



Immediate Reliability Need to Address Operational Performance Issues: AEP 765kV Switchable Line Reactors

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- 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 .

- During Winter Storm Elliot, the Broadford 765kV bus was one of the limiting facilities due to low voltage, which caused multiple IROL exceedances.
- In January, 2024, Operations had to proactively remove the reactors from service to help with voltages in the area during heavy transfers. At the same time, all of the reactors could not be removed ahead of time as high voltages were a concern during off-peak hours.
- The AEP-DOM interface has bound 596 times since June 1, 2022 until February 25, 2024. In January 2024, the interface was binding for 303 times, among that 201 times are limited by steady state voltage collapse even with reactors out at Broadford.
- Power System studies were conducted including peak and valley load conditions on multiple days including extreme conditions such as Winter Storm Elliot, Winter Storm Gerri, and middle of the day with mild forecasts. Broadford 765kV bus typically has the lowest voltage in the area and is the limiting element for the AEP/DOM IROL Interface.
- The switchable reactors will allow for increasing the interface limits, preventing potential voltage collapse conditions that may occur at higher transfers with the reactors connected. The switchable reactors will also enable control of higher voltages during valley/light loading periods.



Historical Operational Performance – Influencing Factors

- More than 5000MW generation in the BGE/PEPCO/DOM areas retired in the past several years.
- During high load periods, higher transfers from the northwest (AEP) towards the southeast (Dominion).
- The AEP/DOM interfacing is being utilized closer to the limits. The Broadford area is a constant weak point where the voltage collapse point has the potential of developing.

Unit	Capacity (MW) Total: 10,797.5	Fuel Type (All)	State (All)	Age	Transmission Owner Zone (3)	Future Deactivations		Deactivated Gene
						Owner Notification Date	Actual Deactivation Date	Reliability Analysis (All)
Chesterfield 5	336.8	Coal	VA	56	Dominion	2.20.2020	6.1.2023	✓
Chesterfield 6	678.1	Coal	VA	51	Dominion	2.20.2020	6.1.2023	✓
Lanier 1 CT	7	Coal	VA	21	Dominion	9.29.2021	6.1.2023	✓
DINWIDDIE 1 CT	3	Coal	VA	28	Dominion	9.29.2021	6.1.2023	✓
Weakley CT	7	Coal	VA	21	Dominion	9.29.2021	6.1.2023	✓
Rockville CT	4	Coal	VA	26	Dominion	9.29.2021	6.1.2023	✓
Yorktown 3	767.1	Coal	VA	48	Dominion	12.20.2022	6.1.2023	⚠
Dickerson CT1	18	Coal	MD	55	PEPCO	7.25.2022	10.23.2022	✓
Morgantown CT1	16	Coal	MD	52	PEPCO	4.12.2022	10.1.2022	✓
Morgantown CT2	16	Coal	MD	51	PEPCO	4.12.2022	10.1.2022	✓
Morgantown Unit 1	613.3	Coal	MD	51	PEPCO	6.09.2021	5.31.2022	✓
Morgantown Unit 2	619.4	Coal	MD	50	PEPCO	6.09.2021	5.31.2022	✓
Oaks Landfill	2.2	Coal	MD	11	PEPCO	5.27.2021	7.1.2021	✓
Chalk Point Unit 1	333.1	Coal	MD	56	PEPCO	8.10.2020	6.1.2021	✓
Chalk Point Unit 2	337.2	Coal	MD	55	PEPCO	8.10.2020	6.1.2021	✓
Birchwood Plant	238	Coal	VA	24	Dominion	10.06.2020	3.1.2021	⚠
Spruance NUG 1	116	Coal	VA	25	Dominion	11.25.2019	1.12.2021	✓
Possum Point 5	770.2	Coal	VA	29	Dominion	3.26.2019	12.30.2020	✓
Dickerson Unit 1	182	Coal	MD	61	PEPCO	5.15.2020	8.13.2020	⚠
Dickerson Unit 2	180	Coal	MD	60	PEPCO	5.15.2020	8.13.2020	⚠

Deactivated Generation in BGE/PECO/DOM since 2020-present

- PJM has determined that the operational performance issues described above create an immediate reliability need for which a competitive window is not feasible:
 - The identified operational performance issues are based on a review of historical concerns associated with the operation of the system;
 - Projects needed to address such issues must be addressed as soon as practical;
 - PJM determined that no other transmission or non-transmission options would sufficiently address the immediate reliability need;
 - The issue become more prevalent recently, as indicated in Slide #4 and #5. One reason is that more than 5000MW generation in the BGE/PEPCO/DOM areas retired in the past several years, which pushes the AEP/DOM interface closer to the limits. Another reason is the extreme weather conditions such as winter storm events make the situation even worse.
- PJM will proceed with an Immediate need project(s) –without a Window to address the reliability needs driven by Operational Performance issues

- Need Statement Posted at <https://pjm.com/committees-and-groups/committees/teac> under 4.2.2024 TEAC as one of the Informational only items.
- PJM welcomes all stakeholders input and comments on its “Immediate Need Assessment.”
- PJM welcomes all stakeholder feedback.
- Once a proposed transmission solution is identified, PJM will bring it forward to the April 30, 2024 TEAC meeting for first read.

Questions?

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