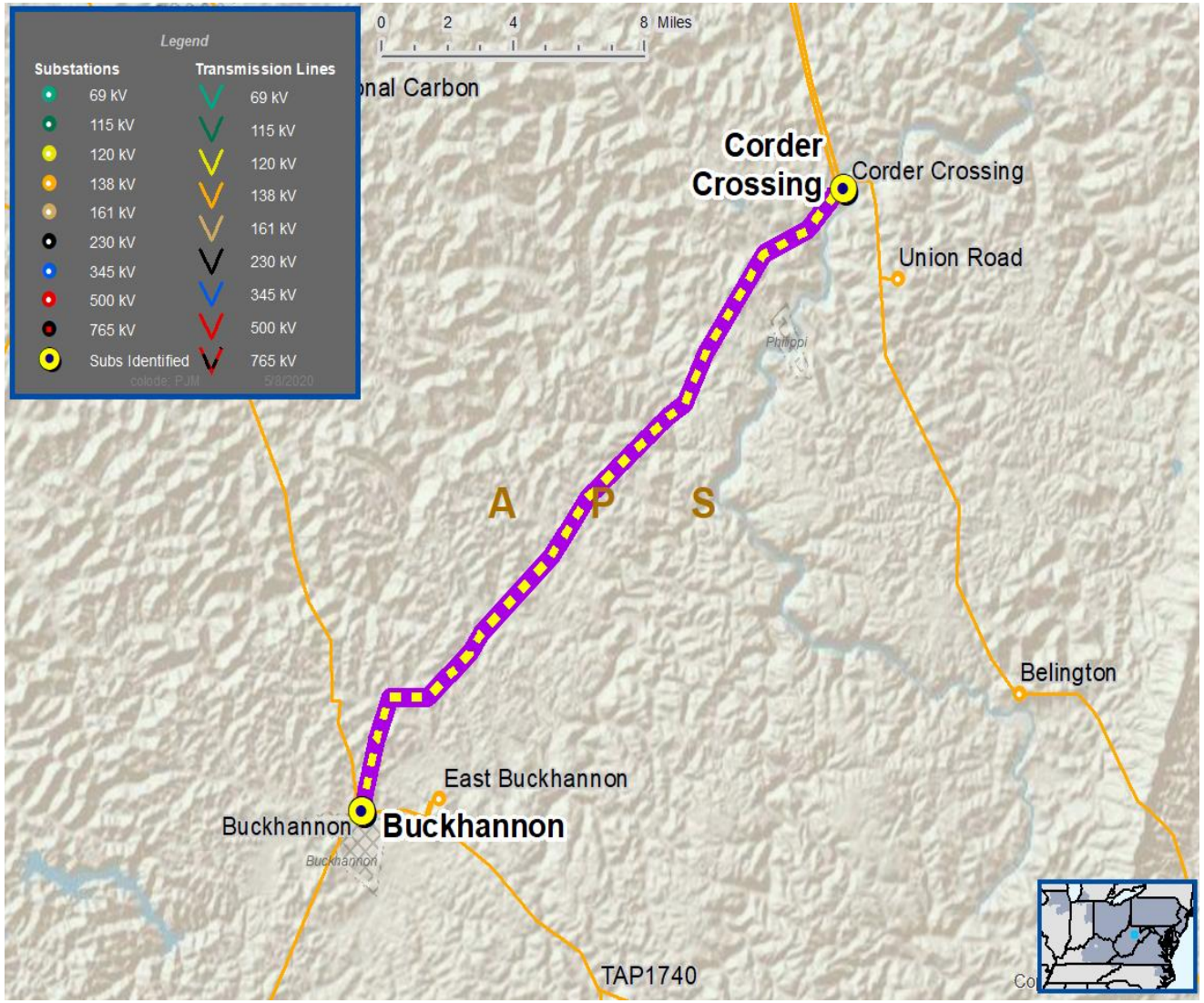


Need Number: APS-2019-012

Process Stage: Solutions Meeting 05/22/2020

Proposed Solution:

- Tap the Buckhannon-Corder Crossing 138 kV line approximately 9.6 miles from Buckhannon substation and build a 138 kV line one span toward the proposed customer substation
- Install two (2) 138 kV in-line switches on either side of the new customer tap connection
- Install one (1) 138 kV in-line switch on the line extension towards the customer substation

Estimated Project Cost: $0.8M

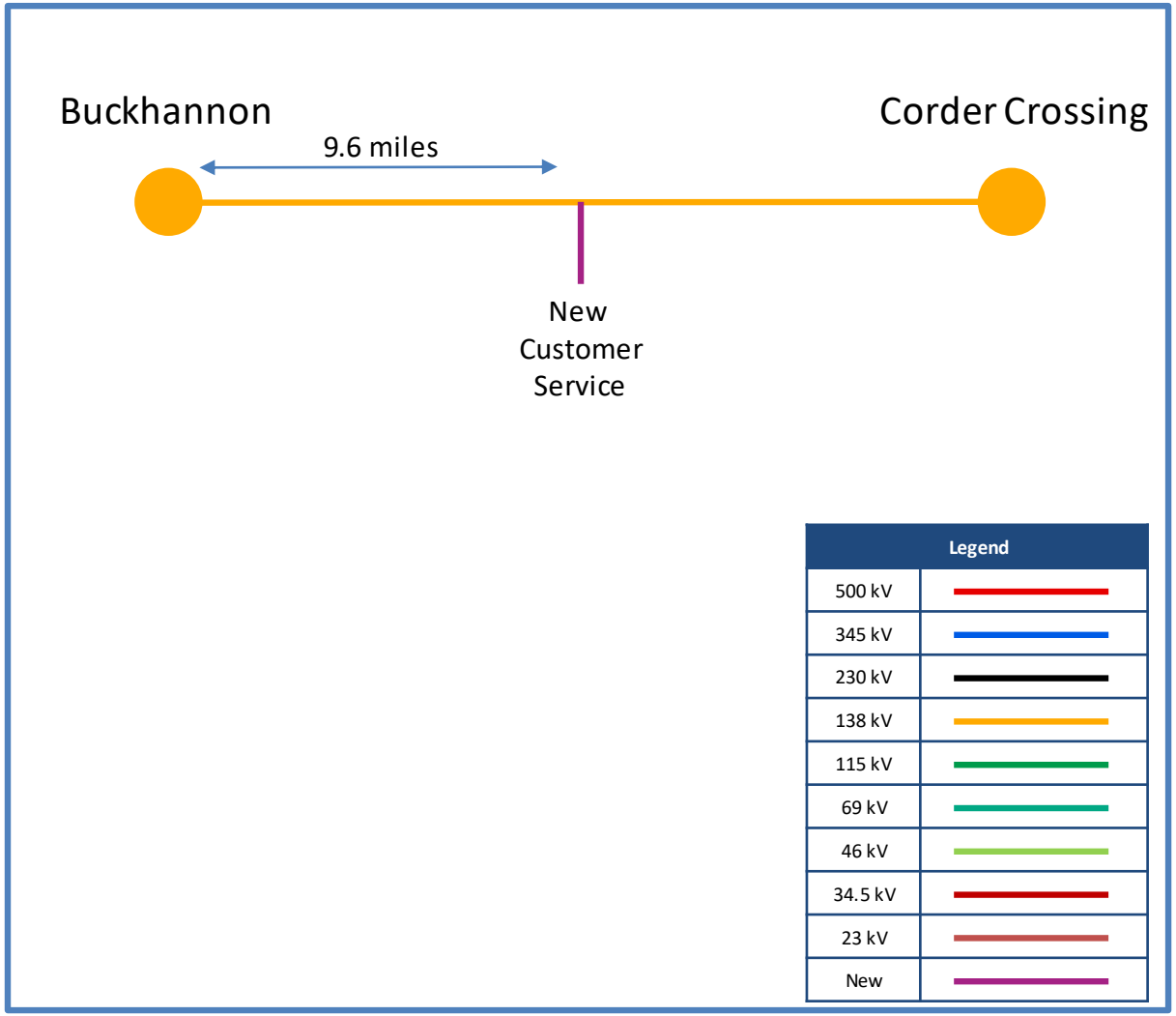
Alternatives Considered:

- N/A

Projected In-Service: 12/31/2020

Project Status: Conceptual

Model: 2019 Series 2024 Summer RTEP 50/50



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

5/12/2020 – V1 – Original version posted to pjm.com

7/23/2020 – V2 – Corrected existing conductor rating for APS-2020-006