



RELIABILITY FIRST

July 25, 2024

VIA ELECTRONIC FILING

Mr. Andrew S. Johnston, Esq.
Executive Secretary
Maryland Public Service Commission
William Donald Schaefer Tower
6 St. Paul Street, 16th Floor
Baltimore, MD 21202-6806

Re: Administrative Docket No. PC 61 – Comments of ReliabilityFirst Corporation Regarding Co-Located Load Configuration

Dear Mr. Johnston:

In response to the Maryland Public Service Commission's June 21, 2024, Notice Convening a Public Conference and Request for Comments, ReliabilityFirst Corporation (RF) respectfully provides comments on technical reliability considerations related to co-located load configuration.

RF is one of the six North American Electric Reliability Corporation¹ (NERC) Regional Entities responsible for preserving and enhancing the reliability, resilience, and security of the bulk power system (BPS, or "system").² Collectively, NERC and the Regional Entities comprise the ERO Enterprise. With specific authorities under the Federal Power Act and through a delegation agreement with NERC, RF's mission serves the public good and supports health and safety by assuring BPS reliability for over 73 million customers in our 13 states (including Maryland) and the District of Columbia.² We are responsible for auditing and enforcing the NERC Reliability Standards for more than 300 registered entities in our footprint, which include Regional Transmission Organizations (specifically PJM and MISO), utility companies, and generators. We also provide outreach and education to registered entities in our footprint, and technical expertise to state public utility commissions, legislators, and other stakeholders.

¹ The North American Electric Reliability Corporation (NERC) is a not-for-profit international regulatory authority designated by the Federal Energy Regulatory Commission (FERC) to assure the effective and efficient reduction of risks to the reliability and security of the grid. Through delegation agreements and with oversight from FERC, NERC works with six Regional Entities (including RF) on compliance monitoring and enforcement activities. Collectively, NERC and the Regional Entities comprise the ERO Enterprise. The ERO Enterprise jurisdiction includes users, owners, and operators of the BPS, which serves nearly 400 million people in the continental United States, Canada, and Mexico.

² RF does not have jurisdiction over the local distribution of electricity, which is a state responsibility.

RF's role with the states is to serve as an independent, objective technical resource concerning reliability risks. While energy policy should appropriately prioritize BPS reliability, our statements are not intended, and should not be interpreted, as advocating for a specific policy outcome.

The co-location of large energy consumers with power plants presents both opportunities and challenges for system reliability. The overall impact will depend greatly on the specific implementation, technologies used, and regulatory framework. Careful planning, robust fail-safes, and thoughtful policy can help to maximize benefits and minimize risks associated with co-located load configuration. Additionally, maintaining diversity in both generation and consumption patterns across the broader grid helps to ensure overall system resilience.

Co-location has the potential to improve grid reliability in several ways. For example, transmission losses can be reduced since less energy is lost when power generation and consumption are in close proximity to each other. Furthermore, this proximity can enable better coordination between power production and consumption, improving load management and reducing strain on the broader grid.

Nuclear power, in particular, can be an advantageous generation source for co-location. For large loads that require high power quality and constant reliability, being close to nuclear generation is beneficial due to its high-capacity factor and effective load-carrying capability (ELCC), and its history of good performance in extreme weather. Additionally, co-located loads can provide a steady revenue stream to nuclear plants that are struggling to compete in the market and facing retirement. Note that the potential benefits of co-location vary, nuclear units will need maintenance and refueling downtime, and should be evaluated on a case-by-case basis.

While co-location can provide benefits, it is important to also evaluate any potential reliability risks, (such as risk of thermal overloads, voltage issues, or stability issues) that could arise in different operating conditions (i.e., full generation, partial generation, or no generation output operating) with the load connected. While these risks can apply to any interconnection, it is important to ensure that the load associated with a co-located facility is studied, so that planners and operators can assess reliability concerns such as contingencies, power flow changes, and voltage that may otherwise be hidden or masked by the generator. Depending on their operation and interconnection type, co-located facilities may or may not be visible to the system operator, and if they fluctuate back and forth during faults or switching, this could cause issues with voltage support, frequency response, harmonics, stability of neighboring resources, or protection system coordination. Additional consideration should be given for system restoration purposes. For instance, if the generation is needed to assist in the restoration of the grid, then obligation to serve the co-located load could be suspended until the grid is restored in a manner that can reliably feed the co-located load.

To help avoid or mitigate these risks, the Transmission Owner/Transmission Planner for a proposed co-located facility can conduct a study of the facility. The study may analyze the impact of the proposed modifications and report the effects on performance and equipment, to determine configuration requirements for the interconnection of the generation source to the

customer load source.³ Components of such a study on the impact of the co-located facility to the system could include the following:

- a) Real-time metering and telemetry;
- b) Protection systems operation and coordination;⁴
- c) Power factor requirements at the facility, including the need for the installation of reactive devices;
- d) Review of the facility's ability to meet its designated voltage schedule with the addition of co-located load;
- e) The need for any temporary operational guidelines in the event of abnormal system configurations such as the potential curtailment of load; and
- f) Operational configuration while utilizing back-up generation.

Another practice that can reduce risk is ensuring that the co-located load has a point of interconnection with the generation source that is delineated with a rated circuit breaker and coordinated with its associated protection systems. This helps to ensure reliable isolation and switching. The required configuration for co-located loads within PJM is presently an evolving process and may be modified by an ongoing FERC review. Additionally, creating guidelines for re-accessing the interconnection (if the generation is offline or down for an extended maintenance period) can reduce the potential for long outages.

There are also cyber security related risks to consider, and measures that can reduce these risks at a co-located facility. Such risks include having a single point of failure, or the potential for cascading failures if a cyber issue on either the generation or load side could propagate to the other. Actions to reduce these risks could include segmenting the cyber systems and assets between the co-located generation and load facility to prevent shared access in the event of a cyber-attack.

Generating facilities that meet Bulk Electric System (BES) thresholds are registered with NERC and their associated Regional Entity and are held applicable to NERC Reliability Standards that preserve and enhance reliability and security. Furthermore, the new co-located load, depending on the size, may also have to register with NERC as a Distribution Provider (DP) which would also hold them accountable to NERC Standards. These Standards include cyber-security standards, communication standards, modeling standards, relaying/protection standards, and operation standards. However, if the co-located load is less than 75 MW of peak load, the NERC Standards do not apply, which may create additional reliability and security risks for consideration when implementing these arrangements, that also fall under state jurisdiction regarding distribution load.

ReliabilityFirst has analyzed the balance between load growth and generation within this region, specifically reviewing the impact of co-located loads at Maryland's Calvert Cliffs Nuclear Power

³ The Electric Power Research Institute (EPRI) includes a summary of some of [the considerations needed to study and plan for these installations](#).

⁴ This includes the review and classification of any Remedial Action Schemes (defined in NERC Reliability Standard PRC-012), as determined by the Reliability Coordinator.

Plant. Adding co-located load minus additional generation and transmission enhancements would be detrimental to grid reliability as it would partially or fully remove the support of the Calvert Cliffs unit(s). Furthermore, analysis confirms potential voltage collapse in eastern PJM and Dominion if no additional reinforcements are made in the 2028/2029 timeframe. Several factors have led to this conclusion. Load growth has continued to increase, largely in the Dominion and eastern PJM area. Concurrently, a significant number of megawatts have been retired, specifically in Maryland, which has increased the reliance on importing power from PJM West to serve the load. These resources being retired, coupled with the increased load growth, are further stressing the PJM system with high west-to-east transfers across the region. Therefore, any changes to power generation should be carefully evaluated before implementation.

Finally, it is clear that the load and demand on the system will continue to increase with the growth of digitization (including data center load growth) and electrification (including increased growth of electric vehicles and electric appliances). While utilizing efficient equipment can help reduce the total demand, significant growth is still expected in the upcoming years. This increased demand on the system, coupled with the changing resource mix and increased reliance on variable resources and natural gas, means that balancing and forecasting is becoming more complex, and keeping that balance between supply and demand is essential to reliability. For additional information on risks associated with the changing resource mix and the increase in demand, the NERC reliability assessments⁵ are available as a resource. These assessments are well-known resources for policymakers, regulators, and industry stakeholders, and they evaluate various factors, including the reliability impacts of the retirement of conventional generation, such as coal and nuclear, and the addition of new, inverter-based resources. They also consider severe weather scenarios, incorporating generation outages under peak load conditions.⁶ Regional Entities like RF also conduct reliability assessments specific to their regions.⁷ Thank you and please feel free to reach out to us with any questions. We are pleased to serve as a technical resource for the states on key reliability topics.

⁵ See NERC's reliability assessments [here](#).

⁶ Areas of the United States at risk of extreme weather impacts are identified in NERC's Winter and Summer Reliability Assessments. See NERC's [2023/2024 Winter Assessment](#), and [NERC's 2024 Summer Assessment](#).

⁷ See RF's latest Summer Reliability Assessment [here](#).