"Enhancing America's Grid Security and Resilience"
June 16, 2023

Before the Subcommittee on Energy, Climate, & Grid Security
U.S. House of Representatives
Field Hearing, Moore County, NC

Testimony of Timothy Ponseti
Vice President, Operations
SERC Reliability Corporation

Introduction

Thank you for the opportunity to participate in this very important Field Hearing focused on enhancing America's grid security and resilience. My name is Tim Ponseti, and I am the Vice President of Operations at SERC Reliability Corporation.

SERC is one of the six North American Electric Reliability Corporation[1] (NERC) Regional Entities responsible for preserving and enhancing the reliability, resilience, and security of the Bulk Power System (BPS).[2] Collectively, NERC and the Regional Entities comprise the Electric Reliability Organization (ERO) Enterprise. With specific authorities under the Federal Power Act and through a delegation agreement with NERC, SERC's mission serves the public good and supports health and safety by assuring BPS reliability for over 91 million customers in all or part of 16 states. SERC is responsible for auditing and enforcing the NERC Reliability Standards for more than 280 registered entities in its footprint - entities which include Regional Transmission Organizations, utility

[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 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] See the appendix for a map depicting the footprints of NERC and the Regional Entities.

companies, and generator owners and operators. SERC conducts independent Reliability Assessments of our region based upon engineering studies and analyses. SERC also provides outreach, training, and education to those same registered entities, conducts technical outreach with state public utility commissions, legislators, and other stakeholders to foster a common understanding of current and emerging risks.

SERC is an independent resource for its stakeholders. SERC's essential mission is the effective and efficient reduction of risks to the bulk power system. SERC's staff is comprised of credible and expert subject matter experts, with a wealth of industry experience such as power system engineers, control area operators, federal law enforcement, and forensic cyber experts, as well as data analysts, auditors, attorneys, and others. SERC participates with the Federal Energy Regulatory Commission (FERC) and NERC on inquiries, task forces, and working groups, and has a balanced and objective perspective working on the complex challenges we face today. SERC's independence is critical to the success of its mission, as it is this independence that fosters credibility in the discussion of best practices in the reduction of risk and the elevation of overall grid reliability, resilience, and security.

SERC's Reliability Corporation's Role in Shining a Light on Top Regional Reliability Risks to the Bulk Electric System

As a Regional Entity in the ERO Enterprise, SERC has a geographically broad and organizationally diverse view of the risks that affect the Registered Entities entrusted to our oversight. Unlike the

Registered Entities themselves, SERC does not directly operate, plan, or maintain the Bulk Power System. Rather, SERC leverages its highly knowledgeable and expert staff to identify emerging risks, recognize known risks, and "shine a light" on those risks to show the entities what we see. This in turn helps the entities prioritize mitigation strategies to eliminate those risks.

The tools SERC utilizes to identify risks are numerous. One very effective tool is SERC's community of Technical Committees[3], the forum in which SERC engages the reliability expertise of its member companies. Every year, SERC staff engages these robust committees, to identify the top regional risks facing its footprint. These 30 or so risks are then carefully sorted through, discussed, and ranked in a regional risk report that highlights (shines a light on) the top risks to the SERC region along with mitigation actions to address those risks. The final 2022-2023 SERC Regional Risk report was approved in December 2022, and posted to SERC's website, along with an Executive Summary. A copy of the Executive Summary is included as Appendix A.

The Top Ten SERC Regional Reliability Risks identified in the 2022-2023 Regional Risk Report, and explained in more detail in the Executive Summary attached as Appendix A are as follows:

1. Supply Chain
2. Exploitation of Vulnerabilities
3. Shortage of Required Skillsets
4. Resource Uncertainly / Changing Resource Mix
5. Extreme Weather

[3] SERC's Technical Committees consist of the Engineering Committee (EC), the Operations Committee (OC), and the Critical Infrastructure Protection Committee (CIPC).

6. Legacy Architecture
7. Extreme Physical Events (Man-Made), Sabotage & Attacks
8. Fuel Diversity and Fuel Availability
9. Variable Energy Resources Integration
10. Parallel / Loop Flow Issues

The SERC Team, along with its Technical Committee members, also identified seven Common Themes and Emerging Trends among all the Risks:

1. Increased security risks (both cyber and physical) – Sabotage and Attacks were among the highest ranked risks identified (Supply Chain, Exploitation of Vulnerabilities, Legacy Architecture, and Extreme Physical Events).

2. Finding individuals with the required knowledge and experience to meet the needs of the evolving electric industry has become a challenge with the societal changes that are facing our workforces today (Shortage of Required Skill Sets).

3. The SERC Region remains susceptible to multiple types of Extreme Weather, which coupled with other risks such as loss of situational awareness, fuel diversity and availability, variable energy integration and others poses a high risk to reliability of the BPS (Extreme Weather, Fuel Diversity).

4. The increase in natural gas as a fuel and the increase of renewable generation, coupled with the decline in coal-fired generation, present new operational and

planning risks (Fuel Diversity, Supply Chain, Resource Uncertainty, and Variable Energy Resource Integration).

5. The importance of emerging technologies and how best to incorporate them will influence the reliability and security of the BPS (Resource Uncertainty, Legacy Architecture, and Variable Energy Resource Integration).

6. Significant changes to the grid require new models, analyses, and tools for reliable integration (Variable Energy Resource Integration).

7. The changes in generating technologies, fuel types, and weather conditions result in evolving operational challenges that our control room staff must address (Resource Uncertainty, Variable Energy Resource Integration, and Parallel/Loop flow issues).

SERC's Reliability Corporation's Role in Physical Attacks on the Bulk Power System

Along with the Electric Reliability Organization (ERO) and the policy makers present here today, SERC shares a deep concern for the recent increase in physical attacks on electricity infrastructure. The Electricity Information Sharing and Analysis Center (E-ISAC) reported an increase of over 10% in physical security incidents from 2021 to 2022. The recent uptick in ballistic and physical attacks, particularly in clustered and coordinated events, is an area of real concern.

As mentioned above, SERC has a number of tools in place that we use to help shine a light on the measures that can be taken to prevent attacks such as the one that occurred in Moore County in December 2022. In this specific instance, one such tool is the rapid deployment of internal SERC resources. Following the Moore County attacks, SERC assembled a Physical Security Substation task force, consisting of physical security experts, compliance experts, and all communication and response teams that are involved with physical security events.

The SERC team has remained focused on developing a detailed understanding of the recent physical attacks on substations to identify potential solutions. SERC does this by aggregating and reviewing data related to these events and taking a holistic approach to the physical security issues. Ultimately, SERC's team will identify training and outreach solutions that will elevate the physical security skills and aptitude in the SERC Region to help keep the system more secure. The SERC team has also identified a list of best practices to include design basis threats along with an overall assessment and application of tools such as Vulnerability of Integrated Security and Analysis, which is recommended by the United States Department of Energy (DOE).

Two recent outreach events that SERC conducted as a result of the task force's work were focused on Insider Threats and Control Room Security, hosted in 2022, and on Substation Security, hosted in 2023. Currently, SERC's Physical Security Team has delivered 2 focused physical security workshops, aimed at raising the awareness and overall level of physical security throughout all levels of the Bulk Electric System, with numerous requests pending.

SERC's Situational Awareness and Events Analysis department is also partnering with the NERC E-ISAC on information sharing, which allows SERC to promote increased engagement within the ERO Enterprise on outreach events. These outreach events and training sessions provide key aid in educating the stakeholder community, with the ultimate goal of keeping the bulk power system more reliable and secure.

Partnership with NERC and FERC on Next Steps

Given the recent increase in physical attacks on the BPS, the Federal Energy Regulatory Commission in December 2022 ordered NERC to conduct a study to examine the effectiveness of the CIP-014 Physical Security Reliability Standard. The Order directed NERC to address three questions:

1. Are the applicability criteria of the CIP-014 Reliability Standard adequate?
2. Is the risk assessment adequate, taking into account information gathered during compliance audits of the standard?
3. Should a minimum level of physical protection be established for all BPS transmission stations and substations and primary control centers.

NERC completed the study of the CIP-014 Reliability Standard, and additional actions are underway. Throughout the study process, and in subsequent actions, NERC has engaged the ERO Enterprise experts to support the study, mindful of the need for a risk-based approach in our response as well as the need to balance costs and scope of protecting the most critical assets to the BPS.

At FERC's April 20, 2023, Open Meeting, Jim Robb, NERC's President and CEO, provided a summary of the scope of the ERO Enterprise's work in response to FERC's questions around the CIP-014 Reliability Standard:

- With respect to the first question: NERC has determined that the applicability criteria meets the objectives of CIP-014 and no expansion of the CIP-014 standard applicability criteria is recommended at this time. This is because CIP-014 was conceived to identify critical assets that if rendered inoperable could result in instability, uncontrolled separation, or cascading system conditions. Data suggests that the overwhelming majority of the 345kv and all 500kv substations would be subject to the CIP-014 requirements. There is a possibility that with additional data and analysis, more substation configurations could warrant assessment under CIP-014. For this reason, the ERO Enterprise is committed to further studying this issue.

- With respect to the second question, NERC's findings demonstrate that the objective of the CIP-014 risk assessment requirements remains appropriate. However, NERC has stated that additional specificity is needed concerning expectations for the risk assessment used to identify which of the subset of applicable substations should be deemed "critical" under the standard. Specifically, data from the Compliance Monitoring and Enforcement Program found inconsistent approaches to performing the risk assessment, especially as it relates to dynamic studies. In some instances, entities did not provide the technical studies expected nor adequate justification for study decisions. For this reason, NERC submitted a standards authorization request for CIP-

014 revisions, stating that the CIP-014-3 risk assessment should be refined to ensure that entities conduct effective risk assessments of their applicable substations.

- Regarding the third question, NERC concluded that a common minimum level of physical security protection may not be needed at this time. While the ERO Enterprise is sensitive to potential human consequences to physical attacks on substations, we strongly recommend and believe in taking a risk-based approach to physical security of the electric grid. As Mr. Robb stated in his remarks to FERC, the high capital costs of physical security hardening of substations warrant appropriate risk analysis.

The CIP-014 Reliability Standard establishes appropriate baseline requirements to protect the most critical bulk power system substations. Substations outside of CIP-014 may create localized impacts if rendered inoperable but not the broad bulk power system events CIP-014 was designed to prevent.

The ERO Enterprise is committed to studying whether additional measures are needed. In furtherance of that commitment, NERC is working with FERC staff to hold a technical conference in August 2023 to discuss this issue further and potentially identify whether additional substations should be studied for inclusion in the applicability criteria of the CIP-014 Reliability Standard.[4]

[4] The FERC technical conference will cover four things: 1)Applicability – Correct facilities, correct weighting of Stations/substations, system configurations, should load loss be considered?; 2) Minimum level of Physical Protection – Mandatory minimum protections, flexible criteria versus bright-line, what is the reliability goal?; 3) Best practices and operational preparedness – Best practices around prevention, protection, response, and recovery, incident training for preparedness; and 4) Planning a more resilient grid and potential obstacles – cyber/physical security integrated with engineering?, reducing critical substations?, TPL-001 modifications, Obstacles for developing a more resilient grid.

Inclusion of additional substations in the applicability criteria of CIP-014 would be studied using a risk-based approach, being very mindful of cost/scope issues.

CONCLUSION

The impact of localized events such as the Moore County incident are high profile, deeply concerning events that result in unacceptable consequences to the people living in these areas. To the families and communities in Moore County, this incident could have resulted in loss of life sustaining capabilities and maintaining activities. The lack of heat, groceries, gasoline, and basic services are unacceptable consequences and can become critical for some individuals.

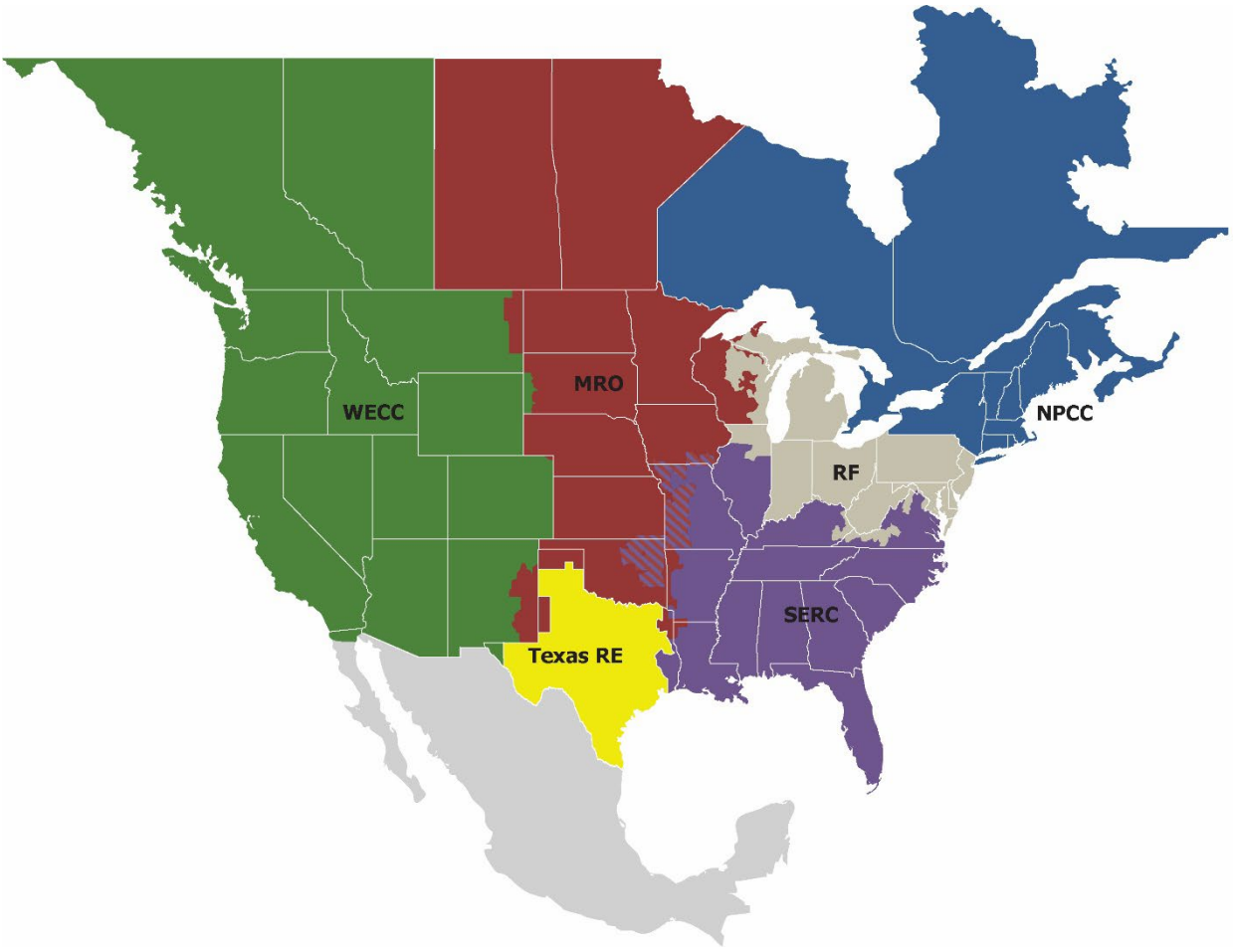
From a broader perspective, it is fortunate this attack did not result in severe impacts to the bulk power system at large – effects of the Moore County event were limited to local facilities in the Moore County area. Nevertheless, SERC is committed to working with its registered entities, NERC, and FERC to learn from this event, and continue its important mission of ensuring a highly reliable, resilient, and secure Bulk Electric System through all the means at our disposal, including education, outreach, and evangelizing best practices around physical security protections.

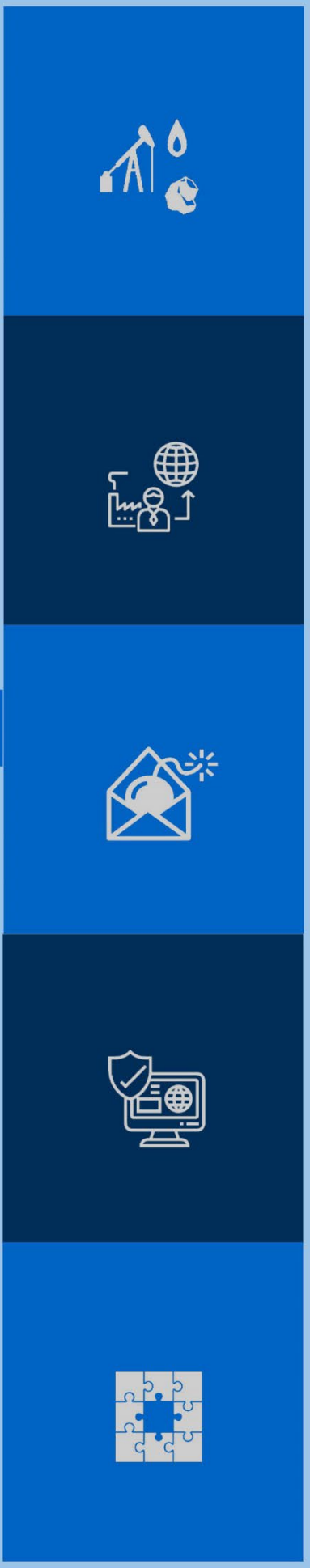
APPENDIX A

1. **MAP of entire NERC FOOTPRINT with the 6 REGIONS in NORTH AMERICA**

2. **SERC'S 2022-2023 REGIONAL RISK REPORT EXECUTIVE SUMMARY**

MAP of entire NERC FOOTPRINT with the 6 REGIONS in NORTH AMERICA





SERC

2022-2023 REGIONAL RISK REPORT

Executive Summary

Executive Summary

The Electric Grid is vital to our everyday lives and is fundamental for the health, safety, and well-being of our communities. A reliable and secure electric grid provides the platform for our economy, societal, and technological advancements. Increasing electrification of our communications, transportation, utilities, and environment has created dependence and reliance on the grid.

Grid reliability is an essential component of our national security and society. SERC's mission is to reduce risks to the reliability and security of the electric grid (also known as the bulk power system, or BPS) for today and the future. To accomplish this mission SERC works with its stakeholders through the technical committees and working groups to develop risk-based solutions to reliability and security concerns. The development of the Regional Risk Report is a key deliverable to support that effort.

In the review of SERC Reliability Risks the Engineering Committee (EC), Operations Committee (OC), and Critical Infrastructure Protection Committee (CIPC) separately identified the top Reliability Risks to the SERC Region from their perspectives. Then the groups collaborated to consider those risks that were significant for two or more of the technical committees and to determine the overall ranking for the most significant risks for the SERC Region.

THE 2022-2023 SERC TOP 10 REGIONAL RISKS

Figure 1: 2022-2023 SERC Top 10 Regional Risks

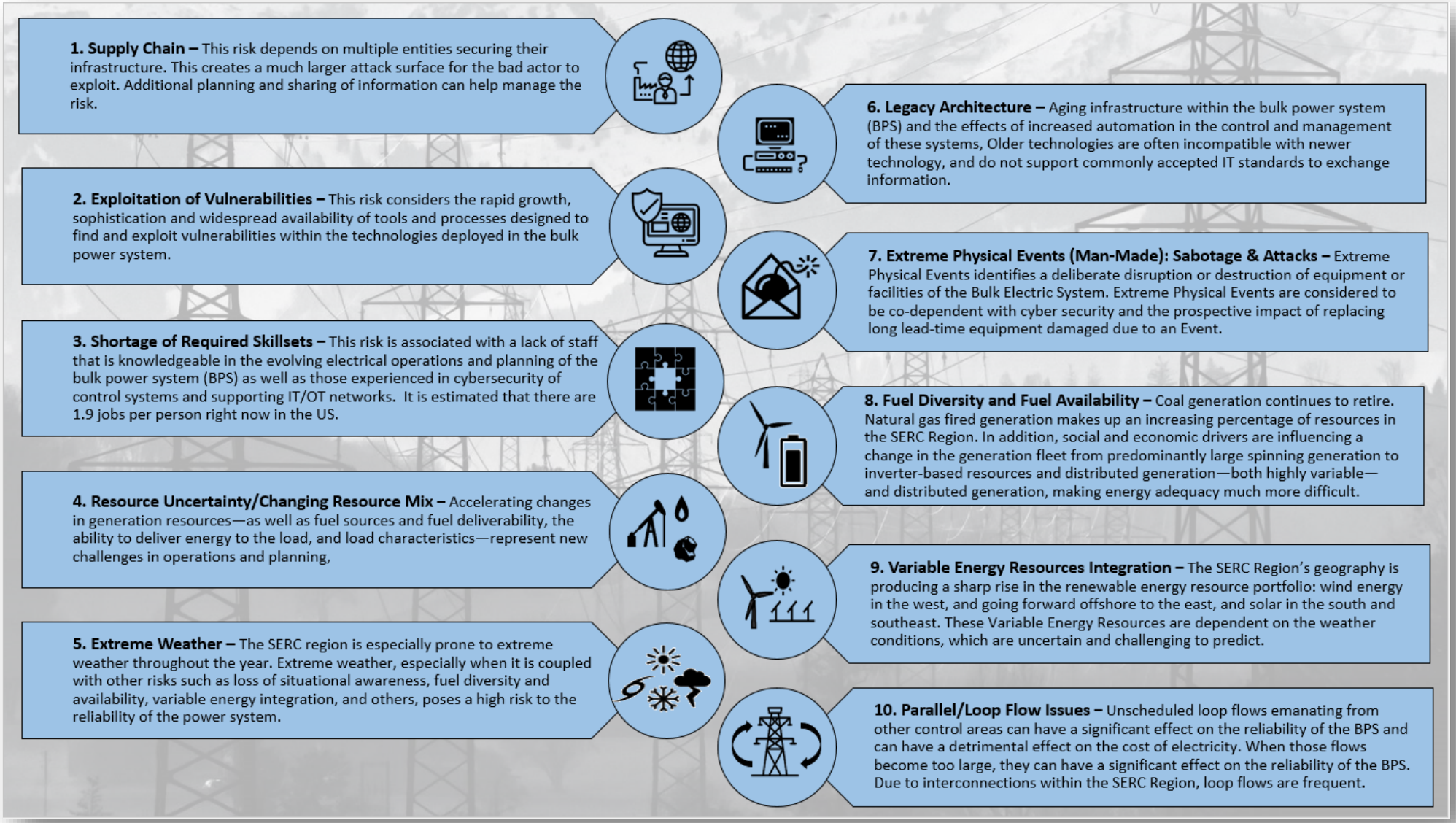
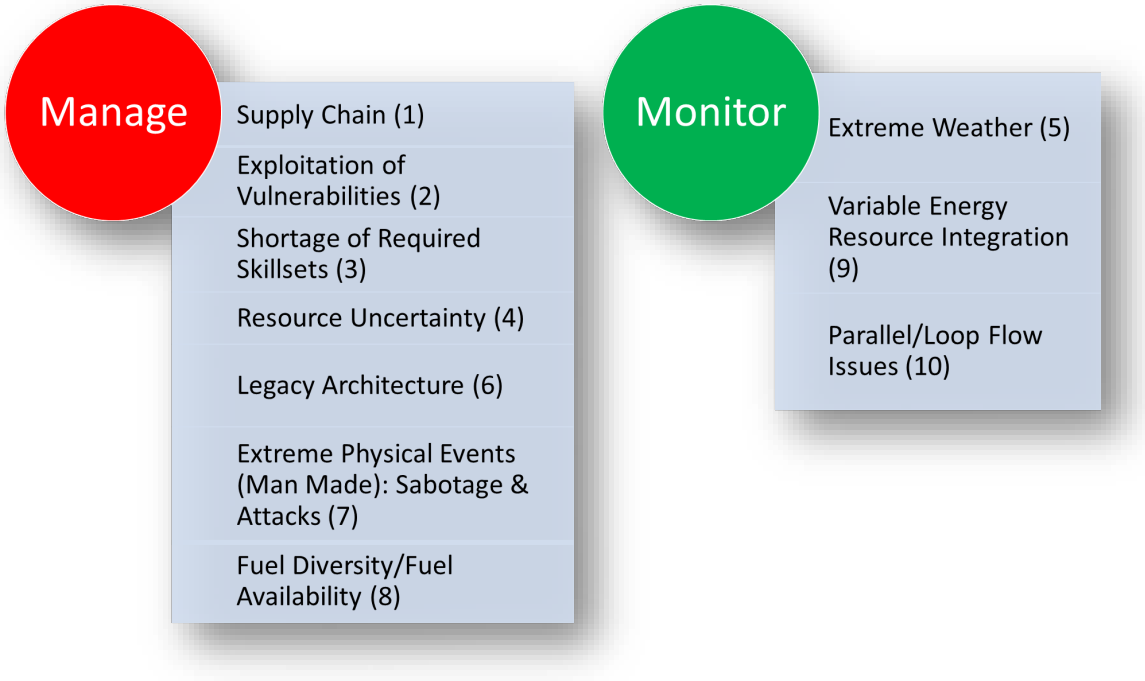


Table 1 displays the top identified SERC Reliability Risks and their risk status for the SERC Region. Each risk is given a status based on the Manage and Monitor definitions below.

Table 1: Top Ten Risks by Risk status



The **Manage** status group includes emerging risks where mitigation plans need to be developed and implemented, through SERC, NERC, or other Industry engagements, or additional mitigation plans need to be considered.

The Monitor status group includes risks for which mitigation plans and guidance are already in progress, and for which time is needed to allow mitigation actions to be implemented and evaluate the effectiveness of reducing risk.

SERC REGIONAL RISKS COMMON THEMES AND EMERGING TRENDS

The committee recommends the periodic evaluation of known and emerging risks, so that we can employ our resources to those risks that pose the greatest threat to security and reliability. The following common themes and trends were identified for the SERC Region:

- Increased security risks (both cyber and physical) – Supply Chain, Exploitation of Vulnerabilities, Legacy Architecture, and Extreme Physical Events (Man-Made): Sabotage & Attacks were among the highest ranked risks identified
- Finding individuals with the required knowledge and experience to meet the needs of the evolving electric industry has become a challenge with the societal changes that are facing our workforces today. – Shortage of Required Skillsets
- The SERC Region remains susceptible to multiple types of extreme weather. – Extreme Weather

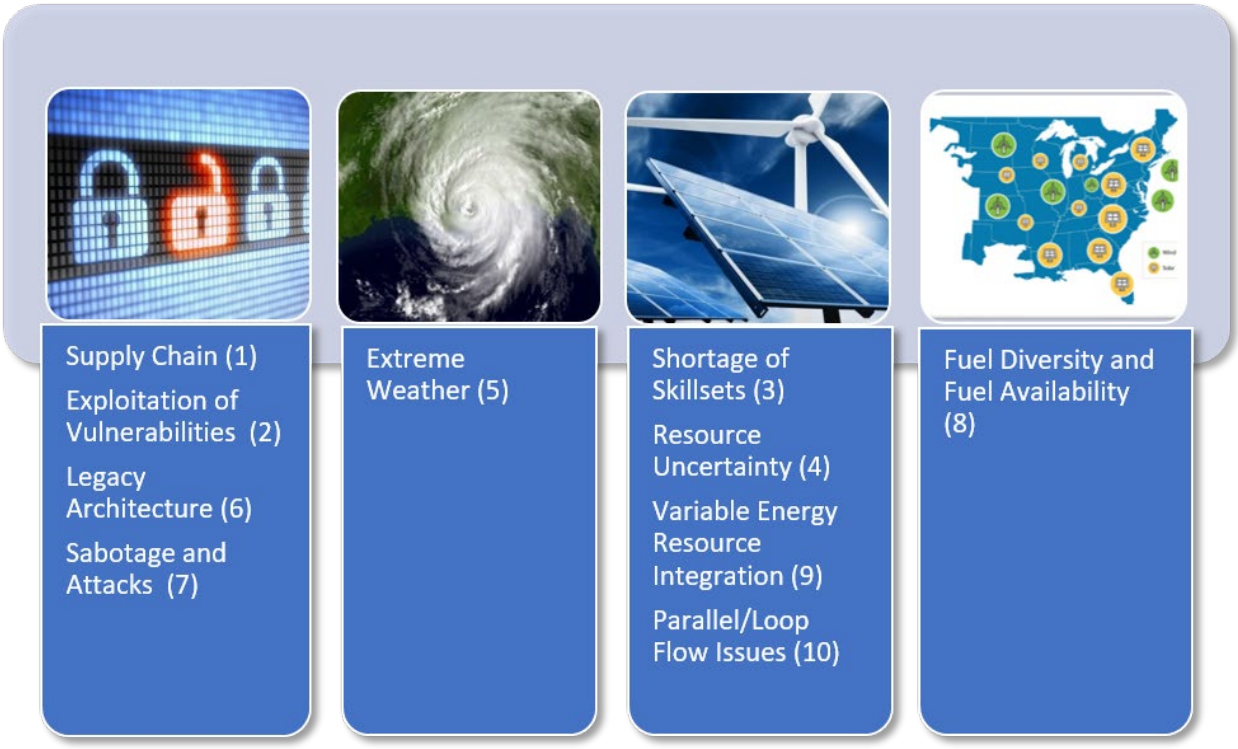
The increase in natural gas as a fuel and the increase of renewable generation, coupled with the decline in coal-fired generation, present new operational and planning risks,

which can be seen in the risks associated with Fuel Diversity, Supply Chain, Resource Uncertainty, and Variable Energy Resource Integration.

- The importance of emerging technologies and how best to incorporate them will influence the reliability and security of the bulk power system. – Resource Uncertainty, Legacy Architecture, and Variable Energy Resource Integration
- Significant changes to the grid require new models, analyses, and tools for reliable integration. - Variable Energy Resource Integration
- The changes in generating technologies, fuel types, and weather conditions result in evolving operational challenges that our control room staff must address. - Resource Uncertainty, Variable Energy Resource Integration, and Parallel/Loop flow issues

Figure 2 shows how the SERC Regional Risks map to the 2021 ERO Reliability Risk Priorities Report[5] high-level risk categories.

Figure 2 SERC Risks by ERO Reliability Risk Categories



[5] 2021 ERO Reliability Risk Priorities Report - RISC Approved July 2021, Board Approved August, 2021

CONCLUSION

The SERC Regional Risk Report groups our top ten Regional risks into four categories: Security, Grid Transformation, Extreme Natural Events, and Critical Infrastructure Interdependencies.

SERC's highest Regional risks are in the area of Security where the technologies and associated challenges continue to evolve rapidly. Supply Chain has seen a significant increase in challenges in the post pandemic world. The global supply chain is experiencing increased pressures because of political tension in areas that supply natural resources and manufactured components essential to the electric industry. In addition, the Shortage of Required Skillsets has been heightened by post-pandemic societal shifts (e.g., "The Great Resignation"). Together, these two risks compound the challenges to planning, constructing, maintaining, and operating key systems in the electrical grid.

SERC further notes that the interdependencies between the four categories and the individual risks themselves add increased complexity to both understanding the actions needed to mitigate the risks and the likelihood that a risk may become more impactful in the future.
Continued focus on the interdependent nature of the highest risks going forward, as well as a commitment to mitigation and regularly evaluating the effectiveness of implemented mitigation strategies are key to addressing these risks and understanding emerging risks across the SERC Region.