



Reliability Analysis Update

Transmission Expansion Advisory
Committee

January 7, 2020

- The following definitions explain the basis for excluding flowgates and/or projects from the competitive planning process and designating projects to the incumbent Transmission Owner.
- Flowgates/projects excluded from competition will include the underlined language on the corresponding slide.
 - Immediate Need Exclusion: Due to the immediate need of the violation (3 years or less), the timing required for an RTEP proposal window is infeasible. As a result, the local Transmission Owner will be the Designated Entity. - Operating Agreement, Schedule 6 § 1.5.8(m)
 - Below 200kV Exclusion: Due to the lower voltage level of the identified violation(s), the driver(s) for this project are excluded from the competitive proposal window process. As a result, the local Transmission Owner will be the Designated Entity - Operating Agreement, Schedule 6 § 1.5.8(n)
 - Substation Equipment Exclusion: Due to identification of the limiting element(s) as substation equipment, the driver(s) for this project are excluded from the competitive proposal window process. As a result, the local Transmission Owner will be the Designated Entity - Operating Agreement, Schedule 6 § 1.5.8(p)



2019 RTEP Analysis Update

PJM CIL (Capacity Import Limit) Study 2019

- Compliance:
 - NERC Standard MOD-004-1, Requirement 6:
 - Requires the Transmission Planner to establish a CBM value for each Available Transfer Capability (ATC) Path or Flowgate to be used in planning during each of the full calendar years two through ten following the current year.
- Purpose:
 - The purpose of this study is to confirm that the PJM and surrounding transmission systems will be robust enough to enable PJM to import the amount of emergency assistance (CBM) assumed available in the 2019 PJM Reserve Requirement Study (RRS) and PJM RAA (R6.1).
 - The amount of CBM used in the PJM Reserve Requirement Study (RRS) is **3,500 MW**.
 - Attachment C.7 of Manual M-14B requires that CBM be preserved in generator deliverability studies
- Methodology:
 - Attachment G.11 “PJM Capacity Import Limit (CIL) Calculation Procedure”

<u>Supply Zone</u>	<u>2019 RTEP CBM Allocation (MW)</u>	<u>2020 RTEP CBM Allocation (MW)</u>
North	412	120
West 1	1,104	1,402
West 2	926	896
South 1	176	38
South 2	881	1,044
TOTAL	3,500	3,500

- The 2019 PJM CIL Study verifies that PJM meets its requirement for CBM in accordance with NERC standard MOD-004-1 Requirement 4.
- The primary drivers for the CBM allocation changes from the previous study are
 - Increased generation dispatch in the Niagara area of NYISO resulted in a reduction in import capability from the North Zone
 - Withdrawn deactivation requests of several large units in PJM resulted in an increase in import capability from the West 1 Zone

15 Year Analysis Results



15 Year Analysis Result for 2019 RTEP

2019 RTEP 15 Year Analysis - Single Result								
Fr Bus	Fr Name	To Bus	To Name	CKT	KVs	Areas	100% Year	Comment
253110	09ADKINS	243453	05BEATTY	1	345/345	209/205	2024	Not a 15 year issue assuming Stuart and Killen retire

2019 RTEP 15 Year Analysis - Tower Result								
Fr Bus	Fr Name	To Bus	To Name	CKT	KVs	Areas	100% Year	Comment
253110	09ADKINS	243453	05BEATTY	1	345/345	209/205	2024	Not a 15 year issue assuming Stuart and Killen retire
923061	AB1-105 TAP	238781	02HANNA	1	345/345	202/202	2024	Not a 15 year issue assuming Mansfield and Beaver Valley retire
926060	AC1-085 TAP	253014	09CLINTO	1	345/345	209/209	2024	Not a 15 year issue assuming Stuart and Killen retire

Spare Equipment Strategy Analysis

- TPL-001-4 Requirement 2.1.5
 - *When an entity's spare equipment strategy could result in the unavailability of major Transmission equipment that has a lead time of one year or more (such as a transformer), the impact of this possible unavailability on System performance shall be studied. The studies shall be performed for the P0, P1, and P2 categories identified in Table 1 with the conditions that the System is expected to experience during the possible unavailability of the long lead time equipment.*

- PJM Transmission Planning
 - Performed Spare Equipment Strategy Analysis per **TPL-001-4 R2.1.5**
 - Collected spare equipment information/updates from member TOs through an email survey
 - Ran N-1 analysis where individual long lead time equipment is removed from service (**Category P0**)
 - Ran N-1-1 analysis where individual long lead time equipment is removed from service and then another unplanned outage occurs (**Category P1 & P2**)
 - Studied Summer 2020, Summer 2024 and Winter 2024 cases
- Results
 - No violations found

Extreme Event Analysis

- NERC Standard TPL-001-4 requires Extreme Event Analysis
- Assesses the impact of extreme events (N-2, Gas Pipeline, extreme weather, etc.)
- If analysis concludes there is cascading, PJM must evaluate possible actions to reduce likelihood of cascading
- Transmission Owners provide extreme event contingencies
- PJM Develops: Gas pipeline contingencies and N-2 pairs (every reasonable combination of PJM Single contingencies 345 kV and up)

- N-1 and N-2 analysis on 2024 RTEP Model
- Contingencies:
 - Over 135,000 N-2 pairs
 - Over 30 gas pipeline contingencies
 - Over 2000 TO Provided Extreme Events Contingencies based on TPL-001-4 Table 1
- No cascading events identified
- Results and report will be provided to RFC and SERC as required

Informational Update to TEAC



2nd review of project will be presented at an upcoming SRTEP-South meeting

Dominion Transmission Zone: Baseline Line #153 (Spotsylvania-Oak Green) and Culpeper 115kV Delivery

Process Stage: First Review (presented at 12/16/19 SRTEP-South meeting)

Criteria: Dominion’s FERC 715 Planning Criteria (Post-Contingency Radial - Thermal and Voltage)

Assumption Reference: Dominion Energy’s Facility Interconnection Requirements

Model Used for Analysis: 2024 RTEP Summer

Proposal Window Exclusion: Below 200kV, FERC 715 (TO Criteria)

Problem Statement:

- 115kV Line #153 (Spotsylvania-Oak Green) exceeds 100% of its emergency rating for the N-1-1 loss of 115kV Line #11 (Gordonsville-Somerset) and 115kV Line #70 (Remington-Mt. Run).
- Voltage at Culpeper drops below 85% for the N-1-1 loss 115kV Line #153 (Spotsylvania-Oak Green) and 115kV Line #70 (Remington-Mt. Run).

Existing Facility Rating:

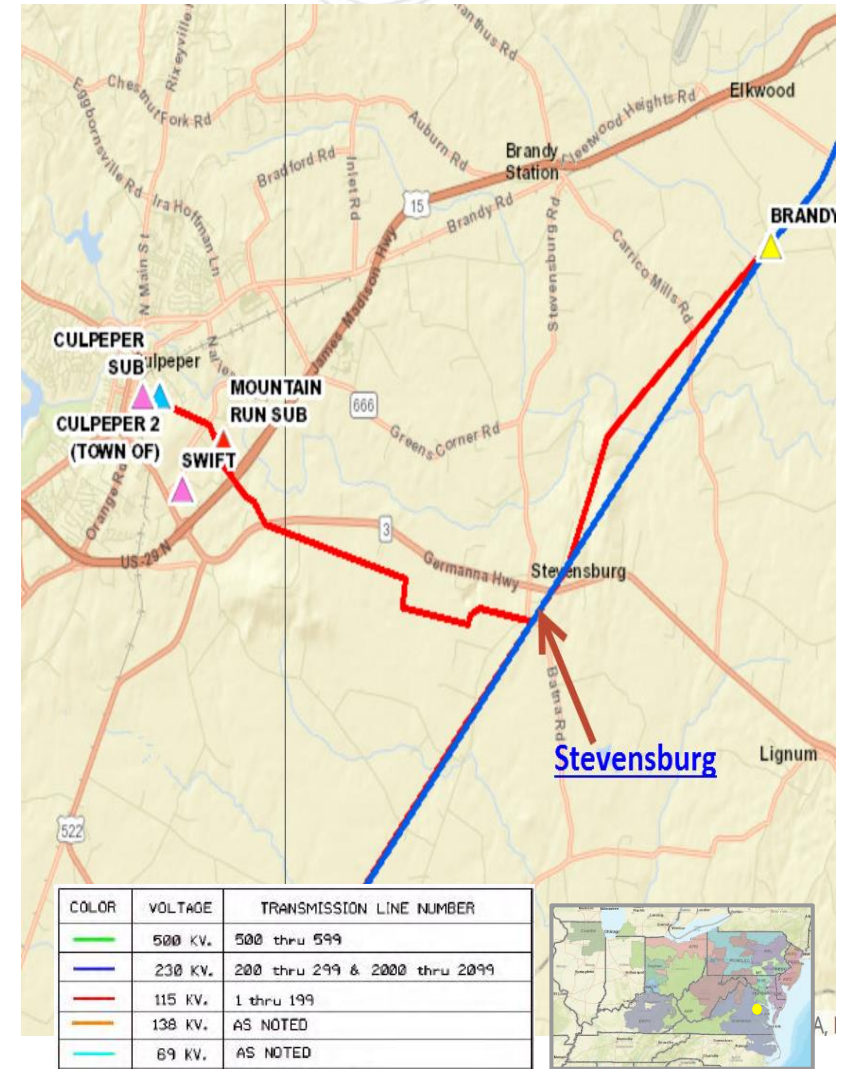
Spotsylvania-Paytes Tap = 226 MVA (summer – Normal and Emergency)

Locust Grove-Unionville = 204 MVA (summer – Normal and Emergency)

Proposed Solution: Acquire land and build a new 230kV switching station (Stevensburg) with a 224MVA, 230-115kV transformer. 230kV Line #2153 (Gordonsville-Remington) will be cut and connected to the new substation. 115kV Line #70 (Remington-Mt. Run) and 115kV Line #2 (Mt. Run-Oak Green) will also be cut and connected to the new substation. This will provide Culpeper another source to support voltage in the area as well as eliminating the thermal issue. **Estimated Cost:** \$22M

Alternative: No feasible alternatives.

Projected In-service Date: 12/31/2023



Questions?



2020

- TEAC meetings are the following Tuesdays or Wednesday in 2020
- 1/7, 2/4, 3/10, 4/14, 5/12, 6/2, 7/7, 8/4, 9/1, 10/6, 11/4 (Wednesday), 12/1.

- V1 – 12/31/2019 – Original slides posted
- V2 – 1/3/2020 – Updated wording for clarification on slide #15
- V3 – 1/3/2020 – Added slides 16 & 17 as an informational update
- V4 – 1/8/2020 – Updated 15 year results table to remove Sammis