Transmission Expansion Advisory Committee – AEP Supplemental Projects

February 08, 2021

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
Troutville, VA Area

Need Number: AEP-2021-AP001

Process Stage: Solutions Meeting 2/9/2022

Previously Presented: Needs Meeting 1/6/2021

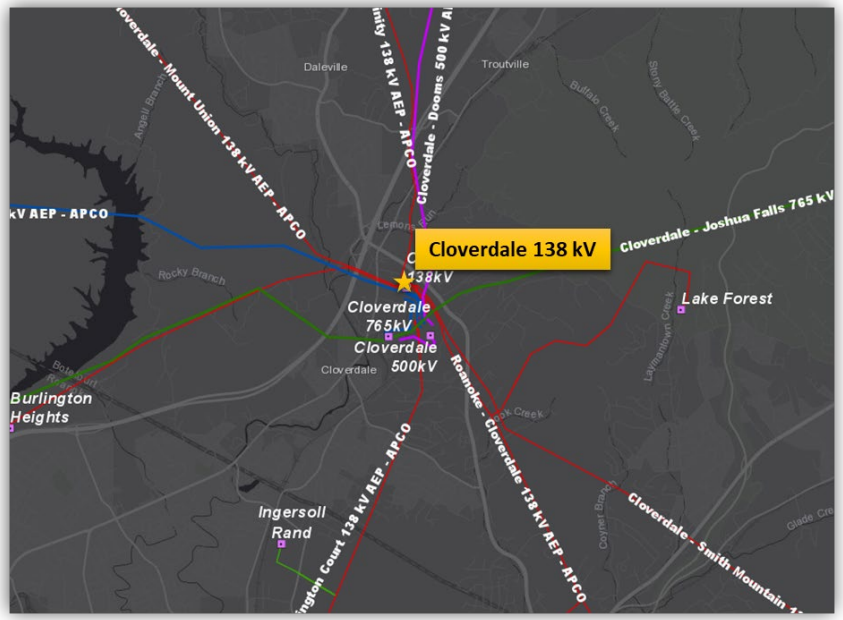
Supplemental Project Driver: Equipment Condition/Performance/Risk

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

Problem Statement:

Cloverdale Station:

- **345/138 kV Transformer #11A**
  - Transformer 11A was manufactured in 1972 with identified upward trending insulation power factor which indicates increased particles in the oil as well as elevated levels of ethylene indicating increased decomposition of the insulating paper materials, decreasing the units ability to withstand electrical faults
  - Unit leaks oil
  - Connected in parallel with transformer 11B; high-side connected directly to 345 kV bus #1 exposing it to faults and scheduled maintenance outages
- **345/138 kV Transformer #11B**
  - Transformer 11B was manufactured in 1997 with increased tertiary bushing power factor indicating capacitive layer deterioration. The change in bushing dielectric data indicates the tertiary bushings are at greater risk of failure or loss of service of the transformer. Also, observed elevated levels of carbon monoxide and carbon dioxide indicates decomposition of the paper insulation that impairs the units ability to withstand future short circuit or through fault events
  - Unit leaks oil
  - Connected in parallel with transformer 11A; high-side connected directly to 345 kV bus #1 exposing it to faults and scheduled maintenance outages
- **345/138 kV Transformer #3**
  - High-side connected to 345 kV bus #2 via Motor Operated Air-Break Switch (MOAB) exposing the bus to momentary transformer fault events
- 31 of the 94 microprocessor relays in the Cloverdale 138 kV Station were commissioned between 2003 and 2020 utilize obsolete firmware
- 69 kV hook-stick circuit breaker and switcher disconnect switches identified in need of replacement with Gang Operated Air-Breaker Switches



AEP Transmission Zone M-3 Process
Troutville, VA Area

Need Number(s): AEP-2021-AP001

Process Stage: Solutions Meeting 2/9/2021

Proposed Solution:

Cloverdale Station

- Replace 345/138 kV Transformer 11A & 11B with new 345/138 kV, 675 MVA Transformer 11 and reconnect to the 138 kV structure via a new 138 kV tie-line with 3 custom single-pole structures outside of the station in order to keep storage/driving space within the station. Install two new 345 kV 5000A 63 kA breakers to connect the new transformer and existing transformer 3 into a string position in the 345 kV yard.
- Replace all 69 kV hook-stick switches new 2000 A GOAB switches.

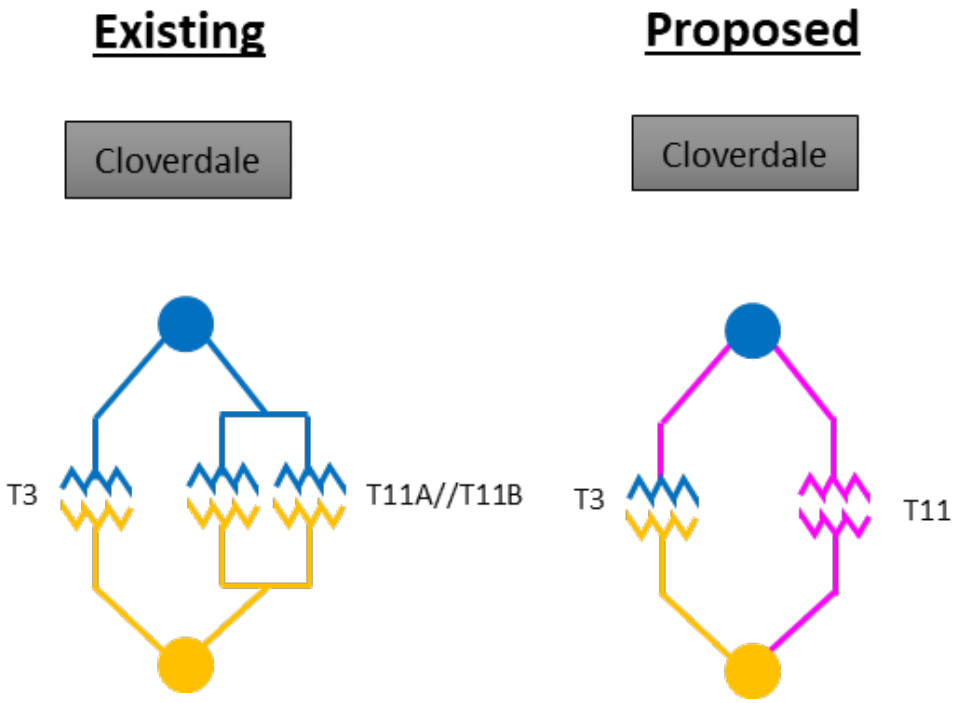
Total Estimated Transmission Cost: $12.33 M

Ancillary Benefits:
Installation of 2 new 345 kV circuit breakers will allow for the high-side of the new 345/138 kV transformer 11 and the existing 345/138 kV transformer 3 to be located in a breaker and a half position, preventing an outage of the 345 kV buses for loss of either transformer.

Alternatives Considered:
No cost effective alternatives were identified.

Projected In-Service: 10/31/2025

Project Status: Scoping



Questions?

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

01/28/2022 - V1 – Original version posted to pjm.com