



Solution for the Immediate Need Operational Performance Issues: AEP 765kV Switchable Line Reactors

First Read

Wenzheng Qiu
Transmission Planning
Transmission Expansion Advisory Committee
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AEP Transmission Zone: Baseline Operational Performance: 765kV Fixed Line Reactors

Process Stage: Proposed Solution – First Read

Criteria: Operational Performance

Assumption Reference: Real time operation

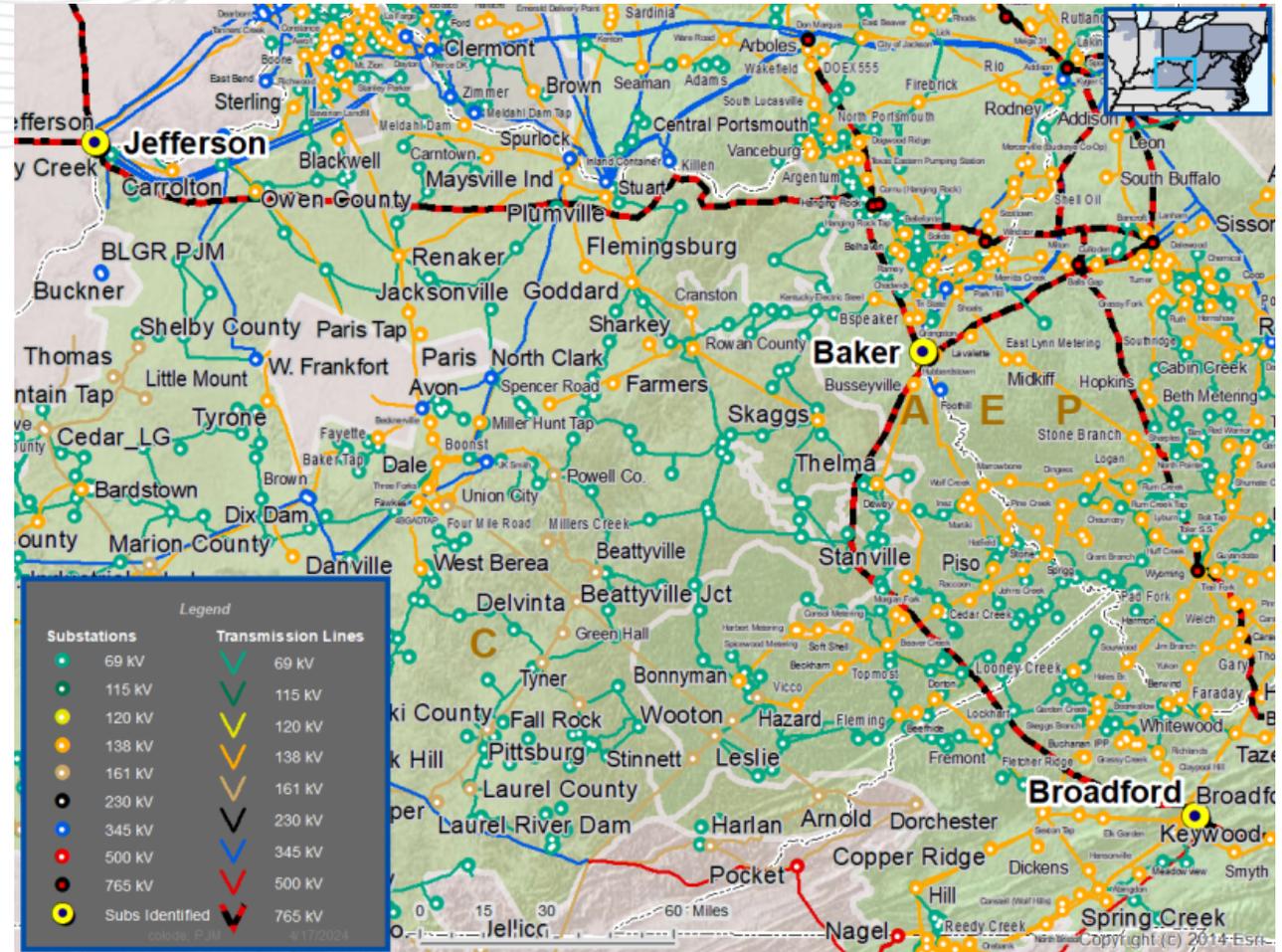
Model Used for Analysis: Operation cases

Proposal Window Exclusion: Immediate Need

Problem Statement:

PJM Operations has requested flexibility in the ability to switch in 765 kV reactors at Baker, Broadford, and Jefferson stations. Currently, these reactors are tied directly to the line which requires a line outage to switch the reactors on and off. During recent winter storm events, PJM determined that having the ability to remove these reactors from service could have helped support certain systems.

* The detailed need was presented in 4.2.2024 TEAC and the need document was posted at <https://pjm.com/committees-and-groups/committees/teac> under the same TEAC as one of the Informational only items.



- The following AEP 765kV lines have fixed reactors (using isolating switches with no breakers) which are not switchable while the associated 765kV line(s) are energized;
 - 765kV reactor at Broadford on the Broadford – Jacksons Ferry 765kV line.
 - 765kV reactor at Broadford on the Broadford – Baker 765kV line.
 - 765kV reactor at Jefferson on the Jefferson – Greentown 765kV line.
 - 765kV reactor at Baker on the Broadford – Baker 765kV line.
- As system conditions change during day-to-day operations, the reactors need to be switched Off (under higher transfers or heavy load conditions) or On (to manage High Voltage/low transfer conditions).
- Currently, the four 765kV lines listed above will need to be taken out of service to allow for safe switching of their associated line reactors.
- Switching the 765kV line(s) OOS during high transfer conditions poses operational risk and add unnecessary operation cycles to the main line breakers.

- The associated 765kV lines directly impact the AEP/DOM interface and are the key to reliable operation under high power transfer conditions.
- During high load conditions as well as high transfer conditions, the line reactors may need to be switched off to manage low 765kV voltages conditions.
 - Under high power transfer conditions, including extreme weather, switching the lines off to disconnect the line reactors poses an operational risk (breakers and/or other equipment may fail during the maneuver preventing the switched off line from being returned to service)
- Under light load and low transfer conditions; the reactors are also required (to be switched in) to manage high voltages in the area.
- These reactors need to be removed from service prior to issues developing and most of the time it is not feasible to perform during real-time operations. This presents high risk if equipment breaks and the line (s) cannot be placed back in service .



AEP Transmission Zone: Baseline Operational Performance: 765kV Fixed Line Reactors

Proposed Solution:

- Add a 765 kV breaker at Baker station for the reactor on the Broadford 765 kV line. **Estimated Cost: 23.36M**
- Add two 765 kV breakers to the reactors at Broadford station on the Baker and Jacksons Ferry 765 kV lines. **Estimated Cost: 29.05M**
- Add a 765 kV breaker to the reactor at Jefferson station on the Greentown 765 kV line. **Estimated Cost: 8.53M**

Total Estimated Cost: \$60.935 M

Alternatives: N/A. Considering the location of the existing reactors and the immediate need nature of the request, no viable alternates were identified.

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2027

Facilitator:
Jason Connell,
Jsaon.Connell@pjm.com

Secretary:
Tarik Bensala,
Tarik.Bensala@pjm.com

SME/Presenter:
Wenzheng Qiu,
Wenzheng.Qiu@pjm.com



Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

Version No.	Date	Description
1	4/19/2024	<ul style="list-style-type: none">• Original slides posted
2	4/22/2024	<ul style="list-style-type: none">• Add slides #3-5 for details for the problem statement

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