

Reliability Analysis Update

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Sub Regional RTEP Committee – PJM West
July 18, 2025

Changes to Existing Projects

Baseline Reliability Projects

AEP Transmission Zone: Baseline B3333 Reactivation and Scope Change

B3333: Originally presented on 8/31/2021 to address Buchanan units 1 and 2 Deactivation
Cancelled on 3/14/2025 due to Buchanan units 1 and 2 deactivation was withdrawn.
Reactivated on 7/18/2025

Reason for Reactivation: the subsequent deactivation of Buchanan units 1 and 2

B3333 Scope change: Redlined below

Reason for the scope change: The original planned new substation land is not available, has to move the new location ~~0.4~~ 2.6 mile away.

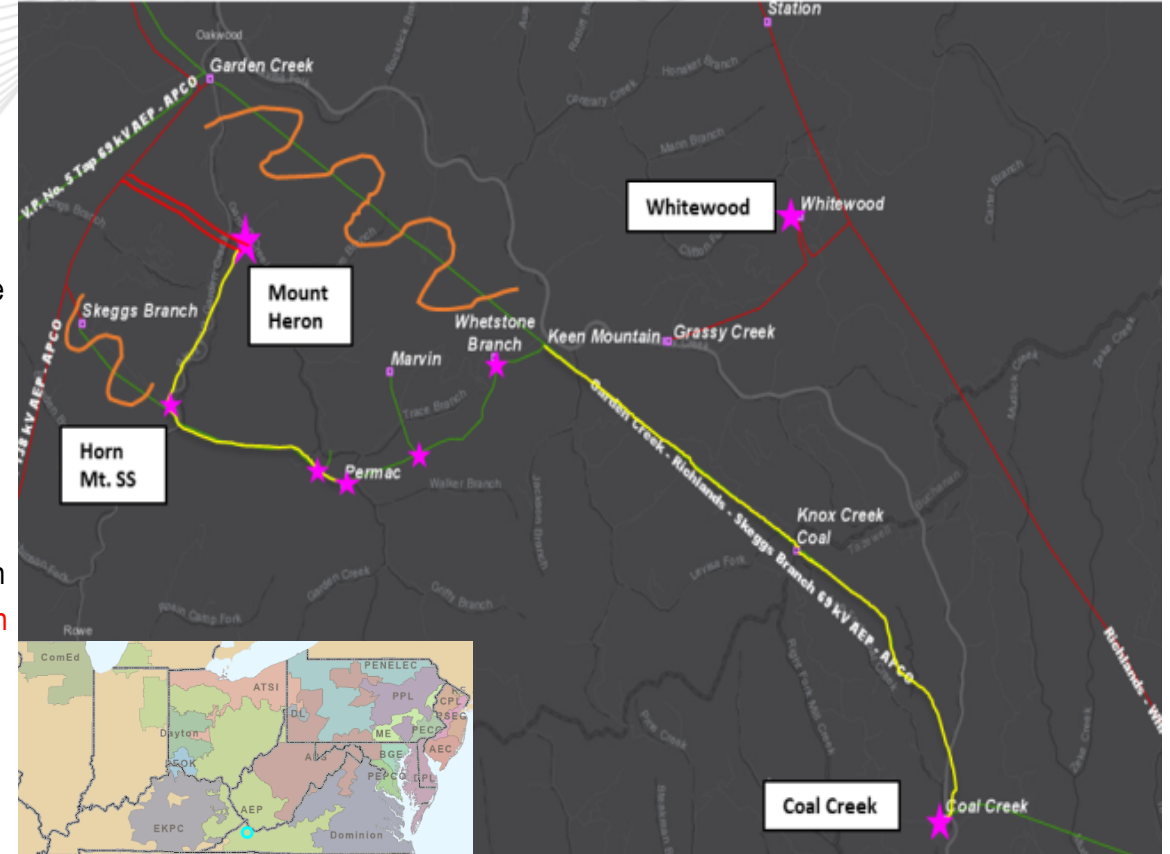
Proposed B3333 Scope:

Rebuild Skeggs Branch substation in the clear as ~~Coronado~~ Mount Heron substation. Establish New 138kV and 69kV Buses. Install 138/69kV 130 MVA transformer, ~~two~~ 138kV breakers, 138kV Circuit Switcher, ~~two~~ 69kV breaker. Retire Existing Skeggs Branch substation **(B3333.1) ~~\$6.345M~~ \$9.935M**

New ~~~1.2~~ 1.6 mi double circuit 138kV extension to new ~~Skeggs Branch~~ Mount Heron substation location and work required to tap the Clinch River – Garden Creek 138kV line. Retire the existing Skeggs Branch 138kV Tap **(B3333.2) ~~\$4.62M~~ \$19.144M**

Install ~~43.2~~ 57.6 MVAR Cap bank at Whitewood along with 138kV breaker. **(B3333.3) ~~\$1.05M~~ \$2.765M**

Rebuild ~9 mi 69kV line from ~~new Skeggs branch station~~ Horn Mountain SS to Permac switch. Rebuild from Str. 340-28 to Coal Creek station. **6-wire the short double circuit** section between Whetstone Branch and Str. 340-28 to convert the line to single circuit. **Retire** Garden Creek to Whetstone Branch 69kV line section. **(B3333.4) ~~\$26.25M~~ \$45.304M**



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Retire Knox Creek SS. (B3333.5) \$ 0.06 M

Horn Mountain SS, ~~This will be served directly from 69kV bus at New Skeggs branch Substation.~~
Replace 600A Switch and structure with 3 Way 1200A POP Pole Switch and pole. (B3333.6) ~~\$0.05 M~~ \$1.987M

At Clell SS, Replace (2) 600A POP Switches and Poles with single ~~2~~ 3 Way 1200A POP Switch and Pole.(B3333.7) ~~\$0.34M~~ \$1.796M

At Permac, Replace 600A Switch and structure with 2 Way 1200A POP Pole Switch and pole. (B3333.8) ~~\$ 0.31 M~~ \$2.503M

At Marvin SS, Replace 600A Switch and structure with ~~2~~ 3 Way 1200A POP Pole Switch and pole. (B3333.9) ~~\$ 0.31 M~~ \$2.688M

At Whetstone Branch substation, Replace 69KV 600A 2 Way POP Switch with 69KV 1200A 2 Way POP Switch. Remove 69KV to Skeggs Branch (Switch "22" POP). (B3333.10) ~~\$ 0.568 M~~ \$1.695M

At Garden Creek substation, Remove 69KV Richlands (via Coal Creek) line (Circuit Breaker F and disconnect switches) and update relay settings. (B3333.11) ~~\$ 0.138 M~~ \$0.537M

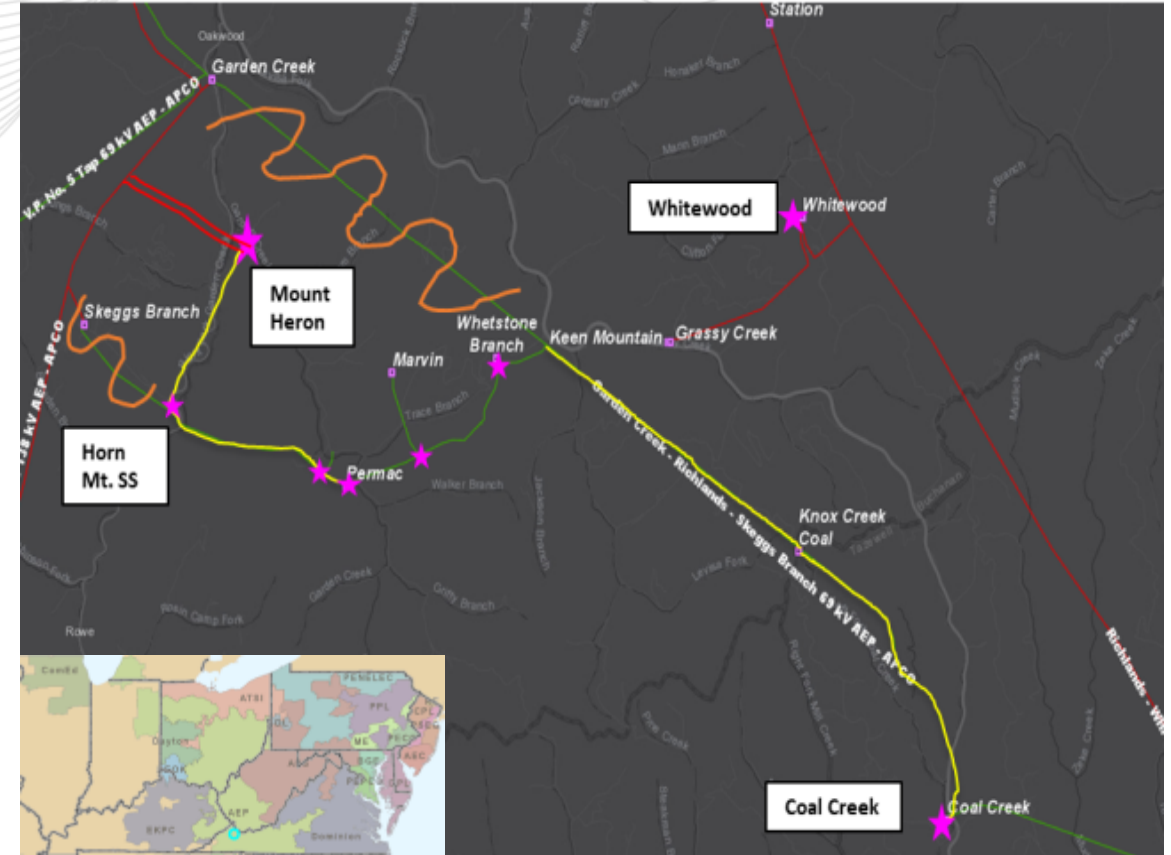
Remote End work at Clinch River substation. (B3333.12) \$0.08 M

Remote End work at Clinchfield substation. (B3333.13) \$0.08 M

Install ~2.6 mi greenfield 69kV line from greenfield Mount Heron station to the existing Horn Mountain S.S. \$18.015M

Total Estimated Cost: ~~\$40.171 M~~ \$106.589M

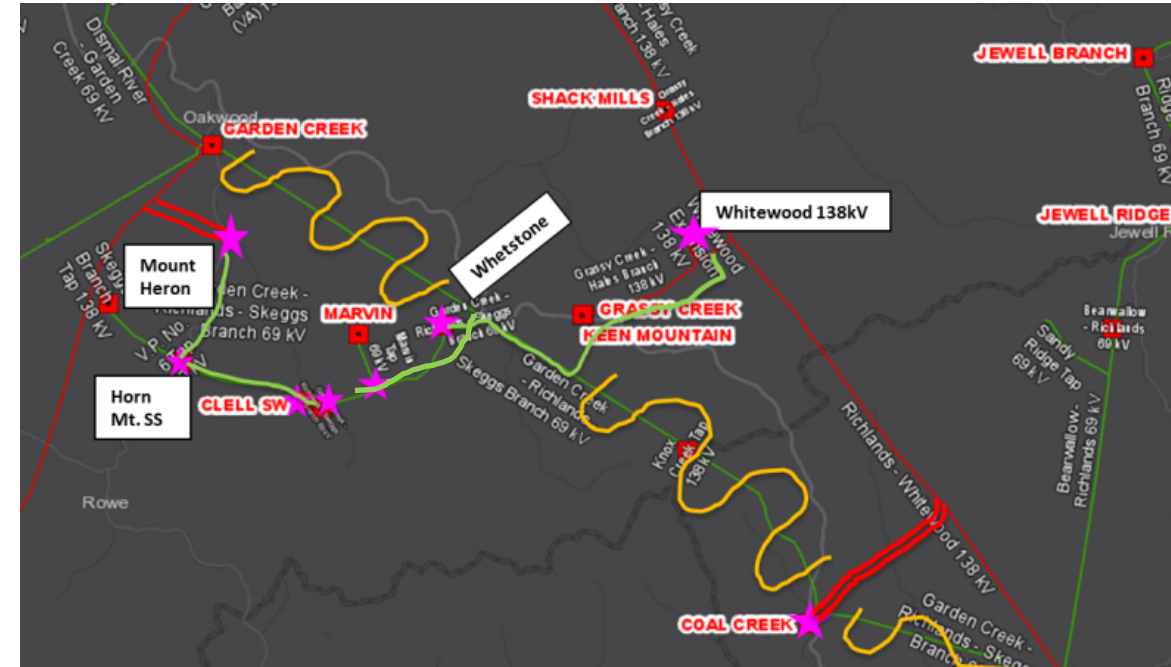
Projected IS Date: ~~12/15/2023~~ 12/10/2027



AEP Transmission Zone B3333 Reactivation and Scope Change

Alternative:

- Establish Mount Heron substation. – This station scope is identical to the proposed project.
- New Greenfield 69kV line between Mount Heron to Horn Mountain 69kV switch. – This scope is identical to the proposed project.
- Replace switches at Horn Mountain, Permac, Marvin. – This scope is identical to the proposed project.
- Rebuild 69kV line between Horn Mountain to Clell SS. – This scope is identical to the proposed project.
- Retire the Garden Creek – Whetstone Branch 69kV line section. – This scope is identical to the proposed project.
- Install a 69kV capacitor bank at Mount Heron station.
- Retire Whetstone Branch – Richlands 69kV line. ~11.5 miles.
- Establish new 138kV Coal Creek substation. Install new 138/12kV 20 MVA transformer along with related distribution equipment. Convert customer feed to 138kV. Install new revenue metering for this customer.
- Cut into Whitewood – Richlands 138kV line. Install ~2.5 mi 138kV double circuit line from the line cut in location to new Coal Creek 138kV substation.
- Install 138/68/12kV 130 MVA transformer along with a 138kV and 69kV circuit breaker at Whitewood station.
- New ~5 mi Greenfield 69kV line between Whitewood and Whetstone Branch substations.



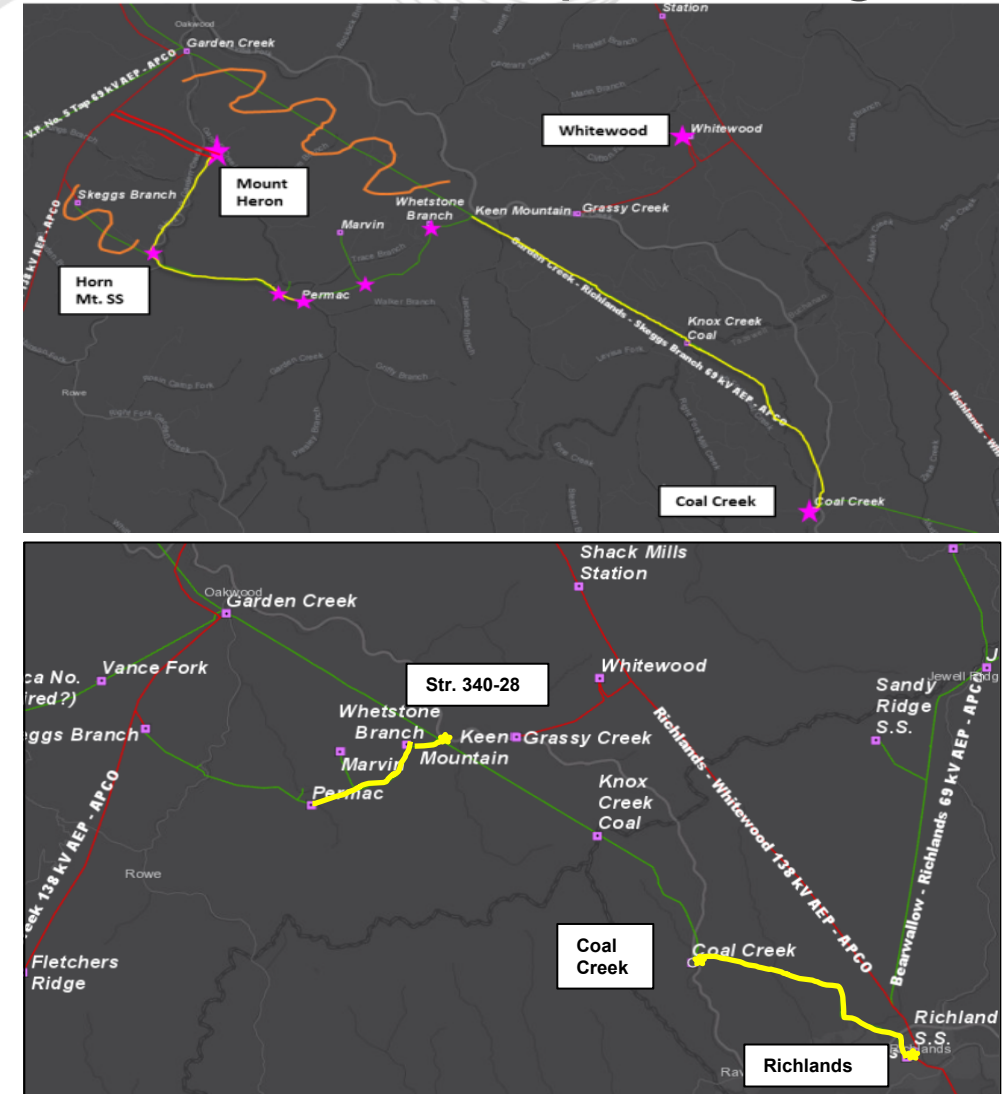
AEP Transmission Zone: Baseline B3333 Reactivation and Scope Change

Alternative (continue)

- ❑ The alternative is similar to the proposed project due to the difficulty of finding a station site in the area's terrain. Given the limited station sites, Mount Heron station site was assumed for the alternative project.
- ❑ The alternative solution has additional risks that may cause the alternative cost to increase. Including the unidentified right of way and potential constraints of the 138 kV lines from the Richlands - Whitewood line to Coal Creek Station.
- ❑ This alternative is not desirable due to the need to convert Coal Creek station and the Transmission customer to 138kV. Coal Creek is a landlocked station and may require relocating the station to convert to 138kV. Whitewood station is on a hilltop and the equipment needed for this alternative was placed at the station based on desktop information.

Cost comparison:

- The cost for B3333 is \$106.589M and the cost for S3135 (TEAC 11/17/2023, projected IS 10/30/2027) is \$29.2M. The total cost for the holistic solution is \$135.789M.
- The conceptual estimate for the alternative holistic solution is \$142.57M.
- Modifying solutions will impact the timeline.



Ancillary Benefits:

Supplemental needs Addressed:

- AEP-2021-AP013: Skeggs Branch substation needs.
- Part of AEP-2021-AP014 – N.O. at Permac station.
 - Improved sectionalizing capability for multiple substations (Twin Valley SS, Marvin, Clell) being hard tapped to 69kV Line or operated radially.
 - Three – terminals at Whetstone Branch.
 - Garden Creek-Coal Creek line condition
- Part of AEP-2021-AP003: Accommodates New Salmon substation load addition.

The customers along the 69kV line between Mount Heron and Whetstone Branch have requested to increase their load. Due to these customer loads, the 69kV line between Skeggs Branch to Whetstone Branch has a 69kV switch that is normally open at Permac. This results in the customers on this line being served from two radial 69kV lines. The transformer at Skeggs Branch is also limiting the customer load on the 69kV line. This solution will allow the customers to use their max desired load and have looped Transmission service.

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Reliability Analysis Update

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Version No.	Date	Description
1	July 15, 2025	<ul style="list-style-type: none">• Original slides posted
2	July 17, 2025	<ul style="list-style-type: none">• Cost Comparison

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