SUMMARY

As the regional transmission organization (RTO)[1] for this portion of the United States, PJM acts as a neutral, independent party to operate and plan the high-voltage electric transmission system. To dispense our planning obligation, PJM conducts a process that provides a long-term regional plan for infrastructure modifications that are driven by changing demand and the changing placement of power generation, including retirements. This regional perspective allows PJM to draw upon a larger contingent of solutions than perhaps otherwise available through local planning alone.

PJM's plan maintains the integrity of the transmission system as changes are either actualized or forecasted to occur. Thus, the analysis conducted below is subject to change based on the conditions of the system at the time of any official retirement notice from the subject plant(s).

In PJM's capacity as an RTO, the chair of the Maryland House of Delegates Environment and Transportation Committee requested PJM to study the retirement of Maryland coal-fired generation based on the following schedule:

- Warrior Run Unit 1 (2030)
- Morgantown Units 1 and 2 (2025)
- Brandon Shores Units 1 and 2 (2025)
- Herbert A Wagner Unit 3 (2023)
- Chalk Point Units 1 and 2 (2020)
- Dickerson Units 1, 2, and 3 (2020)

At present, under certain operating conditions, the Baltimore/Washington, D.C. transmission corridor requires PJM to deploy special operating procedures that ensure electric reliability. These operating procedures engage during periods of high demand in the area. When engaged, these procedures require the operation of localized generation. The use of localized generation relieves the Baltimore/Washington, D.C. transmission infrastructure that, absent the use of local generation, will otherwise import power at levels above its safe operation. These operating procedures offer a basis for assessing reliability impacts of retirement scenarios for any localized generation in the Baltimore/Washington, D.C. region.

Based upon PJM's assessment of the requested retirement scenario, the simultaneous retirement notification of the generation sources studied will impose infrastructure overloads to seven existing transmission facilities in the region. Details of those facilities are noted below. Such overloads may be mitigated through electrical transmission network upgrades as well as further enhanced operating procedures, such as those noted above.

Under an official retirement notification, PJM would engage in an intensive process with the affected transmission owners to identify transmission network upgrade solutions – and their estimated costs – required to ensure reliability given the retirement notification. PJM would also work to deploy any additional operating procedures that may mitigate the need for infrastructure upgrades.

[1] Regulated by the Federal Energy Regulatory Commission (FERC), regional transmission organizations administer the high-voltage electric transmission grid on a regional basis throughout North America. FERC's Order No. 2000 (1999) delineated twelve characteristics and functions that an entity must satisfy in order to become a Regional Transmission Organization. https://www.ferc.gov/industries/electric/indus-act/rto.asp

Study Results

Questions and requests are noted below in boxes. PJM responses are below.

Retirement Analysis

Request an analysis of generation options necessary to resolve any concerns relative to taking the six plants off-line. The six coal-fired generation plants in question are:

- Warrior Run Unit 1 (2030)
- Morgantown Units 1 and 2 (2025)
- Brandon Shores Units 1 and 2 (2025)
- Herbert A Wagner Unit 3 (2023)
- Dickerson Units 1, 2, and 3 (2020)
- Chalk Point Units 1 and 2 (2020)

While the request noted above indicates different years for the date of retirement, PJM performed its analysis under the assumption that all units listed in this request gave simultaneous *notification* to PJM of their intention to retire.

This is consistent with how PJM would conduct its retirement analysis if given formal notification. Using this approach allows PJM to create a proverbial *version* of the transmission system accounting for these retirements. Then, any subsequent changes that arise prior to the unit's actual retirement, are able to be planned around the upgrades for these retirements.

The results of the PJM analysis identified seven facilities requiring system reinforcements are noted below. Under a formal retirement notification, to ensure reliability given the scope of the retirement scenario, PJM would engage with the affected transmission owners to identify the upgrade solutions, estimated schedules and estimated costs or enhanced PJM operating procedures.

If a retirement date is requested in advance of the upgrades, PJM may request, though cannot require, the generating facility continue operation until required transmission upgrades are implemented.

Monitored Transmission Line or Transformer Facility	Facility Loading Modeled Above Rating (%)
Howard - Pumphrey 230 kV line	106.50
Dickerson H - Dickerson 230 kV section	108.24
Safe Harbor 3-4 Tap – Gracet on 230 kV line	120.56
Frederick Rd 110528 - Chestnut Hill 110528-A 115 kV line	105.53
Frederick Rd 110527 - Chestnut Hill 110527-A 115 kV line	104.36
Waugh Chapel 230/115 kV transformer	103.79
Harrisonville 110560-A - Dolfield Tap 110560	102.85

In addition to transmission violations, PJM's generator retirement analysis also assesses the ability for the affected portion of the grid to be restored amid a large-scale blackout. Currently, the BGE and PEPCO transmission zones are slightly generation deficient when total generation capability is compared to summer peak customer demand. Absent replacement by localized thermal generation, the proposed coal retirements will result in a large imbalance. This imbalance will have an impact on customer restoration time if a system blackout were to occur. Without some replacement, the retirement of all of the subject plants will result in the BGE and PEPCO transmission zones relying heavily on neighboring systems to import power, resulting in a significant delay in customer restoration time.

Prior Analyses

Previously published analysis for the Dickerson and Chalk Point units stated that the necessary grid upgrades would be completed by June 2020. Have those upgrades have been completed or are on schedule to be completed in 2020?

In 2013, Dickerson and Chalk Point generating stations announced a proposed deactivation date of June 1, 2017. The analysis referenced resulted from that announcement. However, these units rescinded their deactivation request in 2016. After rescinding, PJM canceled all baseline network upgrades that were no longer required upgrades associated with those deactivation announcements.

Upgrades and Siting of Renewable Generation

Provide analysis of the potential impact, including reliability issues, of upgrading transmission facilities to support new renewable energy sources, specifically as it may apply to the BGE service territory due to the anticipated loss of generation and capacity from the Brandon Shores coal-fired power plant.

The existing coal generation owners possess Capacity Interconnection Rights (CIRs)[2] at each unit. Within PJM's Tariff, CIRs may be sold or transferred up to one year after a unit's actual retirement date or else forfeited and available to other generation developers.

Generation owners obtaining these CIRs could use these rights to install new generation, equivalent in size and system impact without requiring system upgrades, provided that they are accomplished near the deactivated facility's electric injection location.

Thus, the electric reliability value of any new facility is very much dependent on proposed size, electric injection location and implementation timing. Specifics would once again need to be studied and modeled for individual projects to determine any reliability benefits or potential negative impacts.

[2] The rights to input generation as a generation capacity resource into the transmission system at the point of interconnection where the generating facilities connect to the transmission system.