



Sub Regional RTEP Committee PJM South

December 16, 2020

First Review

Baseline Reliability Projects



Dominion Transmission Zone: Baseline Harrisonburg Area

Process Stage: First Review

Criteria: FERC 715 (TO Criteria)

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP Winter case

Proposal Window Exclusion: Below 200 kV

Problem Statement:

DOM-VM17, DOM-VD37, DOM-VD38

Voltage magnitude and drop violations around the Harrisonburg area. The loss of 230/115kV transformer #5 and the cap bank at Harrisonburg results in a low voltage violation of 0.896pu and a voltage drop of more than 10% around Harrisonburg.

Proposed Solution:

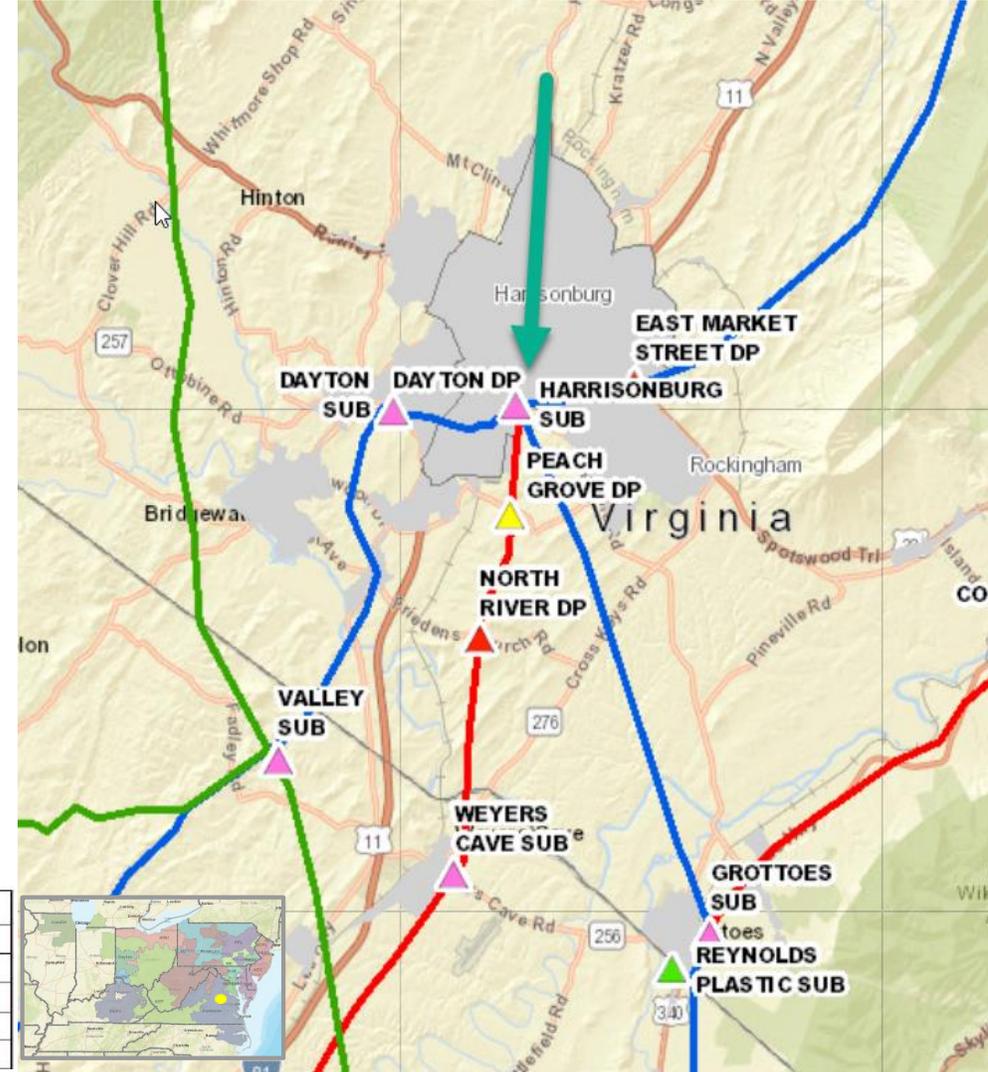
Install a second 115kV 33.67MVar cap bank at Harrisonburg substation along with a 115kV breaker.

Estimated Cost: \$1.25 M

- Substation work for conversion: \$ 1.25 M

Alternatives: N/A

Required In-Service: 12/1/2025



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	89 KV.	AS NOTED





Dominion Transmission Zone: Baseline James River DP Area

Process Stage: First Review

Criteria: N-1-1 (Winter Voltage Drop), FERC 715 (TO Criteria)

Assumption Reference: 2025 RTEP assumption

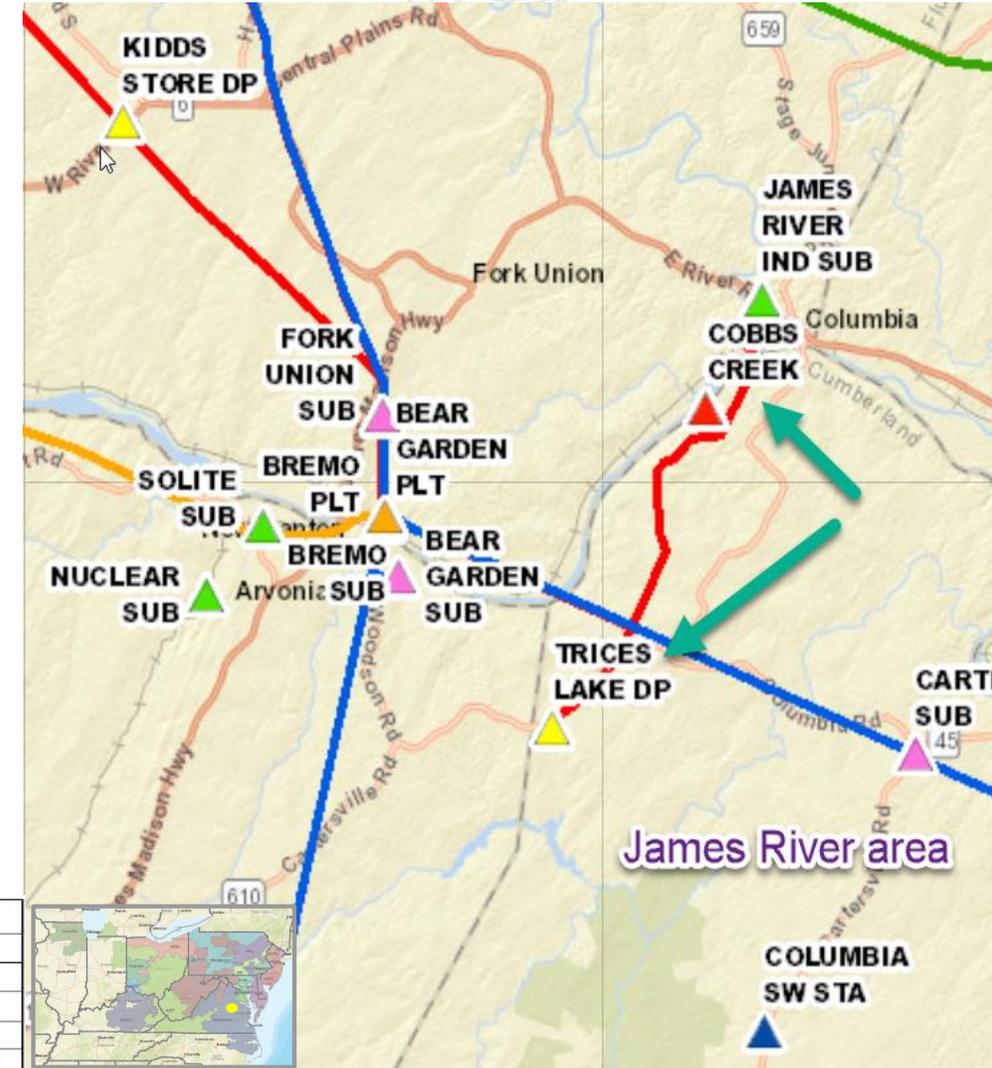
Model Used for Analysis: 2025 RTEP Winter case

Proposal Window Exclusion: Below 200 kV

Problem Statement:

N2-WWD61 to N2-WWD71, DOM-VM1 to DOM-VM16, DOM-VD21 to DOM-VD36

Voltage magnitude and drop violations around the James River area. The loss of 230/115kV transformer #9 at Bremo along with either 115kV Line #1030 or transformer #1 at Fork Union results in low voltage below 0.85 per unit and voltage drop of more than 10% around James River.



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Dominion Transmission Zone: Baseline James River DP Area

Proposed Solution:

Cut existing 115kV Line#5 between Bremo and Cunningham substations and loop in and out of Fork Union substation.

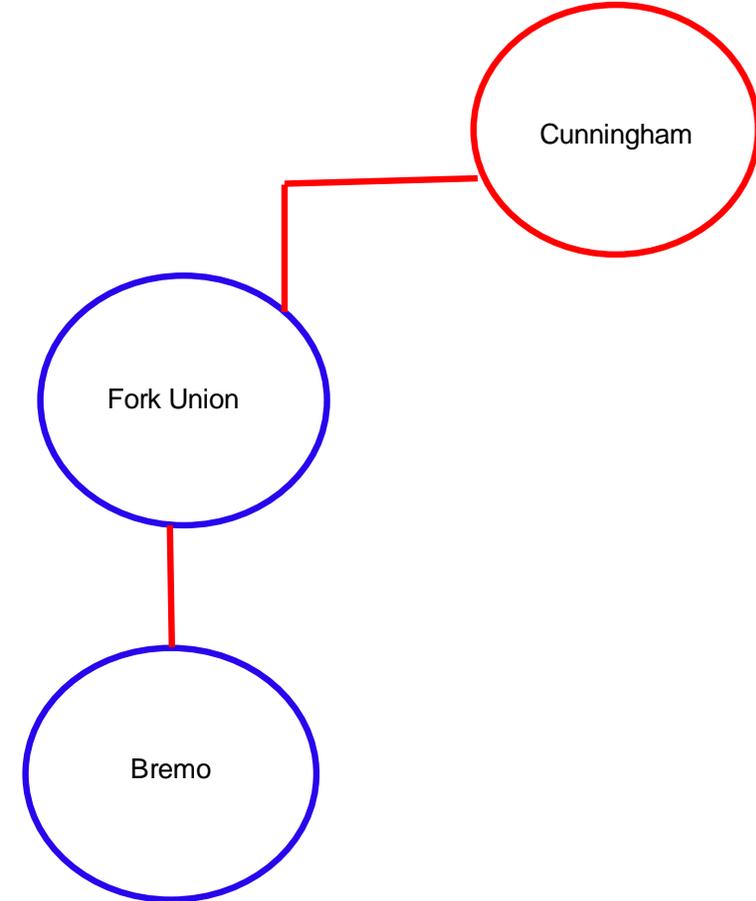
At Fork Union substation, replace the single structure backbone to double structure backbone and install two new 115kV breakers to terminate the two lines.

Estimated Cost: \$2.5 M

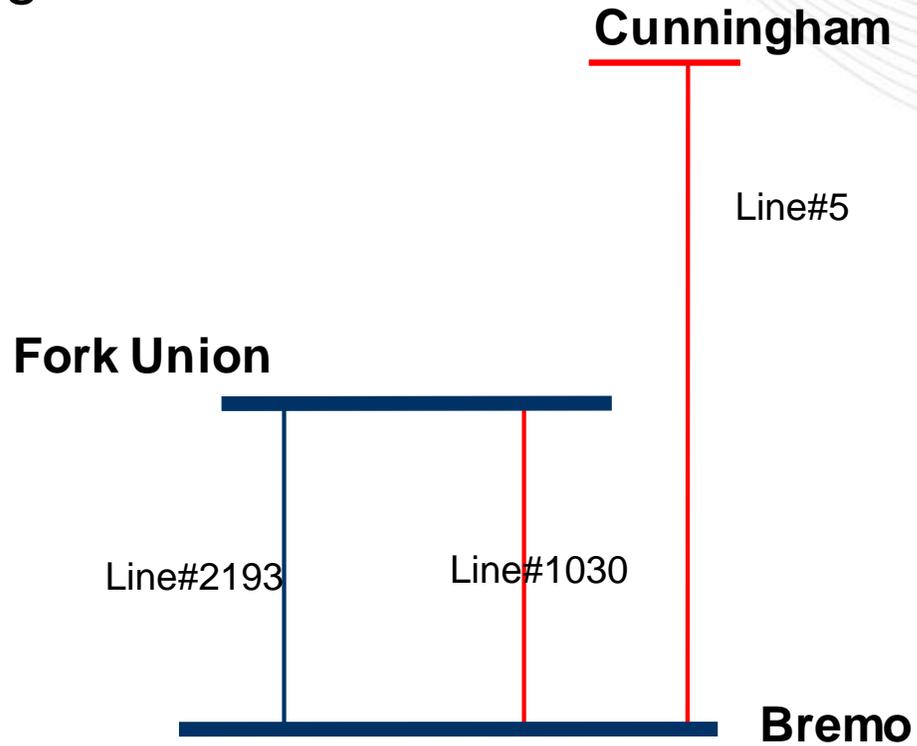
- Transmission work for conversion: \$ 1 M
- Substation work for conversion: \$ 1.5 M

Alternatives: N/A

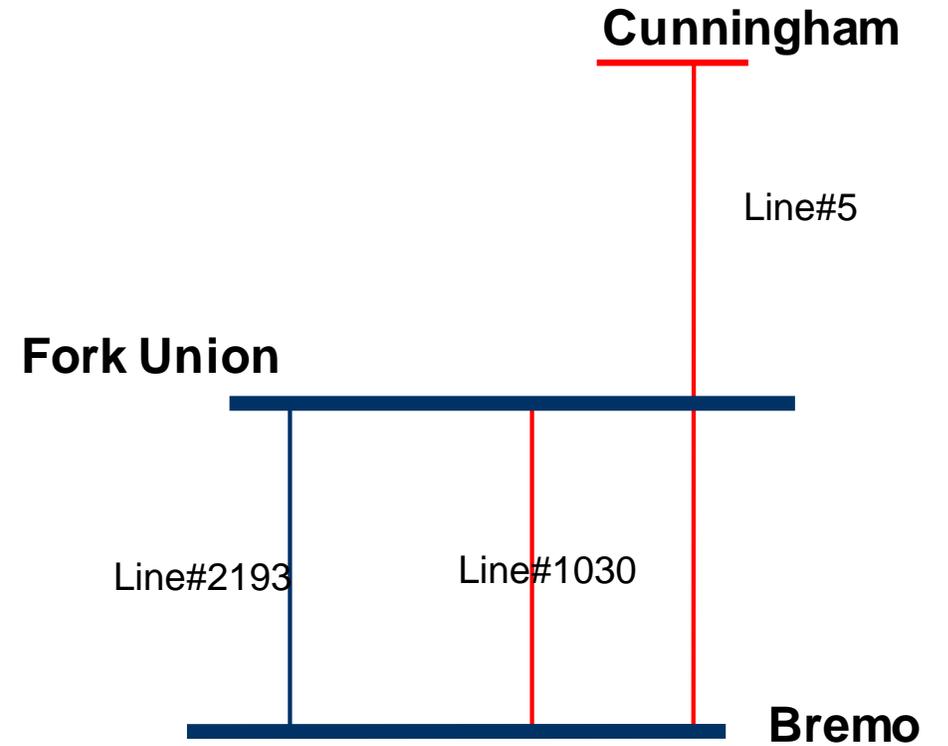
Required In-Service: 12/1/2025



Existing Oneline



Proposed Oneline





Dominion Transmission Zone: Baseline 115kV Line#117 Doods to Dupont-Waynesboro

Process Stage: First Review

Criteria: FERC 715 (TO Criteria) C2.7 Network transmission lines - Taps > 4

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP Summer + Winter cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

DOM-02

Currently there are 5 taps on 115kV Line#117 (Doods to Dupont-Waynesboro)

Proposed Solution:

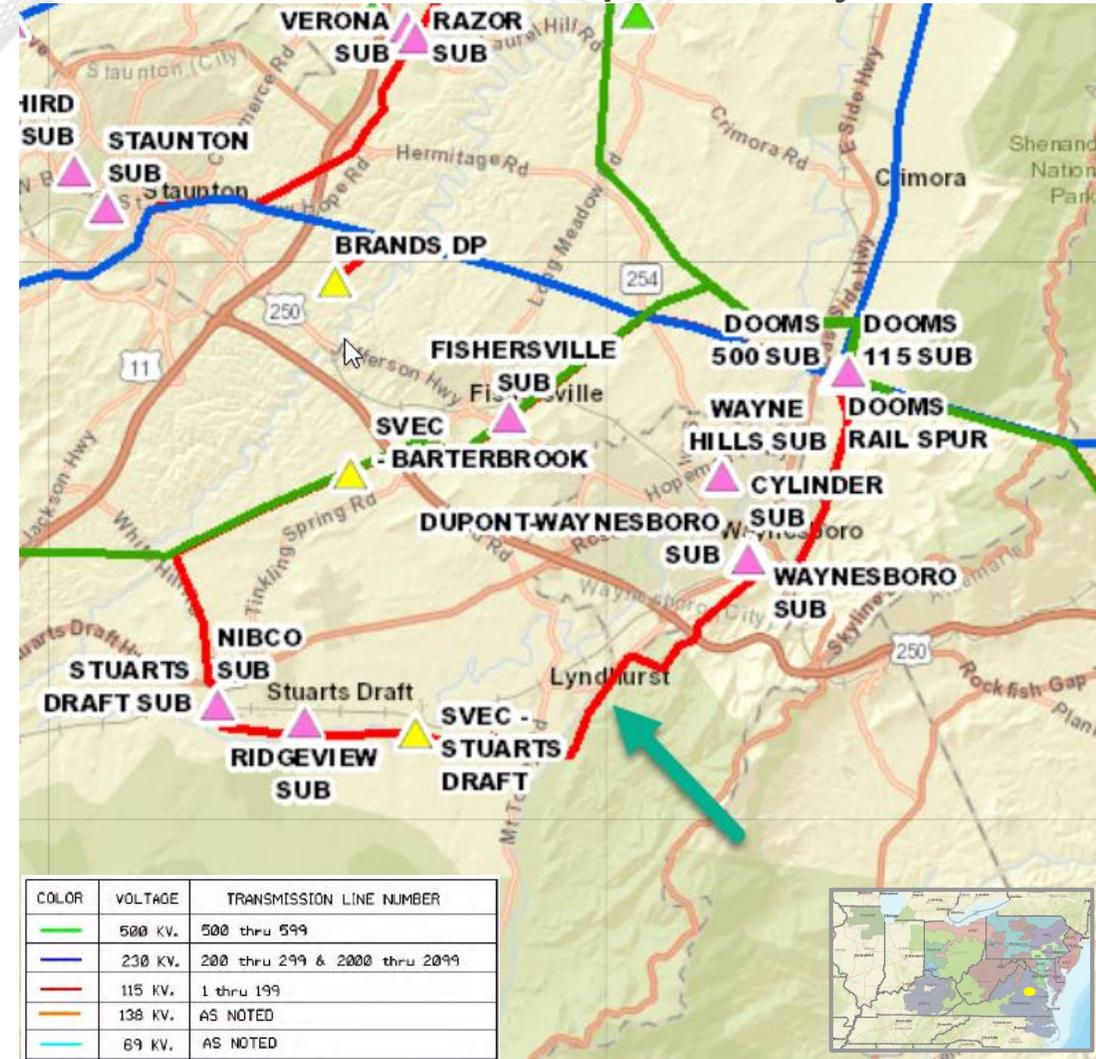
Install a breaker at Stuarts Draft station and section Line#117 into two 115kV lines.

Estimated Cost: \$5 M

- Transmission work for conversion: \$ 2 M
- Substation work for conversion: \$ 3 M

Alternatives: N/A

Required In-Service: 6/1/2025





Dominion Transmission Zone: Baseline Midway and Red Hill Area

Process Stage: First Review

Criteria: FERC 715 (TO Criteria)

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP Winter case

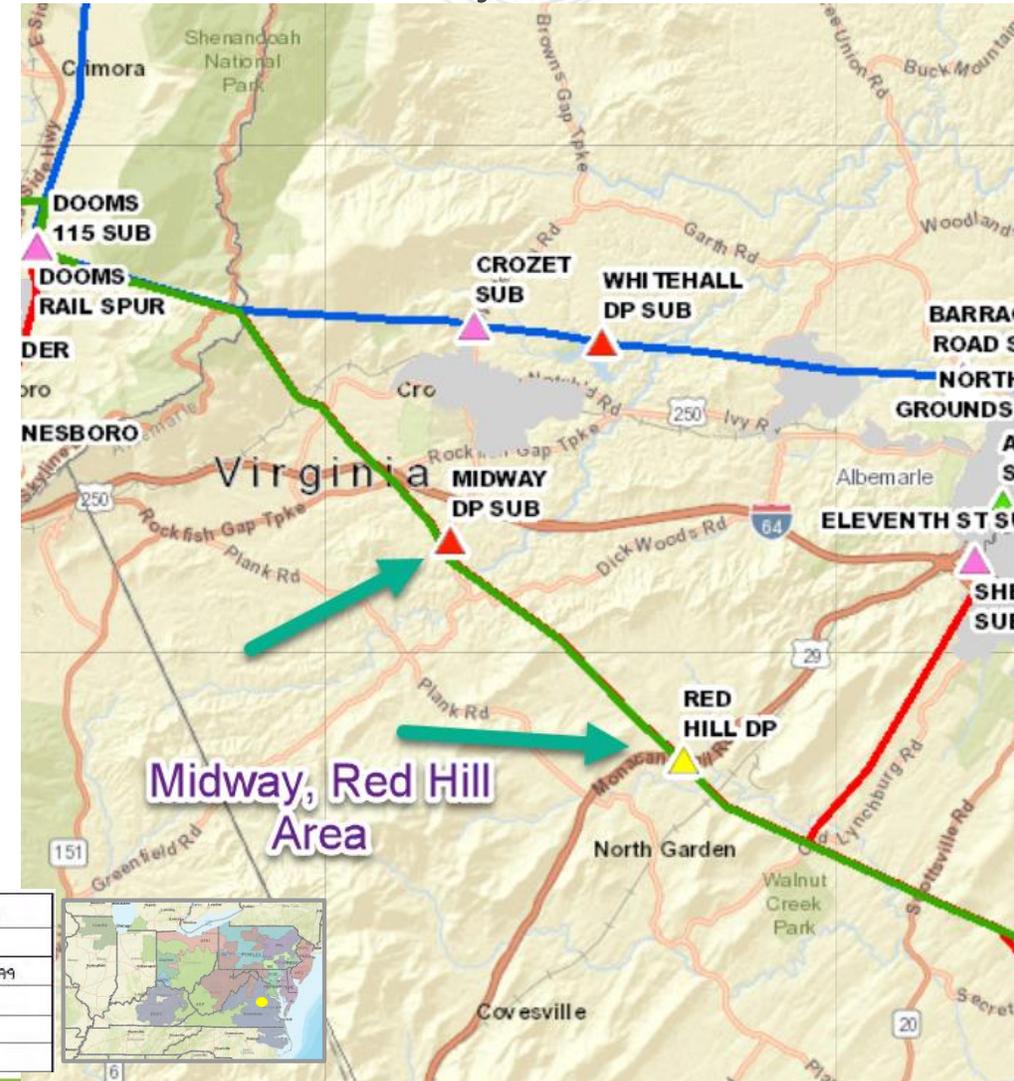
Proposal Window Exclusion: Below 200 kV

Problem Statement:

DOM-VD1 to DOM-VD20

Various voltage drop violations around the Midway - Red Hill area. Any one of the following contingencies will result in a voltage drop of more than 10% in the Midway - Red Hill area.

- Dooms 115kV Bus 2 outage
- Breaker failure on any one of the following breakers at Dooms: 10242, 16042, 16043, 16044, 16045, L542-2 and L842-2



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	89 KV.	AS NOTED

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Dominion Transmission Zone: Baseline Midway and Red Hill Area

Proposed Solution:

Build a 230kV switching station called Walnut Creek and operate it at 115kV voltage level at the junction where both 115kV lines #91 and #39 start to share the structure with. The station arrangement will be a new 4-115kV breaker ring bus station with an additional 115kV 33.67MVar and both 115kV line #91 and #39 will loop in and out of the new station.

Estimated Cost: \$12 M

- Transmission work for conversion: \$ 3 M
- Substation work for conversion: \$ 9 M

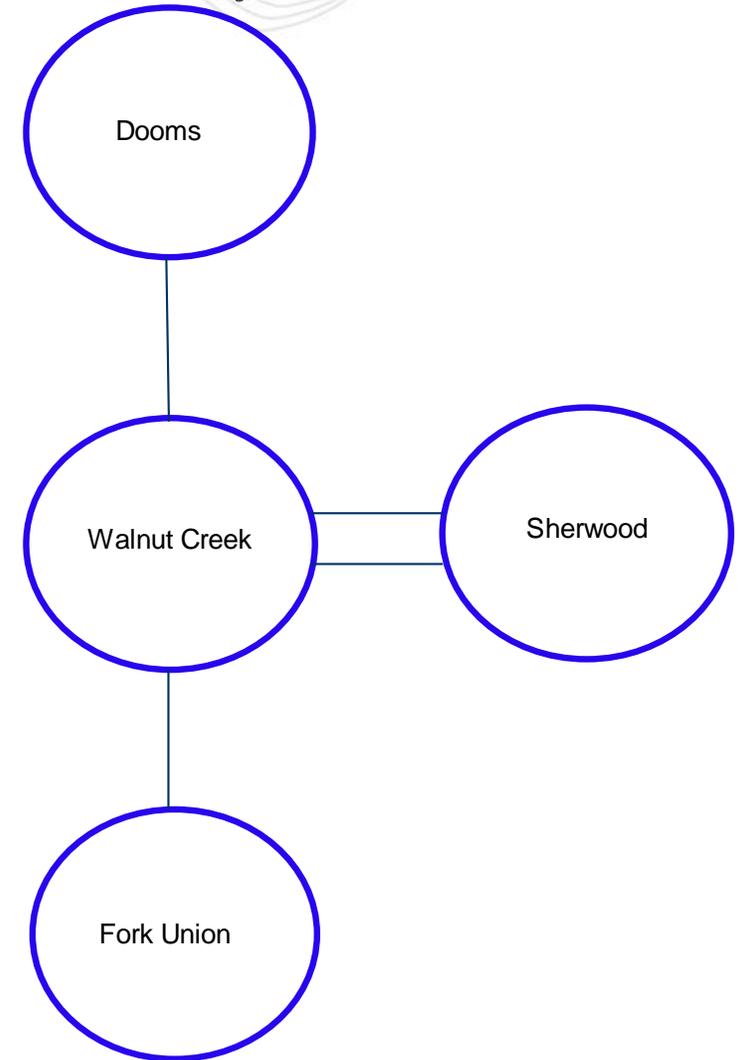
Alternatives:

Convert existing 115kV Line#39 between Dooms and Sherwood substations and Line#91 between Sherwood and Fork Union substations to 230kV lines. Convert Existing 115kV Sherwood substation to a 230kV station, build four 230kV breakers ring bus to accommodate two 230kV lines in and two distribution transformers.

Estimated Cost: \$37.5 M

- Transmission work for conversion: \$ 17 M
- Substation work for conversion: \$ 20.5 M

Required In-Service: 12/1/2025



Proposed 115 kV Electric Transmission Solution: Colington Tap to Nags Head Substation

Dominion Transmission Zone: Baseline Colington Tap – Nags Head 115kV Line

Process Stage: Project Status Update

Criteria: Dominion’s FERC 715 Planning Criteria (C.2.6 – Radial transmission lines)

Assumption Reference: 2025 RTEP Summer Case

Model Used for Analysis: 2025 RTEP Summer Case

Proposal Window Exclusion: Below 200 kV

Problem Statement:

DOM-O1

- Nags Head and Oregon Inlet DP are served radially from 115 kV Line #52 from Colington Tap point.
- The radial line section from Colington Tap to Nags Head is 4.5 miles long; the section from Nags Head to Oregon Inlet DP is 9.2 miles.
- Line #52 exceeds 100 MW maximum limit for radial transmission line.

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Solution being considered:

Substation:

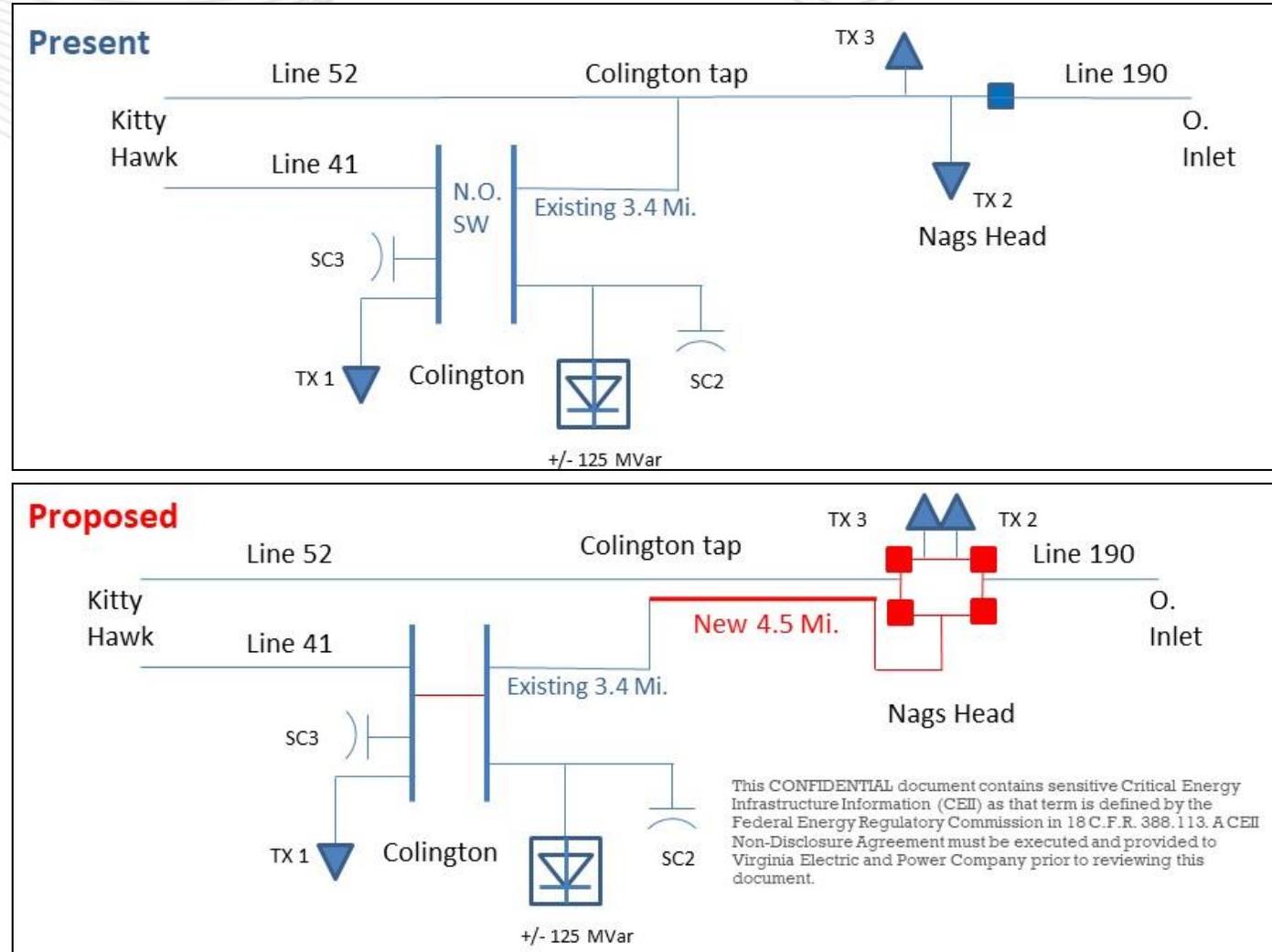
- Re-configure Nags Head substation to a 4-breaker ring bus arrangement to accommodate three transmission lines and two distribution transformers. Close normally open switch at Colington.

Transmission:

- Build a new 115 kV overhead transmission line from Colington Tap to Nags Head. Field survey work is in progress to evaluate feasibility/constructability of this line.

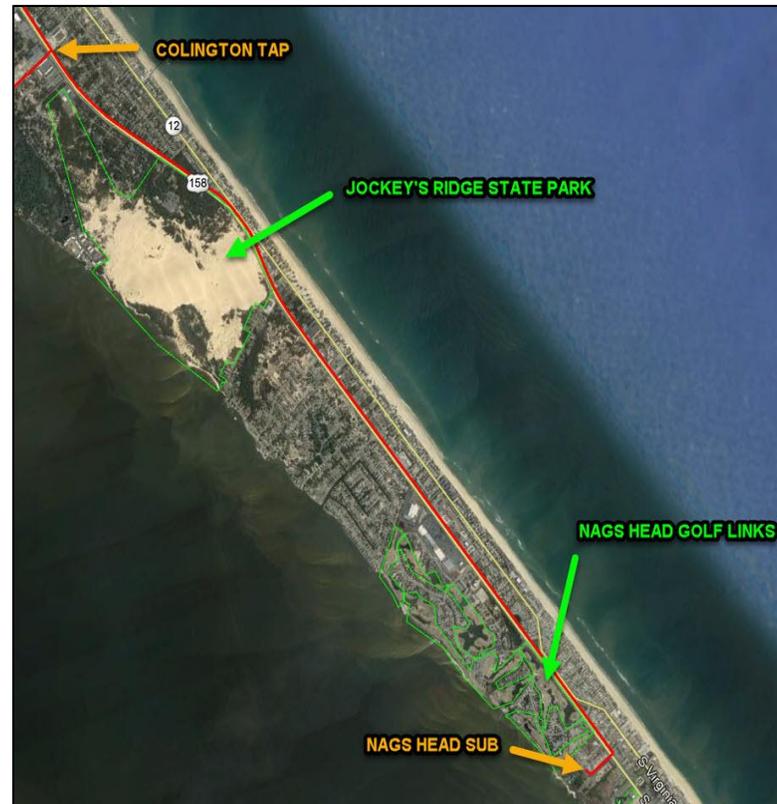
Required In-Service: 6/01/2025

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Overhead Transmission line challenges:

- The existing energized Line #52 concrete structures on the east side of Route 158 are designed for single circuit only.
- The east side does not have adequate North Carolina Department of Transportation (NCDOT) “clear recovery zone” for a second overhead circuit.
- The existing energized Line #52 must remain in service to serve Nags Head and Oregon Inlet DP stations during construction.



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Overhead Transmission line challenges:

- The preferred option is to build a new 115 kV overhead transmission line from Colington Tap to Nags Head along the west side of Route 158. Field survey work is in progress to evaluate feasibility/constructability.
- Initial findings suggest west side has potential conflicts with drainage swale (canals) and space as utility facilities are being relocated on the western side of Route 158 due to a new multi-use concrete bicycle and walk path installation that is occurring in the Town of Nags Head. This includes water line and gas utilities.
- Jockey Ridge State Park will offer permitting challenges.
- Locality approval could be challenging.



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Alternative Transmission solution being considered:

- Install underground transmission line(s) or
- Install underwater transmission line(s) through Roanoke Sound
- Field survey work is in progress to evaluate feasibility/constructability of this line and can take until April 2021 for all below grade infrastructure data to introduce viable transmission line route(s) that will require approvals.



Questions?





Revision History

12/9/2020 – V1 – Original version posted to pjm.com